MINNESOTA DEPARTMENT OF HEALTH 2003 GASTROENTERITIS OUTBREAK SUMMARY

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

Compiled by:

Minnesota Department of Health
Infectious Disease Epidemiology, Prevention and Control Division
Acute Disease Investigation and Control Section
Foodborne, Vectorborne, and Zoonotic Diseases Unit
717 Delaware Street S.E.
Minneapolis, MN 55414
Phone: (612) 676-5414
Fax: (612) 676-5730
Internet: www.health.state.mn.us

Minnesota Department of Health
2003 Gastroenteritis Outbreak Summary

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MINNESOTA DEPARTMENT OF HEALTH
2003 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.

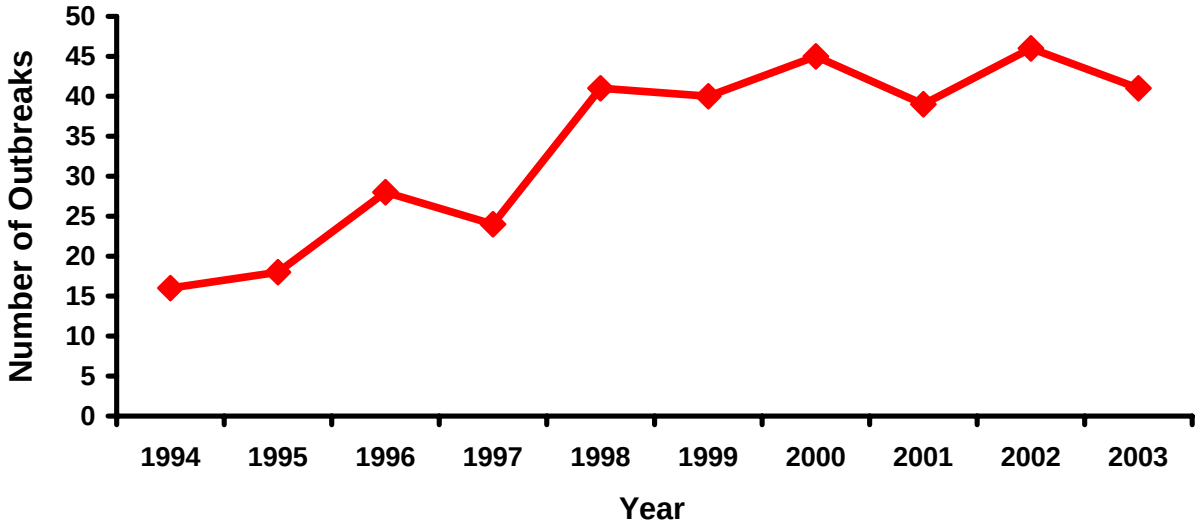
CONFIRMED AND PROBABLE NON-FOODBORNE, NON-WATERBORNE OUTBREAKS

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 2003, the Minnesota Department of Health (MDH) Acute Disease Investigation and Control Section identified a total of 108 outbreaks of gastroenteritis involving at least 3,358 cases of illness. The 108 outbreaks were classified as follows (see page 1 for definitions): 41 confirmed foodborne outbreaks, 15 probable foodborne outbreaks, two confirmed waterborne outbreaks, and 50 non-foodborne, non-waterborne gastroenteritis outbreaks. During the past 10 years, the median number of confirmed foodborne outbreaks identified per year was 39 (range, 16 to 46). During the past 5 years, the median number of confirmed foodborne outbreaks identified per year was 40 (range, 39 to 46). The median number of cases of illness identified per confirmed foodborne outbreak in 2003 was eight (range, one to 81).

Number of Confirmed Foodborne Outbreaks Per Year, Minnesota, 1994-2003



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 2003, 14 (34%) of the 41 confirmed foodborne outbreaks were initially reported to MDH via the hotline.

Of the 41 confirmed foodborne outbreaks, 16 (39%) were either laboratory-confirmed (n=14) or epidemiologically defined (n=2) outbreaks of norovirus gastroenteritis. Twelve (29%) of the confirmed foodborne outbreaks were attributed to bacterial intoxications (caused by *Clostridium perfringens*, *Staphylococcus aureus*, or *Bacillus cereus*). There were four (10%) confirmed foodborne outbreaks due to *Salmonella*, and one outbreak that involved both *Salmonella* and *Campylobacter* infections. Three of the confirmed foodborne outbreaks were caused by scombroid toxin, two were caused by *E. coli* O157:H7, one was caused by *Cryptosporidium*, and two confirmed foodborne outbreaks were of unknown etiology.

The importance of norovirus as a cause of foodborne disease outbreaks in 2003 continues a pattern that has been observed for over two decades in Minnesota. During 1981-2003, 239 (47%) of 506 confirmed outbreaks of foodborne disease were due to norovirus, while 104 (20%) confirmed foodborne outbreaks were caused by infectious bacterial pathogens such as *Salmonella* and *E. coli* O157. Therefore, over this 23-year period the combined number of foodborne outbreaks due to infectious bacterial agents was less than half the number of foodborne outbreaks due to norovirus. A study by the Centers for Disease Control and Prevention found that norovirus was detected in 93% of outbreaks of nonbacterial gastroenteritis.[1]

Many outbreaks of norovirus are due to ill food workers handling ready-to-eat food items such as salads and sandwiches in restaurant or catering settings. In other foodborne norovirus outbreaks, ill or convalescent individuals contaminate shared food (e.g., self-serve food items in a 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, environmental contamination, and excluding ill employees from work until 72 hours after recovery.

After norovirus, the second leading cause of foodborne outbreaks in Minnesota in 2003 were bacterial intoxications caused by such pathogens 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 were four confirmed foodborne outbreaks due to *Salmonella* in 2003; three of the four were associated with restaurants. The causes of restaurant outbreaks of salmonellosis are often complex and can involve consumption of undercooked foods of animal origin, infected foodhandlers, cross-contamination between raw and ready-to-eat foods, 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 2003; one outbreak was linked to alfalfa sprouts consumed at chain restaurants, and the other outbreak was associated with frozen steaks sold by door-to-door vendors.

There were three outbreaks of scombroid poisoning associated with restaurants in 2003. Scombroid poisoning results from eating certain fish (most commonly tuna) that have not been kept at a safe temperature at some point between harvest and consumption.

There were two waterborne outbreaks identified by MDH in 2003; in both incidents, restaurant patrons who drank beverages dispensed from malfunctioning machines experienced acute copper toxicosis.

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

There were 50 non-foodborne, non-waterborne outbreaks of gastroenteritis identified in 2003. Four of these outbreaks were associated with animal contact, most notably two outbreaks of cryptosporidiosis associated with an educational farm program for middle school and high school students in a northern Minnesota school district. However, the majority of outbreaks in the non-foodborne, non-waterborne category were associated with person-to-person transmission of enteric pathogens in nursing homes, schools, daycares, and other facilities. The beginning of 2003 saw the continuation of a striking increase in the number of person-to-person outbreaks of norovirus gastroenteritis, primarily in nursing home settings. This increase, first observed in late 2002, was seen throughout the U.S. and may have been due largely to circulation of a specific strain of norovirus. For reasons that are unclear, norovirus outbreaks in nursing homes are most likely to occur during the winter months.

CONFIRMED FOODBORNE OUTBREAKS

(1)
Norovirus Gastroenteritis Associated with a Private Gathering

January Kandiyohi County

On Monday, January 6, 2003 the food safety coordinator from a grocery store in Willmar relayed a customer's complaint of foodborne illness to the Minnesota Department of Agriculture (MDA). According to the complainant, several employees from a Willmar area company had become ill with vomiting and diarrhea on Friday, January 3, after attending a company holiday party held on January 1. Food for this party consisted of cheese, sausage, and taco dip trays prepared and delivered by the grocery store's deli on January 1. Only employees who had attended the party became ill. MDA staff notified Minnesota Department of Health (MDH) epidemiologists of the complaint, and an outbreak investigation was initiated.

On Monday, January 6, names and numbers of party attendees were obtained from the company that hosted the holiday party, and a menu was obtained from the retail deli. Attendees were interviewed about illness history and food consumption using a standard questionnaire. A case was defined as a person who had attended the holiday party with subsequent onset of vomiting or diarrhea (≥3 stools in a 24-hour period). Three stool specimen kits were delivered to cases for bacterial and viral pathogen testing at the MDH Public Health Laboratory (PHL).

On Tuesday, January 7, an MDA sanitarian investigated the complaint at the retail deli, focusing on employee health and hygiene, food preparation practices, and equipment. An employee illness log was obtained with copies of 18 other orders placed by various groups for food trays prepared at the deli on December 31 and January 1.

Thirteen (100%) of 13 attendees were interviewed, and seven (54%) met the case definition. Two additional attendees reported onset of mild illness symptoms that did not meet the case definition and were removed from the analysis. The median incubation was 36.5 hours (range, 31.5 to 48.5 hours). The median duration of illness was 23 hours (range, 11 to 65 hours). Four (57%) of seven cases were female; three (43%) were male. One (14%) of 7 cases was 5 to 19 years of age, five (72%) cases were 20 to 49 years old, and one (14%) case was >50 years old. All seven cases reported diarrhea, and six cases reported vomiting, fever, and stomach cramps. The MDH PHL received two of three stool specimens, and both were positive for norovirus. No food items were statistically associated with illness (there were only four non-ill controls).

An attendee reported onset of vomiting and diarrhea on December 31, a day before the company holiday party, and again on January 3, like the six other cases. This attendee also reported gastrointestinal illness in household members from December 16 to December 20.

Contacts for seven of the 18 orders were interviewed about illness history. Two of the seven contacts reported gastrointestinal illness among three persons; one met the case definition and two were not interviewed. Both orders were prepared on December 31, neither by the employee who prepared the order for the company party. No contact information was available for six orders, and calls were not returned from contacts for the remaining five orders.

A deli employee, who prepared the food trays for the company party and an order for another group on December 31, reported diarrhea onset in a household member on December 31. The contact for the other order prepared by this employee reported no known illness among the group. No gastrointestinal illnesses were identified among other deli employees who worked on December 31 and January 1, or their household members.

This was an outbreak of norovirus gastroenteritis associated with a private gathering with food. The source of contamination and vehicle of transmission were not confirmed. Possible sources of food contamination included an ill party attendee and a food employee with an ill household member.

(2)
E. coli O157:H7 Infections Associated with Alfalfa Sprouts

January — Hennepin and Ramsey Counties

On February 14, 2003, through routine surveillance of *E. coli* O157 isolates submitted from clinical laboratories, the Minnesota Department of Health (MDH) identified a cluster of five *E. coli* O157 case-isolates with an indistinguishable pulsed-field gel electrophoresis (PFGE) pattern.

During February 14 to 18, MDH conducted a case-control study based on hypotheses generated from standard enteric pathogen interviews of the first four cases. A case was defined as a Minnesota resident with a culture-confirmed *E. coli* O157 infection with illness onset after January 1, 2003 and with an isolate matching the outbreak PFGE subtype. Two age-matched controls were selected for each case by sequential digit dialing anchored on the case's telephone number. Using the same format as the cases, controls were asked about specific foods they had eaten and any restaurant exposures for the week before illness onset of the matched case. Additionally, the interview included questions about food consumption at 22 chain restaurants, because initial case interviews suggested a common exposure to one of two restaurant chains. Potential controls were excluded if they reported traveling outside Minnesota in the month before the case's illness onset date, or if they reported any diarrhea (≥3 loose stools in a 24-hour period) or anyone in their household with an *E. coli* O157 infection in the month before the case's illness onset date.

PFGE testing after digestion with the enzyme *Xba*1 was performed on all *E. coli* O157 isolates received at MDH, and those with the pattern common to this cluster were designated MN726. All MN726 isolates were also tested by PFGE after digestion with a second enzyme, *Bln*1. *E. coli* O157:H7 (motile) MN726 isolates indistinguishable by PFGE after digestion with *Bln*1 were designated PulseNet pattern EXHX01.1424. *E. coli* O157:NM (non-motile) MN726 isolates indistinguishable from the motile strains by PFGE after digestion with *Bln*1, were designated PulseNet pattern EXNX01.0116.

Investigators from the Minnesota Department of Agriculture (MDA) and sanitarians from Minneapolis Environmental Health and Hennepin County Epidemiology and Environmental Health participated in the traceback investigation. MDA inspected the sprouter-grower plant on

February 17, and sampled seeds, sprouted seeds, and irrigation water. The Food and Drug Administration (FDA) collected environmental samples for culture from the sprouter-grower plant on March 4.

Five primary cases and two secondary cases were identified. *E. coli* O157 MN726 isolates from cases two, three, four and five were motile and designated PulseNet pattern EXHX01.1424. *E. coli* O157 MN726 isolates from case one, and two family members of case five were non-motile and designated PulseNet pattern EXNX01.0116. All seven case-isolates were indistinguishable by PFGE testing with two enzymes, *Xba*1 and *Bln*1. Illness onset dates for the five primary cases ranged from January 15 to February 2. The median age of the five primary cases was 30 years (range, 21 to 57 years); four cases were female and one was male. All seven cases reported diarrhea, three (43%) with blood. All seven cases reported cramps, four (57%) reported fever, and one (14%) reported vomiting. Two cases were hospitalized for 3 and 5 days, respectively, and two additional cases visited an emergency room.

Three of the first four primary cases reported eating sandwiches with alfalfa sprouts and lettuce at a chain sandwich restaurant (two cases each ate at a different restaurant in the chain) or a chain bagel restaurant (one case). Meal dates for the three ranged from January 10 to January 29. The restaurants were all in the Minneapolis-St. Paul metropolitan area. The fourth case ate regularly at the same chain sandwich restaurant, and when she did she typically ordered a sandwich with sprouts. However, she could not recall eating there the week before illness onset. The fifth case in the initial cluster was a 6-year-old male with illness onset on February 8. His mother reported a diarrheal illness with onset on February 1. She ate at a different location of the bagel restaurant chain on January 30, and had a bagel with alfalfa sprouts and lettuce. The 6-year-old was classified as a secondary case. There appears to have been secondary transmission to another child as well, a 3-year-old sister with illness onset on February 5. The outbreak strain of *E. coli* O157:NM was isolated from stool samples submitted by this child and the mother, collected on February 17 and February 24, respectively. Neither of the children reported sprout or lettuce exposures in the week prior to illness onset.

In the case-control study, three of four cases reported eating sprouts during the week before illness onset, compared to zero of eight controls (odds ratio [OR], undefined; 95% confidence interval [CI] lower limit, 1.7; p=0.01). Alfalfa sprouts were the only food item statistically significantly associated with *E. coli* O157 MN726 infection. Four of four cases reported eating lettuce compared to seven of eight controls (OR, undefined; 95% CI lower limit, 0.01; p=0.72).

Sprouts from the four different restaurants identified by cases were traced back to the same distributor, then to a single sprouter-grower plant in Minneapolis, and from there to a single seed distributor. The sprouter received 12,000 lbs of seeds from a Kentucky distributor on December 31, 2002. The seeds were from a single lot of 44,000 lbs of seed imported from an Australian seed producer; these seeds had been distributed nationwide, and only 220 lbs remained in Kentucky. Sprouts consumed by case-patients at all four restaurants were traced to this lot of 44,000 lbs of seed.

The MDA cultures of samples of sprouts, irrigation water, and remaining seed at the sprouter plant were negative for *E. coli* O157. Results of the FDA's March 4 cultures of environmental samples could not be obtained.

Two problems pertaining to disinfection of seeds were identified by MDA during inspection of the sprouting plant: inadequate concentration of chlorine (the sprouter's process achieved 15,000 ppm rather than the FDA requirement for 20,000 ppm chlorine) and inadequate agitation of the seeds with the chlorine solution. The Minneapolis sprouter voluntarily stopped production of alfalfa sprouts, and cleaned and disinfected the plant. The remaining 8,000 lbs of seed from the lot was returned to the Kentucky distributor. After inspection by MDA on February 21, the sprouter resumed production with a new lot of seeds.

This was an outbreak of infections with *E. coli* O157, motile and non-motile strains, associated with consumption of sprouts traced to a Minneapolis sprouter-grower plant. Deficiencies in disinfection of the seeds prior to sprouting were discovered and corrected.

(3)
Suspected Bacterial Intoxications Associated with a Restaurant

January Hennepin County

On January 22, 2003 the City of Minneapolis Division of Environmental Health received a complaint of illness from an individual who ate at a Minneapolis restaurant on January 21. A sanitarian from the City of Minneapolis visited the restaurant on January 23 and interviewed the restaurant manager. The restaurant manager reported that the restaurant had received two other complaints from three additional patrons who ate at the restaurant on January 17 and January 23. The manager reported that all of the complainants had eaten the falafel sandwich, which was served with hummus, tabouleh, and eggplant-tomato-tahini dressing. This item was removed from the menu during the outbreak investigation. The sanitarian interviewed the additional complainants on January 23. A case was defined as a person with onset of vomiting or diarrhea (≥3 loose stools in a 24-hour period) after eating at the restaurant. One stool sample was collected from an ill patron. Samples of falafel and hummus served on January 21 were collected for testing.

All four complainants were interviewed, and all four reported vomiting, diarrhea, and chills/hot flashes. Two of four (50%) cases reported abdominal cramps. The median incubation period was 2 hours (range, 1.5 to 3.5 hours). The median duration of illness was 8.5 hours (range, 7.5 to 39 hours). The cases all reported eating a falafel with eggplant-tomato-tahini dressing, hummus, and tabouleh. None of the cases' four dining companions became ill; none of the companions had consumed the falafel meal.

The manager and sanitarian discussed the food preparation procedures used to make the falafel, dressing, hummus, and tabouleh. Two separate batches of falafel were served on January 17 and January 21. During the course of the discussion, the sanitarian noticed that the dishwasher had a bandaged cut covered by a finger cot. The dishwasher reported that she made the falafels and formed them by hand before they were deep-fried for 4 minutes. The dishwasher reported

wearing gloves while preparing the falafels. The sanitarian recommended that the dishwasher wear gloves while in the kitchen and be removed from all food preparation duties until her cut had healed. In addition, the sanitarian discussed the need to monitor the cooling process for ingredients used to make the hummus and tabouleh.

The food samples and the stool sample tested negative for *Salmonella, Shigella, E. coli* O157:H7, *Staphylococcus aureus* and *Bacillus cereus* at the City of Minneapolis laboratory. The falafel and the stool sample were sent to the Minnesota Department of Health Public Health Laboratory (MDH PHL) where both tested negative for *S. aureus, B. cereus,* and *Clostridium perfringens* organisms and toxins. The samples were not tested for *Salmonella, Shigella, E. coli* O157:H7, or norovirus at the MDH PHL.

This was an outbreak of foodborne intoxication among persons who ate at restaurant. Based on the environmental investigation and the incubation periods and symptoms of the cases, this outbreak was most likely caused by *S. aureus* or *B. cereus*.

(4)
Suspected Bacterial Intoxications Associated with a Restaurant

March Ramsey County

On Friday, March 14, 2003 the Minnesota Department of Health (MDH) received an illness complaint through the foodborne illness hotline from a group of people who shared a meal at a restaurant in Roseville on March 11. The group denied any previous common contact. MDH interviewed the patrons to assess symptom histories and foods consumed at the restaurant. A sanitarian from Ramsey County visited the restaurant on Friday, March 14 and again on Monday, March 17. A case was defined as a person with vomiting or diarrhea (≥3 stools in a 24-hour period) after eating at the restaurant. No stool samples were collected from symptomatic individuals due to the length of time that had passed from the illness recovery dates to notification of MDH.

Five patrons were interviewed by MDH. Four patrons reported symptoms; however, one did not meet the case definition and was removed from analysis. Three cases reported diarrhea, and two reported cramps. None reported vomiting or fever. The incubation period ranged from 8 to 13 hours. Duration of illness ranged from 13 hours to 32 hours. The patrons reported eating a variety of items including Bourbon chicken, bistro chicken, spicy chicken, yellow rice, ziti salad, and Caesar salad.

During the environmental assessment of the establishment, Ramsey County sanitarians found food handling deficiencies in the preparation and holding of the rice. The rice is prepared in the morning and then remains at room temperature throughout the day. The temperature of the rice was 73ºF at 2:30 p.m. One of the employees mentioned that she ate some of the same food served to the patrons and become ill with diarrhea approximately 7 hours later. Ramsey County sanitarians issued orders requiring the restaurant to change cooling procedures for the rice, and comply with the provision requiring a Certified Food Manager.

The vehicle and etiology of this outbreak were not determined. However, the symptoms were compatible with a foodborne bacterial intoxication caused either by *Clostridium perfringens* or the diarrheagenic form of *Bacillus cereus*. Given the temperature abuse of the rice, it is a plausible vehicle for this outbreak.

(5)
Norovirus Gastroenteritis Associated with a Banquet

March Becker County

On Thursday, March 27, 2003 the Minnesota Department of Health (MDH) foodborne illness hotline received two separate complaints from persons who attended a banquet held at a banquet facility in Detroit Lakes on the evening of Saturday, March 22. The initial complaints were that approximately 12 of the over 130 banquet attendees subsequently became ill with gastrointestinal symptoms. An investigation was initiated in collaboration with an MDH West Central District sanitarian.

Epidemiologists interviewed attendees by phone about food consumption and illness history. A case was defined as any person who attended the banquet and subsequently developed vomiting or diarrhea (≥3 loose stools in a 24-hour period). Stool kits were provided to seven cases. On March 27, the sanitarian conducted an environmental investigation at the banquet facility and spoke with the cook about recent illnesses and foodhandling procedures. The names and phone numbers of the restaurant employees were obtained by the sanitarian.

Eighty-five attendees were interviewed; 41 (48%) met the case definition, 38 (45%) had no symptoms, and six (7%) had symptoms that did not meet the case definition and were excluded from further analysis. Thirty-nine cases (95%) had diarrhea, 30 (73%) had cramps, 22 (54%) had vomiting, and 10 (24%) had fever. One case reporting visiting a health care provider, but none of the cases were hospitalized. The median incubation was 39.5 hours (range, 1 to 67 hours) and the median duration was 39 hours (range, 6 to 167 hours). At least two attendees reported recent gastrointestinal illness in their households during the week prior to the banquet, and there were additional anecdotal reports of concurrent gastrointestinal illnesses occurring in the larger community.

Seven cases submitted stool samples to the MDH Public Health Laboratory for bacterial and viral testing. All seven stools were negative for *Campylobacter*, *E. coli* O157, *Salmonella*, and *Shigella*. Four (57%) of the seven stools were positive for norovirus by reverse transcriptase-polymerase chain reaction (RT-PCR). The four cases that tested positive for norovirus lived in four different households. Gene sequence analysis of the RT-PCR products was conducted for three cases, and all three sequences were identical.

The food at the banquet was served buffet-style. Consumption of salad was significantly associated with illness (30 of 41 [73%] cases vs. 12 of 38 [32%] controls; odds ratio, 5.9; 95% confidence interval, 2.0 to 17.8; $p<0.001$). A food preparation review conducted by the sanitarian revealed that the salad was made from bagged lettuce salad mix combined with shredded red cabbage, lettuce, and carrots. After the ingredients were combined, the mixture

was rinsed and placed in large serving bowls. The six persons who were working at the restaurant at the time of the banquet were all interviewed. One worker reported gastrointestinal illness that had occurred 2 weeks prior to the banquet; the others all denied recent gastrointestinal symptoms in themselves or their household members. The restaurant had not received any other complaints from other banquet groups or individual patrons.

This was an outbreak of norovirus gastroenteritis associated with a buffet-style banquet held at a restaurant. Salad was implicated as the vehicle. The source of the viral contamination could not be confirmed.

(6)
Suspected Bacterial Intoxications Associated a Catered Dinner

March Mower County

On April 9, 2003 the Minnesota Department of Health (MDH) foodborne illness hotline received three independent complaints from people who had attended a dinner theatre on March 30 in Mower County. MDH began an investigation into the suspected foodborne outbreak and interviewed attendees about food consumption and illness history. A case was defined as a person with onset of vomiting or diarrhea (≥3 more loose stools in a 24-hour period) after eating at the dinner theatre on March 30. No stool or food samples were obtained for testing due to the delay in reporting. Onsite visits to the catering facility were made on April 10 and 11 by MDH sanitarians.

Fifty-two attendees were interviewed. Fourteen (27%) people met the case definition. An additional four people reported gastrointestinal symptoms that did not meet the case definition and were excluded from the analysis. All cases reported diarrhea and 12 (86%) reported cramps. One case (7%) reported having a fever. No cases reported vomiting or bloody stools. The median incubation period was 12.5 hours (range, 4 to 17 hours). The median duration of illness was 26 hours (range, 4 to 172 hours).

The dinner theatre was held at a community center in LeRoy on March 28, 29, and 30, and the dinner was catered by a company in Racine. The dinner was served family style and included cheese, crackers, sausage, chicken, steak, mashed potatoes, gravy, raspberry chutney, mixed fruit, coleslaw, rolls, butter, pickles, ice cream, cookies, and beverages. Consumption of raspberry chutney was marginally associated with illness (12 of 14 [86%] cases vs. 18 of 32 [56%] controls; odds ratio, 4.7; 95% confidence interval, 0.90 to 24.3; p=0.05).

During the environmental investigation, MDH sanitarians found that the caterer was licensed as a “small establishment”, not as a caterer. The food was prepared the day of the event, placed in hotboxes, and transported from Racine to LeRoy. The caterer denied that any leftover foods were reserved on subsequent days at the community center. The caterer denied any time/temperature abuse during the preparation and transport of the chutney.

The identified illnesses were consistent with an outbreak of foodborne bacterial intoxications by *Clostridium perfringens* or the diarrheagenic form of *Bacillus cereus*; however, since no stool or food specimens were obtained, the etiology of the outbreak could not be confirmed.

(7)
Norovirus Gastroenteritis Associated with a Restaurant

April Sherburne County

On April 9, 2003 the Minnesota Department of Health (MDH) received a complaint of gastrointestinal illness in several people that were part of group of 14 family members that ate at a restaurant in Elk River on April 5. The family members reside in different cities, and did not have any other common exposures. A review of complaints previously received by MDH identified that another group of three people became ill after eating at the same restaurant on February 23. An investigation was initiated on April 9. Names and phone numbers of persons in the group that ate at the restaurant on April 5 were obtained. Epidemiologists from MDH interviewed persons from the group by phone about food consumption and illness history. A case was defined as any person who developed vomiting or diarrhea (≥3 loose stools in a 24-hour period) after eating at the restaurant or who worked at the restaurant. Two stool specimens were obtained for bacterial and viral testing.

An MDH environmental health specialist inspected the restaurant on March 3, after the initial complaint. The environmental health specialist conducted another environmental assessment of the restaurant on April 10 and 11. During the assessment, managers and staff were instructed about excluding ill employees from work and proper handwashing technique. A menu review was conducted identifying foods that may have direct hand contact. Managers and staff were also instructed to clean and sanitize food contact surfaces with strong bleach solution, to wash all pans and utensils used with ready-to-eat (RTE) foods using the sanitizing rinse dishwasher, and to discard all RTE foods that were prepared or otherwise handled prior to April 11. Names and phone numbers of all employees were obtained. MDH environmental health specialist interviewed some restaurant employees about recent gastrointestinal illness and job duties during the assessment. MDH epidemiologists interviewed the remaining employees by phone. Stool specimen collection supplies were given to recently ill employees.

Names of patrons from credit card receipts were used to identify other patrons that ate at the restaurant from April 5 through April 7. Epidemiologists from MDH interviewed persons by phone about food consumption and gastrointestinal illness history.

Ninety people were interviewed. Fifty-eight of the 90 people interviewed were patrons that ate at the restaurant from April 1 through April 7 (all 16 people from the complaint and 42 people identified using credit card receipts). Thirty-two of the 90 people interviewed were employees of the restaurant. Three patrons were excluded from the analysis because they had mild gastrointestinal illness that did not meet the case definition or because they were classified as secondary cases. Of the remaining 87 people, 19 (22%) met the case definition, including eight employees and 11 patrons. Sixteen (84%) of the cases reported having diarrhea, nine (47%) reported vomiting, eight (42%) reported abdominal cramps, four (21%) reported fever, and one

(5%) reported bloody stools. One person reported visiting a health care provider. The median incubation period for patrons was 32 hours (range, 9 to 55 hours). The median duration of illness was 39 hours (range, 13 to 168 hours). The two stool specimens obtained from patrons (a case and a secondary case) were negative for *Salmonella*, *Shigella*, *Campylobacter*, *E. coli* O157 and *Yersinia*, but were positive for norovirus. None of the employees submitted specimens for testing. Patron cases had meal dates of April 1, 5, 6, or April 7. One employee reported having gastrointestinal illness with onset on February 24 and working during the course of her illness. Another employee reported having onset of gastrointestinal illness on March 1. The remaining six ill employees reported onsets of illness from April 1 through April 9.

Ill patrons consumed a variety of foods including cheeseburgers and chicken sandwiches, lettuce, tomato, pickles, onions, chicken strips, eggs, pancakes, sausage links, roast beef, meat loaf, mashed potatoes with gravy, coleslaw, onion rings, French fries, cottage cheese, mixed vegetables, salads, malts, lemonade, and coffee. None of the foods had a statistically significant association with illness. The environmental health assessment revealed that the procedure for cleaning the dicer and parts of the meat slicer did not include running them through the dishwasher or using the three-step sink process.

This was an outbreak of norovirus gastroenteritis associated with eating at a restaurant. The vehicle and source of contamination was not identified. A number of employees were ill with gastrointestinal symptoms, indicating transmission among workers. Infected workers most likely contaminated multiple foods eaten by patrons of the restaurant.

(8)
Infections with Multiple Enteric Pathogens Associated with Beef

April Olmsted County

On April 15, 2003 the Minnesota Department of Health (MDH) foodborne illness hotline received a call from an individual reporting gastrointestinal illness in 20 persons from eight different families. The families had eaten beef from a cow butchered on April 12 on a farm in Winona County. Five to six families contributed to the purchase of the cow and also participated in the butchering. Many of the families had been to the farm multiple times over the past 15-20 years to obtain beef.

The cow was shot, then laid on a tarp over a hay-covered barn floor. The families brought their own knives and equipment to skin the cow and cut the beef into portions. The beef was stored and transported in their own containers. Most of this group then went to a park in Winona County where some of the meat was barbecued and eaten. Also on April 12, in the evening, a party featuring the beef was held at the house of one of the families. In addition, several families took raw beef home and prepared it over the next 2 days in their homes by boiling or barbequing.

MDH notified Olmsted County Public Health Services (OCPHS) and the Minnesota Department of Agriculture. OCPHS staff contacted 11 families totaling at least 60 members, and interviewed 35 people about their illness histories and 3-day food histories using a standard questionnaire. A case was defined as a person who attended either gathering following the farm visit on April 12,

or who prepared the beef at home, and subsequently became ill with vomiting or diarrhea (≥3 loose stools in a 24-hour period). Stool specimens obtained from six ill persons (from four different families) were tested for *Salmonella, Campylobacter,* diarrheagenic *E. coli, Shigella,* and *Yersinia.*

Fifteen (43%) of 35 persons interviewed met the case definition. Seven additional individuals reported mild gastrointestinal symptoms that did not meet the case definition and they were not included in the analysis. Among cases, the median incubation period from the first meal was 35 hours (range, 6 to 108 hours). The median duration of illness was 74 hours (range, 12 to 214 hours). All 15 cases reported diarrhea, 11 (73%) reported abdominal cramps, 10 (67%) reported fever, nine (60%) reported chills, and one (7%) reported vomiting. Two cases were hospitalized for 3 days each.

Salmonella Somatic Group D (9,12: non-motile) was isolated from three persons tested, and *Salmonella* Enteritidis (motile) was isolated from the stool of one person. These four *Salmonella* isolates were indistinguishable by PFGE subtyping; thus they were genotypically indistinguishable, but phenotypically different in that three isolates were non-motile and one was motile. *Campylobacter jejuni* was isolated from the stool of two cases, including one case-patient co-infected with *Salmonella*. A sixth case tested positive for *Aeromonas hydrophilia*.

Consumption of cooked beef at any location was associated with illness (8 of 15 cases vs. 1 of 14 controls; odds ratio [OR], 14.9; 95% confidence interval [CI], 1.5-144.2; p=0.009). Consumption of a dish made of organ meats and boiled intestines was also associated with illness (7 of 10 cases vs. 1 of 14 controls; OR, 30.3; 95% CI, 2.6 to 732.1; p=0.002). No other food items served at the gatherings were associated with illness.

This was a foodborne outbreak of *Salmonella, Campylobacter* and *Aeromonas* infections associated with butchering a cow on a farm, and consuming the beef at various locations. A compliance officer from the Minnesota Department of Agriculture sent a letter to the farm operator warning him to cease slaughtering animals for consumption by others without first licensing his facility. The involved families were advised to dispose of any remaining meat.

(9)
Scombroid Poisoning Associated With Leftover Tuna

April Hennepin County

On April 30, 2003 the Minneapolis Division of Environmental Health (MEH) notified the Minnesota Department of Health (MDH) of a foodborne illness complaint involving a group of 10 people that had dined together at a Minneapolis restaurant on April 21. The complainant stated that symptoms had occurred in some of the diners as well as a household member of one of the diners who ate leftovers from the meal. The symptoms described by the complainant were consistent with scombroid poisoning. The restaurant had not received any other reports of illnesses. An MEH sanitarian and MDH epidemiologists interviewed diners by phone about food consumption and illness history.

The original complainant had eaten a tuna entrée at the restaurant on the evening of April 21. The next day, she ate the leftover tuna for lunch. She estimated that the leftover tuna had been left unrefrigerated for a few hours before lunch. Thirty minutes later, she had onset of headache, tachycardia, and flushing. She went to an urgent care clinic, and her symptoms resolved 3 hours later.

A second member of the group that ate at the restaurant on the evening of April 21 also brought home leftovers of the same tuna entrée. On April 25, this person's housemate, who had not eaten at the restaurant, consumed the leftover tuna. He stated that he had removed the tuna from the refrigerator and microwaved it for 2 minutes. Thirty minutes later, he had onset of pounding headache, tachycardia, dizziness, and urticaria. He took ibuprofen and an antihistamine, and his symptoms resolved 4.5 hours after onset. He thought that his housemate who had eaten at the restaurant had experienced diarrhea the night she ate at the restaurant, but we were unable to interview her about her symptoms.

A third member of the restaurant party reported eating mahi-mahi, but no tuna, at the restaurant. Twenty-four hours later, she had onset of headache and tachycardia. She said that she had not eaten any leftovers from her meal. This long incubation period was not consistent with scombroid poisoning.

Efforts to obtain contact information in order to interview the other diners from the group of 10 were unsuccessful.

