MINNESOTA DEPARTMENT OF HEALTH 2007 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

Not intended for citation in the peer-reviewed literature

MINNESOTA DEPARTMENT OF HEALTH
2007 GASTROENTERITIS OUTBREAK SUMMARY

Table of Contents

Definitions 1

Summary 2

Outbreak Narratives

Confirmed Foodborne Outbreaks 5

Probable Foodborne Outbreaks 75

Confirmed Waterborne Outbreaks 87

Outbreaks with Other Routes of Transmission: Outbreaks Due to Animal Contact 94

Outbreak Summary Tables

Confirmed Foodborne Outbreaks 100

Confirmed Waterborne Outbreaks 103

Outbreaks with Other or Unknown Routes of Transmission 104

Maps: Outbreaks by Category and County 108

Foodborne Illness Complaints Table and Figures 112

Foodborne Illness Complaint Form 119

Foodborne Outbreak Investigation Guidelines 123

Sample Foodborne Outbreak Investigation Questionnaire 134

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 (note: for botulism, marine toxins, and chemical exposures, even a single case is classified as an outbreak). 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

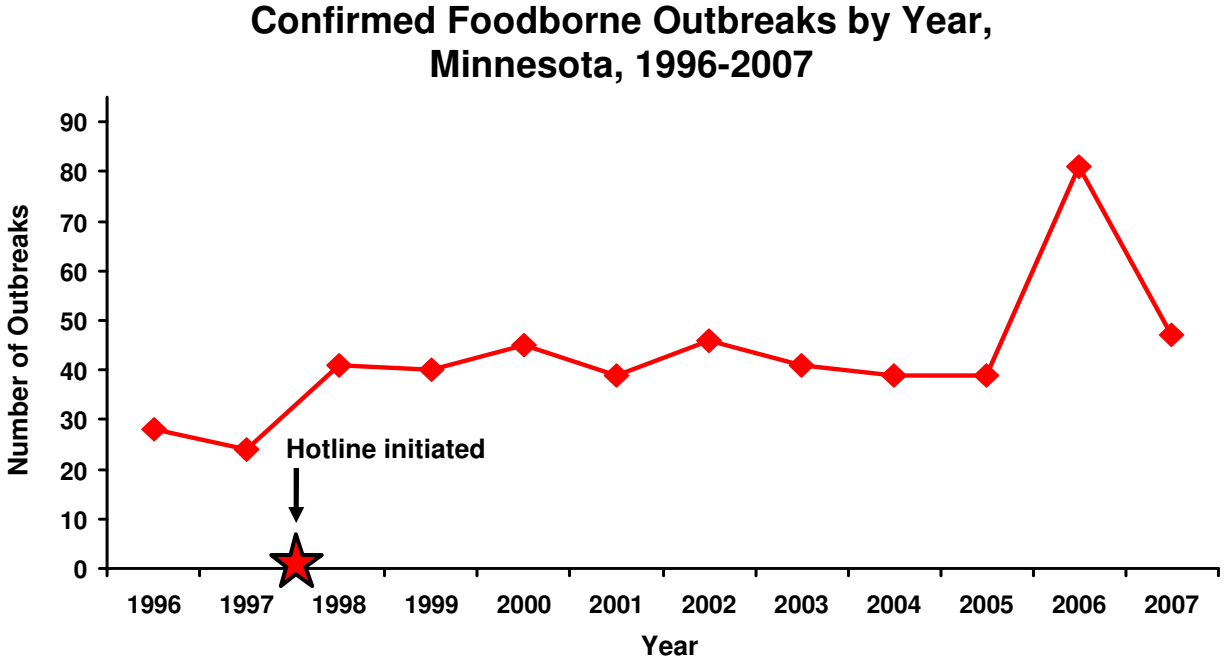
These are similar to foodborne outbreaks, except epidemiologic evaluation implicates water as the source of illness. Waterborne outbreaks may be associated with drinking water or with recreational water.

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 2007, the Minnesota Department of Health (MDH) Acute Disease Investigation and Control Section identified a total of 130 outbreaks of gastroenteritis involving at least 1,167 cases of illness. The 130 outbreaks were classified as follows: 47 confirmed foodborne outbreaks, 12 probable foodborne outbreaks, 3 confirmed waterborne outbreaks, and 68 outbreaks with other or unknown routes of transmission (see page 1 for definitions). The median annual number of confirmed foodborne outbreaks from 1996-2006 was 40 (range, 24 to 81). The median number of cases identified per confirmed foodborne outbreak in 2007 was 10 (range, 1 to 66).



In 2007, 30 (64%) of the 47 confirmed foodborne outbreaks were initially reported to MDH or local public health agencies via complaint calls from the public. Fifteen (32%) outbreaks were identified through routine laboratory-based surveillance of reportable bacterial pathogens, one (2%) was identified through a report from a physician, and one (2%) was initially reported by a private environmental health restaurant consultant.

