MINNESOTA DEPARTMENT OF HEALTH 2006 GASTROENTERITIS OUTBREAK SUMMARY

Foodborne Outbreaks
Waterborne Outbreaks
Outbreaks with Other Routes of Transmission
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

Internet: www.health.state.mn.us/divs/idepc/dtopics/foodborne/

P.O. Box 64975
Saint Paul, Minnesota 55164-0975
Phone: 651-201-5414
Fax: 651-201-5743

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MINNESOTA DEPARTMENT OF HEALTH
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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

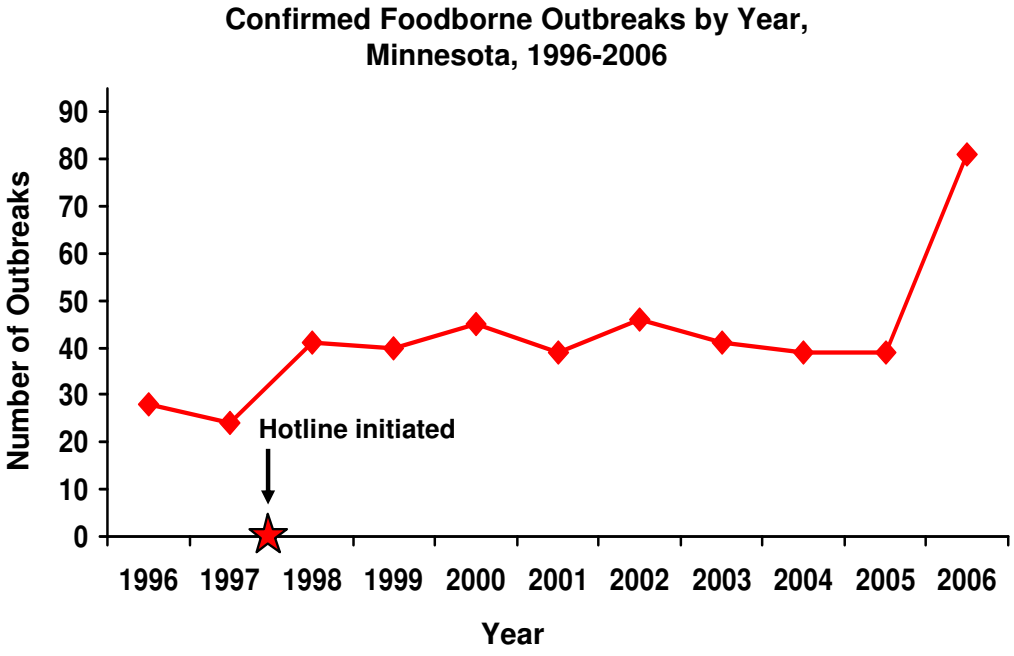
These are similar to foodborne outbreaks, except epidemiologic evaluation implicates water as the source of illness. Waterborne outbreaks may be associated with drinking water or with recreational water.

Outbreaks with Other or Unknown Routes of Transmission

These 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. This category also includes outbreaks for which the route of transmission could not be determined.

Summary

In 2006, the Minnesota Department of Health (MDH) Acute Disease Investigation and Control Section identified a total of 214 outbreaks of gastroenteritis involving at least 5,763 cases of illness. The 214 outbreaks were classified as follows: 81 confirmed foodborne outbreaks, 18 probable foodborne outbreaks, two confirmed waterborne outbreaks, and 113 outbreaks with other or unknown routes of transmission (see page 1 for definitions). The 81 confirmed foodborne outbreaks is by far the highest total ever observed in Minnesota. The previous highest number of confirmed foodborne outbreaks identified in Minnesota in one year was 46 in 2002, and the median annual number of such outbreaks from 1996-2005 was 40.5 (range, 28 to 46). The median number of cases identified per confirmed foodborne outbreak in 2006 was 10 (range, 2 to 81).



In 2006, 67 (83%) of the 81 confirmed foodborne outbreaks were initially reported to MDH or local public health agencies via complaint calls from the public. Nine (11%) outbreaks were identified through routine laboratory-based surveillance of reportable bacterial pathogens, four (5%) were identified through a combination of surveillance and complaint calls, one (1%) was identified through a report from a physician, and one (1%) was initially reported by a poison control center.

Of the 81 confirmed foodborne outbreaks, 54 (67%) were either laboratory-confirmed (n=46) or epidemiologically defined (n=8) outbreaks of norovirus gastroenteritis. There were nine (11%) confirmed foodborne outbreaks caused by *Salmonella*, five (6%) by scombroid toxin, three (4%) by *E. coli* O157:H7, two (2%) by *Clostridium perfringens*, and one (1%) each by *Staphylococcus aureus*, *Cyclospora cayetanensis*, *Shigella sonnei*, *Listeria monocytogenes*, and the mushroom *Amanita bisporigera*. The remaining three (4%) confirmed foodborne outbreaks were classified

as suspected bacterial intoxications (caused by *Clostridium perfringens*, *Staphylococcus aureus*, or *Bacillus cereus*).

The importance of norovirus as a cause of foodborne disease outbreaks in 2006 continues a pattern that has been observed for over two decades in Minnesota. During 1981-2006, 345 (52%) of 667 confirmed outbreaks of foodborne disease were due to norovirus, while 132 (20%) confirmed foodborne outbreaks were caused by infectious bacterial pathogens such as *Salmonella* and *E. coli* O157. The record number of norovirus outbreaks identified in 2006 in Minnesota was a reflection of a global norovirus epidemic that occurred during the winter of 2006-2007; other parts of the United States, as well as numerous other countries, reported unprecedented norovirus activity during this time period.

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

Not all of the record increase in confirmed foodborne outbreaks in 2006 was accounted for by norovirus. There were nine confirmed foodborne outbreaks caused by *Salmonella* in 2006; this represents a record number of salmonellosis outbreaks in Minnesota in a single year. Five salmonellosis outbreaks were associated with single 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. One salmonellosis outbreak was associated with commercially distributed, tomatoes, with several of the cases linked to a fast food restaurant. One salmonellosis outbreak was associated with commercially distributed, stuffed, frozen, microwaveable chicken entrees; this outbreak represented the fourth salmonellosis outbreak associated with this type of product in Minnesota since 1998, and the third during 2005-2006. One outbreak of salmonellosis was part of the larger multistate outbreak due to peanut butter that caused well over 500 laboratory-confirmed cases nationwide. The final salmonellosis outbreak was caused by an unknown vehicle distributed to prisons and restaurants.

MDH identified three foodborne outbreaks caused by *E. coli* O157:H7 in 2006. One of these outbreaks was among members of a community in northern Minnesota; most of the cases were associated with a church potluck smorgasbord. The likely vehicles were ready-to-eat food items such as potato salad that were cross-contaminated from ground beef during preparation of the food for the smorgasbord. Three cases developed hemolytic uremic syndrome, and one died. One *E. coli* O157:H7 outbreak was associated with shredded iceberg lettuce served at two outlets of a Mexican fast food restaurant chain. The lettuce was traced to a farm in California, where the outbreak strain of *E. coli* O157:H7 was isolated from environmental samples. The source of contamination was one or both of the dairy farms that were contiguous with the farm on which the lettuce was grown. The mechanism of contamination likely was cross contamination in the

water piping system used to move water from the dairy farm lagoons to inedible crops on the produce farm; this system was also used to irrigate lettuce fields with other water sources. The final *E. coli* O157:H7 outbreak was associated with a single restaurant. The vehicle was not confirmed, but lettuce was suspected.

Six of the confirmed foodborne outbreaks identified in Minnesota in 2006 were bacterial intoxications caused by pathogens such as *Clostridium perfringens*, *Bacillus cereus*, and *Staphylococcus aureus*. These outbreaks often lack laboratory confirmation, as the resulting illnesses typically are of short duration. A recurring theme in outbreaks of bacterial intoxications is improper time and temperature control of potentially hazardous food items such as meats, rice, and sauces.

Five outbreaks of scombroid fish poisoning were identified in Minnesota in 2006. Three of these outbreaks were caused by escolar fish and two were caused by tuna.

An outbreak of mushroom poisonings in an extended Hmong family was associated with consumption of *Amanita bisporigera* mushrooms harvested from a regional park. A 10-year-old female developed multiple organ failure and died 11 days after mushroom consumption.

An outbreak of acute, febrile gastroenteritis caused by *Listeria monocytogenes* was associated with a restaurant. The vehicle was chicken taco salad, but a specific ingredient was not implicated.

An outbreak of *Cyclospora cayetanensis* infections was associated with consumption of fresh fruit salad served at breakfast at a golf club in June; a specific fruit vehicle could not be implicated.

There were two waterborne gastroenteritis outbreaks identified by MDH in 2006. The first was an outbreak of norovirus gastroenteritis associated with a private swimming beach, and the second was an outbreak of cryptosporidiosis associated with multiple school swimming pools.

There were 113 outbreaks with other or unknown routes of transmission in 2006. The majority of outbreaks in this category were associated with person-to-person transmission of enteric pathogens, predominantly norovirus, in nursing homes, schools, daycares, and other facilities. For reasons that are unclear, most norovirus outbreaks in nursing homes occur during the winter months.

Confirmed Foodborne Outbreaks

(1)
Suspected Norovirus Gastroenteritis Associated with a Restaurant

January Anoka County

On January 10, 2006, the Minnesota Department of Health (MDH) received a report concerning illness among a group of four persons that dined at a restaurant in Coon Rapids, Minnesota on January 5. The complainants were from two separate households and had no other recent common meals. Anoka County Community Health and Environmental Services (ACCHES) was notified of the complaint.

Epidemiologists from MDH obtained a list of credit card receipts and conducted phone surveys of patrons who had eaten at the restaurant on January 5 or 6 to obtain information on consumption of foods/beverages and illness history. A case was defined as a person who developed vomiting or diarrhea ($\geq$3 loose stools in a 24-hour period) after dining at the restaurant. A sanitarian from ACCHES visited the establishment to evaluate food preparation and handling procedures and to interview the staff regarding recent illness. MDH was unable to collect any stool samples for testing.

All four persons from the original complaint were interviewed and 13 additional patrons were identified and interviewed through credit card receipts. Of the 17 patrons interviewed, five (29%) met the case definition. All five cases had diarrhea, four (80%) had vomiting, four (80%) had cramps, and one of three (33%) had fever. The median incubation period was 33 hours (range, 20 to 38 hours). The median duration of illness was 55 hours (range, 54 to 55 hours).

Eating at the restaurant on January 5 was associated with illness (5 of 5 cases vs. 5 of 12 controls; logit odds ratio [OR], 15.0; logit 95% confidence interval [CI], 0.68 to 332; Fisher's exact chi-square, $p = 0.04$). Specific food items were associated with illness, including seafood, other than shrimp, (4 of 5 cases vs. 2 of 11 controls; OR, 18.0; 95% CI, 1.2 to 260.9; $p = 0.04$) and ice cream (4 of 5 cases vs. 2 of 12 controls; OR, 20.0; 95% CI, 1.39 to 287.6; $p = 0.03$). Although seafood was statistically significant, multiple types of seafood were reported, including fried fish, seafood medley, broiled fish, and mussels.

During the inspection of the restaurant, the sanitarian noted that the staff was following the proper handwashing procedures. The ice cream machine was also inspected since consuming ice cream was significantly associated with illness; the chemical sanitation for the machine was appropriate and the machine was working properly. The sanitarian was unable to interview the five food workers due to language barriers; the manager of the facility reported none of the staff had recently been ill.

This was an outbreak of gastroenteritis associated with a restaurant in Coon Rapids. The etiological agent was not determined, but illnesses and incubation periods were characteristic of norovirus gastroenteritis. Two food items were statistically associated with illness. The source of contamination was not confirmed.

(2)
Norovirus Gastroenteritis Associated with a Private Event

January Ramsey County

On January 26, 2006, the Minnesota Department of Health (MDH) foodborne illness hotline received a complaint of illness from a party of 11 that had attended a fundraising event held at a facility on January 14. The complainants had nothing else in common besides the meal at the facility. Foods served at the event were prepared in private homes and included sandwiches, scones, lemon curd, jams, cookies, and fresh fruit. Sanitarians from the City of Maplewood were notified and an investigation was initiated.

On January 26 the organizer of the event was contacted and interviewed by MDH epidemiologists. The organizer of the event provided MDH with a list of event attendees and a list of those who had also prepared or served food at the event. Event attendees were interviewed by phone about food consumption, other shared exposures, and illness history using a standard form. A case was defined as a person with vomiting or diarrhea (≥3 loose stools in a 24-hour period) after attending the fundraising event January 14. Two ill fundraiser attendees submitted stools to MDH for testing.

Forty attendees were interviewed, and 18 (45%) met the case definition; an additional three people experienced illness not meeting the case definition and were excluded from the analysis. All cases experienced diarrhea, 16 (89%) had vomiting, 12 (67%) had cramping, and two (13%) reported fever. The median incubation period was 33 hours (range, 18 to 45 hours). The median duration of illness was 68 hours (range, 32 to 144 hours). Two cases visited their medical provider but were not admitted to a hospital.

One attendee was at the event while ill with gastrointestinal symptoms but reported consuming only tea. Another attendee reported extensive gastrointestinal illness in her immediate family during the week of the fundraising event, although she was not ill herself.

Both stool samples were positive for norovirus. Nucleic acid sequencing was conducted on the positive norovirus samples; the nucleic acid sequences were identical.

The lemon curd was statistically associated with illness (11 of 17 cases vs. 4 of 17 controls; odds ratio, 5.62; 95% confidence interval, 1.09 to 35.50; $p = 0.018$). This item was store-bought and a volunteer subdivided the lemon curd into portions that were placed on each table for self service. Information on who brought and subdivided the lemon curd was not available.

Six people that prepared food were identified and interviewed. None reported gastrointestinal illness in themselves or family members the week prior to the fundraising event.

This was an outbreak of norovirus gastroenteritis associated with a fundraising event in Maplewood, Minnesota. The lemon curd was implicated as the vehicle of transmission. The source of the viral contamination was not identified. The lemon curd could have been contaminated by persons who served it, but this was not substantiated. Some attendees reported

gastrointestinal symptoms in themselves or family members during the week prior to the event, suggesting that contact of foods at the tables by attendees also may have contributed to the outbreak.

(3)
Suspected Norovirus Gastroenteritis Associated with a Restaurant

January Hennepin County

On January 25, 2006, a Minneapolis Environmental Health (MEH) environmentalist received a complaint of gastrointestinal illness among four co-workers who dined at a restaurant in Minneapolis on January 20 at noon. The group reportedly had no other recent common food exposures and assumed that their symptoms were the consequence of eating at the restaurant. Hennepin County Public Health Protection (HCPHP) and Minnesota Department of Health (MDH) epidemiologists were notified, and an investigation was promptly initiated.

Environmentalists from the MEH inspected the restaurant, evaluated food preparation and storage procedures, and interviewed restaurant employees who had either worked on January 20 or who had prepared food that was served on January 20. HCPHP epidemiologists requested the list of patrons that purchased food from the restaurant on January 20 for lunch, and a list of foods sold to them. The list was delivered on January 27. A case was defined as a person who developed vomiting or diarrhea ($\geq$3 loose stools in a 24-hour period) after eating at the restaurant on January 20. Stool specimen kits were delivered to one patron and one restaurant employee.

Forty patrons and 15 of 17 (88%) eligible employees were interviewed about possible illnesses and foods consumed on January 20. Eleven patrons (28%) met the case definition. All 11 patron-cases reported cramping, nine (82%) reported diarrhea, seven (64%) reported fever, and six (55%) reported nausea and vomiting. None sought medical care. Incubation periods ranged from 13 to 56 hours (median, 40 hours) and durations of illness ranged from 8 to 103 hours (median, 32 hours). Nine patron-cases (82%) were male, and the age of patron-cases ranged from 24 to 38 years (median, 30 years). MDH did not receive any stool samples associated with this outbreak.

Many types of sandwiches were served to interviewed patrons. Consumption of ham was significantly associated with illness (7 of 11 cases vs. 5 of 22 controls; odds ratio, 7.7; 95% confidence interval, 1.6 to 36.8; $p = 0.01$).

All employees ate at the restaurant but none reported vomiting or diarrhea. One restaurant employee (a manager that also preps food, including slicing of ingredients) reported nausea during January 13-15 but refused to submit a stool specimen. Environmentalists educated restaurant employees on the importance of hand hygiene, exclusion from work when ill with gastrointestinal symptoms, and proper cleaning and disinfection for norovirus.

This was an outbreak of gastroenteritis associated with a restaurant in Minneapolis. The etiologic agent was not confirmed, but the clinical picture of illnesses and the distribution of incubations were characteristic of norovirus. Ham was implicated as the vehicle. The ham likely was contaminated by an ill or recently ill person that cut or handled the ham.

(4)
Norovirus Gastroenteritis Associated with a Hockey Tournament

January Winona County

On January 24, 2006, the Minnesota Department of Health (MDH) foodborne illness hotline received a report concerning illness among five families who attended a hockey tournament in Winona, Minnesota during January 20-22. The complainant reported the hockey team stayed at a hotel in Winona and that several members of the hockey team became ill. Winona County (WC) Environmental Services was subsequently notified.

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

A sanitarian from WC visited the hotel to evaluate food preparation and handling procedures and to interview the staff regarding recent illness. Environmental inspection of the pool and hot tub at the hotel was completed to assess proper chlorination levels.

Forty-one members of the hockey team were interviewed; 16 (36%) met the case definition. Three members of the hockey team reported mild gastrointestinal symptoms that did not meet the case definition; these individuals were excluded from the analysis. Thirteen cases (81%) had diarrhea, 13 (81%) had vomiting, 10 of 13 (77%) had cramps, and eight of 15 (53%) reported fever. Incubation periods could not be calculated, as team members shared multiple meals. The median duration of illness was 39.5 hours (range, 14 to 87 hours). The stool sample was positive for norovirus.

Consuming fresh fruit at the hotel on January 21 was significantly associated with illness (11 of 14 cases vs. 0 of 17 controls; logit odds ratio, 115.0; logit 95% confidence interval, 5.4 to 2440.8; $p < 0.001$). The fruit was provided by a family member and was cut up and served in a bowl for players and family members to serve themselves. One of the family members, a young child, had an onset of vomiting and diarrhea early on January 21.

The sanitarian from WC interviewed six food workers at the hotel who worked the weekend of the hockey tournament; no food staff members reported recent gastrointestinal symptoms. The inspection of the kitchen and the pool facilities did not reveal critical problems. The hotel reported that additional hockey teams had also stayed overnight at their facility. Contact information was obtained for the two other hockey teams that were also present at the hotel. One hockey team reported illness among the players; however, an investigation could not be initiated after several attempts to talk to the team's contact person failed.

This was an outbreak of norovirus gastroenteritis among hockey players and family members associated with consumption of privately-prepared cut fruit. The fruit was consumed at a hotel

where team members were staying. However, contamination of the fruit by an ill family member was the most plausible cause of the outbreak.

(5)
Norovirus Gastroenteritis Associated with Sub Sandwiches

January Brown County

On January 23, 2006, the Minnesota Department of Health (MDH) foodborne illness hotline received a complaint of gastrointestinal illness in 10 of 15 members of a basketball team that ate at a restaurant in New Ulm, Minnesota on January 21. One person was reported as being hospitalized due to the illness. In addition to the restaurant meal, the persons on the team had several other potential exposures in common, including a sub sandwich meal on January 20 that was prepared by one of the parents. MDH notified Brown-Nicollet Environmental Health (Brown-Nicollet), an investigation was initiated, and the restaurant was contacted on January 23. The Minnesota Department of Agriculture (MDA) was notified on January 27.

Epidemiologists from MDH obtained contact information for all team members. The coach, some of the parents, and all players were interviewed regarding illness history, activities, and foods and beverages consumed at restaurants, at school and at home. Epidemiologists from MDH also contacted the school to ascertain if there were additional cases of illness among students that were not part of the team.

Environmental health specialists from Brown-Nicollet conducted an environmental health assessment of the restaurant, reviewed records of employee illness calls, and interviewed the restaurant employees who worked at the time of the team's meal about recent history of gastrointestinal illness and work duties.

MDA reviewed records of employee illness calls and spoke with management at the grocery store deli where the ingredients for the January 20 sub sandwich meal were purchased.

Stool samples were collected from persons with a history of gastrointestinal illness and submitted to MDH for bacterial and viral testing. A case was defined as a person that was part of the team or had an exposure in common with the team and subsequently became ill with vomiting or diarrhea (≥3 loose stools in 24-hour period), or who had a laboratory-confirmed norovirus infection.

Seventeen persons, including team members, a coach, and a parent were interviewed about food consumption and exposures from January 19 through January 21, and illness history. Thirteen persons (76%) met the case definition. Among the cases, 10 (77%) reported cramps, nine (69%) had vomiting, eight (62%) had diarrhea, four (31%) reported a fever, and none reported bloody stools. One case (8%) visited a hospital emergency room. The median duration of illness was 16 hours (range, 10 to 50 hours); however, most cases had not recovered at the time of interview.

Four stool specimens were collected from three team members and a parent. All four tested negative for *Campylobacter*, *E. coli* O157, *Salmonella*, *Shigella*, and *Yersinia*, and all were

positive for norovirus. Three norovirus-positive specimens, including the specimen from the parent, were sequenced, and they all were identical.

No single food item or meal was associated with illness in statistical analysis, likely due to the small number of persons interviewed that were not ill.

One of the cases with a laboratory-confirmed norovirus infection was a team member parent who became ill in the morning of January 22; this parent did not attend any of the team events but did eat the same sub sandwiches that the team ate on January 20. The parent's spouse provided all the ingredients for the sub sandwiches, including deli cheese, ham, turkey and roast beef that she plated for the team, and sandwich bread that she sliced. The meats and cheese were purchased at a grocery store deli in Mankato.

The parent that prepared the sub sandwich meal reported running a home daycare with five to eight children ranging in age from 3 months to 10 years. Five of the children in the daycare had experienced vomiting and/or diarrhea within the 2 weeks prior to preparing the sub sandwich meal for the team. At least three of those children had onsets of illness less than 1 week prior to the meal.

All 13 of the cases ate the sub sandwiches vs. three of four controls. From the sub sandwich meal, the median incubation of illness was 39 hours (range, 26 to 57 hours).

The five restaurant employees that worked on January 21 were interviewed and none had a history of recent gastrointestinal illness. The restaurant illness log was reviewed and did not list other employees with recent gastrointestinal illness. No additional complaints were received about the restaurant.

The grocery store deli manager reported that none of the employees had recent history of gastrointestinal illness. The deli's employee illness log did not have a record of employees with recent gastrointestinal illness. No complaints of illness among customers were received by the deli.

The school reported no increase in illness among students that did not belong to the team.

This was an outbreak of norovirus gastroenteritis associated a sub sandwich meal. The sandwich ingredients were provided and plated by a parent who provided child daycare at their home. Ill children or recently ill children were the ultimate source of contamination. A laboratory-confirmed norovirus infection in a parent with an identical viral nucleic acid sequence as the team members' specimens indicated a common source for that parent's and the team's illnesses. That parent ate the sub sandwiches but did not have any other common exposures with the team, indicating that the sub sandwiches were the vehicle. Additionally, the illness incubation was consistent with the sub sandwich meal being the source. Furthermore, there was no illness in workers at the restaurant where the team members ate on January 21 or in deli workers where the ingredients for the sub sandwiches were purchased, ruling out the restaurant and the deli as the source. No increase in illness at the school indicated that meals or other events associated with the school were not the source of this outbreak.

(6)
Foodborne Bacterial Intoxications Associated with a Correctional Facility

January Rice County

On January 23, 2006, a Minnesota Department of Health (MDH) foodborne environmentalist received a report of illness among prison inmates from a correctional facility in Faribault, Minnesota. Over 100 individuals had reportedly become ill with gastrointestinal symptoms. An investigation was immediately initiated.

MDH staff received line lists of ill inmates from the prison and sent interview forms to the prison staff to administer to inmates. A case was defined as an inmate with vomiting or diarrhea ($\geq$3 loose stools in a 24-hour period) since January 21. Two cases submitted stool samples to MDH for bacterial culture, toxin testing, and viral testing. The EHS environmental health specialist went to the prison on January 23 to conduct an environmental assessment.

Seventy-six of the 93 (81%) inmates interviewed met the case definition. Seventy-five (99%) cases had diarrhea, nine (12%) had vomiting, nine (12%) had fever, and three (4%) had bloody diarrhea. The median duration of illness was 30 hours (range, 4.5 to 87.8 hours). The stool samples obtained from inmates were negative for *Clostridium perfringens, Staphylococcus aureus* and *Bacillus cereus* toxins.

Onset dates for reported cases were January 21 and 22. By univariate analysis, turkey (66 of 67 cases vs. 8 of 25 controls; odds ratio [OR], 140.3; 95% confidence interval [CI], 19.5 to 2,988.3; $p < 0.001$), potatoes (53 of 67 cases vs. 2 of 25 controls; OR, 43.5; 95% CI, 9.9 to 286.3; $p < 0.001$), and gravy (64 of 67 cases vs. 3 of 25 controls; OR, 156.4; 95% CI, 28.8 to 878.1; $p < 0.001$) served on January 21 were statistically associated with illness.

By multivariate analysis using logistic regression, gravy was statistically associated with illness in an adjusted model including gravy, turkey, and potatoes. Using stepwise logistic regression model selection, the logistic model including gravy was selected, with gravy remaining independently associated with illness (adjusted OR, 87.3; 95% CI, 19.9 to 382.8; $p < 0.001$). The median incubation period was 12 hours (range, 2 to 19 hours).

Upon environmental assessment, various temperature control problems were discovered. Food at the prison was mostly prepared in a central kitchen then transported to various kitchens in different buildings on the prison campus. Gravy sent to one of the buildings arrived at a lukewarm temperature and was probably not reheated to an appropriate temperature. At the time of inspection, sausage gravy was observed sitting out in a large pan undergoing improper cooling. Ready-to-eat foods prepared on Saturday or before were thrown out. Evening meal delivery and service was observed, and various hazardous food cooling methods were found. Employees of the prison kitchen were given food safety materials, including information on temperature control and proper heating and cooling. Cooking, reheating, cooling, and holding of foods were reviewed with staff to prevent future instances of improper temperature control.

This was an outbreak of bacterial foodborne intoxications, most likely caused by *C. perfringens.*

The vehicle for this outbreak was gravy, which was delivered and held at improper temperatures. Potential for temperature abuse in the preparation of the gravy with subsequent proliferation of bacteria was observed, and measures were taken to correct temperature control in the future.

(7)
Norovirus Gastroenteritis Associated with a Hotel Restaurant

January Hennepin County

On February 6, 2006, a manager from a hotel in Plymouth called Hennepin County Public Health Department (HCPHD) to report complaints of gastrointestinal illness among patrons in two unrelated corporate groups that visited the Hotel on January 30 and 31. HCPHD and Minnesota Department of Health (MDH) epidemiologists were subsequently notified and an investigation was initiated.

Epidemiologists from HCPHD obtained lists of patrons that dined at the Hotel from January 30 - February 7 and interviewed them using a standard symptom questionnaire and open-ended food history questionnaire. An extensive list of food items (served mainly in self-service buffet style and at multiple times to multiple groups) was also provided.

Stool samples were collected and tested for bacterial and viral pathogens at the MDH Public Health Laboratory. Stool kits were offered to employees and patrons with ongoing diarrhea. A case was defined as a hotel patron with onset of vomiting and/or diarrhea ($\geq$3 loose stools in a 24-hour period) since January 31. Environmentalists from HCPHD visited the hotel to evaluate food preparation and handling procedures and to interview staff regarding recent illness.

Nineteen of the 54 (35%) interviewed patrons met the case definition. Of the 19 cases, 17 (89%) reported diarrhea, 13 (72%) reported vomiting, 10 (53%) reported cramping, 10 (55%) reported fever, and none reported blood in the stool. Reported onset dates suggested a point source mode of transmission with two peaks on January 31 (nine ill) and February 4 (four ill). The incubation period for patrons that had only one exposure on January 30 ranged from 31 to 38 hours (median, 32 hours). Duration of illness ranged from 17 to 152 hours (median, 59 hours).

Three of 54 (5%) interviewed employees reported recent illness. These workers' duties included monitoring and refilling items on the buffet tables and serving patrons. These workers had not been excluded from work for 72 hours after recovery.

A variety of foods were served for breakfast, lunch and dinner between January 30 and February 7. Some meals were pre-plated, while others were served buffet-style. Eating from any buffet was associated with illness (14 of 15 cases vs. 12 of 20 controls; odds ratio [OR], 9.3; 95% confidence interval [CI], 0.95 to 443.0; p = 0.048). Eating from the hotel's salad bar was also significantly associated with illness (10 of 10 cases vs. 13 of 20 controls; OR, undefined; 95% CI, 1.22 to undefined; p = 0.038). Consuming any meal at the hotel on January 30 was associated with illness (12 of 18 cases vs. 7 of 29 controls; OR, 6.3; CI, 1.46 to 28.2; p = 0.005).

During inspection of the establishment, inspectors issued orders to correct issues with kitchen

processes, food temperatures, sanitation, handwashing and ill employee exclusion.

Stool samples from one hotel employee and four patrons were positive for norovirus. Nucleic acid sequencing was conducted on positive norovirus samples from two cases; sequencing was identical.

This was an outbreak of norovirus gastroenteritis associated with a hotel in Plymouth, Minnesota. Illness was associated with self-service buffet-style meals. Transmission likely occurred through contamination of ready-to-eat food items by an ill employee. Food, utensils and/or surfaces may have been contaminated and served as vehicles in this outbreak.

(8)
Norovirus Gastroenteritis Associated with a Restaurant

January Hennepin County

On February 3, 2006, the Minnesota Department of Health (MDH) foodborne illness hotline received a report of gastrointestinal illness in a group of three co-workers following lunch at a restaurant on January 31. On February 6, the MDH foodborne illness hotline received a second, independent report of gastrointestinal illness in another group of three individuals who dined together at the restaurant for lunch on January 31. A Minneapolis Environmental Health (MEH) environmentalist and a Hennepin County Public Health Department (HCPHD) epidemiologist were notified of the complaints, and an investigation was promptly initiated.

An epidemiologist from HCPHD conducted phone interviews of the complainants to obtain information on illness history and consumption of foods/beverages using a standard symptom and open-ended food questionnaire. A case was defined as a patron who developed vomiting or diarrhea ($\geq$3 loose stools in a 24-hour period) following lunch on January 31 at the restaurant.

An environmentalist from MEH inspected the restaurant kitchen and interviewed employees about job duties, food consumption, and illness history during January 27-31 using a standard restaurant employee questionnaire. Stool kits were delivered to two patrons and one employee and submitted to MDH for bacterial and viral testing.

The MEH environmentalist found several critical violations in the kitchen. One food worker reported a vomiting illness with onset on January 31 and recovery on February 4. He worked while ill; his duties included dishwashing, floor cleaning, and washing/cutting of lettuce, cucumbers and tomatoes.

Of the six interviewed patrons, five (83%) met the case definition. Three cases (60%) were male, and cases ranged in age from 37 to 61 years (median, 43 years). The median incubation period was 34 hours (range, 31 to 38 hours). The median duration of illness was 42 hours (range, 36 to 85 hours). All cases had diarrhea, four (80%) had vomiting, two (40%) had cramping and fever, and none reported blood in the stool.

The small number of interviewed patrons precluded statistical analysis of food consumption.

However, all ill patrons ate salad (lettuce, tomato, cucumber) and dressing. Four of the five cases also consumed gyros, including three cases that had gyro sandwiches prepared for them by the bakery staff. Other ill patrons served themselves at the buffet. The one non-ill patron that was interviewed served herself at the buffet but did not consume any salad or dressing.

Stool samples from both patrons and the employee were positive for norovirus. All three stool samples were negative for *Campylobacter, Salmonella*, Shiga-toxin producing *E. coli*, *Shigella*, and *Yersinia*.

This was an outbreak of norovirus gastroenteritis associated with a Minneapolis restaurant. Salad was suspected as the vehicle. The source of illness was a food worker who worked while ill with gastrointestinal symptoms.

(9)
Scombroid Fish Poisoning Associated with a Restaurant

February Hennepin County

On February 7, 2006, the Minnesota Department of Health (MDH) foodborne illness hotline received a complaint of illness in a person who ate at a restaurant in Minneapolis. The person ate an ahi tuna salad at the restaurant on February 6 and developed scombroid-like symptoms. The United States Food and Drug Administration (FDA) district office in Minneapolis, the City of Minneapolis Environmental Health (MEH), and Hennepin County Community Public Health Protection were notified.

MDH staff interviewed the physician and the spouse of the reported case about the case's illness history and food consumption. A list of names and contact information for other patrons that ate the ahi tuna salad on February 6 were obtained from the restaurant.

An environmental health specialist from MEH went to the restaurant on February 7 to review food handling practices, focusing on temperature control processes for the ahi tuna. Samples of leftover cooked tuna from the February 6 lunch and unopened fillets from one of the two lots used on February 6 were submitted to an FDA laboratory for histamine analysis.

A case was defined as a person who ate the tuna and developed at least two symptoms consistent with scombroid poisoning (i.e., facial flushing, rash, sweating, palpitations, dizziness, numbness, tingling, or other unusual sensations) after eating the fish.

Thirty-five tuna salads were served for lunch on February 6. The restaurant staff recognized eight persons, and provided their names and phone numbers. All eight were contacted and interviewed, but one had not eaten at the restaurant that day. Including the initial case reported, a total of two (25%) cases of scombroid poisoning were identified. The first case had onset of symptoms while still at the restaurant. The case collapsed at the restaurant and was taken to the hospital emergency room. When he reached the hospital, he was hypotensive and had a rash. He was hospitalized for his illness. The second case experienced flushing and itchiness on the chest on the same day he ate the tuna (exact time is unknown). The case did not seek medical attention.

The food preparation review for the tuna indicated that the tuna was received frozen by the restaurant. Each 4-ounce tuna fillet was packaged individually in air-tight packaging. Individual tuna fillets were thawed under running water. Once thawed, they were grilled, cooled, and served as an ingredient in a salad. One tuna fillet was used per salad. The salads were kept on the cafeteria line on ice. Only six salads were kept on the cafeteria line at a time, and they were served within 15 minutes of being placed on the line.

A cooked tuna fillet prepared at the same time as the steaks eaten by the cases had been placed in the freezer by the manager immediately after being informed of illness in a patron. Four sub-samples had elevated levels (above 50 parts per million) of histamine (348 ppm, 482 ppm, 501 ppm, and 544 ppm). Raw tuna fillets taken from the open box in the restaurant's freezer were also submitted to the FDA laboratory for testing. Histamine was not found on any of the nine sub samples of the raw fillets. The tuna fillet could have come from either one of two boxes of fillets, and one box had been discarded so information about the source of the tuna was not available. The distributor was identified, but no additional investigation was done since no histamine was found in the raw tuna.

This was an outbreak of two cases of scombroid poisoning associated with ahi tuna served at a Minneapolis restaurant. Leftover cooked tuna had a high level of histamine. Unused raw frozen tuna from one of the two boxes used at the restaurant for that meal tested negative for histamine. No handling problems were found at the restaurant. Since the packaging was no longer available, additional trace back efforts were not initiated. The source of mishandling of the fish was not identified.

(10)
Norovirus Gastroenteritis Associated with a Restaurant

February Hennepin County

On February 13, 2006, the Minnesota Department of Health (MDH) foodborne illness hotline received a complaint of illness among a party of three who had eaten at a restaurant in Plymouth on February 8. The complainant had eaten at the restaurant again on February 9 with three other co-workers. In the group from February 8 all, reported gastrointestinal illness, as did an additional person from the February 9 group. MDH notified Hennepin County Public Health Protection (HCPHP) staff of each of these complaints, and an investigation was initiated.
A HCPHP sanitarian inspected the restaurant on February 13, focusing on food preparation practices and employee health and hygiene. Employees currently on duty were interviewed on-site regarding their job duties and illness history. An employee contact list and schedule were provided by the restaurant so that additional employees could be interviewed via telephone. Names from reservation lists for February 8-10 were also provided by the restaurant so additional patrons could be contacted. Epidemiologists from HCPHP interviewed patrons and additional employees via telephone.

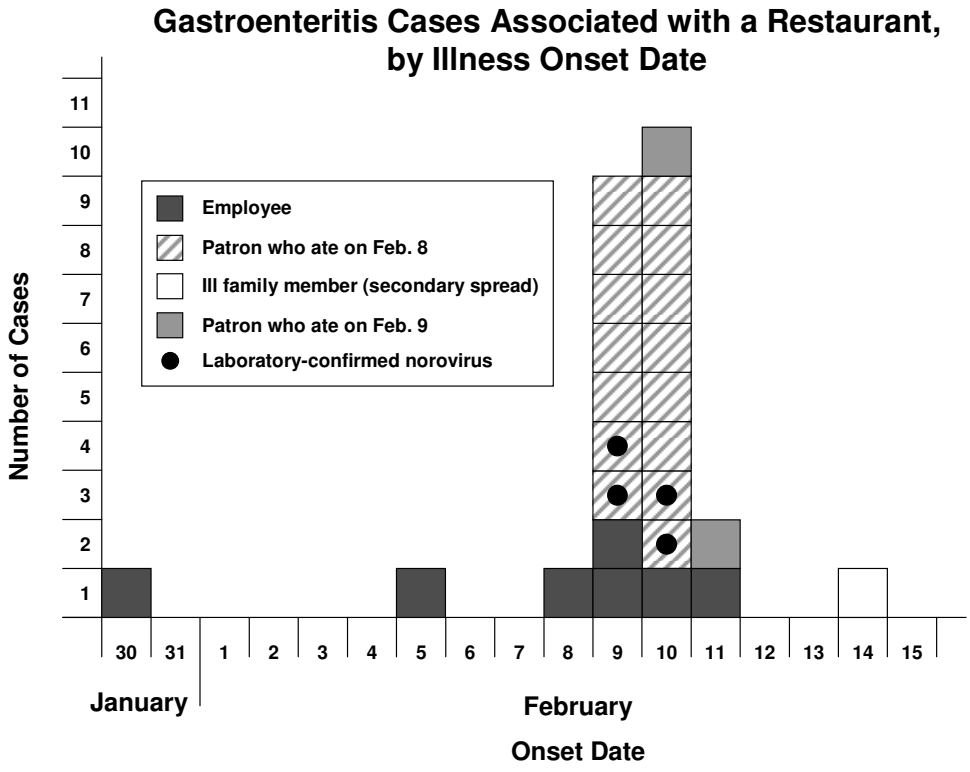
A patron case was defined as a person who ate at the restaurant since February 8 and subsequently developed vomiting and/or diarrhea ($\geq$3 loose stools in a 24-hour period). Stool specimens from four patrons and one employee were submitted to the MDH Public Health

Laboratory for bacterial and viral testing.

A total of 47 patrons who had eaten at the restaurant during February 8-9 were interviewed. Seventeen (36%) patrons met the case definition. Eight groups representing 25 people who had eaten at the restaurant on February 10 were also contacted. None reported any symptoms after eating at the facility.

Of the 17 patron cases, 13 (76%) had vomiting, 12 (70%) had diarrhea, nine (53%) had cramps, and eight (47%) reported fever. The median incubation was 35 hours (range, 20 to 57 hours). The median duration of illness was 50 hours (range, 9 to 120 hours). Stool specimens from four patrons (representing three independent complaints) tested positive for norovirus. Sequences of viral DNA from two norovirus-positive specimens (representing two independent complaints) were identical.

Patron cases were asked open-ended questions about what foods they had eaten and were not asked about each food item specifically. A variety of food items were consumed, including salads, entrees, sandwiches, burgers, and appetizers. By grouping food items together, (e.g., any salad, any sandwich, any entree) and using univariate analysis comparing patron cases and controls, consuming any salad was significantly associated with illness (12 of 17 cases vs. 7 of 29 controls; odds ratio, 7.5; 95% confidence interval, 1.96 to 29.0; p = 0.002).



All 62 employees were interviewed; of these, seven employees (11%) reported gastrointestinal illness since January 30. One employee's stool specimen was tested and was negative for norovirus, *Salmonella*, *Shigella*, *Campylobacter,* and *E. coli* O157.

Upon inspection, the HCPHP sanitarian noted that policies relating to handwashing and employee illness were in compliance with Hennepin County regulations. HCPHP sanitarians recommended restriction of staff who exhibited symptoms consistent with norovirus from any duties that would expose them to food for at least 72 hours after symptoms abated, and also to perform a thorough cleaning of the kitchen and sanitize with a concentrated chlorine bleach solution.

This was an outbreak of norovirus gastroenteritis associated with a Plymouth restaurant. Although a specific vehicle could not be determined, the source of the outbreak was likely ill food workers. The establishment was instructed on the importance of limiting bare-hand contact of food items, excluding ill food workers from work, and reporting patron complaints of illness to the health department.

(11)
Norovirus Gastroenteritis Associated with a Restaurant

February Otter Tail County

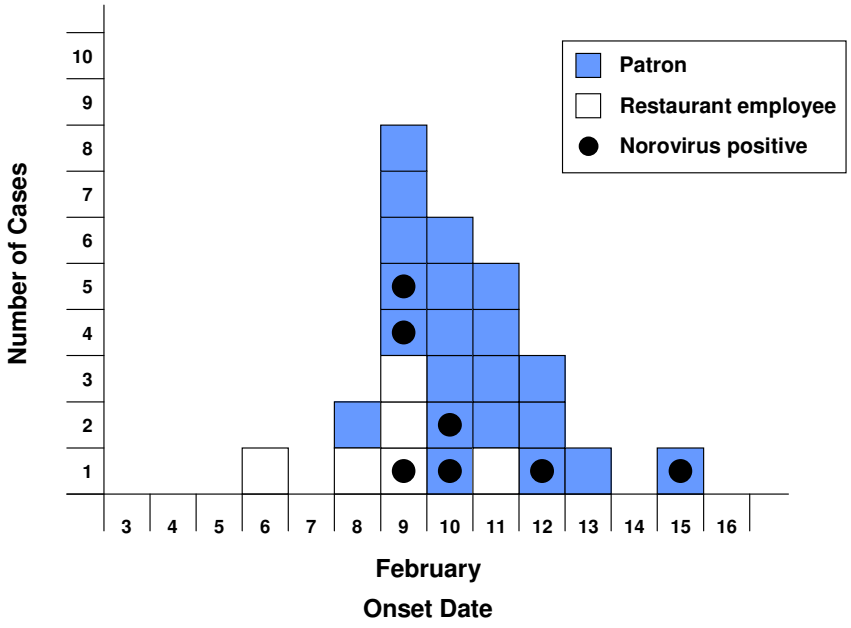
On February 10, 2006, the Minnesota Department of Health (MDH) foodborne illness hotline received a report (Complaint A) concerning illness of an individual that dined at a restaurant in Fergus Falls, Minnesota on February 8. On February 13, the foodborne illness hotline received an independent report (Complaint B) concerning illness among a group of three persons that also dined at the same restaurant on February 8. On February 13, the foodborne illness hotline received a third independent report (Complaint C) concerning illness among a group of six that dined at the restaurant on February 7. On February 13, the foodborne illness hotline received a fourth independent report (Complaint D) concerning illness of an individual that dined at the restaurant on February 9. On February 14, the foodborne illness hotline received a fifth independent report (Complaint E) concerning illness of two persons that dined at the restaurant on February 10.

Epidemiologists from MDH conducted phone surveys of patrons associated with all five complaints to obtain information on consumption of foods/beverages and illness history. Epidemiologists also obtained a list of credit card receipts and conducted phone surveys of additional patrons who had eaten at the restaurant during February 8-10 to obtain information on consumption of foods/beverages and illness history. A case was defined as a person who developed vomiting or diarrhea ($\geq$3 loose stools in a 24-hour period) after dining at the restaurant. A sanitarian from the MDH Environmental Health Services (EHS) visited the establishment to evaluate food preparation and handling procedures and to interview the staff regarding recent illness. Stool samples were collected from nine patrons (three from Complaint B, one from Complaint D, two from Complaint E, and three from additional patrons) and one restaurant employee and submitted to MDH for bacterial and viral testing.

Thirty patrons (including members associated with all five complaints and additional patrons) were interviewed; 21 (70%) met the case definition. Two patrons reported mild gastrointestinal symptoms that did not meet the case definition; these patrons were excluded from the analysis. Nineteen cases (90%) had diarrhea, 15 of 20 (75%) had cramps, 14 (67%) had vomiting, and six of 19 (32%) reported fever. The median incubation period was 32 hours (range, 10 to 74 hours). The median duration of illness was 35 hours (range, 2 to 92 hours). The attack rate among the additional patrons that were contact through credit card receipts was 64%

Six food workers from the restaurant reported recent gastrointestinal illness (see epidemic curve). One food worker reported an onset of vomiting and diarrhea on February 6; this food worker worked on February 7 and was involved with making sandwiches. Another food worker reported an onset of vomiting and diarrhea on February 8; this food worker worked on February 13 and was involved in food preparation. Another food worker reported an onset of vomiting on February 9; this food worker worked on February 12 and February 13 and was involved in food preparation. Another food worker reported an onset of vomiting and diarrhea on February 9; this food worker did not work from February 8 through 11. Another food worker reported an onset of mild diarrheal symptoms on February 9; this food worker worked February 9 and February 10 and was involved in sandwich preparation. Another food worker reported an onset of diarrhea and vomiting on February 11; this food worker worked on February 11 and February 13 and was involved with making sandwiches.

Gastroenteritis Cases Associated with a Sandwich Restaurant, by Illness Onset Date



Stool samples from six patrons were positive for norovirus; samples from the remaining three patrons were not tested due to the number of confirmed cases already reported. Nucleic acid sequencing was conducted on positive norovirus samples from three cases (from three different meal dates); all three sequences were identical. The sample from the restaurant employee was positive for norovirus (see epidemic curve).

No specific food item was significantly associated with illness. Produce items were the most frequently reported foods consumed by the cases; 19 of 20 cases (95%) reported having lettuce and nine of 16 (56%) had tomatoes. Several cases reported anecdotally that they consumed cucumbers with their sandwiches. Tomatoes, cucumbers and green peppers are prepared on-site; 12 of 18 (67%) of cases reported consuming tomatoes, cucumbers, or green peppers.

On February 13, the establishment was temporarily closed. Under direction of EHS, cold food products were discarded and the facility was thoroughly cleaned. On February 14, the restaurant was allowed to open contingent on recommendations put forth by EHS, including excluding ill employees for 72 hours after resolution of symptoms, improving handwashing procedures, and improving the hot water supply.

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

(12)
Norovirus Gastroenteritis Associated with a Hotel

February Hennepin County

On February 17, 2006, the Minnesota Department of Health (MDH) foodborne illness hotline received a report regarding illness among a group of approximately 1,000 people who had recently attended a conference (Conference A) at a hotel in Bloomington, Minnesota from February 10 to 12. The City of Bloomington Environmental Health (CBEH) was subsequently notified. On February 21, the MDH foodborne illness hotline received an independent report concerning illness among a group of approximately 1,000 people who had attended a separate conference (Conference B) at the same hotel from February 14 to 16.

Epidemiologists from CBEH obtained lists of all attendees and menu items for both conferences. Attendees were interviewed regarding illness history and food consumption. A case was defined as a person who developed vomiting or diarrhea ($\geq$3 loose stools in a 24-hour period) after attending either conference. CBEH staff obtained contact information for additional conferences held at the hotel from February 10 to 26. Stool samples were collected from five attendees (three from Conference A and two from Conference B) and submitted to MDH for bacterial and viral testing.

On February 17, CBEH staff contacted hotel management and initiated an environmental health investigation. Sanitarians focused on food preparation practices and employee health; employees were interviewed regarding job duties, illness history and food consumption. On February 21, CBEH staff met with hotel management to discuss proper disinfection and cleaning practices for guest and public bathrooms.

Conference A
Of the 140 attendees interviewed, 46 (33%) met the case definition. Eighteen (13%) additional attendees were excluded from further analysis; one experienced an onset of illness prior to the conference (see epidemic curve), and 17 reported mild symptoms that did not meet the case definition. Forty-two (91%) cases had diarrhea, 31 (67%) had vomiting, 28 (62%) of 45 had

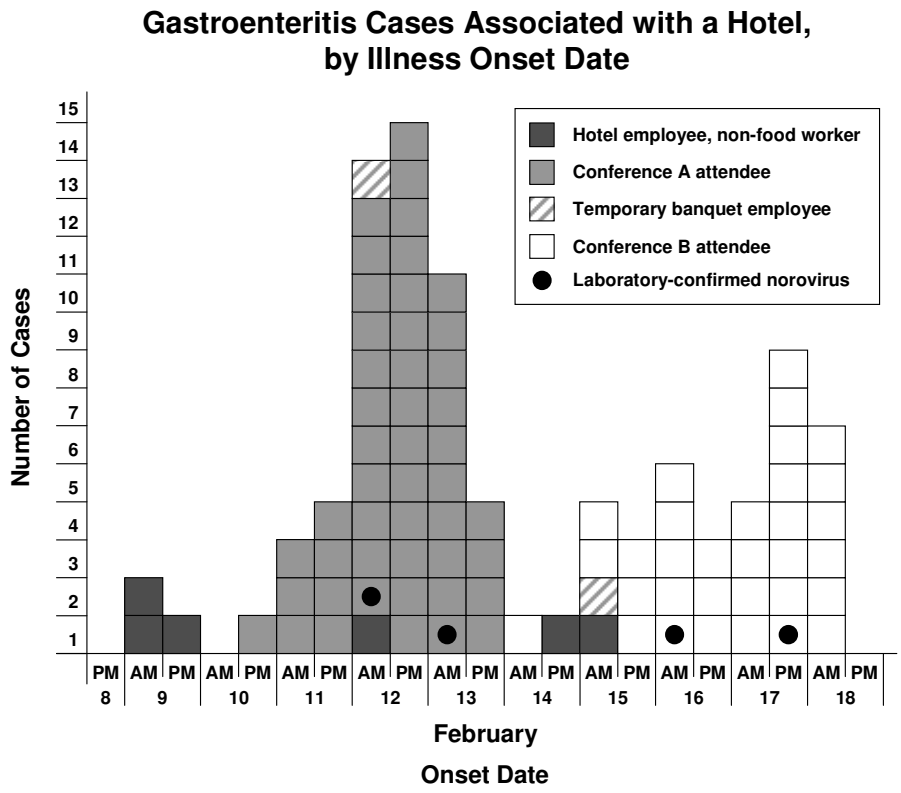
cramps, 14 (32%) of 44 had a fever, and one (2%) of 44 had bloody stools. Eighteen (39%) cases were female. One (2%) case was 1 to 4 years of age, 36 (78%) were 20 to 49 years of age, and nine (20%) were >50 years of age. Stool samples from two Conference A attendees were positive for norovirus. Nucleic acid sequencing of the positive samples was unsuccessful. The median duration of illness was 34 hours (range, <1 to 92 hours).

Multiple meals were common among group members; therefore the analysis of food items examined cases that had an incubation period between 24-48 hours for each meal. Consuming ready-to-eat shrimp, served buffet style during the reception meal on February 10, was associated with illness (17 of 19 cases vs. 41 of 70 controls; odds ratio [OR], 6.0; 95% confidence interval [CI], 1.3 to 28.1; p = 0.01). Drinking beverages other than water (soda, milk and alcoholic drinks) during the dinner buffet on February 11 was also associated with illness (14 of 16 cases vs. 31 of 71 controls; OR, 8.8; 95% CI, 1.9 to 41.7; p = 0.002).

Conference B
Of the 134 attendees interviewed, 35 (26%) met the case definition. Eight attendees were excluded from further analysis: one experienced onset of illness prior to the conference and seven reported mild gastrointestinal symptoms that did not meet the case definition. Thirty-two (91%) cases had diarrhea, 22 (63%) had cramps, 21 (60%) had vomiting, 13 (39%) of 33 reported fever, and three (9%) of 31 had bloody stools. Twenty-one (60%) cases were male. Twenty-one (60%) cases were 20 to 49 years of age, and 14 (40%) were >50 years of age. The median duration of illness was 17 hours (range, <1 to 110 hours). Stool samples from two Conference B attendees were positive for norovirus. Nucleic acid sequencing of the positive samples was unsuccessful.

The analysis of food items served at each meal focused on cases with an incubation period between 24-48 hours following that particular meal. Consuming cinnamon buns during breakfast on February 16 was significantly associated with illness (5 of 10 cases vs. 12 of 83 controls; OR, 5.9; 95% CI, 1.5 to 23.6; p = 0.02). Eating lunch in the pool area restaurant on February 16 was associated with illness (11 of 12 cases vs. 36 of 82 controls; OR, 14.1; 95% CI, 1.7 to 114.0; p = 0.004). Several food items served during this meal approached statistical significance, including romaine lettuce (13 of 13 cases vs. 64 of 83 controls; logit OR, 8.2; logit 95% CI, 0.46 to 143.6; p = 0.07), chicken breast (13 of 13 cases vs. 62 of 83 controls; logit OR, 9.3; logit 95% CI, 163.0; p = 0.06), whipped cream (12 of 13 cases vs. 51 of 80 controls; OR, 6.8; 95% CI, 0.84 to 55.2; p = 0.055), and beverages other than water (9 of 13 cases vs. 34 of 83 controls; OR, 3.2; 95% CI, 0.92 to 11.4; p = 0.07).

Of the 16 full-time hotel employees interviewed, six (38%) reported recent gastrointestinal illness. Onset of illness among three employees occurred prior to Conference A, while onset of illness in three employees coincided with illness among attendees (see epidemic curve). Twelve (34%) of 35 temporary banquet employees were interviewed; two (17%) reported recent gastrointestinal illness. The onset of illness for both temporary employees coincided with illness among attendees.



Apart from extending the employee illness policy to temporary employees, CBEH sanitarians did not identify critical violations relating to hygiene and food preparation practices during the environmental health investigation. CBEH staff contacted event coordinators of five other conferences held at the hotel from February 22 to 26; all event coordinators reported no illness in conference attendees.

This was an outbreak of norovirus gastroenteritis associated with a hotel. Numerous cases of illness occurred in attendees of independent conferences that began on February 10 and 14, respectively. Routes of transmission likely included consumption of contaminated food, contact with contaminated environmental surfaces, and person-to-person contact. The ultimate source of contamination in this outbreak was not identified.