The clinical and epidemiologic features of this outbreak were characteristic of scombroid poisoning. The vehicle was leftover tuna. Tuna are a known histamine-producing species of fish and have been associated with several past outbreaks of scombroid poisoning. The available information suggested that temperature abuse of tuna leftovers from a restaurant meal was the cause of the outbreak.

(10)
Norovirus Gastroenteritis Associated with a Church Supper

May Morrison County

On Monday, May 12, 2003 Morrison County Public Health Services (MCPHS) received reports of illness from people who had attended a church supper in Randall on Thursday, May 8. An investigation was initiated in collaboration with the Minnesota Department of Health (MDH) Acute Disease Investigation and Control Section. Epidemiologists interviewed attendees by phone about food consumption and illness history. A case was defined as any person who attended the dinner and subsequently developed vomiting or diarrhea (≥3 loose stools in a 24-hour period). Three cases sent stool samples to the MDH Public Health Laboratory for bacterial and viral testing.

Eighteen people attended the dinner, including one person who prepared the dinner and two people who assisted with serving and cleaning up. All eighteen attendees were interviewed; 14 (78%) met the case definition, three (17%) had no symptoms, and one (5%) had symptoms that

did not meet the case definition and were excluded from further analysis. The three persons who reported no symptoms were the same persons that prepared and served the dinner. All 14 cases (100%) had diarrhea, 12 (86%) had cramps, five (36%) reported fever, four (29%) had vomiting, and one (7%) reported bloody stools. One case visited an emergency room, but none of the cases were hospitalized. The median incubation period was 35 hours (range, 29 to 50 hours) and the median duration of illness was 53 hours (range, 3 to 72 hours). No attendees reported gastrointestinal illness in themselves or their household members during the week prior to the church supper. There were four possible secondary cases among household members of ill persons; these secondary cases did not attend the supper.

All three stool samples sent to MDH tested negative for *Campylobacter*, *E. coli* O157:H7, *Salmonella*, and *Shigella*. All three stools were positive for norovirus by reverse transcriptase-polymerase chain reaction (RT-PCR). The three cases that tested positive for norovirus lived in three different households. Gene sequence analysis of the RT-PCR products was conducted for three cases, and all three sequences were identical.

Foods served at the supper included ham, mashed potatoes, corn, Jell-O salad, rolls, cake, nuts, and mints served individually to attendees. Serving dishes were later passed around the table so attendees could help themselves to seconds. There was also a self-service tray that included pickles, carrots, celery, and dip. Because the three people who were involved with the preparation and service of the food were the only persons interviewed who did not report illness, statistical analysis of foods consumed was not possible.

This was an outbreak of norovirus gastroenteritis associated with a church supper. The food vehicle and the source of the viral contamination could not be determined.

(11)
Suspected Bacterial Intoxications Associated with a Mother's Day Buffet

May Anoka County

On May 12, 2003 Anoka County Community Health and Environmental Services (ACCHES) received a complaint of foodborne illness among five people who attended a Mother's Day brunch at the a restaurant in Fridley on May 11. The complainants resided in three separate households and denied any other common exposures.

ACCHES and Minnesota Department of Health staff interviewed the five patrons about food consumption and illness history. A case was defined as a person with onset of vomiting or diarrhea (≥3 loose stools in a 24-hour period) after eating at the restaurant. No stool or food samples were obtained. An onsite visit was made to the restaurant by an ACCHES sanitarian on May 12. The menu for the Mother's Day brunch was obtained, and general food preparation procedures were discussed.

Four of the patrons met the case definition. All four cases reported diarrhea, and three (75%) reported cramps. None reported vomiting or fever. The median incubation period was 10 hours (range, 7 to 14 hours). The median duration of illness could not be calculated as the patrons

were still experiencing symptoms at the time of their interviews. No additional patrons were interviewed. Patron lists were unobtainable as the restaurant said they did not take last names or telephone numbers with the reservation list, and they discarded credit card receipts at the end of each evening.

The buffet menu was extensive and included ham, prime rib, roast pork, baked chicken, fettuccini alfredo, crab legs, popcorn shrimp, mashed potatoes, gravy, fried potatoes, scrambled eggs, omelet, French toast, pancakes, syrup, sausage patty, sausage links, bacon, bread, rolls, bagels, muffins, chocolate mousse, layer cake, strawberry shortcake, and beverages. The restaurant claimed to use many pre-cooked items; however, no systematic food flows were conducted to determine food-handling practices.

The illnesses were characteristic of an outbreak of foodborne bacterial intoxications such as that caused by *Clostridium perfringens* or the diarrheagenic form of *Bacillus cereus*. However, since no stool or food specimens were obtained and no other patrons were interviewed, the etiology or source of this outbreak could not be confirmed.

(12)
Salmonella Enteritidis Infections Associated with Eggs

May St. Louis and Lake Counties

In June and July 2003, the Minnesota Department of Health (MDH) Public Health Laboratory received through routine surveillance seven isolates of *Salmonella* Enteritidis that were indistinguishable by pulsed-field gel electrophoresis (PFGE) using two different enzymes. This PFGE subtype of *S.* Enteritidis was designated SE1B1, the most common subtype of *S.* Enteritidis in Minnesota. Routine interviews of the cases by MDH epidemiologists revealed that three of the cases had patronized the same restaurant in Duluth (Restaurant A). The restaurant was contacted, and an investigation was initiated on July 11. Three additional cases in the cluster lived in the same area (Duluth or Silver Bay), but did not eat at Restaurant A. The seventh case lived in Polk County and did not travel to the Duluth area.

A confirmed case was defined as a person from whom SE1B1 was isolated since May 2003. Isolates from cases were sent to the Centers for Disease Control and Prevention for phage typing. A case-control study was conducted to determine if there was a statistical association between illness and eating at Restaurant A or other restaurants, or eating specific food items at home. All cases with the outbreak PFGE pattern identified through surveillance were included regardless of whether they reported eating at the restaurant or not. Three to four community controls were recruited per case using sequential digit dialing anchored on the case's telephone prefix and interviewed using the same interview form as that used for cases.

On July 11, an epidemiologist and environmental health specialists from St. Louis County conducted an environmental health evaluation of Restaurant A, reviewed food preparation procedures, observed cleaning of the facility, and reviewed work schedules for evidence of employee illness. Restaurant employees were interviewed about recent gastrointestinal illness. Restaurant employees with a history of any gastrointestinal illness since May 15 were asked to

submit stool specimens for *Salmonella* testing. The Minnesota Department of Agriculture initiated a traceback investigation of eggs used by Restaurant A, and eggs eaten by cases at home or at other restaurants.

Seven confirmed cases of *S.* Enteritidis SE1B1 infection were identified, with dates of illness onset ranging from May 13 to June 22. Three of the cases ate at Restaurant A in the week prior to their onset of illness. One case ate an omelet at the restaurant on May 26. The second case ate a club sandwich (turkey, bacon, lettuce and tomato) at the restaurant on June 7. The third case ate at the restaurant on June 14, and had a cheeseburger with lettuce, tomato, onions, French fries and coleslaw.

Of the cases that did not patronize Restaurant A, one case ate poached eggs at a restaurant in Lake County on May 15. One case lived in Duluth and ate an Asian restaurant on May 12. The third case only had fast-food restaurant exposure within the week prior to illness onset. The last case lived in Polk County, did not visit Duluth, and did not eat at any restaurants in the week prior to illness onset. Isolates from six of the seven cases were phage type (PT) 8. The isolate from the remaining case (from Polk County) was PT13a.

Of the six cases that matched by PFGE and phage typing, all reported diarrhea and fever (100%), five (83%) reported nausea, three (50%) reported vomiting, and three (50%) reported bloody stools. Duration of illness ranged from 7 to 23 days, with a median of 17.5 days. One case was hospitalized for 6 days.

The six persons from whom SE1B1 was isolated and that matched by phage typing (PT8) were included in the case-control study. Nineteen community controls were recruited and included in the study. Because of the small sample size, the study lacked power for a matched analysis. On unmatched analysis, eating at Restaurant A was significantly associated with illness (3 of 6 cases vs. 0 of 19 controls; odds ratio [OR], undefined; 95% confidence interval [CI], undefined; p=0.009; Logit OR, 39.0, Logit 95% CI, 1.63 to 932). Eating eggs at a restaurant was also associated with illness (4 of 6 cases vs. 1 of 18 controls; OR, 34.0; 95% CI, 2.4 to 475; p=0.007). No other exposures were significantly associated with illness.

Eighty-six of 101 (85%) Restaurant A employees were interviewed about illness history and work duties. Five of the 86 (6%) employees reported gastrointestinal symptoms since May 15. Four restaurant employees submitted stool samples for testing. All four tested negative for *Salmonella*. One person no longer worked at the restaurant and refused to submit a specimen for testing.

The environmental health assessment of Restaurant A revealed ample opportunity for cross-contamination. Only one preparation table was used for raw meats and vegetables. The kitchen had only a one-compartment sink. Foods in the cook line were either too warm or too cold; for example, eggs were kept at 88°F, and gravy at 134°F. The kitchen was unclean (e.g., the dry storage area, walk-in cooler and freezer, vents, floors and walls all needed cleaning). As a result of the investigation, the restaurant was thoroughly cleaned, hazardous foods not held at the proper temperatures were discarded, and the management was instructed to emphasize good hand washing and to exclude employees with gastrointestinal illness.

A traceback of sources of eggs eaten by all the cases was conducted. The restaurant in Lake County and Restaurant A both purchased eggs from a supplier in Wisconsin that in turn purchased eggs from a producer in Iowa. No other common sources of eggs were identified. All information collected during this investigation was turned over to the United States Food and Drug Administration (FDA); no further action was taken by the FDA.

This was a cluster of *Salmonella* Enteritidis SE1B1 PT8 infections identified during routine surveillance. Within the cluster, an outbreak associated with eating at Restaurant A was identified. Eggs from a producer in Iowa were most likely the initial vehicle in the Restaurant outbreak, and for the additional case that ate eggs at a restaurant in Lake County. However, without further traceback information, eggs from Iowa could not be confirmed as the vehicle.

(13)
Scombroid Poisoning Associated with Escolar Fish

May Hennepin County

On May 27, 2003 the Minneapolis Division of Environmental Health (MEH) was contacted by a person who had dined with one other person at a Minneapolis restaurant on the evening of May 25. Both patrons had consumed escolar, a white fish. Within an hour of eating, they experienced symptoms including headache, flushing, rash, and tachycardia. One of the patrons was a physician who recognized the signs and symptoms of possible scombroid poisoning. MEH initiated an investigation and contacted the Minnesota Department of Health and the Food and Drug Administration (FDA)'s district office in Minneapolis.

The two patrons were interviewed by a MEH sanitarian about food consumption and illness history. An MEH sanitarian went to the restaurant on May 27 to review foodhandling practices, focusing on the escolar. An FDA inspector assessed the facility that had provided the escolar to the restaurant.

Both cases had onset of symptoms within 1 hour of eating. Both experienced heart palpitations, pounding headache and a rash; they sought care at hospital emergency room and were treated with intravenous antihistamines and corticosteroids. Both patrons recovered within 2 hours of receiving the medications.

The restaurant had thrown away the implicated batch of escolar after hearing of the patrons' illnesses. Therefore, there was no escolar available for histamine testing. According to the restaurant's sales records, the two cases were the only people who had ordered escolar on May 25. Eighteen orders of escolar were sold on May 24 and two on May 26; no other complaints were received. The MEH sanitarian found that the restaurant did not keep temperature logs; therefore, the sanitarian could not verify past receiving and holding temperatures for the escolar served on May 25. However, no problems with receiving and holding temperatures were observed at the time of the sanitarian's visit. The sanitarian educated restaurant staff about the proper handling of escolar and stressed the importance of keeping temperature logs in order to prevent and correct time/temperature problems.

An inspector from the FDA district office visited the local seafood distributor that had supplied the restaurant with the implicated fish. The inspector examined the distributor's seafood HACCP records and observed the distributor's seafood handling practices. No problems were found. The local seafood distributor had received the escolar from Los Angeles.

The clinical and epidemiologic features of this outbreak were consistent with scombroid poisoning. The likely vehicle was escolar. Escolar are a known histamine-producing species of fish and have been associated with past outbreaks of scombroid poisoning. The source of temperature abuse of the escolar was not established.

(14)
E. coli O157:H7 Infections Associated with Frozen Steaks Sold Door-to-Door

May-September Multi-County, Multi-State

On June 11, 2003 the Minnesota Department of Health (MDH) Public Health Laboratory identified two isolates of *E. coli* O157:H7 (O157) with an indistinguishable pulsed-field gel electrophoresis (PFGE) subtype pattern (designated MN179). These two isolates were submitted to MDH from clinical laboratories through routine statewide laboratory-based surveillance. By June 15, initial interviews with these two cases had revealed that both cases had recently consumed vacuum-packed frozen steaks sold by door-to-door vendors from a meet company (Brand A) that was headquartered in Minnesota. An epidemiologic investigation was initiated.

All Minnesota residents with a culture-confirmed O157 infection are routinely interviewed with a standardized questionnaire about symptom history, food consumption, and other potential exposures occurring in the 7 days prior to onset of illness. An interview with an abbreviated questionnaire was conducted with people who called MDH to report illness after widespread news accounts of the outbreak.

A confirmed case was defined as a Minnesota resident with a culture-confirmed infection with *E. coli* O157:H7 who had a history of consuming Brand A steaks in the week prior to onset of illness. A probable case was defined as a person who did not have a culture-confirmed O157 infection but who reported symptoms compatible with O157 infection, had a history of consuming Brand A steaks in the week prior to onset of illness, and had a leftover steak sample test positive for O157 with the MN179 PFGE subtype. Leftover steak samples were collected from all confirmed and probable cases and submitted to the Minnesota Department of Agriculture (MDA) for O157 testing.

PFGE testing after digestion with the enzyme *Xba*1 was performed on all O157 isolates received at MDH, and those with the pattern common to this outbreak were designated MN179. All MN179 isolates were also tested by PFGE after digestion with a second enzyme, *Bln*1. All MN179 isolates were indistinguishable by PFGE after digestion with *Bln*1 and were designated as ECB13 (PulseNet patterns EXHX01.0047 and EXHA26.0015, respectively). On June 17, a message describing the epidemiologic characteristics of the cluster and encouraging other states to share information on any matches was posted on the PulseNet web board. MDH epidemiologists contacted epidemiologists at the Michigan and Kansas state health departments because each state had a single O157 case whose isolate was indistinguishable from the

Minnesota isolates by PFGE. Both states worked with their local health departments to gather epidemiologic information on these cases.

By June 27, MDH had identified two additional Minnesota residents with O157 who had consumed Brand A steaks, bringing the total number of Minnesota cases to four. The cases had purchased variety packs, which included multiple boxes of steaks, each box containing a different type of steak. The steaks were flash-frozen and were packaged in individual, vacuum-packed portions. A conference call was held with officials from the Michigan and Kansas state health departments, the Foodborne and Diarrheal Diseases Branch of the Centers for Disease Control and Prevention (CDC), and the Food Safety and Inspection Service of the United States Department of Agriculture (USDA-FSIS). MDH confirmed with both Michigan and Kansas that, based on USDA establishment numbers on packaging, their cases had consumed steaks that originated from the same processing plant (located in Chicago, Illinois) as did the steaks consumed by the Minnesota cases. The Michigan case had consumed Brand A bacon-wrapped fillets. The production date of the Michigan case's product, 3/19/03, was the same as the production date of bacon-wrapped fillets consumed by one of the Minnesota cases. The Kansas case had consumed a non-Brand A brand of bacon-wrapped fillets; however, this company's steaks also originated from the same processing plant as the Brand A steaks.

On the same day as the conference call, MDH issued a press release to inform Minnesota consumers of the association between the O157 cases and Brand A steaks. Two days later, on June 29, USDA-FSIS announced that the processing plant was voluntarily recalling 739,000 lbs of frozen beef products. The nationwide recall included product produced from March 17 through March 22, 2003. The recalled meat had been distributed nationwide to restaurants, institutions, and retailers under several different brand names.

This outbreak resulted in six confirmed O157 cases in Minnesota as well as single confirmed cases in Michigan, Kansas, Iowa, and North Dakota. In Minnesota, in addition to the six confirmed cases identified through laboratory-based surveillance, two probable cases were identified through persons calling MDH with complaints of illness following news accounts of the outbreak. Both reported bloody stools. Stool samples were collected from both probable cases several weeks after their illnesses; these samples were culture-negative for O157. At least one of the probable cases had been treated with antibiotics.

Five of the six confirmed cases had O157 isolates with a PFGE pattern that was indistinguishable by two enzymes (MN179ECB13). However, one case had a unique PFGE pattern, which was designated MN743ECB18.

Onsets of illness for the six confirmed cases ranged from May 27 to September 23. Four of the six culture-confirmed Minnesota cases had onset dates from May 27 to June 18. Two additional cases occurred after the recall was announced on June 29; one in early August and another in late September. These two cases were unaware of the recall, and had eaten Brand A steaks that had been in their freezers for several months. One of the probable cases reported an onset date of June 12, and the other probable case could not give an onset date.

The median age of Minnesota cases was 27 years (range, 5 to 59 years). Each case resided in a different county in Minnesota: Carlton, Carver, Clay, Crow Wing, Hennepin, St. Louis, Washington, and Wright. All eight cases had diarrhea and cramps, seven (88%) had bloody stools, three (38%) had fever, and three (38%) had vomiting. The median incubation period was 3 days (range, 2 to 5 days), and the median duration of illness was 8 days (range, 6 to 30 days). Three of the cases were hospitalized. Two cases were hospitalized for 2 days each with gastroenteritis. One case, a 52-year-old, was hospitalized for 25 days with hemolytic uremic syndrome.

Leftover Brand A steaks were collected from all six confirmed and two probable cases and submitted to the MDA Microbiology Laboratory for O157 testing. Two of the confirmed cases had purchased a variety pack and were unsure of which specific type of Brand A steak they had consumed in the week prior to illness. Leftover ball tip and sirloin steaks from these cases tested negative for O157.

The remaining six cases (four confirmed and two probable) reported consuming Brand A bacon-wrapped fillets. All had leftover bacon-wrapped fillets in their freezers still in intact, vacuum-wrapped packages. Fillets from all six of these cases tested positive for the MN179 PFGE subtype of O157 (one fillet was also positive for an additional subtype, MN742; no cases of human illness due to this subtype were identified).

The MDA Microbiology Laboratory conducted an experiment to see if O157 could be cultured from the interior of a partially cooked bacon-wrapped fillet. One package was aseptically opened, and the bacon was removed and discarded. Using sterile tongs, a beef fillet approximately 60 mm in diameter and 35 mm thick, with an approximate weight of 100 grams, was placed into a hot non-stick fry pan and seared on each surface for 20-40 seconds. The tongs were dipped in 95% EtOH and flamed between each time they were used to rotate the fillet. The objective was to cook the surface but leave an uncooked core. The searing cooked the fillet to a depth of 5-10 mm. Following the searing, approximately 5 mm of the cooked surface was trimmed off with a sterilized knife. O157 of the MN179 subtype was cultured out of the remaining core.

Three Minnesota cases with O157 culture-positive bacon-wrapped fillets still had the original boxes. The boxes all listed a 3/19/03 production date. The Michigan case also had O157 MN179 culture-positive bacon-wrapped fillets; the original box for these bacon-wrapped fillets also listed a 3/19/03 production date.

Steaks have not been considered an important vehicle for O157 infection, because unlike ground beef, the interior of the steak should be free of pathogenic bacteria. Cooking just the surface should be enough to destroy any surface contamination that might be present. However, the steaks implicated in this outbreak were non-intact cuts of beef; according to the package label, the steaks were injected with up to 12% of a solution that included water and flavorings. The USDA investigation of the processing plant revealed that these steaks underwent multiple passes through a needle-tenderizing apparatus. The plant had a “clean in place” procedure for the needle apparatus; it was dissembled and cleaned on a weekly basis.

This was a multi-state outbreak of *E. coli* O157:H7 infections caused by steak products produced by processing plant in Chicago, Illinois. Eight cases (six culture-confirmed) in Minnesota were identified in this outbreak. Four of the six confirmed cases specifically recalled consuming bacon-wrapped fillets in the week before illness onset. Of cases that had the original product packaging available, a production date of 3/19/03 was implicated. It is likely that the flavoring injection and/or needle-tenderizing processes used in the production of the steaks led to cross-contamination between individual steaks and transferred O157 to the interior of the steaks.

Needle-tenderized or injected steaks are a newly recognized vehicle for *E. coli* O157:H7 infection. Pathogens may be transferred into the steak interior by these processing methods. Consumers generally do not cook steaks thoroughly. In a survey conducted by the CDC/FDA/USDA Foodborne Active Disease Surveillance Network, 50% of individuals who had consumed steak in the past week reported eating it pink. There may be a need for consumer education or labeling to encourage thorough cooking of these types of steak products.

This outbreak emphasized the importance of the nationwide PulseNet system and timely epidemiologic follow-up to outbreak recognition and the rapid identification and recall of an outbreak vehicle. Information from single cases in a cluster identified through PulseNet can be critical in the investigation of multi-state outbreaks, as illustrated by the Michigan and Kansas cases in this outbreak.

(15)
Suspected Bacterial Intoxications Associated with a Retirement Party

May Anoka County

On May 30, 2003 the Minnesota Department of Health (MDH) received a complaint of gastrointestinal illness among a group of approximately 50 coworkers who attended a retirement gathering at a restaurant in Fridley on May 29 from 3:30 p.m. to 6 p.m. The complainants denied having any other common meals. The establishment had been investigated earlier in the month due to an outbreak associated with a buffet served for Mother's Day brunch. Anoka County Community Health and Environmental Services (ACCHES) was contacted, and an investigation was initiated on May 30.

Lists of foods served were obtained from the event organizer and the restaurant. The event organizer emailed all the potential attendees and assembled a list of names and phone numbers of persons who reported that they had attended the retirement gathering. MDH epidemiologists interviewed persons on the list about food consumption and illness history. A case was defined as a person with onset of vomiting or any diarrhea (at least one loose stool in a 24-hour period) after eating at the restaurant. Two stool samples were obtained for bacterial culture, bacterial toxin testing, and viral testing. No reservation lists, credit card receipts or checks were available that could have been used to identify other restaurant patrons.

ACCHES sanitarian conducted an environmental health investigation of the establishment and reviewed food preparation procedures.

Forty-seven of 48 attendees were interviewed. Six (13%) of 47 met the case definition. All six cases reported diarrhea, four (67%) reported severe cramps, and none reported vomiting or fever. The median incubation period was 4.5 hours (range, 1.5 to 22 hours). The median duration of illness was 2.5 hours (range, 1.5 to 2.5 hrs). The two stool specimens obtained were collected 1 and 2 days after symptoms subsided. Both specimens were negative for *Salmonella, Shigella, Campylobacter*, *E. coli* O157, *Yersinia*, norovirus, *Clostridium perfingens* toxin, *Bacillus cereus*, and *Staphylococcus aureus.*

Foods served included barbecue ribs, chicken wings, turkey wraps, roast beef wraps, peel and eat shrimp, shrimp cocktail, cheese cubes, fresh fruit, vegetables, broccoli salad, tortellini salad, and garlic bread. Illness was associated with eating turkey wraps (6 of 6 cases vs. 22 of 40 controls; odds ratio [OR] undefined; 95% confidence interval [CI] lower limit, 1.10; p=0.04) and tortellini salad (6 of 6 [100%] cases vs. 22 of 41 [54%] controls; OR, undefined; 95% CI lower limit, 1.16; p=0.04).

A food preparation review was conducted for the statistically implicated foods. The tortellini salad was prepared using precooked frozen cheese tricolor tortellini. The bag was placed under running water in the prep sink for thawing. After thawed, the tortellini were placed in a bowl, and diced tomatoes, green onions, and commercially prepared shelf-stable dressing were added. The salad was placed on ice on the buffet table for self-serving. The turkey wraps were prepared using tortilla wraps, cream cheese, and turkey. All the foods were served in a buffet line, even though the restaurant was not equipped for buffet operation. The buffet line consisted of dining tables placed together without hot-holding equipment. Although the restaurant stated that the tortellini salad was placed on ice, they also stated that the food was plated and served for immediate consumption, indicating that they were not taking the necessary steps for keeping foods cold on the buffet line. ACCHES held an administrative hearing with the restaurant in order to have the restaurant either stop serving buffet-style or acquire appropriate equipment for buffet serving.

This was an outbreak associated with a retirement party held at a Fridley restaurant. The etiology was not determined. The short incubation and duration of illnesses suggested a foodborne bacterial intoxication, but the median incubation was unusually short for know agents that produce predominately diarrheal illness (as opposed to an illness characterized by vomiting). The most likely vehicles were tortellini salad or turkey wraps. Holding foods at room temperature in the buffet line could have contributed to bacterial growth and/or toxin production in these foods.

(16)
Scombroid Poisoning Associated with Tuna

July Hennepin County

On July 8, 2003 the Minnesota Department of Health (MDH) received a complaint from a physician. The doctor reported that the patient had vomiting, flushing, dizziness, and a rash within 30 minutes of eating tuna at a Minneapolis restaurant. MDH initiated an investigation and contacted the Hennepin County Community Health Department (HCCHD) and the Food and Drug Administration (FDA) district office in Minneapolis.

The physician reported the illness history and food exposure since the patient was unable to talk. A HCCHD sanitarian conducted a food flow assessment of the restaurant and obtained samples of the tuna. Although the restaurant initially discarded the samples, they were still frozen when they were collected for testing. According to the restaurant, these samples were from the same tuna case as the patient consumed. HCCHD also obtained information on the distributor and supplier for the tuna used in the restaurant.

Fifteen 1-ounce samples of tuna were sent to a regional FDA laboratory to test for levels of histamine. The FDA Division of Investigation Branch initiated a trace back of the tuna by contacting the distributor and supplier. FDA was able to obtain additional samples of tuna from the suppler to further assess levels of histamine.

All 15 tuna samples from the restaurant had levels of histamine higher than the 50 parts per million (ppm) regulation; the median histamine level was 150 ppm (range, 60.3 to 460 ppm). The FDA also detected elevated levels of histamine from tuna samples collected from the supplier; these samples were from a different lot as the tuna served at the restaurant.

The food flow assessment noted proper temperatures for the main line, the walk-in cooler and the freezer at the restaurant.

This was an outbreak of scombroid poisoning associated with eating tuna. Histamine testing suggested that histamine production in the tuna occurred prior to the restaurant receiving the supply. The FDA will continue to work with the tuna supplier to establish the extent of the problem and the necessary control measures.

(17)
Norovirus Gastroenteritis Associated with a Potluck Picnic

July Hennepin County

On July 16, 2003 the Minnesota Department of Health (MDH) received a complaint from an individual reporting a group with gastrointestinal symptoms following a potluck picnic held in Eden Prairie on July 12. The complainant estimated that at least 20 people became ill out of the 70 individuals who attended the event. All food items were prepared by the picnic attendees or purchased from a grocery store.

A case was defined as any person who attended the potluck event and subsequently developed vomiting and/or diarrhea (≥3 loose stools in a 24-hour period). Epidemiologists from the Hennepin County Community Health Department (HCCHD) interviewed the complainant and obtained an illness and food history. The complainant provided a list of foods that were served. HCCDH also obtained the names and telephone numbers of family members who attended the event, including the party organizer. Two attempts were made to obtain a complete list of all attendees from the party organizer, but HCCHD received no such list.

Two stool specimens were collected and submitted to the MDH Public Health Laboratory for testing. No food samples were available for testing.

Of the five persons who were interviewed, four met the case definition. Incubations ranged from 38 to 40 hours (median, 38 hours); durations ranged from 34.5 to 58 hours (median, 46 hours). Symptoms included diarrhea (100%), nausea (100%), abdominal cramps (75%), chills (75%), vomiting (50%), and fever (50%).

The potluck event was held from 1:00 to 10:00 p.m. with the following items served: cut veggies (and dip), fresh fruit (and dip), cool whip salads, spinach and shrimp dips, tortilla rollups, meatballs, wieners, chicken wings and tenders, cookies and bars, soft drinks, keg beer and an alcoholic slush drink (vodka, lemonade, and cranberry juices). The tortilla rollups were kept on ice; however the fruit (and dip), vegetables (and dip), cool whip salads, spinach dip, and shrimp dip were not. The chicken wings, wieners and meatballs were kept warm in a crock-pot. Although the chicken tenders were not kept warm, it was reported that they were eaten promptly after being served. Due to the inability to contact more than the five interviewed guests, statistical analysis to evaluate potential vehicles was not feasible.

The two stool samples submitted to the MDH Laboratory tested positive for norovirus.

This was an outbreak of norovirus gastroenteritis associated with a potluck event. The vehicle and source of contamination were not determined. HCCHD educated those interviewed on the danger of keeping food at room temperature for long periods of time, as well as the danger of food contamination if proper hygiene is not observed. Further information was provided on the characteristic symptoms of norovirus infection, the transmission routes, and prevention measures.

(18)
Gastroenteritis Associated with a Catered Lunch

July Beltrami County

On Friday, August 1, 2003 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 memorial service on the Red Lake Indian Reservation on Sunday, July 27. A restaurant in Bemidji catered a post-service lunch. The organizer of the memorial service received several calls from multiple attendees who reported vomiting and diarrhea shortly after the event. An investigation was initiated.

The organizer of the memorial service was interviewed to get an overview of the memorial service, the types of food that was ordered from the restaurant, the timeline in which the food was delivered and served, and how it was served. A partial list of attendees was obtained but a full roster was unavailable. Epidemiologists from MDH interviewed attendees by phone regarding illness history, food consumption history, and names and phone numbers of people who attended the event or received plates of leftover food. A case was defined as any person who ate the food (at the memorial service or received leftover food) and developed vomiting or diarrhea (≥3 stools in a 24-hour period) on or after July 27. Stool samples were collected from those who had a later onset of gastrointestinal illness and submitted to the MDH Public Health Laboratory (PHL). On all other stool samples, the PHL conducted routine bacterial cultures and

PCR testing for norovirus. Testing for the presence of Shiga toxin genes was performed on "sweeps" of bacterial colonies by PCR.

A local environmental health inspector interviewed the manager of the restaurant and performed a restaurant inspection.

Interviews of both the organizer of the event and the restaurant manager revealed that approximately 150 persons attended the event. Food had been ordered for 250 persons, so guests had taken extra food home and donated to another party (a wake which occurred simultaneously in a different part of the community center; MDH did not receive any illness complaints from this event). The food had been delivered by the restaurant manager to the memorial service after being transported (approximately 45 minutes) in the back of a pick-up truck that was not equipped with heating or refrigeration units. The food arrived at approximately 12:30 p.m. but was not served until approximately 2:15 p.m. due to delays in the memorial service. The food was not kept in temperature-controlled conditions during this delay. The food was served to the guests by the manager and another restaurant employee. The menu included fried chicken, potato salad, coleslaw, baked beans, and dinner rolls. Rice crispy bars were provided by another guest and cans of pop were provided by the organizer of the event.

Sixty-two guests of the memorial service were interviewed. Forty-four (71%) guests met the case definition. Eighteen (41%) cases were male and 26 (59%) were female. The incubation period ranged from 1.5 hours to 70 hours; the median incubation period was 15.5 hours. Illness onset dates ranged from July 27 to July 30; the median illness onset date was July 28. The median duration of illness was 45.5 hours, (range, 4 hours to 10 days for full recovery). Six of the 44 cases did not attend the event but ate plates of food brought home. Thirty-seven (86%) of 43 cases reported diarrhea, 26 (65%) of 40 reported fever, 26 (59%) of 44 reported vomiting, 21 (55%) of 38 reported cramps, and three (8%) of 44 reported having bloody stools. None were hospitalized, though five had called their medical provider and three were seen by a medical provider (two in clinic, one in a local emergency room).

Univariate analysis of food items showed that two items were significantly associated with illness: potato salad (36 [82%] of 44 cases vs. 9 [50%] of 18 controls; odds ratio [OR], 4.5; 95% confidence interval [CI], 1.3 to 15.7; $p=0.011$); and coleslaw (35 [80%] of 44 cases vs. 6 [33%] of 18 controls; OR, 7.8; 95% CI, 2.2 to 27.3; $p<0.001$). Multivariate analysis showed that coleslaw was independently associated with illness (adjusted OR, 7.8; 95% CI, 2.3 to 26.4; $p=0.001$).

There was a wide range in illness incubation periods among cases, thereby making it difficult to attribute the outbreak to a single etiology (e.g., a toxin-mediated, viral, or bacterial origin). The high proportion of cases with vomiting along with the low number of cases with blood in their stool was suspicious for a toxin-mediated or viral event. We divided the cases into those with an incubation period of <24 hours (n = 28) and those with an incubation period of ≥24 hours (n = 16). In those with early onsets of illness, the median incubation period was 7.5 hours (range, 1.5 to 23 hours) and the median duration of illness was 46 hours (range, 4 hours to 8 days). The illness profile of the "early-onset" group was similar to that of the overall group: 23 (85%) of 27 cases reported diarrhea, 17 (61%) of 28 reported vomiting, 11 (50%) of 22 reported cramps, 15

(60%) of 25 reported fever, and three (14%) of 22 reported having bloody stools. Univariate analysis of food items showed that potato salad and coleslaw continued to be significantly associated with illness: potato salad (23 [82%] of 28 cases vs. 9 [50%] of 18 controls; OR, 4.6; 95% CI, 1.2 to 118.5; p=0.021) and coleslaw (23 [82%] of 28 cases vs. 6 [33%] of 18 controls; OR, 9.2; 95% CI, 2.3 to 38.0; p<0.001). Multivariate analysis of the "early-onset" group showed that coleslaw was independently associated with illness (adjusted OR, 9.2; 95% CI, 2.3 to 36.5; p=0.002).

In those with late onsets of illness, the median incubation period was 42 hours (range, 27 to 70 hours) and the median duration of illness was 37 hours (range, 16 hours to 10 days). The illness profile of the "late-onset" group was also similar to that of the overall group: 14 (88%) of 16 cases reported diarrhea, nine (56%) of 16 reported vomiting, 10 (63%) of 16 reported cramps, 11 (73%) of 16 reported fever, and none reported having bloody stools. Univariate analysis of food items demonstrated that only coleslaw was significantly associated with illness (12 [75%] of 16 cases vs. 6 [33%] of 18 controls; OR, 6.0; 95% CI, 1.3 to 29.7; p=0.015). Potato salad was borderline significant (13 [81%] of 16 cases vs. 9 [50%] of 18 controls; OR, 4.3; 95% CI, 0.9 to 23.7; p=0.057).