Of the 47 confirmed foodborne outbreaks, 23 (49%) were either laboratory-confirmed (n=21) or epidemiologically defined (n=2) outbreaks of norovirus gastroenteritis. There were eight (17%) confirmed foodborne outbreaks caused by *Salmonella*, three (6%) by *E. coli* O157:H7, three (6%) by scombroid toxin, two (4%) by *Clostridium perfringens*, two (4%) by hepatitis A virus, and one (2%) each by *Cryptosporidium parvum,* enterotoxigenic *E. coli*, and *Vibrio parahaemolyticus.* The remaining three (6%) confirmed foodborne outbreaks were classified as suspected bacterial intoxications (caused by *Clostridium perfringens* or *Bacillus cereus*).

The predominance of norovirus as a cause of foodborne disease outbreaks in 2007 continues a pattern that has been observed for over two decades in Minnesota. During 1981-2007, 368 (52%) of 714 confirmed outbreaks of foodborne disease were due to norovirus, while 145 (20%)

confirmed foodborne outbreaks were caused by infectious bacterial pathogens such as *Salmonella* and *E. coli* O157.

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

There were eight confirmed foodborne outbreaks caused by *Salmonella* in 2007; this represents the second highest number of salmonellosis outbreaks in Minnesota in a single year. Four salmonellosis outbreaks were associated with single food service establishments, including restaurants and a grocery store delicatessen. Commercially distributed tomatoes were implicated as the vehicle for one of these outbreaks. The causes of restaurant outbreaks of salmonellosis are often complex and can involve consumption of raw produce items or undercooked foods of animal origin, infected food workers, cross-contamination between raw and ready-to-eat foods, environmental contamination, and inadequate cooking, hot holding, cooling, and reheating of multiple food items. Three salmonellosis outbreaks were associated with other commercially distributed products, including leafy greens, a prepackaged snack food, and pot pies, respectively. The final salmonellosis outbreak was caused by an unknown vehicle present at an office potluck meal.

MDH identified three foodborne outbreaks caused by *E. coli* O157:H7 in 2007, all associated with consumption of commercial products. The first of these outbreaks was associated with ground beef purchased at a high-end grocery store chain. The outbreak strain was eventually found in both opened and unopened packages of ground beef collected from case-households, prompting a recall of the implicated product. There were no deaths or cases of hemolytic uremic syndrome (HUS) involved in this outbreak. The second *E. coli* O157:H7 outbreak was associated with steaks purchased at one location of a warehouse grocery store chain. One outbreak case developed HUS, but there were no deaths. Use of customer cards assisted in the identification of the implicated product, which records showed had been purchased by cases within hours of each other. The final *E. coli* O157:H7 outbreak was associated with premade hamburger patties from a warehouse grocery store chain. Prompt case interviews and product/packaging collection revealed that cases had consumed the same brand of hamburger patties; this product was also recalled. HUS developed in four of the 11 cases identified in this outbreak; no deaths occurred.

Five of the confirmed foodborne outbreaks identified in Minnesota in 2007 were bacterial intoxications caused by pathogens such as *Clostridium perfringens* and *Bacillus cereus*. 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, which allows for the proliferation of organisms that produce these enterotoxins.

Three outbreaks of scombroid fish poisoning were identified in Minnesota in 2007. Two of these outbreaks were associated with mahi-mahi and one was associated with tuna.

There were two outbreaks of hepatitis A identified by MDH in 2007, both occurring in restaurant settings. Contamination in the first outbreak could have been introduced either through an ingredient or through an infected food worker. The second outbreak was most likely the result of an infected food worker; over 2,300 restaurant patrons received immune globulin in response to this outbreak.

MDH routine surveillance resulted in identification of an outbreak of *Cryptosporidium parvum* infections associated with consumption of baked beans served at a family picnic; contamination likely occurred via an infected attendee.

An outbreak of enterotoxigenic *E. coli* infections occurred among attendees of a conference held at a resort. Several food items were statistically associated with illness, but the most likely vehicle was determined to be dried parsley which was used in the preparation of multiple dishes. However, this could not be confirmed through laboratory testing.

There were three waterborne gastroenteritis outbreaks identified by MDH in 2007. The first was an outbreak of *Cryptosporidium parvum* infections associated with a fitness center swimming pool. The second was an outbreak of *C. hominis* infections associated with a hotel water park. The third was an outbreak of *C. parvum* infections associated with swimming pools at another fitness center.

There were 68 outbreaks with other or unknown routes of transmission in 2007. 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. Four of these outbreaks were due to animal contact: *Salmonella* Typhimurium infections associated with frozen rodents, *Salmonella* Montevideo infections associated with chicken contact, *E. coli* O157:H7 infections associated with exposure to the cattle barn at a fair, and *Campylobacter upsaliensis* infections probably associated with cats from a humane society.