(13)
Norovirus Gastroenteritis Associated with a Restaurant

February Swift County

On February 14, 2006, the Minnesota Department of Health (MDH) received a report from Countryside Public Health Department (CSPH) of gastrointestinal illness in members of the Minnesota National Guard. The initial complainant reported that at least four persons were ill. The ill persons reportedly had four meals in common that were part of three events in the week prior to their illness onset. The first meal was lunch on February 11 at Restaurant A in Appleton, Minnesota. The second meal was dinner on February 12 at a large party with more than 400

guests at Restaurant B in Appleton (with food prepared by the restaurant). Later that same evening, appetizers were served that were prepared by the restaurant, and additional food was served that had been brought in by guests. The last meal the National Guard members had in common was lunch on February 13 at Restaurant A. An investigation was initiated on February 14.

Epidemiologists from MDH obtained a partial list of names and contact information for attendees of all the events. Person were interviewed about recent gastrointestinal illness, events attended, and foods and beverages consumed at each event. A case was defined as a person who attended at least one of the events and subsequently became ill with vomiting and/or diarrhea (≥3 loose stools in a 24-hour period). Stool specimens from ill or recently ill persons were submitted to MDH for bacterial and viral testing.

Environmental health specialists from CSPH conducted an environmental health assessment of Restaurant B. The restaurant's owner was asked about employee illness, and names and phone numbers of restaurant employees were obtained. CSPH environmental health specialists and MDH epidemiology staff interviewed employees about recent history of gastrointestinal illness and work duties.

Fifty-one persons were interviewed about attendance at each event, food consumption, and illness history. Four persons had a history of mild gastrointestinal illness that did not meet the case definition; they were excluded from further analysis. Eight persons (17%) met the case definition. Among the cases, all eight had diarrhea, five (63%) had cramps, three (38%) had vomiting, two (25%) had a fever, and none reported bloody stools. One case (13%) sought medical care. The median duration of illness was 24 hours (range, 12 hours to 9 days).

Statistical analysis found that eating dinner at Restaurant B on February 12 was associated with illness (6 of 8 cases vs. 12 of 39 controls; odds ratio, 6.0; 95% confidence interval, 1.0 to 21.4; $p = 0.05$). Eating at other events was not associated with illness. No single food item was significantly associated with illness. From the time of the dinner at Restaurant B, the median incubation of illness was 38 hours (range, 6 to 38 hours).

Four stool specimens were collected for testing. All four tested negative for *Campylobacter*, *E. coli* O157, *Salmonella*, *Shigella*, and *Yersinia*, and three were positive for norovirus.

Nine restaurant employees worked the night of the National Guard events. The restaurant owner did not recall any of those employees reporting illness prior to the event or on the day of the event. The owner was not aware of any illness in patrons during the event. Of the 15 restaurant employees who were interviewed, two reported a history of gastrointestinal symptoms; however, they had onset of illness on February 18 and 21 (after the events). None of the restaurant employees reported illness on or prior to the events. A specimen collection kit was sent to one of the employees, but the employee did not return the kit for testing.

The environmental health evaluation found several areas that needed correction. Among the findings, the restaurant should not have allowed foods prepared at private homes to be served at the event, several foods were not date marked in the walk-in cooler, and spray bottles were not

marked with contents. On a follow-up visit, the environmental health specialist noted that the general cleaning was much improved, and that the employees showed improvement in handwashing.

This was an outbreak of norovirus gastroenteritis associated with a Minnesota National Guard dinner a restaurant in Appleton, Minnesota on February 12. A single food vehicle was not implicated. The source of contamination was not identified. Employees with gastrointestinal illness in days after the event may be an indication of norovirus transmission among restaurant employees.

(14)
Suspected Norovirus Gastroenteritis Associated with a Restaurant

February Hennepin County

On February 21, 2006, the Minnesota Department of Health (MDH) foodborne illness hotline received a complaint of gastrointestinal illness among two family members from a single household who ate dinner together at a restaurant in Brooklyn Park, Minnesota on February 17. No other complaints were reported at that time, but one of the complainants was an employee at the restaurant. City of Brooklyn Park environmentalists went to the restaurant, but found no employee illness. On March 2, the MDH foodborne illness hotline received a second complaint of gastrointestinal illness among three co-workers who ate at the restaurant on February 15. The City of Brooklyn Park was notified of this complaint and a full investigation was initiated.

MDH staff interviewed complainants about food consumption and illness history. A case was defined as a person who ate at the restaurant and subsequently developed vomiting and/or diarrhea ($\geq$3 loose stools in a 24-hour period).

City of Brooklyn Park environmentalists conducted an environmental health assessment at the restaurant after each complaint. The manager of the establishment was asked about employee illness since late January, staff members at the restaurant were interviewed, and food preparation practices were observed and discussed.

Four patrons representing two complaints were reached for interview, and all four met the case definition. All four cases reported diarrhea, vomiting, and cramps, and three (75%) reported fever. No cases reported bloody stools. The median incubation period was 35 hours (range, 31 to 40 hours). The median duration of illness was 44 hours (range, 36 to 84 hours).

Cases ate a variety of sandwiches with various vegetable toppings. The restaurant was not asked for patron names since more than two weeks had elapsed since illness onsets; therefore, a meaningful statistical analysis could not be conducted.

Employee interviews revealed that four employees were ill in the previous month. Of these, three had vomiting (two also had diarrhea) and one had nausea and fever. Onsets for the three ill food workers were February 5, 17, and 25. Several staff members were handling ready-to-eat foods without gloves at the restaurant, though handwashing stations were accessible and fully stocked.

The restaurant did not have an employee illness log, and did not have a certified food manager. Previous attempts to get an employee certified as a food manager had failed. All staff members were educated on the importance of handwashing. Management and staff were also educated on the importance of excluding ill food workers and the possibility of transmission of illness from food workers to patrons.

This was a foodborne outbreak of gastroenteritis associated with a restaurant in Brooklyn Park, Minnesota. The symptoms and incubation periods were characteristic of norovirus. A specific food vehicle was not determined. The source of the outbreak was most likely an ill or recently ill food worker who contaminated ready-to-eat foods through bare-hand contact.

(15)
Norovirus Gastroenteritis Associated with a Restaurant

February Chisago County

On March 6, 2006, a manager of a restaurant in Wyoming, Minnesota contacted the Minnesota Department of Health (MDH) Acute Disease Investigation and Control Section. The manager had received two separate foodborne illness complaints from two unrelated groups who had eaten food from the restaurant on February 27. Both groups reported eating food from the restaurant at approximately 5:30 pm. An outbreak investigation was initiated in collaboration with MDH Environmental Health Services (EHS).

Complainants were interviewed by phone about food consumption and illness history using a standard form. A case was defined as a person with vomiting or diarrhea ($\geq$3 loose stools in a 24-hour period) after eating food from the restaurant in Wyoming. Four ill persons submitted stools to MDH for bacterial and viral testing.

EHS sanitarians went to the restaurant on March 6 to evaluate food handling practices and interview food workers who were present about recent gastrointestinal illness. On March 7, the restaurant provided MDH with a roster of employees and an employee schedule. MDH staff interviewed food workers by phone about recent gastrointestinal symptoms, focusing on those who worked at the restaurant on February 27.

The first complaint group consisted of three people from three different households. They denied having any other food in common. It was reported that all three persons were ill; however, MDH was only able to reach two of the three persons. Both reported vomiting, diarrhea, and cramps with incubation periods of 27 and 30 hours, respectively. Durations of illness were 1-2 days. Neither case sought medical attention. One case had a chicken sandwich and a soda; the other case had a different type of chicken sandwich, a double cheeseburger, French fries, and a soda. No stool samples were submitted by these two cases.

The second group consisted of three siblings who lived in the same household. One had a cheeseburger and fries, one had a cheeseburger, chicken sandwich, and a fruit parfait, and one had a double cheeseburger, chicken sandwich, and fries. All three were ill with vomiting, diarrhea, and cramps with incubation periods of 21, 23, and 24 hours, respectively. The duration of illness was approximately 3 days for all three cases. None of the three cases sought medical

attention. The parent of these three cases, who did not go to or eat food from the restaurant, became ill at least 24 hours after the children became symptomatic. The parent was ill for approximately 3 days, and was most likely a secondary case exposed to the virus via proximity to the three ill children. The three cases and the parent all submitted stool samples to MDH for bacterial and viral testing; all four stool samples were positive for norovirus by RT-PCR. The viral sequences from all four persons were identical.

The EHS sanitarian was able to interview 11 food workers onsite during the March 6 visit to the restaurant. Three food workers reported recent gastrointestinal symptoms. One had several weeks of vomiting and diarrhea beginning on February 10. The other two reported onset of gastroenteritis during the morning of February 28, which was several hours after the ill patrons ate at the restaurant. Stool kits were given to two of these three individuals, but were not returned to MDH for testing.

The MDH sanitarian advised restaurant management to ask all employees whether or not they had any recent gastrointestinal symptoms and to exclude any ill persons until 72 hours after vomiting and diarrhea had ended. The importance of proper handwashing procedures was stressed.

On March 7, the restaurant provided MDH with a complete roster of 65 employees and employee work schedules. From March 7 to March 9, MDH foodborne disease unit staff conducted phone interviews with restaurant employees, focusing on those who worked on February 27 (particularly during the late afternoon and early evening). Combined with the 11 earlier onsite interviews conducted by the MDH sanitarian, a total of 32 food workers were interviewed. Fourteen (44%) of those interviewed had current or recent gastrointestinal symptoms. The illness onset dates ranged from February 10 to March 8. One worker had onset on February 10, four had onset on February 28, two had onset on March 1, one had onset on March 2, two had onset on March 4, one had onset on March 6, one had onset on March 7, and two had onset on March 8. One stool kit was sent to an ill worker identified through the phone interviews, but it was not returned to MDH for testing.

In addition to being ill themselves, many of the ill food workers reported having ill household members. Onset dates of ill household members dated back to February 25, which was 2 days before the ill patrons ate at the restaurant. One food worker also reported that an ill child vomited near the restaurant counter on either February 25, 26, or 27. It was unclear whether or not this had any connection to the employee illnesses or the patron illnesses.

The restaurant was cooperative with implementing a policy to exclude symptomatic food workers from work until 72 hours after recovery. However, MDH interviews revealed a pattern of several food workers with recent or current gastrointestinal illness, and food workers were continuing to develop symptoms as late as March 8. Therefore, on March 9, upon a recommendation from MDH, the restaurant voluntarily closed in order to assess employee health status and conduct a thorough cleaning and disinfection of the premises. The restaurant re-opened on March 10. No other reports of ill patrons were received by MDH after this time.

This was an outbreak of norovirus gastroenteritis associated with a restaurant. Two unrelated

groups of diners reported illness after eating at the restaurant at the same time on the same day. Evaluation of the restaurant staff revealed that many of the food workers and their family members were ill with norovirus-compatible symptoms during the same time period. It is likely that infected food workers shed the virus in their stool and inadvertently contaminated multiple food items, utensils, and environmental surfaces, thus exposing restaurant patrons to norovirus.

(16)
Norovirus Gastroenteritis Associated with a Potluck Gathering

March Waseca County

On March 10, 2006, the Minnesota Department of Health (MDH) foodborne illness hotline received a complaint of gastrointestinal illness associated with a potluck gathering among staff at a workplace in Waseca, Minnesota. The potluck occurred on March 8 and was served buffet style. Food was prepared at the private homes of staff members and brought to work for the potluck. Foods available included Oreo fluff, taco soup, raspberry crumble bread, fiesta dip, bacon-bacon dip, spinach and herb dip, beer bread, Chinese salad, red pepper and onion preserves dip, beef stew, tuna salad, "suddenly salad", au gratin potatoes, caramel bars, pistachio salad, pumpkin pie, spaghetti salad, deer sausage, and homemade deer jerky. The person who called in the complaint reported that five of the 17 people who attended the potluck called in sick on Friday, March 10 (2 days after the potluck).

MDH epidemiologists obtained a list of individuals who attended the potluck and what foods each co-worker prepared and brought to the potluck. MDH staff conducted phone interviews with attendees to obtain information on illness history, consumption of foods/beverages, and specific work-related event attendance. Open-ended questions were asked regarding meals eaten during the 3 days prior to the potluck. A case was defined as a staff member who attended the potluck and subsequently became ill with vomiting and/or diarrhea ($\geq$3 loose stools in a 24-hour period). Five stool samples were collected from attendees and submitted to MDH for bacterial and viral testing.

All 17 potluck attendees were interviewed and eight (47%) met the case definition. One individual reported mild gastrointestinal symptoms that did not meet the case definition; this individual was excluded from the analyses. Six cases (75%) had diarrhea, five (63%) had vomiting, five (63%) had cramps, one (13%) had bloody stools, and three (38%) reported fever. The median incubation period was 38 hours (range, 32 to 47 hours). The median duration of illness was 58 hours (range, 42 to 75 hours). Stool samples from four cases were positive for norovirus.

No specific food items were significantly associated with illness. Consumption of "suddenly salad" had an elevated relative risk, but the association was not statistically significant (6 of 8 persons who consumed the salad were ill vs. 2 of 5 persons who did not consume the salad; risk ratio, 2.6; 95% confidence interval, 0.76 to 9.1; $p = 0.13$). The case who prepared the "suddenly salad" reported the first onset and also was the only person to be hospitalized for her illness.

This was an outbreak of norovirus gastroenteritis among a group of co-workers associated with a

potluck meal at their workplace. The vehicle was not confirmed. A salad brought to the potluck may have been the vehicle, but the small number of people attending the potluck limited the power of the statistical analysis to confirm an association. The source of contamination was not identified.

(17)
Norovirus Gastroenteritis Associated with a Restaurant

March Carver County

On March 14, 2006, the Minnesota Department of Health (MDH) foodborne illness hotline received a complaint of gastrointestinal illness in one person from a party of four who ate at a grocery deli together. This person had also eaten at Restaurant A in Chanhassen on March 9. Also on March 14, a Hennepin County epidemiologist received an independent complaint of gastrointestinal illness in two family members who ate at a pizza restaurant together; however, these two individuals had also eaten at Restaurant A in Chanhassen on March 12. MDH Environmental Health specialists were notified and an investigation was initiated.

MDH staff interviewed complainants about food consumption and illness history. A case was defined as a person who ate at Restaurant A in Chanhassen and subsequently developed vomiting and/or diarrhea ($\geq$3 loose stools in a 24-hour period). Stool kits were sent to each complainant household.

MDH environmentalists conducted an environmental health assessment at Restaurant A on March 15. The manager of the establishment was asked about employee illness since February 1, staff members at the restaurant were interviewed, and food preparation practices were observed and discussed.

All three patrons (representing two complaints) were reached for interview, and all three met the case definition. All three cases reported diarrhea and vomiting, and one (33%) reported cramps. No cases reported fever or bloody stools. The median incubation period was 12 hours (range, 11 to 24 hours). Duration of illness for one case was 64 hours (the others were still ill at the time of interview). Household members for each of the complainant parties also became ill with similar symptoms after the complainants but had not eaten at Restaurant A; their illnesses appeared to be due to secondary person-to-person transmission within their families. Six stool samples were positive for norovirus (three from each household). The viral sequences representing each complainant group were different by one base and appeared to be variants of the same virus.

Cases ate different meals at Restaurant A, including a sausage breakfast sandwich and hamburgers. The restaurant did not have additional patron names from the implicated meal dates; therefore, a statistical analysis of food items could not be conducted.

Employee interviews revealed that five employees were ill in the previous month, and one additional employee could not be reached but was reported to have been ill. Onset dates for the ill food workers ranged from late February through March 15. All experienced vomiting and none reported diarrhea. Several staff members were handling ready-to-eat foods without gloves,

but the restaurant changed its policy to implement glove use. All staff members were educated on the importance of handwashing. Management and staff were also educated on the importance of excluding ill food workers and the possibility of transmission of illness from food workers to patrons.

This was an outbreak of norovirus gastroenteritis associated with a restaurant in Chanhassen, Minnesota. A specific vehicle was not identified, but the source of contamination was likely one or more ill food workers.

(18)

Salmonella Typhimurium Infections Associated with Frozen Stuffed Chicken Entrees

April-June Multiple counties/Multiple states

In 1998 and 2005, two outbreaks of salmonellosis associated with eating frozen, pre-browned, single-serving, microwaveable stuffed chicken products were identified in Minnesota. Thirty-three cases of *Salmonella* Typhimurium infection associated with consumption of Brand A Chicken Kiev were identified in the 1998 outbreak. Four cases of *S.* Heidelberg infection associated with consumption of Brand B Chicken Broccoli and Cheese were identified in the 2005 outbreak. The investigations of these two outbreaks lead to minor label changes of the two specific brands of stuffed chicken products.

Two additional outbreaks associated with the same type of product were identified and investigated in Minnesota in 2005 and 2006. Twenty-seven cases of *S.* Enteritidis infection associated with multiple brands and varieties of frozen, stuffed chicken products occurred from August, 2005 through July, 2006. During the *S.* Enteritidis investigation, an outbreak of *S.* Typhimurium infections was identified when the Minnesota Department of Health (MDH) Public Health Laboratory identified human-case isolates of *S.* Typhimurium that were indistinguishable by pulsed-field gel electrophoresis (PFGE).

All *Salmonella* cases reported to MDH are routinely interviewed about food consumption and other exposures as part of enteric disease surveillance in Minnesota.

The Minnesota Department of Agriculture (MDA), the Centers for Disease Control and Prevention, the United States Department of Agriculture (USDA) Food Safety and Inspection Service (FSIS), and other states were notified of the *S.* Typhimurium cases.

The MDA Dairy and Food Inspection Division collected products for testing that the *S.* Typhimurium cases had purchased at the same time as the products consumed in the week before their illness onset. The MDA Microbiology Laboratory cultured the products for *Salmonella*, and all isolates were sent to the MDH Public Health Laboratory for PFGE subtyping.

Three cases with *S.* Typhimurium isolates of an indistinguishable PFGE subtype (designated TM2c) reported eating Brand B stuffed chicken products in the week prior to onset of illness. Dates of illness onset ranged from April 16 through June 25, 2006. Two of the cases were hospitalized. The cases reported eating several varieties of the products: Kiev, Broccoli and

Cheese, Mushroom and Cheddar, Mushrooms in Wine Sauce, and/or Romanov. *S.* Typhimurium that matched the PFGE subtype of the cases' isolates was isolated from a product which one of the cases purchased at the same time as the products he consumed before his illness onset. The product was Chicken Mushrooms in Wine Sauce, with a production code that represented a June 3, 2005 production date. Additionally, *S.* Typhimurium TM2c was isolated from products collected from two of the *S.* Enteritidis outbreak case-households. Both products were produced by the same company and had production codes which represented production dates of February 2 and March 2, 2006.

All three cases of the *S.* Typhimurium outbreak cooked the chicken products in the microwave, and none took an internal temperature after cooking.

In March 2006, shortly before the recognition of the *S.* Typhimurium outbreak, the USDA FSIS sent a letter to all processing plants that make these or similar products to those recalled, instructing them to re-evaluate the adequacy of the package labels to ensure that the consumer is aware that these products are "uncooked". Also in response to the outbreaks, the National Advisory Committee for the Microbiological Criteria for Foods (NACMCF) issued new guidelines for labeling this type of product. These guidelines included: advising consumers that microwaving raw poultry from a frozen state is not advisable unless the manufacturer instructions ensure that they achieve the recommended (165ºF) endpoint temperature; the principal display panel of the label should have a warning declaration explicitly stating that the product contains raw poultry; and reminding consumers to fully cook the product when the product is raw but gives the appearance of being fully cooked. The processing plants were required to submit the new labels for USDA approval within 8 months.

After the recognition of the *S.* Typhimurium outbreak, USDA FSIS issued a consumer alert on July 3, 2006. The consumer alert included instructions to consumers on needing to "take multiple temperature readings using a food thermometer at different locations throughout the product due to the non-uniformity of the heating process and the creation of 'cold spots'" when cooking these products in the microwave. This alert was not run in local newspapers, and did not appear to have an effect on the outbreak. On July 20, MDA and MDH issued a joint press release notifying Minnesota consumers about the outbreak, and strongly advising against cooking these types of products in the microwave.

This was the fourth outbreak of *Salmonella* infections in Minnesota associated with eating frozen, pre-browned, single-serving, microwaveable stuffed chicken products. Even though these products are raw, the products' cooked appearance and the labels' microwave instructions have lead to consumers undercooking the products. The three cases in this outbreak cooked the products in the microwave. Despite instructions on the label to take an internal temperature to ensure that these products were cooked thoroughly, none of the cases took the internal temperature.

Under the new label requirements, consumers will more easily identify the product as raw. The producers were required to verify that the cooking instructions (time and temperature) on the label are sufficient for the product to reach the appropriate internal temperature.

(19)
Foodborne Bacterial Intoxications Associated with a Restaurant

April Carlton County

On April 19, 2006, the Minnesota Department of Health (MDH) foodborne illness hotline received a report concerning illness among a group of 11 that dined at a restaurant in Cloquet, Minnesota on April 17. MDH Environmental Health Services (EHS) was subsequently notified.

Epidemiologists from MDH conducted phone surveys of group members to obtain information about consumption of foods/beverages and illness history. Epidemiologists from MDH obtained a list of credit card receipts and conducted phone surveys of patrons who had eaten at the restaurant on April 17 and 18 to obtain information on consumption of foods/beverages and illness history. A case was defined as a person who developed vomiting or diarrhea ($\geq$3 loose stools in a 24-hour period) after dining at the restaurant.

A sanitarian from EHS visited the establishment to evaluate food preparation and handling procedures and to interview the staff regarding recent illness. A stool sample from a patron identified through credit card receipts was collected and submitted to MDH for bacterial and viral testing.

Thirty patrons (including 11 members from the original complaint and additional patrons) were interviewed; five met the case definition. All five cases had diarrhea and four (80%) had cramps; none of the cases reported having vomiting or fever. The median incubation period was 10 hours (range, 4 to 14 hours). At the time of interview, two cases had recovered (with illness durations of 9 and 106 hours); three cases reported continued symptoms exceeding 20 hours. Consuming refried beans was associated with illness (5 of 5 cases vs. 9 of 22 controls; logit odds ratio, 15.6; 95% logit confidence interval, 0.77 to 317.7; $p = 0.04$). The stool sample from the patron tested positive for *Clostridium perfringens*; however, it should be noted that this patron dined at the restaurant twice (April 18 and 25) and became ill after the April 25 meal.

During the inspection of the restaurant, the EHS sanitarian noted several critical violations, including temperature abuse issues. The containers of beans in the refrigerator, which were prepared the previous day, were between 66 and 77 degrees Fahrenheit. The restaurant was instructed to dispose of food items that had improper temperatures; the sanitarian provided recommendations on how to prepare and store foods.

This was an outbreak of foodborne intoxications associated with consumption of refried beans. The distribution of incubations, absence of vomiting and fever, and recovery from one case suggest the etiology was *C. perfringens*. However, the lengthy illness durations are not characteristic of typical *C. perfringens* intoxications. Improper storage and cooling of the beans allowed subsequent proliferation of bacteria.

(20)
Norovirus Gastroenteritis Associated with a Catered Lunch

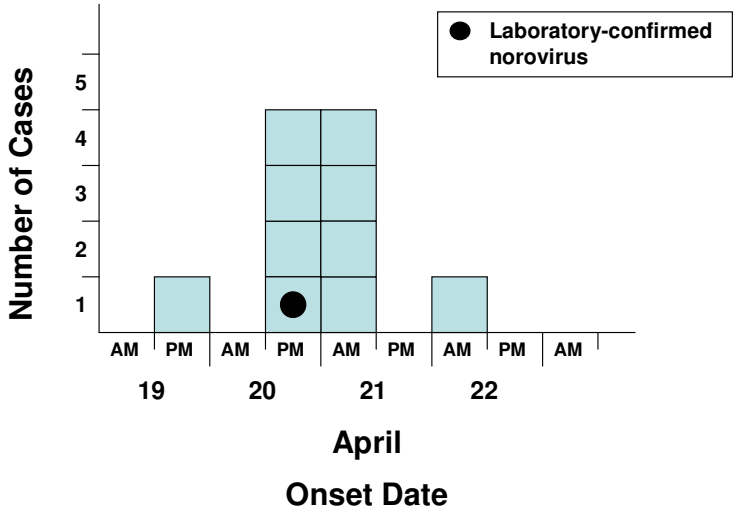
April Ramsey County

On April 27, 2006, the Minnesota Department of Health (MDH) foodborne illness hotline received a report concerning illness among a group of co-workers following a catered lunch on April 19 from a restaurant and catering facility in St. Paul, Minnesota. Environmentalists from the City of St. Paul (COSP) were subsequently notified.

Epidemiologists from MDH obtained a list of co-workers and conducted phone surveys to obtain information on food consumption and illness history. A case was defined as a co-worker who developed vomiting or diarrhea (≥3 loose stools in a 24-hour period) following the catered meal. A stool kit from one co-worker was collected and submitted to MDH for bacterial and viral testing. A sanitarian from SPRC visited the establishment to assess food preparation and handling procedures and interview the staff regarding recent illness.

Of the 22 co-workers interviewed, 11 (50%) met the case definition. In addition, two co-workers reported mild gastrointestinal symptoms that did not meet the case definition and were excluded from the analysis. Ten cases (91%) had diarrhea, seven (64%) had vomiting, six (55%) had cramps, and four of nine (44%) had a fever. The median incubation period was 37.5 hours (range, <1 to 61 hours). The median duration of illness was 22 hours (range, 7 to 79 hours). The stool sample collected from the co-worker was positive for norovirus. One co-worker reported an onset of diarrhea approximately the same the time as the catered lunch was consumed (see epidemic curve).

Gastroenteritis Cases Associated with a Catered Lunch, by Illness Onset Date



There were three types of sandwiches provided by the restaurant during the catered lunch, and a co-worker provided cupcakes. No food item was significantly associated with illness; however, when the co-worker who became ill on April 19 was excluded from analysis, consuming a turkey sandwich was associated with illness (4 of 8 cases vs. 0 of 9 controls; logit odds ratio, 19.0; logit 95% confidence interval, 0.83 to 434.4; p = 0.03). Consuming cupcakes was not associated with illness.

During the inspection of the restaurant, the sanitarian from COSP noted that the owner and another individual prepared and sliced the party sandwiches the morning before the catered lunch. The owner reported no recent illness. The additional individual only came in to help and was not considered a current employee; the illness history for this individual could not be determined after multiple interview attempts failed. The restaurant received no complaints from patrons or other catered events.

This was an outbreak of norovirus gastroenteritis associated with consuming turkey sandwiches during a catered lunch. The source of contamination was not determined; transmission likely occurred through an ill co-worker who contaminated food items at the event. However, contamination of sandwiches by an ill food worker was not completely ruled out.

(21)
Norovirus Gastroenteritis Associated with a Restaurant

April Ramsey County

On April 25, 2006, the Minnesota Department of Health foodborne illness hotline received a complaint of gastrointestinal illness from a group of three patrons who ate at a restaurant in Arden Hills, Minnesota, on April 20. Ramsey County Public Health was notified and an investigation was immediately initiated.

Ramsey County environmentalists obtained a list of patrons who ate at the restaurant on April 20 and who paid by credit card. MDH staff interviewed patrons about food consumption and illness history. A case was defined as a person who ate at the restaurant and subsequently developed vomiting and/or diarrhea (≥3 loose stools in a 24-hour period). A stool kit was sent to one of the original complainants.

Ramsey County environmentalists conducted an environmental health assessment at the restaurant. The manager of the restaurant was asked about employee illness during April. Staff members were interviewed, and food preparation practices were observed and discussed.

Thirty-eight patrons were interviewed, including the original complainants; seven met the case definition. Six (86%) cases had diarrhea, four (57%) had vomiting, four (57%) had cramps, and two (29%) had fever. No cases reported bloody stools. One case was hospitalized. The median incubation period was 35.5 hours (range, 0.75 to 50.5 hours). The median duration of illness was 47 hours (range, 14 to 51.5 hours). One patron submitted a stool sample; it tested positive for norovirus.

By univariate analysis, consumption of toast (3 of 4 cases vs. 2 of 16 controls; odds ratio [OR], 21.0; 95% confidence interval [CI], 0.96 to 1,032.4; Fisher 2-tailed p = 0.032) was associated with illness. The two-egg combo (2 of 4 cases vs. 1 of 16 controls; OR, 15.0; 95% CI, 0.57 to 819.2; Fisher 2-tailed p = 0.088) and the ham and cheese omelet (2 of 4 cases vs. 1 of 16 controls; OR, 15.0; 95% CI, 0.57 to 819.2; Fisher 2-tailed p = 0.088) approached significance.

Employee interviews revealed one asymptomatic employee with an ill child at home, and one employee who became ill after the meal date in question. Both employees tested positive for norovirus. One other employee reported mild illness and tested negative for norovirus. Nucleic acid sequencing was conducted on positive norovirus samples from the patron and food workers; the sequences from all three specimens were identical.

Management and employees were educated on the importance of handwashing and were asked to minimize bare-hand contact with ready-to-eat foods by using gloves or utensils when possible. The restaurant staff disassembled one of their food preparation lines for thorough cleaning and disinfection. Restaurant staff was told to maintain an accessible handwashing area (the hand sink was blocked by pallets of dishes) and keep the handwashing area stocked with soap, paper towels, and a nail brush for employee use.

This was an outbreak of norovirus gastroenteritis associated with a restaurant in Arden Hills, Minnesota. The source of contamination was likely a food worker with an ill household member.

(22)
Norovirus Gastroenteritis Associated with a Restaurant

April Anoka County

On April 26, 2006, Anoka County Community Health and Environmental Services (Anoka) notified the Minnesota Department of Health (MDH) of a complaint of gastrointestinal illness in 12 of 16 persons in a group that ate at a restaurant in Ham Lake, Minnesota on April 21. An investigation was initiated and the restaurant was contacted on April 26.

Epidemiologists from MDH contacted the persons in the group and interviewed them about illness history and foods and beverages consumed at the restaurant. A list of restaurant patrons that paid by credit card after eating at the restaurant on April 21 was obtained. Restaurant patrons were contacted and interviewed to assess if persons not associated with the initial complaint also became ill.

Environmental health specialists from Anoka conducted an environmental health assessment of the restaurant. Anoka environmental health specialists interviewed employees about recent history of gastrointestinal illness and work duties.

A case was defined as a person who ate at the restaurant and subsequently became ill with vomiting and/or diarrhea (≥3 loose stools in a 24-hour period). Stool samples collected from patrons with a history of gastrointestinal illness were submitted to MDH for bacterial and viral testing.

Forty-one patrons were interviewed about food consumption and illness history, including 14 persons that were part of the initial complaint and 27 patrons identified using the credit card receipt list. Four persons (two from the initial complaint) had a history of mild gastrointestinal illness that did not meet the case definition; they were excluded from further analysis. Among the remaining 37 persons, nine (24%) met the case definition. Of the nine cases, eight were associated with the initial complaint. All nine cases reported diarrhea, eight (89%) had vomiting, six (67%) had a cramps, two (22%) had fever, and none reported bloody stools. None of the cases sought medical care for their illness. The median incubation was 31 hours (range, 24 to 52 hours). The median duration of illness was 25 hours (range, 19 to 108 hours). The case that was not part of the initial complaint ate at the restaurant within 1 hour of the complaint group, and had illness onset consistent with the onsets of cases in that group.

Three stool specimens were collected from patrons. All three tested negative for *Campylobacter*, *E. coli* O157, *Salmonella*, *Shigella*, and *Yersinia*, and two were positive for norovirus. Norovirus-positive specimens were sequenced, and were identical. Both specimens were from persons in the initial complaint group. The specimen that tested negative was submitted by the case identified using credit card receipts; however, it was collected 10 days after onset of symptoms and 8 days after illness recovery.

Patron cases had eaten a variety of foods, including salads, appetizers (onion rings, potato skins, mozzarella sticks), entrees (BBQ ribs, roasted chicken, pasta, pizza), sandwiches, cooked vegetables, and ice cream. The cake was purchased at a bakery and served at the restaurant to the party who filed the initial complaint. By univariate analysis, eating onion rings (5 of 8 cases vs. 1 of 28 controls; odds ratio [OR], 45.0; 95% confidence interval [CI], 3.8 to 1,098; $p < 0.001$), baked potatoes (4 of 8 cases vs. 1 of 26 controls; OR, 26.0; 95% CI, 2.2 to 662; $p = 0.006$), cake (5 of 9 cases vs. 2 of 28 controls; OR, 16.3; 95% CI, 2.2 to 139; $p = 0.005$), BBQ ribs (5 of 9 cases vs. 3 of 28 controls; OR, 10.4; 95% CI, 1.6 to 67.2; $p = 0.01$), appetizers (5 of 8 cases vs. 4 of 28 controls; OR, 10.0; 95% CI, 1.5 to 64.6; $p = 0.01$), dinner salad (6 of 9 cases vs. 7 of 28 controls; OR, 6.0; 95% CI, 1.1 to 34.5; $p = 0.04$), and cooked vegetables (4 of 8 cases vs. 0 of 27 controls; OR, undefined; 95% CI, 4.1 to undefined; $p = 0.001$) were significantly associated with illness. Eating appetizers was associated with illness in a multivariate model selection. Multivariate analysis for individual appetizers was not possible. The only food the case that was not part of the initial complaint ate in common with the complaint group was an appetizer (onion rings).

None of the 19 restaurant employees interviewed reported a history of gastrointestinal symptoms.

This was an outbreak of norovirus gastroenteritis associated with eating a restaurant in Ham Lake, Minnesota. Cases were identified among persons that were part of a large group, and from a person whose name was obtained from credit card receipts. A number of foods were statistically implicated and could have served as vehicles; however, an appetizer, onion rings, was the only food in common between the case identified from credit card receipts and cases from the larger group. None of the restaurant employees reported a recent history of gastrointestinal illness. The source of contamination was not identified.

(23)
Norovirus Gastroenteritis Associated with a Restaurant

April Hennepin County

On May 2, 2006, the Minnesota Department of Health (MDH) foodborne illness hotline received a report concerning illness among a group of four who dined at a restaurant in Eden Prairie, Minnesota on April 30. On May 3, the MDH foodborne illness hotline received an independent report concerning illness among a group of nine who also dined at the restaurant on April 30. Hennepin County Public Health Protection (HCPHP) was subsequently notified.

Epidemiologists from HCPCP conducted phone surveys of patrons associated with both complaints to obtain information on consumption of foods/beverages and illness history. Epidemiologists from HCPHP obtained credit card receipts and conducted phone surveys of patrons who had eaten at the restaurant during May 1-4 to obtain information on consumption of foods/beverages and illness history. Additional patrons who dined at the restaurant on April 30 were identified through information provided by patrons associated with both complaints. A case was defined as a person who developed vomiting or diarrhea ($\geq$3 loose stools in a 24-hour period) after eating at the restaurant.

A sanitarian from HCPHP visited the establishment on May 4 to evaluate food preparation and handling procedures and to interview the staff regarding recent illness. Sanitarians visited the restaurant again on May 12 to monitor compliance with requests made during the initial inspection. Stool samples from seven patrons (additional patrons from four different households who were not associated with either complaint) were submitted to the MDH Public Health Laboratory for bacterial and viral testing.

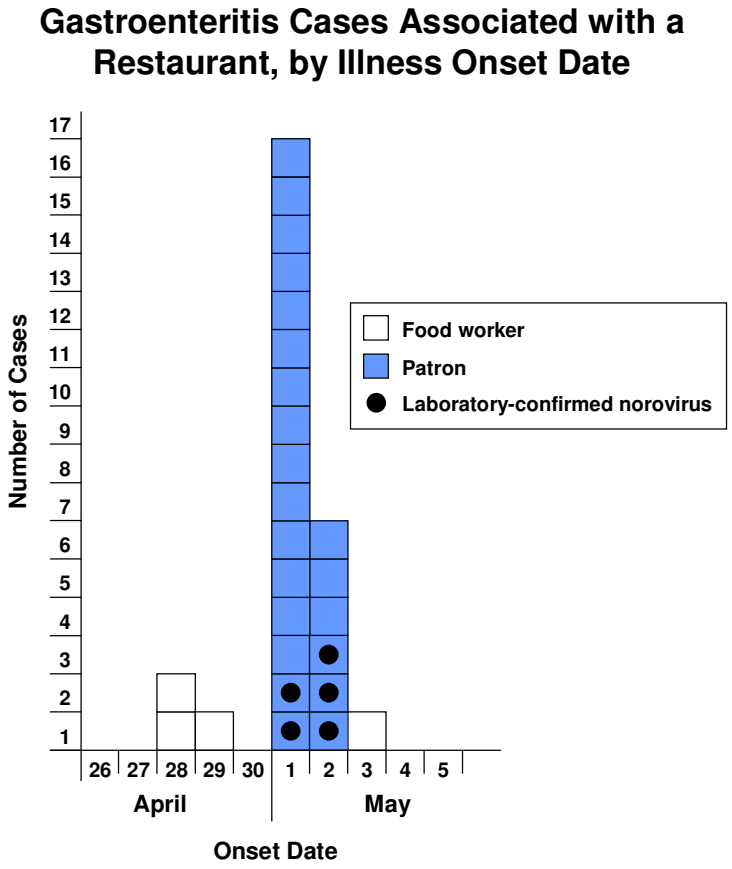
Forty patrons who dined at the restaurant on April 30 were interviewed, and 23 (58%) met the case definition. In addition, six patrons reported mild gastrointestinal symptoms that did not meet the case definition; these patrons were excluded from the analysis. Twenty-two cases (96%) had diarrhea, 20 (87%) had vomiting, 14 (61%) reported fever, and 13 (57%) had cramps. The median incubation was 33 hours (range, 27.5 to 58 hours). The median duration of illness was 39.5 hours (range, 6 to 71 hours). Stool samples from five patrons were positive for norovirus. Nucleic acid sequencing was conducted on positive norovirus samples from the five cases (three different households); all five sequences were identical.

Forty patrons who dined at the restaurant during May 1-4 were also interviewed. One family reported illness after eating at the restaurant on May 1; three of five family members had an onset of diarrhea between 12.0 to 14.5 hours after the meal. Two stool samples from members of this family were submitted for testing; both were negative for norovirus.

A wide variety of food items were served buffet-style during brunch on April 30. Several food items were significantly associated with illness, including cheese hash browns (17 of 23 cases vs. 0 of 11 controls; logit odds ratio [OR], 61.9; logit 95% confidence interval [CI], 3.2 to 1,208.3; $p < 0.001$), fruit (23 of 23 cases vs. 6 of 11 controls; logit OR, 39.8; logit 95% CI, 1.9 to 817.0; $p = 0.002$), huevos rancheros (8 of 23 cases vs. 0 of 11 controls; logit OR, 12.6; logit 95% CI, 0.66 to

241.6; p = 0.03), eggs Benedict (8 of 23 cases vs. 0 of 11 controls; logit OR, 12.6; logit 95% CI, 0.66 to 241.6; p = 0.03), bacon (18 of 23 cases vs. 4 of 11 controls; OR, 6.3; 95% CI, 1.3 to 30.5; p = 0.03), and roast (8 of 23 cases vs. 0 of 11 controls; logit OR, 12.6; logit 95% CI, 0.66 to 241.6; p = 0.03).

Four food workers reported recent gastrointestinal illness including three with onset on either April 28 or April 29 (see epidemic curve); one additional employee reported nausea. According to the employee work schedules, employees were working either during or just after recovery of symptoms (including on April 30).



The sanitarian from HCPHP identified several critical violations, including bare-hand contact with ready-to-eat food items and lack of a convenient hand sink for wait staff at the bar. The establishment was instructed on the importance of limiting bare-hand contact of food items, frequent handwashing, and excluding ill food workers from work.

This was an outbreak of norovirus gastroenteritis associated with an Eden Prairie restaurant. Several food items were statistically associated with illness. Transmission likely occurred through contamination of ready-to-eat food items by one or more ill employees.

(24)
Norovirus Gastroenteritis Associated with a Correctional Facility

May Anoka County

On May 4, 2006, the Minnesota Department of Health (MDH) received a report concerning illness among inmates at a correctional facility in Lino Lakes, Minnesota. Public health officials at Anoka County Community Health and Environmental Services (ACCHES) indicated that approximately half of the inmates from one "prison pod" became ill on May 3.

Staff from ACCHES and the correctional health official conducted surveys of inmates from the pod to obtain information on consumption of foods/beverages and illness history. A case was defined as an inmate who developed vomiting or diarrhea ($\geq$3 loose stools in a 24-hour period) during May 1-7.

A sanitarian from ACCHES inspected the cafeteria at the facility. A local catering company (Company A) prepared food served at the correctional facility; the sanitarian also visited this company to evaluate food preparation and handling procedures and to interview the staff regarding recent illness. Stool kits were collected from six inmates and one employee from Company A and submitted to MDH for bacterial and viral testing.

Of the 14 inmates interviewed, eight (57%) met the case definition. All eight cases reported vomiting and diarrhea, six (75%) had cramps, and four (50%) had fever. The median duration of illness was 36 hours (range, 10 to 88 hours).

Multiple meals were common among inmates; all food items were served cafeteria style. Several food items during dinner on May 1 were significantly associated with illness, including salad (8 of 8 cases vs. 0 of 6 controls; logit odds ratio [OR], 221.0; logit 95% confidence interval [CI], 3.8 to 12,694.7; $p < 0.001$), cake (8 of 8 cases vs. 2 of 6 controls; logit OR, 30.6; logit 95% CI, 1.2 to 784.7; $p = 0.02$), fruit drink (8 of 8 cases vs. 2 of 6 controls; logit OR, 30.6; logit 95% CI, 1.2 to 784.7; $p = 0.02$), ham and potatoes (7 of 8 cases vs. 1 of 6 controls; OR, 35.0; 95% CI, 1.7 to 703.0; $p = 0.03$), and carrots (7 of 8 cases vs. 1 of 6 controls; OR, 35.0; 95% CI, 1.7 to 703.0; $p = 0.03$). Consuming bologna sandwiches on May 2 was also associated with illness (8 of 8 cases vs. 1 of 6 controls; logit OR, 62.3; logit 95% CI, 2.1 to 1,822.6; $p = 0.003$). Consuming lettuce (8 of 8 cases vs. 2 of 6 controls; logit OR, 30.6; logit 95% CI, 1.2 to 784.7; $p = 0.02$) and fruit drink (8 of 8 cases vs. 2 of 5 controls; logit OR, 23.8; logit 95% CI, 0.89 to 633.5; $p = 0.04$) on May 2 were also significantly associated with illness.

Thirteen employees from Company A were interviewed regarding recent illness; one employee reported an onset of vomiting and diarrhea on May 2. According to the work schedules, this employee did work while ill on May 2 and May 3. This employee normally washes dishes, however on May 2 this worker prepared bologna sandwiches, which was one of the food items significantly associated with illness among inmates. The median incubation period for cases from the bologna sandwich meal was 30 hours (range, 25 to 87 hours). Stool samples from five inmates and the Company A employee that prepared the bologna sandwiches were positive for norovirus. Nucleic sequencing was conducted on positive norovirus samples from three

individuals (two inmates and the Company A employee); all three sequences were identical.

This was a foodborne outbreak of norovirus gastroenteritis associated with a correctional facility. Multiple food items were statistically associated with illness, but the distribution of incubation periods and the environmental health investigation implicated bologna sandwiches as the primary vehicle. Transmission occurred through contamination of these sandwiches by an infected food worker who worked while ill.

(25)
Norovirus Gastroenteritis Associated with a Restaurant

May Clay County

On May 12, 2006, the Minnesota Department of Health (MDH) foodborne illness hotline received a report of illnesses from a group of 22 teachers who dined at a restaurant in Moorhead, Minnesota on May 10. Some of the teachers did not work in the same school and had no other events in common. Sanitarians from Moorhead Neighborhood Services (MNS) were notified and an investigation was initiated. In the following days a total of 10 independent complaints about the restaurant were received by MDH or MNS.

The complainants were interviewed to assess their symptoms and food consumption histories. A sanitarian from MNS visited the restaurant on May 12 and 13 to interview employees and to conduct a food-handling review. A case was defined as a person who ate at the restaurant and subsequently became ill with vomiting and/or diarrhea (>3 loose stools in a 24-hour period). Stool specimens were obtained from ill patrons and employees.

One hundred and eight patrons were interviewed. Sixty (56%) met the case definition; an additional person experienced illness not meeting the case definition and was excluded from the analysis. Fifty-eight (98%) cases had diarrhea, 51 (85%) had vomiting, 42 (72%) had cramping, 26 (46%) reported fever, and one (2%) had bloody stools. The median incubation period was 30 hours (range, 13 to 78 hours). Twenty-eight people were still experiencing symptoms at the time they were interviewed; for the thirty-two people who had recovered, the median duration of illness was 69 hours (range, 21 to 176 hours). Six cases called or visited their medical provider and one was admitted to a hospital.

Five stool samples were collected, including one sample from a restaurant employee. All five samples tested positive for norovirus. Further laboratory analysis was conducted on three of the specimens (two patrons and one employee); all three had identical nucleic acid sequences.

Transmission to patrons occurred primarily on May 10 and 11, but one case with a meal date of May 12 was identified. Consumption of salad was statistically associated with illness (57 of 60 cases vs. 19 of 45 controls; odds ratio, 26; 95% confidence interval, 6.4 to 123.9; $p<0.001$). No other foods were statistically associated with illness.

Twenty of 28 food workers were interviewed. Two food workers admitted to having gastrointestinal symptoms and one admitted to working on May 10 while ill. This worker's

duties included preparing salad. The other ill employee tested positive for norovirus and became ill after May 10, but did not report working while ill. As not all food workers were interviewed, it is possible that there were other ill employees during this time period.

Prior to this investigation the restaurant had three inspections between February 1 and May 12, and several critical violations were noted. An inspection on February 8 noted that ready-to-eat sausage was stored beneath raw meat in the walk-in cooler; there were no date marks on cheeses, dips, and meatballs; cooked turkey was out-of-date; improper sanitization of dishes was observed; and there was a lack of sanitizer test strips. An inspection on March 9 found that red meat and raw fish were thawed on the same tray in walk-in cooler, the ice-scoop handle was in contact with ice, bread from previous customers was being re-served, there was improper temperature control of potentially hazardous desserts in the display case and no date-marking on desserts, baked potatoes were not date-marked, and mold was found in the icemaker. An inspection on April 26 again documented warm temperatures in the dessert cooler. In addition to these critical violations there were a total of 22 non-critical violations recorded during these three inspections.

This investigation prompted an additional environmental assessment of the restaurant on May 12. Several critical items were noted, including poor reporting of illness by employees, several cold-holding temperature violations, and lack of a usable hand-washing sink. The restaurant had also received at least two complaints from patrons and had not reported these complaints. The restaurant was advised to close on May 12 until all ready-to-eat foods were disposed of, employees were interviewed, ill employees were excluded from work, and thorough environmental cleaning and sanitation had been completed. The restaurant complied with these stipulations and reopened on Sunday May 14.

This was an outbreak of norovirus gastroenteritis associated with a restaurant in Moorhead, Minnesota. Salad was statistically implicated as the vehicle of transmission. The source of contamination was likely an ill food worker. Corrective actions were taken at the restaurant, including hand-washing education.

(26)
Scombroid Fish Poisoning Associated with a Restaurant

May — Hennepin County

On May 11, 2006, the City of Bloomington Environmental Health (CBEH) received two independent complaints of illness involving persons who had consumed escolar at a restaurant that same day for lunch. The illness symptoms were characterized as sensitivity or allergic reactions. CBEH initiated an outbreak investigation involving product trace-back in cooperation with the Minnesota Department of Health and the U.S. Food and Drug Administration (FDA).

Complainants were interviewed about illness history and food consumption using a standard questionnaire. A case was defined as a person who ate at the restaurant with subsequent onset of symptoms consistent with scombroid fish poisoning (i.e., dizziness, facial flushing and sweating, rash, palpitations, headache, vomiting, diarrhea).

An environmental health investigation was initiated on May 11, focusing on food preparation practices and procedures. A sample of escolar, supplied by the restaurant, was submitted to the FDA for tissue histamine analysis. Two complainants were interviewed and both met the case definition. Onset of symptoms occurred within an hour of consuming the fish.

The environmental health investigation identified no critical food safety violations with the establishment's food preparation practices and procedures. For fish species other than tuna or mahi mahi, FDA sets the action level for histamines at 500 ppm. Laboratory results for the raw escolar taken from the restaurant demonstrated extraordinarily high levels of histamine (6,390 ppm). Raw escolar samples taken from the supplier were also found to have elevated histamine levels ranging from 2,440 to 8,000 ppm.

This was an outbreak of scombroid fish poisoning associated with a Bloomington restaurant. The source of the outbreak was escolar fish distributed by a supplier located in Minneapolis. The escolar product from this distributor was implicated in two other outbreaks of scombroid illness among patrons of metro-area restaurants (see reports #28 and #29).

(27)
Scombroid Fish Poisoning Associated with a Restaurant

May Hennepin County

On May 19, 2006, the Minnesota Department of Health (MDH) received a report from the City of Edina Health Department (CEHD) concerning illnesses among patrons who recently dined at a restaurant in Edina, Minnesota. Three individuals had consumed a tuna burger from the restaurant on May 18 and developed scombroid-like symptoms shortly after. A fourth patron purchased the tuna burger on May 18 but did not consume it until May 19, then becoming ill. The United States Food and Drug Administration (FDA) district office in Minneapolis and the Minnesota Department of Agriculture (MDA) were subsequently notified.

A sanitarian from CEHD visited the restaurant to assess food preparation and holding procedures. The sanitarian also obtained information on the distributor for the tuna used in the restaurant. Officials from FDA obtained samples of tuna (both ground tuna and tuna filets) to be sent to the regional FDA laboratory for histamine level testing. FDA and MDA also initiated a trace back of the tuna by contacting the distributor.

A detailed symptom history for the four complainants was not available. Two anonymous patrons contacted the restaurant to complain about the tuna burger. The third complainant was seen at an emergency room for scombroid-like symptoms; the physician then contacted the restaurant. The fourth complainant was not interviewed after several attempts failed.

The restaurant indicated that they received both tuna fillets and trimmings weekly from a local distributor. The tuna filets were cut into steaks and the leftover pieces were ground with the tuna trimmings. The ground tuna was then mixed with additional ingredients, portioned into 5 lb bags, iced, and kept in a walk-in cooler. According to the chef, old ground tuna was never mixed with fresh product. The tuna was formed into patties on the kitchen line and cooked well-done. The

restaurant indicated that 15 tuna burgers were sold on May 18. MDH was unable to obtain credit card receipts for patrons who recently ate tuna burgers at the restaurant.

During the inspection of the restaurant on May 22, the sanitarian from CEHD noted that tuna delivered to the restaurant earlier that morning had not been refrigerated and was still found in the shipment box on the kitchen floor. The sanitarian also noted color variation with the tuna fillets that were stored in the walk-in cooler. The histamine level for the ground tuna was 3,200 parts per million (ppm); according to FDA regulations, histamine levels should not exceed 50 ppm. The histamine level for the tuna filets was less than 50 ppm.

The FDA worked in conjunction with MDA to inspect the distributor. Samples of tuna trimmings from the distributor were obtained and tested for histamine levels; the levels were substantially less than the level found with tuna from the restaurant. However, the samples were not the same batch as the tuna trimmings used by the restaurant on May 18.

This was an outbreak of scombroid poisoning associated with eating tuna burgers. Histamine testing suggested that histamine production in the tuna occurred during food preparation at the restaurant; however, improper tuna processing prior to the restaurant receiving the supply could not completely ruled out.

(28)
Scombroid Fish Poisoning Associated with a Restaurant

May Hennepin County

On May 19, 2006, the Minneapolis Environmental Health Division (MEH) received a call from an employee at a Minneapolis restaurant reporting illness in two employees and two customers; all four of them developed symptoms consistent with scombroid fish poisoning shortly after eating escolar. MEH alerted the Minnesota Department of Health on May 22, who in turn forwarded the complaint to Hennepin County Public Health Protection (HCPHP). HCPHP initiated an investigation on May 22.

HCPCP epidemiologists interviewed the employees and patrons who dined at the facility on May 18. On May 22, a MEH sanitarian visited the facility and conducted an inspection. The sanitarian collected remaining escolar from the facility and delivered it to the U. S. Food and Drug Administration's (FDA) laboratory in Minneapolis for histamine analysis.

A case was defined as a person who ate at the restaurant on May 18 and subsequently became ill with scombroid-like symptoms within 12 hours of the meal.

All four people who consumed the escolar were interviewed and met the case definition. The median incubation period was 22.5 minutes (range, 10 minutes to 2 hours). The median duration of illness was 2.5 hours (range, 1.5 to 3.5 hours). The median age of cases was 31.5 years (range, 25 to 33 years) and three cases (75%) were male. All four cases experienced facial/full body flushing and palpitations or rapid pulse; 75% of the cases reported dizziness, headache, and hives; 50% of the cases reported anxiety, diarrhea, generalized rash, itchiness, sweating, and

tingling or burning in the mouth or throat; and 25% of the cases reported difficulty swallowing, localized rash, metallic taste, oily rectal discharge, peppery taste, and shortness of breath.

The two ill employees reported eating escolar, chicken, and rice. One employee reported eating a 3-ounce portion and the other reported consuming an 8-ounce portion of the escolar. The two patrons split an entrée of escolar, which included a 10-ounce portion of fish and was accompanied by rice. The patrons also shared a fried eggroll appetizer.

For fish species other than tuna or mahi mahi, FDA sets the action level for histamines at 500 ppm. Laboratory results for the raw escolar taken from the restaurant demonstrated extraordinarily high levels of histamine ranging from 8,150 to 8,940 ppm. Raw escolar samples taken from the supplier were also found to have elevated histamine levels ranging from 2,440 to 8,000 ppm. An inspection of the restaurant found no critical violations or evidence of mishandling that would account for or contribute to this outbreak.

This was an outbreak of scombroid fish poisoning associated with a Minneapolis restaurant. The source of the outbreak was escolar fish distributed by a supplier located in Minneapolis. The escolar product from this distributor had previously been implicated in two other outbreaks of scombroid illness among patrons of metro-area restaurants (see reports #26 and #29).