Inspection of the restaurant by environmental health showed that the most significant violation was that the establishment did not have appropriate transport vehicles, but no food workers were reported to be ill. Stool kits were distributed to a few of the cases that had a later onset of illness. Two stool specimens were returned; both tested negative for norovirus and for routine bacterial pathogens.

This was an outbreak of gastroenteritis due to an unknown etiology. Illness was associated with consumption of coleslaw. Recommendations to the food establishment as well as the organizer of the event consisted primarily of encouraging/requiring the use appropriately temperature-controlled containers when transporting, storing, and serving potentially hazardous foods.

(19)
***Clostridium perfringens* Intoxications Associated with Ground Beef**

July Olmsted County

On Tuesday, July 29, 2003 Olmsted County Public Health Services (OCPHS) received a complaint from an individual reporting gastroenteritis after eating lunch at a Mexican restaurant in Rochester on July 28. According to the complainant, he and three co-workers became ill approximately 12 hours after the meal, and were still ill at the time of the complaint. The complainant also said that he and his co-workers had not shared any other meals recently and had not had any other common exposures that could account for the illnesses. An investigation was initiated.

OCPHS staff, including sanitarians, a public health nurse, and a Spanish-speaking interpreter, visited the restaurant on July 29. Checks and credit card receipts were used to compile a list of persons who dined at the restaurant on July 28. Patrons were interviewed by phone about symptoms and foods consumed. A case was defined as a person who ate the restaurant and

subsequently developed vomiting or diarrhea (≥3 loose stools in a 24-hour period). One case submitted a stool sample to the Minnesota Department of Health (MDH) for testing. A sample of refried beans (the only food item that was left over from July 28) was collected and sent to MDH for testing. Foodhandlers who were present at the restaurant were interviewed with assistance from the interpreter. OCPHS sanitarians evaluated food preparation and staff hygiene, paying special attention to meat and refried beans because early epidemiologic information suggested *Clostridium perfringens* intoxication as a possible etiology.

Twenty-eight restaurant patrons were interviewed and eight (29%) met the case definition. All eight cases (100%) had diarrhea, seven (88%) had cramps, one (13%) had fever, and no one reported vomiting. The median incubation period was 10 hours (range, 5 to 17 hours). Because most of the cases were still ill at the time of interview, duration of illness was not determined. The stool sample collected from a case was positive for *Clostridium perfringens* enterotoxin type A. The leftover refried beans tested negative for enteric pathogens.

Consuming a menu item containing ground beef was significantly associated with illness (8 of 8 [100%] cases vs. 3 of 20 [15%] controls; odds ratio, undefined; $p<0.001$).

During interviews with the restaurant workers, OCPHS sanitarians were told that the ground beef served on July 28 had been prepared that morning; the staff said that they did not carry over food from previous days. The ground beef was reportedly cooked to 165°F before being placed in the steam table. The quantity of ground beef prepared seemed extremely large (30 lbs or ground beef and 25 gallons of water along with onions and tomatoes) for the equipment observed (a large stock pot on a range). At the time of the environmental assessment, the ground beef in the steam table was being held for service at 180°F. The OCPHS sanitarians noted several problems at the restaurant; there was no certified food manager on staff, the kitchen handwashing sink had no water flow, foods held in the walk-in cooler were at an unsafe temperature, refried beans in the steam table were at 127°F, and bare hand contact with tortilla chips was observed. The restaurant voluntarily closed on July 29 and reopened on August 1 after correcting the violations identified by OCPHS sanitarians and meeting additional conditions requested by OCPHS.

This was an outbreak of *Clostridium perfringens* intoxications associated with ground beef served at a Mexican restaurant. Although the exact means of *C. perfringens* amplification and survival were unknown, it appeared that restaurant management had inadequate systems in place to assure that staff routinely followed correct time-temperature practices in preparing the ground beef.

(20)
Clostridium perfringens Intoxications Associated with Pork

August — Pine County

On August 5, 2003 the Minnesota Department of Health (MDH) Acute Disease Investigation and Control Section received a complaint of illness from two individuals who ate together at a restaurant in Hinckley on August 3. These individuals reported that they had no other common exposures. An MDH sanitarian was notified and an investigation was initiated immediately.

Upon inspection of the restaurant, the MDH sanitarian found that the restaurant had received one other complaint. Two people had become ill after eating at the restaurant on August 3. In addition, two relatives of these individuals ate leftovers from the restaurant and also subsequently became ill.

MDH staff interviewed 119 restaurant patrons (including complainants, individuals who had consumed leftovers from the restaurant, and additional patrons from a list provided by the restaurant) who had eaten at the restaurant on August 3 about food consumption and illness history. A case was defined as a person with vomiting or diarrhea (≥3 loose stools in a 24-hour period) after eating food from the restaurant. Five cases submitted stool samples to MDH for bacterial and viral testing. Leftover food samples from the two original complainants were also submitted to MDH for testing. An MDH sanitarian went to the restaurant on August 5 to conduct an environmental assessment.

Eight of the 119 (6%) persons interviewed met the case definition. Four of these cases were complainants (to MDH or the restaurant), two were relatives who had eaten leftovers, and one was identified from the patron list provided by the restaurant. One additional case became ill with gastrointestinal symptoms 68 hours after eating at the restaurant. Since this individual had a clinical picture that was different from other cases, this case was excluded from analysis. All seven remaining cases (100%) had diarrhea, six (86%) had cramps, and one (14%) had fever. The median incubation period was 11 hours (range, 1.5 to 20.5 hours). The median duration of illness was 12 hours (range, 6 to 23 hours). Stool samples from all five cases (including two cases that had eaten leftovers) that submitted samples were positive for *Clostridium perfringens* enterotoxin type A. The leftover pork and mashed potatoes submitted by the original complainants were also positive for *C. perfringens* enterotoxin A. Molecular subtyping with pulsed-field gel electrophoresis (PFGE) showed that the subtype of *C. perfringens* isolates cultured from the food samples was indistinguishable from the subtype of isolates from the stool samples of four cases (PFGE subtype CP1). The sample from the other confirmed case yielded *C. perfringens* PFGE subtype CP2.

Italian braised pork with mashed potatoes, Italian green beans, garden salad, and a dinner roll was the special that was served at the restaurant on August 3. Univariate analysis showed that eating the special (5 of 7 cases vs. 7 of 98 controls; odds ratio [OR], 35.0; 95% confidence interval [CI], 5.4 to 276.7; $p<0.001$) was statistically associated with illness. Among the food items that were part of the special, consumption of Italian braised pork (5 of 7 cases vs. 7 of 97 controls; OR, 34.6; 95% CI, 5.4 to 273.9; $p<0.001$), potatoes (6 of 7 cases vs. 21 of 83 controls; OR, 23.7; 95% CI, 3.2 to 554.5; $p<0.001$), and green beans (6 of 7 cases vs. 30 of 103 controls; OR, 14.6; 95% CI, 2.0 to 342.1; $p=0.005$) were statistically associated with illness. After multivariate analysis using logistic regression, eating Italian braised pork (adjusted OR, 34.3; 95% CI, 5.6 to 209.6; $p<0.001$) remained independently associated with illness.

During the environmental assessment of the restaurant, the MDH sanitarian determined that 1,026 meals were served on August 3, including 400 portions of green beans and 93 braised pork meals. The pork shanks were a packaged, pre-cooked, frozen product. On August 3, the pork was thawed in the cooler and portioned into steam table pans. The pans were then cooked in an

oven, placed in a hot holding box, and taken from the box to the steam table one pan at a time. However, upon inspection, the MDH sanitarian observed kitchen staff trying to cook partially frozen pork, and the staff gave conflicting reports for the amount of time the pork was cooked. The sanitarian was also informed that on August 3, the hot holding box was not properly assembled (no water was present in the unit), and temperatures were not monitored for the hot holding box or the steam tables.

This was an outbreak of foodborne intoxications caused by *C. perfringens*. Consumption of pork was statistically associated with illness. The possibilities that the pork was not properly cooked and was not held at the appropriate temperature were identified as potential mechanisms for bacterial proliferation. An annual inspection of the restaurant in 2004 showed that the restaurant has implemented a system for food temperature monitoring and documentation subsequent to this outbreak.

(21)
Norovirus Gastroenteritis Associated with a Restaurant

August Hennepin County

On Friday, August 8, 2003 the City of Edina Health Department was notified that a restaurant in Edina had received a report of at least 10 people who became ill after eating a lunch catered to a workplace (Group A) on Tuesday, August 5. The restaurant had also received a complaint of gastrointestinal illness from a group of three people (Group B) who dined at the restaurant on August 5. An investigation was initiated in collaboration with the Minnesota Department of Health (MDH). Subsequently, the restaurant received an additional illness complaint concerning another catered workplace lunch held on August 5 (Group C).

MDH obtained a list of the people in Groups A, B, and C. MDH epidemiologists interviewed group members by phone about illness history and food consumption. A case was defined as a person who developed vomiting or diarrhea (≥3 loose stools in a 24-hour period) after eating food from the restaurant. Five stool samples from cases (two from Group A and three from Group C) were submitted to MDH for bacterial and viral testing.

The restaurant provided the investigators with a list of other catered events from the week of August 4. MDH epidemiologists contacted nine additional workplaces that had meals catered by the restaurant from August 5 to August 7 and inquired about any illnesses that had followed the meals. Out of the nine workplaces, four (Groups D, E, F, and G) reported experiencing gastrointestinal illness after the meals. Groups D and E had catered meals on August 5 and Groups F and G had catered meals on August 7.

The City of Edina sanitarian went to the restaurant on August 8 to speak with management, evaluate food preparation and handling procedures, and determine if there were any ill food workers.

Group A, catered lunch on August 5: Twenty-three of the 27 luncheon attendees were interviewed. Eleven (48%) met the case definition, nine (39%) reported no symptoms, and three

(13%) had symptoms that did not meet the case definition and were excluded from further analyses. Ten cases (91%) had diarrhea, seven (64%) had cramps, seven (64%) had fever, four (36%) had vomiting, and one (9%) reported bloody stools. No cases reporting seeking medical attention for their symptoms. The median incubation period was 41 hours (range, 20 to 51 hours). The median duration of illness was 52 hours (range, 20 to 59 hours). Both of the two stool samples collected from Group A cases were negative for *Campylobacter*, *E. coli* O157:H7, *Salmonella*, *Shigella*, and *Yersinia*. Both samples were positive for norovirus. Food served at Group A's catered lunch included a choice of pot roast or pan-roasted salmon entree, green salad, bread, and platters (fruit, vegetables, and shrimp). The platters were the only items that were prepared at another branch of the restaurant; the other items were prepared at the Edina location. The only item significantly associated with illness was the pan-roasted salmon (9 of 10 [90%] cases vs. 3 of 9 [33%] controls; odds ratio [OR], 18.0; 95% confidence interval [CI], 1.2 to 916.7; p=0.02). The sanitarian conducted a food preparation review on the pan-roasted salmon and found that although the salmon itself was sautéed and then baked, some diced vegetables and basil were hand-applied to the entrée after cooking.

Group B, ate at the restaurant on August 5: Two of the three complainants who dined together were interviewed. The third person in the party was reportedly ill as well, but could not be reached for an interview. They denied any other meals in common. Both met the case definition; both had diarrhea and fever, one had vomiting, and one had cramps. Neither case sought medical attention. The two cases had incubation periods of 32.5 and 34 hours, respectively. Durations of illness were 35 and 58 hours. Both cases ate balsamic chicken salad with strawberries and bread.

Group C, catered lunch on August 5: All 21 luncheon attendees were interviewed. Eleven (52%) met the case definition, eight (38%) reported no symptoms, and two (10%) had symptoms that did not meet the case definition and were excluded from further analyses. All 11 cases (100%) had diarrhea, nine (82%) had cramps, eight (73%) had vomiting, and three (27%) had fever. At least one case sought medical attention for their symptoms. The median incubation period was 38 hours (range, 32 to 86 hours). The median duration of illness was 63 hours (range, 10 to 96 hours). All three stool samples collected from Group C cases were negative for *Campylobacter*, *E. coli* O157:H7, *Salmonella*, *Shigella*, and *Yersinia*. All three samples were positive for norovirus. Food served at Group C's catered lunch included a green salad, turkey salad, chicken salad, bread, and cookies. The green salad was the only item significantly associated with illness (11 of 11 [100%] cases vs. 2 of 8 [25%] controls; OR, undefined; lower limit of 95% CI, 3.0; p=0.001).

Group D, catered lunch on August 5: According to the contact at this company, two of the eleven people who ate at this catered workplace lunch subsequently became ill with gastroenteritis. The company refused to provide more information. Food items served at this lunch included a variety of salads and sandwiches.

Group E, catered lunch on August 5: All 11 luncheon attendees were interviewed. Five (45%) met the case definition, four (36%) reported no symptoms, and two (18%) had symptoms that did not meet the case definition and were excluded from further analyses. All five cases (100%) had diarrhea, five (100%) had cramps, three (60%) had fever, one (20%) had vomiting, and one

(20%) had bloody stools. No cases sought medical attention for their symptoms. The median incubation period was 35 hours (range, 2 to 46 hours). The median duration of illness was 51 hours (range, 24 to 72 hours). Four stool kits were dropped off at the company by MDH but none were returned for testing. Food served at Group E's catered lunch included a variety of salads, sandwiches, fruit cups, and cookies. No single item was statistically associated with illness.

Group F, catered lunch on August 7: The contact at this company knew of two of approximately 20 people who ate at this catered workplace lunch and subsequently became ill with gastroenteritis. One of the ill persons was the contact; this person reported onset of vomiting, diarrhea, and cramps approximately 36 hours after eating, and had sought medical attention at a hospital emergency room. The other ill person reportedly had a similar incubation period and symptoms. Because most of the other attendees were traveling out of the country, no further interviews were conducted. Food items served at this lunch included a variety of salads, pasta, a fruit platter, and cookies.

Group G, catered lunch on August 7: Twelve of the 18 luncheon attendees were interviewed. Four (33%) met the case definition, six (50%) reported no symptoms, and two (17%) had symptoms that did not meet the case definition and were excluded from further analyses. All four cases (100%) had diarrhea, three (75%) had cramps, and one (25%) had bloody stools. No one reported vomiting or fever. At least one case sought medical attention for their symptoms. The median incubation period was 27 hours (range, 13 to 32 hours). The median duration of illness was 68 hours (range, 49 to 79 hours). Food served at Group G's catered lunch included the turkey with dried cherries salad, six different kinds of sandwiches, and cookies. No single item was statistically associated with illness.

Genetic sequencing of norovirus from Groups A and C: MDH conducted genetic sequencing on the norovirus detected in three of the five positive stool samples (one from Group A and two from Group C). The viral sequences of all three were identical.

Upon the recognition of a possible foodborne outbreak on August 8, the City of Edina sanitarian went to the restaurant to gather information, including a list of food workers. Twelve food workers from the restaurant were interviewed from August 8 to August 12 (three were interviewed by a Spanish-speaking epidemiologist). One worker reported an ill household member, but this worker had not been in the restaurant during the relevant time period. Another worker reported diarrhea, but it reportedly did not start until August 7. The food workers identified by restaurant management as the individuals who most likely prepared implicated food items denied any recent gastrointestinal symptoms in themselves or in their household members.

A worker at another branch of the restaurant had been at the Edina restaurant on the evening of August 4, the day when much of the food for the catered lunches of August 5 was prepared. This person did not prepare any food for the catered lunches, but did eat salad greens that were in the front case. This person had onset of symptoms consistent with norovirus gastroenteritis 32 hours later.

The following measures to stop further disease transmission at the restaurant were recommended by the City of Edina and MDH: Exclusion of any ill food workers until 72 hours after cessation

of symptoms; emphasis on strict handwashing procedures; and reduction of bare-hand contact with ready-to-eat food items such as salad and sandwich ingredients.

This was an outbreak of norovirus gastroenteritis associated with multiple food items prepared at a restaurant in Edina. There were at least 38 ill persons identified from seven separate groups. The most likely source of the outbreak was viral contamination of ready-to-eat ingredients (e.g., salad greens) via bare-hand contact by one or more ill or recently ill food workers. However, no ill food workers were identified through interviews.

(22)
Gastroenteritis Associated with a Youth Camp

August St. Louis County

On August 15, 2003 the nurse at a youth wilderness adventures camp located near Ely called the St. Louis County Public Health Department (SLCPHD) to report an outbreak of gastrointestinal illness at the camp. The camp serves as a base for canoeing and backpacking trips in the surrounding area. The Minnesota Department of Health (MDH) was notified and an investigation initiated on August 15.

Lists of the foods served since dinner on Wednesday August 13 (the first meal served to the campers), of campers, and of known ill individuals were faxed to SLCPHD. A map of the camp showing the location of the cabins in which known sick individuals were staying was also faxed to SLCPHD. SLCPHD staff went to the camp and interviewed campers and staff about illness history and foods eaten since August 13. An attempt was made to interview two healthy controls from the same cabin for every ill individual. Illness attack rates were calculated for the Wednesday dinner and all meals on Thursday.

An SLCPHD environmental health specialist conducted an environmental inspection. The inspection focused on food preparation and handling and the camp's potable water system. Food service workers were interviewed about recent illness history. No water samples were collected.

Forty-six people, approximately 42% of all the campers and group leaders present at the camp, were interviewed. Of these, 21 reported some type of illness since August 11. A case was defined as any person who developed diarrhea (defined by self-report) or vomiting after arriving at the camp. Eighteen (39%) met the case definition. Of the 18 cases, five were group leaders, 12 were campers, and the status of one person was not determined. Fifteen (83%) cases reported diarrhea, 11 (61%) reported abdominal cramps, seven (39%) reported fever, and six (33%) reported vomiting. Illness onset times ranged over a 16-hour period from 6:00 p.m. on Thursday, August 14 to 9:00 a.m. on Friday, August 15, with a median onset time of 2:30 a.m. on August 15. Duration of illness was not calculated since most of the case individuals had been sick for less than 24 hours and were still ill when they were interviewed. The camp's administrative office later reported that by Saturday morning all the ill individuals had either completely recovered or recovered enough to be able to go on their scheduled trips. This suggested an illness with duration of approximately 24 to 36 hours.

Stool sample collection kits were provided to seven individuals who were ill at the time of interview. Only one individual provided a stool sample that was suitable for testing. That stool sample tested negative for *Salmonella, Shigella, Campylobacter, E. coli* O157, *Yersinia, Clostridium perfringens* toxin, *Bacillus cereus, Staphylococcus aureus* and norovirus.

Other than coming together at meal times, there was no common event or activity at which many people could have been exposed at the same time. There was no clustering of cases by cabin.

Food items statistically significantly associated with illness included butterscotch bars served at Wednesday's dinner (18 of 18 cases vs. 22 of 28 controls; odds ratio [OR], undefined; 95% confidence interval [CI], undefined; p=0.004) and dry cereal from the Thursday breakfast (12 of 18 cases vs. 8 of 27 controls; OR, 4.75; 95% CI, 1.12 to 21.3; p=0.01). However, a variety of dry cereals were combined in a single category for statistical analysis. The incubation period from the meal to onset of illness was approximately 33 hours for the Wednesday dinner and 23 hours for the Thursday breakfast.

Some time after the August 15 environmental inspection of the camp, the sanitarian's inspection notes and SLCPHD's regular inspection records file for the camp were lost. Thus, this report cannot comment on environmental conditions that could have played a role in this outbreak. It is known that none of the food preparation staff reported any illness in the 2 weeks before August 15. It is also known that the sanitarian had commented there was a lack of handwashing facilities in the dining room. No correction orders were issued to the camp as a result of the outbreak investigation.

This was an outbreak of gastroenteritis at a youth camp. The implicated vehicle was butterscotch bars served for dinner on Wednesday, August 13. The etiology and source of contamination were not determined.

(23)
Salmonella Saintpaul Infections Associated with a Block Party

September Dakota County

On September 17, 2003 the Minnesota Department of Health (MDH) became aware through routine surveillance of two cases of *Salmonella* Saintpaul infection that reported attending the same neighborhood block party on September 1. Both *Salmonella* isolates were indistinguishable by pulsed-field gel electrophoresis (PFGE) (subtype designated STP19).

Upon notification of the two initial cases, MDH contacted the hostess of the party and obtained a list of food items that were served. The hostess indicated that approximately everyone residing on her street had attended the block party on September 1. Using a telephone book database, MDH obtained a list of individuals who were listed as residents on the street in question. Epidemiologists contacted these individuals to ascertain who had attended the party, what foods they had consumed, and any resulting illness. A case was defined as a person who was diagnosed with *S*. Saintpaul or who developed diarrhea (≥3 loose stools in 24-hour period)

within seven days of attending the block party. Since there was no food remaining, samples were not collected.

One additional *S.* Saintpaul case was reported through routine surveillance on September 24; the isolate from this individual also was subtype STP19, and the case reported attending the same block party on September 1. Of the 32 individuals who reported attending the party, five cases were identified. All cases experienced diarrhea, four (80%) had a fever, and three (60%) reported vomiting. Symptoms began between 24 and 144 hours (median, 75 hours) after attending the party. Three of five cases were diagnosed with *S.* Saintpaul, all with an indistinguishable PFGE subtype (STP19). The hostess reported that she had prepared some foods and beverages for the party; however, the majority of items were brought by those attending the party. These food items were either prepared at home or purchased commercially. No one reported having gastrointestinal symptoms in their household prior to the block party.

Consuming toffee bars was significantly associated with illness (2 of 5 cases vs. 1 of 26 controls; odds ratio [OR], 16.7; 95% confidence interval [CI], 1.1 to 243.7; p=0.06). Food items that approached statistical significance included potato salad (3 of 5 cases vs. 5 of 24 controls; OR, 5.7; 95% CI, 0.74 to 43.9; p=0.11), cake (2 of 5 cases vs. 2 of 22 controls; OR, 6.7; 95% CI, 0.66 to 66.8; p=0.14), brownies (4 of 5 cases vs. 9 of 25 controls; OR, 7.1; 95% CI, 0.69 to 73.7; p=0.14), and ice (2 of 4 cases vs. 2 of 25 controls; OR, 11.5; 95% CI, 1.0 to 131.3; p=0.08). Cases were more likely to have eaten after 4:00 p.m. (5 of 5 cases vs. 2 of 25 controls; Logit OR, 103; 95% CI, 4.3 to 2,474; p<0.001).

This was an outbreak of foodborne salmonellosis associated with a block party. A large quantity of food items were served, some of which were allowed to remain outdoors for an extended period of time at ambient temperatures. Because there was some cooking of foods of animal origin going on during the event (e.g., grilling chicken) cross-contamination of surfaces or ready-to-eat food items was a possible cause of this outbreak.

(24)
Salmonella Heidelberg Infections Associated with a Restaurant

September St. Louis County

On September 22, 2003 the Minnesota Department of Health (MDH) Public Health Laboratory identified five isolates of *Salmonella* Heidelberg that were indistinguishable by pulsed-field gel electrophoresis (PFGE); the isolates were designated PFGE subtype SH1. Four of the corresponding cases resided in St. Louis County. Routine interviews of the first four cases revealed that they had all eaten the same restaurant in Duluth during the week before their illness onset. An investigation was initiated on September 23.

Prior to the identification of this outbreak, St. Louis County Health Department (SLCHD) sanitarians had visited the restaurant four times during the month of August. Repeated temperature violations were found during these inspections. The restaurant did not comply with a number of violations cited on the environmental inspection reports, including orders not to use

a cooler that was malfunctioning. The cooler was to be repaired or replaced by November 1, and was not to be used unless repaired.

SLCDH and MDH epidemiologists and a SLCDH sanitarian conducted an environmental assessment of the restaurant on September 24. No complaints had been made to the restaurant. Environmental samples were taken from several different surfaces in the restaurant. A list of patrons from September 22 and 23 was obtained.

Sixteen of the 23 restaurant employees were interviewed on September 24. Other food workers were interviewed on September 25, and stool samples were requested from all food workers.

All *Salmonella* cases reported to MDH are routinely interviewed about exposures and food consumption at home and at restaurants as part of foodborne disease surveillance in Minnesota. Epidemiologists reviewed the information gathered during the interviews of *S.* Heidelberg cases whose isolates matched the initial cases in St. Louis County by PFGE in order to identify other potential cases associated with eating at the restaurant.

A news article in the Duluth Tribune on September 30 also encouraged people who had recently eaten at the restaurant and subsequently experienced gastrointestinal illness to contact the MDH foodborne illness hotline.

Confirmed cases were defined as persons from whom *S.* Heidelberg SH1 was isolated and who reported working or eating at the restaurant since August 15 (and prior to onset of symptoms). Probable cases were defined as persons who had fever and diarrhea and ate at the restaurant prior to symptom onset. Suspect cases were those who ate at the restaurant and subsequently developed mild gastrointestinal symptoms (i.e., mild diarrhea, cramps, fatigue), but did not meet the case definition.

A case-control study was conducted to evaluate particular food items at the restaurant that may have been associated with illness. Only confirmed cases were included. Controls were individuals who were recruited using the list of restaurant patrons from September 22 and 23, and who reported no gastrointestinal symptoms.

Forty-one culture-confirmed *S.* Heidelberg cases were identified. Thirty-six of the 41 confirmed cases were patrons identified through routine surveillance. One of these cases was a Wisconsin resident, and one was a Washington resident. One of the 41 confirmed cases was a patron complainant who submitted a stool sample to MDH. Four of the 41 confirmed cases were food workers at the restaurant. All four of these food workers were excluded from work in food service until two consecutive stools collected at least 24 hours apart tested negative for *Salmonella.* Only one of these food workers reported symptoms of recent gastrointestinal illness. The other 19 food workers tested negative for *Salmonella* and reported no recent illness. One of the culture-confirmed patron cases was classified as a secondary case. This case did not become ill until 24 days after eating at the restaurant. This person's meal companion was ill with mild diarrhea 5 days after eating at the restaurant. The confirmed case likely acquired *Salmonella* via secondary transmission from the meal companion. The meal companion was classified as a probable case.

Sixteen probable cases were identified. Of the 16 probable cases, 10 were people who had called the MDH hotline, four were meal companions of confirmed cases, and two were ill patrons identified from the list of patrons with meal dates on September 22 and 23.

Twenty suspect cases (i.e., individuals who reported mild illness but did not meet the case definition) were identified, including nine people identified from the patron list, six who had called the MDH hotline, and five who were meal companions of confirmed cases. MDH was able to reach 39 additional patrons who reported no illness. Among the 50 patrons with meal dates on September 22 and 23, the attack rate using the definition for probable cases was 4% (2 probable cases). When including both suspect and probable cases, the attack rate was 22% (2 probable and 9 suspect cases).

Of the 37 culture-confirmed patron cases, 36 (97%) reported diarrhea, 33 (89%) reported fever, 30 (81%) reported cramps, 15 (41%) reported vomiting, and 12 (32%) reported bloody diarrhea. Seven (19%) of the 37 confirmed patron cases were hospitalized, with a median duration of hospitalization of 4 days (range, 2 to 6 days). Meal dates among confirmed patron cases ranged from September 1 to September 25. The median incubation period for patron cases (excluding the one secondary case) was 91 hours (range, 12 to 264 hours). The earliest onset of illness for a confirmed case was September 8.

Cases had eaten a variety of foods, including several breakfast items. Eggs, pancakes, and bacon were commonly eaten items among patrons. By univariate analysis comparing confirmed cases and well patrons, eating eggs (31of 37 cases vs. 13 of 38 controls; odds ratio [OR], 9.9; 95% confidence interval [CI], 2.9 to 35.6; $p<0.001$) and eating pancakes (18 of 37 cases vs. 6 of 38 controls; OR, 5.1; 95% CI, 1.5 to 17.6; $p=0.005$) were significantly associated with illness. Eating bacon approached statistical significance (6 of 37 cases vs. 1 of 38 controls; OR, 7.2; 95% CI, 0.76 to 169.4; $p=0.056$). After multivariate analysis using logistic regression, eating eggs (adjusted OR, 8.2; 95% CI, 2.6 to 25.5; $p=0.003$) and pancakes (adjusted OR, 3.6; 95% CI, 1.1 to 12.0; $p=0.04$) remained independently associated with illness.

The eggs used for the foods served at the restaurant were traced back to a distributor in Douglas County, Wisconsin. The eggs were not traced back to their original source farm.

Upon environmental inspection on September 24 and September 25, several temperature violations were found, in addition to a faulty hand soap dispenser, dishwasher disinfectant that did not meet the minimum concentration requirement, improper storage of foods to prevent cross-contamination, and improper labeling of prepared foods in a walk-in cooler. Several foods were discarded due to these violations. Environmental samples obtained on September 24 were negative for *Salmonella*.

As a result of the environmental assessment findings, the restaurant voluntarily closed until 5:00 a.m. on September 26 in order to comply with critical orders listed in previous inspection reports. SLCHD set forth guidelines after the inspection on September 25 in order for the restaurant to remain open. The guidelines included discarding ready-to-eat foods, discarding packaged foods that had been opened, obtaining a work order to replace cooling units on the prep-line, obtaining

a repair order for a malfunctioning cooler, conducting a thorough environmental cleaning, and excluding employees from work whom SLCHD staff had not interviewed.

The restaurant met these guidelines and was allowed to remain open on September 26. Due to the increasing number of *Salmonella* cases reported to MDH who had eaten at the restaurant, the SLCHD gave the restaurant a deadline of 5:30 p.m. on September 26 to find alternative staff for the restaurant until current staff could be screened for *Salmonella*. The restaurant front office manager, certified food manager, and cashier were the only employees allowed to work. These individuals were only allowed to serve as supervisors and were not allowed to do any food preparation. All other employees were excluded from work until they submitted two consecutive stool samples at least 24 hours apart that tested negative for *Salmonella*. There was another restaurant in Superior, Wisconsin under the same ownership as the Duluth restaurant. The Duluth restaurant decided to use replacement staff from the Superior restaurant. On September 27, the SLCHD epidemiologist discovered the Duluth restaurant's certified food manager engaged in food preparation at the restaurant. This employee was again reminded that he was not allowed to handle food, but was there to supervise. On September 28, upon investigation of the restaurant in Superior, one of the excluded food workers from the restaurant in Duluth was found working as a foodhandler in the Superior restaurant. He was immediately excluded again. The restaurant in Duluth was closed on September 28 due to concerns regarding the multitude of violations that had accumulated at that point. The restaurant was required to discard all prepared foods, conduct a thorough environmental cleaning, replace malfunctioning equipment, repair hand soap dispensers, make hand-washing stations available at all times, and establish approved procedures for the preparation of several foods. The restaurant was allowed to reopen on October 22. The SLCHD held a safe food handling employee-training session at the restaurant that was attended by all restaurant employees.

This was an outbreak of *S.* Heidelberg SH1 infections associated with eating at a restaurant. The outbreak was identified through routine laboratory-based surveillance at MDH. Transmission to patrons likely took place throughout the month of September, until the restaurant was closed. Consumption of eggs and pancakes was associated with illness. Several violations in food holding, handwashing, disinfection, and labeling of food items were identified; these problems likely contributed to the survival and proliferation of *S.* Heidelberg in foods and/or environmental surfaces, with subsequent transmission to patrons. Infected restaurant employees may also have played a role in the transmission of *Salmonella* to patrons.

(25)

Suspected *Clostridium perfringens* Intoxications Associated with Prime Rib

September Ramsey County

On Wednesday, September 17, 2003 the Minnesota Department of Health (MDH) Acute Disease Investigation and Control Section received a complaint from a group of two couples that became ill after eating dinner at a restaurant in St. Paul on Friday, September 12. An environmental health specialist from the City of St. Paul Office of License, Inspections and Environmental Protection and an epidemiologist from St. Paul-Ramsey County Department of Public Health were contacted, and an investigation was initiated.

MDH epidemiologists interviewed the four patrons about food consumption and illness history. A case was defined as a person with vomiting or diarrhea (≥3 loose stools in a 24-hour period) after dining at the restaurant. No stool or food samples were collected by MDH. The City of St. Paul environmental health specialist went to the restaurant on September 18 to review foodhandling practices.

The two couples denied any other common food exposures. All four individuals met the case definition. While some of them ate also items such as salad and baked potato, the only food item common to all four cases was prime rib, reportedly ordered rare. All four cases had cramps and diarrhea, one case reported bloody stools, and none of the cases reported vomiting or fever. The median incubation was 14 hours (range, 2 to 18 hours) and the median duration of illness was 22 hours (range, 12 to 49 hours). One case submitted a stool sample to his clinic; the stool was negative for bacterial pathogens but was not tested for bacterial enterotoxin-producing organisms such as *Clostridium perfringens*.

The restaurant manager reported selling approximately 40 prime rib meals on September 12, and had received no other illness complaints. The environmental health specialist reviewed the restaurant's handling of prime rib. One potential problem was that the special oven used to cook and hold prime rib had a broken gasket. Per the restaurant manager, the defect was first noted on September 16. Also, there appeared to be problems with calibration of the oven.

The cook reported routinely holding the prime rib at 250°F for several hours prior to serving and said that although the oven was set to 180°F, it was actually heated to 250°F. A roast being held at the oven at the time of the environmental assessment was at 138°F; according to the restaurant, this roast had been placed in an oven pre-heated to 300°F for 3 to 4 hours and then held at a temperature of 250°F for at least 3 hours. The restaurant was ordered to calibrate thermometers and repair defective equipment.

The clinical and epidemiologic features of these illnesses were consistent with *Clostridium perfringens* intoxications. Prime rib that has been temperature-abused has been the vehicle in past outbreaks of *C. 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. An incorrectly calibrated oven with a broken gasket may have contributed to the proliferation of the enterotoxin-producing organism in the prime rib.

(26)
Norovirus Gastroenteritis Associated with an Elementary School

September Pope County

On September 26, 2003 the Minnesota Department of Health (MDH) was notified that several children attending an elementary school in Pope County were absent from school. The mother reported that her child and several other classmates were sick with vomiting and diarrhea. The school reported that of the 346 students who attend the school, approximately 30 to 35 were home ill on September 26.

Epidemiologists from MDH conducted phone surveys with the students' parents to obtain information on school-related activities, foods consumed at the school, and illness history. A case was defined as a student who developed vomiting or diarrhea (≥3 loose stools in 24-hour period) during the week of September 23. Local sanitarians conducted an environmental inspection of the school cafeteria and interviewed the kitchen staff regarding any recent illness.

Of the 93 students interviewed, 33 (35%) met the case definition. Thirty-two (97%) of 33 cases had vomiting, 20 had diarrhea (61%), 20 of 30 (67%) had cramps, and 12 of 30 (40%) had fever. The median duration of illness was 15 hours (range, <1 to 75 hours). Stool samples were received from 10 students for testing for enteric pathogens. Three samples were positive for norovirus.