Confirmed Foodborne Outbreaks

(1)
Norovirus Gastroenteritis Associated with a Restaurant

January Pine County

On January 11, 2007, the Minnesota Department of Health (MDH) foodborne illness hotline received an illness complaint associated with a meeting that was held at a casino in Hinckley, Minnesota during January 9 to 10. The complainant stated that 18 of 21 people who attended the meeting had subsequently become ill with vomiting or diarrhea. The meeting involved one pre-plated lunch at a restaurant in the casino on January 9; foods served included salad, rolls, beef tenderloin, potatoes, carrots, cauliflower, and desserts. Many of the meeting attendees also ate breakfast and dinner at the casino on January 9. MDH initiated an investigation on January 11.

The Indian Health Service (IHS) was contacted and IHS staff assessed food worker illness and food preparation practices at the restaurant. The Minnesota State Trooper's Association e-mailed all meeting attendees and asked them to call the MDH for a telephone interview. A case was defined as a meeting attendee with vomiting and/or diarrhea (≥3 loose stools in a 24-hour period) following the meeting. Stool samples were collected from five ill meeting attendees and submitted to the MDH Public Health Laboratory for bacterial and viral testing.

Interviews were completed for 16 meeting attendees. Of these, 12 (75%) met the case definition. Eleven (92%) cases reported diarrhea, 11 (92%) had cramps, 10 (83%) had vomiting, four (44%) had fever, and none reported bloody stools. Duration of illness information was available for 3 cases; the median duration was 65 hours (range, 18 to 92 hours). All five stool samples were positive for norovirus genogroup II and were sequenced; all viral sequences were identical.

One of the ill cases was only present for lunch on January 9. The median incubation period from that meal was 29 hours (range, 14 to 67 hours). Analysis of food items associated with illness was attempted, but the paucity of controls prevented a meaningful statistical analysis.

The IHS environmental health assessment revealed three cooks that reported vomiting and diarrhea in the week prior to the meeting, and all of them reported working banquets. It was unclear if these specific food workers had prepared food for the Minnesota State Trooper's Association meeting. The importance of handwashing and excluding food workers with gastrointestinal symptoms was emphasized.

This was a foodborne outbreak of norovirus gastroenteritis associated with a meal at a Hinckley restaurant. A specific food vehicle was not identified. The ultimate source of the outbreak likely was one or more infected food workers who contaminated ready-to-eat food items.

(2)
Hepatitis A Associated with a Restaurant

January Hennepin County

On February 22, 2007, a case of hepatitis A in Hennepin County was reported to the Minnesota Department of Health (MDH). The case was investigated by Hennepin County Epidemiologists, and the only potential risk factor for hepatitis A virus (HAV) infection identified was eating at various restaurants. On February 26, four additional cases of hepatitis A were reported to MDH, including two in Hennepin County and two in Dakota County. Initial interviews conducted by public health staff in Dakota County and Hennepin County revealed that all four of these cases also reported working and/or eating at restaurants in downtown Minneapolis. A full investigation was initiated.

A case of HAV infection was defined as either: 1) an individual with a positive HAV-specific IgM antibody test, discrete onset of symptoms in February, and jaundice or elevated aminotransferase levels; or 2) an individual with discrete onset of symptoms in February, jaundice or elevated aminotransferase levels, and an epidemiological link to a laboratory-confirmed case. All cases were interviewed using a standard hepatitis A questionnaire by the epidemiologist for their county or MDH. After interviewing the first five cases, a supplemental interview form was added, and cases were interviewed specifically about restaurants in downtown Minneapolis.

From February 22 through March 8, 14 cases of hepatitis A were reported to MDH. Ten of the cases were residents of Hennepin County, two were residents of Dakota County, one was a resident of Ramsey County, and one was a resident of Scott County. Eleven (79%) of the cases were female. The mean age was 39 years (range, 17 to 64 years). Illness onset dates ranged from February 10 to February 22. Six (43%) cases were hospitalized.

Thirteen cases were interviewed using the supplemental interview form. Of these 13 cases, 12 reported eating frozen yogurt at a department store restaurant in Minneapolis during the 2-6 weeks prior to their illness onset. Nine cases reported eating strawberries as a topping, one had only kiwi, one did not report specific toppings, and one was unsure of toppings but reported not caring for strawberries. Only two could give specific meal date information: one ate at the restaurant during the week of January 15 and the other during the first week of February.

Specimens from nine cases were submitted to MDH. Hepatitis A viruses were typed by nucleic acid sequencing, and all nine matched; this included the HAV from the one case who did not report eating at the restaurant. The type identified for this outbreak is one of the most predominant according to the Centers for Disease Control and Prevention.

Minneapolis Environmental Health inspectors conducted an inspection of the restaurant and interviewed employees regarding symptom history. No ill employees were identified. Ten current employees were tested for hepatitis A, and none were positive. Three former employees who would have worked during the outbreak timeframe also were identified; one was

interviewed by environmental health and reported no recent illness. Two of the former employees were not able to be interviewed.

Subsequent to the outbreak investigation, a hepatitis A case with onset in March was reported to MDH; investigation revealed that this case was secondary to a restaurant patron case.

This was an outbreak of hepatitis A associated with eating at restaurant in Minneapolis. An outbreak vehicle or source of contamination could not be determined. The two most plausible explanations for this outbreak were strawberries that came into the food establishment contaminated, or an unidentified infected food worker at the establishment.