(29)
Scombroid Fish Poisoning Associated with a Golf Club

May Hennepin County

On May 20, 2006, the Minnesota Department of Health (MDH) received a faxed report from the Hennepin Regional Poison Control Center detailing two apparent scombroid fish poisoning cases seen in a married couple who had visited a hospital on the evening of May 19 after eating a meal at a golf club in Hennepin County. Also over the weekend, the MDH foodborne illness hotline received a call from an employee at the golf club reporting numerous cases of illness in patrons who had attending a wine tasting dinner on May 19. On May 22, Hennepin County Public Health Protection (HCPHP), in conjunction with MDH, the Minnesota Department of Agriculture (MDA) and the U. S. Food and Drug Administration (FDA), initiated an investigation of this event.

HCPCP epidemiologists interviewed patrons who had dined at the facility on May 19. On May 22, HCPHP sanitarians visited the facility and met with the head chef. A full inspection was not conducted because an inspection of the facility had been conducted within the previous 2 weeks. In addition, by the time of this investigation, two other known scombroid outbreaks in metro-area restaurants involving the same fish supplier were also under investigation. Approximately 2.5 pounds of raw ahi tuna and 5 pounds of raw escolar were collected from the restaurant and delivered to the FDA office in Minneapolis for histamine analysis.

A case was defined as a person who ate dinner at the golf club on May 19 and subsequently became ill with scombroid-like symptoms within 12 hours of the meal.

Of the 40 patrons who ate at the wine tasting dinner, 34 (85%) were reached for interview.

Eighteen (53%) patrons met the case definition. The median incubation period was 1.75 hours (range, 0.5 to 12 hours). The median duration of illness was 5.5 hours (range, 1.5 to 72 hours). The median age of cases was 48 years (range, 27 to 63 years) and 11 cases (61%) were female.

Symptoms were wide-ranging and included diarrhea (72%), headache (50%), facial flushing (44%), nausea (33%), abdominal cramps (17%), itchiness (17%), palpitations or rapid pulse (17%), tingling or burning in the mouth or throat (17%), sweating (17%), anxiety (11%), dizziness (11%), full body flushing (11%), generalized rash (11%), vomiting (11%), oily rectal discharge (11%), difficulty swallowing (6%), hives (6%), localized rash (6%), metallic taste (6%), peppery taste (6%), and shortness of breath (6%).

The menu served at the wine tasting event consisted of numerous courses, two of which included fish that are known vehicles for scombroid fish poisoning: tuna and escolar. Statistical analyses demonstrated that tuna consumption was inversely associated with illness (odds ratio, 0.21; 95% confidence interval, 0.05-0.93; $p < 0.05$). Very small portions of the raw tuna were served as a diced topping on a cracker during the appetizer course. Of the 19 people who ate the tuna appetizer, the majority (68%) reported only eating 1 or 2 of these crackers. Patrons likely consumed no more than ¼ ounce of the tuna each.

All but one person reported eating the escolar; therefore, escolar consumption was not statistically associated with illness. However, reports of other scombroid fish poisoning outbreaks associated with escolar from the same distributor during the same time frame, and statistical analysis ruling-out tuna as the vehicle, support escolar as the vehicle for this outbreak. Patrons were served approximately 3 to 3.5-ounce portions of the escolar. The majority of case patrons (89%) and non-ill patrons (87%) reported eating their entire portion. Although the majority of all patrons ate a full portion of escolar, it is well known that histamine levels can vary considerably within the same cut of fish, thus explaining why patrons were not uniformly affected. Had a larger portion of escolar been served, the attack rate likely would have been higher.

For fish species other than tuna or mahi mahi, FDA sets the action level for histamines at 500 ppm. Laboratory results for the raw escolar taken from the golf club demonstrated extraordinarily high levels of histamine ranging from 4,690 – 7,530 ppm. Raw escolar samples taken from the distributor were also found to have elevated histamine levels ranging from 2,440 – 8,000 ppm. Elevated histamine levels were not found in the tuna sample. An inspection of the golf club found no critical violations or evidence of mishandling that would account for or contribute to this outbreak.

This was an outbreak of scombroid fish poisoning associated with a golf club in Hennepin County. The source of the outbreak was escolar fish from a distributer located in Minneapolis. The escolar product from this distributor had previously been implicated in two other concurrent outbreaks of scombroid illness among patrons of metro-area restaurants (see reports #26 and #28).

(30)
Norovirus Gastroenteritis Associated with a Community Center Potluck

May Polk County

On May 23, 2006, the Minnesota Department of Health (MDH) Foodborne Diseases Unit received a report from an infection control practitioner (ICP) in Fosston of gastrointestinal illnesses among several people. The ICP said she would give the MDH foodborne illness hotline phone number to ill individuals so that MDH staff could evaluate their exposure histories. On May 31, the MDH foodborne illness hotline received a complaint of gastrointestinal illness from a person who attended a luncheon at a community center in Fosston on May 21. This complainant provided a list of others who had been ill, and an investigation was immediately initiated.

MDH staff interviewed luncheon attendees about food consumption and illness history. A case was defined as any person who ate at the community center luncheon on May 21 and subsequently developed vomiting and/or diarrhea ($\geq$3 loose stools in a 24-hour period). Three stool kits were sent to ill attendees.

An MDH environmentalist visited the community center on June 1. The environmentalist assessed the food handling practices and kitchen at the center, and determined whether the event was catered or if community members brought the food.

Nineteen luncheon attendees met the case definition. All 19 cases had diarrhea and vomiting, 10 (53%) had cramps, eight (42%) had fever, and one (5%) reported bloody diarrhea. The median incubation period was 34 hours (range, 12 to 77 hours). The median duration of illness was 126 hours (range, 21 to 232 hours). One person was hospitalized. One stool sample was returned to the MDH Public Health Laboratory; it was positive for norovirus.

Luncheon attendees reported consuming a variety of foods, including several different salads prepared by different individuals. A detailed and comprehensive list of foods served was not available, attendees reported different foods, and attendees often reported consuming salads that were slightly different. A reliable food list could not be determined. None of the known foods were statistically significantly associated with illness.

MDH environmentalists found that the community center had community members bring foods for the “pot luck” style luncheon. No foods were catered to the facility or prepared on site. A complete list of foods served and who prepared them was not available. A contact at the community center reported that there had been illness in some of the attendees prior to this luncheon, but no previously ill attendees were identified in the interviews.

This was an outbreak of norovirus gastroenteritis associated with a pot luck meal at a community center in Fosston, Minnesota. A specific food vehicle was not identified, due at least in part to the fact that a detailed, reliable list of foods served was not available. The source of contamination likely was an ill or recently ill person who prepared one or more of the food items; however, this was not confirmed.

(31)
Suspected Norovirus Gastroenteritis Associated with a Catered Lunch

May Washington County

On June 1, 2006, the Washington County Public Health (WCPH) Department was notified of a complaint that a restaurant in Oak Park Heights, Minnesota had received following a lunch catered to a group of corporate employees on May 24. On June 5, the Minnesota Department of Health (MDH) foodborne illness hotline was notified.

Epidemiologists from MDH conducted phone surveys of corporate employees to obtain information on food consumption and illness history. A case was defined as a corporate employee who developed vomiting or diarrhea ($\geq$3 loose stools in a 24-hour period) following the catered meal. MDH was unable to collect any stool samples for testing. A sanitarian from WCPH visited the restaurant to assess food preparation and handling procedures and interview the staff regarding recent illness.

Of the 11 corporate employees interviewed, 10 (91%) met the case definition. Nine cases (90%) had diarrhea, nine (90%) had vomiting, seven (70%) had cramps, and three of nine (33%) had a fever. The median incubation period was 31 hours (range, 13 to 46 hours). The median duration of illness was 70 hours (range, 23 to 133 hours). There were four types of sandwiches provided by the restaurant during the catered lunch. The ability to identify factors associated with illness was precluded by the fact that there was only one control.

During the inspection, the sanitarian from WCPH interviewed four food workers regarding illness history; two employees reported an onset of vomiting and diarrhea on May 25. The sanitarian noted that only one restaurant employee prepared and sliced the party sandwiches the morning before the catered lunch. This food worker reported no recent illness; however, two household members of this food worker had an onset of vomiting on May 19. The restaurant received no complaints from patrons or other catered events.

This was an outbreak of gastroenteritis among co-workers associated with a catered lunch. The etiological agent was not confirmed, but illnesses and incubation periods were characteristic of norovirus gastroenteritis. The vehicle of transmission was not identified. The source of contamination of the sandwiches may have been a food worker with ill household members; however, this was not confirmed.

(32)
Salmonella Typhimurium Infections Associated with a Restaurant

June Hennepin County

On June 8, 2006, the Minnesota Department of Health (MDH) foodborne illness hotline received a complaint of illness among a group of five people who had eaten at a restaurant in Minneapolis on June 5. Another complaint about the same restaurant was received by MDH on June 9. This group of four had eaten at the restaurant on June 6. MDH notified Hennepin County Public

Health Protection – Epidemiology (HCPHP) and Minneapolis Environmental Health (MEH) staff of these complaints. An investigation was immediately initiated. The original complainants indicated they had reported the illness to restaurant management on June 6 but regulatory authorities were not notified of this complaint by the management.

On June 9, MEH sanitarians and an MDH epidemiologist conducted an environmental assessment of the restaurant and began interviewing employees. Environmental samples were taken from the blender (the type with a blade housing which is not easily removed and cleaned) used in the kitchen of the restaurant. A list of patrons from June 4 to June 8 was obtained from the restaurant. HCPHP epidemiologists called patrons from June 9 to June 16 to ascertain illness history and food consumption at the restaurant. All 48 restaurant employees were interviewed between June 9 and June 16 by MEH. Stool samples were required from all food workers.

All *Salmonella* cases reported to MDH are routinely interviewed about exposures and food consumption as part of foodborne disease surveillance in Minnesota. Throughout the month of June MDH epidemiologists interviewed other *S.* Typhimurium cases whose isolates were indistinguishable from initial restaurant case isolates by pulsed-field gel electrophoresis (PFGE) with restaurant-specific questions in addition to a general questionnaire.

News articles in the *Star Tribune* (a Minneapolis newspaper) and reports on several local television stations asked people who had recently eaten at the restaurant and subsequently experienced gastrointestinal illness to contact HCPHP.

Patron cases were defined as persons who had *S.* Typhimurium isolated from stool cultures or persons who had fever and diarrhea (≥3 loose stools in a 24-hour period) and who reported eating at the restaurant since June 1 and prior to onset of symptoms. Probable cases were those who had diarrhea but did not report fever and had eaten at the restaurant since June 1. Suspect cases were those who had eaten at the restaurant since June 1 and subsequently developed mild gastrointestinal symptoms (i.e., one to two loose stools).

A case-control study was conducted to evaluate particular food items at the restaurant that may have been associated with illness. Controls were individuals who were recruited from the list of restaurant patrons from June 4 to June 8, and who reported no gastrointestinal symptoms.

Forty patron cases were identified. Twenty-six of these were culture-confirmed *S.* Typhimurium patron cases. Seven food workers at the restaurant also tested positive for *S.* Typhimurium. All 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.* Four of these food workers reported symptoms of recent gastrointestinal illness (onsets ranging from June 7 to June 8 – Figure 1). The other 41 food workers tested negative for *Salmonella* and reported no recent illness. Ten probable cases and four suspect cases were identified. Fifty patrons with no reported illness were interviewed.

Analysis was limited to patron cases only (n = 40). Among the 104 patrons with meal dates from June 2 - 9, the attack rate for patron cases was 38%. Of the patron cases, all reported diarrhea and fever, 38 (95%) reported cramps, 25 (62%) reported vomiting, and eight (20%) reported bloody

diarrhea. Six (15%) of the patron cases were hospitalized, with a median duration of hospitalization of 3 days (range, 1 to 5 days). Meal dates among patron cases ranged from June 4 and June 9 (Figure 1). The median incubation period for patron cases was 14.5 hours (range, 6 to 91 hours). The earliest onset of illness for a patron case was June 5.

Patron cases had eaten a variety of foods, including salads, appetizers, entrees, sandwiches and carrot curry soup. By univariate analysis comparing patron cases and controls, carrot curry soup (38 of 40 cases vs. 1 of 50 controls; odds ratio [OR], 931.0; 95% confidence interval [CI], 81.3 to 10,655.3; $p < 0.001$), salad dressing (27 of 39 cases vs. 21 of 47 controls; OR, 2.7; 95% CI, 1.1 to 6.7; $p = 0.022$), sandwiches (14 of 40 cases vs. 5 of 50 controls; OR, 4.8; 95% CI, 1.5 to 14.9; $p = 0.004$), and dessert (11 of 40 cases vs. 5 of 50 controls; OR, 3.4; 95% CI, 1.0 to 10.8; $p = 0.031$) were significantly associated with illness. After multivariate analysis using logistic regression, carrot curry soup (adjusted OR, 1,222.5; 95% CI, 78.2 to 19,102.9; $p < 0.001$) remained independently associated with illness.

MEH made two visits to the facility on June 9, finding implementation of food safety standards a significant concern in light of numerous critical violations. Violations cited included improper temperatures, improper cooling, inadequate utensil washing and disinfection, cross-contamination, improper use of unpasteurized eggs and an inaccessible handwashing sink. The restaurant was reported to have pulled carrot curry soup (made on June 4 and served from June 4 to June 7) from the menu based on the complaints they received. The cooler in which the soup had been stored was 47ºF at the time of inspection, which is six degrees over the limit. MEH issued orders to correct the violations identified, discard all temperature abused and/or potentially contaminated products, and to remove chilled soups from the menu until further notice. A follow-up inspection was conducted on June 10. The restaurant closed on Sunday, June 11 in order to comply with the issued orders. MEH met with management on Monday, June 12 to discuss and to issue requirements and actions needed in response to the inspections and outbreak findings. Resources and materials were provided for the implementation of food safety standards, and follow-up enforcement action was discussed.

The requirements included the implementation of a system to monitor and maintain food safety standards including proper handling and storage of all potentially hazardous foods, replacement or repair of improperly functioning cooling units, obtaining a NSF approved blender that could be easily cleaned, conducting a thorough environmental cleaning of the entire facility, requiring all prep staff to wear gloves until further notice, and excluding employees from work according to the criteria set forth.

The carrot curry soup was prepared as follows: carrots, ginger, lemongrass, onions and curry paste were cooked in oil for five to ten minutes. Milk and water were added and cooked in a five-gallon batch to boil and cooled on the counter for 30 minutes. The carrot mixture was pureed in the blender and put into a five-gallon container with an ice-wand and placed in the walk-in cooler. The soup was later divided into one-gallon containers and stored in the True reach-in cooler. The soup was served chilled.

The environmental sample of the blender from June 9 was negative for *Salmonella*. However, kitchen staff reported using the blender to make aioli, a sauce that contained

unpasteurized eggs, and was used to puree vegetables for the carrot curry soup. It was also reported that the same sieve was used to separate egg yolks of unpasteurized eggs and to strain vegetables. This was of particular concern in light of inadequate concentration of sanitizer found in the dishwashing machine. Also, though it is not a violation, unpasteurized eggs were also used in the many of the desserts, and so came into contact with food contact surfaces and equipment.

Based on documentation received from restaurant management, consultation with the outbreak team and re-inspection of the establishment, MEH approved the restaurant to reopen on June 14 under the conditions of operating with a limited menu and restricting employees who had tested positive for *Salmonella* from food preparation until they had two consecutive negative stool tests. In addition, ill employees known to work at other food establishments were restricted from those establishments as well.

This was an outbreak of *S.* Typhimurium infections associated with consumption of carrot curry soup at a Minneapolis restaurant. The outbreak was identified through the MDH foodborne illness hotline. As noted, violations were associated with temperature control of microbes, and utensil washing and disinfection. In addition, the blender that was used to puree carrots for the carrot curry soup was also used to make aioli with unpasteurized eggs, and the same sieve was used to separate egg yolks of unpasteurized eggs and to strain vegetables. These practices, along with inadequate cooling and storage, most likely were associated with the introduction, survival, and proliferation of *S.* Typhimurium in the soup, with subsequent transmission to patrons. Infected food workers may also have played a role in the transmission of *Salmonella* to patrons.

(33)

Listeria monocytogenes Febrile Gastroenteritis Associated with a Restaurant

June Dakota County

On June 14, 2006, the Minnesota Department of Health (MDH) foodborne illness hotline received a complaint regarding a restaurant in Eagan, Minnesota. The two complainants stated that they ate together on June 7 and both became ill with gastrointestinal symptoms 24 to 48 hours after eating their meal. Both complainants were still experiencing symptoms at the time of the complaint. They denied any other common exposures in the weeks prior to illness onset. MDH sanitarians responsible for inspecting the restaurant were contacted and an investigation was initiated.

MDH sanitarians made several visits to the restaurant to interview food workers, obtain credit card receipts, and assess food-handling procedures. Environmental samples were obtained on June 15 and July 3. Both of the complainants submitted stool samples to MDH for testing. A case was defined as a person who developed symptoms of vomiting and/or diarrhea ($\geq$3 loose stools in a 24-hour period) after eating at the restaurant and subsequently tested positive for *Listeria monocytogenes*.

The two cases reported diarrhea, light-headedness, chills, abdominal cramping, fever (101º F and 103.4º F), and severe body aches. The incubation periods were 25 hours and 30 hours. Both cases experienced illness for greater than 7 days. Cases reported their ages to be 60 years and 77

years. Stool specimens for both cases were positive for *Listeria monocytogenes*; the isolates had indistinguishable PFGE patterns.

Both cases reported eating chicken taco salads. The salad consisted of a fried taco shell filled with lettuce, tomatoes, shredded cheese, olives, guacamole, sour cream, salsa, and was topped with cooked chicken (possibly in a salsa/chili-type sauce).

Credit card receipts were obtained for people who dined at the restaurant on June 7. The credit card receipts listed each item ordered; therefore, calling priority was given to people who ordered meal-type menu items rather than just appetizers. Eight people identified by credit card receipts were interviewed; none reported illness.

Environmental samples were collected on June 15 and July 3. Samples were collected from both food contact and non-food contact surfaces including cutting boards, hand sinks, one dishwashing sink, utensils, and coolers. Samples collected on June 15 were positive for *Pseudomonas aeruginosa*, *Enterobacter cloacae*, and *Klebsiella pneumoniae*; these initial samples were not tested for *Listeria monocytogenes* because a clinical diagnosis had not been made at the time the samples were collected. Laboratorians reported that the plates were overgrown with bacteria, indicating a severe lack of cleaning and sanitizing at the restaurant. After the results of the clinical specimens were obtained, MDH returned to the restaurant on July 3 to collect additional samples to test specifically for *Listeria*. All food-contact and non-food-contact surfaces had been cleaned and sanitized by this point. All samples collected on July 3 were negative for *Listeria*.

Numerous critical violations were noted during the environmental assessment of the restaurant. Each of these was a repeat violation which had also been noted on previous inspections:

- The person-in-charge was not aware of foodborne illness risk factors.
- Employees were not aware of foodborne illness signs or symptoms.
- Employees were not washing their hands between handling raw foods and ready-to-eat foods.
- Employees were using bare-hand contact with ready-to-eat foods.
- Foods in the reach-in cooler were at unsafe temperatures for extended periods of time (these foods were discarded).
- There were various cross-contamination issues. Meat was stored over raw produce in the walk-in cooler. Cutting boards, knives and other utensils were being used for both raw foods and ready-to-eat foods without sanitizing between uses.
- There were time-temperature problems including improper cold-holding, hot-holding, cooling, and reheating.
- Sanitizer solution that was used to store wiping cloths was not at the proper concentration (50-200 ppm).

Due to the numerous critical violations noted during the environmental assessment, sanitarians from MDH required that the restaurant limit their menu to same-day-service foods only (i.e., food items requiring cooling and reheating steps were not allowed to be served). In addition, until one of the problematic refrigeration units could be shown to maintain the proper temperature for extended periods of time, only non-potentially hazardous food items were

allowed to be stored in that cooler. The operator was also required to submit a risk-control plan to address the critical violations noted during the assessment.

This was an outbreak of acute, febrile gastroenteritis caused by *Listeria monocytogenes* associated with a restaurant. The vehicle was chicken taco salad, but a specific ingredient was not implicated. Although environmental samples were negative for *Listeria*, numerous critical food-handling violations were noted at the restaurant which likely contributed to contamination of food with *Listeria*.

(34)
Salmonella Typhimurium Infections Associated with a Restaurant

June Washington County

On July 8, 2006, the Minnesota Department of Health (MDH) Public Health Laboratory identified two clinical isolates of *Salmonella* Typhimurium that were indistinguishable by pulsed-field gel electrophoresis (PFGE); the isolates were designated PFGE subtype TM122. A third clinical isolate of TM122 was identified on July 19. Routine interviews of these cases revealed that they had all eaten at a restaurant in Stillwater during the week before their illness onset, with meal dates of June 17, 23, and 28. An investigation was initiated on July 20.

On July 20, a Washington County sanitarian conducted an environmental assessment of the restaurant. Restaurant employees were interviewed on July 21 with the assistance of a translator, and stool samples were collected from all employees. Lists of patrons who dined on June 17, 23, and 28 were obtained from the restaurant. An MDH epidemiologist and an MDH sanitarian took environmental samples from various areas in the kitchen and buffet space.

MDH staff called patrons from June 17, 23, and 28 to ascertain illness history and food consumption at the restaurant.

Patron cases were defined as persons who had *S.* Typhimurium isolated from stool or who had fever and diarrhea (≥3 loose stools in a 24 hour-period) after eating at the restaurant since June 1. Probable cases were persons who had diarrhea but did not report fever and had eaten at the restaurant since June 1.

A case-control study was conducted to evaluate particular food items at the restaurant that may have been associated with illness. Controls were individuals who were recruited from the list of restaurant patrons from June 17, 23, and 28, and who reported no gastrointestinal symptoms.

Four patron cases were identified. Three of these were culture-confirmed with *S.* Typhimurium. Six probable cases were identified. Fifty interviewed patrons reported no illness. Four patrons had mild illness that did not meet the case definition.

Analysis was limited to the four patron cases only. All four patron cases reported diarrhea, fever, and cramps, two (50%) reported bloody diarrhea, and one (25%) reported vomiting. One (25%) of the patron cases was hospitalized for 4 days. The median incubation period for patron cases

was 91.5 hours (range, 5 to 121.5 hours). The earliest onset of illness for a patron case was June 17.

Patron cases had eaten a variety of foods, including several items off the hot and cold buffet lines. In the univariate analysis, dumplings (4 of 4 cases vs. 13 of 48 controls; odds ratio [OR], undefined; 95% confidence interval [CI], undefined; p = 0.008), seafood delight (2 of 3 cases vs. 1 of 48 controls; OR, 94.0; 95% CI, 2.7 to 18018.7; p = 0.007), and sushi (3 of 3 cases vs. 7 of 15 controls; OR, undefined; 95% CI, undefined; p = 0.04) were significantly associated with illness. After multivariate analysis using logistic regression, no specific food items remained independently associated with illness.

During the environmental assessment on June 20, Washington County Public Health found numerous critical violations at the restaurant. Violations cited included improper temperatures, cross-contamination, and lack of handwashing. Employees were observed doing multiple tasks, including handling raw meats and ready-to-eat foods, or handling dirty dishes and clean dishes, without washing hands in-between. No employees were observed washing their hands at the handwashing sink. Several cold holding violations were identified. Items in coolers, prep coolers, and on the buffet line (including shrimp, pork, seafood salad, and cut fruit) were above 41ºF. Cut fruit on the buffet line was reportedly consumed within 4 hours, but procedures were not in place to document time. The establishment voluntarily closed on June 20 in order to throw out prepared or opened foods that may have been contaminated, clean and sanitize the environment, and interview and obtain stool samples from all employees.

Washington County sanitarians reviewed kitchen cleaning and disinfection procedures, discussed handwashing, and conducted interviews with all employees. No employees reported gastrointestinal symptoms or illness within their households since June 1. All food workers at the restaurant tested negative for *Salmonella*.

All environmental samples from June 20 were negative for *Salmonella*. Restaurant owners were told specific areas to clean and disinfect before re-opening. The restaurant cleaned all surfaces and re-ordered foods on June 21 so they could re-start food preparation on June 22.

This was an outbreak of *S.* Typhimurium infections associated with eating at a Stillwater restaurant. The outbreak was identified through routine surveillance of *Salmonella* cases at MDH. The small number of cases precluded confirmation of the specific food vehicles. However, violations associated with temperature control, cross-contamination, and lack of handwashing were documented. These practices likely were associated with the introduction, survival, and proliferation of *S.* Typhimurium in various foods, with subsequent transmission to patrons.

(35)
Cyclosporiasis Associated with a Golf Club Restaurant

June Ramsey County

On July 18, 2006, the Minnesota Department of Health (MDH) foodborne illness hotline received a complaint of gastrointestinal illness among a party of four individuals who were members of a club that held weekly breakfasts for their members at a golf club in Roseville, Minnesota. The complainants had nothing else in common besides these weekly breakfasts and had been ill with diarrhea for more than 2 weeks. Foods served at the breakfasts each week included eggs, sausage, bacon, potatoes, French toast, doughnuts, fresh fruit, and breakfast pastries. Sanitarians from Ramsey County were notified and an investigation was initiated.

On August 8 the club members provided MDH with a list of club members and their contact information. Club members were interviewed by phone about food consumption, other shared exposures, and illness history using a standard form. A case was defined as a club member with vomiting or diarrhea (≥3 loose stools in a 24-hour period) with an illness duration longer than 3 days and illness onset during the month of June. Six ill club members submitted stools to MDH for bacterial, viral, and parasitic testing. A detailed environmental investigation was conducted at the golf course by Ramsey County Department of Public Health. Golf course staff members were interviewed and food preparation was observed.

Forty-two club members were interviewed, and 14 (33%) met the case definition; an additional three people experienced illness not meeting the case definition and were excluded from the analysis. One of the people who met the case definition had poor date recall and was excluded from the food analyses. Three cases that were ill prior to June 22 were excluded from the specific food analysis for the June 22 meal but were included in the case summary. All cases experienced diarrhea, 11 (79%) had fever, eight (57%) had cramps, and three (21%) had vomiting. Onset dates ranged from June 8 to June 30; 10 of 14 cases with a known onset date had onset during June 28-30 (see epidemic curve). The median duration of illness was 30 days (range, 22 to 36 days). Nine cases (64%) visited their medical provider but none were admitted to a hospital. All club member attendees were asked about golf club breakfasts that they attended in the month of June. The only meal that approached statistical significance was breakfast on June 22 (10 of 10 cases vs. 12 of 19 controls; odds ratio [OR], undefined; 95% confidence interval [CI], undefined; Fisher exact two-tailed p = 0.06). The median incubation period calculated from breakfast on June 22 was 7 days (range, 6 to 8 days).

Consumption of fruit salad on June 22 approached statistical significance (9 of 10 cases vs. 6 of 12 controls; OR, 9.0; 95% CI, 0.71 to 458.8; p = 0.074). This fruit salad was a chef's special prepared each week especially for the group and at any given time could have included raspberries, blackberries, blueberries, strawberries, pineapple, watermelon, cantaloupe, honeydew melon, and grapes. A record of which fruits were served each specific week was not made by the kitchen staff. All club members were asked about consumption of each individual fruit item in the fruit salad each week. Consumption of several specific fruits on June 22 was statistically associated with illness, including raspberries (7 of 8 cases vs. 2 of 10 controls; OR, 28.0; 95% CI, 1.53 to 1413; p = 0.015), blueberries (6 of 8 cases vs. 1 of 11 controls; OR, 30.0;

95% CI, 2.21 to 406.0; p = 0.006), blackberries (5 of 8 cases vs. 1 of 11 controls; OR, 16.7; 95% CI, 1.02 to 864.2; p = 0.041), cantaloupe (7 of 7 cases vs. 3 of 11 controls; OR, undefined; p = 0.004), and honeydew melon (7 of 8 cases vs. 2 of 10 controls; OR, 28.0; 95% CI, 1.53 to 1413; p = 0.015).

Of the six stool samples that were collected from breakfast attendees and submitted to MDH, four samples were positive for *Cyclospora cayetanensis.*

The environmental health inspector reported that the golf club was washing produce properly and did not report any violations. Invoices were collected from the golf club for all food items that were served on June 22. The Minnesota Department of Agriculture conducted a traceback investigation on the fruits in the fruit salad. The golf course had purchased items in the fruit salad from one of two distributors. As the fruit salad was a chef's special and was not a standard item, it was not clear which fruits were in the salad served on June 22; therefore, it was generally not possible to trace a specific fruit to one supplier. However, both distributors acquired their raspberries and strawberries from the same supplier. The berries were grown in California. No other reports of illness had been received by the supplier.

(36)
Salmonella Paratyphi B var. L(+) Tartrate+ (formerly Java) Infections Associated with Prisons and Restaurants

June-July — Multiple counties/Multiple states

On July 5, 2006, the Minnesota Department of Health (MDH) Public Health Laboratory (PHL) identified three human case isolates of *Salmonella* Paratyphi B var. L(+) Tartrate+ (formerly Java) that were indistinguishable by pulsed-field gel electrophoresis (PFGE); the subtype was designated JAV52. On the same day, MDH received a call from a federal prison in Rochester reporting two cases of *Salmonella* in inmates in two long-term care wards. The two cases were among the three PFGE matches identified by the MDH PHL. An investigation was initiated.

All *Salmonella* cases reported to MDH are routinely interviewed about illness history, food consumption and other exposures as part of surveillance. Interviews of *S.* Paratyphi B var. L(+) Tartrate+ JAV52 cases were compared by epidemiologists to identify potential common exposures.

A case was defined as a Minnesota resident from whom *S.* Paratyphi B var. L(+) Tartrate+ JAV52 was isolated.

On July 13, when additional cases that had no connection to the prison system were identified, a case-control study was initiated. Cases that were prison inmates or that were not reached for an interview were excluded from the study. At least three controls per case were enrolled through sequential digit dialing anchored on the case's telephone number. Controls were matched to case by age group, and reported no diarrhea or vomiting during the 2 weeks preceding the case-patient's onset date. All cases and controls were interviewed using the same questionnaire used in surveillance, with additional detailed questions about restaurants, grocery stores and exposure to correctional facilities.

MDH PHL staff queried PulseNet, the national PFGE database, for cases in other states. Colorado had several matches, and was already following up with the cases. The Centers for Disease Control and Prevention was notified, and information on the investigations was communicated to other states via a listserve message on July 18. From that point in the investigation, the Minnesota and Colorado investigations were coordinated. States with single cases or possible cases were contacted by telephone requesting information on their cases; however, information on those cases was limited or not available.

The Minnesota Department of Agriculture (MDA) Dairy, Food and Meat Inspection Division obtained invoices from various restaurants and prisons and conducted tracebacks of products suspected in the epidemiological investigation. The traceback information was cross-referenced with information obtained in the Colorado investigation in an attempt to identify the vehicle and source of the outbreak.

Nine *S.* Paratyphi B var. L(+)Tartrate+ JAV52 cases were identified in Minnesota. The median age of the cases was 32 years (range, 15 to 50 years). Five (56%) were female. Illness onset dates ranged from June 22 through July 14. Two of the cases were hospitalized. None of the cases died. One case was unreachable by telephone, his home looked uninhabited, and contact information for next-of-kin was unavailable. Of the remaining eight cases, all had diarrhea, seven (88%) had cramps, six (75%) had a fever, four (50%) had bloody stools, and three (38%) reported vomiting. The median duration of illness was 7 days (range, 4 to 13 days).

Six cases and 20 controls were included in the case-control study. The two inmate cases and the case that was not reached were excluded from the study. Univariate statistical analysis found that eating at Restaurant A (5 of 6 cases vs. 3 of 20 controls; odds ratio [OR], 28.3; 95% confidence interval [CI], 1.81 to 983; $p = 0.005$) and visiting or working in a prison (2 of 4 cases vs. 0 of 20 controls; OR, undefined; 95% CI, 1.69 to undefined; $p = 0.02$) were associated with illness. On a matched analysis, eating at Restaurant A (OR, 1.78; 95% CI, 1.15 to 30.6; $p = 0.03$) and visiting or working in a prison (OR, 2.04; 95% CI, 1.28 to 45.8; $p = 0.03$) were still associated with illness. No single food item was statistically associated with illness. Multivariate analysis was not possible since none of the controls worked or visited a prison. Statistical analysis looking at specific foods eaten at Restaurant A was not feasible due to the small number of controls that had eaten at that restaurant.

Among the four cases that had a prison exposure, two were prison inmates in a federal facility in Olmsted County, and did not eat any foods from outside the prison. One case was a counselor at a regional correctional facility in Saint Louis County. One case visited a minimum security prison in South Dakota. The kitchen manager from the federal facility provided a menu of all the foods served in the week prior to the cases' illnesses. A recipe for beef enchiladas served during that time period was obtained. Invoices for all the ingredients in the enchiladas, including vegetables, spices, beef, cheese, and tortillas were obtained.

Among the five cases that ate at Restaurant A, two ate at different restaurant locations in Duluth, and three ate at the same restaurant location in Worthington. Three ate soft shell beef burritos, two ate soft shell beef tacos, and one ate a soft shell bean burrito. Four reported having cheese on their burrito or taco, and the fifth had nacho cheese sauce. Two reported having lettuce. The

restaurants were contacted. The restaurant chain's corporate regional manager contacted MDH and provided invoices and detailed information on foods items and source for multiple foods including vegetables, spices, beef, cheese, and tortillas.

The investigation in Colorado revealed that their cases had eaten at restaurants of a different Mexican-style fast food chain. None of their case had any contact with prison facilities. The Colorado fast food chain did not cooperate with the investigation.

MDA reviewed invoices for foods obtained from the federal prison and from Restaurant A to look for foods obtained from a common source, and for foods that could possibly be distributed to the prison and the Restaurant A chain in Minnesota as well as the other restaurant chain in Colorado. A food with a common source was not identified.

This was an outbreak of *S.* Paratyphi B var. L(+) Tartrate+ JAV52 infections associated with foods eaten at Restaurant A and various prison facilities. A specific food vehicle was not identified. The cases in the Colorado outbreak had eaten at a different Mexican-style fast-food chain, and therefore are consistent with the findings of our investigation. Tracebacks of several foods did not find a food in common between Minnesota and Colorado cases, but the information gathered in those tracebacks was incomplete, and food items were not traced-forward.

(37)
Escherichia coli O157:H7 Infections Associated with a Church Potluck

July Cass County

Background
During July 27-August 1, 2006, the Minnesota Department of Health (MDH) Public Health Laboratory received three isolates of *E. coli* O157:H7 from residents of and visitors to Longville, Minnesota. The pulsed-field gel electrophoresis (PFGE) patterns for all three isolates were indistinguishable (named EXHX01.1281 in the national PulseNet database); this pattern had not previously been observed in Minnesota. On July 31, MDH received a report concerning illness among members of a church in Longville, Minnesota. The church had recently held a funeral luncheon on July 10 and their monthly summer potluck smorgasbord on July 19. Subsequently, multiple individuals reportedly became ill with cramps and bloody diarrhea.

On August 2, MDH notified the Minnesota Department of Agriculture (MDA) of the outbreak occurring in Longville. MDA was informed that ground beef used to make meatballs for the smorgasbord was purchased at a grocery store in Longville. The following day, MDH learned that the United States Department of Agriculture (USDA) had recently isolated the outbreak PFGE subtype of *E. coli* O157:H7 from a sample of beef trimmings collected from a beef processing plant.

On August 4, MDH identified a fourth *E. coli* O157:H7 case isolate with the same PFGE pattern in a resident of Brainerd, Minnesota.

Methods

Epidemiologists from MDH obtained the member directory from the church and interviewed parishioners to obtain information on attendance at community events, dining at restaurants, shopping at grocery stores, and illness history. MDH requested that local clinics and hospitals send contact information for all individuals who recently had sought medical attention for bloody diarrhea.

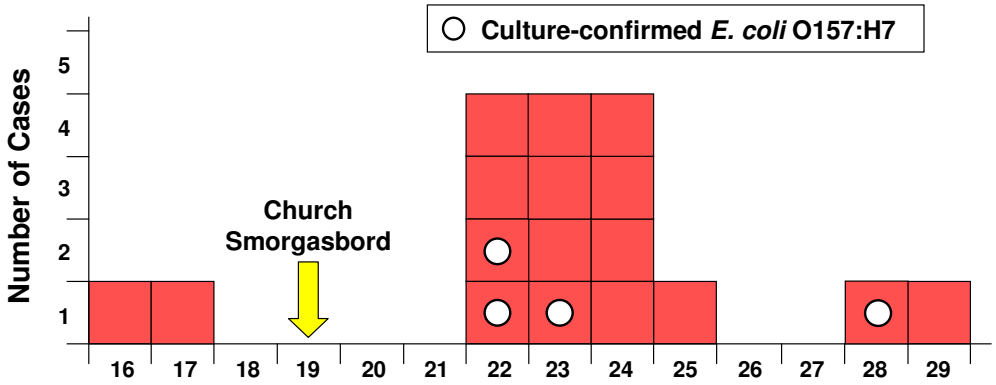
A case was defined as a resident or visitor to the Longville area who became ill with bloody diarrhea since July 10, or a Minnesota resident with a confirmed *E. coli* O157:H7 infection matching the outbreak PFGE pattern. In addition to the four culture-confirmed samples already tested by MDH, stool kits from two ill church members were collected and submitted to MDH for bacterial and viral testing.

An MDH sanitarian visited the church to conduct an environmental assessment of the kitchen, which was used to prepare foods for the smorgasbord. MDA contacted the local grocery store and local restaurants to obtain information on the type and source of beef products. MDA conducted an on-site inspection at the grocery store on August 7 and obtained samples of ground beef that was currently in retail; these samples were cultured for *E. coli* O157:H7. During this inspection the MDA inspector learned that several local restaurants and churches frequently purchase ground beef from the retail case at the grocery store. Officials from MDH and MDA contacted USDA for information regarding the beef sample *E. coli* O157:H7 isolate that matched the outbreak PFGE subtype.

Results

A total of 146 people were interviewed, and 17 met the case definition. Fourteen other individuals reported recent gastrointestinal symptoms that did not meet the case definition; these persons were excluded from the analysis. All 17 cases reported bloody diarrhea, 16 (94%) had cramps, six (35%) had vomiting, and four of 16 (25%) had fever; nine cases (53%) were hospitalized (median length of stay, 5 days; range, 1 to 27 days). Three cases developed hemolytic uremic syndrome, and one case died. The median age of cases was 71 years (range, 28 to 84 years); there was no significant difference in age between cases and controls (i.e., those who were not ill). Dates of illness onset ranged from July 16 to 29; 13 cases reported onset from July 22 to 25 (Figure 1). The stool samples from both ill church members that were submitted directly to MDH were negative for norovirus and enteric bacteria (*Campylobacter, E. coli* O157:H7, *Salmonella, Shigella,* and *Yersinia)*; only one of these members who submitted a stool sample to MDH met the case definition.

Figure 1. Cases of Bloody Diarrhea Associated with the Longville Community *E. coli* O157:H7 Outbreak by Illness Onset Date, July 2006



Date of Illness Onset
July 2006

Attending the smorgasbord at the church on July 19 was significantly associated with illness (12 of 17 cases vs. 44 of 117 controls; odds ratio [OR], 4.0; 95% confidence interval [CI], 1.3 to 12.1; p = 0.01). Many food items were available at the event, including meatballs, ham, turkey, mashed potato bake, baked beans, deviled eggs, a variety of cold salads, desserts, and beverages. Several of the food items, including the mashed potato bake, meatballs, turkey, and potato salad were prepared at the church in the 3 days prior to the event; the remaining food items were prepared by church members in their homes. All food items were served buffet-style. According to the event coordinator, roughly 300 people attended the smorgasbord on July 19 between 5:00 p.m. and 7:00 p.m. The event was advertised to the public, and an admission fee was charged. Several people reported taking home leftover food, including potato salad, and eating it in the days following the smorgasbord; some reported sharing the leftover foods with friends and family members (some of whom did not attend the original event at the church). Consuming any foods from the church smorgasbord (whether or not a case actually attended the event) was significantly associated with illness (13 of 17 cases vs. 44 of 117 controls; OR, 5.4; 95% CI, 1.5 to 21.1; p = 0.002). In particular, consuming lettuce salad at the church smorgasbord was significantly associated with illness (4 of 10 cases vs. 3 of 40 controls; OR, 8.2; 95% CI, 1.5 to 46.3; p = 0.02). There may have been more than one lettuce salad dish available at the smorgasbord. Any lettuce salads that were available were prepared at the home of church members and brought to the church on the day of the smorgasbord. Consuming potato salad that was prepared for the smorgasbord approached significance (8 of 12 cases vs. 15 of 40 controls; OR, 3.3; 95% CI, 0.8 to 13.0; p = 0.07). This included one case that consumed leftover potato salad at a dinner party the following day (this case did not consume potato salad at the smorgasbord event).

On July 17, members of the church purchased several food items from a local grocery store, including approximately 40 lbs. of ground beef for making meatballs. Officials from MDA determined that the grocery store received approximately 1,900 lbs. of chuck rolls from a meat distributor (Distributor A) on July 10, 2006. The majority of this chuck roll shipment was ground into ground beef at the grocery store. Based on the MDA inspector's interview of the meat manager, the grocery store probably sold ground beef from the July 10 shipment of chuck rolls to three restaurants in Longville during the same time period.

Four of the 17 cases identified in this outbreak did not consume food from the church smorgasbord. Of these, two consumed ground beef-containing food items from one of the three restaurants that may have received ground beef from the grocery store. One of these cases consumed tacos at a local restaurant. The restaurant did not prepare the tacos, but hosted the event for the local Lions Club. The hamburger used to prepare the tacos was purchased from the grocery store on July 17 (the same day the church purchased the hamburger used to make the meatballs).

One case became ill 2 days before the smorgasbord and did not attend the event due to illness. However, this person did prepare one of the food items served at the smorgasbord (this food item was not statistically associated with illness). This case was unsure of hamburger consumption in the week prior to illness onset. One culture-confirmed case had no identifiable connection to Longville.

Environmental Assessment

Per Minnesota Statute 157, the church kitchen is not licensed or inspected by MDH or Cass County, and is not required to meet the standards applied to commercial kitchens. However, the kitchen was equipped with several pieces of commercial equipment, including a commercial stove/oven with ventilation hood, a 2-door NSF-approved refrigerator, dishwasher, and mixer. The kitchen was approximately 20 x 30 feet, had granite counters along two walls, and had a large pass-through window to the dining room. There was a center island that contained two prep-sinks and a large granite counter workspace. The dishwashing area was equipped with a 3-compartment sink, dishwasher, and a small pass-through window to the dining area. There was a single handwashing sink equipped with soap and paper towels near the door that separated the kitchen from the dining area.

On July 17, members of the church purchased several food items from a local grocery store, including approximately 40 lbs. of ground beef and 20 lbs. of ground pork for making meatballs, five turkeys, and 100 lbs. of sliced ham. On the same day, church members began preparing the potato salad; potatoes and eggs were cooked and peeled, and then stored overnight in the refrigerator. The ground meat and other foods were also stored in this refrigerator.

On July 18, approximately 20 church volunteers assisted in preparing the large quantity of foods needed to accommodate the predicted smorgasbord attendance. The majority of volunteers worked for approximately 2 hours each, and most of the food was prepared during a 2-3 hour period. Volunteers cooked the turkeys, sliced the ham into smaller pieces, assembled the mashed potato bake, prepared and cooked the meatballs, made a carrot salad, and chopped the eggs and potatoes for the potato salad; all food items were then refrigerated overnight. The volunteers

reported using all three sinks (i.e., the two prep sinks as well as the handwashing sink) for handwashing.

The mixture for the meatballs was prepared in batches in the mixer located next to the center island. Approximately 10-12 lbs. of ground beef and pork were placed in the mixer, along with chopped onions, milk, eggs, breadcrumbs, and seasonings. After the mixture was combined, volunteers started portioning and rolling the meatballs. Because of space restrictions, meatball preparation was extended out of the kitchen into the dining area. According to the event coordinator, the volunteer staff wore gloves during preparation of the meatballs. The rolled meatballs were placed on sheet pans and baked in the oven for 30-45 minutes. The final cook temperature of the meatballs was not measured; however, they were visually assessed for doneness by breaking open several meatballs to see if they appeared fully cooked. After being removed from the oven, meatballs were placed in roasting pans. Gravy was made using the pan drippings and then poured over the meatballs. The roasting pans were then placed in the refrigerator for storage overnight.

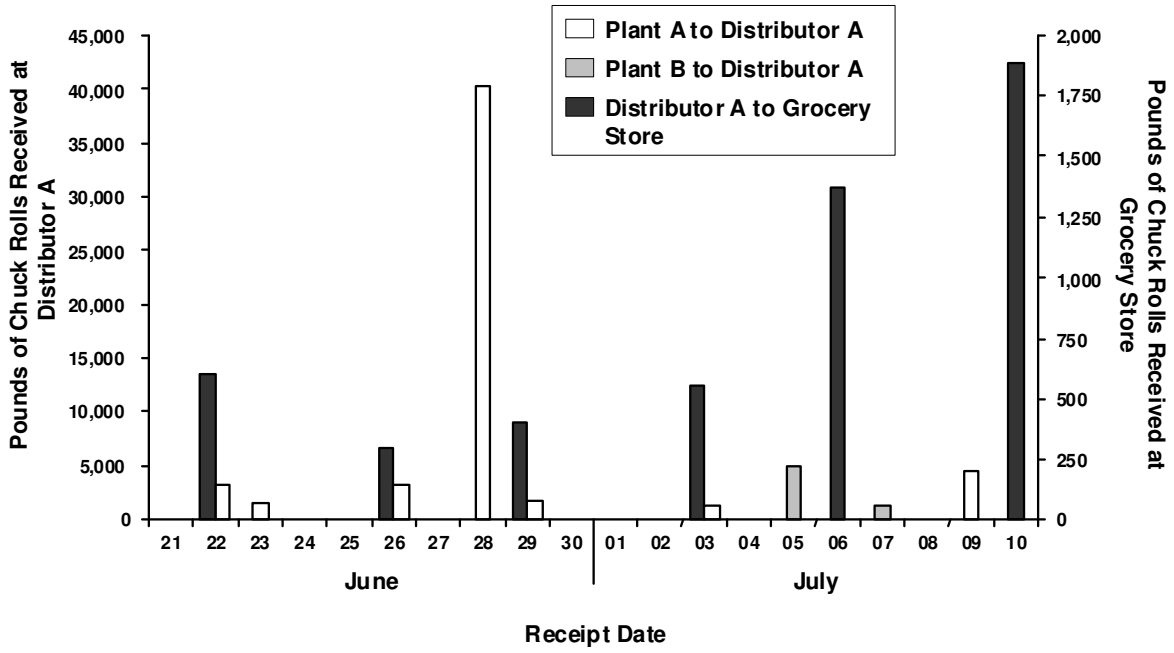
While the meatballs were being prepared, volunteers were also chopping the peeled eggs and potatoes for the potato salad. The event coordinator recalled this preparation being conducted at the center island. The mashed potato bake was also assembled and the cooled turkeys were cut and placed on platters during this time period.

On July 19, the dressing for the potato salad was cooked and then mixed with the previously chopped eggs and potatoes; the potato salad stayed in the same pot until it was served that evening. The meatballs and mashed potato bake were heated in the afternoon prior to the event. During the smorgasbord, warm foods were stored in roasting pans within the kitchen and brought out to the service line as needed.

Product Traceback

MDA attempted to trace back the chuck rolls received by the grocery store used to produce the ground beef that was purchased by the church. In the weeks prior to the outbreak, the grocery store had received all of its chuck rolls from a single distributor (Distributor A). The grocery store received approximately 5,100 lbs of chuck rolls from Distributor A on six separate dates, from June 22 through July 10, 2006 (Figure 2). The meat used to make meatballs for the church smorgasbord and the Lions Club's tacos was ground at the grocery store on July 17. Based on timing and volume, the ground beef used by the church and the Lions Club most likely originated from the 1,900 lb shipment of chuck rolls received by the grocery store from Distributor A on July 10 (Figure 2). However, the grocery store did not keep grinding records, and there were no records to document sales of ground beef to either the church or the local restaurants. Grinding practices at the grocery store were not in violation of the Minnesota Food Code.

Figure 2. Amount of Chuck Rolls Received at Distributor A and at the Longville Grocery Store, by Source and Receipt Date, June 22 through July 10, 2006



MDA obtained sales invoices from Distributor A to determine potential sources of the chuck rolls that were supplied to the grocery store in Longville prior to July 16. Distributor A employees, via personal communication, reported to MDA that chuck rolls received from any processing plant are held for a minimum of 1 week, and an average of 2 weeks before distribution. Therefore the traceback focused on chuck rolls received by Distributor A since June 22.

According to the invoices, Distributor A received chuck rolls from two processing plants since June 22 (Plant A and Plant B). The majority of the chuck rolls (55,791 lbs, 90% of total) received by Distributor A during this time frame came from Plant A. Because of the typical 1-2 week distribution lag time, the chuck rolls received at the grocery store on July 10 likely were received by Distributor A during June 26-July 3. All of the chuck rolls received by Distributor A during that time frame came from Plant A. Therefore, Plant A was the most plausible source of chuck rolls that were distributed to the grocery store. However, records at the grocery store and Distributor A were not adequate to definitively demonstrate this link.

The USDA reported that the sample of beef trimmings from the processing plant that yielded the outbreak PFGE subtype of *E. coli* O157:H7 was collected on June 14, 2006. However, USDA would not report the name of the processing plant to MDH or MDA, and therefore it is unclear if the sample was from Plant A.

The ground beef samples from the Longville grocery store tested negative for *E. coli* O157:H7.

Conclusions
This was an outbreak of *E. coli* O157:H7 infections among members of the Longville, Minnesota community. Multiple potential routes of transmission of *E. coli* O157:H7 to cases were identified. An environmental assessment of the church kitchen and food preparation procedures indicated that there was a high potential for cross-contamination between ground beef and ready-to-eat foods during food preparation for the smorgasbord. This cross-contamination could have occurred via contamination of environmental surfaces, utensils, or hands during handling of the ground beef. In addition, church workers and smorgasbord patrons could have been exposed directly to contaminated surfaces. At least one case that prepared food items for the smorgasbord was ill prior to food preparation, and was present in the church kitchen facility while food preparation was taking place; this also could have contributed to contamination of food items or environmental surfaces, or person-to-person transmission to other volunteers.

Four of the 17 cases identified in the outbreak were not associated with the church smorgasbord. Some of these cases were likely associated with ground beef consumption at restaurants that may have purchased ground beef from the retail case at the same grocery store that supplied ground beef to the church for the smorgasbord. This finding provides further evidence that the ground beef purchased from the grocery store was the source of *E. coli* O157:H7 for this outbreak.

The isolation of the rare outbreak PFGE subtype of *E. coli* O157:H7 from a sample of beef trimmings from a USDA-inspected plant in the weeks prior to the outbreak suggests that the chuck rolls that were used to produce the ground beef at the store were likely already contaminated when received by the store. Grinding of this product at the grocery store may have mixed contaminated and uncontaminated product. The lack of sufficient records precluded a definitive traceback of the chuck rolls to the plant of origin. However, records that were available from the grocery store and Distributor A suggested that the ultimate source of the implicated chuck rolls was Plant A.

Due to the outbreak, the church canceled its potluck smorgasbord that was scheduled for August, and contacted the local and state health departments for advice in planning future events.

(38)
Norovirus Gastroenteritis Associated with a Restaurant

July Ramsey County

On July 17, 2006, an employee at an independent-living facility in North Oaks, Minnesota contacted the Minnesota Department of Health (MDH) foodborne illness hotline. She reported that approximately 18 employees and residents of the facility had eaten lunch together at a restaurant in North Oaks on July 13. The complainant stated that several lunch attendees had subsequently become ill with gastrointestinal symptoms. MDH initiated an outbreak investigation in collaboration with Ramsey County Environmental Health.

The independent-living facility provided MDH epidemiologists with the names and phone numbers of lunch attendees. Clinic employees were interviewed by phone about food

consumption, other shared exposures, and illness history using a standard form. A case was defined as a person with vomiting or diarrhea (≥3 loose stools in a 24-hour period) after eating lunch at the restaurant on July 13. Two cases submitted stool samples to the MDH Public Health Laboratory to be tested for norovirus and enteric bacterial pathogens.

The independent-living facility also provided MDH with a list of other facility employees who did not attend the lunch.

Ramsey County Environmental Health went to the restaurant on July 18 to interview restaurant staff, evaluate food handling practices, and collect more information on the suspect meal.

Eighteen of the lunch attendees were interviewed. Fourteen (78%) met the case definition. Eleven of the 14 cases (79%) had diarrhea, nine (64%) had vomiting, six (43%) had cramps, and seven of 12 cases (58%) reported fever. No cases reported bloody stools. The median incubation period was 28 hours (range, 5 to 48 hours). As most of the ill persons were still symptomatic at the time of interview, duration of illness could not be calculated. Stool samples submitted to MDH from two cases tested positive for norovirus by RT-PCR.

The food served at the lunch was prepared especially for this group and consisted of spinach salad, club sandwich, "homemade" potato chips, cookies, bars, lemonade, and iced tea. By statistical analysis, iced tea was significantly associated with illness (12 of 14 cases [86%] vs. 1 of 4 controls [25%]; odds ratio, 18.0; 95% confidence interval, 1.1 to 506.1; p = 0.04).
MDH called a sample of independent-living facility employees who did not attend the July 13 lunch at the restaurant to assess if there was any background illness. Eleven employees were contacted by phone, and none reported any recent gastrointestinal illness.

The restaurant provided MDH with a list of patrons who had reservations at the restaurant for the evening of July 13. MDH reached 14 people from four separate parties and did not identify any ill persons. However, one couple from a fifth party met the case definition. One spouse had onset of diarrhea approximately 12 hours after eating dinner at the restaurant, and the other spouse had onset of diarrhea and vomiting with a similar incubation period. One spouse submitted a stool to MDH for testing, but the stool was negative for norovirus and enteric bacterial pathogens. No illness was identified among the approximately 11 other people in this couple's dining party.

There were six restaurant employees involved in preparing or serving the July 13 lunch. One of the six was out of the country and could not be interviewed. The other five were interviewed. Three of them reported recent gastrointestinal illnesses. One food worker was ill with "flu-like symptoms" such as chills and aches on July 11 and July 12. For the lunch, this worker made the iced tea and handed plated food to customers. A second food worker had vomiting with onset on July 14 and a third had vomiting with onset on July 15. These workers reported eating food at the restaurant on July 13.