Two cases reported an onset date of September 21 and September 22, respectively; these individuals were ill at least 2 days prior to all other cases. Fourteen (42%) of the 33 cases occurred among the first graders, including one of the primary cases (onset, September 22). Overall, no single meal was significantly associated with illness during the week before the outbreak began. However, dining during the latter half of breakfast on September 23 was associated with illness (14 of 17 cases vs. 15 of 43 controls; OR, 8.7; 95% CI, 2.2 to 35.2; $p<0.001$). Eating breakfast later on September 24 (14 of 18 cases vs. 18 of 43 controls; OR, 4.9; 95% CI, 1.4 to 17.2; $p=0.01$) and September 25 (14 of 16 cases vs. 16 of 45 controls; OR, 12.7; 95% CI, 2.6 to 70; $p<0.001$) were also significantly associated with illness. Eating during the latter half of lunch on September 25 had a significantly higher risk of illness (17 of 20 cases vs. 26 of 49 controls; OR, 5.0; 95% CI, 1.3 to 19.3; $p=0.01$).

The inspection of the facility revealed that the cafeteria had a "seconds tables." In order to maintain federal funding, the school is required for each student to take a certain number of food items when purchasing a school meal. If the child does not wish to eat the item he/she was given, they are allowed to place the food on this "seconds table" for other children to consume.

This was an outbreak of norovirus gastroenteritis among students attending an elementary school. Transmission likely occurred through contamination of cafeteria food and/or utensils by ill students. Many students could handle food items on the "seconds table" during the course of a meal, which would explain the greater risk of illness among students who were in the latter half of the meal schedule. Having a table for reservice of food items is against Minnesota Food Code

(4626.0335). The school was educated on the risk of future illness by using such a system. The school ended use of this "seconds table" at school food services.

(27)
Suspected Norovirus Gastroenteritis Associated with a Football Team

October Todd County

On Saturday, October 11, 2003 the Minnesota Department of Health (MDH) on-call epidemiologist was notified of an outbreak of gastrointestinal illness among members of a high school football team in Todd County. A county public health nurse, who was also the school nurse and a parent of two of the team members, reported that persons associated with the team became ill on Friday and Saturday, October 10 and 11.

The Todd County public health nurse provided MDH with a list of football players, coaches, and cheerleaders. These team members were interviewed by MDH epidemiologists about illness history and food consumption from October 8 to October 10. A case was defined as a person with onset of vomiting or diarrhea (≥3 loose stools in a 24-hour period) during or after the potluck dinner. No stool specimens were collected.

Thirty (67%) of 45 football players, coaches, and cheerleaders were interviewed, and 21 (70%) met the case definition. Three persons reported mild symptoms such as nausea and abdominal cramps; they were excluded from the analysis. Twenty (95%) cases reported vomiting, 15 (71%) reported diarrhea, 12 (57%) reported fever, and three (14%) reported cramps. Dates of illness onset were October 10 and 11, but the majority of cases (19 of 21 [90%]) became ill on October 11.

The football players, coaches, and cheerleaders reported multiple common exposures, including daily school breakfasts and lunches, a potluck dinner held on Thursday, October 9, a baked potato snack on Friday, October 10, and meals at various fast-food establishments prior to and following the football game on Friday, October 10.

The meal date and time used to calculate incubation periods was based on the potluck meal served to the players and coaches on October 9 at 5:30 p.m.. Using the potluck meal as the exposure, incubation periods ranged from 16 to 52 hours, with a median of 34 hours. The duration of illnesses ranged from 0.25 to 53 hours, with a median of 22 hours.

Foods served at the potluck dinner included three different hot dishes, hotdogs and buns, bars, ice cream, and milk. None of the food items were statistically associated with illness, but the bars approached significance (20 of 21 [95%] cases vs. 4 of 6 [67%] controls; odds ratio, 10.0; 95% confidence interval, 0.6 to 307.3; p=0.11). Two persons did not attend the potluck dinner; one reported nausea and the other did not report illness. None of the other common exposures (daily school breakfasts and lunches, the baked potato snack, fast-food meals, and the shared water bottles) were statistically associated with illness.

Team members were asked about household members who may have been ill during the week prior to the potluck dinner. None of the persons interviewed reported illness among other members of their households. One of the parents reported that there was an ill person in the household of one of the members whose parent brought a food item to the potluck dinner.

Case illness histories in this outbreak of gastroenteritis among football players and affiliated team members are consistent with an etiology of norovirus. Case onset dates suggest that the outbreak was associated with the potluck dinner. However, the specific vehicle or source of contamination could not be confirmed.

(28)
Staphylococcus aureus Intoxications Associated with Leftover Smoked Turkey

October Koochiching County

On Monday, October 20, 2003 an infection control practitioner at a hospital in Lake of the Woods County contacted the Minnesota Department of Health (MDH) foodborne illness hotline. The infection control practitioner reported that two people had been admitted to a hospital with vomiting on the previous day. The ill persons had onset of symptoms a few hours after attending a gift opening held at private home in Koochiching County on the afternoon of Sunday, October 19. Two other attendees of the gift opening had also presented to a different hospital emergency room with vomiting. In addition to the gift opening, all four ill persons had attended other wedding-related events held over the weekend including a rehearsal dinner held on Friday, October 17 at a hotel and a reception dinner held on Saturday, October 18 at a hall.

Koochiching County Health Department staff obtained a list of event attendees from the family of the bride. On October 23, MDH epidemiologists received the list and interviewed attendees by phone about attendance at different wedding-related events (e.g., rehearsal dinner, wedding reception, and gift opening), food consumption, and illness history. A case was defined as any person who attended a wedding-related event and subsequently developed vomiting or diarrhea (≥3 loose stools in a 24-hour period). The MDH Public Health Laboratory conducted bacterial, bacterial toxin, and viral testing on stool samples collected from three cases.

On October 29, a sanitarian from the MDH Northwest District office in Bemidji went to International Falls to assess the facility where the wedding reception was held.

A total of 43 people were interviewed. Of those, four (9%) met the case definition, 35 (82%) reported no symptoms, and four (9%) had symptoms that did not meet the case definition and were excluded from further analysis. All four cases had vomiting, three (75%) had diarrhea, three (75%) had cramps, two (50%) had fever, and one (25%) had bloody stools. All four cases sought medical attention in an emergency room, and two of the four were hospitalized overnight for dehydration. The duration of acute symptoms was less than 24 hours, but cases reported feeling unwell for up to 4 days after onset.

Attending the gift opening on the afternoon of October 19 was significantly associated with illness (4 of 4 [100%] cases vs. 5 of 35 [14%] controls; odds ratio, undefined; lower limit of 95%

confidence interval, 2.82; p<0.001). Leftovers from the wedding reception, including smoked turkey (served cold), buns, cake, and salads, were served at the gift opening. No food items were significantly associated with illness, but turkey was the only common food item at the gift opening that was consumed by all four cases. The four cases had onset of symptoms between 2 and 3 hours after eating the leftovers. It was reported that four other gift opening attendees also became ill; these persons could not be reached for an interview.

Stool specimens from three cases tested negative at MDH for *Campylobacter*, *E. coli* O157:H7, *Salmonella*, *Shigella*, norovirus, *Clostridium perfringens* enterotoxin type A, and *Bacillus cereus*. All three stool specimens were positive for enterotoxin A-producing *Staphylococcus aureus*. Molecular subtyping by pulsed-field gel electrophoresis (PFGE) was conducted on the three *S. aureus* isolates, and all three isolates had an indistinguishable PFGE pattern.

Results from the environmental health investigation conducted by the MDH Northwest District sanitarian at the reception site suggested that the leftover smoked turkey was the most likely vehicle. The hall where the reception was held was not a licensed facility. According to the hall manager, the sliced smoked turkey was prepared offsite by a private party and delivered to the hall at about noon on Friday, October 17. This item remained at room temperature for several hours, at which point it was refrigerated. On the day of the reception, the turkey was at room temperature on a buffet for several more hours. At the end of the reception, the turkey was refrigerated again until the next day, when it was transported to the site of the gift opening and left at room temperature for several more hours. During the interviews with guests, several people raised concerns about the refrigerators at the hall not being cold enough. The facility had two refrigerators. One of the refrigerators was operating at 49 to 50°F. The MDH sanitarian recommended that the facility either replace or repair that refrigerator. The other refrigerator had an acceptable operating temperature of 40°F. The facility was provided with food safety educational information and signs for the kitchen regarding safe food temperatures for those who would be using the hall for future events.

This was an outbreak of *Staphylococcus aureus* intoxications associated with consuming leftover food at a gift opening. The most likely vehicle was leftover smoked turkey that may have undergone cumulative time/temperature abuse over a 2-day period.

(29)
Salmonella Enteritidis Infections Associated with Eggs

October — Mille Lacs County

On November 13, 2003 the Minnesota Department of Health (MDH) received two independent reports of *Salmonella* infections from school nurses in Mille Lacs County. One of the reported cases was a school cook, and the other was a student at a different area school who happened to work at a restaurant in Princeton. The next day, the MDH Public Health Laboratory confirmed the two reported cases as having *Salmonella* Enteritidis. Two additional isolates of *S.* Enteritidis were also identified that day. All four isolates were indistinguishable by pulsed-field gel electrophoresis (PFGE). This PFGE subtype was SE1B1, the most common subtype in Minnesota. One of the newly identified cases was also from Mille Lacs County. The infection

control practitioner (ICP) for the area hospital was contacted, and over the weekend she reported to MDH additional suspect cases seen at the hospital. Interviews of the confirmed cases and suspect cases by MDH staff revealed that they had all patronized the same restaurant in Princeton. An investigation of the restaurant was initiated on November 17.

MDH Environmental Health (EH) specialists conducted an environmental assessment of the restaurant on November 17. The restaurant closed that day and remained closed until November 20 for cleaning, disinfection, and disposal of food items, and until illness among workers could be assessed. While the restaurant was closed, MDH EH specialists provided hand-washing training to all restaurant employees.

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

All *S.* Enteritidis cases reported to MDH are routinely interviewed about exposures and food consumption at home and at restaurants as part of surveillance activities. Information gathered during routine interviews was reviewed by an MDH epidemiologist in order to identify other potential cases associated with eating at the restaurant.

Confirmed cases were defined as persons from whom *S.* Enteritidis SE1B1 was isolated and who reported eating at the restaurant prior to symptom onset, or who worked at the restaurant. Probable cases were defined as persons who had diarrhea (≥3 loose stools in a 24-hour period) and fever and ate at the restaurant in the week prior to symptom onset, or who had diarrhea and ate at the restaurant with a confirmed case.

Names of patrons who had eaten at the restaurant from October 20 to November 15 were obtained from credit-card receipts. A case-control study was conducted to identify vehicles for infection.

The Minnesota Department of Agriculture (MDA) laboratory tested uncooked shell eggs available at the restaurant at the time of the investigation for *S.* Enteritidis. MDA also conducted a traceback investigation to identify the source of eggs used by the restaurant at the time of the outbreak. As part of the traceback investigation, an evaluation of egg-handling practices at the distributor was conducted. Farms that supplied eggs to the restaurant were inspected, and environmental samples were collected and tested for *S.* Enteritidis. Inspectors from the United States Food and Drug Administration (FDA) assisted with the farm investigation. Interventions were implemented based on environmental sampling results.

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

Thirty cases were identified from routine surveillance and complaints, including 27 confirmed and three probable cases. Twenty-three cases (20 confirmed and three probable) were patrons of

the restaurant. Seven cases (all confirmed) were restaurant employees. Twenty-two employees tested negative for *S.* Enteritidis. Three of the seven (43%) restaurant employee cases reported no gastrointestinal symptoms during the month prior to the investigation. Five additional restaurant patrons with gastrointestinal symptoms after eating at the restaurant were identified but excluded from the analysis because they did not meet the case definition.

Among the 27 symptomatic cases (23 patrons and 4 employees), all reported diarrhea, 21 (78%) reported abdominal cramps, 20 (74%) reported fever, 11 (41%) reported vomiting, and 10 (37%) reported bloody stools. The median duration of illness was 230 hours (range, 62 to 310 hours). Twenty-four (89%) cases visited a health care provider. Ten (37%) were hospitalized for a median of 4 days (range, 1 to 7 days) for their illness.

Meal dates among patron cases ranged from October 26 to November 15. The median incubation period for patrons was 81 hours (range, 19 to 176 hours). The earliest reported dates of onset of illness were October 31 for a patron and November 2 for an employee.

Isolates from three of the cases were sent to CDC for phage typing; all three were phage type 13a.

Cases had eaten a variety of foods including French toast, eggs (scrambled, basted, hard boiled, sunny side up, omelets), pancakes, waffles, hamburgers, chili, chicken, biscuits, and salads. Eating French toast (8 of 23 cases vs. 6 of 49 controls; odds ratio, 3.8; 95% confidence interval, 1.1 to 13; p=0.05) was associated with illness.

The environmental assessment found that the prep-line refrigerator was keeping foods (including eggs) at 50°F. Waffle batter was prepared in a large batch that included 36 eggs, which was broken down into four buckets and placed into refrigeration. A working container of batter was kept in the cookline upright refrigerator. One ladle and the working container may have been used for multiple days between different buckets of batter (allowing for cross contamination from batch to batch). Pancake batter was made in 5-gallon batches and transferred into pitchers. Batter from the pitchers was then used to fill a pancake dispenser. The pancake dispenser was washed every other day. French toast egg wash was made from large batches of pooled eggs that were distributed to working containers that possibly carried over from day-to-day in the cookline upright refrigerator.

As a result of the environmental assessment findings, the restaurant discarded all prepared or open packages of ready-to-eat foods. The restaurant was thoroughly cleaned. The prep-line refrigerator was repaired. All employees received training on hand washing. The restaurant agreed to purchase additional waffle ladles and pancake batter dispensers. Also, the restaurant started to use pasteurized eggs for French toast and batter foods.

Five cases containing 27 to 29 dozen shell eggs each were collected by the MDA from the restaurant. Eighty samples from composites of two to 10 eggs each were cultured. All egg samples were negative for *Salmonella*. The restaurant purchased eggs from one distributor, Distributor A. Several problems were identified at the distributor. Graded shell eggs were packed in containers that did not have safe handling instructions. Cartons were being re-used

without completely removing the old pack date and grade. A review of purchase records at the distributor identified two farms in Minnesota (Farm A and Farm B) as the only possible sources of shell eggs sold to the restaurant during the outbreak period. Officials from MDA investigated both farms. All environmental and manure drag samples at Farm A tested negative for *S.* Enteritidis. Farm B identified two barns as the source of eggs sold to the distributor during the outbreak time period. Environmental and manure drag samples were collected from both barns. One of the barns tested positive for *S.* Enteritidis. Based on the positive results, MDA expanded the investigation and conducted environmental and manure drag testing of all barns housing layer flocks and barns housing pullets. FDA inspectors assisted in the investigation. Eight of the 11 layer barns ultimately tested positive for *S.* Enteritidis SE1B1. Isolates sent to CDC for phage typing were all phage type 13a. Both of the pullet barns tested negative. Live rodents were observed in several of the barns. As a result, eggs from barns that tested positive were diverted to pasteurization until 1,000 eggs from each barn test negative at four consecutive 2-week intervals.

Before the farm investigation was completed, an additional case of *S.* Enteritidis SE1B1 was identified by MDH during routine surveillance activities. The case reported illness onset on January 8, 2004. This case had not eaten at restaurant in Princeton, but did eat eggs that were traced to Farm A. The case purchased the eggs at a grocery store during the week before his illness onset.

This was an outbreak of *S.* Enteritidis SE1B1 infections associated with eating at a restaurant in Princeton. The outbreak was identified through routine surveillance activities at MDH. Documented transmission to patrons of the restaurant occurred for more than 2 weeks. French toast was statistically implicated as a vehicle; however, multiple foods likely acted as vehicles for patrons. Shell eggs were confirmed as the ultimate source of *S.* Enteritidis through trace back and environmental testing at the farm of origin. Several deficiencies in food holding and preparation, such as inadequate refrigeration and potential for cross-contamination, were identified at the restaurant. These deficiencies likely contributed to the survival and proliferation of *Salmonella* in foods and cross-contamination in the kitchen. Deficiencies were also identified at the distributor that supplied shell eggs served at the restaurant. Extensive *S.* Enteritidis SE1B1 contamination was found at the source egg farm. A later sporadic *S.* Enteritidis SE1B1 case was associated with eggs from the implicated farm, but not the restaurant. Control measures, such as extensive testing and diverting eggs to pasteurization, were implemented at the farm.

(30)
Norovirus Gastroenteritis Associated with a Luncheon

November Hennepin County

On Monday, November 3, 2003 the Minnesota Department of Health (MDH) was notified via the foodborne illness hotline of an outbreak of enteric illness among a group of four people who had been together on Saturday, November 1. On Saturday morning, the members consumed coffee drinks from a market vendor in Minneapolis, and at noon consumed hamburgers and chicken at a restaurant in Plymouth. The group members had no other activities or exposures in common. MDH epidemiologists notified MDH Environmental Health Services staff, Hennepin

County epidemiologists, and the City of Minneapolis Environmental Health staff of the complaint, and an outbreak investigation was initiated.

On Tuesday, November 4 a Hennepin County sanitarian and epidemiologist inspected the restaurant in Plymouth, focusing on food preparation practices and employee health and hygiene. They met with restaurant managerial staff and interviewed food employees who worked on November 1. No additional restaurant patrons were identified; credit card receipts were not available and the restaurant did not accept checks. No additional patrons of the market in Minneapolis were identified. The coffee vendor operation was not assessed.

A case was defined as a person who visited the market in Minneapolis or the restaurant in Plymouth on November 1, with subsequent onset of vomiting or diarrhea (≥3 loose stools in a 24-hour period). Stool specimen kits were delivered to two of the cases for bacterial and viral pathogen testing at the MDH Public Health Laboratory.

Three of four persons identified from the initial complaint met the case definition. The median incubation, calculated from the morning coffee on November 1, was 36 hours (range, 35 to 38.5 hours). The median duration of illness was 10.5 hours (range, 4 to 17 hours). All three cases were female, 20 to 49 years of age. Two (67%) of three cases reported diarrhea, two (67%) reported vomiting, one (33%) reported cramps, and one (33%) reported fever. Both stool specimens tested positive for norovirus. Genetic sequencing was conducted on norovirus from both cases and both sequences were identical.

All four members consumed a coffee drink ordered from a vendor at a market in Minneapolis. At the restaurant in Plymouth, all three cases reported consuming hamburgers of various types that included sliced tomatoes prepared at the establishment, and fries. The non-ill member consumed chicken and fries.

The environmental health investigation at the restaurant in Plymouth revealed evidence of improper hand washing by a food employee at the broiler station who dipped hands in a pail of sanitizer in place of hand washing at a hand sink with soap and water. The sanitarian also noted the use of disposable gloves and utensils by employees while handling food. Hennepin County epidemiologists interviewed five of five food employees, two of two managerial staff, and three of 10 service staff who worked during the lunch hour on November 1. All ten employees reported no illness during the week prior to November 1.

No further complaints of illness were received from patrons of the market in Minneapolis or the restaurant in Plymouth.

This was an outbreak of norovirus gastroenteritis. The restaurant was the most likely source, but exposure from items consumed at a market could not be ruled out as a source.

(31)
Suspected Norovirus Gastroenteritis Associated with a Catered Lunch

November Hennepin County

On November 14, 2003 the City of Minnetonka Environmental Health Division informed the Minnesota Department of Health (MDH) that they were investigating a possible foodborne illness outbreak associated with a lunch catered by a Minnetonka restaurant. The City of Minnetonka had began the investigation on November 12, when restaurant management notified them of a recent report of illnesses among people who had eaten catered box lunches at a meeting held in a Minneapolis workplace on November 6. The restaurant had prepared approximately 40 box lunches for the meeting; the lunches consisted of sandwiches (choice of turkey, roast beef, or ham, with lettuce, tomato, and Swiss cheese), potato salad, pickles, and brownies.

MDH forwarded this information to an epidemiologist from the Hennepin County Community Health Department (HCCHD) on November 14.

City of Minnetonka environmental health staff obtained a list of meeting attendees from the event organizer, and, in collaboration with HCCHD staff, interviewed attendees about food and beverage consumption and illness history. A case was defined as a person with onset of vomiting or diarrhea (≥3 loose stools in a 24-hour period) after attending the luncheon. Stool kits were made available to cases, and one case submitted a specimen to MDH for bacterial and viral testing.

Environmental health specialists visited the restaurant on November 14 to evaluate foodhandling practices and employee illnesses. Stool samples were obtained from two of the restaurant workers.

Twenty-four of the approximately 30 luncheon attendees were interviewed, and 16 (67%) met the case definition. Fourteen cases (88%) had diarrhea and cramps, 12 (75%) had fever, 10 (63%) had vomiting, and no one had bloody stools. No cases had sought medical attention for their symptoms. The median incubation period was 37 hours (range, 9 to 125 hours), and the median duration of illness was 2 days (range, 1.5 to 5 days). The stool specimen submitted by a case was negative for norovirus as well as for *Campylobacter*, *E. coli* O157:H7, *Salmonella*, and *Shigella*; however, the specimen was collected over a week after the case became ill.

No food items were significantly associated with illness, although brownies approached statistical significance (16 of 16 cases vs. 6 of 8 controls; odds ratio, undefined; p=0.10).

The restaurant had not received any other complaints of illness. City of Minnetonka environmental health specialists observed foodhandling deficiencies; these included washing hands in the food prep sink in the bakery instead of at the designated handwashing sink, failure to wash hands before resuming work duties, and failure to minimize bare-hand contact while frosting brownies. Fifteen workers were interviewed about recent illness and job duties; 11 of the 15 had been involved in preparing the box lunches. A bakery worker who had probably frosted the brownies for the box lunches described having an ill household member around the

time of the outbreak. A stool specimen submitted from this household member was negative for bacterial and viral pathogens; the specimen was collected several days after this person was reportedly ill. Another employee, who may have also been involved in frosting brownies for the box lunches, was reported to be ill a few days after the lunches were prepared. At the time of the investigation, this employee had an ill household member; a stool specimen from this household member was positive for norovirus.

This was a foodborne outbreak associated with box lunches catered by a restaurant. The clinical and epidemiologic characteristics of the illnesses were consistent with norovirus gastroenteritis. Frosted brownies were a plausible vehicle. There was evidence (including a norovirus-positive stool specimen from a member of one food worker's household) suggesting that gastrointestinal infections may have been circulating among restaurant employees and their families. The inadequate handwashing practices observed at the restaurant could have facilitated viral contamination of frosting or other ready-to-eat food items that were extensively handled during the preparation of the box lunches.

(32)
Norovirus Gastroenteritis Associated with a Wedding Reception

November Ramsey County

On Wednesday, November 12, 2003 the Minnesota Department of Health (MDH) was notified via the foodborne illness hotline of an outbreak of gastrointestinal illness among persons who had attended a wedding reception at a hotel in St. Paul on November 8. The call was made by a guest of the reception who had become ill. The wedding party and guests had attended one or more functions with food over a 3-day period. On Friday, November 7, a gathering with food was held at a private residence for approximately 30 persons. On Saturday, approximately 200 reception patrons were served hors d'oeuvres and food items from fruit and antipasti platters; salad, pasta, and crepes from buffet tables; and cupcakes, hallavah, candy, and nuts brought to the reception by guests. Four other banquet functions were held at the hotel Saturday evening. On Sunday, approximately 60 patrons were served a private brunch buffet at the hotel. The hotel staff failed to report this incident to the local regulatory authority (or MDH) as required by Minnesota Rules Chapter 4626 part 0060; rather, they had begun an independent investigation, which included telephone interviews of reception guests.

On Thursday morning, November 13, MDH epidemiologists notified the City of St. Paul and MDH Environmental Health offices, and the St. Paul-Ramsey County Epidemiology office about the complaint and began an outbreak investigation. On Thursday afternoon, MDH received copies of menus and names, phone numbers, and completed questionnaires from ill patrons (approximately 44) that the hotel staff had interviewed on November 11 and 12. Data from these questionnaires were excluded from analysis. The hotel staff provided MDH with contact names and phone numbers for the four other banquet functions held the evening of November 8.

On November 14, MDH received a list of names and phone numbers of the reception patrons from the wedding party. Patrons were interviewed about illness history and food consumption using a standard questionnaire. A case was defined as a person who had attended any of the wedding-party functions from Friday, November 7 to Sunday, November 9, and who had

subsequently experienced onset of vomiting or diarrhea (≥3 loose stools in a 24-hour period). Stool specimens from eight patrons and one banquet employee were submitted to the MDH Public Health Laboratory (PHL) for bacterial and viral pathogen testing.

On Thursday morning, November 13, sanitarians with the St. Paul Office of License, Inspections, and Environmental Protection (LIEP) met with hotel managerial staff and initiated an environmental health investigation focusing on employee health and hygienic practices, food flow, and use of equipment. Culinary and banquet employees associated with the wedding reception were interviewed about work duties, illness history, and food consumption using a standard questionnaire.

Eighty-one (49%) of 164 patrons interviewed met the case definition. Twenty-four (14%) patrons were removed from analyses: 15 (9%) complained of mild illness symptoms but did not experience vomiting or diarrhea, seven (4%) were likely secondary cases, and two (1%) experienced loose stools before or during the wedding reception.

One hundred sixty-two (99%) of the 164 persons interviewed attended the Saturday wedding reception. Eighty-one (50%) of these 162 patrons met the case definition (81 [100%] of 81 cases overall). Forty-one (51%) of the 81 cases attended no other wedding meal function. The median incubation, calculated from the time of the reception meal, was 38.5 hours (range, 4 to 120.5 hours). The median illness duration was 24 hours (range, 2 to 133 hours). Sixty-five (80%) of 81 cases reported diarrhea, 53 (66%) of 80 reported vomiting, 51 (65%) of 79 reported cramping, 34 (47%) of 72 reported fever, and three (4%) reported bloody stools. One person reported being hospitalized.

Twenty-two (13%) of 164 persons interviewed attended the Friday private gathering, and 15 (68%) of the 22 met the case definition (15 [18%] of 81 cases overall). Thirty-eight (23%) of 164 persons interviewed attended the crepe buffet at the Saturday reception, and 23 (60%) of the 38 met the case definition (23 [28%] of 81 cases overall). Forty (24%) of 164 persons interviewed attended the Sunday brunch, and 26 (65%) of the 40 met the case definition (26 [32%] of 81 cases overall). Forty-one (51%) of the 81 cases attended only the wedding reception and not any of these other meal functions.

Five (55%) of nine stool specimens received by the MDH-PHL tested positive for norovirus; all nine specimens tested negative for *Campylobacter*, *E. coli* O157:H7, *Salmonella*, and *Shigella*. Genetic sequencing was conducted on norovirus from all five cases and all sequences were identical. Three of the five lab-confirmed cases attended wedding functions on all three dates; the remaining two cases attended only the reception.

Several food items served at the reception were associated with illness by univariate analysis, including stuffed mushrooms (34 of 79 cases vs. 13 of 58 controls; odds ratio [OR], 2.6; 95% confidence interval [CI], 1.1 to 6.1; p=0.012), sliced carrots (14 of 58 cases vs. 3 of 46 controls; OR, 4.6; 95% CI, 1.1 to 21.9; p=0.016), any cut vegetable (32 of 60 cases vs. 14 of 44 controls; OR, 2.4; 95% CI, 1.0 to 6.0; p=0.029), any salad item (68 of 74 cases vs. 40 of 52 controls; OR, 3.4; 95% CI, 1.1 to 11.3; p=0.018), and ice (67 of 76 cases vs. 35 of 48 controls; OR, 2.8; 95% CI, 0.97 to 7.9; p=0.031).

By multivariate logistic regression, stuffed mushrooms (OR, 3.7; 95% CI, 1.4 to 10.0; p=0.009) and any salad item (OR, 4.9; 95% CI, 1.2 to 20.0; p=0.025) were associated with illness, adjusting for children. Stuffed mushrooms (OR, 3.5; 95% CI, 1.3 to 9.4; p=0.011) and ice (OR, 3.3; 95% CI, 1.1 to 9.5; p = 0.027) were associated with illness without adjustment. Similarly, stuffed mushrooms (OR, 4.1; 95% CI, 1.6 to 10.7; p=0.004) and ice (OR, 3.6; 95% CI 1.3 to 10.1; p=0.016) were associated with illness under both multivariate models by stepwise selection of independent variables.

Twelve (100%) of 12 culinary employees and 14 (93%) of 15 banquet employees were interviewed. Twenty-three (88%) of the 26 employees interviewed denied any illness in themselves or anyone in their households from November 1 to the interview date. Two banquet employees met the case definition with onset dates of November 9 and 10. Another banquet employee reported onset of milder illness symptoms but did not meet the case definition. These employees reported no common food item but had consumed food from antipasti platters, the pasta buffet, as well as food items brought by patrons.

Contact persons from the four other functions with food held at the hotel on November 8 reported no subsequent illnesses among their groups. However, the food items associated with illness were either not served at the other functions (stuffed mushrooms, field greens with garden vegetables), or were handled by employees while working at the wedding reception (ice).

A patron reported loose stools in two household member patrons with onsets before or during the wedding reception. Vomiting was not a reported symptom in these two patrons. Also, they did not consume or handle stuffed mushrooms or salad bar items, nor did they serve themselves from the buffet tables. Therefore, they were not considered a likely source of contamination.

This was an outbreak of norovirus gastroenteritis associated with a wedding reception at a hotel on November 8. Multiple food items were implicated as vehicles of transmission. A source of contamination was not identified; no culinary or banquet staff reported illness prior to the reception. However, infectious food employees are a known source of contamination in foodborne outbreaks of norovirus.

(33)
Norovirus Gastroenteritis Associated with Tuna Sushi Rolls

November Hennepin County

On November 19, 2003 the Minnesota Department of Health (MDH) received a foodborne illness complaint from a group that had dined at a restaurant in Minneapolis on November 15. On November 17, the Minneapolis Division of Environmental Health (MEH) received another foodborne illness complaint from persons who ate at the same restaurant on November 14. An investigation was initiated in collaboration with the Minneapolis Division of Environmental Health (MEH) and the Hennepin County Community Health Department (HCCHD). On November 20, MDH received a third independent complaint from a group that dined at the restaurant on November 14.

The restaurant provided HCCHD epidemiologists with a list (generated from credit card receipts) of restaurant patrons from November 14 and 15. Patrons were interviewed by phone about food and beverage consumption and illness history. A case was defined as a person with onset of vomiting or diarrhea (≥3 loose stools in a 24-hour period) after dining at the restaurant. Five cases submitted a stool specimen to MDH for bacterial and viral testing.

MEH environmental health specialists visited the restaurant on November 19 to evaluate foodhandling practices and employee illnesses. Stool samples were obtained from one of the restaurant workers.

Fifty-two patrons were interviewed, and eight (15%) met the case definition. Seven (88%) had vomiting, seven (88%) had diarrhea, five (63%) had cramps, and five (63%) had fever. The median incubation period was 31 hours (range, 16 to 48 hours). Because most of the cases were still ill at the time of interview, duration was not calculated. All five stool samples collected from cases as well as the stool sample collected from a restaurant worker were positive for norovirus. The norovirus detected in one of the cases' samples was sequenced and compared to the sequence of the norovirus detected in the restaurant worker's sample; the two sequences were identical.

Consumption of the tuna sushi rolls was significantly associated with illness (6 of 7 [86%] cases vs. 1 of 41 [2%] controls; odds ratio, 240; 95% confidence interval, 10 to 35,899; $p < 0.001$).

MEH sanitarians interviewed 23 restaurant employees. Only one reported any recent or current illness; this individual was ill at the same time as the patrons and had a stool sample test positive for norovirus (see above). An inspection revealed that the front handwashing sink lacked a nailbrush. A sanitarian performed a food preparation review of the tuna sushi rolls. The preparation involved some bare-hand contact when spreading rice on the seaweed mat and adding diced vegetables.

This was an outbreak of norovirus gastroenteritis associated with consuming tuna sushi rolls at a restaurant. It was unclear whether the source of the viral contamination was an infected food worker or a contaminated ingredient.

(34)
Norovirus Gastroenteritis Associated with a Wedding Reception

November Morrison County

On November 18, 2003 the Minnesota Department of Health (MDH) received a report from the Morrison County Public Health Department concerning guests who had become ill after attending a wedding reception on November 15. The bride's mother had indicated that approximately one half of the 270 guests who attended the reception became ill with symptoms of vomiting and diarrhea. She reported that the reception was held a banquet hall in Little Falls. The report also indicated there was a groom's dinner the night before (approximately 30 people attended), and sandwiches (prepared by the bride's mother) were served before the wedding ceremony.

Epidemiologists from MDH conducted phone surveys with guests from the reception to obtain information on consumption of foods/beverages and illness history. A case was defined as a guest who attended one of the wedding events and subsequently became ill with vomiting or diarrhea (≥3 loose stools in 24-hour period). Public health officials from Morrison County conducted a routine inspection of the ballroom food service facility and interviewed the staff to ascertain work-related duties and any recent illness.

Stool samples were collected from six guests and one banquet hall employee and submitted to MDH for bacterial and viral testing.

Of 128 guests who were interviewed, 66 (52%) met the case definition. Fifty-one (77%) cases reported diarrhea, 42 (64%) had vomiting, 44 of 65 (68%) had cramps, and 27 of 61 (44%) reported fever. The median incubation period, calculated from the time of the reception meal, was 37 hours (range, 1 to 86 hours). The median duration of illness was 42 hours (range, 5 to 204 hours). Five stool samples from six guests were positive for norovirus. Three food service employees reported symptoms of vomiting and/or diarrhea 36 to 60 hours after the reception; all had consumed food items from the same buffet used to serve the reception guests. One of the employees submitted a stool sample for testing; this employee was also positive for norovirus.