(3)
Clostridium perfringens Intoxications Associated with a Restaurant

January Anoka County

On January 30, 2007, Anoka County Community Health and Environmental Services (ACCHES) received a complaint of gastrointestinal illness among a group of patrons that ate at a restaurant in Coon Rapids on January 28. Upon contacting the restaurant, ACCHES learned of two additional independent complaints received by the restaurant the previous day. The groups reported illness onsets of January 28 and 29. The three complaints reported that 5 of 18, 3 of 3, and 4 of 4 patrons became ill, respectively. ACCHES contacted the Minnesota Department of Health (MDH) and an investigation was initiated on January 30.

A list of restaurant patrons from January 28 was obtained from credit card receipts. ACCHES visited the restaurant to evaluate food preparation and handling procedures. MDH staff interviewed patrons to obtain information on food/beverage consumption and illness history. A case was defined as a restaurant patron who subsequently developed vomiting and/or diarrhea ($\geq$3 loose stools in a 24-hour period). Stool specimens obtained from three patrons and leftover prime rib from one case were submitted to MDH for bacterial, viral, and toxin testing.

Illness histories and exposure information were obtained from 42 patrons, and 11 (26%) met the case definition. Two people reported illness that did not meet the case definition and were excluded from further analyses. The 11 cases represented 8 individuals from the three independent complaints and 3 individuals identified through credit card receipts.

All 11 cases reported diarrhea, 9 (82%) cramps, 3 (27%) fever, and 2 (18%) vomiting. The median incubation period was 11 hours (range, 5.5 to 15.5 hours). The median duration of illness was 29 hours (range, 26 to 36 hours) for the seven people who had recovered at the time of interview. All three stool samples and the leftover prime rib tested positive for *Clostridium perfringens* of the same pulsed-field gel electrophoresis (PFGE) subtype (designated PERF15).

By univariate analysis, consumption of prime rib (10 of 11 cases vs. 2 of 27 controls; odds ratio [OR], 135; 95% confidence interval [CI], 8.5 to 5402; $p < 0.001$), baked potatoes (7 of 11 cases vs. 7 of 22 controls; OR, 5.5; 95% CI, 1.0 to 33; $p = 0.029$), and salad (11 of 11 cases vs. 16 of 25 controls; OR, undefined; 95% CI, 1.1 to undefined; $p = 0.034$) were significantly associated

with illness. By unconditional multivariate logistic regression, only eating prime rib was independently associated with illness, and remained significant in a multivariate model selection (OR, 135; 95% CI, 11 to 1,000; $p < 0.001$).

Inspection of the restaurant by an ACCHES sanitarian found multiple food safety violations. The sanitarian found that the restaurant was not keeping an employee illness or a temperature log, and one oven thermometer was not functioning. In addition, temperature abuse in the preparation of the prime rib was documented. The cooked prime rib was allowed to sit for 30 minutes on top of the stove before being placed in a walk in cooler for 30 minutes allowing for bacterial proliferation. A chef also reported having to throw away cooked and cooled prime rib because of a bad smell on three separate occasions during the week prior to the outbreak.

This was an outbreak of *Clostridium perfringens* intoxications caused by prime rib consumed at a restaurant in Coon Rapids. Prime rib was significantly associated with illness, and *C. perfringens* with indistinguishable PFGE patterns were isolated from three ill patrons and leftover prime rib. Temperature abuse was documented during the preparation of the prime rib, allowing for bacterial proliferation. Corrective actions were taken at the restaurant including following written procedures for cooking, cooling, and reheating foods, fixing a broken oven thermometer, keeping an employee illness log, and requiring prompt reporting of patron illness complaints.

(4)
Norovirus Gastroenteritis Associated with a Restaurant

January Hennepin County

On February 1, 2007, the Minneapolis Division of Environmental Health (MDEH) received a complaint of gastrointestinal illness among a group of eight work colleagues that attended a lunch meeting catered by a restaurant on January 29. MDEH immediately notified Hennepin County Public Health Department (HSPHD) epidemiology and the Minnesota Department of Health (MDH), and an investigation was initiated.

HSPDH staff interviewed seven members of the original complaint group and two additional patrons about illness history and food consumption. A case was defined as a person who ate catered or delivered food from the restaurant on January 29 and subsequently became ill with vomiting and/or diarrhea (≥3 loose stools in a 24-hour period). A stool specimen kit was delivered to one complainant.

On February 2, MDEH sanitarians inspected the restaurant, evaluated food preparation/storing procedures, and interviewed employees about illness history and work duties. The environmental health assessment of the restaurant focused on employee health and norovirus prevention education. After MDEH was informed of a previously ill food worker who prepared sandwiches for catering and delivery on January 29, MDH and HSPHD epidemiology requested a list of patrons from that date who purchased food prepared by the ill food worker; the list was delivered on February 2. A stool specimen kit was delivered to this employee as well.