Subsequently, Ramsey County Environmental Health expanded its interviewing to all restaurant employees, but did not identify any other ill food workers. Four food workers ultimately provided stool samples to the MDH Public Health Laboratory. Three of the four were positive for norovirus. The norovirus sequences from the three positive food workers and from the two

cases who ate lunch at the restaurant on July 13 were identical.

As a result of the investigation, on July 21 Ramsey County Environmental Health issued orders to the restaurant to control the risk of additional illnesses. The orders included evaluating all employees for recent gastrointestinal symptoms and maintaining a written log of employee interviews, excluding all employees for at least 72 hours after last diarrhea or vomiting episode, reviewing proper handwashing procedures with all employees, requiring all employees to wear gloves while handling ready-to-eat foods, discarding all prepared ready-to-eat food times, cleaning and sanitizing all food contact surfaces and equipment, and cleaning and sanitizing all bathrooms.

This was an outbreak of norovirus gastroenteritis associated with a lunch served at a restaurant. The most likely source was infected food workers at the restaurant, as corroborated by the positive norovirus samples that were genetically identical to the norovirus from the cases.

Although two of the three positive food workers reported onsets of illness that were after the implicated lunch, one of the positive food workers reported onset of symptoms on July 11, which was 2 days before the lunch. This particular positive food worker prepared the iced tea, which was the only specific item statistically associated with illness.

(39)
Norovirus Gastroenteritis Associated with a Restaurant

July Cass County

On August 1, 2006, the Minnesota Department of Health (MDH) was notified of a possible outbreak at a restaurant in Hackensack, Minnesota. The original complainant stated that seven people from four separate households dined at the restaurant on Friday, July 28, and subsequently became ill within hours of each other. The sanitarians responsible for inspecting the restaurant were contacted, and an investigation was initiated.

The complainants were interviewed to assess illness history and foods consumed at the restaurant. Several MDH sanitarians went to the restaurant to interview food workers, assess food-handling practices, and obtain credit card receipts and/or reservation lists.

Stool specimen collection kits were delivered to several ill complainants and food workers. A case was defined as a person who ate at the restaurant and became ill with vomiting and/or diarrhea ($\geq$3 loose stools in a 24-hour period) in the 72 hours following their meal.

MDH interviewed three separate patron groups who reported illness: two groups with meal dates of July 28 (the original complainants and a groom's dinner identified from a reservation list), and a separate complaint received for a July 29 meal date. All seven people from the original complaint were interviewed; four (57%) met the case definition. Approximately 50 people attended the groom's dinner; 32 were interviewed and 14 (44%) met the case definition. Two of nine people from the third complaint were interviewed and met the case definition. In total, 41 people were interviewed and 20 (49%) met the case definition.

Eighteen cases (90%) had diarrhea, 14 cases (70%) had cramping, 11 cases (55%) had vomiting, and five cases (25%) reported feeling feverish. None reported bloody stools. The median incubation period for all cases was 46 hours (range, 14 to 71 hours). For the individual groups, the median incubation periods were 35 hours (range, 32 to 39 hours) for the original complainants; 46 hours (range, 14 to 71 hours) for the groom's dinner; and 27 hours (range 14 to 40 hours) for the July 29 meal-date complainants. Duration of illness could not be determined because the majority of cases had not recovered at the time their interviews were conducted.

Patrons reported eating a variety of food items including dinner salads, bread and butter, pork tenderloin, chicken, prime rib, walleye, duck, shrimp, potatoes, pasta, vegetables, and soup. None of the food items was significantly associated with illness.

MDH began interviewing employees the afternoon of August 1. The management at the restaurant stated that the employees had recently been "battling the stomach flu". They also stated that they received an illness complaint regarding a meal eaten on July 21. However, they did not obtain contact information, and did not refer the caller to MDH, so no follow-up information could be obtained. The restaurant closed on August 1 so MDH sanitarians could fully assess employee illness; they reopened for dinner on August 2 after the majority of employees had been interviewed (employees were not allowed to work until they had been interviewed by MDH sanitarians). Thirty-one employees were interviewed; five reported experiencing gastrointestinal symptoms in the week prior to interviews (onset dates ranged from July 23 to July 30). The standard recommendation from MDH is that ill food workers not return to work for 72 hours after their symptoms subside; all five ill employees returned to work earlier than recommended.

MDH sanitarians required the restaurant to discard all ready-to-eat food items and all foods prepared by ill food workers. Sanitarians learned that the restaurant did not have a strong illness exclusion policy, nor did they seem to understand the potential hazards of employees working while ill. The management at the restaurant was reminded of the necessity for excluding/restricting ill food workers for the appropriate time period, and that illness complaints should be referred to the health department for further evaluation.

Five stool specimens were submitted from patrons for testing; all were positive for norovirus. Although five stool collection kits were distributed to ill employees, none were returned for testing. Nucleic acid sequences from three norovirus samples (two from the original complainant group and one from the groom's dinner) were identical.

This was an outbreak of norovirus gastroenteritis associated with a restaurant in Hackensack, Minnesota. Transmission of norovirus likely occurred through contamination of food items by ill food workers. No specific food items were associated with illness; however, five employees reported either working while ill or returning to work inside the 72-hour recommendation.

(40)
Salmonella Miami Infections Associated with a Restaurant

July Carver County

On August 15, 2006, through routine laboratory surveillance of *Salmonella* isolates, the Minnesota Department of Health (MDH) identified a cluster of three *Salmonella* Miami cases. Two isolates were indistinguishable by pulsed-field gel electrophoresis (PFGE) (subtype designated MIM4); the remaining isolate differed by one band. A search of the national PulseNet database revealed three additional *Salmonella* Miami isolates with matching PFGE patterns from Kansas, Florida, and Maine.

MDH routinely interviews all *Salmonella* cases with a standard questionnaire to assess symptom history, potential exposures, and food consumption prior to illness onset. A case was defined as a person who had a laboratory-confirmed *Salmonella* Miami infection with an isolate that was within 3 bands of PFGE subtype MIM4. A case-control study was conducted among cases and geographically-matched controls. Controls were selected through sequential digit dialing anchored on the respective case's phone number.

When a restaurant was implicated, MDH sanitarians and epidemiologists went to the restaurant to interview food workers, assess food-handling practices, and obtain environmental samples. All food workers were interviewed regarding work duties, illness history, and food consumption. All food workers were asked to submit two stool samples for *Salmonella* testing. Employees who reported any gastrointestinal symptoms during the previous 2 weeks were excluded from work until two consecutive *Salmonella*-negative results were obtained. Environmental samples of food and non-food contact surfaces were collected and tested for *Salmonella*.

Interviews of the initial three Minnesota cases revealed that all had eaten meals at a particular restaurant in Chanhassen, Minnesota on July 28 or July 29, 2006. The Kansas case had a history of traveling to Minnesota and also ate at the same restaurant on July 28. MDH received one additional *Salmonella* Miami isolate the following week; the corresponding case also reported eating at the restaurant on July 28. In total, four cases reported eating at the restaurant on July 28 and one on July 29. Case interviews revealed no common exposures besides eating at the restaurant. The case-control study was conducted during August 16 – 24. Four cases and 12 controls were enrolled. Eating at the restaurant in Chanhassen was significantly associated with illness (4 of 4 cases vs. 1 of 12 controls (odds ratio, undefined; $p = 0.003$)). Four cases with a food history reported eating the following items at the restaurant: potato soup, dinner salad, ice tea, and lemonade; chicken sandwich with lettuce, tomato, and bacon, and broccoli; turkey bacon sandwich, lettuce salad, and tomato; and jambalaya. No specific dishes or food ingredients were associated with illness in the case-control study.

The median incubation period for all cases was 5 days (range, 2 to 15 days). For the Minnesota resident cases (n=4), four had diarrhea and cramping, three had a fever, and two had vomiting. Two cases had recovered from illness at the time of interview, illness durations of 5 days and 9 days, respectively. Two cases (one from Minnesota and one from Kansas) were hospitalized.

On August 16, four sanitarians, one epidemiologist, and one MPH student from MDH visited the restaurant to assess food handling practices, employee hygiene, and employee illness. Multiple cross contamination offenses were noted on the environmental assessment, including: handling of raw foods and then ready-to-eat foods without washing hands or utensils; use of common towels; and, touching ready-to-eat foods with bare-hands. The restaurant voluntarily closed for cleaning. All of the environmental samples were negative for *Salmonella.*

A total of 78 employees were interviewed. Six reported recent gastrointestinal illness and were excluded from work until they had submitted two stool samples that tested negative for *Salmonella*. Sixty-six employees submitted two stool samples. Twelve did not submit two samples because they were no longer employed at the restaurant. All stool samples were negative for *Salmonella*.

This was an outbreak of *Salmonella* Miami infections associated with a restaurant in Chanhassen, Minnesota. No specific food vehicle was implicated in this outbreak. However, the cross contamination offenses observed during the environmental inspection indicated that multiple read-to-eat foods could have been contaminated from raw foods. Corrective action was taken at the restaurant including thorough cleaning and hand washing education. No additional cases were identified.

(41)
Norovirus Gastroenteritis Associated with a Restaurant

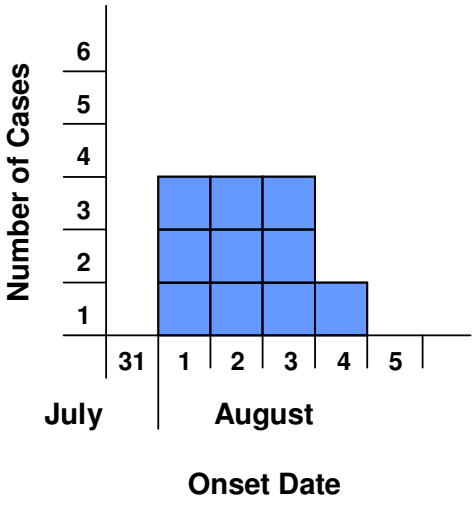
August Olmsted County

On August 2, 2006, Olmsted County Public Health Services (OCPHS) received a complaint of illness in one person who became ill with vomiting and diarrhea after eating at several local restaurants. Contact with management of all restaurants revealed an ill employee at Restaurant A. Management reported that this employee became ill on July 28 and was seen in a local emergency room on August 1. The employee had worked from July 29 through August 1. The Restaurant A meal date of the initial complaint was July 31. The morning of August 3, the manager of Restaurant A was faxed a norovirus intervention/control form and was asked to implement the measures. At this time, he reported receiving a second complaint of illness from a patron. After OCPHS contacted the patron, it was found that two people became ill with vomiting and diarrhea after eating at the restaurant on July 31 and August 1. An investigation was then initiated. A third complaint of illness was received August 3 from a manager of a different restaurant. Upon interview, OCPHS found that within this group, three of four had become ill with vomiting and diarrhea after eating at several local restaurants, one of which was Restaurant A, with a meal date of August 1. Four more complaints from Restaurant A patrons were received on August 4 and August 7, with meal dates of August 1.

OCPHS staff obtained illness and food consumption histories from all complainants. A patron list for Restaurant A was not available (names were not listed on credit card receipts). The Minnesota Department of Health (MDH) was notified via fax on August 2 and via phone contact on August 3. A case was defined as a person who ate at Restaurant A on July 31 or August 1 and subsequently became ill with diarrhea ($\geq$3 loose stools in a 24-hour period) or vomiting.

All food workers were interviewed and an assessment of the food preparation practices was conducted on August 3. Stool kits were delivered to five ill patrons. Three of these samples, representing one independent complaint, were submitted on August 4 for norovirus testing. The ill employee refused to submit a stool sample.

Gastroenteritis Cases Associated with a Restaurant, by Illness Onset Date



All 10 patrons interviewed met the case definition. There were no controls available to interview. All cases had diarrhea, eight (80%) had vomiting, seven (70%) had cramps, and two (20%) reported fever. The median incubation period was 31.5 hours (range, 26 to 61.5 hours). The median duration of illness was 13.5 hours (range, 1 to 33 hours). (See epidemic curve.)

The three patron stool samples submitted to MDH were positive for norovirus. Two of these viruses were sequenced; the sequences were identical. The results of the food worker interviews revealed only one ill employee out of nine. It was difficult to communicate with the ill employee because the employee did not have a phone. Two different onset dates and times were given; July 28 and August 1. This employee was a server; job duties included handling beverages, ice, bread, and plated food items, operating the cash register, and clearing tables. Bare-hand contact by a food worker was observed at the restaurant. The 10 ill patrons ate a variety of foods, all of which could have involved hand contact. No specific food items were implicated.

The management and staff of Restaurant A were directed to implement glove use and clean and sanitize all food service areas as well as discard any ready-to-eat food items that may have been held over from the date of the suspect meal (including emptying and sanitizing the ice machine). Management was also required to exclude any workers ill with vomiting or diarrhea until 72 hours after recovery.

This was an outbreak of norovirus gastroenteritis associated with a restaurant in Olmsted County. The likely source of contamination was an ill food worker. Due to the limited amount of data, no single food item could be identified as the vehicle for the illnesses.

(42)
Suspected Foodborne Bacterial Intoxications Associated with a Restaurant

August Hennepin County

On August 8, 2006, the Minnesota Department of Health (MDH) foodborne illness hotline received a complaint of illness among a party of 10 who had eaten at a restaurant in Plymouth, Minnesota on August 6. MDH notified Hennepin County Public Health Protection (HCPHP) staff of the complaint on August 9, and an investigation was initiated.

On August 9, a HCPHP sanitarian inspected the restaurant, focusing on food preparation practices. Employees currently on duty were interviewed on-site regarding their job duties and illness history. Names from reservation lists for August 6 were also provided by the restaurant so additional patrons could be contacted.

Epidemiologists from HCPHP interviewed patrons. A case was defined as a person who had vomiting and/or diarrhea ($\geq$3 loose stools in a 24-hour period) after dining at the restaurant on August 6.

Of the 28 patrons who had eaten at the restaurant on August 6 that were interviewed, six (21%) met the case definition. Four of the six cases were from the original complaint. Five additional persons had mild symptoms that did not meet the case definition and were excluded from analyses. Of the six cases, all had diarrhea and three (50%) had cramps. None reported vomiting or fever. The median incubation was 11.5 hours (range, 6 to 15.5 hours). The median duration of illness was 20 hours (range, 12.5 to 32 hours).

Cases ate a variety of food items, including chips, salsa, chicken enchiladas, beans, rice, and guacamole. Two food items were statistically associated with illness, including chicken (6 of 6 cases vs. 7 of 16 controls; odds ratio [OR] undefined; $p = 0.017$) and refried beans (6 of 6 cases vs. 8 of 16 controls; OR, undefined; $p = 0.03$).

None of the 11 interviewed employees reported any recent gastrointestinal symptoms. Upon inspection, the HCPHP sanitarian noted that the salsa cooler temperatures were 45-55° F. The shredded beef on the hot holding table was at 125-130° F. In addition, the shredded beef had not been properly heated to 165° F before being placed in the hot holder. It was also observed that employees were not properly washing hands and wearing gloves when touching ready-to-eat foods. HCPHP sanitarians communicated to management that proper heating and cooling temperatures needed to be achieved and maintained.

This was an outbreak of suspected foodborne bacterial intoxications associated with a restaurant in Plymouth, Minnesota. The distribution of incubation periods, symptoms, and illness durations were characteristic of *Clostridium perfringen*s or the diarrheagenic form of *Bacillus cereus.* The implicated vehicle was either chicken or refried beans. Problems with improper heating and cooling of foods were documented, and these problems likely were the primary factor leading to this outbreak.

(43)
Suspected Foodborne Bacterial Intoxications Associated with a Restaurant

August Carver County

On August 30, 2006, the Minnesota Department of Health (MDH) foodborne illness hotline received a complaint of illness among three family members from a single household who ate dinner together at a restaurant in Chanhassen, Minnesota on August 19. Two of the three individuals had subsequently become ill with gastrointestinal symptoms. No other complaints were reported at that time, and the family members had other common exposures. On September 7, the MDH foodborne illness hotline received a second complaint of illness among four family members from a single household who ate at the restaurant on August 19. Three of these individuals had subsequently become ill with gastrointestinal symptoms. MDH Environmental Health Services (EHS) was notified and an investigation was initiated.

MDH staff interviewed the complainants about food consumption and illness history. A case was defined as a person with vomiting or diarrhea ($\geq$3 loose stools in a 24-hour period) after eating at the restaurant. An MDH environmentalist contacted the restaurant on September 7 and conducted an environmental assessment.

Five of the seven (71%) persons interviewed met the case definition. All cases had diarrhea, and four (80%) had cramps. None reported vomiting. The median incubation period was 10 hours (range, 6 to 14 hours). The median duration of illness was 12 hours (range, 10 to 32 hours).

Cases had eaten a variety of food items including chips, salsa, various chicken dishes, rice, and beans. Four of five cases had eaten a chicken entree. An inadequate amount of control data did not allow for meaningful statistical analysis of food items consumed. It had also been over 2 weeks since the meal when the second complainants reported their illnesses, and patron receipts were not available.

MDH environmentalists had completed an environmental health assessment of the restaurant on September 1 after the first complaint was received. During this assessment, the environmentalist found a number of critical violations. Chicken in the steam table was held at 111° F and ground beef in the steam table was held at 127° F. There were no records to show how long these items were out of temperature control. It was also observed that improper cooling procedures were being used. The restaurant made gallons of sauce days ahead of time, and stored the sauce in 3-gallon buckets with the lid tightly attached. On September 1 at 3:30 p.m. the temperature of the sauce that was made on August 31 at 2:00 pm was 71° F.

MDH environmentalists visited the restaurant again on September 7 and further discussed temperature control issues that had been covered on the September 1 visit. Temperature problems were again observed at the restaurant. Substantial language barriers were present in communicating with the restaurant staff, but MDH environmentalists spent additional time getting appropriate materials to the restaurant to reinforce the points about temperature control and assessing current practices.

This was an outbreak of foodborne bacterial intoxications, most likely caused by *C. perfringens.* The vehicle was not confirmed; however, illness may have been associated with consumption of chicken dishes. Potential for temperature abuse in the preparation of various items was documented.

(44)
Norovirus Gastroenteritis Associated with a Restaurant

August Lyon County

On August 24, 2006, the Minnesota Department of Health (MDH) foodborne illness hotline was notified of a possible outbreak at a restaurant in Marshall, Minnesota. The original complainant stated that four people from two separate households became ill after eating at the restaurant on August 21. The MDH sanitarians responsible for inspecting the restaurant were contacted, and an investigation was initiated.

The complainants were interviewed to assess illness history and foods consumed at the restaurant. An MDH sanitarian and an epidemiologist went to the restaurant to interview food workers, assess food-handling practices, and obtain credit card receipts and/or reservation lists.

Stool specimen collection kits were delivered to several ill complainants and food workers. A case was defined as a person who ate at the restaurant and subsequently became ill with vomiting and/or diarrhea ($\geq$3 loose stools in a 24-hour period) in the 2 days following their meal.

MDH interviewed 16 people who ate at the restaurant during August 21-22. Fourteen people met the case definition. All the cases had diarrhea and cramping, 10 (71%) had vomiting, six (43%) reported a fever, and none reported bloody stools. The median incubation period for cases was 33 hours (range, 14 to 45 hours). Duration of illness could not be determined because the majority of cases were still not recovered at the time of their interviews.

Patrons reported eating a variety of food items including fajitas, enchiladas, tacos, beans, rice, guacamole, chips and salsa; no single food item was statistically associated with illness.

MDH began interviewing employees during the afternoon of August 24. The restaurant voluntarily closed on August 24 so MDH could fully assess employee illness; they reopened for dinner on August 25 after the majority of employees had been interviewed (employees were not allowed to work until they had been interviewed by MDH). One employee reported vomiting and fever; however, this food worker stated they became ill on the same day patrons reported illness.

No credit card receipts or reservations lists from the outbreak period could be obtained to assess additional illnesses. During the environmental assessment, MDH sanitarians observed frequent bare-hand contact with ready-to-eat food items. Also during the environmental assessment, sanitarians required that all open or prepared food items be discarded and that the ice machine be emptied and cleaned. The sanitarians provided handwashing education and employee illness policy instructions to the management.

Five stool specimens were submitted from patrons for testing; all were positive for norovirus. Four of the positive samples were submitted for nucleic acid sequencing, and all four had an identical sequence. Although stool collection kits were distributed to ill employees, none were returned for testing.

This was an outbreak of norovirus gastroenteritis associated with a restaurant in Marshall, Minnesota. A specific food vehicle was not identified. Transmission of norovirus likely occurred through contamination of food items by an ill or recently ill food worker, but this was not confirmed.

(45)
Escherichia coli O157:H7 Infections Associated with a Restaurant

August Hennepin County

On September 8, 2006, through routine laboratory surveillance, the Minnesota Department of Health (MDH) identified three clinical isolates of *E. coli* O157:H7 with indistinguishable pulsed-field gel electrophoresis (PFGE) patterns (subtype designated MN920). An investigation was initiated.

MDH routinely interviews all *E. coli* O157:H7 cases to assess symptom history, potential exposures, and food consumption prior to illness onset. A case was defined as a person who had a laboratory-confirmed infection with *E. coli* O157:H7 PFGE subtype MN920 and who had illness onset after August 20, 2006. When a restaurant was implicated as the source of this outbreak, a sanitarian from the City of Bloomington Environmental Health Division visited the restaurant to assess food handling practices, employee hygiene, and employee illness.

Three cases were identified. Illness onset dates of cases ranged from August 25 to August 27. All reported diarrhea, bloody stools, and cramps. One case developed hemolytic uremic syndrome and was hospitalized for 10 days. Case interviews revealed that all had eaten at Restaurant A in Bloomington, Minnesota on either August 23 or August 24. No other common exposures were identified. Foods eaten by cases at Restaurant A included a cheeseburger and fries, fried pork dumplings, and chicken and steak fajitas. The only common food item in the three menu items was shredded iceberg lettuce; however, one of the cases stated the cheeseburger eaten did not come with lettuce. No additional cases were reported to MDH or found through routine surveillance.

Sanitarians from the Bloomington Environmental Health conducted an environmental assessment of the restaurant. No violations were found and no foodworkers reported illness. Food handling practices were adequate, and the sanitarians noted there was little chance for cross contamination between raw meat and the items in the implicated dishes.

The restaurant received lettuce twice a week from Distributor A. The shredded lettuce received by Distributor A is only sent to the 12 Restaurant A locations in the Minneapolis/St. Paul metropolitan area and is processed by an Ohio supplier.

This was a foodborne outbreak of *E. coli* O157:H7 infections associated with eating at a restaurant in Bloomington, Minnesota. The three ill restaurant patrons were identified through routine surveillance at MDH. Although there was not enough epidemiological evidence to make firm conclusions about the vehicle or source of contamination, lettuce was the only common menu item that could have been consumed by all cases.

(46)
Norovirus Gastroenteritis Associated with a Restaurant

August Olmsted County

During the morning of Monday, August 28, 2006, Olmsted County Public Health Services (OCPHS) received three phone calls from members of the public who reported that they had experienced vomiting and/or diarrhea over the weekend; all three attributed their illness to a lunch they had eaten on Thursday, August 24 at a restaurant in Rochester, Minnesota. An outbreak investigation was initiated by OCPHS.

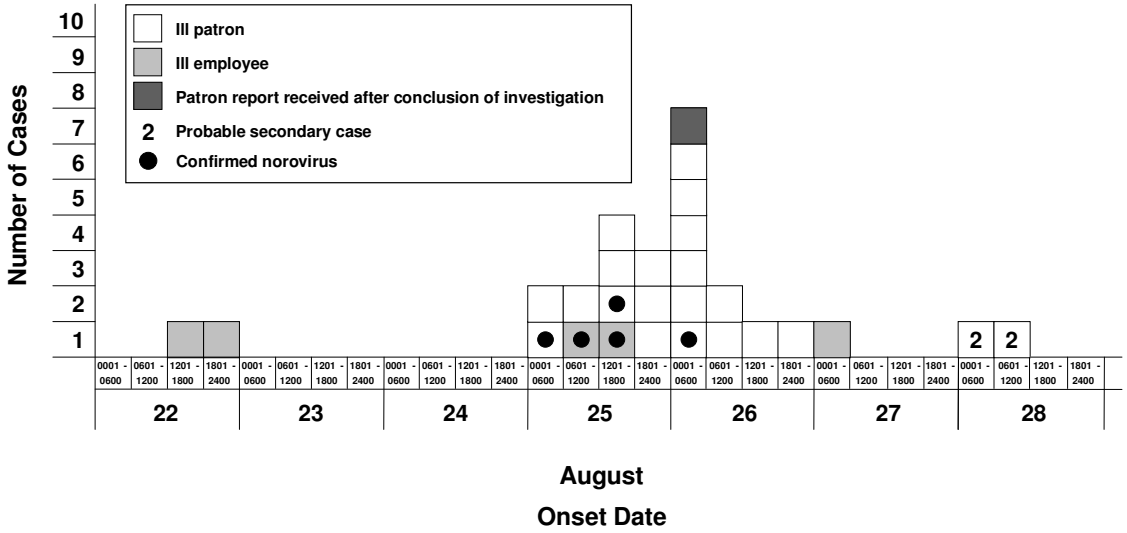
A team from OCPHS went to the restaurant at mid-day on August 28. They examined the employee illness log, obtained a list of employees, and interviewed employees who were onsite. They also obtained credit card receipts from August 24 and a menu; these were used to develop a patron calling list and an interview form. Patrons were called and interviewed using the interview form and the restaurant menu. A case was defined as a person who had eaten at the restaurant and subsequently experienced vomiting and/or diarrhea ($\geq$3 loose stools in a 24-hour period).

An assessment of food preparation and staff hygiene was made using the principles of hazard analysis and critical control points (HACCP) and active managerial control. Special attention was paid to bare-hand contact with ready-to-eat foods and handwashing procedures because the initial epidemiological information indicated norovirus was the likely etiology. Employees were interviewed using a standard food service employee questionnaire, some with the help of a Spanish-language interpreter.

Stool samples were collected from three ill patrons and two ill food workers and submitted to the Minnesota Department of Health (MDH) Public Health Laboratory for bacterial and viral testing.

A total of 73 patrons were interviewed. Of these, 19 (26%) met the case definition. An additional nine persons had mild gastrointestinal symptoms that did not meet the case definition and were excluded from the analysis. Seventeen cases (89%) had diarrhea, 17 (89%) had cramps, 16 (84%) had chills, 15 (79%) had vomiting, 15 (79%) had abdominal cramps, 15 (79%) had headache, and nine (47%) had fever. The median incubation period was 32 hours (range, 9 to 57 hours). The median duration of illness was 36 hours (range, 14 to 69 hours).

Gastroenteritis Cases Associated with a Restaurant, by Illness Onset Date and Time



The assessment of food preparation practices focused on pizza, pasta, salad, and bread (the foods that the original complainants reported eating). Observation revealed that pizza and pasta were of low concern; there was little or no bare-hand contact with these foods. However, the greens for side salads were routinely plated using bare hands instead of tongs. Bread was routinely sliced and placed in serving baskets with bare hands; every table received a bread basket. These tasks were not assigned to particular wait staff members; a significant number of wait staff performed these tasks when they were less busy or when the food items were needed. Even though a handwashing sink was located within the salad- and bread- plating workstation, little handwashing was observed. This area was noted to be quite congested and chaotic, making it difficult to properly wash hands in between tasks. Wait staff were observed handling dirty dishes and then dishing up ready-to-eat foods without a hand wash in between these duties. A review of training materials revealed that no procedural instruction for salad preparation or bread service had been provided to wait staff.

No foods were statistically associated with illness. However, consumption of bread approached statistical significance (16 of 19 cases ate bread vs. 28 or 45 controls; odds ratio, 3.2; 95% confidence interval, 0.85 to 15.5; $p = 0.08$).

Seventy of the 112 employees, including all of the employees who worked the day of the suspect meal, were interviewed; five of them reported being ill during August 22-27 (see epidemic curve), three with vomiting and diarrhea and two with vomiting only. Two of the employees reported vomiting at the restaurant before being sent home. One employee had called on August 20 to report he was sick and was vomiting, but upon interview he provided conflicting information, including a denial of being ill; he was excluded from analysis.

All five stool samples tested for norovirus were positive and all five had identical nucleic acid sequences. This sequence matched samples obtained during a foodborne illness outbreak investigation in Olmsted County earlier the same month (August 2006).

During the initial visit by OCPHS the restaurant management was instructed to take the following immediate control measures:

- Do not allow employees to work if they are ill with vomiting or diarrhea, and do not allow them to return to work until they have been symptom-free for 72 hours.
- Instruct employees not to touch ready-to-eat foods with their bare hands, and provide gloves for employees.
- Discard all open, ready-to-eat foods, including ice.
- Clean and sanitize all food-contact surfaces.
- Assign one staff member to pre-plate all salads and bread in the morning.
- Implement use of the sink by the employee restroom to decrease congestion at the other handwashing sink by the salad area.

Management was instructed to review handwashing policies and techniques, and illness policies with all employees. Managers were instructed to screen employees for illness, inquiring specifically about vomiting and diarrhea, to record all reports of illness on a common illness log. They were also instructed to handle customer complaints of illness by obtaining contact information and relaying it to OCPHS. At a subsequent visit management was also asked to clean and sanitize the employee restroom.

This was a foodborne outbreak of norovirus gastroenteritis associated with a Rochester restaurant. A specific food vehicle was not confirmed. The source of the outbreak was likely infected food workers who transferred virus to ready-to-eat foods, such as bread. The large number of employees who handled ready-to-eat foods with bare hands coupled with inconsistent handwashing practices increased the potential for illness transmission.

Even though the restaurant's corporate training materials were extensive, there were no specific policies and procedures for safe handling of ready-to-eat foods by wait staff. The lack of specific procedures, and therefore training, increased the potential for virus transmission. Additionally, the lack of a management system for verifying safe food handling and adequate handwashing likely contributed to this outbreak.

(47)
Salmonella Newport Infections Associated with a Restaurant

August Ramsey County

On September 11, 2006, the Minnesota Department of Health (MDH) foodborne illness hotline received a call from a patron of a restaurant in New Brighton, Minnesota. The complainant had eaten at the restaurant on August 25, and had an illness consistent with salmonellosis. The complainant had already submitted a stool sample to a physician, who had reported a positive *Salmonella* result. On September 13, the MDH Public Health Laboratory identified three isolates of *Salmonella* Newport that were indistinguishable by pulsed-field gel electrophoresis (PFGE);

the isolates were designated PFGE subtype NEW4. Routine interviews of the cases revealed that two of them had eaten at the restaurant in New Brighton during the week before their illness onset (August 29 and September 2). An investigation was initiated on September 14.

A City of New Brighton sanitarian conducted an environmental assessment of the restaurant on September 14. Patron lists in the form of credit card receipts from August 25, 29, and September 2 were obtained from the restaurant. All restaurant employees were interviewed using a standard form, and stool samples were requested from all employees.

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.* Newport cases whose isolates matched the initial cases by PFGE in order to identify other potential cases associated with eating at the restaurant.

Confirmed cases were defined as persons from whom *S.* Newport NEW4 was isolated and who reported working or eating at the restaurant in New Brighton since August 11, 2006, and prior to onset of symptoms. Probable cases were defined as any person who ate at the restaurant and subsequently developed vomiting and/or diarrhea ($\geq$3 loose stools in a 24-hour period).

A case-control study was conducted to evaluate particular food items at the restaurant that may have been associated with illness. All probable and confirmed cases were included in the analysis. Controls were individuals who were recruited using the list of restaurant patrons from August 25, 29, and September 2, and who reported no gastrointestinal symptoms.

Eight culture-confirmed *S.* Newport cases were identified. Seven of the eight confirmed cases were patrons identified through routine surveillance. One of the eight confirmed cases was a patron complainant who contacted the MDH foodborne illness hotline prior to a physician reporting the patron's *Salmonella* results to MDH.

Ten probable cases were identified. One was a person who had called the MDH hotline, and nine were ill patrons identified from the list of patrons with meal dates on August 29 and September 2.

MDH staff members were able to reach 41 patrons who reported no illness. Among the 59 patrons with meal dates from August 25 through September 15, the attack rate using the definition for confirmed cases was 14% (eight culture-confirmed cases). When including both confirmed and probable cases, the attack rate was 31% (10 probable and eight culture-confirmed cases).

Of the 18 patron cases (confirmed and probable), all reported diarrhea, 15 (83%) reported cramps, eight (47%) reported fever, six (33%) reported bloody diarrhea, and six (33%) reported vomiting. One of the confirmed patron cases was hospitalized for 5 days. Meal dates for patron cases ranged from August 25 to September 15. Meal dates for culture-confirmed cases ranged from August 25 to September 2. The median incubation period for patron cases was 67 hours (range, 30 to 339 hours). The earliest illness onset-date for a patron case was August 27.

Cases had eaten a variety of foods, including several sandwiches or wraps containing chicken. By univariate analysis comparing cases and well patrons, eating the chicken fajita wrap (4 of 18 cases vs. 0 of 40 controls; odds ratio [OR], undefined; 95% confidence interval [CI] lower limit, 2.23; Fisher exact 2-tailed $p < 0.001$), eating salsa (6 of 13 cases vs. 5 of 36 controls; OR, 5.3; 95% CI, 1.2 to 23.5; Fisher exact 2-tailed $p = 0.04$), eating any chicken (15 of 18 cases vs. 20 of 37 controls; OR, 4.3; 95% CI, 1.1 to 20.6; $p = 0.03$), and eating an item containing boneless skinless chicken (10 of 17 cases vs. 3 of 33 controls; OR, 14.3; 95% CI, 2.6 to 95.6; Fisher exact 2-tailed $p = 0.003$) were significantly associated with illness. Eating the buffalo chicken wrap (2 of 18 cases vs. 0 of 40 controls; OR, undefined; 95% CI lower limit, 0.66; Fisher exact 2-tailed $p = 0.09$) and eating the chalupa (2 of 18 cases vs. 0 of 40 controls; OR, undefined; 95% CI lower limit, 0.66; Fisher exact 2-tailed $p = 0.09$) approached significance. In logistic analysis using a stepwise model selection, eating an item containing boneless skinless chicken (OR, 14.3; 95% CI, 3.1 to 66.0; $p < 0.001$) remained independently associated with illness.

Five food workers were positive for *S.* Newport. All five 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 three of these food workers reported symptoms of recent gastrointestinal illness. The other 61 food workers tested negative for *Salmonella* and reported no recent illness.

Upon environmental inspection, sanitarians noted several problems related to potential cross-contamination. Employees were observed cleaning surfaces with dirty rags. Employees did not wear gloves to handle most foods, including raw meat. Raw chicken was placed on the grill by an employee with bare hands; the employee's hands were subsequently wiped off on his apron or sometimes dipped in sanitizer. Salads and wraps were prepared by an employee who also handled raw chicken. This employee was observed washing their hands, and during later visits to the restaurant the employee wore gloves to prepare salads and wraps.

This was an outbreak of *S.* Newport NEW4 infections associated with eating at a New Brighton restaurant. The outbreak was identified both through routine laboratory-based surveillance and phone calls to the foodborne illness hotline at MDH. Transmission to patrons likely took place from late August through early September. Consumption of meals containing boneless skinless chicken was associated with illness. Potential cross-contamination issues were identified; these problems likely contributed to the survival and proliferation of *S.* Newport in foods and/or on environmental surfaces, with subsequent transmission to patrons. Infected food workers may also have played a role in the transmission of *Salmonella* to patrons.

(48)
Mushroom Poisonings Associated with *Amanita bisporigera*

September — Ramsey County

On September 14, 2006 the Minnesota Department of Health (MDH) received a report from a local gastroenterologist of multiple Hmong persons hospitalized after consuming wild mushrooms. The clinician reported he was treating three patients and reported that there were rumors of others hospitalized in other area medical facilities.

Medical records from the initial reported patients were reviewed, and the Hennepin Regional Poison Center (HRPC) was contacted to ascertain additional cases. All potential cases were interviewed using a standard questionnaire. A site visit was conducted at the implicated park to confirm the presence of wild mushrooms and identify the genus and species present.

Two adult Hmong sisters had picked the mushrooms in a regional park in Ramsey County on September 9. Nine members of the extended family consumed mushrooms at two separate meals during the evening of September 9. All nine presented at local emergency rooms with severe vomiting and diarrhea in the early morning hours of September 10. The family brought one of the harvested mushrooms to the emergency room, and a local mycologist with the Minnesota Mycological Society (MMS) identified the mushroom as *Amanita bisporigera*. Six patients were hospitalized, and three were treated and released. The median age of hospitalized patients was 49.5 years (range, 5 to 57 years). The median incubation period following mushroom consumption was 9 hours (range, 9 to 16 hours). After consultation with the HRPC, patients were treated with various combinations of intravenous fluids, activated charcoal, antiemetics, gastroprotectants, acetylcysteine, and penicillin G. Patients were monitored for liver failure. The median aspartate aminotransferase (AST) value of the hospitalized patients was 567 IU/L (range, 18 to 10,400 IU/L); the median international normalized ratio (INR) was 1.91 (range, 1 to 2.64). Three patients had INR values above the normal range. The median duration of hospitalization was 4.5 days (range, 1 to 10 days). A 10-year-old female developed multiple organ failure and died 11 days after mushroom consumption.

Following the mushroom poisonings in Minnesota, several educational outreach techniques were utilized to inform the public, particularly non-English speakers, of the dangers associated with consuming wild mushrooms. MDH issued a press-release warning of the dangers of harvesting and consuming wild mushrooms. Warning posters from the North American Mycological Association (NAMA) and a warning poster designed by MDH written in English and Hmong were distributed to clinics, local health departments, and local businesses. Representatives from MDH, MMS, and HRPC participated in an in-depth radio interview on a local Hmong radio station and a community meeting to answer questions and concerns about wild mushrooms.

This was an outbreak of mushroom poisonings in an extended Hmong family associated with consumption of *Amanita bisporigera* harvested from a regional park. Rapid identification of the mushroom lead to prompt treatment for amatoxin ingestion; however, six patients were hospitalized and one death occurred. Persons who pick and consume wild mushrooms need to be absolutely certain that the mushroom is edible, because misidentification may result in severe illness and death. Targeted educational campaigns need to be developed to warn of the dangers of consuming wild mushrooms. New immigrants should be educated that plants looking similar to plants in their native country might be poisonous. Healthcare providers should contact poison control centers immediately to report mushroom poisonings and receive expertise in clinical management of these cases.

(49)
Norovirus Gastroenteritis Associated with a Church Fundraiser

September Carver County

On September 15, 2006, the Minnesota Department of Health (MDH) foodborne illness hotline received a complaint of gastrointestinal illness from an individual who had attended a church fundraiser held at a golf club in Chaska, Minnesota on September 10. The complainant reported that there were at least three other people that had attended the event that were also ill with gastrointestinal symptoms. Many of the foods served at the event were prepared in private homes and included pork chops, potato salad, lettuce salad, cucumber salad, and many desserts. The golf club provided rolls, cooked potatoes, beverages, and lettuce salad. The foods were served buffet style. MDH Environmental Health Services (EHS) was notified and an investigation was initiated.

On September 15, the organizer of the event was contacted and interviewed by MDH epidemiologists. The organizer provided MDH with a list of event attendees. Event attendees were interviewed by phone about food consumption, other shared exposures, and illness history using a standard form. A case was defined as a person with vomiting or diarrhea (≥3 loose stools in a 24-hour period) after attending the fundraising event on September 10. Six ill fundraiser attendees submitted stools to MDH for testing.

Fifty-two attendees were interviewed, and 24 (46%) met the case definition. An additional two people experienced illness not meeting the case definition and one person had poor onset date recall; these three people and two people who were likely secondary cases were excluded from the analysis. All cases experienced diarrhea, 16 (67%) had cramping, 13 (59%) reported fever, and 11 (46%) had vomiting. The median incubation period was 36 hours (range, 12.5 to 59 hours). The median duration of illness was 63 hours (range, 24 to 232 hours). Three cases visited their medical provider but were not admitted to a hospital.

All six stool samples submitted were positive for norovirus. Nucleic acid sequencing was conducted on two of the positive norovirus samples; the nucleic acid sequences were identical.

Consumption of cucumber salad was statistically associated with illness (10 of 24 cases vs. 2 of 22 controls; odds ratio, 7.14; 95% confidence interval, 1.19 to 73.8; $p = 0.013$). Ingredients for this item were store bought and the dish was prepared by an attendee at home and placed on the buffet line. The person who prepared this food item was not identified.

All six food workers from the golf club that prepared or served food at the event were interviewed. None reported gastrointestinal illness in themselves or family members during the week prior to the fundraising event. A list of foods brought by fundraiser attendees was not available. No critical items were noted during the environmental health inspection.

This was an outbreak of norovirus gastroenteritis associated with a fundraising event held at a golf course in Chaska, Minnesota. The cucumber salad, which was prepared in a private home and brought to the event, was implicated as a vehicle of transmission. The source of

contamination was not determined but could have been the person who prepared the dish or an ill person who attended the fundraiser and contaminated the dish on the buffet line. The cucumber salad only accounted for 10 of 24 cases; therefore, some cases must have become ill via other foods or through person-to-person transmission at the fundraiser.

(50)

Salmonella Typhimurium Infections Associated with Tomatoes Served at Restaurants

September — Multiple counties/Multiple states

During the last week of September 2006, the Minnesota Department of Health (MDH) Public Health Laboratory (PHL) identified four human-case isolates of *Salmonella* Typhimurium that were indistinguishable by pulsed-field gel electrophoresis (PFGE); the subtype was designated TM376. Routine interviews of these cases revealed that they had all eaten at Restaurant A in Arden Hills in the week prior to illness onset. Additionally, on September 27 a complaint was received from an Illinois resident that had traveled to Minnesota and became ill with gastrointestinal symptoms after eating at Restaurant A. The complainant reported being diagnosed with *Salmonella i*nfection. The St. Paul-Ramsey County Department of Public Health, Environmental Health Section (Ramsey County) was contacted, and an investigation of the restaurant was initiated on October 2.

All *Salmonella* cases reported to MDH are routinely interviewed about illness history, food consumption and other exposures as part of surveillance. Interviews of *S.* Typhimurium TM376 cases were compared by epidemiologists to identify potential common exposures. A case was defined as a person from whom *S.* Typhimurium TM376 was isolated.

A case-control study was conducted. MDH staff attempted to enroll three controls per case through sequential digit dialing anchored on the Minnesota cases' telephone numbers. Controls were matched to cases by age group, and reported no diarrhea or vomiting during the 2 weeks preceding the corresponding case's onset date. Cases and controls were interviewed using a standard questionnaire.

On October 4, MDH PHL staff posted a message on PulseNet (the national network of public health and food regulatory agency laboratories) web-board about the MDH investigation. During the first 2 weeks of October, the PulseNet national database was queried to find out if other states had *S.* Typhimurium TM376 cases as well. Several states were contacted by telephone to inquire about investigations into their cases. The Centers for Disease Control and Prevention (CDC) was notified of the matches. On October 19, CDC started coordinating a multi-state investigation, including a case-control study including cases in states other than Minnesota. MDH provided information on the Minnesota cases and shared information gathered in the Minnesota investigation, but did not participate in the multi-state case-control study since the Minnesota study was already underway.

Ramsey County environmental health specialists conducted an assessment of Restaurant A and interviewed employees about recent history of gastrointestinal illness and work duties.

The Minnesota Department of Agriculture (MDA) Dairy, Food and Meat Inspection Division obtained invoices from various restaurants and conducted a traceback of the food implicated by the epidemiological investigation. The traceback information was forwarded to the United States Food and Drug Administration (FDA).

Fourteen *S.* Typhimurium TM376 cases were identified in Minnesota. An additional case who resided and was diagnosed in Illinois but was exposed in Minnesota was identified. Among the Minnesota cases, the median age was 28 years (range, 7 to 62 years). Eight (57%) were male. Onset dates ranged from September 12 through October 13. Two (14%) of the cases were hospitalized. None of the cases died. All the cases had diarrhea, 13 (93%) had cramps, 10 (71%) had a fever, six (43%) had bloody stools, and five (36%) reported vomiting. The median duration of illness was 6.5 days (range, 3.5 to 12 days).

Four of the initial five cases identified in surveillance and the complainant from Illinois reported eating at Restaurant A. An additional case that ate at Restaurant A was identified later in the investigation. All six cases ate hamburgers with lettuce, tomatoes and onions. Some cases ate additional food items at the restaurant. The cases ate at the restaurant on September 12, 13 or 14.

The environmental health evaluation found that the restaurant maintained detailed temperature logs. During September 12, 13 and 14, the recorded temperatures of cooked hamburgers were 151°F on several occasions. All the restaurant employees were interviewed, and none reported recent gastrointestinal illness. The restaurant did not keep an employee illness log.

After the initial Restaurant A investigation, additional cases were identified in surveillance. The new cases did not report eating at Restaurant A. All 15 cases and 38 controls were included in the case-control study. Univariate statistical analysis (unmatched) found that eating at tomatoes at a restaurant (11 of 14 cases vs. 13 of 32 controls; odds ratio [OR], 5.4; 95% confidence interval [CI], 1.05 to 30.8; $p = 0.02$), eating lettuce at a restaurant (12 of 15 cases vs. 15 of 33 controls; OR, 4.8; 95% CI, 0.96 to 26.9; $p = 0.03$), eating at any Restaurant A location (6 of 15 cases vs. 5 of 35 controls; OR, 4.0; 95% CI, 0.80 to 20.8; $p = 0.04$); and eating specifically at Restaurant A (6 of 15 cases vs. 0 of 35 controls; OR, undefined; 95% CI, undefined; $p<0.005$) were associated with illness. Among cases and controls that did not eat at any Restaurant A location (stratified analysis) only eating tomatoes at a restaurant (6 of 8 cases vs. 9 of 28 controls; OR, 6.3; 95% CI, 0.85 to 58.4; $p = 0.05$) was associated with illness. A matched analysis including only cases who reside in Minnesota was conducted. On a matched analysis, only eating lettuce at a restaurant was significantly associated with illness (OR, 2.1; $p = 0.05$); however, the number of cases and control was relatively small for this type of statistical analysis.

The CDC national investigation identified 183 cases in 21 states (including the Minnesota cases). The CDC multi-state case-control study implicated tomatoes consumed at restaurants as the vehicle.

The MDA traceback coordinator collected information about tomatoes and invoices from restaurants where the cases ate. This information was cross-referenced with data collected from other states. The tomatoes were ultimately traced back to a farm in Ohio. All the information was forwarded to the FDA. By the time tomatoes were identified as the vehicle, no new cases were

being identified, and transmission had clearly stopped. Results from the Ohio farm investigation were not released by the FDA.

This was an outbreak of *S.* Typhimurium TM376 infections associated with eating tomatoes at restaurants. The source of the tomatoes was a farm in Ohio.

(51)
Staphylococcus aureus Intoxications Associated with a Grocery Store

September Ramsey County

On September 19, 2005, the Minnesota Department of Health (MDH) foodborne illness hotline received a complaint of illness from five individuals who ate take out chicken and shrimp from a grocery store in St. Paul, Minnesota on September 15. On September 20, a second complaint of illness was received from a group of seven individuals from three different households. This group had also consumed take-out shrimp from the same grocery store on September 15, and the three households did not have any other common exposures. Both complainant groups experienced projectile vomiting shortly after their meal. Environmental health specialists with the City of St. Paul were notified and an investigation was initiated immediately.

MDH staff interviewed the complainants about food consumption and illness history. A case was defined as a person with vomiting or diarrhea ($\geq$3 loose stools in a 24-hour period) after eating food from the restaurant. Case stool samples were not collected, but food samples were collected from one household. The City of St. Paul environmental health specialist went to the establishment on September 20 to conduct an environmental assessment.

Eight people (two from the first complaint group and six from the second complaint group) met the case definition. All cases had diarrhea, cramps, and vomiting. The median incubation period was 2 hours (range, 1 to 6 hours). The median duration of illness was 60 hours (range, 24 to 83 hours). There were four additional persons that reportedly met the case definition that could not be interviewed due to a language barrier.

The shrimp sample obtained from a complainant was positive for *Staphylococcus aureus* enterotoxin A, and the culture results yielded a *S. aureus* plate count of 2.6×10^9 cfu per gram.

During the environmental assessment of the restaurant on September 21 and 22, the City of St. Paul environmental health specialist found temperature abuse issues. Shrimp were being held in holding tables; the shrimp were piled too high and were at 92° F during the inspection. The establishment was instructed about the risks of piling products too high in holding tables and temperature abuse. Repeat visits were made by St. Paul environmental health specialists to ensure that proper procedures were being followed.

This was an outbreak of foodborne intoxications caused by *Staphylococcus aureus.* Prepared shrimp from a local grocery store was implicated as the vehicle. Inappropriate hot-holding temperatures in the holding tables were documented during the environmental health investigation; this would have supported proliferation of bacteria and toxin production. The

establishment was educated about the risks of piling food too high in holding tables and temperature abuse in general.

(52)
Shigella sonnei Infections Associated with a Restaurant

September Sherburne County

In the first week of October 2006, the Minnesota Department of Health (MDH) Public Health Laboratory identified three cases of *Shigella sonnei* with matching PFGE patterns. The cases were interviewed and all stated that they had eaten at Restaurant A in Elk River in the days prior to their illness onset. MDH epidemiologists contacted the sanitarian responsible for inspecting that restaurant, and an investigation was begun on October 5.

MDH staff conducted interviews with all confirmed and suspected *Shigella* cases to assess their exposure history and food consumption prior to becoming ill. Coincidentally, MDH sanitarians had conducted a routine inspection of Restaurant A on October 5. During the routine inspection, the sanitarian found two critical handwashing violations; the hand sink in the bar area had no soap or paper towels, and the hot water was turned off at one of the five hand sinks in the kitchen. Both of these critical items were corrected within 24 hours. Upon being notified of the outbreak, the sanitarian returned to the restaurant the following day to conduct employee interviews and assess food-handling practices as they related to this outbreak.

A case was defined as a person who ate at Restaurant A in Elk River and had a laboratory confirmed *Shigella sonnei* infection with a pulsed-field gel electrophoresis (PFGE) pattern of SS421, SS422, or SS423, or a person who ate at Restaurant A and developed symptoms consistent with shigellosis within three days of their meal date.

Six laboratory confirmed cases of *Shigella sonnei* were linked to this outbreak. Two additional suspect cases were identified as family members of employees who had eaten at the restaurant. All eight cases reported diarrhea, seven cases (88%) reported abdominal cramping, four cases (50%) reported bloody diarrhea, six cases (75%) reported fever, and two cases (25%) reported vomiting. The median incubation period was 45 hours (range, 12 to 48.5 hours). Durations of illness could not be calculated because most cases were still ill at the time they were interviewed. Onset dates ranged from September 22 to September 27; cases reported eating at the restaurant between September 21 and September 26. No single food item was associated with illness; however, cases reported eating one of three menu items: steak, chicken penne pasta, or a bruschetta hamburger.

There were 66 employees working at the restaurant during the time period cases reported eating there. All 66 employees were interviewed by MDH staff to assess illness history, work duties, food consumption at the restaurant, and other pertinent exposures. Six employees reported experiencing gastrointestinal symptoms from September 21 to October 11. Those employees were excluded from working at the restaurant and were required to submit stool samples for *Shigella* testing. All six employees were negative for *Shigella*, and were allowed to return to work when they had been asymptomatic for at least 3 days.

Management at the restaurant implemented several intervention measures to prevent further transmission, including restricting the ill employees, thorough questioning of employees to assess illness status at the beginning of every shift, increased handwashing education, handwashing contests (e.g., incentives for employees who washed their hands most frequently during a shift), and general food safety classes for employees.

This was an outbreak of shigellosis associated with a restaurant in Elk River, Minnesota. Although all six employees tested were negative for *Shigella*, it is possible that samples were collected too long after symptoms resolved to detect the infection. It is also possible that an employee worked while ill and did not identify themselves to MDH or restaurant management as being ill.

(53)

Salmonella Tennessee Infections Associated with Consumption of Peanut Butter

September 2006-March 2007 Multiple counties/Multiple states

From September through December 2006, the Minnesota Department of Health (MDH) received and identified three clinical isolates of *Salmonella* Tennessee. All three isolates were indistinguishable by pulsed-field gel electrophoresis (PFGE); the subtype was designated TEN10. The case-patients were all interviewed using a standard questionnaire. No obvious common food exposures were identified.

On January 8, 2007, the Centers for Disease Control and Prevention notified state health departments of a cluster of *Salmonella* Tennessee case-isolates that were indistinguishable from the Minnesota isolates by PFGE. At this time, 116 isolates from 31 states had been reported to the PulseNet national database since August 1, 2006. A case was defined as a person with *Salmonella* Tennessee infection with the outbreak strain defined by the PFGE pattern, and illness onset or specimen collection date on or after August 1, 2006. Initial review of cases revealed no geographic or demographic clustering, and comparison of patient interviews conducted by state and local health departments showed no obvious common exposures. Upon in-depth interview of 31 cases and comparison with the FoodNet Population Survey, consumption of peanut butter in the week before illness was higher than expected among the cases.

A multistate case-control study conducted during February 5-13, 2007 revealed that illness was strongly associated with consumption of either of two brands of peanut butter (Brand A or Brand B) produced at the same plant in Georgia. The results of this study were reported in the Morbidity and Mortality Weekly Report (2007; Vol. 56: 521-524).

Ten cases from Minnesota were ultimately identified as part of this outbreak. Illness onset dates ranged from September 24, 2006 to March 7, 2007. Nine cases reported consuming peanut butter in the 7 days prior to illness onset; seven reported consuming either Brand A or Brand B peanut butter. The median age of cases was 51.5 years (range, 1 to 78 years) and 70% were female. The median duration of illness was 5 days (range, 1 to 6 days). Two cases were hospitalized and one developed diarrhea while hospitalized for a separate medical procedure.
The Minnesota Department of Agriculture collected and tested 14 jars of Brand A and one jar of

Brand B peanut butter. Four jars of the collected Peter Pan peanut butter and one jar of Great Value peanut butter were consumed by case-patients prior to illness onset. *Salmonella* Tennessee was isolated from three jars of Brand A peanut butter, including one case's open jar. The jars originated from two different production lines in the Georgia plant; the Best If Used By dates ranged from January 27, 2008 to June 14, 2008. In total, laboratories from 13 states and the FDA isolated outbreak strains of *Salmonella* Tennessee from 34 jars of peanut butter produced between July 2006 and January 2007 and from two plant environmental samples obtained in February 2007.