Several food items served at the reception were significantly associated with illness by univariate analysis, including mashed potatoes (65 of 66 cases vs. 43 of 51 controls; odds ratio [OR], 12.1; 95% confidence interval [CI], 1.5 to 100.2; p=0.01), gravy (64 of 66 cases vs. 40 of 51 controls; OR, 8.8; 95% CI, 1.9 to 41.8; p=0.002), chicken (60 of 66 cases vs. 39 of 51 controls; OR, 3.1; 95% CI, 1.1 to 8.9; p=0.04), stuffing (58 of 66 cases vs. 36 of 51 controls; OR, 3.0; 95% CI, 1.2 to 7.8; p=0.03), coffee (9 of 65 cases vs. 17 of 50 controls; OR, 0.31 [protective]; 95% CI, 0.12 to 0.78; p=0.01) and ham (56 of 66 cases vs. 35 of 51 controls; OR, 2.6; 95% CI, 1.0 to 6.3; p=0.04). Male gender was also associated with illness (32 of 66 cases vs. 12 of 51 controls; OR, 3.1; 95% CI, 1.4 to 6.9; p=0.007). Gravy (adjusted OR, 8.8; 95% CI, 1.7 to 44.8; p=0.009), gender, and coffee (protective) were independently associated with illness after analysis by stepwise regression. Individuals who sat at the head table were served directly by the food service staff with food from the kitchen; head table guests did not go through the buffet line. Seven of 10 (70%) guests at the head table, who were interviewed, became ill compared to 59 of 107 guests (55%) who went through the buffet line. Six of seven cases from the head table consumed gravy. Among guests who used the buffet line, stepwise regression analysis revealed that the association between gravy and illness was even stronger (OR, 18.1; 95% CI, 2.1 to 153.9; p=0.008). The genetic sequence of norovirus isolated from the stool of a guest who went through the buffet line was indistinguishable from the norovirus sequence of a guest at the head table.

Attending the groom's dinner or consumption of the sandwiches before the ceremony were not associated with illness. Consumption of wedding cake, the only food item that was brought into the ballroom from an outside source, also was not associated with illness. Two guests became ill the day of the reception. A 5-year-old child had vomiting symptoms beginning 8 hours before the reception; however, the child did not go through the buffet line. Another guest reported diarrhea symptoms one hour after eating the night of the reception; however, she did not have vomiting/cramps/fever until 48 hours later.

Investigation by Morrison County public health staff indicated the banquet hall food service staff had prepared and served the food for the reception on-site. A food flow investigation revealed that the majority of food items were prepared the day of the reception or the day before. Foods were prepared and then held in a warmer before they were served, either to the buffet line or to the head table. No food service employees reported any recent illness before the wedding reception. During the inspection of the facility, Morrison County public health staff noted that there was no sink in the employee restroom.

This was an outbreak of norovirus gastroenteritis among guests of a wedding reception at the banquet hall. Gravy was implicated as the vehicle of transmission. The head table was served food that came directly from the kitchen to the tables. This is not compatible with contamination of the gravy by an ill guest. An ill or recently ill employee may have contaminated the gravy with his/her hands after preparation. However, no food service employees were identified as being ill prior to the reception.

(35)
Suspected Bacterial Foodborne Intoxications Associated with a Potluck

November Carver County

On November 24, 2003 the Minnesota Department of Health (MDH) was notified of an outbreak of gastrointestinal illness among persons who attended a company Thanksgiving potluck event in Chanhassen on November 20. An attendee of the potluck called the MDH foodborne illness hotline to file a complaint because several potluck attendees had reported gastrointestinal illness. Food items served at the meal included both catered items from a licensed caterer and items brought in by company employees. An investigation was initiated on November 24.

MDH epidemiologists interviewed the company's potluck attendees during November 24 – 26. A list of food items was obtained from the original complainant. A case was defined as a person who reported eating at the potluck and who subsequently became ill with vomiting or diarrhea (≥3 loose stools in a 24-hour period).

On November 25, the sanitarian for the city of Hopkins conducted an inspection of the catering facility, with an emphasis on handling and storage practices of consumed food items.

Of 61 attendees interviewed, 22 (36%) met the case definition. Of these cases, 20 (91%) had diarrhea, 16 (73%) had vomiting, 13 (59%) had cramps, five (23%) had fever, and three (14%) had bloody stools. The median incubation time was 4 hours (range, 2.5 to 6 hours). The median duration of illness was 15 hours (range, 1 to 73.5 hours). Twelve additional attendees reported mild illness that did not meet the case definition.

The caterer provided turkey breast, mashed potatoes, gravy, and citrus punch. These foods were brought to the company between 10:00 and 10:30 a.m. the day of the potluck. The catered foods were kept warm with burners and remained covered until the meal was served (from 11:15 a.m. to 12:30 p.m.). All other food items served at the potluck were either brought in by attendees or prepared by attendees shortly before the lunch took place.

Based on univariate analysis, stuffing (21 of 21 cases vs. 18 of 27 controls; odds ratio [OR] undefined; 95% confidence interval [CI] lower limit, 2.52; p=0.003) was associated with illness. Gravy (20 of 21 cases vs. 19 of 27 controls; OR, 8.4; 95% CI, 1.14 to 197.0; p=0.06) and green bean casserole (5 of 21 cases vs. 1 of 27 controls; 95% CI, 0.97 to 200.0; p=0.07) approached statistical significance.

To add information to the investigation, people with mild illness were included as cases for further analysis. Based on this univariate analysis, gravy (33 of 34 cases vs. 19 of 27 controls; OR, 13.9; 95% CI, 1.9 to 319.1; p=0.008), stuffing (32 of 34 cases vs. 18 of 27 controls; OR, 8.0; 95% CI, 1.6 to 57.4; p=0.007), and green bean casserole (8 of 34 cases vs. 1 of 27 controls; OR, 8.0; 95% CI, 1.1 to 185.2; p=0.04) were associated with illness. Citrus punch approached statistical significance (21 of 34 cases vs. 10 of 27 controls; OR 2.8; 95% CI, 0.95 to 7.95; p=0.06). By multivariate analysis, including people with mild symptoms as cases, gravy was independently associated with illness (adjusted OR, 13.9; 95% CI, 1.6 to 119.8; p=0.02).

At the start of the investigation, most attendees of the potluck had already recovered from their illness. It had also been 4 days since the potluck had taken place; therefore, no food or stool samples were tested for the presence of toxin-producing bacteria.

Upon inspection of the catering facility, it appeared that the appropriate food preparation practices were followed. The burners and other equipment were functioning properly, and employees were aware of the proper holding temperatures for the foods that were prepared for this potluck. However, upon further investigation the original complainant reported that some of the excess gravy that was brought to the company by the caterer was held in a container with a spout, and was not heated or held at the same temperature as the rest of the gravy. It is unknown what happened to the excess gravy (i.e., whether it was served, and when).

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.* Stuffing and gravy were statistically associated with illness. The possibility that some of the gravy was not held at the appropriate temperature was identified as a potential mechanism for the proliferation of bacteria and toxin production.

(36)
Norovirus Gastroenteritis Associated with a Restaurant

November Ramsey County

On December 2, 2003 the Minnesota Department of Health (MDH) foodborne illness hotline received a report that four of six people had become ill with gastrointestinal symptoms after eating dinner together at a restaurant in Maplewood on the evening of November 29. The four ill persons were from three different households, and they denied any other common meals. MDH initiated an investigation in collaboration with the sanitarian from the City of Maplewood. MDH epidemiologists interviewed the patrons about food consumption and illness history. A case was defined as a person with onset of vomiting or diarrhea (≥3 loose stools in a 24-hour

period) after eating at the restaurant. Stool samples were collected from all four ill persons and submitted to the MDH Public Health Laboratory for bacterial and viral testing.

The Maplewood sanitarian immediately went to the restaurant to assess foodhandling practices and employee illnesses. The restaurant's management provided a roster of the approximately 55 restaurant employees who had worked on November 28 and/or November 29. Investigators interviewed restaurant employees either in person or by telephone about illness history and work duties. The restaurant declined to provide credit card receipts that might have facilitated the identification of additional patrons from November 29.

Four (66%) of the six diners met the case definition. All cases had vomiting and diarrhea, two (50%) had fever, one (25%) had cramps, and no one had bloody stools. No one sought medical attention. The median incubation period was 31 hours (range, 25 to 36 hours) and the median duration of illness was 32 hours (range, 30 to 48 hours). All four stool samples were negative for *Campylobacter*, *E. coli* O157, *Salmonella*, and *Shigella*, and all four were positive for norovirus. Viruses from all four cases were sequenced, and their viral sequences were identical.

The small number of cases (n=4) and controls (n=2) identified precluded statistical analysis of items consumed at the restaurant. The six diners shared chips and salsa, and each ate different entrees including tacos, quesadillas, and fajitas.

On December 2, the Maplewood sanitarian met with the restaurant manager and the restaurant chain's regional manager to evaluate food safety practices and policies. The restaurant had not received any other patron complaints and did maintain an ill employee log. The ill employee log included a worker who had recently called in sick with gastrointestinal symptoms; however, this person did not work at the restaurant during the relevant time period. The restaurant manager stated that employees were encouraged not to work while ill and were not responsible for finding a replacement if they called in sick.

The sanitarian did not observe any critical problems, but did recommend that the restaurant implement the use of nailbrushes and set a time parameter for employee handwashing.

During December 2-5, approximately 45 of 55 restaurant employees listed on a roster as working on November 28 and/or November 29 were interviewed. One server/bartender reported having a household member who had nausea and vomiting on November 27; however, while the server/bartender worked on November 28, she did not work on November 29. Another server reported having a gastrointestinal illness that included diarrhea, vomiting, cramps, and bloody stools that began on November 21. The server denied working while symptomatic, felt recovered on November 25, and worked on November 25, 28, and 29. The server was working at the time that the cases ate at the restaurant on November 29.

This was an outbreak of norovirus gastroenteritis associated with a restaurant meal. The vehicle was not determined. The most likely source of viral contamination was one or more food workers who were either ill or recovering but still shedding the virus in stool. However, this source could not be confirmed with the available information.

(37)
Suspected Bacterial Intoxications Associated with a Catered Event

December Itasca County

On Tuesday, December 9, 2003 the Minnesota Department of Health (MDH) was notified via the foodborne illness hotline of an outbreak of enteric illness among a group of employees from a Grand Rapids-area company and others who had attended a catered function at a restaurant in Grand Rapids on Friday, December 5. Approximately 190 persons attended the dinner function. Attendees consumed hors d'oeuvres; hot and cold buffet items such as ham, ribs, potatoes, gravy, various chilled salads, rolls; and pies. MDH epidemiologists notified MDH Environmental Health Services (EHS) about the complaint and initiated an outbreak investigation.

On December 9, management staff from the company that hosted the function provided a list of employee names and numbers with no indication of illness history. The restaurant operator provided a list of food items served at the function. Employee names were selected randomly, and they and their guest (if applicable) were interviewed about illness history and food consumption (if applicable) using a standard questionnaire. A case was defined as an employee or guest with onset of vomiting or diarrhea (≥3 loose stools in a 24-hour period) since December 1. Three stool specimen kits were delivered to attendees for bacterial and viral pathogen testing at the MDH Public Health Laboratory.

An MDH sanitarian inspected the restaurant on December 9, focusing on food preparation practices, equipment operation, and employee health. MDH sanitarians and an epidemiologist conducted a detailed assessment at the restaurant on December 12, once the epidemiological findings linked the outbreak to the establishment.

Sixty-one persons were interviewed, including 45 (24%) of 190 (approximate) attendees. Sixteen (100%) of 16 employees that did not attend the dinner function reported no illness symptoms. Eleven (24%) of 45 attendees met the case definition. Six (13%) additional attendees reported mild illness symptoms that did not meet the case definition and were excluded from analyses. The median incubation was 5.5 hours (range, 4 to 36 hours). For cases reporting vomiting (n=6), the median incubation was 4.5 hours (range, 4 to 8 hours). For cases reporting no vomiting (n=5), the median incubation was 12 hours (range, 7 to 36 hours). The median duration of illness was 10.5 hours (range, 0.5 to 51 hours). Five (45%) of 11 cases were female; six (55%) were male. Eight (89%) of nine cases were 20 to 49 years of age, one (11%) of nine was >50 years of age; the ages of two cases were unknown. Nine (82%) of 11 cases reported diarrhea, six (55%) of 11 reported vomiting, and seven (64%) of 11 reported stomach cramps. No cases were hospitalized. There were an estimated 46 (24% of the 190 attendees) cases based on the attack rate among the randomly selected interviewees.

Attending the dinner function was associated with illness (11 of 11 cases vs. 28 of 44 controls; odds ratio [OR], undefined; 95% confidence interval [CI], undefined; p=0.02).

Potato salad (8 of 11 cases vs. 4 of 28 controls; OR, 16.0; 95% CI, 2.3 to 125.0; p<0.001), gravy (11 of 11 cases vs. 18 of 28 controls; OR, undefined; 95% CI, undefined; p=0.04), mashed potatoes (11 of 11 cases vs. 19 of 28 controls; OR, undefined; 95% CI, undefined; p=0.04), green

beans (5 of 11 cases vs. 3 of 27 controls; OR, 6.7; 95% CI, 0.9 to 52.6; p=0.03), and multi-grain bread rolls (4 of 10 cases vs. 1 of 25 controls; OR, 16.0; 95% CI, 1.2 to 819.3; p=0.02) were associated with illness by univariate analysis.

All cases consumed gravy and mashed potatoes. Therefore, these variables were excluded from multivariate models. Of the remaining variables, potato salad (ps) and multi-grain bread (mb) were associated with illness by multivariate logistic regression with unconditional (ps: OR, 20.1; 95% CI, 1.5 to 267.7; p=0.02; mb: OR, 56.2; 95% CI, 2.5 to >999.9; p=0.01) and stepwise (ps: OR, 34.8; 95% CI, 3.0 to 399.1; p=0.004; mb: OR, 42.9; 95% CI, 2.0 to 911.8; p=0.02) selection of independent variables.

No stool specimens were submitted to MDH for testing.

The environmental health investigations revealed evidence of food preparation and handling practices with potato salad that may have contributed to this outbreak. The potato salad was prepared at the restaurant from scratch on December 3 and 4, involving complex processes with at least 24 hours between preparation and service. Additionally, bare-hand contact with potato salad ingredients was noted in the preparation steps.

Gravy was prepared at the restaurant from scratch on December 5, and mashed potatoes were prepared from dehydrated potato mix on December 5. Multi-grain bread rolls were baked from a frozen state just prior to the event and explained relatively few cases, as did green beans.

This was an outbreak of foodborne intoxications associated with a catered function at a restaurant. Potato salad and gravy were implicated as the most likely vehicles of transmission. The specific etiologic agents were not confirmed. The difference in incubations based on symptom histories suggests that there may have been at least two pathogen/toxin combinations in this outbreak. Vomiting illnesses with a short incubation (e.g., 4.5 hours) are characteristic of *Staphylococcus aureus* and the emetic form of *Bacillus cereus*. Diarrheal illnesses with an incubation of 12 hours are characteristic of *Clostridium perfringens* and the diarrheal form of *B. cereus*. The implication of multiple food items provides additional evidence that multiple etiologic agents played a role in this outbreak.

(38)
Norovirus Gastroenteritis Associated with a Shared Meal

December Carver County

On December 16, 2003 the Minnesota Department of Health (MDH) Acute Disease Investigation and Control Section received a complaint of illness among a group who became ill after eating together at two common meals: a lunch provided by a co-worker, and a gathering at a restaurant in Chanhassen on December 10. An MDH sanitarian was immediately notified and an investigation was initiated.

MDH staff interviewed 10 of the 12 persons from the group of co-workers about food consumption and illness history. A case was defined as a person with vomiting or diarrhea (≥3

loose stools in a 24-hour period) after dining at either the work lunch or the restaurant. Four cases submitted stool samples to MDH for bacterial and viral testing. An MDH sanitarian called the restaurant on December 16 to determine if the restaurant had received any other complaints. An MDH sanitarian also made a site visit to the restaurant on December 18.

Six of the 10 (60%) persons interviewed met the case definition. All six cases ate lunch at work in addition to eating at the restaurant. All six cases (100%) had diarrhea, five (83%) had vomiting, five (83%) had cramps, one had fever, and one had bloody stools. The median duration of illness was 25.5 hours (range, 18 to 89 hours). Since all cases ate at both gatherings, incubation periods for both events were calculated. The median incubation from eating at the restaurant was 23.5 hours (range, 20.5 to 27 hours) and the median incubation from eating lunch at work was 29.5 hours (range, 27 to 32 hours). Stool samples from all four cases that submitted samples were positive for norovirus. Recent gastrointestinal illness in the family members of the case who provided most of the food for the lunch was also reported, but the causative agent for their illness was not determined.

Eating at the work lunch was not associated with illness; all 10 co-workers ate lunch together. One person at the company provided most of the food. Sloppy Joes, bean hotdish, cheese, and crackers were all consumed. Another co-worker also brought venison sausage. Even though the meal was not associated with illness, univariate analysis showed that consumption of crackers (6 of 6 cases vs. 1 of 4 controls; odds ratio [OR] undefined; 95% confidence interval [CI] lower limit, 1.26; p=0.03) was statistically associated with illness.

Eating at the restaurant (6 of 6 cases vs. 1 of 4 controls; OR, undefined; 95% CI lower limit, 1.26; p=0.03) was also statistically associated with illness. Seven of the 10 co-workers, including all six who met the case definition, ate at buffalo wild wings. All of the co-workers had various types of chicken wings.

Upon inspection of the restaurant, the MDH sanitarian found that the restaurant had received no other complaints. One food worker had called in sick on December 5, and had returned to work on December 7. This person was not working on the evening of the meal shared by these co-workers (December 10). Two separate individuals handled the chicken wings; one person prepared the raw wings and one person handled the cooked wings. Neither of these food workers reported any recent illness.

This was a foodborne outbreak of norovirus gastroenteritis among a group of co-workers. The outbreak may have been due to a work lunch or a gathering at a restaurant. Crackers served at the lunch and attending the gathering at the restaurant were both associated with illness. The ultimate source of the viral contamination was not confirmed.

(39)
Cryptosporidiosis Associated with a Potluck Event at a Private Home

December Ramsey County

On January 13, 2004 epidemiologists from the Minnesota Department of Health (MDH) identified two cases of laboratory-confirmed cryptosporidiosis who had both attended a potluck event held on December 13, 2003 in a private home in Mankato. According to the host, the potluck was a work-related event attended by 13 people. Each person prepared/purchased a separate food item and brought it to the gathering.

Epidemiologists from MDH obtained a list of everyone who attended the potluck. Phone surveys were conducted to obtain information on consumption of foods/beverages and illness history. A case was defined as an attendee of the potluck who subsequently became ill with vomiting or diarrhea (≥3 loose stools in 24-hour period). Staff from the Minnesota Department of Agriculture (MDA) performed a food product traceback on one food item served at the potluck. Stool samples were not collected since the etiological agent had been confirmed in private laboratories.

Of the 13 attendees interviewed, nine (69%) met the case definition. All nine cases reported diarrhea, seven (78%) had cramps, two (22%) had a fever, and one (11%) had vomiting. The median incubation, calculated from the meal time on December 13, was 6 days (range, 2 to 10 days). The median duration of symptoms was 11 days (range, 4 to 25 days). Three additional attendees became ill with gastrointestinal symptoms after attending the potluck but did not meet the case definition. Three cases (including the two index cases) tested positive for *Cryptosporidium* spp. through private laboratories.

Because only one attendee reported not having any gastrointestinal symptoms following the potluck, a meaningful statistical analysis could not be conducted. A variety of food items were served at the potluck, including deli meats (ham and turkey), bread, green bean casserole, veggie tray, dips (cheese dip and cheese with chili dip), salads (lettuce, oriental, and crab), desserts (brownies, Jell-O, and cookies), and beverages (beer, wine, pop, coffee, and water).

No beverages or foods were made with unpasteurized milk or juices. The private home had a well as the primary source of water; however a reverse osmosis system was in place at the faucet in the kitchen. Two of nine (22%) cases reported consuming water while the only non-ill attendee also consumed water. Three of nine (33%) cases had ice; the non-ill attendee reported not having any ice.

A traceback of the veggie tray (carrots, broccoli, celery, cauliflower, tomatoes, and veggie dip) revealed that the product was shipped pre-assembled to the grocery store where the attendee purchased it. When the supplier of the veggie tray was contacted, no recent illness was reported among employees.

This was an outbreak of cryptosporidiosis associated with a potluck event. The source and vehicle of *Cryptosporidium* were not determined. Transmission was likely foodborne, but a specific vehicle was not confirmed. Possible transmission might have occurred through

contaminated commercial food products; however, this could not be determined without an adequate non-ill control group.

(40)
Norovirus Gastroenteritis Associated with a Restaurant

December Ramsey County

On December 23, 2003 the Minnesota Department of Health (MDH) Acute Disease Investigation and Control Section received a complaint of illness among a group of persons who became ill after eating dinner at a restaurant in St. Paul on December 17. An environmental health specialist from the City of St. Paul Office of License, Inspections and Environmental Protection and an epidemiologist from the St. Paul-Ramsey County Department of Public Health were contacted, and an investigation was initiated.

MDH epidemiologists interviewed the six persons from the group of diners about food consumption and illness history. A case was defined as a person with vomiting or diarrhea (≥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 City of St. Paul environmental health specialist made a site visit to the restaurant on December 24.

Four of the six (67%) persons in the group of met the case definition. The two well persons denied any recent illness, and all members of the group denied any other illness in their households. The four cases came from three separate households and denied any other common food exposures. All four cases (100%) had vomiting, three (75%) had diarrhea and cramps, and no one reported fever or bloody stools. No cases sought medical attention. The median incubation was 33 hours (range, 28 to 39 hours) and the median duration of illness was 3 days (range, 1 to 5 days). Both stools submitted to MDH were negative for *Campylobacter*, *E. coli* O157:H7, *Salmonella*, and *Shigella*. One of the two stools was positive for norovirus. The small number of cases and controls precluded statistical analysis of the association between specific foods and illness. The four ill and two non-ill diners all had a veggie tray, bread, and salad in common.

When the City of St. Paul environmental health specialist visited the restaurant on December 24, the kitchen was closed because of the Christmas holiday. The environmental health specialist left information about proper handwashing techniques and reporting of patron complaints with a bartender. Information on possible illness among food workers and contact information for other patrons were not obtained.

This was an outbreak of norovirus gastroenteritis associated with a restaurant. The vehicle and source of contamination could not be determined with the information obtained

(41)
Suspected Foodborne Intoxications Associated with Tuna

December Hennepin County

On December 27, 2003 the Minneapolis Division of Environmental Health (MEH) received a report from a restaurant regarding a complaint diarrheal illness among a group of 10 who had dined at the restaurant earlier that evening. Also on December 27, MEH received an independent complaint from a group of three who reported diarrheal symptoms after eating at the same restaurant on December 27. The Hennepin County Community Health Department (HCCHD) and the Minnesota Department of Health (MDH) were notified on December 29.

An MEH sanitarian inspected the restaurant to examine food handling and preparation procedures, employee health, and environmental conditions. Food samples were collected to test for bacterial contamination.

Epidemiologists from HCCHD contacted individuals from the group of 10 to assess illness history and foods that were consumed at the restaurant. For the group of three, analysis included information from the initial complaint. A case was defined as an individual who dined at the restaurant on December 27 and subsequently became ill with vomiting and/or diarrhea (≥3 loose stools in a 24-hour period).

Of those interviewed, four of 12 (33%) met the case definition. Four of four (100%) cases reported diarrhea, two (50%) reported nausea, and two (50%) reported abdominal cramps. None of the cases reported vomiting. The median incubation period was 2.5 hours (range, 1.5 to 3.75 hours). The duration of illness for all cases was less than 24 hours. Four additional patrons from the group of 10 also reported symptoms (nausea, cramps, headache, and a loose stool) after the meal, but they did not meet the case definition; these individuals were excluded from the analysis.

Eating tuna was significantly associated with illness (4 of 4 cases vs. 0 of 3 controls; odds ratio, undefined; p=0.03). No other food items were significantly associated with illness. Tuna consumption was also reported among the four ill patrons that did not meet the case definition. One case reported the seared tuna was cold and raw in the middle. Bacterial levels were elevated from a tuna portion that was served on December 27 (coliform [MPN] > 1,000); however, laboratory officials indicated that black pepper on the tuna could explain the elevated bacterial counts. Levels were normal for tuna samples that were available on December 27 and that were not seasoned with pepper (coliform [MPN] = 23). Samples from the hollandaise sauce, the Caesar dressing, and the vinaigrette dressing also had normal bacterial counts (coliform [MPN] <3, for all three samples). No temperature or storage violations were noted during the initial inspection of the restaurant.

This was an outbreak of foodborne intoxication of unknown etiology associated with consumption of tuna. During a re-inspection of the restaurant, it was noted that the restaurant has changed procedures regarding the handling of tuna. Tuna is received on ice, cut, placed in a cooler, and then cooked to order. The tuna now has a maximum shelf life of 3 days.

PROBABLE FOODBORNE OUTBREAKS

(1)
Gastroenteritis Possibly Associated with a Restaurant

January Dakota County

On January 15, 2003 the Minnesota Department of Health (MDH) foodborne illness hotline received a report of four co-workers who all became ill after eating lunch together at a restaurant in Eagan on January 9. They denied any other common meals. MDH epidemiologists interviewed the four co-workers by phone about food consumption and illness history. No stool samples were collected. An MDH sanitarian went to the restaurant to evaluate foodhandling practices and policies and to determine if the restaurant had received any other complaints from patrons.

All four co-workers reported gastrointestinal symptoms after the shared lunch. The median incubation period was 5 hours (range, 1.5 to 7.5 hours), and the median duration of illness was 20 hours (range, 5 to 24 hours). All four had cramps, three had diarrhea, and one had vomiting. The co-workers had shared a fried mushroom appetizer but they had separate entrées (mainly salads) and beverages with ice. One of the four reported having a recent gastrointestinal illness that had lasted from December 31 to January 6.

The restaurant told the MDH sanitarian that they had not received any other patron complaints. The sanitarian identified some critical foodhandling violations including inaccessible hand sinks, potentially hazardous food (shrimp) thawing in the hand sink, and lack of a certified food manager. The sanitarian scheduled additional visits to verify that these problems were corrected.

The clinical and epidemiologic features of these illnesses were consistent with foodborne bacterial intoxications. However, one of the ill people had just recovered from another gastrointestinal illness. Without additional cases or laboratory confirmation, it could not be confirmed that these illnesses were associated with the lunch at the restaurant; person-to-person transmission (for example, of norovirus) or another exposure that occurred in the shared work setting could not be ruled out.

(2)
Suspected Norovirus Gastroenteritis Possibly Associated with a Restaurant

January Hennepin County

On January 28, 2003 the Minnesota Department of Health (MDH) received a complaint of gastrointestinal illness among a group of three people (including one person who ate leftovers) that had eaten at a restaurant in Maple Grove on January 26. On February 3, MDH received a second independent complaint of gastroenteritis from one of two people who had eaten at the same restaurant on February 1. The Hennepin County Community Health Department (HCCHD) was notified and an investigation was initiated on February 3.
MDH staff obtained illness histories and a 4-day food consumption history from all persons from the two complaint groups. A case was defined as any person who developed vomiting or

diarrhea (≥3 loose stools in a 24-hour period) after eating at the restaurant or after eating leftover food from the restaurant. No stool samples were collected for testing. An HCCHD environmental health specialist evaluated the restaurant and interviewed restaurant employees about recent gastrointestinal illness and job duties.

Illness and food consumption histories were obtained from all five persons mentioned in the two separate complaints. Four of the five (80%) met the case definition. All four (100%) had diarrhea and vomiting, one (25%) had cramps, and none reported fever or bloody stools. The median incubation period was 26 hours (range, 24 to 27 hours). All cases had duration of illness of at least 24 hours, but none had recovered by the time of the interviews, so the exact duration of illness could not be calculated. Cases ate a variety of foods at the restaurant: chicken burrito, rice and beans, ribs, burger with lettuce and tomato, coleslaw, ice cream, beer, soft drinks, water, and ice. No single food in common was identified.

Thirty-five employees (13 kitchen staff, 20 wait staff, and two bartenders) were interviewed. None reported any gastrointestinal illness from January 20 through February 6. Four employees reported vomiting and/or diarrhea from January 12 through January 17. The environmental health specialist reviewed food preparation and handling procedures, handwashing, and cleaning and disinfecting procedures with restaurant management and staff.

This was a probable foodborne outbreak associated with eating food from a restaurant. The documented illnesses were characteristic of norovirus gastroenteritis. Because of the limited number of patron cases identified and the absence of stool specimen testing, the link between the restaurant and the illnesses could not be definitively confirmed.

(3)
Gastroenteritis Associated with a School

January McLeod County

On January 29, 2003 a nurse from an elementary school in McLeod County notified the Minnesota Department of Health (MDH) of a marked increase in the absentee rate at the school. Typically six to eight students are absent each day, but there were approximately 64 students who were absent on January 29. The majority of ill students were in grades K-6.

On January 29, an MDH epidemiologist faxed to the school nurse a document that contained guidelines for schools when outbreaks of gastroenteritis are suspected. The epidemiologist spoke to the dietary director about the meals served on January 27 and 28 and inquired about recent illness among dietary staff. The lunch menu and lists of students were obtained by MDH on January 30. MDH epidemiologists interviewed children in grades 1 through 4 about recent illness and food consumption on January 27 and 28. A case was defined as child in grades 1-4 who had vomiting or diarrhea (≥3 loose stools in a 24-hour period) during the week of January 27. Stool kits were delivered to five ill children living in three households.

Forty-five children were interviewed. Seven children were excluded from the analyses; three children became ill prior to the January 27 lunch and four children were not in grades 1 through 4. Of the 38 children included in the analyses, 21 met the case definition. All of the cases reported vomiting, 14 (67%) reported cramps, four (19%) reported fever, and three (54%) reported diarrhea. Grades 1 through 4 eat lunch from 10:45 to 11:00 a.m.; mealtime was not significantly associated with illness. Onsets of illness occurred from January 28 to February 2. The median incubation period from the exposure (the meal served on January 27) was 37 hours (range, 21 to 135 hours). The median duration of illness was 12 hours (range, 2 to 34 hours). The stool kits were not returned to MDH.

Neither lunch on January 27 or January 28 was statistically associated with illness. The school lunch served on January 27 included mashed potatoes and hamburger gravy, fruit salad, and bread. The school lunch on January 28 was a chicken patty on a bun and an apple. None of the menu items from either day were statistically associated with illness.

One employee reported becoming ill on January 29. This employee was excluded from work until Monday, February 3.

This was an outbreak of gastroenteritis among children who attended an elementary school during the last week in January. The etiologic agent could not be determined because stool kits were not returned to MDH for laboratory testing. The distribution of onsets suggests a common source for the outbreak, but although foodborne transmission was possible, it was not confirmed. None of the school lunch items were statistically associated with illness. The source of the outbreak was not determined.

(4)
Norovirus Gastroenteritis Possibly Associated with a Restaurant

January Ramsey County

On January 31, 2003 the Minnesota Department of Health (MDH) foodborne illness hotline received a complaint from a party of two individuals who dined together at a restaurant in St. Paul on the evening of January 29. The two individuals denied any other common food exposures. Both worked in separate nursing home settings where there may have been recent gastrointestinal illnesses. MDH initiated an investigation in collaboration with an epidemiologist from the St. Paul-Ramsey County Department of Public Health and a sanitarian from the City of St. Paul.

MDH epidemiologists interviewed the patrons about food consumption and illness history. A case was defined as a person with onset of vomiting or diarrhea (≥3 loose stools in a 24-hour period) after eating at the restaurant. On January 31, the sanitarian visited the restaurant to assess foodhandling practices. A stool sample was collected from one case and submitted to MDH for bacterial and viral testing.

Both of the two complainants met the case definition. Both had diarrhea, nausea, and cramps, and one had vomiting. One of the cases went to a hospital emergency room and received IV fluids. The incubation periods were 16 and 21 hours, respectively. Both were still ill at the time

of interview. Both cases shared chips, salsa, and guacamole; one case had a sampler platter and the other case had a pork burrito with beans and rice. The stool sample collected from one case tested negative for *Campylobacter*, *E. coli* O157:H7, *Salmonella*, and *Shigella*. The stool was positive for norovirus. The genetic sequence of the norovirus was identical to a norovirus sequence detected in several other outbreaks (including nursing home outbreaks) that occurred during the late fall and winter of 2002-2003.

When the sanitarian went out to the restaurant on January 31, the kitchen manager told the sanitarian that they had not received any other complaints and that no food workers had been ill. Food workers were not interviewed directly. 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 a probable foodborne outbreak of norovirus gastroenteritis associated with a restaurant. However, the epidemiologic link between the two illnesses and the restaurant could not be confirmed with the available information. The ill persons may have been exposed to norovirus in a setting other than the restaurant.

(5)
Salmonella Litchfield Infections Possibly Associated with a Restaurant

April Hennepin County

On Friday, May 9, 2003 City of Bloomington Environmental Health (CBEH) was notified by the Minnesota Department of Health of two laboratory-confirmed *Salmonella* Litchfield infections in unrelated persons that were identified through routine surveillance. Both S. Litchfield isolates were indistinguishable by pulsed-field gel electrophoresis (PFGE) with a PFGE pattern designated LFD6). Both individuals had eaten dinner at the same restaurant in Bloomington on April 16 (case 1) and on April 15 or 16 (case 2). The restaurant management had received a separate complaint of illness on April 18 from a party of two who had eaten lunch at the restaurant on April 17. The restaurant had failed to report this complaint to CBEH as required by the Minnesota Food Code. Food items consumed among the four patrons included lobster, salmon, shrimp, steak, baked potatoes, and salads.

CBEH and MDH staff interviewed the four restaurant patrons about illness history and food consumption. No additional patrons were identified; credit card receipts were not available. A case was defined as a person who had eaten at the restaurant during the week of April 16 with either 1) a subsequent culture-confirmed *S.* Litchfield infection; and/or 2) subsequent onset of vomiting or diarrhea (≥3 loose stools in a 24-hour period) and fever. Eight stool specimen kits were delivered to restaurant employees.

On May 9, CBEH sanitarians interviewed restaurant managers and inspected the establishment, focusing on food preparation and handling, employee health, and equipment. The restaurant provided a list of employees who had worked at the establishment from April 13 to April 30. Ten food employees selected randomly from the list were interviewed about work duties and illness history using a standard questionnaire.

Two (50%) of the four restaurant patrons interviewed met the case definition. These were the two patrons with laboratory-confirmed *S*. Litchfield infections; the two additional patrons who had complained to the restaurant did not meet the case definition. The two cases' incubation periods were 56 hours and over 100 hours, respectively. Illnesses were ongoing at the time of interview. Both cases reported vomiting, diarrhea, and fever. Salad was the only food item common to both cases.

The other two patrons interviewed were from a single household. They reported onset of vomiting and diarrhea, without fever, within an hour of eating at the restaurant. Therefore, their illnesses were not compatible with salmonellosis acquired from their meal at the restaurant. No other complaints of illness associated with the restaurant were received by the restaurant, CBEH, or MDH.