Three groups received catered or delivered food prepared by the previously ill food worker on January 29. The original complainant group (Group A) ordered a platter of various sub style sandwiches (meat, cheese, vegetables, and dressing), bagged potato chips, and pre-packaged cookies. Group B ordered eight box lunches for a group of co-workers. The box lunches consisted of a variety of sub style sandwiches, bagged potato chips, pickle spears, and pre-packaged cookies. Group C ordered three individual sandwiches for three co-workers. This order also included three bags of potato chips.

Seven members of the original complaint, one patron from Group B, and one patron from Group C were interviewed about illness and foods consumed on January 29. Seven members of the original complaint and one patron from Group C met the case definition. Of the patron cases, seven (88%) had diarrhea, seven (88%) had cramps, six (75%) had fever, and five (63%) had vomiting. The median incubation period for patron cases was 39.5 hours (range, 18 to 52.5 hours). The median duration of illness was 18 hours (5.5 to 26 hours) for five of the patron cases; three cases were still experiencing symptoms at the time of interview. A stool sample submitted by one of the ill patrons to the MDH laboratory was positive for norovirus and was negative for *Salmonella*, *E. coli* O157:H7, *Campylobacter*, *Shigella*, and *Yersinia*.

Restaurant management had not received any other reports of patron illness and currently did not have any ill employees. Twelve employees (from 15 eligible employees [80%]) were interviewed about possible illness and work duties. One employee reported illness in the 2 weeks prior to January 29. This employee experienced 13 hours of vomiting, which resolved at noon on January 26. This employee reported not working while experiencing symptoms but did return to work as a delivery driver/sandwich preparer on January 29. This employee reported always wearing gloves when preparing sandwiches. A stool sample was never submitted by the ill food worker.

The MDEH sanitarian noted overall compliance with food code requirements and no critical violations. Preparation and handling of foods and glove use were discussed with restaurant management. Management stated that employees always wear gloves when handling ready-to-eat foods. 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. MDEH, MDH Environmental Health, and HSPHD epidemiology met with the restaurant's corporate and franchise managers on February 28 to further discuss these issues in the context of multiple reported outbreaks in restaurants of this chain in the past year.

This was an outbreak of norovirus gastroenteritis associated with consumption of food from a restaurant. Sub style sandwiches were implicated as the vehicle. The sandwiches likely were contaminated by the previously ill food worker.

(5)
Norovirus Gastroenteritis Associated with a Restaurant

February Ramsey County

On February 7, 2007, the Minnesota Department of Health (MDH) foodborne illness hotline received two independent complaints of gastrointestinal illness among patrons who ate at a restaurant in St. Paul, Minnesota on February 2. City of St. Paul environmental health officers were notified and an investigation was immediately initiated. A week after the start of the outbreak assessment, an additional complaint was forwarded to MDH epidemiologists from MDH environmental health staff. These patrons had eaten at the restaurant on January 30 and subsequently became ill. They were also included in the investigation.

On February 9, City of St. Paul environmentalists obtained a list of patrons from February 2 who paid by credit card. MDH staff interviewed complainants and other patrons about food consumption and illness history. A case was 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). Three stool kits were sent to complainants. Returned kits were tested for bacterial and viral pathogens at the MDH Public Health Laboratory (PHL).

City of St. Paul environmentalists conducted an environmental health assessment at the restaurant. The manager of the establishment was asked about employee illness during January and early February, staff at the restaurant were interviewed, and food preparation practices were observed and discussed.

Thirty-two patrons (including four original complainants) were reached for interview, and 10 met the case definition. All 10 cases reported diarrhea, eight (80%) vomiting, eight (80%) cramps, and five (50%) fever. No cases reported bloody stools. The median incubation period was 32.5 hours (range, 11 to 49.5 hours). The median duration of illness was 41.5 hours (range, 32.5 to 108 hours). Three patrons from the two original complaints submitted stool samples; all three tested positive for norovirus with matching nucleic acid sequences (NLV276).

Patrons ate a variety of foods including various sushi dishes and other ready-to-eat foods. No single food item was statistically associated with illness.

None of the 12 employees at the restaurant reported illness in the month prior to patron illness. All staff were educated on 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 St. Paul, Minnesota. The vehicle and source of contamination were not identified.

(6)
Norovirus Gastroenteritis Associated with a Restaurant

March Mower County

On March 22, 2007, the Minnesota Department of Health (MDH) foodborne illness hotline received a complaint of gastrointestinal illness among a group of patrons that ate at a restaurant in Austin, Minnesota on March 18. The complainants reported no other common exposures. MDH Environmental Health (EH) Services was notified and an investigation was initiated on March 22.

A list of restaurant patrons from March 18 was obtained from credit card receipts. MDH EH inspected the restaurant to evaluate food preparation and handling procedures and interview restaurant employees regarding recent illness. MDH staff interviewed patrons to obtain information on food/beverage consumption and illness history. A case was defined as a restaurant patron who 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, viral, and toxin testing.