On February 14, based on the results of the case-control study and product testing, the company voluntarily recalled all peanut butter produced at the Georgia plant since December 2005. Consumers were asked to discard any peanut butter with a product code beginning with "2111". MDH issued a health alert on February 15 notifying Minnesota consumers to not consume any Brand A or Brand B peanut butter with the implicated product code and to visit their healthcare provider if they were experiencing any gastrointestinal illness. A hotline was implemented to answer questions and record reports of illness from the public.

This was the first outbreak in the United States associated with consumption of peanut butter. As of May 22, 2007, 628 cases from 47 states were identified. Contamination of the peanut butter likely occurred in the plant after the final kill step of roasting the peanuts prior to grinding to make peanut butter.

(54)
Suspected Norovirus Gastroenteritis Associated with a Restaurant

September Hennepin County

On October 3, 2006, the Minnesota Department of Health (MDH) foodborne illness hotline received complaints of illness from two different groups that listed the same Minneapolis restaurant as one of the places where they had eaten. MDH notified Hennepin County Public Health Protection (HCPHP) and Minneapolis Environmental Health (MEH) staff of these complaints on October 3. HCPHP received another independent complaint which also cited the same restaurant and reported that three persons were ill. An investigation was initiated.

On October 3, a MEH sanitarian inspected the restaurant, focusing on food preparation practices. Employees currently on duty were interviewed on-site regarding their job duties and illness histories. Names were requested from the facility for patrons that had eaten at the facility on September 29 or 30. Epidemiologists from HCPHP interviewed patrons from the original complaints. A case was defined as a person who had vomiting or diarrhea ($\geq$3 loose stools in a 24-hour period) after dining at the restaurant on September 29 or 30.

Six patrons who had eaten at the restaurant on September 29 or 30 were interviewed, and all six met the case definition. All six cases had diarrhea, five (83%) cramps, four (67%) had vomiting, and three of five (60%) had a fever. All six cases ate at the restaurant on September 30; the median incubation based on this date was 23 hours (range, 12.5 to 38 hours). Four of the six cases also ate at the restaurant on September 29; the median incubation for these four cases based

on this meal date was 42 hours (range, 37.5 to 55 hours). Four of the six patron cases were still ill at the time of the interview. For the other two patron cases the durations of illness were 32.5 and 39.5 hours, respectively.

Controls were not obtained, so statistical analysis of food items could not be performed. Cases ate a variety of food items, including a several types of sandwiches (e.g., tuna salad, chicken Caesar, turkey bravo, bacon turkey, and beef) and a variety of soups (e.g., chicken, baked potato and wild rice).

Forty-one employees were interviewed. Three employees reported having gastrointestinal symptoms earlier that week. The MEH sanitarian did not note any critical violations during the inspection.

This was an outbreak of foodborne gastroenteritis associated with a Minneapolis restaurant. The etiology was not confirmed, but the distribution of incubation periods, symptoms, and illness durations were characteristic of norovirus. A specific food vehicle was not identified. However, the source of the outbreak was likely one or more ill food workers.

(55)
Salmonella Enteritidis Infections Associated with a Restaurant

October Hennepin County

During the last week of October, review of routine surveillance interviews of *Salmonella* Enteritidis pulsed-field gel electrophoresis (PFGE) subtype SE1B2 cases reported to the Minnesota Department of Health (MDH) revealed that three cases had patronized Restaurant A in Minneapolis, Minnesota. In addition, one Restaurant A food worker that was positive for S. Enteritidis SE1B2 was identified on October 20. An investigation was initiated on November 1. SE1B2 is not a common PFGE subtype of *S.* Enteritidis in Minnesota.

All *S.* Enteritidis cases are routinely interviewed about exposures and food consumption at home and at restaurants as part of surveillance. Interviews of *S.* Enteritidis cases that are indistinguishable by PFGE are compared to identify potential common exposures. Information gathered during routine interviews was reviewed by an MDH epidemiologist. A case was defined as a person from whom *S.* Enteritidis SE1B2 was isolated and who reported eating at Restaurant A prior to symptom onset.

MDH Environmental Health Service (EHS) sanitarians conducted environmental assessments of the restaurant on November 2 and during the following weeks. MDH EHS sanitarians and epidemiologists interviewed restaurant employees about gastrointestinal illness since September 1. All restaurant employees were asked to submit two stool specimens for *Salmonella* testing. Employees who reported any gastrointestinal symptoms during the previous 2 weeks or who did not submit stool specimens within a week of the beginning of the investigation were restricted. Employees who tested positive for *Salmonella* were excluded from work until two consecutive stool specimens obtained at least 24 hours apart tested negative for *Salmonella.* Environmental samples of food and non-food contact surfaces were collected on November 3 and tested for

Salmonella.

Three patron-cases were identified through routine surveillance. In addition to the cases identified through surveillance, one meal companion also reported illness but was not tested for *Salmonella* and was not included in analysis. Five of 46 restaurant employees tested were positive for *S.* Enteritidis SE1B2. Two of these employees, a wait assistant and a chef, were asymptomatic. Three other employees, a bartender, a line cook, and a wait assistant, were symptomatic with onset dates of October 8, October 9, and October 12 respectively.

All patron-cases had diarrhea, one (33%) had vomiting, one (33%) had bloody stools, one had cramps, and one (33%) reported fever. The meal dates for the patron-cases were October 3, October 4, and October 10. The median incubation period for patrons was 189 hours (range, 72 to 224 hours). The median illness duration for patrons was 164 hours (range, 92 to 204 hours). None of the cases were hospitalized for their illness but all cases visited their healthcare provider.

Patron cases had eaten a variety of foods. One case ate pork stew, vegetable potatoes with cheese appetizer, tres leches cake, tortilla chips with three kinds of salsa, and a margarita. Another case had guacamole, chips, salsa with mango, tomato and cilantro, pulled pork enchiladas, refried beans, crepes, whiskey, and water. The third case ate pulled pork enchiladas, and chips with salsas, guacamole, and refried beans.

The environmental assessment did not find any critical violations. However, four non-critical violations were found including wiping cloths not stored in sanitizer solution buckets, lack of sanitizer test strips in each work area to monitor concentration of sanitizer solution, handles of dry food dispensers stored below the top of food, and dishwashers being out of repair. These problems were corrected immediately. EHS sanitarians recommended that Restaurant A apply for a MDH Food Managers Certificate as they did not have a currently certified food manager onsite.

Eggs were not a commonly used ingredient in the restaurant. The main place where eggs were used was pastry preparation. Ten environmental samples were collected on November 3. These samples were collected from cutting boards, grills, stoves, pastry prep areas, produce sinks, and chicken cookers. None of the samples were positive for *Salmonella*.

This was an outbreak of *S.* Enteritidis SE1B2 infections associated with eating at a Minneapolis restaurant. The outbreak was identified through routine surveillance at MDH. Documented transmission to patrons of the restaurant occurred from October 4 through October 10. Food workers who tested positive for *S.* Enteritidis also could have served as a source of *Salmonella* for patrons; however, the symptomatic food workers onset dates were after some of the patron's onset dates. It is possible that the infected food workers shed *Salmonella* in their stool, and that the shedding contributed to the contamination of surfaces and/or food items in the restaurant. As many of the food workers also ate meals at the restaurant, it is possible that they were infected through food eaten at the restaurant. A specific vehicle was not identified.

(56)
***Clostridium perfringens* Intoxications Associated with a Restaurant**

October Carver County

On October 9, 2006, the Minnesota Department of Health (MDH) foodborne illness hotline received a complaint of illness among six individuals from two different households who ate dinner together at a restaurant in Chanhassen, Minnesota on October 8. Five of these individuals had subsequently become ill with gastrointestinal symptoms. These individuals reported that they had also been to a baptism together on October 7; however, no food was served at the baptism, and only those who ate a meal at the restaurant were ill. Carver County Department of Health and MDH Environmental Health Services (EHS) were notified and an investigation was initiated.

MDH staff interviewed the original complainants about food consumption and illness history. MDH also obtained a list of baptism guests and interviewed them about food consumption and illness history. A case was defined as a person who ate at the restaurant on October 8 and subsequently developed vomiting or diarrhea ($\geq$3 loose stools in a 24-hour period). Four cases submitted stool samples to MDH for bacterial culture, toxin testing, and viral testing.

The EHS environmental health specialist went to the restaurant on October 9 to conduct an environmental assessment.

Five of the 18 (29%) persons interviewed met the case definition. (Twelve baptism attendees who had not eaten at the restaurant were also interviewed and none reported illness; therefore, only people who had eaten at the restaurant were included in the case definition and analysis). All cases had diarrhea and cramps, and one (20%) had vomiting. The median incubation period was 13.5 hours (range, 5.5 to 15.0 hours). The median duration of illness could not be determined because all cases were still ill at the time of interview. The stool samples obtained from four of the complainants were positive for *Clostridium perfringens* enterotoxin.

Cases had eaten a range of food items at the restaurant including chips, salsa, chicken fajitas, steak fajitas, beans, beef tacos, rice, chicken enchiladas, and guacamole. The only food item that all of the cases had in common was refried beans. An inadequate amount of control data did not allow for meaningful statistical analysis of food items consumed. However, the one control that was interviewed had eaten beef tacos, chicken enchiladas, chips, salsa, guacamole and rice, but did not report eating refried beans. Credit card receipts were not available at the restaurant, so no other restaurant patrons could be interviewed.

EHS noted that they had completed an environmental health assessment of the restaurant on September 1 due to a previous outbreak investigation (#43). During the environmental assessment on September 1, the sanitarian found a number of critical violations. Chicken in the steam table was being held at 111° F and ground beef in the steam table was being held at 127° F. There were no records to show how long these items had been out of temperature control. It was also observed that improper cooling procedures were being used. The restaurant typically prepared multiple gallons of sauce multiple days ahead of time, and stored them in 3-gallon

buckets with the lid tightly attached. On September 1 at 3:30 pm, the temperature of sauce that had been prepared on August 31 at 2:00 pm was 71° F.

EHS conducted another environmental health assessment of the restaurant on October 10 and again found critical violations associated with temperature control. Specifically, refried beans prepared on October 9 were at 48° F, shredded beef prepared on October 8 was at 47° F, and beef pieces prepared on October 8 were at 44° F. The refried beans could have been prepared at least 24 hours before they were reheated and served; therefore, there was potential for temperature abuse of the refried beans from the time of preparation until the time of reheating. The EHS inspector noted that cooling of food items seemed to be a reoccurring problem, provided educational materials, and conducted a follow-up inspection on October 12.

This was an outbreak of foodborne intoxications caused by *C. perfringens.* The vehicle was not confirmed; however, illness may have been associated with consumption of refried beans. Potential for temperature abuse in the preparation of the refried beans was documented, which in turn could have allowed bacteria to proliferate.

(57)
Norovirus Gastroenteritis Associated with a Restaurant

October Washington County

On October 17, 2006, the Washington County Department of Public Health and Environment (WCPHE) received a complaint from an individual, representing a group of three, who had become ill with vomiting and diarrhea after dining at the a restaurant in Lakeland, Minnesota on October 12. The Minnesota Department of Health (MDH) was notified on October 17 and an investigation was immediately initiated.

On October 17 and 18, an environmental health specialist from the WCPHE contacted the restaurant. Restaurant management indicated that two employees had reported gastrointestinal illness on October 14. The environmental health specialist recommended implementation of strict handwashing practices, no bare-hand contact with ready-to-eat food items, and strict exclusion of all ill employees for 72 hours following complete resolution of gastrointestinal illness. Lists of patrons who dined at the restaurant during October 12-20 were obtained from the restaurant. Stool specimens were collected from three employees.

WCPHE staff interviewed restaurant patrons about food consumption and illness history. Cases were defined as persons who ate at the restaurant and developed vomiting or diarrhea ($\geq$3 stools in a 24-hour period) on or after October 12. Stool specimens were collected from two patrons and submitted to MDH for bacterial and viral testing.

Forty-four patrons were interviewed. Of these, 29 (78%) met the case definition. Seven patrons (16%) had mild illness that did not meet the case definition and were excluded from the analysis. Of the 29 patron cases, 24 (83%) had vomiting, 27 (93%) had diarrhea, and seven (24%) reported low-grade fever. The median incubation period, calculated from individual meal times, was 31 hours (range, 9 to 118 hours). Patron onset dates were October 12, 13, and 20. The

median duration of illness was 90 hours (range, 14 to 172 hours). The two patron case stool specimens were positive for norovirus.

In the univariate analysis, consumption of any sandwich (26 of 29 cases vs. 4 of 8 controls; odds ratio, 8.7; 95% confidence interval, 1.05 to 84.0; Fisher exact p = 0.02) was statistically associated with illness.

During the course of the environmental assessment, beginning on October 17 and concluding on October 20, 46 restaurant employees were interviewed to ascertain illness history (for the employee and immediate household members), employee work schedules and routine work duties, and restaurant food consumption history. Food preparation and service procedures, including of ready-to-eat foods, handling of dirty and clean dishes and employee hygienic practices were observed, with numerous deficiencies noted. Nine (20%) restaurant employees reported illness from October 4 to October 16. The three employee stool specimens were positive for norovirus. Viruses from two employee and two patron stools were sequenced; the nucleic acid sequences from all four stools were identical.

On October 20, the restaurant was closed for thorough cleaning and disinfection of all food preparation surfaces, food storage areas, cookware, tableware and restrooms with a 1,000 ppm chlorine bleach solution. All opened single service food containers and prepared foods were discarded. All restaurant employees attended a mandatory safe food handling in-service training at the restaurant, instructed by WCPHE staff. The restaurant was allowed to reopen on October 24.

This was a foodborne outbreak of norovirus gastroenteritis associated with eating sandwiches at a Lakeland restaurant. Given the extent and duration of illness within the employee population, a significant threat of viral transmission from various food items existed in the facility. The likely source of contamination was one or more ill food workers.

(58)
Norovirus Gastroenteritis Associated with a Restaurant

October Mower County

On October 17, 2006, the Minnesota Department of Health (MDH) foodborne illness hotline received several independent complaints of illness from people who ate at a restaurant in Austin, Minnesota on October 14. The MDH sanitarians responsible for inspecting the restaurant were contacted, and an investigation was initiated.

The complainants were interviewed to assess illness history and foods consumed at the restaurant. Two MDH sanitarians went to the restaurant to interview food workers, assess food-handling practices, and obtain credit card receipts and/or reservation lists.

Stool specimen collection kits were delivered to five ill complainants. A case was defined as a person who ate at the restaurant and subsequently became ill with vomiting and/or diarrhea (≥3 loose stools in a 24-hour period) in the 72 hours following their meal, or a person who tested

positive for norovirus.

MDH interviewed 14 people who ate at the restaurant on October 14 (those 14 people represented six separate dining groups, and nine distinct households). All 14 people reported illness and met the case definition. Twelve cases (86%) had diarrhea, 12 (86%) had cramping, eight (57%) had vomiting, and three (21%) reported a fever; none had bloody stools. Eight cases (57%) were female. The median incubation period for all cases was 37 hours (range, 30 to 61 hours.) Duration of illness could not be determined because the majority of cases had not recovered at the time of interview. All five stool specimens returned from patrons were positive for norovirus, and all five positive samples had an identical nucleic acid sequence.

Patrons reported eating a variety of food items including chips and salsa, burritos, tacos, taco salads, nachos, enchiladas, quesadillas, fajitas, rice, beans, cheese dip, guacamole, and sour cream. Statistical analysis could not be performed because no well patrons could be identified to interview.

MDH sanitarians interviewed 10 food workers. The majority of the food workers were Spanish-speakers; the restaurant manager was allowed to translate interviews and responses for the sanitarian conducting the interviews. None of the employees reported recent illness in themselves or household members. MDH sanitarians noted bare-hand contact with ready-to-eat food items and were unsure that appropriate handwashing was taking place. In addition, there was no certified kitchen manager. These same violations were noted during an outbreak investigation at the same restaurant in 2004.

This was an outbreak of norovirus gastroenteritis associated with a restaurant in Austin, Minnesota. Transmission of norovirus likely occurred through contamination of food items by ill food workers, but this was not confirmed.

(59)
Norovirus Gastroenteritis Associated with a Restaurant

October Olmsted County

On November 2, 2006, Olmsted County Public Health Services (OCPHS) received a complaint from a person who became ill with vomiting and diarrhea after eating at a Restaurant A at noon on October 30. Another complaint of illness was received on November 3 from a party of two who both became ill with vomiting and diarrhea after eating at Restaurant A between 2:00 and 3:00 p.m. on October 30. An investigation was initiated on November 3. Restaurant A was a sit-down restaurant offering a formal dining atmosphere; the restaurant shared ownership, management, and some staff with three other restaurants in Rochester, Restaurant B, Restaurant C, and Restaurant D. Restaurant B was located immediately above Restaurant A, and the sharing of employees was primarily between those two restaurants.

Investigators arrived at Restaurant A on November 3 at 3:00 p.m. Upon arrival at the restaurant, it was found that there was no person in charge. Consequently, the manager from Restaurant C came to Restaurant A to assist with the investigation. The manager was asked for a list of

employees and their job responsibilities on October 30. He was also asked about employee sick leave practices and recent reports of employee illness.

No reservation list was available and patron checks had already been deposited, so a list of patrons who ate at Restaurant A on October 30 was compiled from credit card receipts. Patron names were not printed on the receipts, so the list was compiled by interpreting signatures. Patrons were interviewed using a standard questionnaire with menu items that were available on October 30. A case was defined as a person who ate at Restaurant A on October 30 and subsequently became ill with vomiting or diarrhea ($\geq$3 loose stools in a 24-hour period).

Some employees that work at Restaurant A were cross-trained to work at Restaurant B, Restaurant C, and Restaurant D. A comprehensive staff roster was obtained and during the next several days employees who prepared or served food at Restaurant A or Restaurant B were interviewed using a standard food service employee questionnaire**.** Investigators conducted an assessment of Restaurant A using hazard analysis and critical control points (HACCP). Due to the symptom profile of the complainants, norovirus was suspected as the etiology, so special attention was paid to the preparation and handling of ready-to-eat foods.

Stool specimens were acquired from ill patrons and employees and sent to the Minnesota Department of Health (MDH) Public Health Laboratory for bacterial and viral testing.

Three persons, all from the original complaint groups, met the case definition. Only three additional patrons were contacted and interviewed due to lack of patron locating information; none of the three met the case definition. All three cases had vomiting, diarrhea, nausea and chills. Two (67%) had abdominal pain. The median incubation period was 43.5 hours (range, 36 to 51 hours). The durations of illness for the two cases who had recovered by the time of interview were 9 and 9.5 hours, respectively. Due to the small number of interviews and the fact that none of the three patrons ate similar foods, a formal case-control study of potential food vehicles was not done.

Forty of the 50 employees who worked at Restaurant A or Restaurant B were ultimately interviewed. One employee who was involved in food prep and cooking at Restaurant A reported to have been mildly ill on November 2 with two bouts of diarrhea. A second employee reported experiencing vomiting and diarrhea on November 2, but did not work on November 2 or 3. A third employee reported an onset of vomiting and diarrhea during the evening of November 6, with vomiting starting immediately following completion of the work shift. Earlier that morning, this same employee prepared five cold salads in Restaurant D for service on November 7. Upon reporting illness to restaurant management, this employee was instructed to stay out of work and call OCPHS. Upon receiving the call from the employee, OCPHS staff immediately went to Restaurant D and Restaurant A to oversee the discarding of the prepared salads and other foods.

Stool samples were submitted by one of the ill patrons and two ill employees. All three stool samples were positive for norovirus, and nucleic acid sequences from all three positive specimens were identical. One food worker with confirmed norovirus who had prepared food consumed on October 30 reported that a person in his household was ill with gastrointestinal symptoms on October 30.

The initial discussion with the manager included a review of the "Norovirus Intervention" sheet, which outlines the specific steps necessary to control the spread of norovirus. Measures implemented included discarding any ready-to-eat food items (including ice) that may have been held over from the date of the suspect meal, implementing a glove use policy until further notice, and cleaning and sanitizing all food service areas (including ice machines). Management was also informed to exclude any workers ill with vomiting or diarrhea until symptoms had been gone for at least 72 hours.

Upon learning of the third ill employee, and discarding foods prepared by the employee, the remaining norovirus interventions were repeated at both Restaurant A and Restaurant D. In addition, restaurant management was instructed to report to OCPHS at each shift change the status of employee health, reports of any customer complaints, and the implementation status of the control measures. This continued until November 10, when no other ill employees or patrons had been identified.

This was a foodborne outbreak of norovirus gastroenteritis associated with an Olmsted County restaurant. No specific food vehicle was identified, but the source was likely either a food worker who was ill or who had an ill family member. Given the presence of ill food workers in two of the restaurants, the risk of disease transmission to additional patrons was high. The discarding of the five batches of various cold salads that were prepared by an incubating food worker likely prevented additional cases of illness. No other cases of illness were reported after measures to mitigate the spread of disease were implemented.

(60)
Norovirus Gastroenteritis Associated with a Restaurant

November Dakota County

On November 6, 2006, the Minnesota Department of Health (MDH) foodborne illness hotline received a call reporting gastrointestinal illness in four of four co-workers who had consumed sandwiches from a restaurant in Eagan, Minnesota for lunch on November 3 (complaint A). The co-workers reportedly had no other recent common food exposures. An outbreak investigation was initiated in collaboration with the MDH Environmental Health Services Section (EHS). On November 9, the foodborne illness hotline received an independent complaint reporting illness in six of eight co-workers from a separate business who had consumed sandwiches delivered from the same restaurant to their work place for lunch on November 3 (complaint B). They also reported having no other recent common food exposures.

Complainants were interviewed by phone about food consumption and illness history using a standard form. A case was defined as a person with vomiting or diarrhea (≥3 loose stools in a 24-hour period), and/or a stool sample that was positive for norovirus after eating food from the restaurant. Six ill persons submitted stools to MDH for bacterial and viral testing, including two associated with complaint A and four associated with complaint B.

An MDH sanitarian went to the restaurant on November 9 to evaluate food handling practices. MDH EHS staff interviewed food workers by phone about recent duties, work schedules, and

recent gastrointestinal illness in themselves or their family members.

Seven members of the complainant groups were interviewed (four from complaint A and three from complaint B). All seven of the interviewed persons met the case definition. All seven cases had vomiting, six (86%) had diarrhea, six (86%) had cramps, and one of six (17%) had a fever. Illness was ongoing in four cases at the time of interview. The median duration of illness for the other three cases was 34 hours (range, 33 to 59.5 hours). The median incubation period from consumption of food from the restaurant was 33 hours (range, 10 to 40 hours).

Cases reported eating a variety of sandwich types including ham and cheese (n = 2 cases), turkey (n = 2), Italian (n = 2), and tuna special (n = 1). Lettuce was the most common add-on vegetable ingredient; it was used on sandwiches for six of the seven interviewed cases. Tomato was the next most common vegetable ingredient; it was used on sandwiches for four of the seven interviewed cases.

Norovirus was detected in stool samples from five of six cases, including one of two from complaint A and four of four from complaint B (including one case who did not complete an interview). Nucleic acid sequencing was conducted on all five positive samples, and all five yielded an identical sequence.

On the November 9 evaluation conducted by the MDH sanitarian, a critical violation was cited for not attempting to limit bare-hand contact with ready-to-eat foods. Six of eight food workers who worked at the restaurant on November 3 were interviewed. None reported any recent gastrointestinal illness in themselves or their family members.

The MDH sanitarian ordered the use of approved food handling gloves for the handling of ready-to-eat foods, provided education and guidance on employee illness and symptoms of foodborne illness, and ordered management to increase monitoring of food workers and ensure that no employees worked while ill with vomiting or diarrhea. Management was instructed to ensure that if ill employees were identified they must contact MDH, and then ensure that the employee did not return to work until 72 hours after vomiting and diarrhea ended.

This was an outbreak of norovirus gastroenteritis associated with eating sandwiches from a chain restaurant. Two unrelated groups of diners reported illness after eating at the restaurant at the same time on the same day. Control subjects were not enrolled, so a specific food ingredient could not be implicated. The ultimate source of the outbreak was not determined. However, the most plausible source was an unrecognized infected food worker who had bare-hand contact with one or more sandwich components.

(61)
Norovirus Gastroenteritis Associated with a Conference

November Itasca County

On November 9, 2006, Minnesota Department of Health (MDH) staff received a call from Itasca County public health staff that had received reports of illness among people who attended a

conference at a lodge in Grand Rapids, Minnesota, on November 6, 7, and 8. St. Luke's Hospital in Duluth also called Itasca County at MDH staff to report illnesses among this conference group. The conference had been cancelled early due to the number of illnesses among attendees. An investigation was immediately initiated.

MDH environmentalists received a list of conference attendees, and MDH staff interviewed attendees about food consumption and illness history. A case was defined as any person who ate at the lodge and subsequently developed vomiting and/or diarrhea (≥3 loose stools in a 24-hour period). Stool kits were sent to three conference attendees.

MDH environmentalists conducted an environmental health assessment at the lodge. The manager was asked about employee illness during October and November. Staff was interviewed, and food preparation practices were observed and discussed.

Twenty-one conference attendees were interviewed; 13 met the case definition. Twelve (92%) cases had diarrhea, 10 (77%) had vomiting, 10 (77%) had cramps, and seven (58%) had fever. No cases reported bloody stools. The median incubation period could not be determined because several meals were served at the conference and no specific food items or meals were associated with illness. The median duration of illness was 49 hours (range, 17 to 70 hours). Two ill attendees submitted stool samples, and both tested positive for norovirus. Nucleic acid sequencing was performed on the two positive samples; the sequences were identical.

No food items were statistically associated with illness. However, lunch salad on Monday (4 of 12 cases vs. 0 of 8 controls; odds ratio [OR], undefined; 95% confidence interval [CI], undefined; Fisher 2-tailed p = 0.12), water at lunch on Monday (11 of 13 cases vs. 4 of 8 controls; OR, 5.5; 95% CI, 0.5 to 74.8; Fisher 2-tailed p = 0.14), water at lunch on Tuesday (9 of 11 cases vs. 3 of 8 controls; OR, 7.5; 95% CI, 0.6 to 117.7; Fisher 2-tailed p = 0.07), and ice at lunch on Tuesday (10 of 11 cases vs. 4 of 8 controls; OR, 10.0; 95% CI, 0.6 to 336.6; Fisher 2-tailed p = 0.11) approached significance. One conference attendee reported standing outside to make a cell phone call and hearing a kitchen employee vomiting outside the back door to the kitchen.

Employee interviews identified three ill employees (all with symptoms of vomiting and diarrhea). One bartender had been ill on November 1, a chef became ill on November 7, and a cook became ill on November 13.

Management and employees were educated on the importance of handwashing and general food safety practices. MDH environmentalists discussed the importance of excluding ill employees and reporting employee illness as well as customer illness to MDH with management. Restaurant staff threw out ready-to-eat foods that had already been prepared since there had been employee illness in the restaurant. The restaurant was also told to supply appropriate handwashing supplies at handwashing sinks (including paper towels).

This was an outbreak of norovirus gastroenteritis associated with a conference held at a lodge in Grand Rapids, Minnesota. The source of contamination was likely ill food workers, though no specific food vehicle could be identified.

(62)
Norovirus Gastroenteritis Associated with a Restaurant

November Rice County

On November 9, 2006, the school nurse from a college in Northfield, Minnesota, called the Minnesota Department of Health (MDH) foodborne illness hotline to report an increase in the number of students absent from school or reporting to the nurse's office with symptoms of gastrointestinal illness. The nurse's initial assessment was that the majority of ill students she had spoken with had illness onsets on November 8. MDH Environmental Health Services (EHS) was notified and an investigation was initiated. MDH began interviewing students immediately and noted that all ill students reported consuming sandwiches from a restaurant in Northfield at a student event held on November 7.

Sanitarians from EHS contacted and/or visited the college to discuss employee illness, hygiene, and prevention measures on November 9 and 10. EHS visited the college on November 9, and conducted an environmental assessment at the restaurant on November 13.

MDH obtained a list of ill students from the school nurse, a list of students that were at the event where sandwiches were served, and a complete school roster. Students were interviewed to assess their symptoms and food consumption histories. On November 10, an email was sent to all students asking them to call the school nurse if they were ill with vomiting or diarrhea. These students were contacted by MDH.

A case was defined as any college student or faculty member who developed vomiting or diarrhea ($\geq$3 loose stools in a 24-hour period) on or after November 8. Five stool collection kits were distributed to ill students. One stool specimen was returned to MDH for testing.

Interviews were completed for 33 students and one faculty member; 12 people (36%) met the case definition. An additional four symptomatic people were excluded from the analysis because their symptoms were not severe enough to meet the case definition. Ten (83%) cases had vomiting, seven (58%) had diarrhea, six (50%), had cramping, and five (46%) reported fever. The median incubation period based on the restaurant meal was 47 hours (range, 36 to 121 hours). The median duration of illness was 51.5 hours (range, 8 to 82 hours). Seven cases contacted or visited the school nurse; none were admitted to the hospital. The stool kit returned by a student tested positive for norovirus**.**

Eating sandwiches from the restaurant on November 7 was statistically associated with illness, (11 of 11 cases vs. 8 of 17 controls; odds ratio undefined; 95% confidence interval, undefined; p = 0.004). Nine of these cases ate sandwiches at the student event on November 7; the other two cases reported eating sandwiches at the restaurant on November 7. No other meals or food items were significant in analysis.

EHS visited the college and interviewed food workers at the school on November 13. None of the food workers at the school reported any gastrointestinal illness. EHS also visited the restaurant on November 13. All restaurant food workers were contacted for interview; three

refused to be interviewed. None of the food workers interviewed reported any gastrointestinal symptoms. Education about norovirus and the importance of reporting illness to management and excluding ill food workers from handling food were emphasized. There was also focus on handwashing education.

This was an outbreak of norovirus gastroenteritis associated with food from a restaurant in Northfield, Minnesota. Illness was associated with the consumption of sandwiches on November 7. The most likely source of contamination was ill restaurant employees; however, this was not confirmed. Corrective actions were taken at the restaurant, including handwashing education.

(63)
Norovirus Gastroenteritis Associated with an Inn

November Washington County

On November 13, 2006, the Minnesota Department of Health (MDH) called the Washington County Department of Public Health and Environment (WCPHE) regarding a complaint to the MDH foodborne illness hotline of gastrointestinal illness associated with an inn in Stillwater. The complainant reported that five of seven individuals in their group became ill with vomiting and diarrhea following a common meal at the inn on November 10. Shortly after an investigation was initiated, the MDH foodborne illness hotline received a second complaint of gastrointestinal illness in two persons that ate at the inn on November 11. On November 14, the MDH foodborne illness hotline received a third independent complaint of illness in a group of inn patrons who ate at the restaurant on November 11.

On November 13, a team of WCPHE environmental health specialists (EHS) conducted an environmental assessment of the restaurant and lodging facilities at the inn. Menus, guest receipts and complaint information were collected. Employee work schedules, duties, and contact information were also obtained. Food service and housekeeping employee interviews were conducted on November 13 and 14. Employee food handling and housekeeping practices were reviewed and observed over the same time frame. Stool specimens were collected from four employees.

WCPHE staff interviewed patrons from three separate dinner groups to ascertain food consumption, illness history and pattern of illness among patrons. Cases were defined as inn patrons who developed vomiting and/or diarrhea (≥3 loose stools in a 24-hour period) on or after November 10. Stool specimens were collected from five patrons. All specimens were sent to MDH for bacterial and viral testing.

A case-control study was conducted to evaluate particular food items and lodging practices at the inn that may have been associated with illness. Controls were individuals who were recruited from the list of restaurant patrons who dined at the restaurant, and who reported no gastrointestinal symptoms.

Health care providers and licensed food service establishments in Washington County were notified through the WCPHE Health Alert Network of an increase in norovirus transmission in

the region and appropriate preventative and reporting actions.

Nineteen patrons were interviewed and 16 (89%) met the case definition. One patron had mild illness that did not meet the case definition. All 16 cases reported diarrhea and nausea, seven (44%) reported vomiting, and four (25%) reported low grade fever. The median incubation was 38 hours (range, 14 to 49 hours). Patron onsets were November 11, 12, and 13. The median duration of illness was 50 hours (range, 24 to 118 hours).

All five patron-case stool specimens tested negative for *Campylobacter*, *E. coli* O157, *Salmonella*, *Shigella*, and *Yersinia*, and all five were positive for norovirus with an identical nucleic acid sequence.

Meaningful statistical analysis to implicate specific foods was not possible due to the small number of interviews conducted for persons who were not ill.

During the 3-day environmental assessment, 35 food service and housekeeping employees were interviewed to ascertain their illness history and that of immediate household members, employee work schedules, work duties, food handling practices, and restaurant food consumption history. Of the 35 employees, 10 reported gastrointestinal illness with onsets ranging from November 6 to 15.

Numerous deficiencies were noted when food preparation and service procedures and housekeeping practices were observed. Violations included improper food temperatures, cross-contamination, and lack of handwashing. Employees were observed handling dirty items (tableware and housekeeping linens) and then handling clean items without washing their hands. Handwashing sinks were inaccessible and not utilized by staff. Scoops without handles were being utilized for dispensing foods. Disposable gloves were being reused. The employee illness log was not being maintained. Wet wiping cloths were not stored in sanitizer, but were sitting on food preparation surfaces. Dishwashing machine temperatures were inadequate to sanitize dishware. Three of the four employee stool specimens were positive for norovirus, and the viral sequence was identical to that of the patron-cases' specimens.

During November 13-16, the restaurant was ordered to complete a thorough cleaning and disinfection of all food preparation surfaces, food storage areas, cookware, tableware and restrooms, dining room surfaces, and common lodging room surfaces with 1,000 ppm chlorine. All opened single service food containers and prepared foods were discarded. All current and previously ill employees were excluded for 72 hours following complete resolution of gastrointestinal symptoms. Management was instructed to assertively inquire as to their employees' health on a daily basis. Bare-hand contact with food was discontinued. Inappropriate food scooping devices were replaced with approved food dispensing scoops with handles. Aggressive handwashing procedures were put in practice. Additional food service employees from another establishment, once screened for recent gastrointestinal illness, were allowed to replace the excluded employees to maintain restaurant operations and address operational and sanitizing orders.

This was an outbreak of norovirus gastroenteritis associated with eating at a Stillwater inn. A

specific food vehicle was not identified. Ill or recently ill food workers were the source of contamination. Inadequate handwashing and poor food preparation practices likely contributed to the contamination of foods and surfaces at the restaurant.

(64)
Norovirus Gastroenteritis Associated with a Funeral Luncheon

November Goodhue County

On November 17, 2006, the Minnesota Department of Health (MDH) was notified of a possible outbreak associated with a catered funeral luncheon in Red Wing, Minnesota. The original complainant stated that several family members and friends were ill after eating at the luncheon on November 13. Goodhue County sanitarians were contacted, and an investigation was initiated.

MDH obtained a partial list of funeral attendees and interviewed them to assess illness history and foods consumed at the funeral luncheon. Goodhue County sanitarians contacted the caterer to assess food-handling practices and obtain information about other catered events during the same time period.

Stool specimen collection kits were delivered to several ill complainants. A case was defined as a person who ate at the funeral luncheon and became ill with vomiting and/or diarrhea ($\geq$3 loose stools in a 24-hour period) in the 72 hours following their meal.

MDH interviewed 27 people who ate at the funeral luncheon. Fourteen people (52%) met the case definition. All cases had diarrhea, 11 (79%) had vomiting, nine (64%) had cramping, and five (36%) reported feeling feverish; none reported bloody stools. Eleven cases (79%) were female. The median age of cases was 49 years (range, 29 to 72 years). The median incubation period was 39 hours (range, 5 to 52 hours). Durations of illness could not be determined because the majority of cases had not recovered at the time their interviews were conducted. Two stool specimens from funeral luncheon attendees were submitted for testing, and both were positive for norovirus; nucleic acid sequences from the positive specimens were identical.

Luncheon attendees reported eating a variety of food items including ham and turkey sandwiches, potato salad, carrots, celery, broccoli, cauliflower, vegetable dip, coffee, and water. Eating broccoli (8 of 11 cases vs. 2 of 10 controls; odds ratio [OR], 10.7; 95% confidence interval [CI], 1.4 to 82.0; p = 0.02) and cauliflower (6 of 11 cases vs. 1 of 10 controls; OR, 10.8; 95% CI, 1.0 to 117.0; p = 0.04) were significantly associated with illness. Eating carrots and veggie dip both approached significance (9 of 11 cases vs. 4 of 10 controls; OR, 6.8; 95% CI, 0.9 to 49.2; p = 0.06; and 11 of 14 cases vs. 4 of 10 controls; OR, 5.5; 95% CI, 0.9 to 33.2; p = 0.07, respectively).

Several of the food items were commercially prepared products (e.g., potato salad, buns, and vegetable dip). The rest of the items were prepared by a single food worker, and involved extensive bare-hand contact with ready-to-eat food items (e.g., the food worker cut/sliced all of the raw vegetables and sliced the pre-cooked ham). The food worker stated that several family

members were ill with gastrointestinal symptoms in the week prior to this outbreak, and the food worker developed gastrointestinal symptoms on the day of the funeral luncheon.

This was a foodborne outbreak of norovirus gastroenteritis associated with a catered funeral luncheon in Red Wing, Minnesota. The vehicle was one or more raw vegetables such as broccoli and cauliflower. Transmission of norovirus occurred due to contamination of these food items by an ill food worker.

(65)
Norovirus Gastroenteritis Associated with a Restaurant

November Hennepin County

On November 17, 2006, Minneapolis Environmental Health (MEH) received a complaint that several members of a group of 10 persons became ill after eating at a restaurant in Minneapolis on November 14. Hennepin County Public Health Protection - Epidemiology (HCPHP) and the Minnesota Department of Health (MDH) were notified.

On November 17, MEH requested a list of patrons from the restaurant to obtain information on consumption of foods/beverages and illness history. A case was defined as a person who ate at the restaurant on November l4 and subsequently became ill with vomiting and/or diarrhea (≥3 loose stools in 24-hour period).

An MEH environmentalist visited the restaurant on November 17 to evaluate food preparation and handling procedures. Restaurant employees were interviewed regarding illness history, food consumption, and job duties performed from November 7 to November 17. A list of 24 patrons who dined at the restaurant on November 14 and used credit cards was supplied by the restaurant. Stool specimens were collected from three patrons and submitted to MDH for bacterial and viral testing.

HCPHP epidemiologists were unable to reach any patrons on the credit card list. Nine patrons from the original complainant group were interviewed; four (44%) met the case definition. All four cases had diarrhea, three (75%) reported cramps, two (50%) had vomiting, and two (50%) reported fever. The median incubation period was 37 hours (range, 29 to 43 hours). The median duration of diarrhea was 16 hours (range, 13 to 31 hours). All three stool samples collected from patrons were positive for norovirus.

An inadequate amount of control data did not allow for meaningful statistical analysis of food items consumed. Cases ate a variety of food items, including turkey panini sandwich, fries, basil pesto chicken sandwich, grilled ham and cheese sandwich, butternut squash soup, and salad. Controls ate patty melts, tilapia, risotto, and fish and chips.

Twenty-six of the 30 employees were interviewed; one employee reported onset of gastrointestinal symptoms of vomiting and diarrhea on November 15. On November 17, an MEH Code Compliance Officer inspected the restaurant. No food temperature violations were noted, and the hand sinks were properly stocked with soap, towels, and nailbrush. Employees were using disposable gloves. A food flow evaluation was done for basil pesto chicken and no major

food-safety violations were noted.

This was an outbreak of norovirus gastroenteritis associated with a Minneapolis restaurant. The vehicle was not determined. Transmission likely occurred through contamination of ready-to-eat food items by an ill employee.

(66)
Norovirus Gastroenteritis Associated with a Restaurant

November Anoka County

On November 16, 2006, the Minnesota Department of Health (MDH) received a complaint of gastrointestinal illness in five of 12 employees of a small company in Ham Lake. The company employees had ordered take-out food for lunch from a fast-food restaurant on Monday November 13 and from Restaurant A in Coon Rapids on Tuesday November 14. Based on information collected during the initial interviews, the fast-food restaurant was ruled out. The company employees had no other meals or snacks in common that week. Anoka County Community Health and Environmental Services (Anoka) was contacted and an investigation was initiated.

Epidemiology staff from MDH interviewed the employees of the company that filed the complaint about food consumption and recent gastrointestinal illness. A list of Restaurant A patrons that paid by credit card after eating at the restaurant from November 13 through November 16 was obtained. Restaurant patrons were contacted and interviewed to assess if patrons not associated with the initial complaint also became ill.

A case was defined as a person who ate at Restaurant A in Coon Rapids and subsequently became ill with vomiting and/or diarrhea (≥3 loose stools in a 24-hour period).

An Anoka environmental health specialist visited the restaurant, spoke to the manager, and reviewed the employee illness log. Anoka environmental health specialists and MDH staff interviewed restaurant employees about recent history of gastrointestinal illness and work duties. Stool specimens from ill or recently ill patrons and restaurant employees were submitted to MDH for bacterial and viral testing.

Twenty-eight persons were interviewed about food consumption and illness history. Of those, 11 were employees at the Ham Lake company that filed the complaint and 17 were Restaurant A patrons identified through credit card receipts. Thirteen persons (46%) met the case definition. Among the cases, five were part of the initial complainant group, and eight identified through credit card receipts. Twelve (92%) cases had diarrhea, nine (69%) had vomiting, eight (62%) had cramps, seven (54%) had fever, and two (15%) had bloody stools. One case (8%) sought medical care for his illness. The median incubation was 31 hours (range, 14 to 51 hours). The median duration of illness was 53 hours (range, 45 to 56 hours).

Statistical analysis found that eating salad (10 of 13 cases vs. 2 of 15 controls; odds ratio, 21.7; 95% confidence interval, 2.9 to 181.8; $p < 0.001$) was associated with illness.

Four stool specimens were collected for testing: two from the group that filed the initial complaint, and two from patrons identified through credit card receipts. All four tested negative for *Campylobacter*, *E. coli* O157, *Salmonella*, *Shigella*, and *Yersinia*, and all four were positive for norovirus. The viral sequences were identical in all four positive samples.

Of the approximately 94 restaurant employees, 14 were interviewed about illness history and work duties. Two reported a history of gastrointestinal symptoms with illness onsets on November 1 and November16. The ill employee with onset on November 16 was a manager trainee who worked on November 16 despite experiencing vomiting and diarrhea. During that shift, the ill employee helped prepare a meal for a group of 300 people. MDH contacted the organizer of that group. That person reported mild illness (nausea and cramps) with onset on November 18. Although she heard that at least two other persons experienced gastrointestinal illness, she did not provide contact information for other event attendees.

The employee illness log listed two employees as having called in sick with "flu" symptoms on November 14 and 16. The specific symptoms were not listed. The two employees were not reached for an interview despite repeated attempts. There were no additional entries on the employee illness log, including no listing for the two employees who reported a history of gastrointestinal illness.

A stool specimen was collected from the restaurant employee with illness onset on November 16. The specimen tested negative for *Campylobacter*, *E. coli* O157, *Salmonella*, *Shigella*, and *Yersinia*, but was positive for norovirus with a viral sequence identical to that of the patrons.

The environmental health specialist did not observe deficiencies in employee handwashing during the restaurant evaluation. The manager reported that employees used tongs when preparing ready-to-eat foods; however, the cook reported that the employees used gloves instead.

This was an outbreak of norovirus gastroenteritis associated with a restaurant in Coon Rapids. Salad was implicated as the vehicle. Cases of gastrointestinal illness were identified in the group that filed the initial complaint and in additional patrons who ate at the restaurant. Laboratory-confirmed norovirus infection with an identical viral nucleic acid sequence in persons from the initial complaint group, case-patrons identified using credit card receipts, and a restaurant employee indicated a common source for their illnesses. An ill employee or several ill employees were the source of contamination. An employee with gastrointestinal illness earlier in the month is likely an indication of norovirus transmission among restaurant employees.

(67)
Suspected Norovirus Gastroenteritis Associated with a Funeral Luncheon

November Hennepin County

On November 21, 2006, the Minnesota Department of Health (MDH) foodborne illness hotline received a complaint about several people developing vomiting and diarrhea following a funeral luncheon held at a restaurant in Edina, Minnesota on November 15. An investigation was initiated.

One attendee provided MDH with a list of food items served at the reception and a list of guests. Foods served at the luncheon included a buffet of chicken wild rice soup, pasta salad, coleslaw, fresh fruit, a deli tray with assorted meats and cheeses, and fresh vegetables. Guests were interviewed by phone about food consumption and illness history. A case was defined as a person who experienced vomiting or diarrhea (≥ 3 loose stools in a 24-hour period) after the funeral luncheon.

A total of 21 guests were on the list provided by the family. All guests were interviewed; 12 (57%) met the case definition, eight (38%) reported no symptoms, and one (5%) had mild symptoms that did not meet the case definition. Eleven (92%) cases had diarrhea, Seven (58%) had vomiting, six (50%) had cramps, and two (16%) had a fever, and none had bloody stools. The median incubation period was 24 hours (range, 4 to 54 hours). The median duration of illness was 48 hours (range, 24 to 152 hours).

One food item, carrots, served during the luncheon was significantly associated with illness. Eight of 12 (66%) cases and none of the eight controls reported eating carrots (risk ratio [RR], 3.0; 95% confidence interval 1.35 to 6.68; p = 0.004). No other food items were significantly associated with illness.

Public health officials from the City of Edina Environmental Health inspected the restaurant that provided the meal. Twenty-three food workers were interviewed about work duties and illness history from November 2 to the time of interview. Two workers reported illness in that time frame. One food worker reported gastrointestinal illness beginning on November 10, and this worker also may have handled the carrots the day before the event. The carrots served at the restaurant were cleaned and peeled by two dishwashers and then stored in a 5-gallon bucket of water. When needed, food prep workers would take carrots from the bucket and prepare them for a vegetable tray.

The epidemiologic and clinical characteristics of these illnesses were characteristic of norovirus gastroenteritis. Carrots served at the funeral luncheon were identified as a vehicle for infection. The source of the contamination was not confirmed, but likely was a food worker with recent gastrointestinal illness.

(68)
Suspected Norovirus Gastroenteritis Associated with a Catered Luncheon

November Goodhue County

On November 20, 2006, the Minnesota Department of Health (MDH) learned of a possible outbreak of gastroenteritis associated with a teacher's luncheon held on November 15 in Red Wing, Minnesota. On November 17, MDH had been notified of an outbreak associated with a funeral luncheon in Red Wing (see report #64). Through that investigation, MDH and Goodhue County sanitarians learned that the teacher's luncheon had been catered by the same individual who prepared the food for the funeral luncheon. When the teacher's luncheon coordinator was contacted, MDH learned that members of that group were ill after eating at the luncheon. At that point, another outbreak investigation was initiated.

MDH obtained a list of attendees and interviewed them to assess illness history and foods consumed at the luncheon. Goodhue County sanitarians contacted the caterer to assess food-handling practices and obtain information about other catered events during the same time period. A case was defined as a person who ate at the luncheon and became ill with vomiting and/or diarrhea (≥3 loose stools in a 24-hour period) in the 72 hours following their meal. No stool specimens were collected during this investigation.

MDH interviewed 64 people who ate at the teacher's luncheon; of these, 25 (39%) met the case definition. Nine people reported symptoms but did not meet the case definition; therefore, they were excluded from the analysis. Twenty-three cases (92%) had diarrhea, 13 (52%) had vomiting, 13 (52%) had cramping, 10 (40%) reported feeling feverish, and two (8%) reported bloody stools. Seventeen cases (68%) were female. The median age of cases was 53 years (range, 31 to 79 years). The median incubation period was 44 hours (range, 27 to 58 hours). For the 19 cases who had recovered by the time of their interviews, the median duration of illness was 81 hours (range, 16 to 128 hours).

Patrons reported eating a variety of food items including ham and turkey sandwiches, pasta salad, potato chips, and beverages. Eating pasta salad (25 of 25 cases vs. 23 of 30 controls; odds ratio [OR], undefined; 95% confidence interval [CI], 1.8 to undefined; $p = 0.01$) was significantly associated with illness. Eating potato chips was also significantly associated with illness (24 of 24 cases vs. 22 of 30 controls; OR, undefined; 95% CI, 2.12 to undefined; $p = 0.006$).

All foods were prepared by a single food worker, but were served at the luncheon by several different individuals. The food worker who catered this luncheon had also catered a funeral luncheon 2 days prior from which 50% of the attendees became ill with gastroenteritis after consuming the foods (see report #64). The funeral luncheon outbreak was attributed to the ill food worker (in the previous outbreak investigation, the food worker stated that several family members were ill with gastrointestinal symptoms in the week prior to the funeral luncheon; and, the food worker developed gastrointestinal symptoms on the day of the funeral luncheon).

This was a foodborne outbreak of suspected norovirus gastroenteritis associated with a catered teacher's luncheon in Red Wing, Minnesota. Pasta salad and/or potato chips were identified as likely vehicles. Transmission of norovirus occurred due to contamination of food by an ill food worker.

(69)
Norovirus Gastroenteritis Associated with a Restaurant

November Anoka County

On November 22, 2006, the Minnesota Department of Health (MDH) received a complaint of gastrointestinal illness in three persons in a group of eight that ate at a restaurant in Blaine, Minnesota on November 15; the group reported no other recent common exposures. Anoka County Community Health and Environmental Services (Anoka) was contacted and an investigation was initiated. An outbreak of norovirus gastroenteritis at another restaurant in Coon

Rapids that was part of the same chain was being investigated at the time this complaint was received (see Report # 66). During the Coon Rapids restaurant investigation, it was found that many employees worked at both locations.

Epidemiology staff from MDH interviewed persons in the complaint group about food consumption and recent gastrointestinal illness. A case was defined as a person who ate at the Blaine restaurant and subsequently became ill with vomiting and/or diarrhea (≥3 loose stools in a 24-hour period). Stool specimens from ill or recently ill patrons were submitted to MDH for bacterial and viral testing.

An Anoka environmental health specialist conducted an assessment of the restaurant, reviewed the employee illness log, and interviewed restaurant employees about recent history of gastrointestinal illness and work duties.

Eight persons were interviewed about food consumption and illness history. One person had mild symptoms that did not meet the case definition so was excluded from further analysis. Two persons (29%) met the case definition. Both cases reported diarrhea, vomiting and cramps, one reported a fever, and neither reported bloody stools. Illness incubation periods were 36 and 37 hours. Durations of illness were 27 and 63 hours.

The cases ate pizza, garlic bread and a sandwich. Statistical analysis to implicate a specific food item was not possible due to the small number of patrons interviewed.

Stool specimens were collected from both cases. Both tested negative for *Campylobacter*, *E. coli* O157, *Salmonella*, *Shigella*, and *Yersinia*, but both were positive for norovirus. The viral sequences matched each other and the sequence found in ill patrons and employees during the Coon Rapids restaurant investigation.

Thirty-one employees were interviewed about illness history and work duties. The number of employees reporting a recent history of gastrointestinal illness, if any, was not reported to MDH. The employee illness log did not list any employees as having called in sick. Many employees also worked at the Coon Rapids location, where illness among restaurant employees was identified and norovirus was confirmed.

The environmental health specialist observed employee handwashing during the restaurant visit, and did not observe any deficiencies. Utensils, gloves and other barriers were used during food preparation. The environmental health specialist discussed the need to document illness calls from employees, and also discussed the implications of the complaint in the context of the outbreak at the Coon Rapids location.

This was an outbreak of norovirus gastroenteritis associated with a restaurant in Blaine. Although it is unknown if restaurant employees reported a history of recent gastrointestinal illness, this outbreak was detected just days after a norovirus outbreak at another restaurant in the same chain was detected. Many restaurant employees worked at both restaurant locations. Laboratory-confirmed norovirus infections in patrons of the Blaine restaurant with an identical viral nucleic acid sequence as the patrons and employees specimens of the Coon Rapids

restaurant indicated a common source for illnesses at both restaurants. Therefore, an ill employee or several ill employees were likely the source of contamination.

(70)
Norovirus Gastroenteritis Associated with a Restaurant

November Hennepin County

On November 27, 2006, the Minnesota Department of Health (MDH) foodborne illness hotline received a complaint of illness among a party of nine who had eaten dinner at a restaurant in Minneapolis, Minnesota on November 24. Six members of this party reported illness following their meal. On November 27, MDH notified Hennepin County Public Health Protection (HCPHP) and Minneapolis Environmental Health (MEH) of this complaint. An investigation was initiated.

HCPHP epidemiologists interviewed members of the complainant group on November 27 and 28. Reservation records were requested from the restaurant, but complete records with sufficient contact information were not received until December 6. At that time, additional patrons who dined on November 24 were interviewed. On November 28, MEH sanitarians inspected the restaurant, focusing on food preparation practices and employee health and hygiene.

A case was defined as a person who ate dinner at the restaurant on November 24 and subsequently became ill with vomiting or diarrhea ($\geq$3 loose stools in a 24-hour period). Stool specimens from two patrons were submitted to the MDH Public Health Laboratory for bacterial and viral testing.

A total of 75 patrons who had eaten at the restaurant on November 24 were interviewed. Of these, eight (11%) met the case definition. Of the eight cases, seven (88%) had cramps, six (75%) had diarrhea, six (75%) had vomiting, and four (50%) reported fever. The median incubation was 10.5 hours (range, 6 to 44 hours). The median duration of illness was 16 hours (range, 3 to 48 hours). Six cases (75%) were female.

Two stool specimens from cases who ate dinner on November 24 tested positive for norovirus. Nucleic acid sequences for these viral samples were identical.

Patron cases had eaten a variety of foods, including salads, appetizers, entrees, and desserts. By univariate analysis, Japanese sashimi (3 of 7 cases vs. 4 of 66 controls; odds ratio [OR], 11.6; 95% confidence interval [CI], 1.9 to 70.8; $p = 0.002$), mushroom eggrolls (4 of 7 cases vs. 10 of 66 controls; OR, 7.5; 95% CI, 1.4 to 38.5; $p = 0.007$), red snapper sushi (3 of 7 cases vs. 1 of 66 controls; OR, 48.8; 95% CI, 4.1 to 581.1; $p < 0.001$), and salmon (3 of 7 cases vs. 3 of 66 controls; OR, 15.8; 95% CI, 2.4 to 104.5; $p < 0.001$) were significantly associated with illness. Multivariate analysis using stepwise logistic regression resulted in a model containing only mushroom egg rolls (adjusted OR, 22.8; 95% CI, 1.7 to 307.8; $p = 0.018$).