At the restaurant, CBEH sanitarians observed a food worker with a bandaged finger handling salads without using single-use gloves. In the walk-in cooler, condensation from an overhead pipe was observed dripping into lettuce containers below the pipe. Only two of the eight stool specimen kits delivered to the restaurant employees were returned to MDH; both specimens tested negative for *Salmonella*. Employees interviewed reported no illness from April 13 to April 30.

This was a probable foodborne outbreak of *Salmonella* Litchfield PFGE type LFD6 infections associated with a restaurant. Two unrelated patrons became ill with salmonellosis after eating at the restaurant over a 1 to 2 day period. The source and vehicle of transmission were not confirmed.

(6)
Suspected Norovirus Gastroenteritis Associated with a High School

April Sherburne County

In May 2003, the Minnesota Department of Health (MDH) received an isolate of *Salmonella* Typhimurium from a clinical laboratory. The isolate was from a Sherburne County high school student who had reported 5 days of fever, cramps, and bloody diarrhea with an onset date of April 24. MDH epidemiologists conducted a routine interview of the case, who stated that "55 kids at school" had also experienced gastrointestinal illness recently.

The high school principal and nurse were interviewed to get an overview of the type and extent of illness among students in late April and about any special field trips or class activities that had taken place during that time period. The high school was a private high school consisting of approximately 800 students in grades 7-12, with a full range of athletic and extracurricular activities during school and after school hours. Students were on Easter holiday from Thursday, April 16 through Monday, April 21. The school nurse and principal confirmed that there had been a surge of student absences, many due to gastrointestinal symptoms, on Thursday and Friday, April 24 and 25.

The school nurse provided MDH with a roster of those students who had visited the infirmary, been sent home for gastrointestinal symptoms, or had missed school because of illness. A full class list for all grades also was obtained to identify controls for a case-control study. Controls were identified via random selection. School lunch menus for the week of April 21 were obtained. Epidemiologists from MDH interviewed students by phone regarding illness history, foods consumed, and events attended (both within the school and in the general community). A case was defined as a high school student with vomiting or diarrhea (≥3 loose stools in a 24-hour period) since April 17. No stool samples were collected. The head manager of the school kitchen was interviewed to identify any illnesses among kitchen workers and to get a description of how various menu items were prepared and served.

Eighty-four students were interviewed. Many students on the absentee list had been ill with non-gastrointestinal symptoms. Seven students reported mild symptoms (nausea, headache) that did not meet the case definition; these students were excluded from the analysis. Thirty-four (44%) of the remaining 77 students met the case definition.

Cases were distributed among grades 7-12. The attack rate by grade level appeared to be higher among students in grade 10 (12 [80%] of students interviewed), but a representative sample of students was not used. Twenty (59%) of cases were male and 14 (41%) were female. Illness onset dates ranged from April 21 to April 29; the median illness onset date was April 24. The median duration of illness was 26 hours (range, 2 hours to 7 days). The epidemiological curve demonstrated a large peak of illness onsets during the morning of Thursday, April 24 and another smaller peak during the morning of Friday, April 25. Twenty-six (77%) had vomiting, 19 (56%) cases had diarrhea, 17 (50%) had cramps, 14 (41%) had fever, and one (3%) reported having bloody stools (this was the student with the confirmed *Salmonella* infection). The epidemiologic profile of this outbreak of gastrointestinal illness—a high proportion of cases with vomiting, with a smaller proportion of cases with diarrhea, bloody stools, or fever, and a relatively short duration of illness—strongly indicated a viral (e.g., norovirus) rather than a bacterial etiology.

Since the epidemiological curve demonstrated two peaks of illness onset times separated by approximately 24 hours, we analyzed the cases together and also as two separate groups; this was done to evaluate the hypothesis that there each peak may have been related to specific food items served for school lunch on different days. More specifically (allowing for the 24-48 hour incubation period characteristic of norovirus), the Tuesday (April 22) lunch menu was analyzed for its association with cases with illness onsets from approximately noon Wednesday (April 23) to noon Thursday (April 24) (designated group #1, n=21). The Wednesday (April 23) lunch menu was analyzed for its association with cases with illness onsets from approximately noon Thursday to noon Friday (April 25) (designated group #2, n=11). For group #1, univariate analysis of menu items from Tuesday showed that three items were significantly associated with illness: pork chops (17 [85%] of 20 cases vs. 23 [53%] of 43 controls; odds ratio [OR], 4.9; 95% confidence interval [CI], 1.3 to 23.2; p=0.016); mashed potatoes (19 [90%] of cases vs. 29 [67%] of controls; OR, 4.6; 95% CI, 1.0 to 32.1; p=0.046); and milk (20 [95%] of 21 cases vs. 30 [70%] of 43 controls; OR, 8.7; 95% CI, 1.3 to 194.5; p=0.021). For group #2, univariate analysis of menu items from Wednesday showed that one item, “walking tacos”, was significantly associated with illness (11 [100%] of 11 cases vs. 28 [65%] of 43 controls; OR, undefined; lower limit of 95% CI, 1.5; p =0.021). A “walking taco” consisted of individual bags of Doritos into

which seasoned taco meat, cheese, tomatoes, salsa, and sour cream were scooped. Analysis of the walking taco's ingredients showed an association between cases and three specific ingredients: Doritos and taco meat were identical to each other and to the walking taco itself (11 [100%] of 11 cases vs. 28 [65%] of 43 controls; OR, undefined; lower limit of 95% CI, 1.5; p=0.021) and lettuce (11 [100%] of cases vs. 18 [42%] of controls; OR, undefined, lower limit of 95% CI, 3.8; p=0.001). No school, athletic, extracurricular, or community-wide special events or activities were associated with illness.

Multivariate analysis performed with cases in group #1 for the Tuesday lunch menu items showed that only pork chops were independently associated with illness (adjusted OR, 4.6; 95% CI, 1.2 to 18.3; p=0.028). Multivariate analysis could not be performed with group #2 for the Wednesday lunch menu items due to a zero cell count.

Interviews with the eight food workers at the school revealed that none had been ill in the 10 days prior to the outbreak; one was ill with headache and lightheadedness, but no gastrointestinal symptoms, on the evening of Thursday, April 24.

This was an outbreak of suspected norovirus gastroenteritis at a high school; illness was associated with multiple school lunch items on successive days. The source of the outbreak was not determined and person-to-person transmission could not be ruled out. Recommendations to the school emphasized better student and food worker handwashing and more frequent cleaning of serving utensils.

(7)
Gastroenteritis Possibly Associated with a Restaurant

May Ramsey County

On July 21, 2003 the Minnesota Department of Health (MDH) foodborne illness hotline received two independent complaints from people who had dined separately at a restaurant in St. Paul on the evening of July 15. In Group A, one of two people was ill, and in the Group B, three of four people were ill. MDH initiated an investigation in collaboration with an epidemiologist from the St. Paul-Ramsey County Department of Public Health and a sanitarian from City of St. Paul.

MDH epidemiologists interviewed the patrons about food consumption and illness history. A case was defined as a person with onset of vomiting or diarrhea (≥3 loose stools in a 24-hour period) after eating at the restaurant. The sanitarian visited the restaurant on July 22 and July 28 to assess foodhandling practices and employee illnesses. Stool samples were collected from one person from Group A and two people from Group B; the samples were submitted to MDH for bacterial and viral testing.

In Group A, one of the two patrons met the case definition, and in Group B, three of the four patrons met the case definition. All four cases (100%) had diarrhea and cramps; none had vomiting or fever. The incubation periods were 14, 35, 38, and 43 hours, respectively. Two of the four cases had recovered by the time of the interview; their durations of illness were 3 and 4 days, respectively. One of the cases sought medical attention and was prescribed antibiotics.

Food items common to the cases included chips, salsa, guacamole, and beverages. Due to the small number of cases, a case-control study was not conducted. All three stool samples collected from cases tested negative for *Campylobacter*, *E. coli* O157:H7, enterotoxigenic *E. coli*, *Salmonella*, *Shigella*, norovirus, and astrovirus.

On July 22, the sanitarian went to the restaurant and asked the kitchen manager how they prepared salsa and guacamole. The restaurant reportedly did not check temperatures during the preparation and holding of either of these items; the items were not being prepared at the time the sanitarian was at the restaurant. The kitchen manager told the sanitarian that no employees had been ill with gastrointestinal symptoms and that no other complaints from patrons had been received. The kitchen manager also claimed to not have any record of other patrons who had dined at the restaurant on July 15. On July 28, the sanitarian interviewed the four restaurant employees who worked on July 15; all denied any recent gastrointestinal illness in themselves or their family members.

This was a probable foodborne outbreak of gastroenteritis associated with a restaurant. The epidemiologic and clinical characteristics of the illnesses were compatible with a common etiology; however, the link between the restaurant and the illnesses could not be conclusively determined with the available information.

(8)
Gastroenteritis Possibly Associated with a Restaurant

June Hennepin County

On June 17, 2003 the Minnesota Department of Health (MDH) foodborne illness hotline received a complaint from two individuals who patronized a restaurant in Long Lake on June 12. The Hennepin County Community Health Department (HCCHD) was notified of the complaint and initiated an investigation on June 18.

Epidemiologists from MDH interviewed the complainants regarding food consumption and illness history. A case was defined as any person who developed vomiting and/or diarrhea (≥ 3 loose stools in a 24-hour period) after eating at the restaurant. The environmental assessment of the restaurant was performed by HCCHD by conducting a routine inspection of the facility and interviewing the 15 employees regarding food consumption and any illness history. No foods from June 12 were available; thus environmental samples were not collected. No stool samples were collected from the two ill patrons.

Both complainants met the case definition, and both reported diarrhea, vomiting, and fever. The incubation period was 38 hours for both cases. Durations of illness were 11 and 24 hours, respectively. Both cases reported sharing the same food item (nachos consisting of meat, chips, sour cream, cheese, and olives) at the restaurant. While the two individuals did attend other common food establishments, they did not have the same food items.

Investigation of the facility itself revealed that four of 15 (27%) employees reported vomiting and diarrhea, with onset dates ranging from June 12 to June 15. The environmental inspection

indicated that facility staff was not properly cleaning prep areas, cutting boards, and counter tops, as the restaurant was out of sanitizer. The inspection team also noted that employees were unlikely to wash hands before consuming food items or handling utensils.

This was a probable outbreak of gastroenteritis associated with a restaurant. The etiologic agent could not be confirmed; only two cases were identified and stool samples were not collected. Furthermore, the ill persons did have other food exposures in common. However, illnesses in patrons were compatible with norovirus gastroenteritis. Infected food workers may have been source of the outbreak. HCCHD educated with the staff and owners of this new establishment on improving foodhandling practices.

(9)
Gastroenteritis Possibly Associated with a Restaurant

June Hennepin County

On June 27, 2003 the City of Minneapolis Environmental Services (MEH) received a complaint of gastrointestinal illness among attendees of a dinner party held at a restaurant on June 26. Minneapolis reported the complaint to the Minnesota Department of Health, who in turn forwarded it to the Hennepin County Community Health Department (HCCHD).

The coordinator of the event was contacted and a list of attendees was obtained. An HCCHD epidemiologist interviewed the remaining attendees. A case was defined as any person who developed vomiting or diarrhea (≥3 loose stools in a 24-hour period) after attending the dinner party at the restaurant.

MEH conducted an environmental health assessment of the restaurant on June 30. Preparation steps for the foods served to the dinner party were reviewed. Restaurant logs of food temperatures at different stages of preparation and of foods being held hot were also reviewed.

Thirty-two of 51 (63%) diner party attendees were reached for interviewing. Two (6%) persons met the case definition. Both cases reported diarrhea, and one case reported cramps. Neither of the cases experienced vomiting, fever or blood in the stools. One case had an incubation of 6.5 hours, and duration of illness of 6 hours. The second case had an incubation of 1 hour, and duration of illness of 5 hours. Five persons (16%) reported mild illness that did not meet the case definition. Of those, four cases reported having cramps (80%), four reported nausea (80%), two (40%) reported headache, and one person (20%) reported an episode of loose stool. Incubations ranged from 2.2 to 10.5 hours (median, 5.5 hours). All five persons reported recovery the following day (June 27).

Dinner party attendees were given a choice of New York Strip or salmon fillet for their main course, of which the majority had the beef (31 of 32 persons). Other items were served family style and eaten by the majority of the attendees included shrimp appetizer, crab-stuffed mushrooms, scallops with bacon, Cesar salad, au gratin potatoes, asparagus with Hollandaise sauce, garlic mashed potatoes, mushrooms, bread, butter, chocolate dessert, cheesecake, wine, water, ice and other beverages. No food items were statistically associated with illness.

The environmental health assessment did not reveal any problems in the preparation steps for the foods served to persons in the dinner party. According to the restaurant logs of temperatures of foods at different stages of preparation and hot holding showed that foods were prepared and held at the correct temperatures. Temperatures of the walk-in cooler, foods in the cooler, and hot foods were all appropriate. All hand wash sinks were stoked on inspection with soap, paper towels and nailbrush.

This was a probable outbreak of bacterial foodborne intoxications associated with a restaurant. The etiology was not identified. The illnesses and incubations were not characteristic of a specific pathogen. However, ill persons reported similar symptoms (although mild) and similar incubations, suggesting a common source outbreak. Conversely, other explanations for the illnesses in the complainants cannot be completely ruled out.

(10)
Gastroenteritis Possibly Associated with a Restaurant

July Hennepin County

On July 25, 2003 the City of Minneapolis Environmental Services (MEH) received a complaint of gastrointestinal illness among four of 12 people following a pizza delivery from a Minneapolis restaurant to their place of employment on July 24. On July 26, a separate complainant reported to the restaurant that three of three family members became ill after consuming take-out food from the restaurant on July 25.

An MEH environmental health specialist inspected the restaurant on July 28. A list of foods served to the complainants was obtained. Food samples were collected from foods prepared at the restaurant at the time of the inspection, food items used in the preparation of foods eaten by the complainants, and a sample of food believed to have been served to the complainants for testing at the MEH laboratory. The complainants were not asked to submit stool specimens for testing.

The first complaint was forwarded to the Minnesota Department of Health (MDH) on July 28. MDH received a copy of the second complaint on July 31. The Hennepin County Community Health Department (HCCHD) was notified of both complaints on July 31.

A HCCHD epidemiologist attempted to reach the other persons who ate meals with the complainants in order to obtain more complete illness and food consumption histories.

A case was defined as any person who developed vomiting or diarrhea (≥3 loose stools in a 24-hour period) after eating food from the restaurant.

Two of 12 persons from the first complaint, and all three persons from the second complaint were interviewed. Four (80%) met the case definition. The fifth person reported mild gastrointestinal symptoms but did not meet the case definition. Three of the four (75%) cases reported diarrhea, one of four (25%) reported vomiting, and one of four (25%) reported nausea.

The median incubation was 2 hours (range, 45 minutes to 2 hours), and the median duration of illness was 7 hours (range, 2 to 24 hours).

Cases ate a variety of foods. Person in the first complaint ate four types of pizza: mushroom, sausage and mushroom, vegetable, and "the works". The family in the second complaint ate sausage and pepperoni pizza, lasagna, an Italian sausage hoagie and soft drinks.

Food samples tested included lasagna, whole Italian sausage used in hoagies, crumbled sausage used in pizza and lasagna, and a pizza cooked at the inspector's request with all the ingredients on the complainant's pizza. All results were reported by MEH as "normal". No other complaints were received. No restaurant employees reported gastrointestinal illness.

This was a probable foodborne outbreak associated with eating food delivered from a Minneapolis restaurant. The short incubation and duration of illnesses suggested a foodborne bacterial intoxication. However, the relative lack of vomiting with the short incubations observed is not typical of known intoxications caused by pathogens such as *Staphylococcus aureus* or the emetic form of *Bacillus cereus.* Because no stool specimens were collected at the time that the complaints were received and so few persons were reachable after the complaints were forwarded to the epidemiologist, the etiology could not be evaluated and the vehicle could not be determined.

(11)
Norovirus Gastroenteritis Associated with a Private Gathering

September Anoka County

On September 29, 2003 the Minnesota Department of Health (MDH) was notified about gastrointestinal illness among persons who had attended a private gathering at a Blaine residence held on the afternoon of September 27. A second call was received at MDH regarding this suspected outbreak on September 30. Approximately 54 adults and children attended the event. 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 (≥3 loose stools in a 24-hour period). Five stool specimens were submitted to MDH for bacterial and viral testing.

Forty-five attendees were interviewed. Four persons had a mild illness that did not meet the case definition and were excluded from the analysis. Of the remaining 41 persons, 33 (80%) met the case definition. Twenty-eight cases (85%) had vomiting, 27 (82%) had diarrhea, 15 (46%) had cramps, and 11 of 30 (37%) had fever. The median incubation was 36 hours (range, 26 to 61 hours). The median duration of illness was 24 hours (range, 4 to 77 hours). One person visited a health care provider. All five stool specimens tested positive for norovirus and negative for *Salmonella*, *E. coli* O157:H7, *Campylobacter*, *Shigella* and *Yersinia*. Three of the five positive norovirus samples were sequenced and all three norovirus sequences were identical.

Food items served included home-prepared turkey sandwiches, potato salad, spinach dip, and beverages and commercially prepared cake, carrots, crackers and chips. No single food item served at the gathering was statistically associated with illness.

A guest staying at the residence where the private gathering was held was ill with severe gastrointestinal symptoms throughout the day of the gathering. Due to the severity of the symptoms, this person was taken to the hospital after event guests began to arrive.

This was an outbreak of norovirus infections associated with a private gathering. The most likely source of contamination was an ill household guest who contaminated surfaces (e.g., bathroom) in the home. Foods could have become contaminated by the hands of guests or people serving food, or each person could have contaminated the food they were eating after coming into contact with contaminated surfaces.

(12)
Norovirus Gastroenteritis Associated with an Elementary School

October Anoka County

On October 22, 2003 the Minnesota Department of Health (MDH) was notified of an elevation of absenteeism among students at an elementary school in Columbia Heights. The school nurse indicated that there were approximately 16 students absent on October 22 and that all were from the same class.

Epidemiologists from MDH conducted phone surveys with parents of students from the affected class to obtain information on school-related activities, foods consumed at the school, and illness history for those ill. A case was defined as a student who attended the elementary school and had become ill with vomiting or diarrhea (≥3 loose stools in 24-hour period) since October 13. Public health officials from Anoka County conducted a routine inspection of the school cafeteria and interviewed the kitchen staff.

Of the 22 students interviewed, 14 (64%) met the case definition. Vomiting was reported for 14 cases (100%), cramps for 10 (71%), diarrhea for seven (50%), and fever for one of six (17%). One student reported an onset date of October 18, at least 2-3 days prior to the remainder of the cases. The only specimen submitted tested positive for norovirus.

No exposure was found to be significantly associated with illness. However, two potential exposures had elevated odds ratios, including lunch served on October 20 (13 of 14 cases vs. 5 of 7 controls; odds ratio [OR], 5.2; 95% confidence interval [CI], 0.38 to 70.9; p=0.25); this association became stronger after adjusting for gender (OR, 13.5; 95% CI, 0.42 to 430.2; p=0.11). The food items served for lunch on October 20 included mozzarella sticks, BBQ sandwiches, curly fries, fruit, and milk. Attending adventure club (a before and after-school childcare program) also had an elevated odds ratio (5 of 14 cases vs. 1 of 7 controls; OR 4.5; 95% CI, 0.31 to 64.8; p=0.28), after adjusting for gender. The index case did not attend adventure club.

This was an outbreak of norovirus gastroenteritis among elementary school children. The index case (onset, October 18) indicated eating school lunch on October 20. Since there was only illness among one classroom and a large proportion of the food items involved usage of the hands, it is plausible that the transmission occurred through contamination of food or utensils by the index case.

(13)
Norovirus Gastroenteritis Possibly Associated with a Restaurant

November Hennepin County

On December 1, 2003 the Minnesota Department of Health (MDH) foodborne illness hotline received a complaint about a restaurant in Maple Grove. The complainant reported gastrointestinal illness in three of eight persons who dined together from a buffet at the restaurant on November 27 (Thanksgiving Day). The three ill persons were from two different households, and they denied any other common food or beverage items.

On November 25, the MDH Acute Disease Investigation and Control Section had received another complaint that mentioned the same restaurant; this person had become ill with vomiting, diarrhea, cramps and fever 40 hours after eating alone at the restaurant on November 23. MDH notified an epidemiologist from the Hennepin County Community Health Department (HCCHD), who initiated an investigation in collaboration with an HCCHD environmental health specialist.

MDH epidemiologists interviewed three persons from the group of diners about food consumption and illness history. The other five persons in the group were reportedly not ill, but they were not interviewed directly. A case was defined as a person with vomiting or diarrhea (≥3 loose stools in a 24-hour period) after eating at the restaurant. Two cases (from two separate households) submitted stool samples to MDH for bacterial and viral testing. An HCCHD environmental health specialist made a site visit to the restaurant on December 1.

All three ill persons met the case definition; all had consumed a variety of items from the buffet. All had diarrhea and cramps, two (67%) had vomiting, one (33%) reported fever, and no one reported having bloody stools or seeking medical attention. The median incubation was 35 hours (range, 33 to 38 hours) and the median duration of illness was 2 days (range, 2 to 3 days). Both stools submitted to MDH were negative for *Campylobacter*, *E. coli* O157:H7, *Salmonella*, and *Shigella*. Both of the stools were positive for norovirus. The viral genetic sequences of the two positive samples were identical.

The HCCHD environmental health specialist met with the restaurant's general manager and kitchen manager. They said that they had not received any additional complaints about ill patrons. The restaurant estimated that they served approximately 1,690 people on November 27. Restaurant management denied that any employees had recently been ill with gastrointestinal symptoms. However, employees 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. It could not be ruled out that one of the non-ill persons in the dining group may have had a recent gastrointestinal illness.

(14)
Norovirus Gastroenteritis Possibly Associated with a Restaurant

December St. Louis County

On December 3, 2003 the St. Louis County Public Health Department (SLCPHD) received a report from a local medical center regarding a 16-month-old child who was hospitalized due to dehydration from persistent vomiting. The report indicated that the mother of the child was also having gastrointestinal symptoms. Upon contacting the mother, SLCPHD learned that eight others had become ill after the group had dined at a fast-food restaurant in Cook on December 1. The Minnesota Department of Health (MDH) was notified on December 4.

Epidemiologists from SLCPHD conducted phone interviews with members of the group to determine food items consumed and illness history. A case was defined as a member of the group who developed vomiting and/or diarrhea (≥3 loose stools in a 24-hour period) after dining at the restaurant on December 1. A stool specimen was collected from the 16-month-old child for bacterial and viral testing at MDH.

An environmental health specialist (EHS) from SLCPHD went to the restaurant to conduct a standard inspection on December 3. St. Louis County also conducted interviews with employees of the restaurant to determine recent illness history, work schedules, and normal work duties.

Of the 12 individuals with completed interviews, 10 (83%) met the case definition. The 10 cases included three adults from 20 to 40 years of age and seven children from 1 to 4 years of age. All 10 cases reported vomiting, and two (20%) had diarrhea. Using the meal time on December 1 as the exposure time, the median incubation was 34 hours (range, 25 to 43 hours). Since most cases were still experiencing symptoms when they were interviewed, the average duration of illness was not determined. The submitted stool sample was negative for enteric bacteria and for norovirus.

No food item was significantly associated with illness since only one control was identified. All 10 cases reported having French fries, and nine (90%) consumed ice cream. No other food item was eaten by more than three cases. The one individual who did not become sick did not have anything to eat.

Of the 23 employees interviewed, two (9%) reported having gastrointestinal symptoms around December 1. Neither of these two employees worked on December 1. One worker reported having chronic gastrointestinal symptoms since July; the stool sample submitted to this individual's health care provider was negative for enteric bacteria and ova/parasites. The other

employee reported vomiting and diarrhea beginning on November 30 (duration, 8 days). This employee was responsible for maintaining the child play area at the restaurant.

The EHS did not find any unsafe conditions during the site inspection. Since ice cream was consumed by 90% of the cases, the inspector evaluated the ice cream dispenser. This machine was functioning properly and had an automatic self-sanitizing process that operates once a day. The EHS tested the sanitation process by running the 90-minute cycle; the process was found to be functioning properly.

This was a gastrointestinal illness outbreak associated with restaurant. The etiologic agent could not be confirmed, but illnesses in patrons were compatible with norovirus gastroenteritis. The source and vehicle of the etiologic agent were not determined. Transmission due to an ill employee or patron contaminating the surfaces in the play area was a plausible cause of the outbreak, but this was not confirmed.

(15)
Bacterial Intoxications Possibly Associated with a Restaurant

December Hennepin County

On December 8, 2003 the Minnesota Department of Health (MDH) received a complaint of gastrointestinal illness among 10 people that were part of group that ate at a restaurant in Spring Park on December 5. The group reported not having any other common meals or exposures. A Hennepin County Community Health Department (HCCHD) epidemiologist was notified, and an investigation was initiated.

HCCHD epidemiologists obtained the list of names and phone numbers of members in the party, and a list of foods served to them at the restaurant. Contact names and foods served for four unrelated dining parties from the same day and time were also obtained. Stool specimens were not collected for testing. Environmentalists from the HCCHD inspected the restaurant and evaluated food preparation procedures. An inspector from the Minnesota Department of Agriculture (MDA) evaluated procedures at the bakery where the bread for the restaurant was prepared.

A case was defined as any person who developed vomiting or diarrhea (≥3 loose stools in a 24-hour period) after eating at the restaurant. A possible case was defined as a person who complained of nausea or cramps, but did not develop diarrhea or vomiting.

Sixteen persons from the party that made the complaint were interviewed. The contact person for an unrelated dining party reported that two of the 14 persons in the group developed gastrointestinal illness after eating at the restaurant. However, those two persons became ill 3 days after children who had not eaten at the restaurant in the same household developed vomiting and diarrhea, and therefore their illnesses were most likely unrelated to their restaurant meal. The contact persons for the remaining three dining parties reported no gastrointestinal illness among the 89 persons in those groups. Therefore, no persons from those groups were interviewed.

Of the 16 persons from the complaint party, three (19%) met the case definition. All three reported diarrhea and nausea, two reported cramps, and none reported vomiting. Three (19%) additional persons reported mild gastrointestinal symptoms that did not meet the case definition; they were classified as possible cases. Two of the possible cases reported only experiencing nausea, and one reported only cramps. The median incubation period for cases and possible cases combined was 3 hours (range, 2.5 to 7.5 hours) and the median duration of illness was 13.5 hours (range, 10 to 14.5 hours). No one sought medical care for his/her illness.

A variety of foods was served to the group: shrimp cocktail, stuffed mushrooms, smoked salmon, coconut shrimp, appetizer bread, spinach artichoke dip, spinach salad, walleye, steak, mashed potatoes, butternut squash, warm wild rice bread, and crème brulee. No single food item was statistically associated with illness.

According to the restaurant, no additional complaints of illness were received, and none of the employees reported gastrointestinal illness. No food from the party remained for sampling. The chef provided a detailed description to the environmentalist of food handling procedures for each item served. All items served to the party were prepared fresh that day by the chef. An inspection of the restaurant was conducted on December 9. All temperatures, cooling procedures, chemical procedures, sanitizing and personal hygienic practices were in compliance. The wild rice bread was purchased from a bakery. The MDA inspector's evaluation of the wild rice bread preparation procedures did not reveal any problems.

All ill persons reported similar symptoms, with similar onsets and duration, suggesting that this was a common source outbreak. Because the ill persons reported not having any other common exposures, it is likely that a food served at the restaurant was the vehicle. The illnesses most closely resembled mild bacterial intoxications. However, the illnesses experienced by persons in the party were not characteristic of any known pathogen.

CONFIRMED WATERBORNE OUTBREAKS (DRINKING WATER)

(1) Copper Toxicosis Associated with a Fountain Machine

June Hennepin County

On June 11, 2003 the City of Minneapolis Environmental Health Department (CMEHD) notified the Minnesota Department of Health (MDH) Acute Disease Investigation and Control Section of gastrointestinal illness among a group of 10 persons that visited a restaurant in Minneapolis; the outbreak was suspected to be due to consumption of fountain soda with elevated copper levels. The suspected fountain machine dispensed five kinds of soda, carbonated water, and plain water.

A case was defined as any person who drank fountain soda at the restaurant and subsequently developed nausea or vomiting. On June 10, staff obtained information from the cases, including their exposure and illness history. The City of Minneapolis Environmental Health Department (CMEHD) conducted an inspection of the restaurant and investigated the events leading up to the outbreak. Environmental samples were collected from the fountain soda machine and from a nearby tap water dispenser. The CMEHD sanitarian also conducted a visual inspection of the fountain machine unit itself, including the backflow prevention device. All samples were tested for copper levels at the MDH Laboratory.

Of the 10 group members that visited the restaurant on June 9, four met the case definition. All four cases ingested fountain soda. All four cases experienced nausea and three (75%) reported vomiting. Symptoms started approximately 5 to 90 minutes after consumption of fountain soda. One case (25%) reported diarrhea five hours after onset of symptoms. The duration of illness was ≤24 hours (median, 3.8 hours; range, 0.2 to 24 hours). The six group members who did not become ill did not drink fountain soda. No other differences in food consumption between cases and controls were noted.

Environmental testing revealed that copper levels were above the 1.3 parts per million (ppm) "action level" in Minnesota. Samples of the five soda products had levels of copper from 0.2 to 18 ppm. The water dispensed from the fountain machine was 7 ppm for the carbonated water and 9 ppm for the plain water. Copper levels from the nearby tap water dispenser, separate from the fountain machine, were also elevated (3.9 ppm). The sanitarian noted that the plain water switch on the fountain machine was dispensing carbonated water, suggesting a backflow problem. The fountain machine was temporarily shut down until service technicians could arrive and repair the unit. Backflow from the carbonator was confirmed as the problem, a new backflow prevention device was installed.

The clinical picture of the cases is consistent with copper toxicosis. The cause of the copper toxicosis at the restaurant was a faulty backflow prevention device on the carbonator of a fountain machine. Since the plain water nozzle was dispensing carbonated water, it was theorized that carbon dioxide was leaking back into the water supply. This could create elevated levels of carbonic acid, resulting in a leeching of copper due to the decreased pH. The sample

with 0.2 ppm copper, below the "action level," is considered to be a popular drink choice. Consequently, customers may have dispensed the soda before the sampling began and removed some copper from the unit.

(2)
Copper Toxicosis Associated with a Juice Machine

November St. Louis County

On December 1, 2003 the St. Louis County Public Health Department (SLCPHD) received a complaint from a group of 14 who had become ill with vomiting after dining at a restaurant in Duluth on November 28. Five of the 14 patrons became ill within minutes of drinking lemonade at the restaurant. The Minnesota Department of Health (MDH) was notified of the complaint on December 2.

A sanitarian from SLCPHD conducted an inspection of the restaurant on December 3 and collected samples from the juice machine. A case was defined an individual who became ill with vomiting and/or diarrhea (≥3 loose stools in a 24-hour period) after patronizing the restaurant on November 28. Samples were collected from the juice machine on December 3. On December 12, further samples were collected from the machine as well as water sources throughout the restaurant.

Of the five patrons who consumed lemonade at the restaurant, two (40%) met the case definition. The other three patrons only reported nausea. Both cases vomited within 1 minute of consuming lemonade. The duration of illness was 4.5 hours for one of the cases; the duration for the second case was not determined.

Environmental testing revealed that copper levels in the samples from the juice machine collected on December 3 were above the 1.3 parts per million (ppm) "action level" in Minnesota; levels ranged from 6.4 to 12.8 ppm. Copper levels were still elevated in samples taken from the juice machine on December 12 (1.8 ppm). Samples taken from nearby water dispensers, separate from the juice machine, did not have copper levels above the action level (range, <0.01 to 0.098 ppm). Even though a brass check valve had been installed sometime between December 3 and December 12, copper levels were still elevated (2.3 ppm) when the juice machine was hooked up to a different water dispenser and samples were collected on January 2, 2004.

The incubations and clinical symptoms of the cases are consistent with copper toxicosis. The copper levels were not reduced to a safe level even after a check valve was installed. Copper levels were elevated on samples from the juice machine when it was connected to a dispenser that initially had low levels of copper. This suggests a problem with the internal plumbing of the juice machine itself. The restaurant agreed to discontinue use of this machine until beverages with levels of copper compliant with Minnesota standards could be produced.

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

(1)
Cryptosporidiosis Associated with a Teaching Farm

February Crow Wing County

On February 27, 2003 the infection control practitioner at a hospital in Brainerd notified the Minnesota Department of Health (MDH) of two laboratory-confirmed cases of *Cryptosporidium* infection. One of the cases had been hospitalized on February 19 for diarrhea and vomiting. The two cases were middle school students from different schools, but both were participants in an agricultural program/teaching farm administered through a local high school. MDH was informed that a calf from the teaching farm had died of a diarrheal illness 1 week prior, and that several other calves had also been ill. A veterinarian for the teaching farm reported that a stool sample from one of the ill calves had tested positive for *Cryptosporidium*.

The high school principal was interviewed to get an overview of the teaching farm. Student participants came from three schools: a high school, a junior high school, and a middle school. The program included classes in Animal Science, Greenhouse, Equine Science, Power Mechanics, Small Engines, Pet Science, and Natural Resources. Both of the ill students were participants in the Animal Science class, with involved intensive direct contact with and care of calves; contact with horses, goats, sheep, and rabbits also was possible. The manager/lead instructor at the teaching farm was interviewed to determine the exact nature of the students' activities and to obtain an overview of animal management. Class lists from the Animal Science, Equine Science, and Greenhouse classes were obtained because these classes were all held in the same building. Epidemiologists from MDH interviewed students by phone regarding illness history, exposures to the various animals while in class, and hygienic practices. A case was defined as a student at the teaching farm with a) vomiting or diarrhea (≥3 stools in a 24-hour period); or b) any gastrointestinal symptoms and a positive stool test since February 3 (the date the calves arrived at the teaching farm). Stool kits for both bacterial culture and for ova and parasite testing were offered to students with any gastrointestinal symptoms.

The local hospital sent the positive *Cryptosporidium* specimens from both index cases to the MDH Public Health Laboratory for genotyping by polymerase chain reaction-restriction fragment length polymorphism (PCR-RFLP). For all other stool samples, MDH conducted routine bacterial cultures, routine ova and parasite examination, and other tests for *Cryptosporidium* and *Giardia* such as acid-fast stain and fluorescent antibody tests. PCR-RFLP genotyping was performed on samples that were positive for Cryptosporidium. Testing for the presence of Shiga toxin genes was conducted on "sweeps" of bacterial colonies by PCR.

A site visit to the teaching farm was conducted on March 4 by three MDH epidemiologists. Stool samples were obtained from the nine remaining calves (one of the calves died in February) and from the other species of animals. The students' activities were observed closely during class as well as after class as they prepared to return to school.