Illness histories and exposure information were obtained from 51 patrons; nine (18%) met the case definition, including one from the initial complaint and eight identified using credit card receipts. Two patrons, including one from the initial complaint, reported illness that did not meet the case definition and were excluded from further analysis.

All nine cases reported diarrhea, eight (89%) cramps, seven (78%) fever, three (33%) vomiting, and one (11%) bloody stools. Meal dates included March 16 for four cases and March 18 for five cases. The median incubation period was 21 hours (range, 5 to 144 hours). The median duration of illness was 59.5 hours (range, 7 to 131 hours) for the seven people who had recovered at the time of interview.

MDH EH and MDH epidemiology staff interviewed 34 restaurant employees regarding recent illness. Three employees reported illness, with onsets ranging from February 28 to March 16. All three employees reported vomiting and one reported diarrhea.

Cases reported eating a variety of foods, but no food was significantly associated with illness. Two of the three patron stool samples, including one from a member of the initial complainant group and one from a case identified from credit card receipts, tested positive for norovirus with the same genetic sequence (NLV309). The single employee stool sample was negative for norovirus.

MDH EH inspected the restaurant on March 23. Several critical items related to excluding ill employees, keeping an employee illness log, and employee hygiene were identified.

This was an outbreak of norovirus gastroenteritis associated with a restaurant. While no particular food item was associated with illness, the matching viral sequence in unrelated patrons implicated the restaurant as the source of the outbreak. The presence of ill employees and the

critical items identified by the restaurant inspection indicates contamination by restaurant employees as the likely cause of the outbreak. Corrective actions were taken at the restaurant including handwashing education, exclusion of ill employees, and implementation of an employee illness log.

(7)

E. coli O157:H7 Infections Associated with Consumption of Ground Beef

March-May Multiple counties/Multiple states

From May 1 through May 4, 2007, the Minnesota Department of Health (MDH) Public Health Laboratory identified five clinical isolates of *E. coli* O157:H7 with indistinguishable pulsed-field gel electrophoresis (PFGE) subtype patterns through routine surveillance. This PFGE subtype (designated PulseNet pattern *Xba*1 EXHX01.0047 and *Bln*1 EXHA26.0015) is common in Minnesota and comprises 5.7% of the patterns in the national *E. coli* O157:H7 PulseNet database. For both *Xba*1 and *Bln*1 enzymes, the patterns were the most common in their respective groups. A 60-day review of the PulseNet database showed seven additional states with matching patterns, including Arkansas (1), Iowa (4), Michigan (1), Ohio (2), Texas (3), Utah (1), and Virginia (4). In addition, there were two additional isolates with matching patterns identified in Minnesota in March.

The Minnesota isolates from May originated from five patients; these patients were interviewed by MDH staff with a routine detailed questionnaire about illness history and food consumption in the week prior to illness onset. All patients reported consuming ground beef in the week prior to illness onset.

A case-control study was conducted during May 4–7, 2007, to specifically evaluate ground beef and other food exposures. For the case-control study, a case was defined as a person with diarrheal illness ($\geq$3 loose stools in a 24-hour period), from whom the outbreak PFGE pattern of *E. coli* O157:H7 was isolated from stool and with illness onset after April 20, 2007. Due to the length of time that had elapsed, the two additional case-patients from March were not included in the case-control study. Three controls per case were enrolled through sequential digit dialing using the case-patient's telephone number. Controls were matched to case-patients 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 a standard questionnaire that included specific questions about ground beef purchase locations, purchase dates, and package sell-by-dates.

Seven cases and 21 matched controls were enrolled in the case-control study. All seven case-patients reported consumption of ground beef during the week prior to illness onset compared with 15 of 21 controls; this association was not statistically significant (odds ratio [OR], undefined; 95% confidence interval [CI], 0.55 to infinity; p = 0.28). However, consumption of ground beef purchased at Grocery Chain A or Grocery Chain B was significantly associated with illness (6 of 7 case-patients vs. 4 of 21 controls; OR, 25.5; 95% CI, 2.4 to 619; p = 0.003). Grocery Chain A and Grocery Chain B are high-end grocery stores in the Minneapolis/St. Paul metropolitan area, are owned by the same company, and share common distributors.

On May 8, MDH issued a press release and health alert to enhance case finding and inform the public. All persons who had ground beef purchased from Grocery Chain A or Grocery Chain B since April 7, 2007, were encouraged to discard it or return it to the store. Anyone who developed bloody diarrhea after consuming ground beef from Grocery Chain A or Grocery Chain B were encouraged to seek medical care.

For this outbreak, a case was defined as a person who had a culture-confirmed *E. coli* O157:H7 infection with the outbreak PFGE subtype and who had consumed beef purchased at Grocery Chain A or Grocery Chain B during March–May, 2007. A total of 10 cases were ultimately identified, all through routine surveillance. The median age of case-patients was 53 years (range, 5 to 76 years). Seven (70%) case-patients were female. Illness onset dates ranged from March 27 through May 4, 2007, and seven (70%) case-patients were hospitalized with a median duration of hospitalization of 5 days (range, 2 to 9 days). No cases of hemolytic uremic syndrome were identified. Nine case-patients consumed ground beef purchased at one of four Grocery Chain A or Grocery Chain B stores in the Minneapolis/St. Paul metropolitan area. One case-patient did not consume ground beef from Grocery Chain A or Grocery Chain B but consumed a New York strip steak from Grocery Chain A.