Management had not received any other reports of patron illness and currently did not have any ill employees. The MEH sanitarians noted overall compliance with food code requirements and

no critical violations. A food flow assessment of the mushroom egg rolls did not reveal any deficiencies in preparation, and handwashing sinks were fully stocked and appeared to be in use. Preparation and handling of foods were discussed with restaurant management. Educational materials were also provided to management.

During a pre-shift meeting, 56 employees were screened for illness since November 1. This was done in a group setting by management. No employees reported illness and none were excluded. Management received no further complaints of illness.

This was an outbreak of norovirus gastroenteritis associated with a Minneapolis restaurant. Mushroom eggrolls were statistically implicated as the vehicle. The source of contamination was not determined. However, food workers were not individually interviewed, and may have been the ultimate source of the patron illnesses. The establishment was instructed on the importance of limiting bare-hand contact of food items, frequent handwashing and excluding ill food workers from work until 72 hours after symptom resolution.

(71)
Norovirus Gastroenteritis Associated with a Restaurant-Provided School Lunch

November Carver County

On Tuesday December 5, 2006, the school nurse from a school in Chanhassen, Minnesota, called the Minnesota Department of Health (MDH) foodborne illness hotline to report an increase in the number of students absent from school or reporting to the nurse's office with symptoms of gastrointestinal illness. The nurse mentioned that the first reports of gastrointestinal illness in students and staff occurred on November 29, but a large peak of illness occurred on December 1 and December 2. An absentee list was provided by the nurse to MDH on December 6 along with a school lunch menu. The school absentee list for December 1-4 included approximately 120 ill students and staff from a school with 353 students and 48 staff. It was noted that a number of the ill students reported eating school lunch on November 30 which consisted of 240 assorted sub sandwiches from a restaurant in Chanhassen. Carver County Department of Health and MDH Environmental Health Services (EHS) were notified and an investigation was initiated.

Public health officials from MDH visited the school and the restaurant on December 8. Employees at both locations were interviewed and a food-handling review was conducted. MDH obtained a complete school roster and attendance/absentee lists for the weeks of November 27 and December 4. A random sample of all students in the school, regardless of illness status, was taken and these students were interviewed to assess their symptoms and food consumption histories.

A case was defined as a student or staff member at the school with vomiting and/or diarrhea (≥3 loose stools in a 24-hour period) in December. Stool specimens were obtained from ill students.

Interviews were completed for 67 students and one faculty member; 26 (38%) met the case definition. An additional seven people experienced illness not meeting the case definition and were excluded from the analysis. Twenty-three (88%) cases had vomiting, 17 (65%) had

diarrhea, 15 (60%) had cramping, and 15 (60%) reported fever.

Eating school lunch during the week of November 27 through December 1 was significantly associated with illness (24 of 24 cases vs. 26 of 37 controls; odds ratio [OR], undefined; 95% confidence interval [CI], undefined; $p = 0.003$). Eating sandwiches at school on November 30 was also significantly associated with illness (21 of 26 cases vs. 16 of 36 controls; OR, 5.3; 95% CI, 1.45 to 21.3; $p = 0.004$).

Based on this information, the case definition was narrowed to those who became ill within 48 hours of school lunch on November 30. With this new case definition, eating school lunch during the week of November 27 through December 1 was still significantly associated with illness (19 of 19 cases vs. 26 of 37 controls; OR, undefined; 95% CI undefined; $p = 0.009$), and eating sandwiches was also significantly associated with illness (18 of 19 cases vs. 16 of 36 controls; OR, 22.50; 95% CI, 2.80 to 983; $p < 0.001$). The median incubation period from the sandwich meal was 35.5 hours (range, 28 to 48 hours). The median duration of illness was 34 hours (range, 9.5 to 129 hours).

Three stool specimens collected from students and their families tested positive for norovirus. Nucleic acid sequencing was conducted on two of the positive norovirus samples; the nucleic acid sequences were identical.

There was at least one vomiting incident at the school on December 1, and another one on December 2. The school nurse stated that there were some reports of gastrointestinal illness in students' families prior to the sandwich meal.

EHS visited the school and interviewed food workers at the school. None of the food workers at the school reported any gastrointestinal illness. EHS also visited the restaurant. All restaurant food workers were interviewed, and five reported having recent gastrointestinal symptoms. The employees' onset dates were as follows: November 26, November 30, December 2, December 3, and December 6. The employees' job titles included supervisors and sandwich artists. Management had attempted to exclude ill employees; however, at least two of the ill employees had not reported illness to management. Education about norovirus and the importance of reporting illness to management and excluding ill food workers from handling food was emphasized. There was also focus on handwashing education.

This was an outbreak of norovirus gastroenteritis associated with consumption of sandwiches from a restaurant that served at a school cafeteria. The peak of illness was associated with sandwich consumption on November 30. Subsequent illnesses occurred, likely due to person-to-person transmission. The most likely source of contamination was ill restaurant employees.

(72)

Escherichia coli O157:H7 Infections Associated with Shredded Lettuce at a Mexican-Style Fast Food Restaurant Chain

November-December Multiple counties/Multiple states

On December 8, 2006, the Minnesota Department of Health (MDH) received a report from a microbiologist with the Albert Lea Medical Center that the hospital microbiology lab had recently identified three *E. coli* O157 (O157) isolates. Two originated from patients with bloody diarrhea who had presented to the ER. Two days later, two additional calls were received from a hospital in Austin, Minnesota, which is close to Albert Lea. An ER physician reported two patients who presented with bloody diarrhea, and an infection control practitioner reported eight presumptive O157 isolates. After follow-up with the infection control practitioner at Albert Lea Medical Center, five initial patients were identified, and they were interviewed on December 11. All five had eaten at Restaurant A in Albert Lea, Minnesota during the week before their illness onset. Also on December 11, MDH became aware of a concurrent outbreak of O157 infections associated with Restaurant Chain A in Cedar Falls, Iowa.

On December 11, MDH issued a press release and health alert to enhance case finding. All persons who developed bloody diarrhea after eating at a Chain A restaurant in Minnesota since November 23, 2006, were encouraged to report their illness to MDH. A hotline was established for reporting illness and to address questions from the public.

Potential cases were interviewed by phone about illness history and food consumption at Restaurant Chain A. Stool kits were sent overnight to persons who reported bloody diarrhea, who ate at a Chain A restaurant in Minnesota during the week prior to illness onset, and who were willing to submit a stool sample. All O157 isolates received by the MDH Public Health Laboratory through routine surveillance or cultured from stool kit submissions were subtyped by pulsed-field gel electrophoresis (PFGE) with the restriction enzymes *Xba*1 and *Bln*1.

A confirmed case was defined as a person who had a culture-confirmed O157 infection with illness onset within 1 week after eating at Chain A restaurant, with a meal date from November 24 through December 15. All culture-confirmed cases had eaten at a Chain A restaurant in either Albert Lea or Austin. Therefore, a probable case was defined as a person who developed bloody diarrhea within 1 week after eating at one of these two implicated restaurants with a meal date from November 24 through December 15.

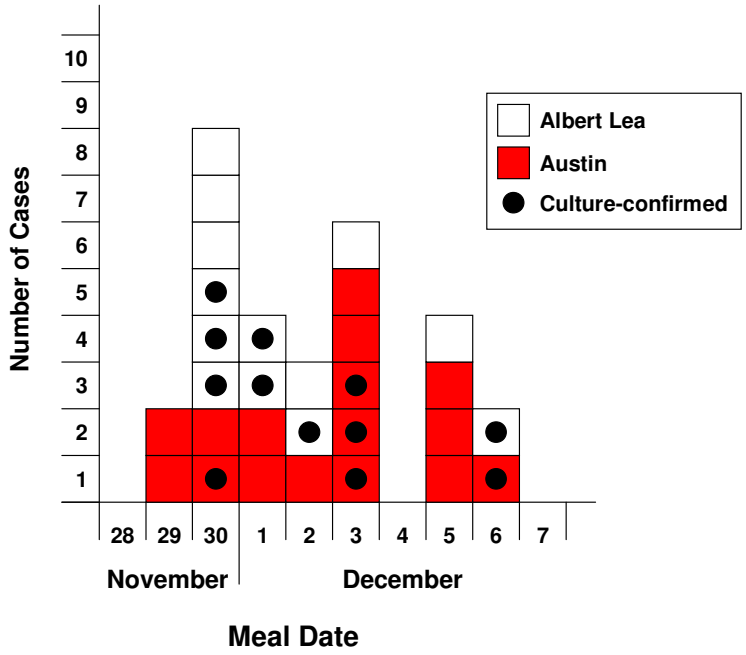
A case-control study was conducted among patrons at the implicated restaurants. Cases included confirmed and probable cases as described above. Well meal companions of cases served as controls. Consumption of menu items was recorded for both cases and controls. Ingredients from each menu item were identified from a Chain A restaurant menu, and ingredient specific analyses were conducted.

The Minnesota Department of Agriculture (MDA) Dairy and Food Inspection Division and the United States Food and Drug Administration (FDA) jointly conducted traceback investigations of the epidemiologically implicated product. MDH and MDA collected leftover product from

case-households for testing at the MDA Laboratory.

Case Finding and Case-Control Study
A total of 124 persons reporting illness were interviewed. Twelve (10%) persons met the confirmed case definition, 20 (16%) met the probable case definition, and 92 (74%) had mild symptoms that did not meet the case definition. Among all confirmed and probable case-patients (n = 32), the median age was 26.5 years (range, 3 to 62 years). Seventeen (53%) case-patients were male. All case-patients reported bloody diarrhea (as per the case definition); the median duration of diarrhea for those who had recovered at the time of interview was 5 days (range, 2 to 12 days). Fifteen (47%) case-patients had ongoing illness at the time of interview. Abdominal cramping was reported by 31 (97%) case-patients, and 18 (56%) reported a low-grade fever (≤101° Fahrenheit). Overall case meal dates ranged from November 29 to December 6, while culture-confirmed case-patient meal dates ranged from November 30 to December 6 among those who could recall a specific meal date; (see epidemic curve). Illness onset dates ranged from December 1 to December 10. Eight (25%) case-patients were hospitalized and one developed hemolytic uremic syndrome. No deaths occurred.

E. coli O157:H7 Cases Associated with a Fast Food Restaurant in Minnesota, by Meal Date, 2006



Eleven of the culture-confirmed cases had isolates from stool that were indistinguishable by PFGE using both enzymes (designated PulseNet *Xba*1 pattern EXHX01.3596 and *Bln*1 pattern EXHA26.1417). These PFGE patterns were also indistinguishable from the outbreak isolates from Iowa. One Minnesota case-isolate differed by one band using *Xba*1. An 8-year-old female patient who had culture-confirmed O157 infection with the primary outbreak PFGE subtype was classified as a secondary case; this patient did not eat at Restaurant Chain A but developed bloody diarrhea a week after illness onset in her sibling, who was a probable case.

Two additional clinical isolates that were indistinguishable by PFGE from the primary outbreak strain were submitted to MDH through routine surveillance during December, but the patients did not meet the case definition. One patient did not recall eating at an implicated Chain A restaurant but lives in the same town as one of the implicated restaurants. The remaining case lives in northern Minnesota and reported not eating at a Chain A restaurant.

The case-control study of Restaurant Chain A patrons was conducted during December 11-15. All 32 confirmed and probable cases, and 21 controls, were enrolled. One food item, shredded iceberg lettuce, was significantly associated with illness (31 of 32 cases reported consuming shredded lettuce vs. 9 of 21 controls (odds ratio, 41.3; 95% confidence interval, 4.7 to 362.3; $p < 0.001$)). No other ingredients were associated with illness. A separate analysis in Iowa also found shredded lettuce to be significantly associated with illness (Iowa Department of Public Health, personal communication).

Product Testing and Traceback

Three leftover tacos collected from case-households were submitted to the MDA Laboratory for culture during the initial week of the investigation; all three were negative for O157. Sanitarians from MDH inspected the two outbreak restaurants in Albert Lea and Austin on December 11. The employee illness log showed no ill food workers prior to the meal dates of cases in either restaurant. No food handling violations were found. Product samples from all menu ingredients were collected and cultured for O157; all food samples were negative.

The Minnesota Department of Agriculture obtained invoices from the restaurants, which identified Distributor A in Rice, Minnesota as the primary distributor for these Chain A restaurant locations. Distributor A was contacted, and distribution records indicated that Distributor A received the majority of its produce and all of its shredded lettuce from a supplier in Saint Paul, Minnesota. All Chain A restaurants associated with cases in Minnesota and Iowa were on the same Distributor A delivery route. Case meal dates were best explained by the delivery sequence of the November 28 shipment which delivered product sequentially to Chain A restaurants in Owatonna, then Albert Lea, then Austin, then Waterloo, Iowa, then Cedar Falls, Iowa, and then to another chain in Grundy Center, Iowa. Records from the supplier and Distributor A indicated that fine-shredded lettuce with a Best if Used By (BIUB) date of December 4 and possibly December 7 would have been on this truck.

The MDA traceback investigation identified several shipments to the supplier from November 17 through November 20, 2006, that could have been used in the production of fine-shredded lettuce shipped via Distributor A to the outbreak-associated Chain A locations in Minnesota and Iowa. Fine-shredded lettuce with a BIUB date of December 4 (produced on November 22 at the supplier and delivered to Chain A restaurant locations on November 28) was the product that best explained the outbreak based on delivery routes and case meal dates.

Some inconsistencies between supplier production and distribution records were identified. Production records indicated that no fine-shredded lettuce with a BIUB of December 7 was produced (this product would have been processed on November 25) but distribution records referenced fine-shredded product with a BIUB of December 7 being shipped. However, production and distribution records from the supplier and Distributor A indicated that the

majority of the product delivered to the Chain A restaurant locations in Minnesota and Iowa on November 28 was most likely fine-shredded lettuce with a BIUB date of December 4.

Based on the implicated lettuce with a BIUB of December 4, two shipments received by the supplier were identified as the possible sources of contaminated product. On January 12, 2007, FDA issued a press release stating that investigators in California, "have DNA-matched the strain of *E. coli* O157:H7 bacteria associated with the outbreak with two environmental samples gathered from dairy farms near a lettuce growing area in California's Central Valley" (http://www.fda.gov/bbs/topics/NEWS/2007/NEW01546.html, accessed on February 15, 2007). These samples were taken from two dairy farms that were adjacent to the lettuce growing operation associated with a shipment received by Bix that temporally correlated with the production and distribution of shredded lettuce consumed at the implicated restaurants.

This was a multi-state outbreak of *E. coli* O157:H7 infections associated with shredded iceberg lettuce consumed at a multiple locations of a restaurant chain in Minnesota and Iowa. Thirty-two cases were identified in Minnesota. Epidemiologic implication of shredded iceberg lettuce occurred within 2 days of initial recognition of the outbreak. A rapid traceback investigation by MDA enabled the FDA to quickly identify potential source fields for the contaminated lettuce and collect environmental samples that yielded the outbreak strain of O157.

Since 1995, 22 lettuce-associated O157 outbreaks have occurred in the United States. In 2005, the FDA issued a "Letter to California Firms that Grow, Pack, Process, or Ship Fresh and Fresh-cut Lettuce". The letter stated FDA's serious concern with the continuing outbreaks of foodborne illness associated with consumption of fresh and fresh-cut lettuce and other leafy greens, and outlined FDA's planned actions and actions expected of the industry to improve the safety of their products. It is clear that interventions to prevent further contamination need to be intensified and expedited.

(73)
Norovirus Gastroenteritis Associated with a Restaurant

December Ramsey County

On December 4, 2006, the Minnesota Department of Health (MDH) foodborne illness hotline received a complaint of illness among friends and family members who attended a birthday party at a restaurant in Vadnais Heights, Minnesota. The complainant stated that at least 13 people from a group of 34 had symptoms of gastrointestinal illness after eating at the restaurant on December 2. Sanitarians from the Ramsey County Department of Public Health (RCDPH) were notified, and an outbreak investigation was initiated.

Epidemiologists from MDH interviewed party attendees to obtain information on food/beverage consumption and illness history. A case was defined as a party attendee who subsequently developed vomiting or diarrhea ($\geq$3 loose stools in a 24-hour period). Stool specimens were obtained from six party attendees and three employees and submitted to MDH for bacterial and viral testing.

A sanitarian from RCDPH visited the restaurant to evaluate food preparation and handling procedures and to interview staff regarding recent illness and job duties.

Illness histories and exposure information were obtained from 32 (94%) of 34 party attendees. Twenty-six (81%) cases were identified. One person reported illness but did not meet the case definition, and thus was excluded from further analysis.

Of the 26 cases, 22 (85%) reported cramps, 21 (81%) reported diarrhea, 17 (65%) reported vomiting, and nine of 25 (36%) reported fever. The median incubation period was 30 hours (range, 8 to 62 hours). The median duration of illness was 16 hours (range, 8 to 54.5 hours) for the 17 people who had already recovered at the time of interview. Five (83%) of six attendees who submitted stool samples tested positive for norovirus.

Upon inspection of the restaurant, the RCDPH sanitarian found that the restaurant had received no additional complaints of illness. The restaurant was allowed to remain open contingent on the restaurant instituting recommendations/restrictions including no bare-hand contact with ready-to-eat foods, excluding ill employees for 72 hours and submitting a list of excluded employees to RCDPH, and educating employees on proper hand hygiene.

Five (17%) of 30 restaurant employees reported symptoms of gastrointestinal illness with onsets from November 7 to December 4. Of these five, three (60%) reported diarrhea, three (60%) reported vomiting, and two (40%) reported cramps. All three employees tested were positive for norovirus. All positive patron samples and two of three positive employee samples yielded an identical nucleic acid sequence.

There was a limited menu available at the party, consisting of appetizers, cakes, and beverages, and no food item was statistically associated with illness.

This was a foodborne outbreak of norovirus gastroenteritis associated with a restaurant in Vadnais Heights. A specific food vehicle was not identified. The source of contamination was one or more ill food workers. As a result of the outbreak, the restaurant implemented a new employee illness policy requiring workers who report gastrointestinal illness to stay home for 72 hours following resolution of symptoms.

(74)
Norovirus Gastroenteritis Associated with a Restaurant

December Goodhue County

On December 7, 2006, the Minnesota Department of Health (MDH) foodborne illness hotline received two independent complaints of gastrointestinal illness in persons that ate at a restaurant in Red Wing, Minnesota. The first complainant reported illness in two persons that ate together at the restaurant at noon on December 2. The second complainant reported illness in all three who ate at the restaurant on the same date and time as the first complaint group. Goodhue County Environmental Health Department (GCEHD) was contacted, and an investigation was initiated on December 7.

Epidemiology staff from MDH interviewed persons from both complaint groups about illness history and foods and beverages consumed at the restaurant. A case was defined as a person who ate at the restaurant and subsequently became ill with vomiting and/or diarrhea (≥3 loose stools in a 24-hour period). Stool samples collected from patrons with a history of gastrointestinal illness were submitted to MDH for bacterial and viral testing.

An environmental health specialist from GCEHD conducted an environmental health assessment of the restaurant. The environmental health specialist and MDH staff interviewed employees about recent history of gastrointestinal illness and work duties.

Four patrons (two from each complaint) were interviewed about food consumption and illness history. All four met the case definition. All reported diarrhea and vomiting, three (75%) reported cramps, and none reported fever or bloody stools. None of the cases sought medical care for their illness. The median incubation was 34 hours (range, 13 to 35 hours). The median duration of illness was 72 hours (range, 59 to 81 hours).

Stool specimens were collected from all four cases in the two complaint groups. The four specimens tested negative for *Campylobacter*, *E. coli* O157, *Salmonella*, *Shigella*, and *Yersinia*, but all were positive for norovirus with an identical nucleic acid sequence.

The four patron cases had eaten salads, a sandwich (Reuben, burger, club, or chicken), and drank a soft drink (diet soda or iced tea).

Fifty-two restaurant employees were interviewed about illness history and duties. Seventeen employees reported a recent history of gastrointestinal symptoms, with illness onsets ranging from November 17 through December 10. Several employees worked while ill, including two workers with illness onsets on December 1 and 2 who were on the schedule on December 2, the complainants' meal date. None of the recently ill employees submitted specimens for testing. The restaurant excluded workers with gastrointestinal symptoms for 72 hours after symptom cessation. The restaurant closed overnight for cleaning.

This was an outbreak of norovirus gastroenteritis associated with eating at a restaurant in Red Wing, Minnesota. Cases were identified among persons of two separate groups that ate at the restaurant on the same day. Laboratory-confirmed norovirus infection with an identical viral nucleic acid sequence in persons from both complaint groups indicated a common source for their illnesses. A specific food vehicle was not identified. A high proportion of restaurant employees reported a recent history of gastrointestinal illness, and several worked while ill. The ill restaurant workers served as the source of contamination. Although efforts to identify more ill patrons were not undertaken, the extent of illness among employees likely resulted in transmission to more patrons than the ones identified.

(75)
Norovirus Gastroenteritis Associated with a Restaurant

December Dakota County

On December 8, 2006, the Minnesota Department of Health (MDH) foodborne illness hotline received a complaint about three people developing vomiting and diarrhea that had eaten at an a restaurant in Burnsville, Minnesota on December 3. The complainant also reported that two people from an additional party of four had also developed similar symptoms and dined at the same restaurant on the same day.

MDH epidemiologists interviewed diners from both parties about food consumption and illness history. A case was defined as a person with vomiting or diarrhea ($\geq$3 loose stools in a 24-hour period) after eating at the restaurant. Stool kits were sent to ill persons who consented to submitting a stool sample. A sanitarian from MDH visited the restaurant to access food preparation and handling procedures and interview staff regarding recent illness.

A total of six diners were interviewed; four (67%) met the case definition and two (33%) reported no symptoms. All cases reported vomiting and abdominal cramps, three reported diarrhea, and two reported fever. The median incubation period was 36 hours (range, 34 to 38 hours). The median duration of illness was 55 hours (range, 29 to 60 hours). Diners consumed a variety of foods including fried sweet potatoes, steak fajitas, French onion soup, fries, lettuce salad, and a chicken sandwich. Two stool kits were sent to two ill cases; both were returned to MDH and both were positive for norovirus. Nucleic acid sequencing was conducted and both sequences were identical.

The restaurant manger denied receiving any additional complaints from patrons. A total of 40 food workers were interviewed about illness history and work duties. Two workers reported illness after November 17. One worker reported vomiting on November 25 and diarrhea on December 9, and the other reported episodes of vomiting and diarrhea on December 8 through December 11.

This was a foodborne outbreak of norovirus gastroenteritis associated with a restaurant. Although no specific food item was implicated, there was evidence of illness transmission among the food workers at the restaurant. It is likely that an ill food worker may have contaminated the food items consumed by the cases.

(76)
Norovirus Gastroenteritis Associated with a Restaurant

December Ramsey County

On December 6, 2006, the Minnesota Department of Health (MDH) foodborne illness hotline received a report (Complaint A) concerning illness among a group of two who dined at a restaurant in Roseville, Minnesota on December 3. On December 8, the MDH foodborne illness hotline received a second, independent report (Complaint B) of illness from an individual who

also dined at the same restaurant in Roseville on December 4. The Ramsey County Health Department (RCHD) was notified and an investigation was initiated.

The complainants were interviewed to assess their symptoms and food consumption histories. Public health officials from the RCHD visited the restaurant on December 13 to interview employees and conduct a food-handling review. A case was defined as a person who ate at the restaurant and subsequently became ill with vomiting and/or diarrhea (≥3 loose stools in a 24-hour period). Stool specimens were obtained from two ill patrons.

All three patrons interviewed met the case definition. All three cases had diarrhea, one (33%) had vomiting, and one (33%) had cramping. None of the cases reported fever or bloody stools. The median incubation period was 31 hours (range, 29 to 32 hours). One of the cases was still experiencing symptoms at the time they were interviewed; for the two people who had recovered, the median duration of illness was 26 hours (range, 24 to 27 hours). None of the cases called or visited their medical provider. Two stool samples were collected and both samples tested positive for norovirus.

Due to the small number of patrons in this investigation and lack of controls, a case-control study to evaluate potential food vehicles could not be performed. However, foods consumed by patrons included taco supreme burritos, tacos, and taco salad.

Fifteen of 18 food workers were interviewed. One food worker admitted to having gastrointestinal symptoms in the week prior to December 2 and reported working the week after their illness. This illness was not reported to management. This worker's duties included preparing foods. As not all food workers were interviewed, it is possible that there were other ill employees during this time period. Investigation by officials from the RCHD found no other major problems with the restaurant.

This was an outbreak of norovirus gastroenteritis associated with a restaurant in Roseville, Minnesota. The source of contamination was likely an ill food worker. Corrective actions were taken at the restaurant, including handwashing education.

(77)
Norovirus Gastroenteritis Associated with a Restaurant

December Carver County

On December 11, 2006, the Minnesota Department of Health (MDH) foodborne illness hotline received a complaint of gastrointestinal illness in persons who attended a holiday party held at a restaurant on December 3 in Norwood, Minnesota. The initial complainant reported that approximately 40 of 50 persons that attended the event were ill. The complainant contacted the caterer and was told that several of the persons that prepared foods for the event were ill with "the stomach flu". The MDH Division of Environmental Health was contacted, and an investigation was initiated.

Epidemiologists from MDH obtained a partial list of names and contact information for

attendees of the holiday party. Persons were interviewed about recent gastrointestinal illness and foods and beverages consumed at the event. Names and contact information were obtained for two other events catered by the establishment on December 2 and 3. Stool samples collected from patrons with a history of gastrointestinal illness were submitted to MDH for bacterial and viral testing.

A case was defined as a person who attended an event catered by the restaurant and subsequently became ill with vomiting and/or diarrhea (≥3 loose stools in a 24-hour period). MDH environmental health specialists conducted an environmental health assessment of the establishment and interviewed employees about recent history of gastrointestinal illness and work duties.

Thirty-five persons who attended the holiday party were interviewed about food consumption and illness history. Additionally, two persons from a different event catered on December 3 were also interviewed. The contact phone number provided for the event catered on December 2 was incorrect, and therefore the person listed for that event was not interviewed. Two persons had a history of mild gastrointestinal illness that did not meet the case definition; they were excluded from analyses. Fourteen persons (40%) met the case definition (12 from the holiday party and the two persons from the other event). Among the cases, 13 (93%) had diarrhea, 12 (86%) had cramps, nine (64%) had vomiting, four (29%) had fever, and none reported bloody stools. None of the cases sought medical care for their illness. The median incubation was 30 hours (range, 14.5 to 71 hours). The median duration of illness was 70 hours (range, 14 to 116 hours).

The menu for both events was identical and included chicken, mashed potatoes, dressing, gravy, corn, cole slaw, cranberries, rolls, cookies, ice cream, nuts, mints, soda, milk, water, and coffee. Eating cole slaw was associated with illness (11 of 12 cases vs. 3 of 14 controls; odds ratio, 40.3; 95% confidence interval, 3.73 to 942; $p < 0.001$). No other food items were significantly associated with illness.

Six stool specimens were collected from holiday party attendees for testing. All six tested negative for *Campylobacter*, *E. coli* O157, *Salmonella*, *Shigella*, and *Yersinia*, and all were positive for norovirus. Nucleic acid sequencing was conducted on five of the six positive specimens and the sequences were all identical.

All 23 restaurant employees were interviewed, and six (26%) reported a recent history of gastrointestinal symptoms. Dates of illness onset among the employees ranged from December 1 through December 11. Although the employees reported not working while ill, the manager reported that two of the employees stayed home due to vomiting on December 2 and returned to work on December 3, one as a cook for the restaurant (not for the party) and one as a server for the party. None of the recently ill employees submitted stool specimens for testing.

According to the manager, utensils were used to prepare the cole slaw; however, during the environmental health evaluation, employees were observed having both gloved contact and bare-hand contact with the food. The person that prepared the cole slaw reported no recent gastrointestinal illness. The environmental health assessment focused on ensuring that restaurant management and employees understood how to prevent foodborne illness.

This was an outbreak of norovirus gastroenteritis associated with events held on December 3 at a restaurant in Norwood, Minnesota. Eating cole slaw was associated with illness. Ill or recently ill employees were the source of contamination.

(78)
Norovirus Gastroenteritis Associated with a Restaurant

December Jackson County

During December 11-13, 2006, Cottonwood/Jackson County Public Health received nine independent complaints of gastrointestinal illness among patrons who ate at a restaurant in Bergen, Minnesota on December 10. The complaints were forwarded to the Minnesota Department of Health (MDH) and an investigation was immediately initiated.

Cottonwood/Jackson County Public Health staff provided MDH staff with illness information and the names and phone numbers of the complainants who ate at the restaurant. MDH staff interviewed them about food consumption and illness history. A case was defined as a person who ate at the restaurant and subsequently developed vomiting and/or diarrhea ($\geq$3 loose stools in a 24-hour period). Two stool kits were sent to complainants.

MDH staff conducted an environmental health assessment at the restaurant. The manager of the establishment was asked about employee illness during December, staff at the restaurant were interviewed, and food preparation practices were observed and discussed.

Eight patrons representing five complaints were reached for interview, and six met the case definition. All six cases reported diarrhea, five (83%) reported vomiting, five (83%) reported cramps, and four (75%) reported fever. No cases reported bloody stools. One case was hospitalized. The median incubation period was 27.5 hours (range, 22 to 39.5 hours). The median duration of illness could not be calculated since all six cases were still recovering when interviewed. One patron submitted a stool sample; it tested positive for norovirus.

The restaurant did not have other patron names or contact information, and some of the complainants could not be reached. Cases ate a variety of foods, including salads, fish, and baked potatoes. Since only eight patrons could be interviewed, a meaningful statistical analysis could not be conducted.

Employee interviews revealed that no employees were ill in the previous month, though one employee had a child at home with vomiting and diarrhea. This employee prepared and handled ready-to-eat foods (including salads) at the restaurant on December 10. The restaurant prepared several salads ahead of time for dinner patrons, but did not have space to prep enough salads for the night. Wait staff and other staff at the restaurant prepared salads as needed after the initial salads were served. Several staff members were handling ready-to-eat foods without gloves at the restaurant with minimal opportunity for handwashing. All staff members were educated about the importance of handwashing and the proper use of tongs or gloves when possible. Management and staff were also educated on the importance of excluding ill food workers and the possibility of transmission of illness from food workers to patrons.

This was an outbreak of norovirus gastroenteritis associated with a restaurant in Bergen, Minnesota. The source of contamination was likely a food worker with an ill household member.

(79)
Norovirus Gastroenteritis Associated with a Restaurant

December Dakota County

On December 22, 2006, the Minnesota Department of Health (MDH) foodborne illness hotline received a complaint of gastrointestinal illness in two of three persons that ate at a restaurant in Lakeville, Minnesota at noon on December 13. The two ill persons in the complaint group lived in different households and had no other common exposures. The MDH Division of Environmental Health was contacted, and an investigation was initiated on December 22.

Epidemiology staff from MDH interviewed persons from the complaint group about illness history and foods and beverages consumed at the restaurant. A case was defined as a person who ate at the restaurant and subsequently became ill with vomiting and/or diarrhea (≥3 loose stools in a 24-hour period). Stool samples collected from patrons with a history of gastrointestinal illness were submitted to MDH for bacterial and viral testing.

MDH environmental health specialists conducted an environmental health assessment of the restaurant and asked the restaurant management about recent history of gastrointestinal illness in employees.

The two ill persons from the complaint group met the case definition. Both reported diarrhea, one reported vomiting, one reported cramps, and neither reported fever or bloody stools. The cases did not seek medical care for their illness. The cases had illness onset on December 14, with incubations of 32 and 33.5 hours, respectively. Illness durations were 48 hours and 89.5 hours.

Stool specimens were collected from both cases. Both specimens tested negative for *Campylobacter*, *E. coli* O157, *Salmonella*, *Shigella*, and *Yersinia*, but both were positive for norovirus with an identical nucleic acid sequence.

Both cases had eaten cobbler salads. One case had bread on the side, and the other case also ate a walleye sandwich and French onion soup.

The restaurant manager reported that the restaurant had approximately 85 to 90 employees. The restaurant's illness log listed two recent sick calls from employees on December 13 and 18; both reported vomiting. According to the restaurant manager no employees worked while ill. Specimen collection kits were delivered to the two recently ill employees, but they did not submit specimens for testing. The restaurant was instructed to exclude workers with gastrointestinal symptoms for 72 hours after symptom cessation. Employees were not directly interviewed about illness history or work duties.

The environmental health assessment found that the restaurant had a policy for employees to

wear gloves while handling ready-to-eat foods; however, employees were observed using bare-hands to garnish plates and did not wear gloves when buttering toast, putting bread in a baskets, or conducting other similar tasks. During the assessment, employees washed their hands appropriately. The inspection report listed two items that needed correction, but those items were not relevant to this investigation.

This was an outbreak of norovirus gastroenteritis associated with eating at a restaurant in Lakeville. Laboratory-confirmed norovirus infection with an identical viral nucleic acid sequence in persons from two separate households coupled with onset of illness very close in time indicated a common source for their illnesses. The cases' only common exposure was the meal at the restaurant. A specific food vehicle was not identified. Although efforts to evaluate employee illness were not undertaken, restaurant records showed that two restaurant employees reported a recent history of gastrointestinal illness. Ill restaurant workers likely served as the source of contamination.

(80)
Suspected Norovirus Gastroenteritis Associated with a Basketball Tournament

December Anoka County

On December 19, 2006, the Minnesota Department of Health (MDH) foodborne illness hotline received a report concerning multiple persons who became ill after attending a girls basketball tournament during December 16-17 at a high school in Spring Lake Park, Minnesota and a middle school in Blaine, Minnesota. Anoka County Community Health and Environmental Services (ACCHES) was notified, and an investigation was initiated.

Contact information for participating team coaches was requested from tournament organizers. Contact information for the basketball players was requested from coaches. Coaches and players were interviewed regarding illness history and foods consumed at the tournament. A case was defined as a person who attended the tournament and subsequently became ill with vomiting or diarrhea (≥3 loose stools in 24-hour period). A stool specimen collection kit was sent to one player, but the kit was not returned.

ACCHES sanitarians visited the schools which hosted the tournament and evaluated food service during the tournament. ACCHES attempted to contact all food workers who worked at the tournament, and interviewed available food workers regarding duties and illness history.

Thirty-seven teams from 26 schools participated in the tournament. Forty-five persons were interviewed, including 18 coaches, 17 players, and 10 relatives of players. Of those interviewed, 21 (47%) met the case definition. Nineteen (90%) cases had vomiting, 14 (67%) had diarrhea, 11 (52%) had cramping, and 11 (52%) had fever. The median duration of illness was 17 hours (range, 6 to 61 hours). Illness onset dates were December 16 (1 case), December 17 (9 cases), December 18 (7 cases), and December 19 (4 cases). Based on food consumption from concession stands at the middle school on December 16, the median incubation for cases was 31.5 hours (range, 12.5 to 32 hours). In addition to ill players that were interviewed by MDH, eight coaches reported 18 more ill players from eight teams.

Concessions were available at both of the tournament venues and included hotdogs, pickles, pretzels (with or without cheese), cookies, nachos, pizza, popcorn, candy, pop, and bottled water.

In the univariate analysis, illness was significantly associated with the following variables: eating foods served at the concession stands at the tournament (20 of 21 cases vs. 10 of 22 controls; odds ratio [OR], 24.0; 95% confidence interval [CI], 3.2 to 540.4; $p < 0.001$); attending the tournament at the middle school (17 of 18 cases vs. 12 of 21 controls; OR, 6.0; 95% CI, 1.1 to 45.1; $p = 0.031$); and attending the tournament at the middle school on December 16 (16 of 19 cases vs. 10 of 20 controls; OR, 5.3; 95% CI, 1.2 to 28.0; $p = 0.023$). Eating food from the concession stands on December 16 at either the middle school or the high school (14 of 21 cases vs. 9 of 22 controls; OR, 3.5; 95% CI, 0.9 to 14.1; $p = 0.06$) approached statistical significance. In multivariate analysis including the statistically significant variables, eating foods served at the concession stands at the tournament was independently associated with illness (adjusted OR, 18.7; 95% CI, 2.1 to 167.3; $p < 0.001$).

The environmental health evaluation conducted by ACCHES sanitarians revealed that the school kitchen was not involved in the sale of concessions at either school. The concession stands at both schools were not licensed (but should have been), and handwashing facilities for food workers were not available at either stand. The stands were staffed by volunteers. ACCHES interviewed 10 volunteer food workers at the high school, and no illness was reported. Of 13 volunteer food workers from the middle school who were interviewed, three reported gastrointestinal illness. Of these, two had illness onset on December 18. The date of illness onset for the other ill volunteer food worker was not reported.

This was an outbreak of gastrointestinal illness associated concession foods served at a basketball tournament. The majority of illnesses were associated with foods from the concession stand at a middle school in Blaine on December 16. An etiology was not laboratory-confirmed, but the distribution of symptoms, illness durations, and incubation periods was characteristic of norovirus gastroenteritis. The implicated concession stand was not licensed, and the lack of handwashing facilities for volunteer food workers likely contributed to the outbreak. The source of the outbreak likely was one or more volunteer food workers who were ill during or prior to the tournament. This was not confirmed due to the fact that many of the volunteers did not call back ACCHES to be interviewed.

(81)
Norovirus Gastroenteritis Associated with a Restaurant

December Hennepin County

On December 26, 2006, the Minnesota Department of Health (MDH) foodborne illness hotline received a complaint of gastrointestinal illness among a group of three people that had eaten dinner at a restaurant in Plymouth on December 22, 2006. On December 29, after interviewing all three people in the party, MDH notified Hennepin County Public Health Department (HSPHD) epidemiology and environmental health units, and an investigation was initiated.

MDH staff interviewed members of the original complaint group about illness history and food

consumption at the restaurant. A case was defined as a person who ate at the restaurant on December 22 and subsequently became ill with vomiting and/or diarrhea (≥ 3 loose stools in a 24-hour period). Stool specimens from the three complainants were obtained for testing.

On December 29, HSPHD sanitarians inspected the restaurant and interviewed employees about illness history and work duties. The environmental health assessment of the restaurant focused on employee health and norovirus prevention education.

All three persons in the complaint met the case definition. All three cases reported diarrhea and cramps, and two (67%) reported vomiting. Incubations were 35, 35, and 39.5 hours. Durations of illness were 56 hours and 94.5 hours for two of the complainants; the other case was still experiencing symptoms at the time of interview. All three complainants were female, ages 45 to 58 years. While the three individuals all work for the same company, they do not work in the same office. They had no previous contact or meals prior to the dinner at the restaurant.

Stool samples submitted by the three ill patrons to MDH were all positive for norovirus. All three viral sequences were identical. One specimen also tested positive for *Campylobacter upsaliensis*. All three were negative for *Salmonella*, *E. coli* O157:H7, *Shigella* and *Yersinia*.

All three ill patrons ate food from the salad bar, a turkey sandwich, and French fries (two ate the turkey sandwich and French fries during dinner on December 22; one took the sandwich and French fries home and ate them on the afternoon of December 23). Items from the salad bar included lettuce, shredded cheese, black olives, onions, peppers, tomatoes, cucumbers, carrots, other raw vegetables, sunflower seeds, French dressing, ranch dressing, bacon bits, pasta salad, and potato salad. Beverages included ice water and iced-tea.

The HSPHD sanitarian contacted restaurant management via telephone on December 29. Management had not received any other reports of patron illness and currently did not have any ill employees. Due to the possibility of ongoing transmission to patrons or employee-to-employee transmission, HSPHD sanitarians inspected the restaurant on December 29 and began interviewing employees.

Of the 50 employees, 38 were interviewed (four did not have working telephone numbers and eight did not return several telephone messages. Interviewing was done at the restaurant on two different days and these 12 employees were not working on either day). One employee reported illness in the 2 weeks prior to the meal in question. This employee experienced 79.5 hours of vomiting, cramping, and fever which resolved on the evening of December 17. Although this employee did not work while experiencing symptoms, he did return to work as a bartender/server on December 18 and also worked on December 21 and 22. Two additional employees reported illness after December 22. One experienced 24 hours of vomiting and diarrhea beginning on the evening of December 24 and another reported 17.5 hours of diarrhea beginning on December 25. Both also reported that other members in their households were ill with similar symptoms.

The HSPHD sanitarian noted overall compliance with food code requirements and no critical violations. Preparation and handling of foods, especially those in the salad bar, were discussed with restaurant management. The sanitarian further stressed the importance of proper handling of

food and beverages, use of gloves when handling ready-to-eat foods, good handwashing, thorough disinfection, and exclusion of ill employees. The restaurant received no additional complaints.

This was an outbreak of norovirus gastroenteritis associated with eating at a restaurant in Plymouth. The vehicle of transmission was not identified. The source of the outbreak was likely an ill or recently ill food worker. The positive *Campylobacter* result was an incidental finding.

Probable Foodborne Outbreaks

(1)
Norovirus Gastroenteritis Probably Associated with a Restaurant

January Anoka County

On February 7, 2006, the Minnesota Department of Health (MDH) foodborne illness hotline received a complaint from a guest who had become ill with gastrointestinal symptoms after attending a party at a private home in Coon Rapids, Minnesota on January 31. The complainant knew of at least eight other guests who had also experienced gastrointestinal symptoms subsequent to the party. The host of the party had picked up chicken wings and several sauces from a restaurant in Blaine to serve at the event. Deviled eggs that were prepared in a private home were also served, but many of those who were ill had not consumed the eggs. There were approximately nine guests at the party, and no other events were associated with the party. Anoka County Community Health and Environmental Services (ACCHES) was contacted and an investigation was initiated.

Epidemiologists from MDH obtained a list of individuals who attended the party from the hosts and also obtained a list of individuals who had eaten at the restaurant on January 31 from the restaurant. Phone interviews were conducted with these individuals to obtain information on illness history and consumption and preparation of foods/beverages. A case was defined as a guest who had either attended the party or eaten food from the restaurant and subsequently became ill with vomiting and/or diarrhea (≥3 loose stools in 24-hour period). Public health officials from ACCHES inspected the restaurant and interviewed staff at the facility to ascertain work-related duties and recent illness history. Stool samples were collected from three guests and submitted to MDH for bacterial and viral testing.

Of the 26 individuals who were interviewed, eight (31%) met the case definition. Six cases were party attendees, and two cases ate at the restaurant independently. Four individuals (two party attendees and two independent restaurant patrons) reported mild gastrointestinal symptoms that did not meet the case definition; these individuals were excluded from analyses. Five (63%) cases had diarrhea, five (63%) had vomiting, five (63%) had cramps, and three (38%) reported a fever. The median incubation period was 32 hours (range, 10 to 43 hours). The median duration of illness was 78 hours (range, 10 to 200 hours). One stool sample tested positive for norovirus, and all three stool samples were negative for *Campylobacter, Salmonella*, *E. coli* O157:H7*, Shigella*, and *Yersinia*.

No specific food item was significantly associated with illness. However, the time of day that the foods were ordered from the restaurant was significantly associated with illness. Cases were more likely to have ordered food from the restaurant after 5:00 p.m. on January 31 than were controls (8 of 8 cases vs. 4 of 13 controls; odds ratio [OR] undefined; $p = 0.002$).

Officials from the ACCHES inspected the restaurant on February 9. There was one problem noted with the fryer where the chicken wings were prepared. The fryer had two separate fry baskets, but only one timer, which could make it easy to undercook chicken wings during busy

times of the day. The restaurant mentioned that on January 31 during the evening shift they had more customers than usual and acknowledged that the timer was a problem that needed to be corrected. No recent illness was reported among food workers employed by the restaurant.

This was a probable outbreak of norovirus gastroenteritis associated with a restaurant in Blaine. Although there were some potential problems with undercooking identified during the environmental health inspection, these problems would not have been an issue related to norovirus transmission. A source of contamination with norovirus could have been an ill food worker that prepared chicken wings or served sauces. However, the vehicle of transmission and source of contamination were not confirmed.

(2)

Suspected Foodborne Bacterial Intoxications Probably Associated with a Restaurant

February Ramsey County

On February 17, 2006, the Minnesota Department of Health (MDH) foodborne illness hotline received a complaint of illnesses among a group of five people from two households who had dined together at a restaurant in Vadnais Heights, Minnesota on February 16. An outbreak investigation was initiated.

Ill members of the complainant group were interviewed by phone about illness history, food consumption at the restaurant, and other possible recent common exposures. Contact information for the other members of the group was not provided; therefore, they could not be interviewed. Names of other patrons who had eaten at the restaurant on February 16 were not available.

A case was defined as a member of the complainant group who developed vomiting or diarrhea ($\geq$3 loose stools in a 24-hour period) after eating at the restaurant. None of the patients submitted stool samples to MDH for testing. A sanitarian from the Environmental Health Section of the St. Paul - Ramsey County Department of Public Health conducted an environmental health assessment of the restaurant on February 17.

Of the five group members, only three were interviewed, and all three met the case definition. All three cases had diarrhea and cramps. Diarrhea was ongoing at the time of interview in two of the three cases; the duration of diarrhea in the other case was 6 hours. One of two (50%) cases reported a fever; the other case was unsure whether fever occurred. None of the cases reported bloody stools. The median incubation period for the cases from the time of the meal at the restaurant was 9 hours (range, 8 to 11.5 hours).

Food consumption information was provided by two of the cases. Both of these cases consumed walleye fingers, tarter sauce, and beer. One of these cases also consumed lemon and water.

The environmental health assessment revealed six critical violations and five non-critical violations. The finding most applicable to this potential outbreak was that beer batter for the walleye fingers was at 50° F; this batter was discarded.

This was a probable outbreak of suspected foodborne bacterial intoxications associated with the consumption of breaded walleye fingers at a restaurant in Vadnais Heights. The distribution of incubations and symptoms is compatible with illnesses caused by *Clostridium perfringens*. The environmental health assessment documented time-temperature abuse, supporting this scenario. However, because cases did not provide stool samples, and additional restaurant patrons (including well controls) could not be interviewed, neither the etiology nor the vehicle for this outbreak could be confirmed.

(3)
Norovirus Gastroenteritis Associated with a Resort

February Becker County

On February 28, 2006, the Minnesota Department of Health (MDH) foodborne illness hotline received a complaint from a guest who had become ill with gastrointestinal symptoms after spending the weekend of February 17-20 at a resort in Callaway, Minnesota. The complainant's family had also become ill and they knew of other guests at the resort that had experienced gastrointestinal symptoms during their stay at the resort. Groups of guests at the resort stayed in separate cabins, and meals were served family style with each cabin receiving its own family style servings in a common dining hall. The foods that were served included spaghetti, salad, bread, applesauce, pancakes, sausages, chicken soup, and brownies. An outbreak investigation was initiated in collaboration with the MDH Environmental Health Services Section.

Epidemiologists from MDH obtained a list of individuals who had stayed together at the resort from the complainant and also obtained a list of other individuals that had stayed at the resort the weekend of February 17-20 from the resort. Phone interviews were conducted with guests to obtain information on illness history and preparation and consumption of foods/beverages. A case was defined as a guest who stayed at the resort the weekend of February 17-20 and subsequently became ill with vomiting and/or diarrhea (≥3 loose stools in 24-hour period). MDH sanitarians went to the resort on March 1 to evaluate food handling practices and to interview staff at the facility to ascertain work-related duties and recent illness history. Stool samples were collected from two guests and submitted to MDH for bacterial and viral testing.

Of the 25 guests who were interviewed, 15 (38%) met the case definition. Two additional persons reported illness onset prior to visiting the resort and were excluded from analysis. All 15 cases (100%) reported diarrhea, 10 (67%) reported vomiting, 11 (85%) reported cramps, and six (40%) reported a fever. The median duration of illness was 82 hours (range, 20 to 120 hours). One stool sample tested positive for norovirus, and both submitted stool samples tested negative for *Campylobacter, Salmonella*, *E. coli* O157:H7*, Shigella*, and *Yersinia*.

No specific food items were found to be significantly associated with illness.

When MDH sanitarians spoke to the owners of the resort they learned that there was at least one vomiting incident during February 17-20. On the evening of February 17 one guest vomited multiple times, once in the dining hall and once in the kitchen area. Based on this meal, the median incubation period calculated from this meal was 32 hours (range, 7.5 to 69 hours). In

addition, one other family had also brought a child to the resort that weekend with a gastrointestinal illness.

Upon inspection, one critical item was noted by MDH sanitarians. Resort staff members were re-serving unwrapped food after it had been served once. In addition, when serving the family style meals, resort staff members were bringing partially consumed family portions of food back into the kitchen for refill and then were delivering the portions back to the tables. It is possible that food bowls from one table could potentially end up on another table. Resort staff members were instructed to use a clean bowl and to separate serving of food items when additional food is brought from the kitchen to the family serving areas. Foodworkers were interviewed, and one foodworker reported gastrointestinal symptoms. However, the food worker became ill at the same time as other guests and reported serving and eating food at the resort on February 17.

This was an outbreak of norovirus gastroenteritis among guests of a resort. Transmission occurred at dinner on February 17. The multiple episodes of vomiting, including one event in the dining hall and one in the kitchen area, likely contributed to the illnesses. Direct person-to-person transmission likely occurred, but transmission may have also occurred through contamination of food and drink through aerosolization of norovirus from vomitus or direct contact by ill guests.

(4)
Suspected Norovirus Gastroenteritis Associated with a Private Party

April Hennepin County

On April 11, 2006, the City of Bloomington Environmental Health (CBEH) received a report of gastrointestinal illness from the Minnesota Department of Health (MDH) involving 15 persons who had attended a private party in Bloomington on April 1. Food items consumed at the party include cheese/fruit kebobs, brats, hamburgers, chicken fingers, macaroni and cheese, celery and peanut butter, gelatin, cake from a grocery store in Bloomington, and various drinks.

On April 11, CBEH staff obtained a list of attendees' names and phone numbers and a list of food items. Attendees were interviewed about illness history and food consumption using a standard questionnaire. A case was defined as a person who attended the birthday party and subsequently developed vomiting or diarrhea ($\geq$3 loose stools in a 24-hour period). Two stool specimen kits were delivered to attendees for bacterial and viral pathogen testing at the MDH Public Health Laboratory.

Eight (57%) of 14 attendees interviewed met the case definition. Two additional attendees reported mild illness symptoms but did not experience vomiting or diarrhea, and one additional attendee suffered from irritable bowel syndrome (causing vomiting); these three individuals were removed from analysis. Four (50%) cases were male. Five cases (63%) were 21 to 49 years of age and three (37%) were >50 years of age.

The median incubation period was 30.5 hours (range, 23 to 49 hours). The median duration of illness was 55 hours (range, 39 to 116 hours). Seven (88%) cases reported vomiting, five (63%)

reported diarrhea, seven (88%) reported cramps, one (13%) reported fever, and none reported bloody stools. No cases were hospitalized.

No stool specimens were received by MDH for pathogen testing. According to one party attendee, another party attendee may have been ill with similar symptoms prior to the party and may have had indirect contact with the cake. No food items were associated with illness.

The clinical and epidemiological characteristics of the cases were characteristic of norovirus gastroenteritis. No specific food items were associated with illness, but there may have been a party attendee with illness prior to the event. The ultimate source of contamination could not be determined.

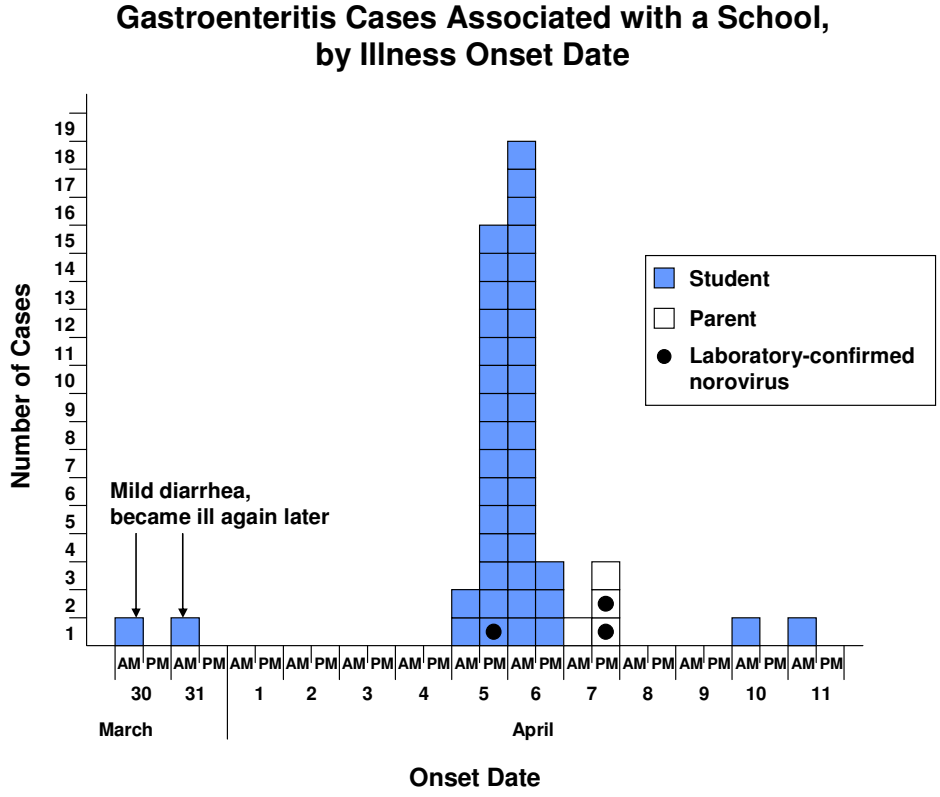
(5)
Norovirus Gastroenteritis Associated with a School

April Anoka County

On April 6, 2006, the Minnesota Department of Health (MDH) foodborne illness hotline received a report concerning an increase in absenteeism at a school in Anoka, Minnesota. The health services coordinator indicated that approximately 15% of the student body (431 students) was absent on April 6.

The school completed the MDH school checklist form, which lists each ill student and general gastrointestinal symptoms. Epidemiologists from MDH conducted phone surveys of these students to obtain information on consumption of foods/beverages and illness history. A case was defined as school student or family member who became ill with vomiting or diarrhea (≥3 loose stools in 24-hour period) during April 5-11. Three stool samples (from two parents and one student) were collected and submitted to MDH for bacterial and viral testing.