Interviews with the manager/lead instructor for the teaching farm revealed that five calves had been obtained from a sales barn on January 30, and that five additional calves were acquired from the same sales barn on February 3. At the time of acquisition, the calves were approximately 3 days old. Students were allowed to care for the calves as soon as they arrived, and the teaching farm manager reported that "one or two [of the calves] were sick" with scours (a term for watery diarrhea in calves).

Ninety-two (91%) of the 101 students enrolled in the Animal Science, Equine Science, and Greenhouse classes were interviewed. Of the 92 students interviewed, 68 were in the Animal Science class only, 17 were in the Equine Science class only, three were in the Greenhouse class only, and four were in both the Animal Science class and the Greenhouse class. Eight students reported mild gastrointestinal symptoms that did not meet the case definition; these students were excluded from further analysis. Thirty-one (37%) of the remaining 84 students met the case definition. Two secondary cases (siblings of primary cases) were reported.

Cases were distributed among all three schools that had students attending the teaching farm: the high school (eight cases), the junior high school (17 cases), and the middle school (six cases). Cases were distributed among all four grade levels (grades 9, 10, 11, and 12). Cases occurred mostly among those is grade 9 (23 cases) but no difference in attack rate by grade level was observed. Twenty-one (68%) cases were male and 10 (32%) were female. Illness onset dates ranged from February 5 to March 3; the median illness onset date was February 17. The median duration of illness was 7 days (range, 6 hours to 19 days). Of the primary cases, 29 (90%) of 31 had diarrhea, 13 (43%) of 30 had vomiting, 19 (66%) of 29 had cramps, five (17%) of 29 had fever, and two (7%) of 28 reported having bloody stools. One student was hospitalized for 2 days. Stool samples obtained from seven primary cases and one secondary case were all positive for *Cryptosporidium*. All specimens that were positive by PCR-RFLP (n=7) were *Cryptosporidium* genotype 2 (the bovine genotype).

Cases occurred predominantly among students in the Animal Science class; 30 (45%) of 67 class participants were ill. Cases were distributed evenly among all the Animal Science class periods (periods 1, 3, 4, 5, and 7). None of the four students who were in both Animal Science and Greenhouse class reported illness. Univariate analysis showed that two variables—participation in Animal Science class and contact with calves—were significantly associated with illness. Thirty of 63 (48%) Animal Science students vs. one of 17 (6%) non-Animal Science students met the case definition (risk ratio [RR], 8.1; 95% confidence interval [CI], 1.2 to 55.2; p=0.002). Contact with calves, regardless of the class, was also associated with illness (29 of 65 [45%] of students having contact with calves were cases vs. two of 19 [11%] of students not having contact with calves; RR, 4.2; 95% CI, 1.1 to 16.2; p=0.007). Contact with calves was a planned part of Animal Science class, but not of Equine Science or Greenhouse classes. Contact with and care of the other animals (horses, goats, sheep, rabbits) was not associated with illness.

Further analysis included students in the Animal Science classes only. More specific calf-related activities were evaluated. Potential exposures frequently reported by cases included entering a calf pen (29 of 30 [97%] cases), petting a calf (28 of 30 [93%] cases), brushing/grooming a calf (27 of 30 [90%] of cases), cleaning a calf pen (24 of 30 [80%] cases), having an ill calf (17 of 30 [57%] cases), caring for or having contact with a calf with scours (13 of 24 [54%] cases, or

getting manure on one's hands (six of 29 [21%] cases). However, none of these exposures were statistically significant risk factors for illness. No individual calf was associated with illness. Specific hygiene practices (e.g., lack of handwashing, drying hands on clothes, etc.) also were not associated with illness. Every student claimed scrupulous hygiene. Eating while at the teaching farm was not statistically associated with illness.

The MDH site visit to the teaching farm showed that each student had primary responsibility for the care of one calf, but often petted many other calves. Petting other calves occurred when calves were collectively released from their pens into a large common central area. Many students reported that "most" to "all" of the calves were sick with scours when they first arrived. The instructors kept a closet of overalls and rubber boots for students to wear; these items were piled atop one another and were washed approximately once per month. Students were observed routinely caring for animals in their street clothes and shoes, rather than in the overalls and boots provided. Many students had long pant legs that dragged on the ground. At the end of the class period, the students gathered around two sinks and performed cursory handwashing before getting back on the bus.

Testing of stool specimens from the calves showed that eight calves were positive for one or more enteric pathogens. Three calves had *Giardia* only, two had *Campylobacter coli* only, one had *Campylobacter jejuni* only, one had both *Campylobacter coli* and *Giardia*, and one had both *Cryptosporidium* and *Giardia*. Of note, the calf, which had tested positive for *Cryptosporidium* earlier by the veterinarian, tested negative. A gene for Shiga toxin (SLT-I) was detected in bacteria cultured from two calves; a non-O157 *E. coli* isolate from one calf has been sent to CDC for serotyping. Stool specimens collected from the other species of animals were negative for enteric pathogens.

Specific recommendations made to teaching farm included assigning each student to one of the six sinks distributed throughout the facility to minimize crowding and optimize thorough handwashing; placing hand sanitizer gel at the building's exit for use just before boarding the bus; and more frequent cleaning of the coveralls and boots with more organized storage to prevent cross-contamination. A hands-on mentoring program for grade 3 students also was cancelled. Lastly, kindergarten through grade 5 students were scheduled to tour the teaching farm later in the spring to learn how to care for the animals; MDH advised that these young students should not have direct contact with calves/cattle and that handwashing and hygiene should be emphasized.

This was an outbreak of cryptosporidiosis associated with calf contact as a component of an Animal Science class at a teaching farm. Multiple calves were ill with gastrointestinal disease during the class. Students participating in the Animal Science class had very close contact with calves and calf pens while wearing street clothes. Infection with *Cryptosporidium* was documented in two calves and seven students. Recommendations emphasized better student handwashing, the use of hand sanitizer gels, and the use, laundering, and storage of protective gear.

(2)
Salmonella Ealing Infections Associated with the Home of a Herpetologist

February Hennepin County

In February 2003, through routine active laboratory-based surveillance, a case of *Salmonella* serotype Ealing (*S*. Ealing) was identified and interviewed by the Minnesota Department of Health (MDH). The case (Case 1) was a 47-year-old woman who was hospitalized for 2 days. She reported visiting the home of a herpetologist-friend 2 days before her onset of illness. She did not report any direct contact with reptiles in the home, but did eat and drink during the several hour-long visit. The herpetologist refused an offer to culture the reptiles for *Salmonella*. In April 2003, again as part of routine surveillance activities, MDH interviewed the mother of a 3-month-old infant with a culture-confirmed *S*. Ealing infection (Case 2). The mother reported that the infant was fed breast milk only, but that they were living in the home of a family member who was a herpetologist, and she suspected indirect contact with reptiles as the source of the child's infection. The herpetologist was the same individual identified by Case 1; the herpetologist now granted permission for culturing of the environment and reptiles in her home.

A case was defined as a person with a laboratory-confirmed *S.* Ealing infection and an epidemiologic link to the herpetologist. Pulsed-field gel electrophoresis (PFGE) subtyping was performed on human, environmental, and reptile *S*. Ealing isolates.

On May 29, 2003, three MDH epidemiologists collected 14 environmental samples from the herpetologist's living quarters and from surfaces in the "reptile room," and 21 fecal samples or cage samples from the approximately 50 reptiles kept in the home. A schematic drawing was made to show the locations of reptile cages relative to the layout of the home. The herpetologist was interviewed about husbandry practices and management of the reptiles, typical flow of visitors and family members through the home and yard, and preventive measures taken to prevent zoonotic transmission of *Salmonella*.

The herpetologist, her husband, Case 2, and Case 2's mother were the only household members. None of the adults reported having a diarrheal illness within the previous 30 days; the infant's mother and the herpetologist submitted stool samples that were culture negative for *Salmonella*. The two cases described above were the only cases identified. The *S*. Ealing PFGE patterns of the isolate from Case 1 and a follow-up isolate from Case 2 (collected on May 29) were indistinguishable, and designated EAL1. The PFGE pattern from the first isolate from Case 2 (collected on April 20) differed from the EAL1 pattern by a single band, and was designated EAL2.

The herpetologist's home was a remodeled dentist's office organized around a long hallway, with the "reptile room" and laundry room at the far end of the house. The herpetologist provided assurance before the site visit that the human-use areas were completely separate from the reptile rooms. This was largely true, except for a large terrarium containing geckos and frogs in the entryway/front room of the home; this terrarium was located a few feet from the infant's playpen. In addition, the laundry-room was used for human laundry and contained sinks that were also used clean reptile equipment. There were also open doorways (i.e., no doors) between

the main reptile room and the hallway to the laundry room, and between the reptile room and the storage area. The storage area was a general-use room connected to the rest of the home, through which the reptiles were carried to bring them outdoors for exercise.

Salmonellae were isolated from numerous reptiles and environmental sources in the house. One or more *Salmonella* serotypes were isolated from 16 (76%) of 21 reptile fecal samples or cage samples and four (29%) of 14 environmental samples (table 2). *S.* Ealing was isolated from a pooled fecal sample from the gecko and frog terrarium in the front room, a pooled feces and water sample from the Fat Tail Geckos, the bathroom countertop, and the edge of the kitchen sink. These isolates were all PFGE subtype EAL1 or EAL3; EAL3 differed by a single band from EAL1 and EAL2 (table 2). *S.* Salamae was isolated from Fat Tail Geckos, Snapping Turtles, Leopard Geckos, the *Mali Uromastyx*, the Bearded Dragon, the edge of the laundry room sink, and dust from the vacuum cleaner bag.

This was an outbreak of *S.* Ealing infections among a visitor and an infant houseguest of a herpetologist. Environmental contamination of multiple household surfaces, including the kitchen sink, with *S.* Ealing was documented; transmission likely occurred through contact with environmental surfaces indirectly contaminated by reptiles.

The level (76%) of *Salmonella* carriage we found among the reptiles is expected and is not indicative of disease; most reptiles (>90%) shed the organisms intermittently throughout life. Because of nearly universal carriage, it is not possible to select *Salmonella*-free reptiles as pets, nor has it been possible to eliminate *Salmonella* carriage from the gastrointestinal tract of reptiles with antibiotic treatment. Therefore, reptile owners must assume that all reptiles are shedding the organisms and must constantly strive to prevent transmission of *Salmonella* to people. The Centers for Disease Control and Prevention has recommended that reptiles not be kept as pets in homes with children under 5 years old or immunocompromised persons.

MDH recommended completely separating the reptile rooms from the human quarters including: moving the geckos and frogs from the front room into the reptile area; installing a door from the reptile room to the hallway to the laundry room and adjacent bathroom and from the storage room to the bedroom; maintaining the storage room as a reptile room; using the backyard exclusively for a reptile exercise area; and installing a large sink and floor drain in the reptile area so that the laundry room wasn't needed for reptile care (figure 1). In addition, MDH recommended moving toward more cleanable surfaces such as glass and stainless steel in the reptile rooms and away from linoleum and wood; using commercially available disinfectants after appropriate cleaning of surfaces; and regularly using a 1:10 solution of bleach to disinfect all the sinks.

MDH epidemiologists recommended that anyone working with the reptiles wash their hands thoroughly with soap and water afterwards, dry them with individual paper towels, and follow this with use of an alcohol-based hand sanitizer. It was also recommended that coveralls or a lab coat, and boots be worn in the reptile rooms and remain there. The herpetologist was encouraged to restrict immunocompromised individuals and children under the age of 5 years from visiting the home.

(3)
Cryptosporidiosis Among Employees at a Veterinary Clinic

June Kandiyohi County

In June 2003, the Minnesota Department of Health (MDH) was notified by a parent of a 15-year old child with a confirmed *Cryptosporidium parvum* infection. The parent indicated that the child worked at a veterinary clinic and that there was another clinic employee, a 14-year old, who had similar symptoms. The mother stated that both teenage employees performed similar work-related activities at the veterinary clinic.

An MDH epidemiologist interviewed the two ill veterinary employees by phone about illness history and potential exposures. A case was defined as an employee of the veterinary clinic who reported vomiting or diarrhea (≥3 loose stools in 24-hour period) during June 2003.

Both ill employees reported diarrhea, nausea, vomiting, and cramps. Symptoms were ongoing for both cases at the time of the interview. The symptoms had been present for 6 and 13 days, respectively. One child did visit a health care provider for the illness and was diagnosed with cryptosporidiosis. The second child did not seek medical attention. Stool samples were requested to ascertain the etiologic agent; the MDH Public Health Laboratory confirmed the presence of *Cryptosporidium parvum* in the submitted stool samples.

Both case reported that while working at the veterinary clinic, they cleaned an animal pen that had been occupied by a sick calf. This calf was at the facility for 1.5 days and was reported to have diarrhea. The calf was not diagnosed with a specific enteric pathogen. The cases reported they did not use any gloves while cleaning the pen. The incubation periods for the cases (calculated from when the calf pen was cleaned) were 3 and 10 days, respectively.

This was an outbreak of cryptosporidiosis among employees of a veterinary clinic. Both cases had a laboratory-confirmed infection with *Cryptosporidium parvum*. The most likely source of illness was the pen of a calf that was ill with diarrhea. The cases were likely exposed while cleaning the pen.

(4)
***E. coli* O157:H7 Infections Associated with a County Fair**

July Scott County

On August 11-12, 2003 the Minnesota Department of Health (MDH) detected a cluster of four cases of *E. coli* O157:H7 (O157) infection that had isolates with an indistinguishable pulsed-field gel electrophoresis (PFGE) pattern designated MN752. The cluster was detected through routine laboratory-based surveillance.

Cases (or their parents) were interviewed to obtain illness histories and extensive food and exposure histories. A case-control study was conducted. Two to three age-matched controls per cases were selected by sequentially calling telephone numbers with the same prefix as the case's

telephone number and asking if age-eligible subjects resided in the household. Seven-day food and exposure histories were obtained from each control, with emphasis on the purchase and consumption of ground beef and other meats and on activities with high risk for exposure to enteric pathogens.

After a county fair was identified as a possible exposure, cases were re-interviewed with a focus on specific activities and foods consumed at the fair. A site visit of the fair was performed on August 15 by MDH epidemiologists and a public health nurse from Scott County. The fair manager and site caretaker were interviewed, and environmental samples were obtained from areas where animals had been kept or exhibited (e.g., cattle barn, sheep and goat barn, petting zoo, manure pits).

Environmental samples were obtained from the fairgrounds and the MDH Public Health Laboratory (PHL) performed routine bacterial cultures and enhanced testing for O157 though the use of immunomagnetic separation. Culture plates were tested for Shiga toxin genes by testing "sweeps" of bacterial colonies by polymerase chain reaction.

In addition to the four cases identified over August 11-12, a fifth case was identified on August 18. Four of the cases were children aged 23 months to 10 years, and one case was a 75-year-old adult. All cases lived within the seven-county Twin Cities metropolitan area. Dates of illness onset ranged from July 28 to August 1. All five cases had diarrhea and cramps, three (60%) had vomiting, three (60%) had fever, and three (60%) had bloody stools. Two cases were hospitalized, and one developed hemolytic uremic syndrome requiring hemodialysis. Initial interviews suggested two possible common exposures: ground beef obtained from different branches of the same supermarket chain (chain A) and attendance at a specific county fair.

In the case-control study, attendance at the county fair was significantly associated with illness (4 [80%] of 5 cases vs. 1 [8%] of 12 controls; odds ratio [OR], 44.0; 95% confidence interval [CI], 1.5 to 2341; p=0.004). All four cases that attended the fair had done so on the same day (July 27). No other risk factors were identified; consuming beef from supermarket chain A was not significantly associated with illness.

The county fair took place during July 23-27. When the cases were interviewed about specific activities and foods consumed at the fair, the foods consumed at the fair, the foods consumed and the fun rides ridden varied between the four county fair attendees. Two (cases A and B) of four may have visited the petting zoo, two (cases A and C) of four may have been in the cattle barn, and two (cases B and C) of four may have been in the poultry barn. All four (cases A, B, C, and D) attended a draft horse show on the afternoon of July 27. One case reported noticing wall signs in the petting zoo that instructed visitors to wash their hands after animal contact, and none of the cases said that they were aware that handwashing stations were available throughout the fairgrounds.

A site visit to the fairgrounds revealed that the educational and exhibit buildings were located near the entrance on the eastern half of the fairgrounds, while the animal buildings were situated on the western half of the fairgrounds. Animal building included a petting zoo (calves, miniature horses, goats, sheep, ducks, and chicks), a cattle barn housing cattle (and possibly ponies), a

sheep and goat barn, a poultry barn, a rabbit barn, and a horse barn. There were two horse rings and a horse hitching area near the horse barn where fairgoers were allowed to pet the horses. Extra sheep and goats were housed on the grass in fenced-in areas away from the entrance/exit. Handwashing and "no eating/drinking" signs were visible in the petting zoo. Food booths were primarily located on the eastern half of the fairgrounds with the educational/exhibit buildings, though some food stands were situated near the petting zoo and other animal barns.

Thirty-six environmental samples were obtained from the petting zoo, sheep and goat barn, cattle barn, manure pits, and the grounds surrounding the cattle barn. The surfaces of fences, walls, and rafters were swabbed, and samples of dried manure were collected. All 36 samples were negative for O157. Other Shiga toxin-producing colonies were recovered in culture but could not be further characterized.

A family member of one pediatric cases visited the animal barns of the Minnesota State Fair (held August 26-September 6) and recognized the same animals that had been at the county fair. He spoke with the animal owners and was told that the animal owners' grandson, a 10-year-old boy, had become ill on August 1 with bloody diarrhea, vomiting, cramps, and fever. The boy had traveled from Nevada to visit his grandparents in Iowa, and had then traveled with them to exhibit animals at the county fair from July 25 to July 27. He visited every building during his 3-day visit to the county fair, and a specific exposure could not be pinpointed. He became ill on August 1 while traveling in New Hampshire visiting other relatives. A stool specimen obtained at an emergency room cultured positive for O157 and PFGE analysis performed by the New Hampshire Department of Health and Human Services Public Health Laboratory revealed that the isolate's PFGE pattern was nearly indistinguishable (differed by one band) from MN752.

This was an outbreak of *E. coli* O157:H7 infections associated with attendance at a county fair. The specific source of the infections was not determined. The one fair exposure reported by all of the cases who attended the fair was the draft horse show on July 27. No environmental samples were positive for O157. Recommendations made to the fair operators included situating handwashing stations in prominent locations marked by more visible signs, promoting frequent handwashing with signs and advertisements, forbidding food/beverage consumption in areas with animals, encouraging handwashing before all eating and drinking activities, and encouraging the use of alcohol-based hand sanitizers.

(5)
Cryptosporidiosis Associated with a Teaching Farm

September — Crow Wing County

In late February 2003, the Minnesota Department of Health (MDH) investigated an outbreak of cryptosporidiosis that occurred among middle and high school students enrolled in Animal Science class at a teaching farm, an agricultural program administered by a high school (see outbreak **(1)** in this section). Students in Animal Science class care for and had intensive direct contact with different species of animals, including calves, goats, sheep, horses, pigs, and rabbits. Multiple calves had been ill with severe diarrheal illness while the students had cared for them. In the end, 30 (48%) of 63 Animal Science students met the outbreak case definition for illness.

Seven students and two calves had stool samples positive for *Cryptosporidium parvum*, genotype 2. Contact with calves was significantly associated with student illness. Recommended interventions included disallowing food and beverages on the premises, distributing the students to all of the available sinks and supervising their handwashing, using boots and pull-on pants to protect street clothes, and placing hand sanitizer gel at the teaching farm exits for use before boarding buses.

In late September 2003, MDH was informed by the local public health nurse of two laboratory-confirmed cases of cryptosporidiosis infection among junior high school students participating in a subsequent semester's Animal Science classes at the teaching farm.

The investigation was initially conducted among the junior high school Animal Science students but was later expanded to include the high school Animal Science students after a letter sent to them resulted in identification of cases of diarrheal illness among the high school students. The instructors at the teaching farm were interviewed to characterize the exact nature of the students' activities, to obtain purchase and illness histories of the animals at the teaching farm, and to determine which interventions had been implemented since the previous outbreak. Participants were from two schools: a junior high school (grade 9) and a high school (grades 10, 11, and 12). Unlike the previous outbreak in February 2003, the local middle school did not have classes at the teaching farm during this semester.

Class lists from the Animal Science classes were obtained. MDH epidemiologists interviewed students by phone regarding illness history and specific calf-related activities. Because this was a recurrent outbreak, the survey questionnaire focused on the use of protective clothing (e.g., coveralls, pull-on pants, lab coats, and boots or alternative shoes), hand hygiene (e.g., handwashing, use of soap and hand sanitizer gels, drying hands on clothing), and the educational efforts made by the staff at teaching farm to improve sanitation. A case was defined as a student at the teaching farm with vomiting or diarrhea (≥3 stools in a 24-hour period) since September 11, 2003 (the first date that students had contact with the calves). Stool kits for both bacterial culture and ova and parasite testing were offered to students with gastrointestinal symptoms.

On all stool samples, the MDH Public Health Laboratory conducted routine bacterial cultures, routine ova and parasite examination, and additional tests for *Cryptosporidium* and *Giardia* (i.e., acid-fast stain and fluorescent antibody tests). Polymerase chain reaction (PCR) for *Cryptosporidium* was performed on all stool samples, and all *Cryptosporidium* amplification products were genotyped using restriction fragment length polymorphism (RFLP) analysis. Testing for the presence of Shiga toxin genes was performed on "sweeps" of bacterial colonies by PCR.

Three MDH epidemiologists conducted a site visit of the teaching farm on September 29. The interventions undertaken by the teaching farm after the previous outbreak were noted, and the students' activities were observed closely during class and after class as they prepared to return to school. Stool samples were obtained from the 14 remaining calves (one calf died soon after arriving at the teaching farm) and the samples were analyzed by the same methods as the students' stool samples. In addition, isolates of enteric pathogens cultured from the calves' stools were subtyped using pulsed-field gel electrophoresis (PFGE).

Univariate/bivariate analyses were performed using Epi Info 6.0 and multivariate analyses were performed using SAS 8.0. 95% confidence intervals and uncorrected p-values as calculated by Epi Info 6.0 were reported unless the Fisher exact test was more appropriate; in those instances, the reported p-values represent those from the Fisher exact test rather than the uncorrected p-value.

Interviews with the lead instructor of the teaching farm revealed that 15 calves arrived at the teaching farm on September 10. Eight of the calves had been obtained from a local livestock sales barn and seven calves had been obtained from a private dairy farm. At the time of purchase, the calves were all 1 to 3 days old. Students starting caring for the calves the day after arrival (September 11). The lead instructor reported that one calf became sick with scours (a term for watery diarrhea in calves) on September 18 and was quarantined and isolated from the students. This calf died on September 24. Another calf had also become ill with scours on September 18, was quarantined, and was recovering by the time of the MDH site visit. No stool testing had been performed on either calf. The lead instructor reported that most of the other calves had 1-2 days of scours soon after arrival, but that they had all since recovered. None of these calves were isolated from the students. Since arrival to the teaching farm, all of the calves had been receiving monensin (trade name Rumensin, a coccidiostat) twice daily in their milk as prescribed by the teaching farm's local veterinarian.

Forty-six students from the junior high school (grade 9) and 45 students from the high school (grades 10, 11, and 12) were enrolled in the teaching farm's Animal Science class (total n =91). The junior high school classes met during third and fourth periods before lunch, and the high school classes met during fifth and sixth periods after lunch.

Eight-one (89%) of the 91 students enrolled in Animal Science classes were interviewed (44 [96%] of 46 junior high school students and 37 [82%] of 45 high school students). Four students reported mild gastrointestinal symptoms that did not meet the case definition; these students were excluded from the analysis. Thirty-seven (48%) of the remaining 77 students met the case definition. Fifteen (41%) cases were male and 22 (59%) were female. Illness onset dates ranged from September 8 to October 1, 2003; the median illness onset date was September 22. The median duration of illness was 4 days (range, 1 to 10 days). All 37 cases had diarrhea, 17 (46%) had vomiting, 28 (76%) had cramps, 17 (47%) had fever, and one (3%) had bloody stools. Stool samples were obtained from ten patients; seven (70%) were positive for *Cryptosporidium parvum*. Five specimens were positive for *Cryptosporidium* by PCR, and all were genotype 2 (the bovine genotype) by RFLP analysis.

Among all students (n=77), 51 (66%) reported wearing coveralls or lab coats and 70 (91%) reported wearing boots or alternative shoes. All students reported washing their hands after class, and 71 (92%) reported always using soap. Seventy-five (97%) of 77 reported being told to wash their hands after animal contact, but only 30 (40%) of the 75 reported being given detailed instructions on how to wash their hands. Twenty-eight (36%) of 77 reported eating or drinking while at the teaching farm.

Univariate analysis showed that multiple variables were significantly associated with illness, including cleaning a calf pen, having contact with any calf with scours, having visible manure on one's hands, wearing coveralls always and reporting that their use was mandatory, any wearing of boots, wearing boots always and reporting that their use was mandatory, handwashing with water only, and drying one's hands on one's clothes. Being told to use the hand sanitizer gel was a protective factor but the act of using sanitizer gel had no protective or risk effect. Lastly, the use of soap was a borderline significant risk factor.

Multivariate analysis was then conducted to determine whether any of these exposures were independently associated with illness after controlling for the others. Variable which had a p-value of ≤0.10 on univariate analysis were entered into a stepwise logistic regression model. For overlapping variables (e.g., "boots-any use", "boots-always", "boots-mandatory"), the variables dealing with actual use rather than whether use was perceived as mandatory were chosen for inclusion in the analyses, and the broadest category ("any use" rather than "always") was included in the analysis. Getting visible manure on one's hands (adjusted odds ratio [AOR], 7.7; 95% confidence interval [CI], 1.4 to 42.5; p=0.018), always wearing coveralls (AOR, 3.6; 95% CI, 1.2 to 11.1; p=0.024), and wearing boots (AOR, 3.8; 95% CI, 1.3 to 11.0; p=0.015) were independently associated with illness after adjusting for the other exposures.

There was a significant difference in attack rate between the two schools: 27 (57%) of the 41 junior high school students became ill vs. 10 (28%) of the 36 high school students (risk ratio [RR], 2.4; 95% confidence interval [CI], 1.3 to 4.2; p=0.008). No differences in attack rates between grades 10, 11, and 12 were observed.

Stratified statistical analyses were conducted to determine if risk factors differed between the junior high school and the high school students. Among junior high school students only, three risk factors were significant on univariate analysis: drying hands on one's clothing (12 [87%] of 15 who dried their hands on their clothing became ill vs. 14 [54%] of 26 who did not; RR, 1.6; 95% CI, 1.1 to 2.4; p=0.033), and eating/drinking while at the teaching farm (13 [87%] of 15 who ate/drank vs. 14 [54%] of 26 who did not; RR, 1.6; 95% CI, 1.1 to 2.4; p=0.033). Multivariate analysis demonstrated that eating or drinking at the teaching farm remained significantly associated with illness (AOR, 5.6; 95% CI, 1.0 to 29.8; p=0.045) after adjusting for other exposures.

Among high school students only, no significant risk factors were identified. There was a significant difference in attack rate between the two periods (periods 5 vs. 6) (8 [44%] of 18 period 5 students became ill vs. 2 [11%] of 18 period 6 students; RR, 4.0; 95% CI, 1.0 to 16.3; p=0.026).

The junior high school periods (periods 3 and 4) were taught by the same instructor and had similar attack rates. The high school periods (periods 5 and 6) were each taught by different instructors (3 instructors total). Considering that there were significant differences in attack rates between the junior high school students and the high school students, and between period 5 and period 6 of the high school classes, analyses were conducted to determine if there were differences in the level of hygiene education performed by each instructor and if there were differences in exposures between schools/periods. There were no significant differences

between the schools/periods regarding the proportion of students who were instructed to wash their hands after animal contact (range, 95-100%), who were told that manure could contain disease-causing organisms (range, 66-88%), or who were instructed how to wash their hands (range, 35-50%).

However, students in the junior high school were significantly less likely than the high school students to have fed the calves (10 [25%] of 40 junior high school students fed calves vs. 28 [80%] of 35 high school students; RR, 0.03; 95% CI, 0.2 to 0.6; p<0.001) or to have had contact with horses (10 [24%] of 41 junior high school students vs. 17 [47%] of 36 high school students; RR, 0.5; 95% CI, 0.3 to 1.0; p=0.036) and rabbits (4 [12%] of 41 junior high school students vs. 11[31%] of 36 high school students; RR, 0.4; 95% CI, 0.2 to 1.0; p = 0.048).

Junior high school students were significantly more likely than high school students to have hugged a calf (12 [30%] of 40 junior high school students vs. 2 [6%] of 35 high school students; RR, 5.3; 95 %CI, 1.3 to 21.7; p=0.007), cleaned a calf pen (36 [90%] of 40 junior high school students vs. 14 [40%] of 35 high school students; RR, 2.3; 95% CI, 1.5 to 3.4; p<0.001) and to have been assigned a calf with scours (21 [62%] of 34 junior high school students vs. 11 [32%] of 34 high school students; RR, 1.9; 95% CI, 1.1 to 3.3; p=0.015). Junior high school students were significantly more likely than high school students to have worn coveralls (35 [85%] of 41 junior high school students vs. 16 [44%] of 36 high school students; RR, 1.9; 95% CI, 1.3 to 2.8; p<0.001), to have worn coveralls 'always' (31 [78%] of 40 junior high school students vs. 7 [19%] of 36 high school students; RR, 4.0; 95% CI, 2.0 to 7.9; p<0.001), and to report that wearing coveralls was mandatory (33 [85%] of 39 junior high school students vs. 11 [31%] of 36 high school students; RR, 2.8; 95% CI, 1.7 to 4.6; p<0.001). Junior high school students were significantly more likely to than high school students to have worn boots (32 [78%] of 41 junior high school students vs. 14 [39%] of 36 high school students; RR, 2.0; 95% CI, 1.3 to 3.1; p<0.001), to have worn them 'always' (28 [70%] of 40 junior high school students vs. 11 [31%] of 35 high school students; RR, 2.3; 95% CI, 1.3 to 3.9; p<0.001), to report that wearing boots was mandatory (40 [98%] of 41 junior high school students vs. 11 [31%] of 35 high school students; RR, 3.1; 95% CI, 1.9 to 5.1; p<0.001), and to brush off their shoes or boots after class always (34 [89%] of 38 junior high school students vs. 22 [65%] of 34 high school students; RR, 1.4; 95% CI, 1.1 to 1.8; p=0.012). Junior high school students were significantly more likely than high school students to use lab coats or different shoes as alternatives to coveralls and boots, and to report that use was mandatory.

In terms of hand hygiene, the behavior "use soap always" was statistically different between schools (35 [85%] of 41 junior high school students vs. 36 [100%] of 36 high school students; RR, 0.9; 95% CI, 0.8 to 1.0; Fisher exact p=0.027). No other hand hygiene practices (e.g., use of sanitizer gel or paper towels, or drying hands on clothes) significantly differed between the junior high school and the high school students. The proportion of students who ate or drank at the teaching farm did not differ between the junior high school and the high school.

There were no significant differences between high school students in period 5 vs. period 6 in their use of coveralls, boots, lab coats, or different shoes, nor in their hygiene practices. Significant risk exposures which different between students in period 5 vs. period 6 included cleaning out a calf pen (12 [71%] of 17 period 5 students vs. 2 [11%] of 18 high school students;

RR, 6.4; 95% CI, 1.7 to 24.3; p<0.001), and entering other pens (14 [78%] of 18 period 5 students vs. 6 [33%] of 18 high school students; RR, 2.3; 95% CI, 1.1 to 4.7; p<0.007).

MDH's visit to the teaching farm showed that each student had primary responsibility for one calf but often petting many other calves, as was the case in the previous semester. Petting other calves occurred when calves were collectively released from their pens into a large common central area. The closet of coveralls and rubber boots had not changed since the previous site visit in February; these items were still piled atop one another, but were now being washed more frequently (approximately every 1-2 weeks instead of monthly). There was a modest increase in the number of students wearing the provided coveralls and boots, but most students still cared for the animals in their street clothes and shoes. Students were allowed to bring in their own set of alternative clothes and shoes to be used strictly at the teaching farm, but some students reporting bring them home daily in their backpacks after class. At the end of the class period, the students had been distributed to the six sinks around the building as had been recommended after the previous outbreak, but the students' handwashing remained extremely cursory. Also, the sinks were located in the barn, whereas the coverall and boot closets were located in the entry hall near the exit. Of the students who were observed changing out of their protective gear, many did so after they washed their hands. Lastly, while talking with a few students, one was seen eating a small bag of animal crackers in the entry hallway where the coverall and boot closets were located. The teaching farm had a vending machine located in a neighboring building complex.

During the site visit, many of the calves appeared ill. Testing of stool specimens from the calves showed that twelve of 14 calves were positive for one or more enteric pathogens. Four calves had *Cryptosporidium* only, two calves had *Giardia* only, one had *Campylobacter* coli only, three had both *Cryptosporidium* and *Giardia*, one had *Cryptosporidium* and *Campylobacter coli*, and one had *Giardia* and *Campylobacter coli*. The *Campylobacter coli* isolates from the three calves had an identical PFGE pattern. There was no significant difference in pathogen load between calves obtained from the sales barn vs. those obtained from the private dairy farm. All calf stool samples tested negative for *E. coli* O157, *Salmonella*, and *Campylobacter jejuni*. All were negative for Shiga-toxin producing bacteria.

The statistical analyses and environmental investigation provided many insights into the reasons for this recurrent outbreak of cryptosporidiosis. Along with calf-specific factors (e.g., cleaning out a calf pen, working with calves with scours, and getting visible manure on one's hands), the use of coveralls and boots were significant risk factors. Although they were intended to be protective measures and the instructor of the junior high school periods appropriately encouraged their use, they likely were contaminated; more effort was needed to ensure that students washed their hands after changing out of them. The use of protective clothing among the high school students was low. Eating or drinking at the teaching farm was a significant risk factor among junior high school students. With their class periods before lunch and the fact that the junior high school did not have a vending machine (the high school did) resulted in many junior high school students eating food from the vending machine on their way back to school.

Considering that this was a recurrent outbreak, more extensive recommendations were made. In terms of the calves, it was recommended that the teaching farm not purchase their calves from sales barns and to quarantine the calves outdoors for 30 days before allowing them to come into contact with students (regardless of the age of the calves at the time of purchase). To prevent

calf-to-calf transmission of pathogens, physical separation of the calf pens during the 30-day quarantine and prevention of nose-to-nose contact between the calves was recommended.