Five samples of ground beef were collected from three culture-confirmed case-patients and submitted to the Minnesota Department of Agriculture (MDA) Laboratory for culture during the outbreak investigation. The MDA Laboratory isolated *E. coli* O157:H7 with the outbreak PFGE pattern from one opened ground beef package with a sell-by-date of April 19, 2007, and one intact ground beef package with a sell-by-date of April 22, 2007. Both packages were purchased at the same Grocery Chain B in Minnetonka, Minnesota; they were submitted by two different case-patients.

A traceback investigation by MDA and the United States Department of Agriculture Food Safety and Inspection Service (USDA-FSIS) found that all the beef trim used for ground beef in the implicated Grocery Chain A and Grocery Chain B stores originated from a single slaughter facility located in Windom, Minnesota. On May 10, the slaughter facility issued a voluntary recall of 117,500 pounds of beef trim that was produced on March 27 and distributed to distributors and retail outlets in eight states (Arizona, Illinois, Iowa, Michigan, Minnesota, Ohio, Virginia, and Wisconsin). Subsequently, the USDA isolated *E. coli* O157:H7 with the outbreak PFGE pattern from a product sample within the plant. The plant was issued a Notice of Intended Enforcement (NOIE). The NOIE listed a number of food safety issues that the plant needed to address within a set time period or face the possibility of USDA-FSIS removing inspectors from the plant.

This was an outbreak of *E. coli* O157:H7 infections associated with ground beef ground and sold in Grocery Chain A or Grocery Chain B grocery stores in the Minneapolis-St. Paul metropolitan area. The beef trim used to make this ground beef originated from a single slaughter facility in Windom, Minnesota. Ten cases were identified in Minnesota. Routine, real-time PFGE subtyping and interviewing of case-patients made rapid detection of this *E. coli* O157:H7 outbreak with a common PFGE subtype possible. A case-control study supported by product sampling allowed for rapid identification of ground beef as the outbreak vehicle, resulting in a

press release to alert the public, a product recall, and intervention at the implicated processing plant by USDA.

(8)
Hepatitis A Associated with a Restaurant

March-April Murray County

On April 30, 2007, the Minnesota Department of Health (MDH) was notified of a case of hepatitis A virus (HAV) infection in an 18-year-old male resident of Murray County. MDH determined that the case had symptom onset on April 24, was an employee at a restaurant in Slayton, Minnesota, and had worked numerous shifts prior to being tested for HAV. A sanitarian from Lincoln, Lyon, Murray, Pipestone Public Health Services (LLMP) and MDH epidemiologists assessed the staff for additional illnesses, and identified one additional confirmed hepatitis A case on May 2. The restaurant closed on May 2.

A case of HAV was defined as either: 1) a restaurant employee or patron with a positive HAV-specific IgM antibody test result, discrete onset of symptoms, and jaundice or elevated aminotransferase levels; or 2) an individual with discrete onset of symptoms, jaundice or elevated aminotransferase levels, and an epidemiologic link to the restaurant or a laboratory-confirmed case.

Following the identification of the additional case, MDH and LLMP agreed that the following actions would be taken: 1) all employees should receive immune globulin (IG); 2) per current guidelines published by the U.S. Centers for Disease Control and Prevention (CDC) and Advisory Committee on Immunization Practices (ACIP), IG was recommended for patrons of the restaurant who had consumed food or beverages within the prior 14 days; 3) a press release would be issued to notify patrons of IG recommendations; and 4) LLMP Public Health Services would hold a clinic to provide IG to patrons. IG was purchased by MDH.

Four additional cases were soon identified (one restaurant employee and three patrons); each case had onset within 19 days of the initial case. In all, eight cases of HAV were identified during the outbreak. All cases were confirmed by positive HAV-specific IgM antibody test results. Three cases were employees of the restaurant, three were patrons who reported multiple exposures to the restaurant, one was a patron who reported one exposure to the restaurant, and one was an individual who had contact with a restaurant patron case (this individual was classified as a secondary case). Known exposure dates to the restaurant ranged from March 31 to April 23. No specific food or beverage items were found to be associated with illness.

The mean age of the eight cases was 33 years (range, 4 to 60 years). Five (63%) cases were female. Illness onset dates ranged from April 23 to May 19. The most common symptoms reported were jaundice (88%), fatigue (88%), abdominal pain (88%), tea-colored urine (75%), and anorexia (75%). Three (38%) cases were hospitalized; one required a liver transplant and subsequently died.

Over 2,300 individuals received IG through the public health clinic at LLMP Public Health Services and an undetermined number of patrons received IG from their health care providers.