A total of 61 individuals were interviewed, including four parents; 49 (80%) met the case definition. Epidemiologists were able to interview 12 non-ill siblings of ill students. Of the 49 cases, 47 (96%) had vomiting, 37 (76%) had cramps, 23 (47%) had diarrhea, and 18 of 48 (38%) had fever. Twenty-seven (66%) of the ill students were in grades 4 and 5. The median duration of illness was 32 hours (< 1 to 101 hours). Two students reported mild gastrointestinal symptoms on March 31 and April 1 (see epidemic curve); however, these students became ill again, with onset dates that coincided with other ill students. Stool samples from the two parents and one student were positive for norovirus. Nucleic acid sequencing was conducted on positive norovirus samples; all three sequences were identical.



No food item was significantly associated with illness; however, two food items served on April 5 approached statistical significance, including celery with peanut butter (15 of 34 cases vs. 0 of 6 controls; logit odds ratio [OR], 10.3; logit 95% confidence interval [CI], 0.54 to 198; p = 0.07) and corn dogs (31 of 35 cases vs. 4 of 7 controls; OR, 5.8; 95% CI, 0.94 to 36.0; p = 0.08). Students were able to choose either the hot lunch menu or the salad bar; students who chose the hot lunch menu on April 5 were more likely to become ill (29 of 33 cases vs. 3 of 6 controls; OR, 7.25; 95% CI, 1.1 to 49.0; p = 0.06). The median incubation period for lunch on April 5 was 14 hours (range, < 0 to 138 hours); one student reported an onset of illness 5 hours prior to lunch.

This was an outbreak of norovirus gastroenteritis among parents and students of a school in Anoka, Minnesota. Several food items were potential vehicles of transmission; however, foodborne transmission was not confirmed during the investigation. The source of contamination was not identified.

(6)
Suspected Norovirus Gastroenteritis Probably Associated with a Restaurant

April Hennepin County

On April 17, 2006, the Minnesota Department of Health (MDH) foodborne illness hotline received a complaint of illness among a group of 10 people who had eaten at several restaurants in Minneapolis during April 14-15. MDH notified Hennepin County Public Health Protection (HCPHP) and Minneapolis Environmental Health (MEH) staff of this complaint.

The group consisted of 24 people (two coaches, nine volleyball players, and 13 family members). Twenty persons were interviewed. The investigation focused on the Friday afternoon and evening (April 14) activities of the nine players and one coach, because they went to two restaurants that the others did not. (None of the family members developed any illness.)

MEH sanitarians contacted five of the restaurants asking if they had any ill employees, other complaints of illness and how many meals were served the day the group ate there. Three restaurants that the group had eaten at on Friday were inspected for food preparation practices and employee health and hygiene. In addition, for the two restaurants where the group had eaten on Friday evening, employees currently on duty were interviewed on-site regarding their job duties and illness history. An employee contact list and schedule were provided by the restaurants so that additional employees could be interviewed via telephone. Names from reservation lists for April 14 were also provided by the restaurants so additional patrons could be contacted.

A case was defined as a person who had vomiting and/or diarrhea ($\geq$3 loose stools in a 24-hour period) since April 14 for patrons and for employees any gastrointestinal illness in the month of April. A total of 29 patrons who had eaten at Restaurant 1 and Restaurant 2 on April 14 were interviewed. Nine were from the volleyball group and 20 were from the reservation lists. Nine (31%) of the patrons met the case definition.

Out of 16 employees, 11 (69%) were interviewed (five from Restaurant 1 and six from Restaurant 2). None of the employees reported any gastrointestinal illness.

Of the nine cases, all had vomiting, five (56%) had cramps, four (44%) had diarrhea, and three (33%) reported fever. For Restaurant 1, the median incubation was 27.75 hours (range, 23.5 to 31.75 hours) and for Restaurant 2, the median incubation was 26.25 hours (range, 22 to 30.25 hours).

An inadequate amount of control data did not allow for statistical analysis of food items consumed. Food items eaten at Restaurant 1 included a variety of milk shakes, burgers with condiments, fries, lasagna, breadsticks, and a variety of sodas. At Restaurant 2, the items included barbeque chicken pizza, pepperoni pizza, cheese pizza, nachos, chicken tenders, Buffalo wings, cheese sticks, a variety of sodas, and smoothies. No stools were submitted by the patrons for testing. Upon inspection, the MEH sanitarian did not noted any problems with either facility.

This was an outbreak of gastrointestinal illness that was associated with one of two restaurants in Minneapolis. Although no agent could be identified due to a lack of stool specimen submission, the symptoms were characteristic of norovirus infection. A specific vehicle could not be pinpointed; however, the source of the outbreak could have been an ill foodworker. The establishments were instructed on the importance of limiting bare-hand contact of food items, excluding ill foodworkers from work and reporting immediately to the health department any patron complaints of illness.

(7)
Gastroenteritis Probably Associated with a Restaurant

April Hennepin County

On April 17, 2006, Hennepin County (HC) received a report from the manager of a restaurant in Eden Prairie, MN. The manager informed HC of a complaint concerning illness among a party of 12 who dined at the restaurant on April 14. The Minnesota Department of Health was subsequently notified.

Public health staff from HC conducted phone surveys of patrons from the complaint to obtain information on consumption of foods/beverages and illness history. A list of credit card receipts for additional patrons was not available. A case was defined as a person who developed vomiting or diarrhea ($\geq$3 loose stools in a 24-hour period) after dining at the restaurant. HC was unable to collect stool samples for testing.

Of the 12 patrons interviewed, three (25%) met the case definition. All three cases had diarrhea, two (67%) had cramps, one (33%) had vomiting, and none reported fever. The median incubation period was 3 hours (range, 1.5 to 3 hours). The median duration of illness was 9.5 hours (range, 8 to 11 hours). Approximately 100 patrons ate the buffet meal on April 14; the restaurant received no additional complaints.

Several food items served buffet style were common among group members, including cheese wontons, shrimp, sweet & sour chicken, broccoli, lo mien, fried rice, egg rolls, green beans, gelatin, and donuts. Consuming crab legs was significantly associated with illness (3 of 3 cases vs. 0 of 9 controls; logit odds ratio, 133.0; 95% confidence interval, 2.19 to 8081.9; p = 0.005).

A sanitarian from HC visited the establishment to assess food preparation procedures. Crab is normally served on Friday and Saturday; however, the restaurant did not offer crab on Saturday after being informed of the complaint. The manager contacted the supplier representative to express concerns regarding the crab; the supplier had not received any other complaints. The crab legs were a precooked, frozen product that was boiled and served in a pan on the buffet line with hot water to ensure proper temperature. The manager indicated that several employees consumed leftover crab legs that evening; no employees became ill.

This was an outbreak of gastrointestinal illness associated with an Eden Prairie restaurant. The etiological agent was not identified during the investigation. Crab legs were statistically associated with illness. The source of contamination was not confirmed.

(8)
Gastroenteritis Probably Associated with a Restaurant

April Hennepin County

The Minnesota Department of Health (MDH) foodborne illness hotline received three separate foodborne illness complaints on April 26, 2006 from a group of co-workers who had all

purchased meals from a restaurant in Minneapolis. Callers complained of diarrheal illness with a short incubation period. One other person was reported ill but refused to be contacted. The complainants declined to provide contact information for other co-workers, but rather asked the co-workers if they had been ill. No other illnesses were identified. Two additional employees had eaten at the restaurant on the same day as complainants but did not become ill.

A City of Minneapolis sanitarian inspected the facility and spoke to the manager on April 27. A Hennepin County epidemiologist re-interviewed the three ill patrons and spoke to one additional non-ill patron. Stool samples were requested from those who had recently recovered from gastrointestinal illness.

Of the three complainants, all had diarrhea and cramps, and none had vomiting or reported fever. The median incubation period was 2.5 hours (range, 2.5 to 7 hours). Duration of illness for two of the cases was 12 hours and 27 hours, respectively, and one person reported ongoing illness. The median age of cases was 28 years (range, 28 to 37 years). Two of the three cases were female.

The two complainants with an incubation of 2.5 hours both ate Mexican food from the restaurant. The first ate on April 24 and had a chicken enchilada pie, which was served with refried beans and rice. The second ate on April 25 and had a chicken chimichanga, which was also served with refried beans and rice. This individual also ate at the restaurant on April 24 and had a French dip sandwich. The third complainant, with the incubation of 7 hours, ate on April 25 and had a baked chicken dinner, which was served with corn, mashed potatoes and a roll. Two additional people were interviewed who also ate at the restaurant on April 24 or April 25 but who did not become ill. One individual had a chili dog and the other had a cold deli sandwich.

Upon inspection of the facility, all three employees were interviewed, although only one (the manager) did any handling of food. None reported illness. No other complaints were received.

Food flows for the chicken chimichanga, baked chicken, refried beans and rice were done. Canned pinto beans, canned rice and frozen precooked diced chicken were used for menu items. Chicken chimichangas, beans and rice were prepared and microwaved to 180ºF, then transferred to a hot-holding unit set at 200ºF and placed on steam table set at 165ºF. Baked chicken was prepared at a kitchen in St. Paul and transported to the cafe in NSF-approved transport containers. Transport time was about 20 minutes.

A second inspection was made a few hours later once food was prepared to check temperatures. No temperature violations were noted.

The facility was informed of four critical and eight non-critical violations. The four critical violations included:

1. Not having a certified food manager on-site at all times. The manager's expired certification was to be renewed immediately.
2. Both hand washing sinks were completely dry, indicating no hand washing had been done there recently.

3. Hand washing sinks were inaccessible due to clutter.
4. An open cup with food and spoon inside were found on a kitchen shelf, indicating that food was being consumed in a food preparation or utensil washing area.

The eight non-critical violations were related to various cleaning and sanitation issues. The sanitarian discussed correcting these violations with the manager and followed up to ensure appropriate corrections were made.

The two stool samples submitted by patrons to the MDH Public Health Laboratory were negative for bacterial enteric pathogens, toxins, and norovirus.

Three complainants experienced similar illnesses and incubations after eating at a Minneapolis restaurant. However, an outbreak associated with this restaurant could not be confirmed. In general, the illnesses were compatible with a foodborne bacterial intoxication, but the combination of symptoms and incubations were not characteristic of any known pathogens that cause foodborne bacterial intoxications. Attempts to identify and contact additional patrons who may have become ill after eating at the establishment were unsuccessful.

(9)

Suspected Foodborne Bacterial Intoxications Probably Associated with a Restaurant

June Ramsey County

On July 6, 2006, the Minnesota Department of Health (MDH) foodborne illness hotline received a complaint of gastrointestinal illness in three individuals from two different households who had eaten lunch together at a restaurant in St. Paul, Minnesota on June 30. St. Paul Environmental Health Services was notified and an investigation was initiated.

A St. Paul environmental health specialist went to the restaurant to conduct an environmental assessment and obtain credit card receipts from other restaurant patrons. MDH staff interviewed the original complainants and additional patrons from credit card receipts about food consumption and illness history. A case was defined as a patron with vomiting or diarrhea (≥3 loose stools in a 24-hour period) after eating at the restaurant. Since it had been several days since the meal date, no stool samples were obtained.

Two of the 14 (14%) persons interviewed (both part of the original complainant party) met the case definition. Both cases had diarrhea and cramps; neither reported vomiting, fever, or bloody stools. The median incubation period was 10 hours (range, 9 to 11 hours). The median duration of illness was 20 hours (range, 16 to 24 hours).

Cases had eaten different entrees; however, both had consumed rice, beans, chips, and salsa. Since only two cases were identified, a meaningful statistical analysis was not possible. During inspection, the St. Paul environmentalist observed appropriate practices at the restaurant for cooking rice and beans. Rice was cooked in a steamer at the steam table for the restaurant. Beans were cooked with vegetables, baked, cooled in an ice bath, and reheated the next day. The environmentalist reinforced appropriate cooking practices and temperature controls with chefs at

the restaurant. No additional problems were noted at that time.

This was a probable outbreak of foodborne intoxications at a St. Paul restaurant. The etiology was not identified, but the distribution of signs, incubations, and illness durations was characteristic of *Clostridium perfringens.* The vehicle was not identified.

(10)
Norovirus Gastroenteritis Probably Associated with a Restaurant

July Olmsted County

On July 19, 2006, Olmsted County Public Health Services (OCPHS) received a complaint of illness reporting that 3 of 4 became ill with diarrhea after eating at a restaurant on July 11. On July 20, OCPHS contacted the other three patrons in the party and found no other common exposures. An investigation was initiated on July 21.

OCPHS staff obtained illness and food consumption histories from the initial complainant's party of four. A reservation list, including names and phone numbers, was obtained from the restaurant and a total of 18 patrons were contacted and interviewed. A case was defined as a person who ate at the restaurant on July 11 and subsequently became ill with vomiting or diarrhea (≥3 loose stools in 24-hour period). The Minnesota Department of Health (MDH) was notified of the outbreak on July 20 via fax.

An assessment of the food preparation practices was made on July 21 and all food workers were interviewed. One stool sample from an ill patron was submitted on July 24. No foods were left over from the suspect meal date. *Salmonella* was initially suspected; therefore, possible cross-contamination issues were investigated and discussed with staff during the onsite assessment.

Five of eighteen patrons interviewed met the case definition. All five cases (100%) had diarrhea and abdominal cramps, four of five (80%) had vomiting, and three of five (60%) reported a fever. The median incubation period for the five ill patrons was 34.75 hours (range 20 to 45 hours). The median duration of illness for the four cases who had recovered at the time of interview was 144 hours (range 121.75 to 201 hours).

The patron stool sample was positive for norovirus. The results of the food worker interviews revealed no ill employees. The five cases all ate a variety of foods, all of which could have involved bare-hand contact during preparation. Menu items at the establishment were very complex and included a number of ingredients. Cross contamination could have also occurred at any one of the preparation steps. There were no implicated food items.

This was a probable outbreak of norovirus gastroenteritis associated with a restaurant. A stool sample from one of the cases was positive for norovirus. No single food item or employee was implicated as being the source of the contamination.

(11)

Suspected Foodborne Bacterial Intoxications Probably Associated with a Restaurant

August Hennepin County

On August 9, 2006, the Minnesota Department of Health (MDH) foodborne illness hotline received a complaint of illness among four patrons who had eaten lunch at a restaurant during an office party on August 8. On August 9, MDH notified Hennepin County Public Health Department (HSPHD) Epidemiology and Environmental Health, and an investigation was initiated.

The investigation centered on interviewing all members of the office party who ate at the restaurant on August 8, as well as interviewing other lunch and dinner patrons. Short incubation periods suggested an etiology of *Staphylococcus aureus* or *Bacillus cereus* as possible causes; therefore, foodworkers were not interviewed. A patron case was defined as a person who ate at the restaurant since August 8 and subsequently developed vomiting and/or diarrhea ($\geq$3 loose stools in a 24-hour period). The complainants consumed a wide variety of appetizers, entrees, and desserts; several of the items were shared among the group.

On August 10, a HSPHD sanitarian inspected the restaurant, focusing on food preparation practices and employee health and hygiene.

Of the 19 office employees in the original party, four (21%) met the case definition. Of the cases, three (75%) reported vomiting, diarrhea, and cramping, and one (25%) reported only vomiting and cramping. The median incubation was 5.75 hours (range, 2.5 to 7 hours). The median duration of illness was 4.75 hours (range, 2 to 19 hours). All four ill patrons were female; one worked in an office in Maple Grove and the other three worked in an office in Plymouth. Staff from the Plymouth and Maple Grove offices had no previous contact prior to the lunch at the restaurant. Additionally, the ill cases did not have any other contact with one another outside of work, nor did they have any other common meals. However, three of the ill patrons all worked together at the front desk of the Plymouth office. A stool sample was submitted by one of the ill patrons to the MDH laboratory and was negative for bacterial enteric pathogens, toxins, and norovirus.

The four ill patrons shared several food items. All four ate calamari fritti, three ate stuffed mushrooms and white chocolate bread pudding, two ate bread with olive oil, bruschetta, shrimp and artichoke pasticcio, and cheesecake, and one ate farfalle alfredo. Three of the ill patrons drank ice water; other beverages consumed among the ill patrons included soft drinks, cocktails, and wine.

Seven other employees who attended the office party were interviewed and none reported illness. These employees also ate several of the same shared items (calamari fritti, stuffed mushrooms, and bread with olive oil) that the large group shared. The remaining eight people who attended the party did not return several calls and could not be interviewed. No specific food items were statistically associated with illness.

The restaurant provided a reservation list for August 8 and HSPHD interviewed an additional eight lunch patrons and 21 dinner patrons. None reported illness.

Upon inspection, the HSPHD sanitarian noted overall compliance with food code requirements. All food items were stored at proper temperatures and there were no violations associated with preparation of the food items. No hand injuries were observed among food handlers. The sanitarian stressed the importance of proper handling of food and beverages to both management and staff. The restaurant received no additional complaints.

This was a probable outbreak of foodborne intoxications associated with a Maple Grove restaurant. While the complainants did not have any other meals in common, three of the four ill patrons worked in the same office. There was not enough information to confirm this as a foodborne outbreak, or to determine the etiology and vehicle for these illnesses.

(12)

Salmonella Saintpaul Infections Probably Associated with a Wedding Reception

September Hennepin County

In early October, the Minnesota Department of Health (MDH) received two case isolates of *Salmonella* Saintpaul through routine laboratory surveillance. The isolates were indistinguishable by pulsed-field gel electrophoresis (designated subtype STP44). An investigation was initiated.

Both cases were interviewed with the MDH standard interview form for cases of salmonellosis. MDH staff attempted to evaluate in detail exposures common to both cases. A case was defined as a person with a culture-confirmed infection with *Salmonella* Saintpaul STP44.

Both cases reported attending the same wedding reception held at a private home in Champlin, Minnesota on September 20. This was the only common exposure identified for the cases. A variety of foods were served at the reception. Some foods were privately prepared, reported as ethnic foods (Thai or Laotian) by one of the cases. These included appetizers or dishes with rice, noodles, vegetables, and ground pork, and different dips and desserts. Chicken and barbecued ribs from a restaurant were purchased and brought into the home. Multiple attempts were made to get a detailed menu and list of reception attendees from the bride, but the information was not forthcoming. Therefore, no additional cases were identified, and a case-control study to implicate a specific food item could not be conducted.

Both cases reported diarrhea and cramps. Neither case reported fever or diarrhea. The duration of diarrhea was 3 days for one case, and 7 days for the other case. Neither case was hospitalized. The incubation period from the wedding reception meal was 1 day for one case, and 2 days for the other case. No additional cases were identified through routine laboratory surveillance.

This was a probable foodborne outbreak of salmonellosis associated with a wedding reception and identified through routine laboratory surveillance. Foodborne transmission could not be confirmed because a menu and guest list for the event could not be obtained.

(13)
Norovirus Gastroenteritis Probably Associated with a Wedding Reception

September Faribault County

On October 3, 2006, the Minnesota Department of Health (MDH) foodborne illness hotline received a complaint that several people developed vomiting and diarrhea following a wedding reception in Winnebago, Minnesota on September 30. Guests attended a groom's dinner in the evening on September 29, a reception on September 30, and a gift opening on October 1. Foods served at the groom's dinner include BBQ and hot chicken sandwiches, cheesy potatoes, nachos and cheese dip. Reception foods included turkey ham and ham sandwiches, potato salad, baked beans, "snicker salad", and cake. The bride, groom, and several family members prepared the food several hours before the wedding ceremony. Leftovers were served at the gift opening.

The bride and groom provided MDH with a list of food items served at the reception and a partial list of guests. Guests were interviewed by phone about food consumption and illness history. A case was defined as a person with vomiting or diarrhea ($\geq$ 3 loose stools in a 24-hour period) after the groom's dinner. Stool kits were sent to ill persons who consented to submitting a stool sample. A sanitarian from Faribault County visited the grocery store that sliced the meat for the reception to access food preparation and handling procedures and interview staff regarding recent illness.

A total of 88 guests were on the list provided by the bride and groom. Other guest contact information was discovered when calling the guests on the list. A total of 85 guests were interviewed; 44 (51%) met the case definition, 37 (44%) reported no symptoms, and four (5%) had mild symptoms that did not meet the case definition. Forty-two (95%) cases reported diarrhea, 34 (77%) reported vomiting, 32 (72%) reported cramps, and 20 (45%) reported a fever. The median incubation period was 33 hours (range, 4 to 73 hours). The median duration of illness was 39 hours (range, 26 to 76 hours). Five stool kits were sent to ill cases. All five kits were returned to MDH, and four stool specimens were positive for norovirus. Nucleic acid sequencing was conducted on the positive norovirus samples; all sequences were identical.

None of the individual foods served during the reception dinner were significantly associated with illness. However, guests could not differentiate between the ham and the turkey ham when asked about foods they had consumed. All 44 of the cases and 31 of 35 (89%) of the controls reported eating either ham or turkey ham. This finding was statistically significant (odds ratio [OR], undefined; 95% confidence interval, 1.4 to undefined; $p = 0.03$).

Other events that the guests reported attending, such as the groom's dinner on September 29 or the gift opening on October 1 were not associated with illness.

Public health officials from Faribault County inspected the grocery deli that sliced the turkey ham and ham for the sandwiches. Several food-handling violations were found. One food worker initially reported a history of vomiting and diarrhea but retracted her story when formally interviewed. She submitted a stool sample 2 weeks after the event; the stool specimen was negative for norovirus.

This was an outbreak of norovirus gastroenteritis among guests at a wedding reception. The ham or turkey ham (or possibly both) may have served as vehicles of transmission. The source of contamination of the ham and turkey ham could have been a foodworker who sliced the meat at a local grocery store deli; however, this could not be confirmed.

(14)
Norovirus Gastroenteritis Probably Associated with a Catered Meal

October Ramsey County

On October 17, 2006, the Minnesota Department of Health (MDH) foodborne illness hotline received a call from an environmental health specialist at the City of St. Paul reporting illness among a group of conference attendees. The conference was held by a university at a St. Paul convention facility from October 9 through October 11 and travel agents from across the United States were in attendance. The foods served at the conference were catered by Catering Company A. Some meals were served buffet style, and other meals were pre-plated. MDH called the organizers of the conference and interviewed them immediately. During this call, an organizer mentioned that after they had made a complaint to Catering Company A on October 13, the catering company told them they were doing an investigation and began calling and interviewing conference attendees about their symptoms. Catering Company A did not notify MDH about this complaint until October 17. An investigation was initiated immediately.

MDH obtained a list of ill conference attendees from the conference organizers, as well as a list of other individuals in attendance at the conference. Menus of food served at the conference were obtained from the caterer. Conference attendees were interviewed to assess their symptoms and food consumption histories. A case was defined as a person with vomiting or diarrhea (≥3 loose stools in a 24-hour period) after attending the conference. Five stool collection kits were distributed to ill conference attendees.

The City of St. Paul environmental health specialist went to the catering establishment on October 18 and 19 to conduct environmental assessments and interview employees.

Environmental health specialists from the City of St. Paul inspected the caterer kitchens and interviewed employees about job duties, food consumption, and illness history since from October 4 using a standard restaurant employee questionnaire.

Of the 64 conference attendees interviewed, 32 (50%) met the case definition. An additional five symptomatic people were excluded from the analysis because their symptoms were not severe enough to meet the case definition, a sixth case was excluded from analysis because of an association with another outbreak, and a seventh case was excluded because their symptoms began on October 10 (seven hours after they arrived at the conference). Thirty cases had diarrhea (94%), 24 (75%) had vomiting, 22 (71%) had cramps, 12 (39%) had fever, and two (6%) had bloody stools. Five cases (16%) called their medical provider, four (13%) visited their medical provider, and one (3%) was hospitalized. The median duration of illness was 69.5 hours (range, 3 hours to 174 hours). Fifteen cases were in attendance at the conference on October 9, 14 were in

attendance on October 10, and 31 were in attendance on October 11. Cases' illness onset dates ranged from October 11 to October 13. One case became ill on October 11, 15 cases became ill on October 12, and 16 cases became ill on October 13. Attendance on any specific day was not associated with illness in analysis and many cases attended multiple days; however at least one case was only in attendance on October 9 and 16 cases were only in attendance on October 11. Drinking ice tea on October 11 was significantly associated with illness (9 of 28 cases vs. 1 of 23 controls; odds ratio 10.4; 95% confidence interval 1.2 to 477; $p = 0.015$.). Ice tea was available to conference attendees throughout the conference; therefore, a specific incubation period could not be calculated. Three of five stool samples submitted to MDH were positive for norovirus. Genetic sequencing was not completed on the norovirus nucleic acid from the specimens because of amplification problems.

On October 19 the City of St. Paul began interviewing foodworkers and reached 18 of them. One of the workers reported gastrointestinal symptoms that occurred on October 13. No other foodworkers reported any gastrointestinal symptoms. Six foodworkers had called in sick the week of October 9 but did not report having gastrointestinal symptoms. The caterer did not have a defined illness exclusion policy. Education about norovirus and the importance of reporting illness to management and excluding ill food workers from handling food was emphasized. There was also focus on handwashing education.

This was a probable foodborne outbreak of norovirus gastroenteritis among a group of conference attendees. Ice tea was identified as a possible vehicle for transmission; however, it only explained nine of 28 cases. Therefore, some cases must have become ill via other foods or person-to-person transmission at the conference. The source of contamination was not determined but could have been the person who prepared the ice tea or an ill person who attended the event and contaminated the tea in the self service line.

(15)
Suspected Norovirus Gastroenteritis Probably Associated with a Restaurant

October Washington County

On November 3, 2006, the Washington County Department of Public Health and Environment (WCPHE) received an illness report from the Minnesota Department of Health via the foodborne illness hotline. Five of six patrons reported gastrointestinal illness after dining at a restaurant in Forest Lake, Minnesota on October 27.

On November 3, an environmental health specialist from WCPHE contacted restaurant management to discuss the complaint. Restaurant management indicated that they had received no other patron illness complaints. The restaurant's employee illness log indicated no illness being reported within the past 5 weeks.

Patron credit card receipts and restaurant menus for October 27-28 were obtained from the restaurant. WCPHE staff interviewed patrons to ascertain food consumption and illness history. Cases were defined as persons who developed vomiting or diarrhea (≥3 stools in a 24-hour period) after dining at the restaurant. Stool specimens were not collected from patrons as all had

recovered from their illness, and the patrons were not interested in providing a specimen.

Nine patrons were interviewed, and four (44%) met the case definition. All four patron cases reported diarrhea, vomiting, mild fever, and cramps. The median incubation period was 44 hours (range, 35 to 50 hours). The median duration of illness was 50 hours.

Patron-cases had eaten a limited number of food items. Given the small number of patrons interviewed, the univariate analysis was limited. Whipped butter (4 of 4 cases vs. 1 of 5 controls; odds ratio, undefined; $p = 0.02$) was significantly associated with illness. No other food items were associated with illness.

During the environmental assessment on November 3 and 6, WCPHE found several critical violations at the restaurant. Violations cited included improper food holding temperatures, lack of handwashing, and inadequate staff training on food safety practices. Employees were observed preparing individual-sized servings of whipped butter. Food service workers and wait staff, after whipping the butter with flavoring, scooped butter into serving containers. To assure a uniform and rounded surface each butterball scoop was smoothed by hand. This practice was often performed with bare hands. Butterballs sat out at room temperature in the kitchen and dining room tables uncovered for hours.

WCPHE sanitarians reviewed kitchen cleaning and disinfection procedures, discussed handwashing, and conducted interviews with all employees. No employees reported gastrointestinal symptoms in themselves or their households since October 20. Employee illness and work schedules did not indicate absences or illnesses from October 1 through November 10.

On November 5, under direction of WCPHE staff, the restaurant underwent thorough cleaning and disinfection of all food preparation surfaces, cookware, tableware and restrooms with 1,000 ppm chlorine. All prepared whipped butter was discarded. Appropriate whipped butter preparation and storage procedures were ordered, including no bare-hand contact. All restaurant employees attended a mandatory safe food handling in-service training at the restaurant, instructed by WCDPHE staff. The environmental health specialist recommended implementation of strict handwashing practices, no bare-hand contact with ready-to-eat food items, and strict exclusion of any ill employees for 72 hours following complete resolution of gastrointestinal illness.

This was a probable foodborne outbreak associated with eating at a Forest Lake restaurant. The epidemiologic and clinical features of the illnesses were characteristic of norovirus. The source of contamination may have been whipped butter. However, given the limited number of patron interviews and the absences of ill food service workers, this was not confirmed.

(16)
Suspected Norovirus Gastroenteritis Associated with a Funeral Gathering

October Crow Wing County

On November 2, 2006, the Minnesota Department of Health (MDH) foodborne illness hotline received a complaint of illnesses among a group of 15 people who had gathered for a funeral. The group consisted of members of four families who stayed in a single household during the weekend of October 27-29. The complainant suspected that the source of illness was pizza consumed at a restaurant in Brainerd on October 28, but the group had shared several meals over the weekend. An outbreak investigation was initiated.

A member of the group provided the names and phone numbers for all individuals in the group. Group members were interviewed by phone about illness history and about food consumption during October 27-29. A case was defined as a member of the group who developed vomiting or diarrhea (≥3 loose stools in a 24-hour period) during October 27-31. No stool samples were submitted to MDH for testing.

Of the 15 group members, seven (47%) met the case definition. Of the seven cases, six (100%) of six had abdominal cramps, five (71%) had vomiting, five (71%) had diarrhea, and four (67%) of six had fever. No cases reported bloody stools. One person sought health care, but no one was hospitalized. The median duration of illness was 19 hours (range, 4 to 103 hours). There were no reports of illness in funeral attendees who were not part of this group.

Several exposures yielded elevated risk ratios, but no meals or food items were significantly associated with illness. Three of four persons who ate turkey from a prepared deli tray for lunch on October 27 became ill vs. two of six persons who did not consume this turkey (risk ratio [RR], 2.25; 95% confidence interval [CI], 0.63 to 7.97; p = 0.26). Six of 10 persons who dined at Restaurant A during the evening of October 27 became ill vs. one of four persons who did not dine at Restaurant A (RR, 2.4; 95% CI, 0.41 to 14.1; p = 0.28). Seven of 11 persons who ate pizza from Restaurant B during the evening of October 28 became ill vs. zero of three persons who did not eat pizza (RR, undefined; p = 0.10). Five of eight persons who ate pepperoni pizza from Restaurant B during the evening of October 28 became ill vs. one of five persons who did not eat pepperoni pizza (RR, 3.13; 95% CI, 0.50 to 19.6; p = 0.18).

This was a probable foodborne outbreak of gastroenteritis associated with a group of people who gathered for a funeral. The etiology was not laboratory confirmed, but the illnesses were characteristic of norovirus. Transmission was likely foodborne. Multiple potential exposures were identified, but a specific food or meal could not be statistically implicated with the limited number of people in the group.

(17)
Norovirus Gastroenteritis Associated with a Birthday Party

October Ramsey County

On November 1, 2006, the Minnesota Department of Health (MDH) foodborne illness hotline received a complaint of illnesses among a group of 30 people who had gathered for a birthday party at a private home in St. Paul, Minnesota on October 28. An investigation was initiated.

A member of the group provided the names and phone numbers for all individuals in the group, and a menu for the event. Party attendees were interviewed by phone about illness history and about food consumption at the party. A variety of foods were prepared by attendees and brought to the party. Ingredients for these dishes were purchased at multiple grocery stores. A case was defined as a person who attended the party and subsequently developed vomiting or diarrhea ($\geq$3 loose stools in a 24-hour period). One stool sample was submitted to MDH for testing.

All 30 group members were interviewed, and 23 (77%) met the case definition. In addition, five attendees reported mild gastrointestinal symptoms that did not meet the case definition and were excluded from further analysis. Of the 23 cases, 18 (78%) had diarrhea, 15 (65%) had vomiting, 12 of 21 (57%) had abdominal cramps, and nine (39%) had fever. No cases reported bloody stools. Two people contacted their health care provider and one person sought health care, but no one was hospitalized. The median duration of illness was 41 hours (range, 12 to 155 hours). The median incubation period from the meal at the party was 29.5 hours (range, 12 to 61 hours). The stool sample submitted to MDH was positive for norovirus and negative for routine enteric bacterial pathogens.

No foods were statistically associated with illness. However, this may have been due to a lack of sufficient controls (n = 2) in this cohort. Two food items approached statistical significance, including chips (17 of 17 cases who ate chips became ill vs. 6 of 8 who did not; risk ratio, undefined; p = 0.09) and taco dip (14 of 14 cases who ate taco dip became ill vs. 8 of 10 who did not; risk ratio, undefined; p = 0.16).

One of the party attendees who had mild gastrointestinal symptoms that did not meet the case definition was an infant who developed these symptoms before the party (but on the same day). The infant's mother attributed one episode of vomiting to a bad cold, and indicated that the child had one episode of diarrhea.

This was an outbreak of norovirus gastroenteritis associated with a group of people who gathered for a birthday party. Foodborne transmission was a probable route of transmission, but this could not be confirmed with the small number of people in the cohort who did not become ill. An ill infant was at the party; this could have resulted in food contamination by a person or persons who had previously handled the infant. The route of transmission for this outbreak could have also been person-to-person.

(18)
Suspected Foodborne Bacterial Intoxications Probably Associated with a Restaurant

November Dakota County

On November 9, 2006, the Minnesota Department of Health (MDH) foodborne illness hotline received a report that three patrons experienced gastrointestinal illness following a dinner together at a restaurant in Burnsville on November 3. MDH Environmental Health Services (EHS) was notified and an investigation was initiated immediately.

On November 9, a sanitarian from EHS inspected the facility focusing on food preparation practices and temperature control. A patron list was not available due to the length of time since the suspect meal. MDH interviewed the original complainants about their food consumption and illness histories using a standard questionnaire. A case was defined as a person who ate at the restaurant on November 3 and subsequently became ill with vomiting and/or diarrhea (≥3 loose stools in a 24-hour period). No stool specimens were obtained for testing.

All patrons from the original complaint met the case definition. All of the cases experienced diarrhea and cramps; none reported vomiting, fever, or bloody stools. The median incubation period was 15 hours (range, 11 to 24 hours). The median duration of illness was 24 hours (range, 22 to 28 hours). All three cases reported eating refried beans either on the side or as a part of a burrito. Other food items consumed by the complainants included beef burritos, chicken enchiladas, beef tacos, cheese, refried beans, tomatoes, chips, salsa, and rice.

An assessment was conducted on November 9 to review food preparation practices. Nine critical items and 10 non-critical items were cited during inspection. Critical items involving time or temperature issues included improper cooling of refried beans on a prep table with pans wrapped tightly with plastic wrap, no cooling logs being used, diced tomatoes being stored at 54° F, cheese being held at 65° F, and a lack of date marking on previously prepared foods including beans, cooked beef, and chopped vegetables. Other critical violations cited included raw chicken and beef being stored on top of or next to ready-to-eat salsa and raw diced tomatoes, no hand washing station was available for employees, there was no certified food manager at the facility, mold was found in the ice dispenser and beverage dispensers, and an excessive amount of sanitizer was being dispensed in the final rinse of the dish machine. The restaurant was instructed to dispose of food items that had improper temperatures. The sanitarian provided recommendations on how to properly prepare, heat, cool, and store foods.

This was a probable outbreak of foodborne bacterial intoxications. The symptoms, incubation period, and duration of illnesses were consistent with *Clostridium perfringens* or the diarrheal form of *Bacillus cereus*. The exact source of the outbreak could not be determined. However, critical items cited during the restaurant inspection that had the potential to support bacterial amplification included improper cooling of beans, no date marking, and temperature abuse of tomatoes and cheese. All cases reported consuming beans as well as food items that may have contained cheese or chopped tomatoes. However, because the complaint occurred 5 days after illness onsets, stool samples could not be collected in time to confirm the pathogen that caused these illnesses.

Confirmed Waterborne Outbreaks

(1)
Norovirus Gastroenteritis Associated with a Private Swimming Beach

May Hennepin County

On May 31, 2006, a parent called Hennepin County Public Health Protection (HCPHP) to report that her daughter and other children who had played at the same private beach were sick with gastrointestinal symptoms. The children were at the beach over Memorial Day weekend, with the majority congregating on Monday, May 29. The caller claimed that there were no other interactions among the children, and no organized shared food event occurred. HCPHP informed the Minnesota Department of Heath and initiated an investigation.

A list of 15 families who were reported to have visited the private beach over Memorial Day weekend was obtained from the complainants. Epidemiologists from HCPHP interviewed beach-goers to obtain information on beach usage, illness history, and whether they had observed any large boats docking or discharging in the area. A case was defined as a person who swam at the private beach during May 27-29 and subsequently became ill with vomiting and/or diarrhea ($\geq$3 loose stools in a 24-hour period) by June 1. Stool specimens were obtained from three individuals and submitted to MDH for bacterial and viral testing.

An HCPHP sanitarian called an official of the Minnetrista municipality to ensure that no recent septic problems had occurred in the area.

Fourteen separate families were reached for interview. Of 33 individuals interviewed, 10 (30%) met the case definition. Two individuals reported illness but did not meet the case definition and thus were excluded from further analysis. Nine cases (90%) reported vomiting, seven (70%) reported cramping, five (50%) reported diarrhea, and five (50%) reported fever. The median duration of illness was 20.5 hours (range, 4.5 to 40.5 hours). The median incubation period calculated using noon on May 29 as the exposure time was 26 hours (range, 5 to 42 hours).

The only risk factor that approached significance was that cases were more likely than controls to have swallowed water (9 of 9 cases vs. 11 of 18 controls; odds ratio, undefined; $p = 0.06$). However, in all reports children were not actually witnessed swallowing water; rather, parents reported this conclusion based on their suspicions of whether a child was likely to have done so or not.

It was reported that up to five diapered children may have played in the water, and one parent reported that her diapered child defecated while in the water. No ill diapered children were discovered in the interview process. Complainants noted that each individual family brought their own snacks and bottled drinks, and that little to no sharing of food items occurred. The private beach does have an outhouse facility equipped with hand sanitizer; however, this facility was not yet set up for the season at the time of the complaint. None of the individuals interviewed reported that they had washed or sanitized their hands before eating or drinking. The Minnetrista official contacted reported no known septic issues in that area that could have

contributed to these illnesses. Complaints reported that they did not see any large boats either docking or discharging in the area.

All three stool samples tested positive for norovirus. Nucleic acid sequencing was conducted on all three of the positive norovirus samples; the nucleic acid sequences were identical.

This was an outbreak of norovirus gastroenteritis associated with swimming at a private beach on Lake Minnetonka. Although several diapered children were reported to have been in the water and one defecated in the water, how the beach water was initially contaminated was not confirmed. As norovirus is a human pathogen, the most likely source of illness was an ill or recently ill swimmer.

(2)
Cryptosporidiosis Associated with School Pools

October Dakota County

On October 9, 2006 an epidemiologist from the Minnesota Department of Health (MDH) Acute Disease Investigation and Control Section received a telephone call from the Dakota County Nurse Coordinator for a Minnesota school district who reported cryptosporidiosis in two middle school-aged boys. The two boys attended schools in different districts but were members of the same community education club swim team. The coach of the club team reported that she was aware of gastrointestinal illness among 18 of the 100 members currently swimming, generally with illness onsets of September 28 and 29. The team practiced in the six middle school pools in the district plus a pool in a private school (grades 7-12) located within the same district. An outbreak investigation was initiated in collaboration with MDH Environmental Health Services (EHS).

On October 10, a letter was sent by e-mail to parents of the district high school swim team members, parents of the private school's swim team members, and parents of the community education club swim team members. Letters were also sent to parents of all children in the district middle schools, regardless of whether or not the students had used the pools during physical education classes. The letter included information about cryptosporidiosis, handwashing and other prevention messages, asked parents to call their health care provider and MDH if anyone in the family had recently experienced diarrhea and abdominal cramps, and requested that students refrain from swimming for 2 weeks following resolution of symptoms. A paper copy of the letter was sent home with all students the following day. In addition, contact information for other users of the pools since September 11 was obtained from the district Community Education Aquatics Program Coordinator. These included another club swim team, swimming lesson instructors and students, water aerobics instructors and students, a cross-country running team, a scuba teacher and class, and two high school swim teams from outside the district. A health alert was sent to area physicians on October 10 describing the situation and including information about symptoms, diagnosis, and treatment of cryptosporidiosis.

Additionally, on October 17 a letter was sent home to parents of a high school swim team members and members of a community swim club that used the high school pool because ill

swimmers had reportedly used that pool.

MDH Environmental Health sanitarians inspected all six district pools and the private school pool on October 11, and the high school pool on October 17. The inspections included a complete water chemistry examination, thorough visual examination and a complete history from the pool operator regarding recent pool operations.

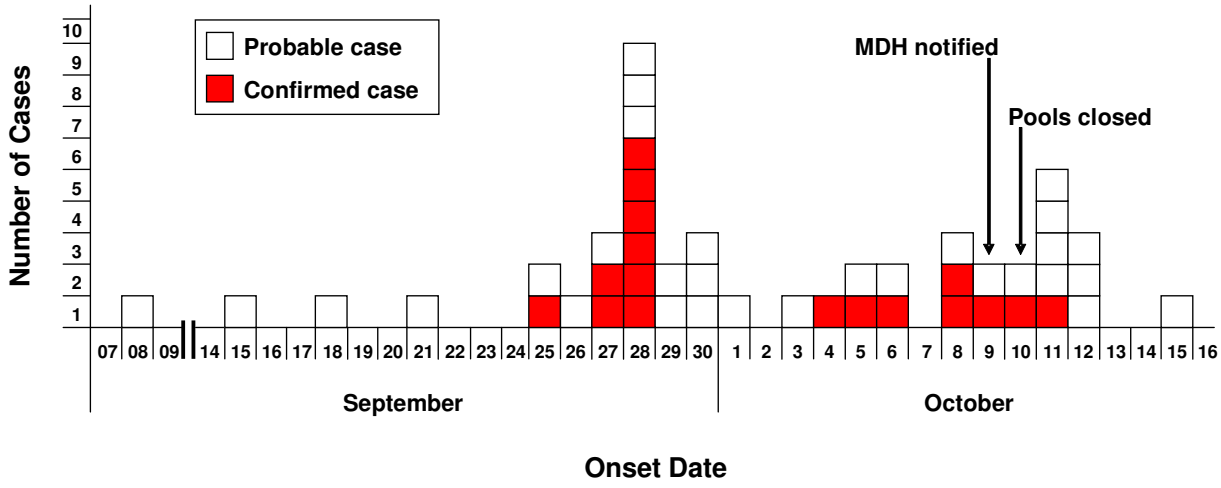
Epidemiologists from MDH telephoned parents who had reported illness in their children to the school nurse, swim team members, and other pool users to interview them about their symptoms and possible exposures. Parents of middle school-aged children who called MDH to report illness after receiving a letter were also interviewed.

A primary case was defined as a pool-user with a laboratory confirmed *Cryptosporidium* infection (confirmed case) or diarrhea of at least 3 days duration (probable case). A secondary case was defined as a laboratory confirmed *Cryptosporidium* infection or diarrhea of at least 3 days duration in a household member of a primary case. Diarrhea was defined as three or more loose stools in a 24-hour period.

Illness histories and exposure information were obtained from 308 people. Forty-seven (15%) cases were identified, including 45 primary cases and two secondary cases. Seventeen cases had a stool specimen that tested positive for *Cryptosporidium.* Five of five case-isolates were identified by the MDH Public Health Laboratory as *Cryptosporidium hominis*.

All 47 cases reported diarrhea, 41 (89%) of 46 reported abdominal cramps, 18 (42%) of 43 reported fever, 11 (24%) of 45 reported vomiting, and three (7%) of 44 reported bloody stools. Twenty-six (55%) cases reported going to their healthcare provider because of their symptoms; no cases were hospitalized. Illness onset dates ranged from September 8 to October 15 (see epidemic curve). The median duration of illness was 5.5 days (range, 3 to 22 days).

Cryptosporidium Cases Associated with the District Pools Outbreak, by Illness Onset Date



The median age of cases was 12 years (range, 1 to 50 years). Thirty-one (66%) cases were female. Fourteen cases (30%) were in the seventh grade; 29 cases (63%) were in the sixth through ninth grades. Seventeen (37%) cases attended Middle School A. Eighteen cases (39%) were members of the community education club swim team. The only exposure to the pools for nine (20%) cases was during their physical education classes.

Upon inspection, all public school pools were found to be operating properly and were within state regulatory limits for pH and chlorine levels. However, *Cryptosporidium* can survive and be transmitted even in properly operated pools. On October 10, EHS closed all six district pools and the private school pool. All seven pools were super-chlorinated at 20 ppm for 8 hours and the filters were backwashed. The "shocking" process was repeated weekly throughout the duration of the outbreak and then regularly throughout the competitive swimming season. All seven pools were reopened on the afternoon of October 11. Due to concerns about the possibility for continuing transmission, Middle School A discontinued swimming in their physical education classes for 3 weeks starting on October 13.

During the epidemiologic investigation, five members of one high school swim team reported swimming in the high school swimming pool while ill on October 10. As a precaution, EHS closed the pool on October 17. The pool was super-chlorinated and the filters were backwashed before being reopened on October 20. There were no reported illnesses associated with the high school swimming pool.

The Middle School A pool was the only pool statistically significantly associated with illness (odds ratio, 5.91; 95% confidence interval, 2.75 to 12.84). However, cases reported swimming in all six district pools as well as the private school pool. The majority of swimmers interviewed, both cases and non-cases, reported using multiple pools.

This was a waterborne outbreak of cryptosporidiosis associated with multiple school swimming pools. There were 47 cases identified, 17 of which were laboratory confirmed. Although the original source of contamination was not identified, an infectious swimmer most likely introduced the parasite into a pool, with subsequent spread to other pools by ill swimmers.

Confirmed Foodborne Outbreaks
Minnesota, 2006

Outbreak Number	Month	Setting	No. Cases	No. Laboratory-Confirmed	Vehicle	Agent	Contributing Factor	County
1	Jan	Restaurant	5	0	Unknown	Suspected norovirus	Unknown	Anoka
2	Jan	Private event	18	2	Lemon curd	Norovirus	Unknown	Ramsey
3	Jan	Restaurant	11	0	Ham	Suspected norovirus	Likely infected food worker	Hennepin
4	Jan	Privately-prepared food at a hotel	16	1	Fresh fruit	Norovirus	Infected food handler	Winona
5	Jan	Private event	13	4	Sub sandwiches	Norovirus	Prepared in home daycare with ill children	Brown
6	Jan	Correctional facility	76	0	Gravy	Suspected bacterial toxin	Temperature abuse	Rice
7	Jan	Hotel restaurant	19	4	Unknown	Norovirus	Infected foodworker	Hennepin
8	Jan	Restaurant	5	2	Salad	Norovirus	Infected foodworker	Hennepin
9	Feb	Restaurant	2	0	Ahi tuna	Scombroid toxin	Unknown	Hennepin
10	Feb	Restaurant	17	4	Unknown	Norovirus	Infected foodworker	Hennepin
11	Feb	Restaurant	21	6	Unknown	Norovirus	Infected foodworker	Otter Tail
12	Feb	Hotel restaurant	81	4	Unknown	Norovirus	Infected foodworker	Hennepin
13	Feb	Restaurant	8	3	Unknown	Norovirus	Unknown	Swift
14	Feb	Restaurant	4	0	Unknown	Suspected norovirus	Infected foodworker	Hennepin
15	Feb	Restaurant	5	3	Unknown	Norovirus	Infected foodworker	Chisago
16	Mar	Potluck	8	4	Unknown	Norovirus	Unknown	Waseca
17	Mar	Restaurant	3	3	Unknown	Norovirus	Infected foodworker	Carver
18	Apr-Jun	Commercial product	3	3	Stuffed chicken products	*Salmonella* Typhimurium	Contaminated product	Multiple counties

Confirmed Foodborne Outbreaks
Minnesota, 2006 (continued)

Outbreak Number	Month	Setting	No. Cases	No. Laboratory-Confirmed	Vehicle	Agent	Contributing Factor	County
19	Apr	Restaurant	5	1	Refried beans	*Clostridium perfringens* enterotoxin	Temperature abuse	Carlton
20	Apr	Catered meal	11	1	Turkey sandwiches	Norovirus	Infected foodworker or attendee	Ramsey
21	Apr	Restaurant	7	1	Toast	Norovirus	Foodworker with ill household member	Ramsey
22	Apr	Restaurant	9	2	Appetizers (likely onion rings)	Norovirus	Unknown	Anoka
23	Apr	Restaurant	23	5	Several food items	Norovirus	Infected foodworker	Hennepin
24	May	Correctional facility	8	5	Bologna sandwiches	Norovirus	Infected foodworker	Anoka
25	May	Restaurant	60	4	Salad	Norovirus	Infected foodworker	Clay
26	May	Restaurant	2	0	Escolar fish	Scombroid toxin	Unknown	Hennepin
27	May	Restaurant	4	0	Tuna burger	Scombroid toxin	Time/temperature abuse	Hennepin
28	May	Restaurant	4	0	Escolar fish	Scombroid toxin	Unknown	Hennepin
29	May	Golf club restaurant	18	0	Escolar fish	Scombroid toxin	Unknown	Hennepin
30	May	Community center potluck	19	1	Unknown	Norovirus	Unknown	Polk
31	May	Restaurant (catered)	10	0	Unknown	Suspected norovirus	Foodworker with ill household member	Washington
32	Jun	Restaurant	47	33	Cold carrot soup	*Salmonella* Typhimurium	Cross-contamination	Hennepin
33	Jun	Restaurant	2	2	Chicken taco salad	*Listeria monocytogenes*	Numerous factors	Dakota
34	Jun	Restaurant	4	3	Unknown	*Salmonella* Typhimurium	Unknown	Washington
35	Jun	Golf club restaurant	14	4	Fruit salad	*Cyclospora cayetanensis*	Unknown	Ramsey

Confirmed Foodborne Outbreaks
Minnesota, 2006 (continued)

Outbreak Number	Month	Setting	No. Cases	No. Laboratory-Confirmed	Vehicle	Agent	Contributing Factor	County
36	Jul	Multiple	9	9	Unknown	*Salmonella* Java	Unknown	Multiple counties
37	Jul	Church smorgasbord and community	17	4	Ready-to-eat foods	*E. coli* O157:H7	Cross-contamination and others	Cass
38	Jul	Restaurant	14	2	Iced tea	Norovirus	Infected foodworker	Ramsey
39	Jul	Restaurant	20	5	Unknown	Norovirus	Infected foodworker	Cass
40	Jul	Restaurant	3	3	Unknown	*Salmonella* Miami	Unknown	Carver
41	Jul	Restaurant	10	3	Unknown	Norovirus	Infected foodworker	Olmsted
42	Aug	Restaurant	6	0	Chicken or refried beans	Suspected bacterial toxin	Time/temperature abuse	Hennepin
43	Aug	Restaurant	5	0	Unknown	Suspected bacterial toxin	Likely time/temperature abuse	Carver
44	Aug	Restaurant	14	5	Unknown	Norovirus	Likely infected foodworker	Lyon
45	Aug	Restaurant	3	3	Suspect lettuce	*E. coli* O157:H7	Unknown	Hennepin
46	Aug	Restaurant	19	3	Unknown	Norovirus	Infected foodworker	Olmsted
47	Aug	Restaurant	18	8	Chicken	*Salmonella* Newport	Multiple	Ramsey
48	Sep	Regional park	6	0	*Amanita bisporigera*	Amatoxin	Ingestion of poisonous wild mushrooms	Ramsey
49	Sep	Private event	24	6	Cucumber salad	Norovirus	Unknown	Carver
50	Sep	Multiple restaurants	15	15	Tomatoes	*Salmonella* Typhimurium	Contaminated raw ingredient	Multiple counties
51	Sep	Grocery store	8	0	Shrimp	*Staphylococcus aureus*	Time/temperature abuse	Ramsey
52	Sep	Restaurant	8	6	Unknown	*Shigella sonnei*	Unknown	Sherburne

Confirmed Foodborne Outbreaks
Minnesota, 2006 (continued)

Outbreak Number	Month	Setting	No. Cases	No. Laboratory-Confirmed	Vehicle	Agent	Contributing Factor	County
53	Sep	Commercial product	10	10	Peanut butter	*Salmonella* Tennessee	Contaminated product	Multiple counties
54	Sep	Restaurant	6	0	Unknown	Suspected norovirus	Infected foodworker	Hennepin
55	Oct	Restaurant	3	3	Unknown	*Salmonella* Enteritidis	Unknown	Hennepin
56	Oct	Restaurant	5	4	Possibly refried beans	*Clostridium perfringens* enterotoxin	Likely time/temperature abuse	Carver
57	Oct	Restaurant	29	2	Sandwiches	Norovirus	Infected foodworker	Washington
58	Oct	Restaurant	14	5	Unknown	Norovirus	Unknown	Mower
59	Oct	Restaurant	3	1	Unknown	Norovirus	Infected foodworker	Olmsted
60	Nov	Restaurant	7	5	Sandwiches	Norovirus	Unknown	Dakota
61	Nov	Lodge restaurant	13	2	Unknown	Norovirus	Infected foodworker	Itasca
62	Nov	Catered event	12	1	Sandwiches	Norovirus	Unknown	Rice
63	Nov	Inn restaurant	16	5	Unknown	Norovirus	Infected foodworker	Washington
64	Nov	Catered meal	14	2	Raw vegetables	Norovirus	Infected foodworker	Goodhue
65	Nov	Restaurant	4	3	Unknown	Norovirus	Infected foodworker	Hennepin
66	Nov	Restaurant	13	4	Salad	Norovirus	Infected foodworker	Anoka
67	Nov	Restaurant	12	0	Raw carrots	Suspected norovirus	Likely infected foodworker	Hennepin
68	Nov	Catered meal	25	0	Pasta salad and/or potato chips	Suspected norovirus	Infected foodworker	Goodhue
69	Nov	Restaurant	2	2	Unknown	Norovirus	Infected foodworker	Anoka
70	Nov	Restaurant	8	2	Mushroom egg rolls	Norovirus	Unknown	Hennepin

Confirmed Foodborne Outbreaks
Minnesota, 2006 (continued)