Many student hygiene measures were recommended: on the first day of class, all students should undergo an hour-long session on proper hygiene, including specific recommendations on proper handwashing; detailed information should be sent home to the students' parents or guardians regarding zoonotic illness and specific instructions on how to properly handle/launder soiled clothing brought home by students; supervised handwashing at the teaching farm, particularly stressing the importance of washing hands after removing the coveralls and boots; allowing class instructors to end periods earlier so students would have sufficient time for proper handwashing; and lastly, no eating or drinking in the teaching farm building or on the bus on the way back to school.

To avoid widespread contamination of the coveralls, boots, and other protective clothing, it was recommended that clothing be laundered at least weekly and that disposable boots be used when there would be contact with animals. It was also suggested that each student should have individual coveralls and lab coats.

This was a recurrent outbreak of cryptosporidiosis associated with calf contact at an educational farm program. Risk factors included cleaning calf pens and getting visible manure on one's hands, wearing street clothes and shoes or contaminated clothing, inadequate hand hygiene, and consumption of food while at the teaching farm. The lack of adequate and consistent enforcement of our prior recommendations led to this recurrence of disease. Infection with Cryptosporidium was documented in eight calves and seven students. Recommendations emphasized allowing students to work only with healthier or older animals, better student handwashing instruction and supervision, the proper use, laundering, and storage of protective gear, and forbidding all eating and drinking at the teaching farm.

Confirmed Foodborne Outbreaks
Minnesota, 2003

Outbreak No.	Month	Setting	No. Cases	No. Laboratory-Confirmed	Vehicle	Agent	Contributing Factor	County
1	Jan	Holiday party	7	2	Unknown	Norovirus	Unknown	Kandiyohi
2	Jan	Commercial product	6	6	Alfalfa sprouts	*E. coli* O157:H7	Contaminated raw product	Hennepin and Ramsey
3	Jan	Restaurant	4	0	Falafels	Suspected bacterial intoxication	Unknown	Hennepin
4	Mar	Restaurant	3	0	Unknown (suspect rice)	Suspected bacterial intoxication	Improper cooling procedures	Ramsey
5	Mar	Banquet	41	4	Salad	Norovirus	Unknown	Becker
6	Mar	Catered event	14	0	Unknown (suspect raspberry chutney)	Suspected bacterial intoxication	Unknown	Mower
7	Apr	Restaurant	11	2	Unknown	Norovirus	Ill food workers	Sherburne
8	Apr	Private gathering	15	6	Beef	Multiple bacterial pathogens	Improper butchering and handling	Olmsted
9	Apr	Private homes	2	0	Tuna	Scombroid toxin	Temperature abuse of leftover food	Hennepin
10	May	Church supper	14	3	Unknown	Norovirus	Unknown	Morrison
11	May	Restaurant	4	0	Unknown	Suspected bacterial intoxication	Unknown	Anoka

Confirmed Foodborne Outbreaks
Minnesota, 2003 (continued)

Outbreak No.	Month	Setting	No. Cases	No. Laboratory-Confirmed	Vehicle	Agent	Contributing Factor	County
12	May	Restaurant	4	4	Eggs	*Salmonella* Enteritidis	Contaminated raw product	St. Louis and Lake
13	May	Restaurant	2	0	Escolar fish	Scombroid toxin	Unknown	Hennepin
14	May-Oct	Commercial product	8	6	Steaks	*E. coli* O157:H7	Contaminated raw product	Multiple
15	May	Restaurant	6	0	Turkey wraps and tortellini salad	Suspected bacterial intoxication	Time/temperature abuse	Anoka
16	Jul	Restaurant	1	0	Tuna	Scombroid toxin	Unknown	Hennepin
17	Jul	Picnic	4	2	Unknown	Norovirus	Unknown	Hennepin
18	Jul	Catered lunch	44	0	Coleslaw	Unknown	Unknown	Beltrami
19	Jul	Restaurant	8	1	Ground beef	*Clostridium perfringens* intoxication	Time/temperature abuse	Olmsted
20	Aug	Restaurant	8	5	Pork	*Clostridium perfringens* intoxication	Time/temperature abuse	Pine
21	Aug	Catered lunches	38	5	Multiple food items	Norovirus	Unknown	Hennepin
22	Aug	Youth camp	18	0	Butterscotch bars	Unknown	Unknown	St. Louis
23	Sep	Block party	5	3	Multiple food items	*Salmonella* Saintpaul	Unknown	Dakota

Confirmed Foodborne Outbreaks
Minnesota, 2003 (continued)

Outbreak No.	Month	Setting	No. Cases	No. Laboratory-Confirmed	Vehicle	Agent	Contributing Factor	County
24	Sep	Restaurant	57	41	Eggs and pancakes	*Salmonella* Heidelberg	Cross-contamination, time-temperature abuse, infected food workers	St. Louis
25	Sep	Restaurant	4	0	Prime rib	Suspected *Clostridium perfringens* intoxication	Improper cooking/hot holding	Ramsey
26	Sep	Elementary school	33	3	Multiple food items	Norovirus	Possible contamination of self-serve food items	Pope
27	Oct	Private home	21	0	Potluck items	Suspected norovirus	Unknown	Todd
28	Oct	Private home	4	3	Smoked turkey	*Staphylococcus aureus* intoxication	Time/temperature abuse	Koochiching
29	Oct	Restaurant	30	27	Eggs	*Salmonella* Enteritidis	Improper foodhandling	Mille Lacs
30	Nov	Restaurant	3	2	Unknown	Norovirus	Unknown	Hennepin
31	Nov	Catered lunch	16	0	Brownies	Suspected norovirus	Possible infected food workers	Hennepin
32	Nov	Catered reception	81	5	Multiple food items	Norovirus	Unknown	Ramsey
33	Nov	Restaurant	9	6	Tuna sushi rolls	Norovirus	Unknown	Hennepin
34	Nov	Catered reception	69	6	Gravy	Norovirus	Unknown	Morrison

Confirmed Foodborne Outbreaks
Minnesota, 2003 (continued)

Outbreak No.	Month	Setting	No. Cases	No. Laboratory-Confirmed	Vehicle	Agent	Contributing Factor	County
35	Nov	Catered event	22	0	Stuffing and gravy	Suspected bacterial intoxication	Time/temperature abuse	Carver
36	Nov	Restaurant	4	4	Unknown	Norovirus	Unknown	Ramsey
37	Dec	Catered event	11	0	Potato salad and gravy	Suspected bacterial intoxication	Unknown	Itasca
38	Dec	Workplace gathering	6	4	Unknown	Norovirus	Unknown	Carver
39	Dec	Private home	9	3	Unknown	*Cryptosporidium*	Unknown	Blue Earth
40	Dec	Restaurant	4	1	Unknown	Norovirus	Unknown	Ramsey
41	Dec	Restaurant	4	0	Tuna	Suspected bacterial intoxication	Unknown	Hennepin

TOTAL: 41

Confirmed Waterborne Outbreaks (Drinking Water)
Minnesota, 2003

Outbreak No.	Month	Setting	No. Cases	No. Laboratory-Confirmed	Vehicle	Agent	Contributing Factor	County
1	Jul	Restaurant	4	0	Fountain drinks	Copper	Faulty backflow prevention device on fountain machine carbonator	Hennepin
2	Nov	Restaurant	5	0	Lemonade	Copper	Defective juice machine	St. Louis

TOTAL: 2

Non-Foodborne, Non-Waterborne Gastroenteritis Outbreaks
Minnesota, 2003

Outbreak No.	Month	Setting	No. Cases	No. Laboratory-Confirmed	Vehicle	Agent	County
1	Jan	Nursing home	42	3	Person-to-person	Norovirus	Lake
2	Jan	Nursing home	179	0	Person-to-person	Suspected norovirus	Faribault
3	Jan	Nursing home	59	1	Person-to-person	Norovirus	Hennepin
4	Jan	Nursing home	60	3	Person-to-person	Norovirus	Steele
5	Jan	Hospital	7	1	Person-to-person	Norovirus	Hennepin
6	Jan	Nursing home	293	3	Person-to-person	Norovirus	Hennepin
7	Jan	Nursing home	127	3	Person-to-person	Norovirus	Hennepin
8	Jan	Restaurant	3	0	Unknown	Unknown	Hennepin
9	Jan	Nursing home	63	2	Person-to-person	Norovirus	Anoka
10	Jan	Elementary school	141	3	Person-to-person	Norovirus	Dakota
11	Jan	Nursing home	102	1	Person-to-person	Norovirus	Washington
12	Jan	Nursing home	29	0	Person-to-person	Suspected norovirus	Winona
13	Jan	Nursing home	58	2	Person-to-person	Norovirus	Hennepin
14	Jan	Nursing home	171	0	Person-to-person	Suspected norovirus	Hennepin
15	Jan	Nursing home	133	2	Person-to-person	Norovirus	Ramsey

Non-Foodborne, Non-Waterborne Gastroenteritis Outbreaks
Minnesota, 2003 (continued)

Outbreak No.	Month	Setting	No. Cases	No. Laboratory-Confirmed	Vehicle	Agent	County
16	Jan	Nursing home	45	1	Person-to-person	Norovirus	Hennepin
17	Jan	Nursing home	56	1	Person-to-person	Norovirus	Ramsey
18	Jan	Nursing home	26	1	Person-to-person	Norovirus	Blue Earth
19	Jan	Nursing home	35	1	Person-to-person	Norovirus	Sherburne
20	Jan	Nursing home	24	0	Person-to-person	Suspected norovirus	McLeod
21	Jan	Daycare	7	7	Person-to-person	*Giardia*	Carver
22	Feb	Nursing home	117	3	Person-to-person	Norovirus	Otter Tail
23	Feb	Nursing home	12	3	Person-to-person	Norovirus	Hennepin
24	Feb	Nursing home	78	3	Person-to-person	Norovirus	Winona
25	Feb	School farm	31	7	Contact with calves	*Cryptosporidium*	Crow Wing
26	Mar	Elementary school	40	0	Person-to-person	Suspected norovirus	Carver
27	Mar	Daycare	10	1	Person-to-person	Norovirus	Hennepin
28	Mar	Nursing home	45	3	Person-to-person	Norovirus	Hennepin
29	Mar	Nursing home	60	3	Person-to-person	Norovirus	Stearns

Non-Foodborne, Non-Waterborne Gastroenteritis Outbreaks
Minnesota, 2003 (continued)

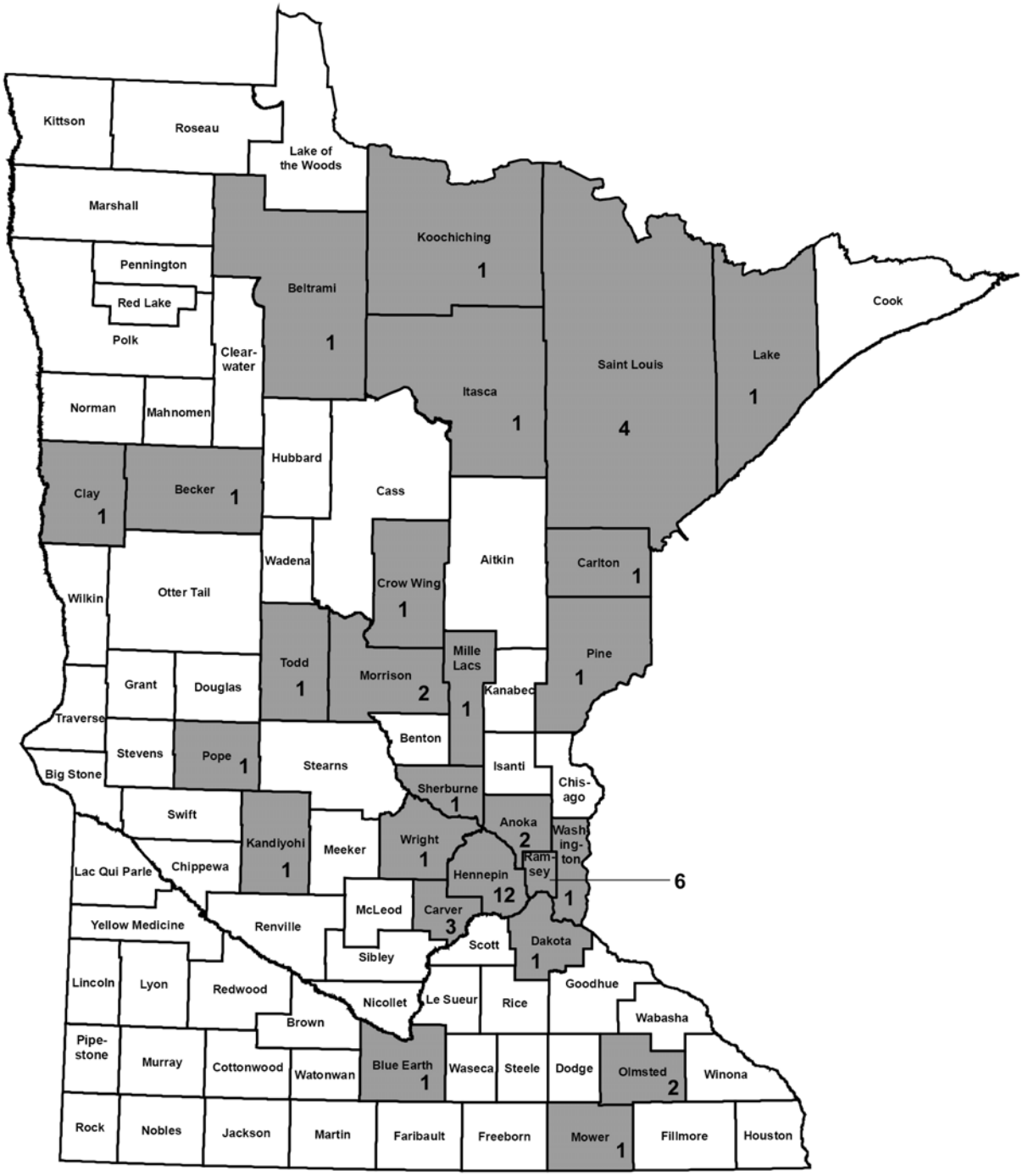
Outbreak No.	Month	Setting	No. Cases	No. Laboratory-Confirmed	Vehicle	Agent	County
30	Mar	Nursing home	75	2	Person-to-person	Norovirus	Hennepin
31	Mar	Nursing home	39	2	Person-to-person	Norovirus	Wilkin
32	Apr	Daycare	4	3	Person-to-person	*Giardia*	Clay
33	Apr	Nursing home	77	3	Person-to-person	Norovirus	Clay
34	Apr	Private home	4	0	Person-to-person	Unknown	Hennepin
35	Jun	Veterinary clinic	2	2	Contact with calves	*Cryptosporidium*	Kandiyohi
36	Jun	Private home	2	2	Contact with reptiles	*Salmonella* Ealing	Hennepin
37	Jul	County fair	5	5	Animal contact	*E. coli* O157:H7	Scott
38	Jul	Camp	16	3	Unknown	Norovirus	Cass
39	Sep	Daycare	30	3	Person-to-person	Norovirus	Hennepin
40	Sep	School farm	37	7	Contact with calves	*Cryptosporidium*	Crow Wing
41	Oct	Daycare	3	3	Person-to-person	*E. coli* O157:H7	Swift
42	Oct	High school	6	0	Unknown	Suspected norovirus	Nobles
43	Dec	Elementary school	23	0	Person-to-person	Unknown	Stevens
44	Dec	Nursing home	12	0	Person-to-person	Suspected norovirus	Hennepin
45	Dec	Nursing home	37	3	Person-to-person	Norovirus	Kandiyohi

Non-Foodborne, Non-Waterborne Gastroenteritis Outbreaks
Minnesota, 2003 (continued)

Outbreak No.	Month	Setting	No. Cases	No. Laboratory-Confirmed	Vehicle	Agent	County
46	Dec	Nursing home	62	1	Person-to-person	Norovirus	Washington
47	Dec	Nursing home	unknown	0	Unknown	Unknown	Dakota
48	Dec	Nursing home	unknown	0	Unknown	Unknown	Aitkin
49	Dec	Nursing home	25	1	Person-to-person	Norovirus	Ramsey
50	Dec	Nursing home	41	1	Unknown	Norovirus	Otter Tail

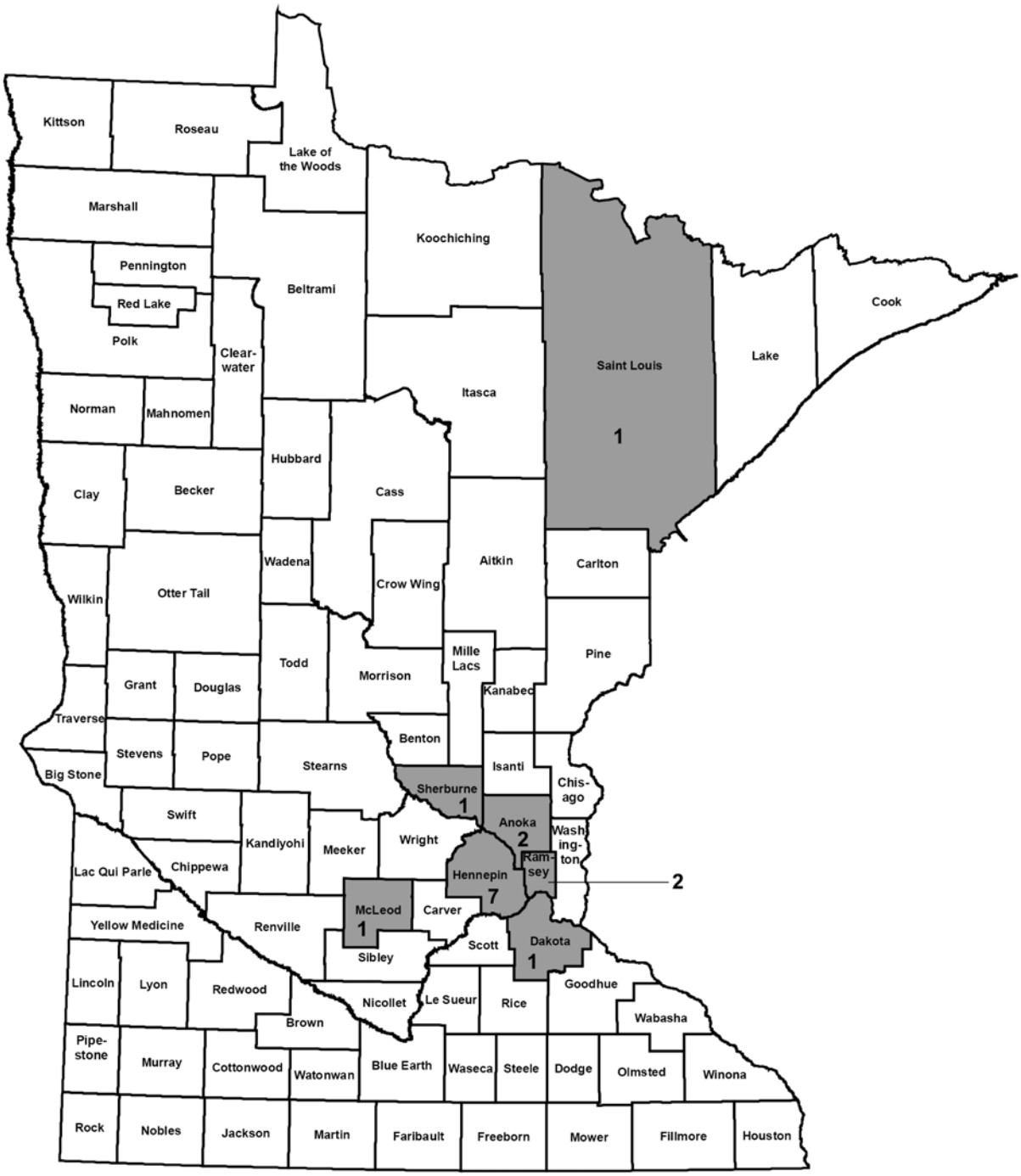
TOTAL: 50

Confirmed Foodborne Outbreaks by County, Minnesota, 2003 (n=41*)

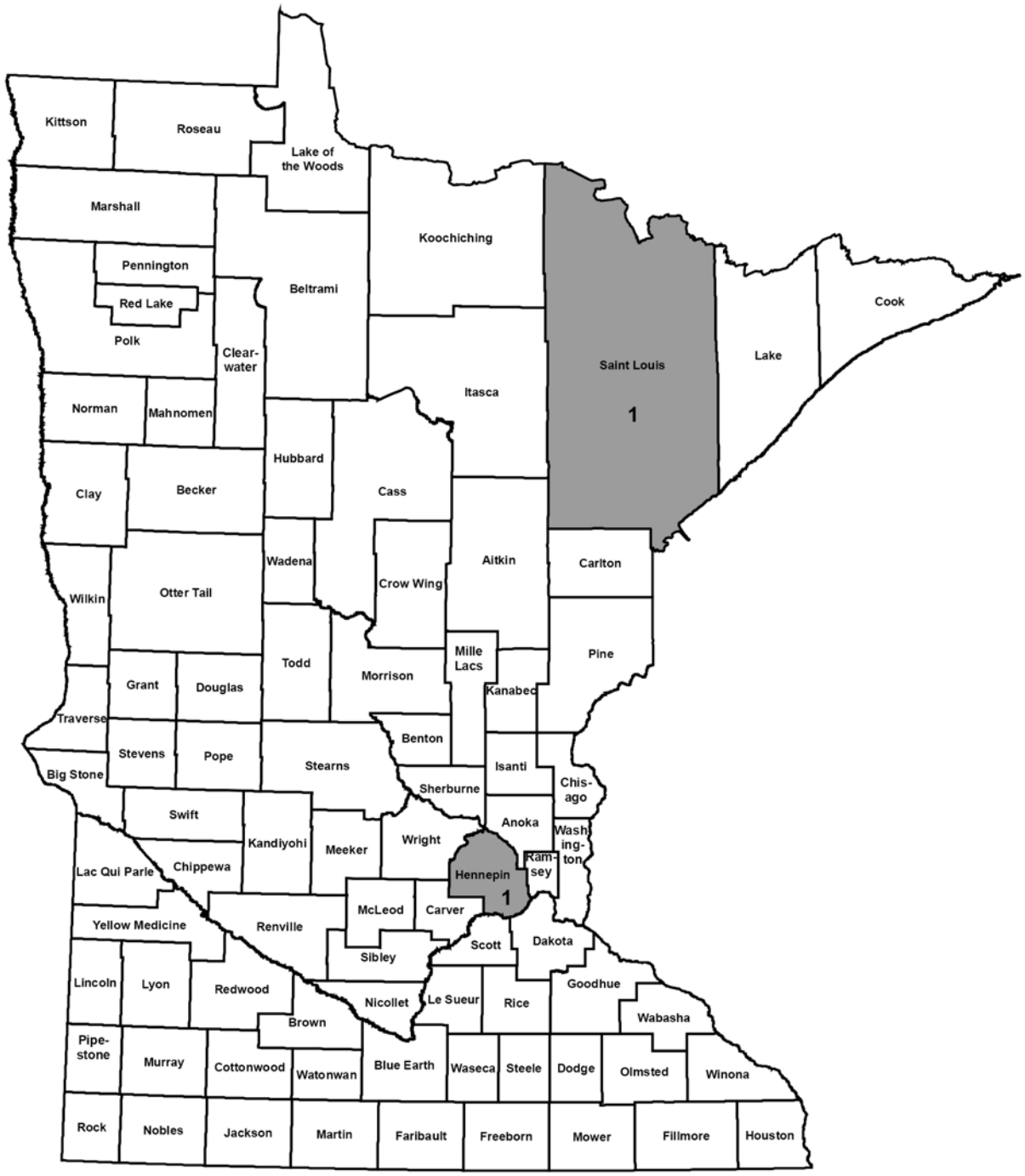


* Numbers on map add up to 50 because 38 of the 41 outbreaks involved single counties but three involved multiple counties. One outbreak involved Carlton, Carver, Clay, Crow Wing, Hennepin, St. Louis, Washington, and Wright Counties; one outbreak involved Hennepin and Ramsey Counties; and one outbreak involved Lake and St. Louis Counties.

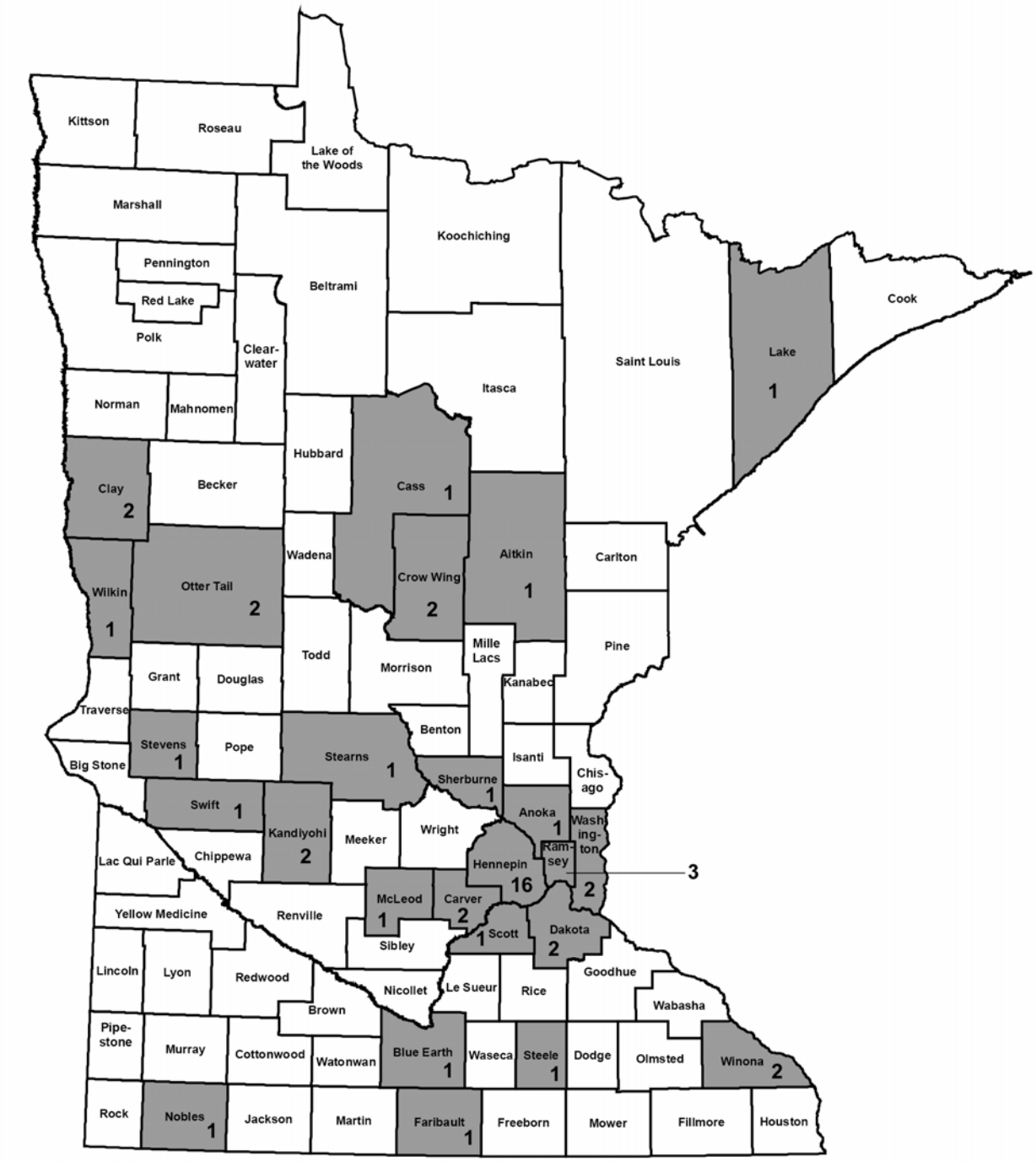
Probable Foodborne Outbreaks by County, Minnesota, 2003 (n=15)



Confirmed Waterborne Outbreaks by County, Minnesota, 2003 (n=2)



Non-Foodborne, Non-Waterborne Gastroenteritis Outbreaks by County, Minnesota, 2003 (n=50)



Foodborne Illness Complaints
Minnesota, 2003

City or County	Foodborne Illness Complaints Faxed From MDH To City or County	Foodborne Illness Complaints Received By MDH From City or County	Total
Aitkin County	1	0	1
Albert Lea, City of	2	0	2
Anoka County	28	12	40
* Becker County	4	0	4
* Beltrami County	6	0	6
* Benton County	0	0	0
Big Stone County	0	0	0
Bloomington, City of	23	32	55
* Blue Earth County	3	0	3
Brooklyn Park, City of	4	5	9
Brown County	6	0	6
* Carlton County	0	0	0
+ Carver County	8	0	8
Cass County	2	0	2
Chippewa County	1	0	1
+ Chisago County	3	0	3
Clay County	2	0	2
* Clearwater County	0	0	0
Cook County	0	0	0
Cottonwood County	0	0	0
* Crow Wing County	6	0	6
Crystal, City of	4	0	4
+ Dakota County	61	0	61
* Dodge County	0	0	0

Foodborne Illness Complaints
Minnesota, 2003

City or County	Foodborne Illness Complaints Faxed From MDH To City or County	Foodborne Illness Complaints Received By MDH From City or County	Total
Douglas County	4	0	4
Duluth, City of	0	0	0
Edina, City of	19	0	19
Faribault County	1	0	1
* Fillmore County	0	0	0
* Freeborn County	1	0	1
Golden Valley, City of	5	0	5
Goodhue County	2	0	2
* Grant County	1	0	1
Hennepin County	46	15	61
Hopkins, City of	3	0	3
* Houston County	1	0	1
* Hubbard County	2	0	2
+ Isanti County	3	0	3
* Itasca County	1	0	1
* Jackson County	0	0	0
* Kanabec County	0	0	0
Kandiyohi County	0	0	0
* Kittson County	0	0	0
* Koochiching County	1	0	1
Lac Qui Parle County	0	0	0
Lake County	0	1	1
* Lake of the Woods County	0	0	0

Foodborne Illness Complaints
Minnesota, 2003

City or County	Foodborne Illness Complaints Faxed From MDH To City or County	Foodborne Illness Complaints Received By MDH From City or County	Total
Le Sueur County	0	0	0
Lincoln County	0	0	0
* Lyon County	1	0	1
* Mahnomen County	0	0	0
Maplewood, City of	13	0	13
* Marshall County	0	0	0
Martin County	0	0	0
* McLeod County	1	0	1
* Meeker County	0	0	0
* Mille Lacs County	3	0	3
Minneapolis, City of	66	81	147
Minnetonka, City of	8	1	9
Moorhead, City of	0	0	0
Morrison County	1	0	1
* Mower County	3	0	3
Murray County	0	0	0
New Brighton, City of	1	0	1
Nicollet County	0	0	0
Nobles County	0	0	0
* Norman County	0	0	0
Olmsted County	1	46	47
* Otter Tail County	2	0	2

Foodborne Illness Complaints
Minnesota, 2003

City or County	Foodborne Illness Complaints Faxed From MDH To City or County	Foodborne Illness Complaints Received By MDH From City or County	Total
* Pennington County	0	0	0
+ Pine County	2	0	2
Pipestone County	0	0	0
* Polk County	2	0	2
Pope County	1	0	1
Ramsey County	39	1	40
* Red Lake County	0	0	0
Redwood County	2	0	2
* Renville County	0	0	0
* Rice County	5	0	5
Richfield, City of	9	0	9
Rock County	0	0	0
* Roseau County	0	0	0
St. Cloud, City of	5	1	6
St. Louis County	5	21	26
St. Louis Park, City of	6	2	8
St. Paul, City of	56	0	56
+ Scott County	12	0	12
* Sherburne County	5	0	5
* Sibley County	0	0	0
Stearns County	1	1	2
* Steele County	3	0	3

Foodborne Illness Complaints
Minnesota, 2003

City or County	Foodborne Illness Complaints Faxed From MDH To City or County	Foodborne Illness Complaints Received By MDH From City or County	Total
* Stevens County	0	0	0
Swift County	0	0	0
Todd County	0	0	0
* Traverse County	0	0	0
Wabasha County	0	0	0
Wadena County	0	0	0
Waseca County	0	0	0
Washington County	29	3	32
Watonwan County	0	0	0
Wayzata, City of	3	0	3
Wilkin County	0	0	0
Winona County	4	0	4
+ Wright County	3	0	3
Yellow Medicine County	0	0	0
Bureau of Indian Affairs	4	0	4
Food and Drug Administration	2	0	2
+ MDH Environmental Health Services	0	0	0
Minnesota Department of Agriculture	22	0	22

Foodborne Illness Complaints
Minnesota, 2003

City or County	Foodborne Illness Complaints Faxed From MDH To City or County	Foodborne Illness Complaints Received By MDH From City or County	Total
University of Minnesota	0	0	0
United States Department of Agriculture	0	0	0
TOTAL	**574**	**222**	**796**

* Complaint faxed to an outstate MDH Environmental Health Services District Office (n=51).
+ Complaint faxed to MDH Environmental Health Services Metro District Office (n=92).

In 2003, the MDH Acute Disease Investigation and Control Section (ADIC) received 454 foodborne illness complaints from the public. Of the 454 complaints received, 249 (55%) were directly received from the MDH foodborne illness hotline toll-free number (1-877-FOOD-ILL). Detailed information on symptoms and a 4-day food history was obtained from each caller (see form on next page), and the complaint was faxed to the appropriate jurisdiction for EACH restaurant, deli, grocery store, or other establishment mentioned in the complaint. The 454 complaints received by ADIC resulted in 574 faxes sent to environmental health agencies. In addition, ADIC received 222 foodborne illness complaints forwarded from other public health agencies.

FOODBORNE ILLNESS COMPLAINT FORM Stool kit delivered 9
Foodborne Illness Report Daily 9
Minnesota Department of Health
Phone: (612) 676-5414 Fax: (612) 676-5730

Complaint date: ___/___/___ Tennessen: 9 Reporter: _____

Agency: _____ Phone:_____ Fax: _____

First Name:_____ Last Name: _____ Age: _____ 9 Female 9 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 9 MDH-EHS 9 MDH-District Office 9 MN Dept of Ag 9 FDA 9 USDA

9 Local Agencies: _____

Comments _____

_____

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

9 Complaint to be logged in database only

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

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

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

Original Caller: _____

History of others Ill:

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

Address: _____ **Phone:** _____

Illness Onset Date: ___/___/___ 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	Y N	
dressing:_____	Y N	or drink:	_____	
Angel food cake	Y N			

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

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