Outbreak Number	Month	Setting	No. Cases	No. Laboratory-Confirmed	Vehicle	Agent	Contributing Factor	County
71	Nov	School lunch provided by restaurant	26	3	Sandwiches	Norovirus	Infected foodworker	Carver
72	Nov-Dec	Restaurant	32	12	Shredded iceburg lettuce	*E. coli* O157:H7	Contaminated raw ingredient	Multiple counties
73	Dec	Restaurant	26	5	Unknown	Norovirus	Infected foodworker	Ramsey
74	Dec	Restaurant	4	4	Unknown	Norovirus	Infected foodworker	Goodhue
75	Dec	Restaurant	4	2	Unknown	Norovirus	Likely infected foodworker	Dakota
76	Dec	Restaurant	3	2	Unknown	Norovirus	Infected foodworker	Ramsey
77	Dec	Restaurant	14	6	Cole slaw	Norovirus	Infected foodworker	Carver
78	Dec	Restaurant	6	1	Unknown	Norovirus	Infected foodworker	Jackson
79	Dec	Restaurant	2	2	Unknown	Norovirus	Likely infected foodworker	Dakota
80	Dec	Concession stands	21	0	Unknown	Suspected norovirus	Infected food handler	Anoka
81	Dec	Restaurant	3	3	Unknown	Norovirus	Infected foodworker	Hennepin

TOTAL: 81

Confirmed Waterborne Outbreaks
Minnesota, 2006

Outbreak Number	Month	Setting	No. Cases	No. Laboratory-Confirmed	Vehicle	Agent	Contributing Factor	County
1	May	Private swimming beach	10	3	Recreational water	Norovirus	Likely ill swimmer	Hennepin
2	Oct	Multiple school swimming pools	47	17	Recreational water	*Cryptosporidium hominis*	Likely ill swimmer	Dakota

TOTAL: 2

Outbreaks with Other or Unknown Routes of Transmission
Minnesota, 2006

Outbreak Number	Month	Setting	No. Cases	No. Laboratory-Confirmed	Vehicle	Agent	County
1	Jan	Nursing home	69	2	Person-to-person (PTP)	Norovirus	Lac Qui Parle
2	Jan	Nursing home	20	2	PTP	Norovirus	Ramsey
3	Jan	Nursing home	23	1	PTP	Norovirus	Stearns
4	Jan	Nursing home	10	2	PTP	Norovirus	Marshall
5	Jan	Nursing home	35	1	PTP	Norovirus	Houston
6	Jan	Nursing home	34	2	PTP	Norovirus	Wright
7	Jan	School	50	0	Unknown	Suspected norovirus	Yellow Medicine
8	Jan	School	90	1	PTP	Norovirus	St. Louis
9	Jan	Daycare	3	3	PTP	Norovirus, rotavirus, astrovirus	Hennepin
10	Jan	Bowling center	14	1	PTP	Norovirus	Hennepin
11	Jan	Resort	11	2	PTP	Norovirus	Crow Wing
12	Jan	School	69	0	Unknown	Suspected norovirus	Hennepin
13	Jan	School	100	1	Unknown	Norovirus	Olmsted
14	Jan	Water park	9	3	Other	Norovirus	Hennepin
15	Jan	Hotel	20	3	Other	Norovirus	Crow Wing
16	Feb	School	100	0	Unknown	Suspected norovirus	Washington
17	Feb	Nursing home	26	0	PTP	Suspected norovirus	St. Louis
18	Feb	School	130	0	Unknown	Suspected norovirus	Ramsey
19	Feb	Nursing home	135	36	PTP	Norovirus	Washington
20	Feb	Nursing home	78	3	PTP	Norovirus	McLeod

Outbreaks with Other or Unknown Routes of Transmission
Minnesota, 2006 (continued)

Outbreak Number	Month	Setting	No. Cases	No. Laboratory-Confirmed	Vehicle	Agent	County
21	Feb	School	60	0	PTP	Suspected norovirus	Hennepin
22	Feb	School	9	1	PTP	Norovirus	Dakota
23	Feb	Daycare	2	2	Unknown	*Campylobacter jejuni*	Otter Tail
24	Mar	Hospital	69	2	PTP	Norovirus	Otter Tail
25	Mar	Nursing home	26	2	PTP	Norovirus	Ramsey
26	Mar	Nursing home	43	1	PTP	Norovirus	Wright
27	Mar	Nursing home	103	2	PTP	Norovirus	Otter Tail
28	Mar	Nursing home	48	0	PTP	Suspected norovirus	Hennepin
29	Apr	Assisted Living	21	1	PTP	Norovirus	Wright
30	Apr	Nursing home	25	0	PTP	Suspected norovirus	Winona
31	Apr	Assisted living	31	0	PTP	Suspected norovirus	Hennepin
32	Apr	Assisted living	14	1	PTP	Norovirus	Hennepin
33	Apr	Nursing home	14	1	PTP	Norovirus	Ramsey
34	Apr	Nursing home	14	2	PTP	Norovirus	Steele
35	Apr	Private home	8	4	Unknown	Norovirus	St. Louis
36	Apr	Restaurant	12	3	Other	Norovirus	Hennepin
37	May	Group home	24	0	Unknown	Suspected norovirus	Anoka
38	May	Nursing home	17	0	PTP	Suspected norovirus	Otter Tail
39	May	Assisted living	8	0	PTP	Suspected norovirus	Hennepin
40	May	School	75	4	PTP	Norovirus	Washington

Outbreaks with Other or Unknown Routes of Transmission
Minnesota, 2006 (continued)

Outbreak Number	Month	Setting	No. Cases	No. Laboratory-Confirmed	Vehicle	Agent	County
41	May	Restaurant	8	2	Other	Norovirus	Ramsey
42	Jun	Resort	17	2	PTP	Norovirus	Clay
43	Jun	Private home	Unknown	3	PTP	*Shigella boydii*	Hennepin
44	Jul	Bike tour	38	0	PTP	Unknown	Multiple
45	Jul	Shelter	2	2	PTP	*Shigella sonnei*	Washington
46	Jul	Nursing home	Unknown	2	PTP	Norovirus	Blue Earth
47	Aug	Nursing home	51	3	PTP	Norovirus	Mower
48	Aug	Nursing home	89	3	PTP	Norovirus	Olmsted
49	Aug	Camp	150	1	PTP	Norovirus	Douglas
50	Aug	Daycare	Unknown	9	PTP	*Shigella sonnei*	Anoka
51	Aug	Restaurant	2	2	Unknown	Norovirus	Hennepin
52	Sep	School	Unknown	50	PTP	*Shigella sonnei*	Anoka
53	Sep	Assisted living	37	2	PTP	Norovirus	St. Louis
54	Sep	Nursing home	10	2	PTP	Norovirus	Winona
55	Oct	Assisted living	25	2	PTP	Norovirus	Cass
56	Oct	Nursing home	59	2	PTP	Norovirus	St. Louis
57	Oct	Nursing home	11	1	PTP	Norovirus	Hennepin
58	Oct	Nursing home	74	2	PTP	Norovirus	Ramsey
59	Oct	Nursing home	27	3	PTP	Norovirus	Hennepin
60	Oct	Nursing home	70	2	PTP	Norovirus	St. Louis

Outbreaks with Other or Unknown Routes of Transmission
Minnesota, 2006 (continued)

Outbreak Number	Month	Setting	No. Cases	No. Laboratory-Confirmed	Vehicle	Agent	County
61	Oct	Office	25	0	PTP	Suspected norovirus	Carlton
62	Oct	Private home	4	0	Unknown	Unknown	Hennepin
63	Oct	Restaurant	Unknown	2	Unknown	Norovirus	Dakota
64	Nov	Private home	Unknown	1	PTP	Norovirus	Ramsey
65	Nov	Nursing home	75	2	PTP	Norovirus	Wright
66	Nov	Nursing home	13	2	PTP	Norovirus	Hennepin
67	Nov	Nursing home	20	3	PTP	Norovirus	Clay
68	Nov	Nursing home	67	3	PTP	Norovirus	Kittson
69	Nov	Nursing home	28	3	PTP	Norovirus	Cook
70	Nov	School	131	0	Unknown	Suspected norovirus	Kandiyohi
71	Nov	Nursing home	35	3	PTP	Norovirus	Mower
72	Nov	School	10	0	Unknown	Suspected norovirus	McLeod
73	Nov	Nursing home	12	3	PTP	Norovirus	Jackson
74	Nov	Nursing home	88	2	PTP	Norovirus	Hennepin
75	Nov	School	29	0	Unknown	Suspected norovirus	Washington
76	Nov	Nursing home	19	2	PTP	Norovirus	Kittson
77	Nov	Restaurant	10	0	Unknown	Unknown	Steele
78	Nov	Restaurant/private	5	0	Unknown	Unknown	Olmsted
79	Dec	Nursing home	Unknown	0	Unknown	Suspected norovirus	Ramsey
80	Dec	Nursing home	Unknown	2	PTP	Norovirus	Ramsey

Outbreaks with Other or Unknown Routes of Transmission
Minnesota, 2006 (continued)

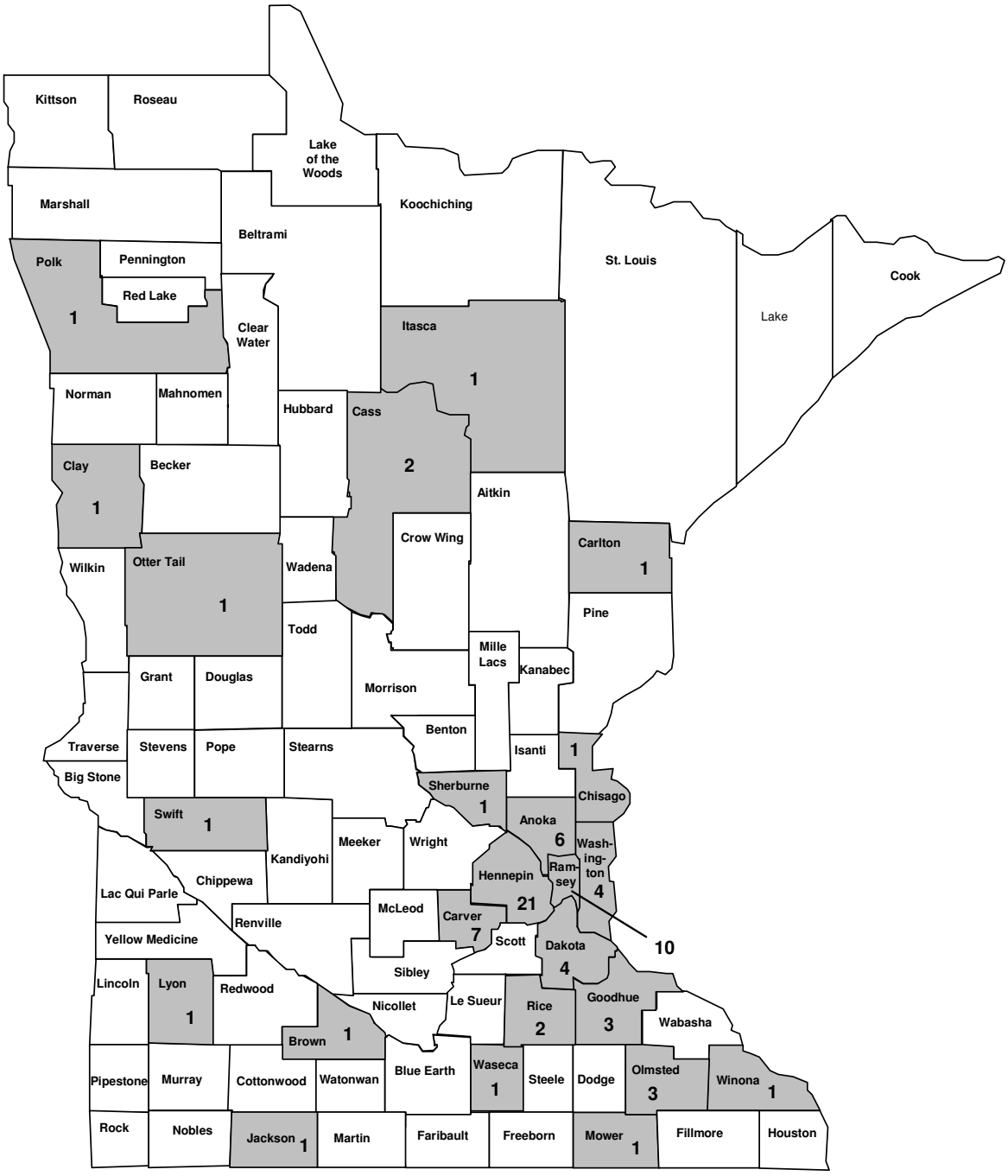
Outbreak Number	Month	Setting	No. Cases	No. Laboratory-Confirmed	Vehicle	Agent	County
81	Dec	Nursing home	72	2	PTP	Norovirus	Dakota
82	Dec	Nursing home	69	3	PTP	Norovirus	Brown
83	Dec	Nursing home	40	3	PTP	Norovirus	Pipestone
84	Dec	Nursing home	35	1	PTP	Norovirus	Anoka
85	Dec	Nursing home	42	1	PTP	Norovirus	Hennepin
86	Dec	Nursing home	12	2	PTP	Norovirus	Sibley
87	Dec	Assisted living	17	3	PTP	Norovirus	Kandiyohi
88	Dec	Daycare	15	0	Unknown	Suspected norovirus	Wilkin
89	Dec	School	90	0	Unknown	Suspected norovirus	Wilkin
90	Dec	Nursing home	61	2	PTP	Norovirus	Hennepin
91	Dec	Nursing home	7	0	PTP	Suspected norovirus	Hennepin
92	Dec	Nursing home	88	2	PTP	Norovirus	Ramsey
93	Dec	Nursing home	66	3	PTP	Norovirus	Pine
94	Dec	Nursing home	21	0	PTP	Suspected norovirus	Jackson
95	Dec	Nursing home	31	3	PTP	Norovirus	Pope
96	Dec	Assisted living	23	0	PTP	Suspected norovirus	Olmsted
97	Dec	Nursing home	86	1	PTP	Norovirus	Goodhue
98	Dec	Nursing home	80	0	PTP	Suspected norovirus	St. Louis
99	Dec	Nursing home	53	0	PTP	Suspected norovirus	Stearns
100	Dec	Assisted living	30	0	PTP	Suspected norovirus	Hennepin

Outbreaks with Other or Unknown Routes of Transmission
Minnesota, 2006 (continued)

Outbreak Number	Month	Setting	No. Cases	No. Laboratory-Confirmed	Vehicle	Agent	County
101	Dec	School	62	0	Unknown	Suspected norovirus	Ramsey
102	Dec	Nursing home	31	0	PTP	Suspected norovirus	Wright
103	Dec	Nursing home	33	3	PTP	Norovirus	Rock
104	Dec	School	63	0	Unknown	Suspected norovirus	Dakota
105	Dec	Nursing home	103	0	PTP	Suspected norovirus	LeSueur
106	Dec	Nursing home	20	0	PTP	Suspected norovirus	Lyon
107	Dec	Jail	57	2	PTP	Norovirus	Rice
108	Dec	Assisted living	20	0	PTP	Suspected norovirus	Washington
109	Dec	Nursing home	70	3	PTP	Norovirus	Otter Tail
110	Dec	Nursing home	60	2	PTP	Norovirus	Dakota
111	Dec	Restaurant	6	0	Unknown	Unknown	Stearns
112	Dec	Restaurant	16	1	Unknown	Norovirus	Hennepin
113	Dec	Restaurant	15	0	Unknown	Suspected norovirus	Hennepin

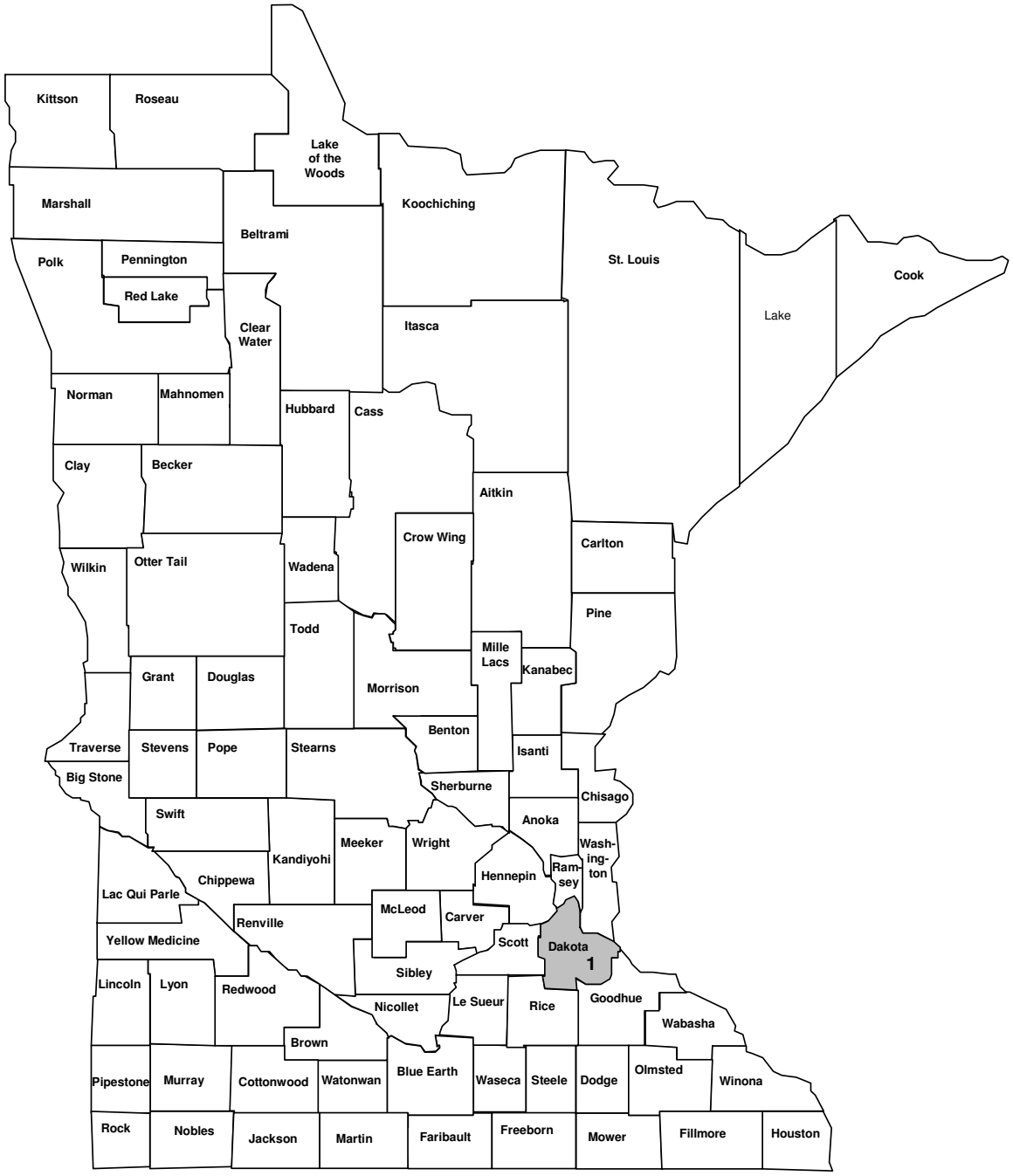
TOTAL: 113

Confirmed Foodborne Outbreaks by County, Minnesota, 2006 (n=81*)

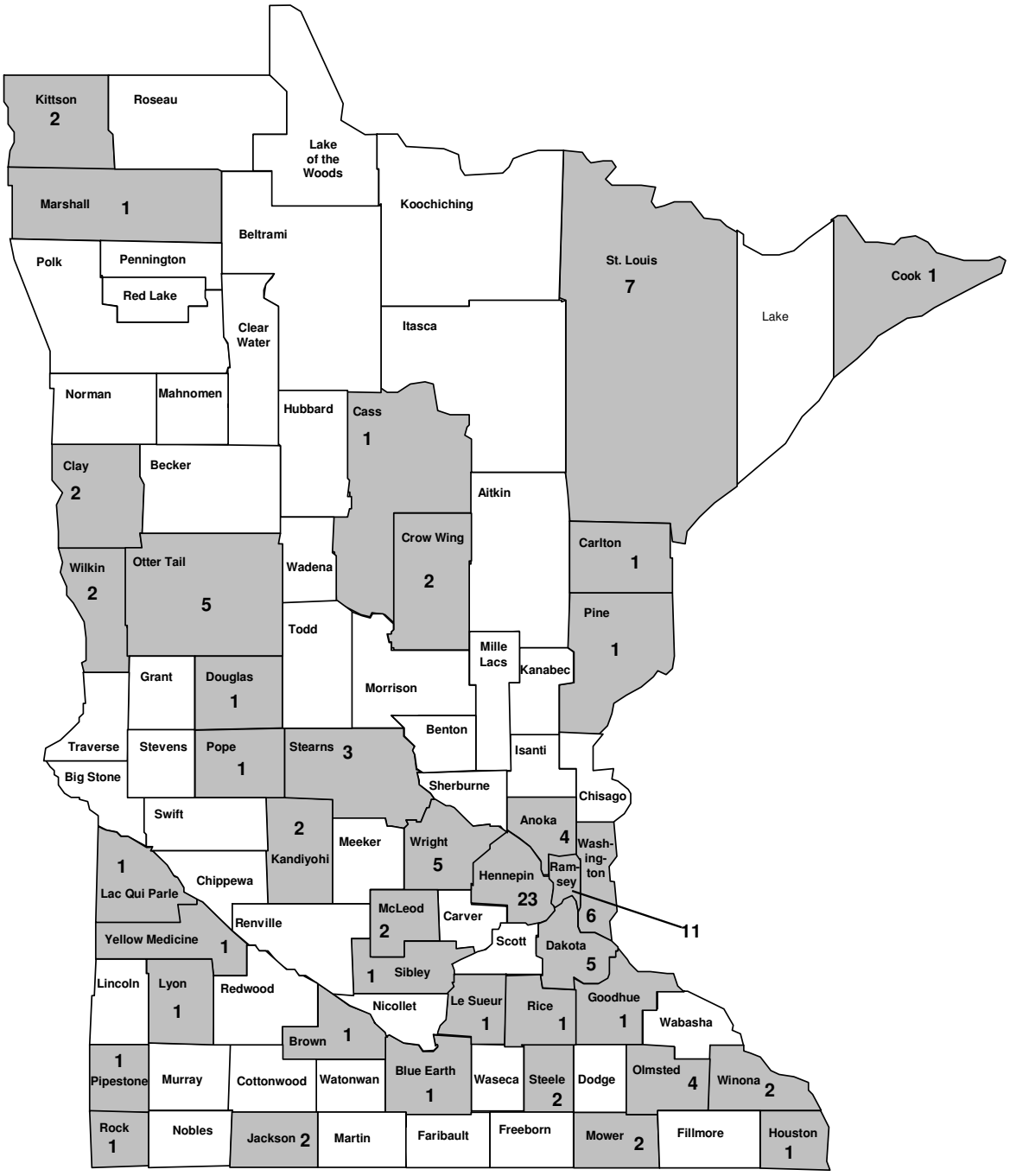


* The total number of confirmed outbreaks in 2006 was 81; however, the numbers on the map add up to 76. The remaining five outbreaks (#18, #36, #50, #53, and #72) involved multiple counties.

Confirmed Waterborne Outbreaks by County, Minnesota, 2006 (n=1)

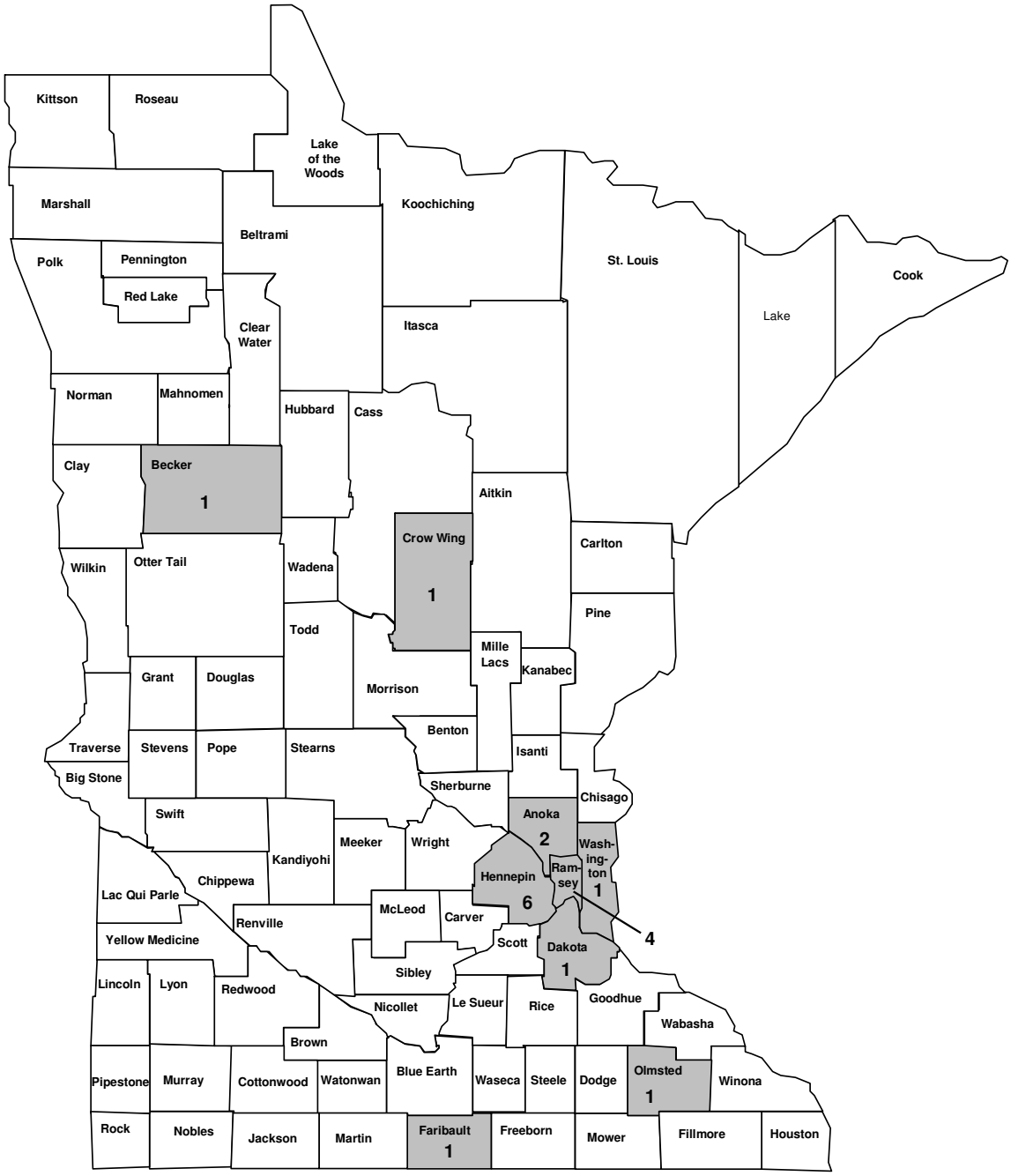


Outbreaks with Other or Unknown Routes of Transmission, Minnesota, 2006 (n=113*)



* The total number of outbreaks with other or unknown routes of transmission in 2006 was 113; however, the numbers on the map add up to 112. The remaining outbreak (#44) involved multiple counties.

Probable Foodborne Outbreaks by County, Minnesota, 2006 (n=18)



Foodborne Illness Complaints, Minnesota, 2006

City or County	Foodborne illness complaints faxed from MDH Epi to environmental health agency	Foodborne illness complaints received by MDH Epi from environmental health agency	Total
Aitkin County	1	0	1
Albert Lea, City of	0	0	0
Anoka County	49	10	59
* Becker County	3	0	3
* Beltrami County	3	0	3
* Benton County	0	0	0
Big Stone County	0	0	0
Bloomington/Richfield, City of	43	50	93
* Blue Earth County	5	0	5
Brooklyn Park, City of	7	3	10
Brown County	2	0	2
* Carlton County	3	0	3
* Carver County	17	0	17
Cass County	2	0	2
Chippewa County	3	0	3
* Chisago County	5	0	5
Clay County	0	0	0
* Clearwater County	0	0	0
Cook County	3	0	3
Cottonwood County	0	0	0
* Crow Wing County	9	0	9
Crystal, City of	4	0	4
* Dakota County	85	0	85

City or County	Foodborne illness complaints faxed from MDH Epi to environmental health agency	Foodborne illness complaints received by MDH Epi from environmental health agency	Total
* Dodge County	0	0	0
Douglas County	6	0	6
Edina, City of	27	6	33
Faribault County	0	0	0
* Fillmore County	2	0	2
* Freeborn County	1	0	1
Goodhue County	8	0	8
* Grant County	0	0	0
Hennepin County	77	31	108
Hopkins, City of	8	0	8
* Houston County	0	0	0
* Hubbard County	2	0	2
* Isanti County	0	0	0
* Itasca County	2	0	2
* Jackson County	0	0	0
* Kanabec County	2	0	2
Kandiyohi County	6	0	6
* Kittson County	0	0	0
* Koochiching County	1	0	1
Lac Qui Parle County	1	0	1
Lake County	3	0	3
* Lake of the Woods County	0	0	0
Le Seuer County	2	0	2
Lincoln County	0	0	0

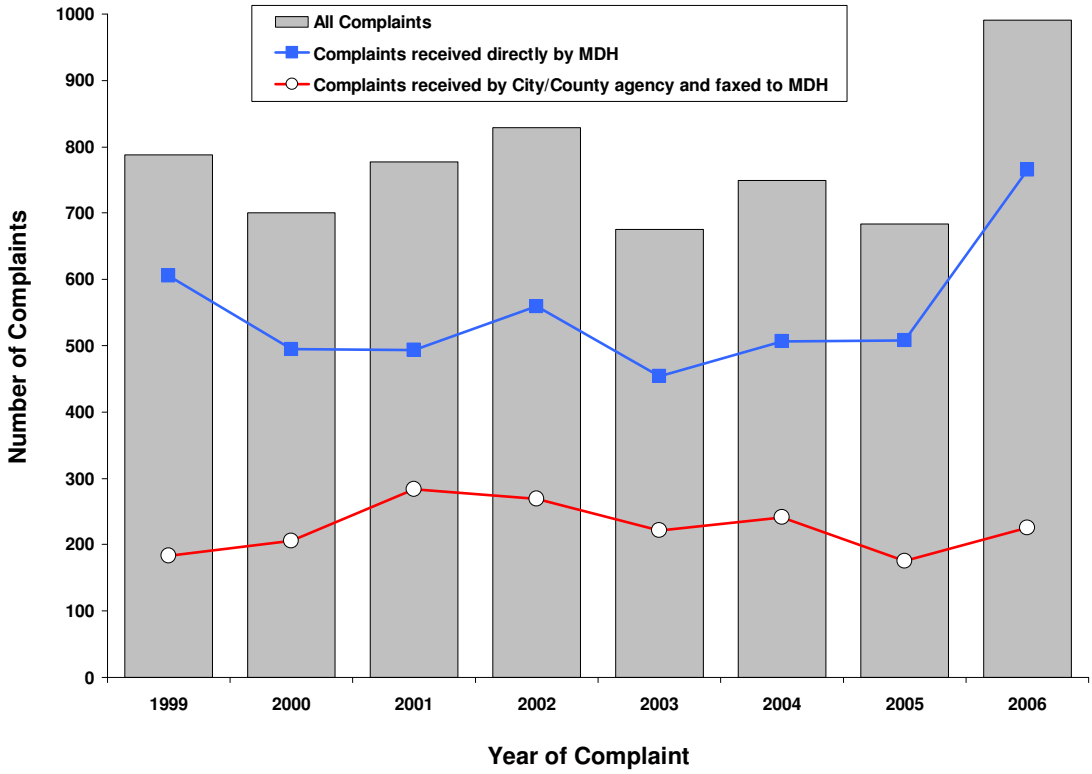
City or County	Foodborne illness complaints faxed from MDH Epi to environmental health agency	Foodborne illness complaints received by MDH Epi from environmental health agency	Total
* Lyon County	7	0	7
* Mahnomen County	0	0	0
Maplewood, City of	19	0	19
* Marshall County	0	0	0
Martin County	0	0	0
* McLeod County	1	0	1
* Meeker County	0	0	0
* Mille Lacs County	4	0	4
Minneapolis, City of	96	25	121
Minnetonka, City of	20	2	22
Moorhead, City of	10	0	10
Morrison County	3	0	3
* Mower County	7	0	7
Murray County	0	0	0
New Brighton, City of	5	0	5
Nicollet County	3	0	3
Nobles County	0	0	0
* Norman County	0	0	0
Olmsted County	8	67	75
* Otter Tail County	10	0	10
* Pennington County	1	0	1
* Pine County	2	0	2
Pipestone County	0	0	0
* Polk County	1	0	1

City or County	Foodborne illness complaints faxed from MDH Epi to environmental health agency	Foodborne illness complaints received by MDH Epi from environmental health agency	Total
Pope County	1	0	1
Ramsey County	62	0	62
* Red Lake County	0	0	0
Redwood County	1	0	1
* Renville County	1	0	1
* Rice County	8	0	8
Rock County	2	0	2
* Roseau County	0	0	0
St. Cloud, City of	15	0	15
St. Louis County	11	15	26
St. Louis Park, City of	16	0	16
St. Paul, City of	92	2	94
* Scott County	16	0	16
* Sherburne County	5	0	5
* Sibley County	0	0	0
Stearns County	10	0	10
* Steele County	3	0	3
Swift County	0	1	1
* Stevens County	0	0	0
Todd County	0	0	0
* Traverse County	0	0	0
Wabasha County	0	0	0
Wadena County	1	0	1
Waseca County	1	0	1

City or County	Foodborne illness complaints faxed from MDH Epi to environmental health agency	Foodborne illness complaints received by MDH Epi from environmental health agency	Total
Washington County	63	4	67
Watonwan County	1	0	1
Wayzata, City of	1	0	1
Wilkin County	1	0	1
Winona County	4	0	4
* Wright County	7	0	7
Yellow Medicine County	0	0	0
Bureau of Indian Affairs	10	0	10
FDA	0	0	0
MN Dept of Agriculture	78	0	78
MDH Environmental Health	0	10	10
University of Minnesota	0	0	0
USDA	0	0	0
Total	999	226	1,225

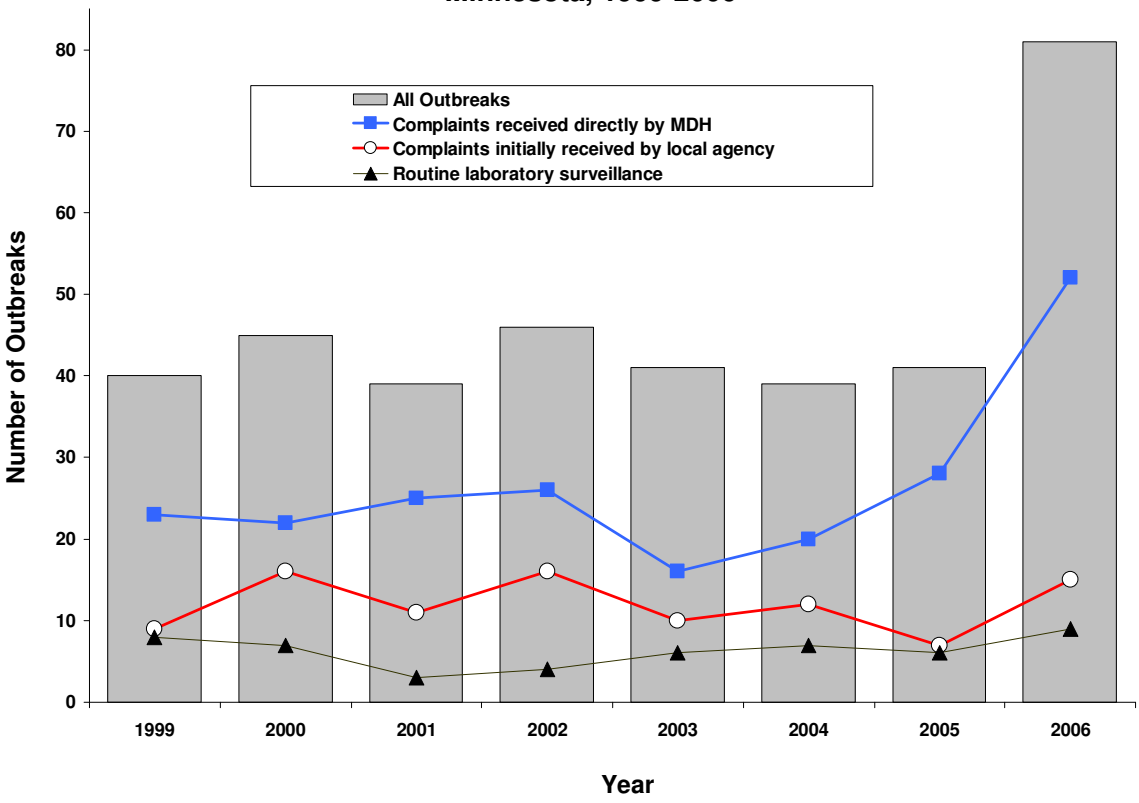
* MDH Environmental Health Services jurisdiction (total number of reports faxed to MDH EHS Metro or District Offices = 213)

Figure 1. Number of Foodborne Illness Complaints per Year, Minnesota, 1999-2006



In 2006, the MDH Acute Disease Investigation and Control Section received 991 foodborne illness complaints. Detailed information on symptoms and a 4-day food history were obtained from each caller (see form on page 169), and the complaint was faxed to the appropriate jurisdiction for each restaurant, deli, grocery store, or other establishment mentioned in the complaint (see complaint table on page 162). Of the 991 complaints received, 765 (77%) were received directly through the MDH foodborne illness hotline (1-877-FOOD ILL) and 226 (23%) were reported to MDH by local public health agencies (Figure 1). In 2006, 67 (83%) of the 81 confirmed foodborne outbreaks were initially reported to MDH or local public health agencies via phone calls from the public; of those, 52 (78%) were reported directly to MDH (Figure 2).

Figure 2. Confirmed Foodborne Outbreaks by Method of Initial Identification, Minnesota, 1999-2006



Revised: 11/17/2005

Foodborne Illness Report
Minnesota Department of Health
Phone: (651) 201-5414 Fax: (651) 201-5082

Stool kit delivered ☐
Daily ☐

Complaint date: _____/_____/_____ **Hotline call:** ☐ **How you got #**_____ Tennessen: ☐

Agency: _____ Reporter: _____

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

Address: _____ Zip: _____

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

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

Diarrhea: Y N onset date: ____/____/____ Time: _____ Vomiting: Y N onset date: ____/____/____ Time: _____

Diarrhea recovery date: ____/____/____ Time: _____ Vomiting recovery date: ____/____/____ Time: _____

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

Other symptoms: _____

Visited health care provider: Y N If yes, name and location:_____ Date of visit: ____/____/____

Provider requested stool sample: Y N Date stool submitted: ____/____/____ Result: _____ Hospitalized: Y N

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: Y N

Food History
If only one person is ill or if all ill persons live in 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.

Foods and Drinks Consumed and Location (including home)

Meal Time	Day of Illness Onset: ____/____/____	Time (hrs) to Illness Onset
Brk: _____	_____	_____
	_____	
Lun: _____	_____	_____
	_____	
Sup: _____	_____	_____
	_____	

Meal Time **Day Prior to Illness Onset: ____/____/____** **Time (hrs) to Illness Onset**

Brk: _____ _____ _____

_____

Lun: _____ _____ _____

_____

Sup: _____ _____ _____

_____

Meal Time **Two Days Prior to Illness Onset: ____/____/____** **Time (hrs) to Illness Onset**

Brk: _____ _____ _____

_____

Lun: _____ _____ _____

_____

Sup: _____ _____ _____

_____

Meal Time **Three Days Prior to Illness Onset: ____/____/____** **Time (hrs) to Illness Onset**

Brk: _____ _____ _____

_____

Lun: _____ _____ _____

_____

Sup: _____ _____ _____

_____

Complainant occupation: _____ Daycare exposure: Y N

Have you been swimming in the past 2 weeks: Y N If yes, where_____ Date: ____/____/____

Did you drink any well water in the past 2 weeks: Y N If yes, where_____

Any ill household members in the last week: Y N If yes, who_____ Date: ____/____/____

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

☐ Local Agencies: _____

Comments _____

_____

_____

Complainant Expectations: ☐ Follow-up restaurants/establishments requested **Or** ☐ MDA Follow-up requested
☐ Complaint to be logged in database only

Original Complainants Name:_____

History of others Ill:

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

Address: _____ **Phone:** _____

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

Diarrhea: Y N onset date: ____/____/____ Time: _____ Vomiting: Y N onset date: ____/____/____ Time: _____

Diarrhea recovery date: ____/____/___ Time: _____ Vomiting recovery date: ____/____/____ Time: _____

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

Other symptoms: _____ Incubation from common event (hrs):_____

Foods eaten at common event: _____

_____

_____

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

Address: _____ **Phone:** _____

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

Diarrhea: Y N onset date: ____/____/____ Time: _____ Vomiting: Y N onset date: ____/____/____ Time: _____

Diarrhea recovery date: ____/____/____ Time: _____ Vomiting recovery date: ____/____/____ Time: _____

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

Other symptoms: _____ Incubation from common event (hrs):_____

Foods eaten at common event: _____

_____

_____

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

Address: _____ **Phone:** _____

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

Diarrhea: Y N onset date: ____/____/____ Time: _____ Vomiting: Y N onset date: ____/____/____ Time: _____

Diarrhea recovery date: ____/____/____ Time: _____ Vomiting recovery date: ____/____/____ Time: _____

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

Other symptoms: _____ Incubation from common event (hrs):_____

Foods eaten at common event: _____

_____

_____

Foodborne Disease Outbreak Investigation Guidelines
Minnesota Department of Health
Phone: (651) 201-5414
Fax: (651) 201-5082

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 – See page 177, "MDH Procedures for Conducting Environmental Investigations of Foodborne Disease Outbreaks"

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

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

Methods

- Who provided information about event attendees (names and/or phone numbers)
- Other agencies that were notified of the outbreak and investigation
- The number of people who attended the event
- The case definition used for the outbreak (the standard definition is vomiting or diarrhea, ≥ 3 stools in a 24-hour period, following the event)
- The number of people interviewed (at least one control should be interviewed per case, and ideally two or more controls should be interviewed per case)
- The number of stools collected for testing
- The pathogens that were tested for in the stool specimens
- Relevant environmental health measures implemented

Results

- The number of people interviewed who met the case definition
- The number of people interviewed with gastrointestinal symptoms who did not meet the case definition
- The percentage of interviewed cases with each of the following symptoms: diarrhea (≥ 3 stools in a 24-hour period), vomiting, fever, bloody stools, and abdominal cramps. Other symptoms may be listed as appropriate.
- The median incubation period and incubation range
- The median duration of illness and duration range
- Hospitalization status of cases
- Results of the stool testing (including PFGE results, if applicable)
- Food items or events that were statistically associated with illness
- The odds ratio(s), p-values, and confidence intervals of the implicated item(s)
- Results of food worker interviews (the number of ill foodworkers, any corrective actions taken)
- Results of food worker stool cultures
- All relevant information found in the environmental investigation

Conclusion

- Etiologic agent
- Implicated vehicle(s)
- Discussion of route of transmission
- Contributing factors to contamination and/or transmission (discuss all plausible sources of contamination when necessary)
- Defense of conclusion, if needed (for example, how do the symptoms, incubation period, and duration suggest a particular pathogen?)

MDH Procedures for Conducting Environmental Investigations of Foodborne Disease Outbreaks

I. Introduction

A systematic environmental investigation is a critical aspect of foodborne illness outbreak investigations. The environmental investigation aims to:

- Identify and eliminate the factors that could lead to further transmission;
- Clarify the nature and mechanism of disease transmission; and
- Provide information needed to design effective strategies to prevent future outbreaks.

The environmental investigation should be initiated as soon as notice of a suspect foodborne disease outbreak is received, but no later than 24 hours after being notified. The investigation of a suspect foodborne disease outbreak is different from a routine inspection. Such an investigation requires a systematic assessment of critical food handling procedures, focusing as much as possible on procedures suggested by preliminary epidemiological and/or laboratory information. The environmental investigation will be coordinated by an Environmental Health Specialist/Sanitarian with involvement of laboratory and epidemiology staff. Any information gathered during the environmental investigation will be done in a manner that is consistent with the Data Practices Act.

II. Information Sharing

EHS personnel involved in the environmental investigation of the implicated FSE will be the main point of contact between the FSE and MDH. Regular communication with ADIC/LPH staff throughout the investigation is necessary to know of the status of the epidemiologic and laboratory investigations. In addition, the following persons should be updated on the progress of the environmental investigation on an on-going basis:

- EHS Outbreak Coordinator, if the outbreak is in MDH jurisdiction
- Your supervisor
- The principal epidemiologist (epidemiologist working on the outbreak).

Note: Media requests for information should be directed to the MDH communications office or the LPH PIO.

III. Conducting the Investigation

A. **Conference Call**: In most cases, a conference call between ADIC and EHS/LPH staff will be held during the initial phase of foodborne disease outbreak investigations. Pay special attention to any working hypotheses that are developed during the conference call. If a conference call is not held or is delayed, consult key staff from each program (ADIC, EHS, and PHL) regarding likely explanations for the outbreak, sample/specimen collection options and strategies, and enforcement options. Key information obtained during this call might include:

- Demographic information about cases
- Illness history for cases

- Number of cases
- Food consumption history
- Name and address of implicated establishment
- How the outbreak was identified
- Information about any suspect food vehicles
- Information regarding the suspected agent(s)
- Recent inspection reports (covering at least 2 inspections)

This information is helpful in developing hypotheses regarding the likely agent, the likely vehicle, how and where the vehicle became contaminated and could suggest actions needed to reduce or eliminate the risk of further transmission.

B. **Contact the Establishment**: Contact the implicated establishment and request that the manager(s) or senior staff member(s) be available for a meeting with the on-site investigation team at the facility at a specified time. Also, when necessary, request information about:

- Menus
- Customer receipts or credit card receipts
- Employee work schedules
- Employee illness

In some situations, the facility's management may be instructed to fax/e-mail information to designated individuals in ADIC or LPH.

C. **Select Tools for the On-site Investigation**: Certain items are needed to facilitate collection of information and/or samples during an outbreak. It may be helpful to prepare an outbreak "kit" containing the following items for the on-site investigation:

- MDH foodborne outbreak investigation manual
- Foodworker interview forms
- Fact sheets about suspected agents
- Information about handwashing and foodworker illness
- Sterile sampling containers
- Specimen containers (stool kits)
- Appropriate media (transport or enrichment)
- Disinfection and sterilizing agents
- Cooler and ice packs
- Sterile implements for sample collection (e.g. scoops, spoons, tongs, tongue depressors, swabs)
- Telephone/pager numbers of key MDH/LPH personnel (including after hours contact numbers)
- Thermometers and data loggers
- pH meter

- Water activity meter
- Enforcement guide
- Camera

IV. On-site Investigation

A. Management Meeting: Upon arriving at the implicated establishment, introduce yourself to the FSE management and explain the purpose of your visit.

i. Provide an overview of the investigation process, including a brief description of the roles of ADIC, LPH, and PHL.

ii. Answer questions and provide details regarding what is known about the outbreak up to that point. **Note: under no circumstances should protected information, such as a complainant's name be shared with establishment personnel (consult the data practices guide or your supervisor for further information).**

iii. Request management's assistance in:

a. Arranging employee interviews

b. Providing records for review (food temperature logs, employee illness records, food purchasing records, etc)

c. Providing work space for field team where possible

d. Arranging for sample/specimen collection and submission to PHL, if needed.

B. Assess Management Control and Operation:

i. Ask about the training and experience of the manager.

ii. Identify the Person in Charge (PIC) at key times suggested by the initial outbreak information.

iii. Obtain information about the operation such as: days and times of operation, number of staff, number of shifts, staffing needs, etc.

iv. Ask about the duties performed by each staff member (including manager). In particular, ask about the food handling responsibilities of all staff.

v. Ask about the establishment's policy regarding ill workers and ask to view the employee illness logs.

C. Conduct Hazard Analysis:

i. Obtain flow charts of preparation procedures for potentially hazardous foods (PHF's), focusing on items suggested by initial outbreak information.

ii. Identify critical control points (CCP) and likely hazards (consult annex 5 of 2001 FDA Food Code for further information).

iii. Evaluate the establishment's monitoring procedures for CCP's by reviewing records, interviewing staff, or observing practices.

iv. Assess whether critical limits for PHF's are/were met by reviewing records, interviewing staff, taking measurements, and/or observing food preparation activities.

v. Determine if there is an appropriate mechanism for taking corrective actions when critical limits are exceeded. This can be accomplished by reviewing the establishments records, interviewing staff, or observation.

Note: This approach to hazard analysis is applicable in all outbreaks linked to FSE's. An analysis based on formal HACCP principles should be attempted even in establishments that are not required to have HACCP plans.

D. Review Sanitation Standard Operating Procedures (SSOP's):

i. Observe establishment layout and food flow (look for opportunities for cross-contamination)

ii. Check cleanliness of equipment and utensils

iii. Check cleanliness of floors, walls, and ceilings

iv. Obtain cleaning schedules and procedures (note the use of high pressure sprayers)

v. Review sanitization procedures (type of sanitizer, appropriateness of use, appropriateness of concentration used)

vi. Evaluate water and wastewater systems

E. Collect Environmental and Stool Samples:

i. Collect samples of food remaining from suspect meal (if available and only after consultation with ADIC and PHL)

ii. Collect foods prepared in the same way as the suspect food, if none of the suspect food is available (only after consultation with ADIC and PHL)

iii. Label samples and establish chain of custody

iv. Store samples in a manner appropriate for the agent under suspicion

v. Arrange for collection and submission of stool samples

vi. Arrange delivery of samples to PHL as soon as possible but no later than 12 hours after collection

Note: Use appropriate sampling techniques and collect enough sample to aid identification of suspect agent (contact the PHL for further information).

F. Enforcement:

Enforcement actions against a FSE implicated in a foodborne disease outbreak should focus on operations and/behaviors that are the likely cause of the outbreak. All observed critical violations must be noted and orders issued for immediate correction of each (see Minnesota Food Code for definition of critical violations). Enforcement actions may include:

i. Closing the facility;

ii. Issuing a fine;

iii. Excluding or restricting ill workers;

iv. Issuing embargo orders;

v. Condemning food; and/or

vi. Issuing correction orders.

Note: some of the above enforcement actions require special considerations to ensure the desired effect. As a general rule, review all enforcement decisions with your supervisor before taking action.

G. Closing a FSE:

Closing a FSE may be necessary to eliminate the risk for further transmission of a foodborne disease agent. The recommendation to close a FSE should only be made after carefully assessing the following factors with your supervisor:

i. Evidence of ongoing transmission or insufficient information regarding whether transmission has been arrested

ii. The overall sanitary status of the establishment (including the availability of safe drinking water, and adequate waste disposal facilities)

iii. The establishment's record related to the correction of critical violations

iv. The availability of a qualified food service manager(s)

v. The number and type of critical violations observed

vi. The likely impact on food safety of mandatory staff exclusions and/or restrictions

vii. The agent involved in the outbreak

viii. The population at risk

Note: orders to close a FSE must be communicated to management in writing. The orders must specify when the facility is to be closed, why the facility is being closed, and the conditions that must be met before the facility is allowed to re-open.

H. Re-opening a FSE

Once it is determined by re-inspection that all conditions specified in the closure orders are met and after consultation with ADIC, the FSE must be permitted to re-open. Permission to re-open must be granted in writing.

I. Report

Upon completing the environmental investigation prepare a summary report containing the following headings and information:

i. Background

- Name and address of the establishment
- Number of ill patrons
- The suspect etiologic agent
- How the outbreak was identified
- How and when EHS was notified

ii. Findings

- Critical violations and repeat critical violations
- Food/surface testing results

- Unusual food preparation procedures
- Employee illness information
- Any other information that could have a bearing on the outbreak

iii. Actions

- Steps taken to confirm the cause of the outbreak
- Steps taken to curtail the outbreak (with dates)
- Education

iv. Conclusions

- Offer some explanation of why the outbreak occurred (based on environmental, epidemiological, and/or laboratory findings).

Note: Copies of summary report and any other documents pertaining to the environmental investigation such as photographs, orders, or video recordings must be submitted to the principal epidemiologist two weeks after completing the environmental investigation. A copy of the final report may be submitted to the FSE, plaintiff's attorneys, or other eligible parties if requested in writing (see data practices policies for further information).

J. **Wrap-up (Lessons learned)**

Each outbreak provides an opportunity to evaluate the effectiveness of our efforts to prevent foodborne disease outbreaks. At the conclusion of the outbreak investigation, you may be asked to collaborate with ADIC, LPH and PHL staff to identify any lessons learned, and develop fact sheets and other educational materials that could be used in to train public health staff and food service workers.

SAMPLE FOODBORNE OUTBREAK INVESTIGATION QUESTIONNAIRE

Name of Outbreak
City, MN
Date

Date: _____

Interviewer: _____

Name:_____ Age _____ Sex: F M

Street:_____ City:_____ County: _____

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

Illness Onset: _____/_____/_____ Time:_____ Recovery: _____/_____/_____ Time:_____

Vomiting ☐Y ☐N Onset: ____/____/_____ Time: _____ Recovery: ____/____/_____ Time: _____

Diarrhea ☐Y ☐N Onset: ____/____/_____ Time: _____ Recovery: ____/____/_____ Time: _____

Number of stools per 24-hr period (max): _____ Diarrhea duration: _____ days/hours

Bloody stools ☐Y ☐N Cramps ☐Y ☐N Fever ☐Y ☐N Temperature _____◦F

First Symptom: _____ Onset Date: ____/____/_____ Time:_____

Other Symptoms: _____ Onset Date: ____/____/_____ Time:_____

Called Provider: ☐Y ☐N Visited Provider: ☐Y ☐N Office / ER Date of Visit: ____/____/_____

Provider requested stool sample: ☐Y ☐N Stool submitted: ☐Y ☐N Hospitalized: ☐Y ☐N

Are you willing to submit a stool sample for testing? ☐Y ☐N

Meal Date: _____/_____/_____ Meal Time: _____

[sample menu]

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

Did anyone in your household experience gastrointestinal illness in the week prior to this meal? ☐Y ☐N

Name and relationship	Age	Onset date
_____	____	____/____/____
_____	____	____/____/____
_____	____	____/____/____