(9)

Salmonella Typhimurium Infections Associated with Consumption of Leafy Greens

March-April Multiple counties/Multiple states

On April 13, 2007, the Minnesota Department of Health (MDH) Public Health Laboratory (PHL) identified two clinical *Salmonella* Typhimurium isolates with indistinguishable pulsed-field gel electrophoresis (PFGE) patterns by two enzymes. The cases were both interviewed using a standard questionnaire. Over the following week, an additional seven indistinguishable isolates were identified by the MDH PHL. A review of the national PulseNet database revealed additional isolates with matching PFGE patterns by first enzyme that were uploaded by Wisconsin and Pennsylvania. A multi-state investigation was initiated.

A case was defined as a person who had a *S.* Typhimurium isolate that matched the outbreak PFGE pattern (CDC Xbal designation JPXX01.0001 and Blnl designation JPXA26.0255), and who had illness onset since March 1, 2007. Minnesota cases were interviewed with a broad-based exposure questionnaire and re-interviewed several times about various specific foods consumed.

Minnesota epidemiologists consulted with epidemiologists in Wisconsin and Michigan about their matching cases. Additional matching cases in other states were subsequently identified. By April 24, a focused case questionnaire had been developed to look specifically at leafy green exposures. A multi-state case-control study was initiated by MDH on May 1 to evaluate these food items. Controls were age-matched to the cases and were enrolled through sequential digit dialing anchored on the case's telephone number.

Seventy-six cases from 14 states were identified in this outbreak (IL, 24; MN, 11; WI, 11; MI, 10; IA, 5; OH, 5; AZ, 2; NY, 2; GA, MA, MO, SD, UT, WA, 1 each). The 11 cases from Minnesota had a median age of 30 years (range, 3 to 62 years) and 9 (81%) were female. Onset dates ranged from March 17 to April 10. All 11 cases reported diarrhea, 10 (91%) cramps, eight (73%) bloody stools, seven (64%) fever, and three (27%) vomiting. Two cases were hospitalized.

A total of 26 cases and 51 controls from four states (MI, MN, OH, WI) were enrolled in the case-control study. Consuming lettuce (25 of 26 cases vs. 37 of 49 controls; odds ratio [OR], 7.9; 95% confidence interval [CI], 1.05 to 360.2; $p = 0.03$) was statistically associated with illness. Consuming spinach or mixed greens was also statistically associated with illness (13 or 23 cases vs. 11 of 47 controls; OR, 4.3; 95% CI, 1.28 to 14.5; $p = 0.006$). No common brand, variety, or source of leafy greens was identified. However, a traceback investigation of the source of contamination was not conducted. No additional cases were identified after May 15, 2007.

This was a multi-state outbreak of *S.* Typhimurium infections associated with consumption of leafy greens. A specific leafy green vehicle for infection and the source of contamination were not identified.

(10)
Salmonella Wandsworth Infections Associated with a Packaged Snack

April-July Dakota County/Multiple states

On April 2, 2007, the Wisconsin Department of Health identified two isolates of *Salmonella* Wandsworth with indistinguishable pulsed-field gel electrophoresis (PFGE) patterns. Throughout April, May, and June, additional isolates from cases were identified in several states. On June 20, one matching isolate was identified by the Minnesota Department of Health (MDH) Public Health Laboratory. An interview was immediately conducted for this case.

A case was defined as a person who had a *S.* Wandsworth isolate that matched the outbreak PFGE pattern (CDC subtype designation WWSX01.0013), and illness onset since January 1, 2007. Cases were interviewed with various questionnaires about food, animal, and shopping exposures. An interviewer at the Centers for Disease Control and Prevention (CDC) conducted open-ended interviews with 10 cases from states other than Minnesota. The Minnesota case's parents were interviewed on June 20 by an MDH epidemiologist using the standard *Salmonella* questionnaire.

Investigators in California interviewed six of their cases, compiled food items mentioned commonly among the cases along with food items commonly consumed by children (with particular focus on organic foods that had been mentioned by many cases) into a single questionnaire. This questionnaire was used to re-interview cases. This questionnaire was subsequently used to re-interview the Minnesota case after the aforementioned interview on June 20.

A case-control study was started after June 20 to evaluate food items found commonly in the California case questionnaire. Controls were age-matched family friends of the cases. Only children were included in the analysis. For case patients less than 2 years of age, controls needed to be within 6 months of the case-patient's age, but not less than 10 months old.

The case's home was visited on June 21, and food samples were collected by MDH staff and tested by the Minnesota Department of Agriculture laboratory using the Bacterial Analytical Manual (BAM) methodology for food testing published by the Food and Drug Administration (FDA). Positive *Salmonella* isolates were also subtyped by PFGE. Additional samples were collected from stores on June 27 by MDH and MDA staff and processed as described above.

Consumption information about the implicated food product was given to FDA for traceback purposes. FDA staff assessed the facility that manufactured the implicated product and one of its suppliers. Investigators took samples of product, seasoning mix, individual spices, and collected environmental samples at the production plants. All FDA samples were processed at FDA laboratories.

Sixty-nine cases from 23 states were identified in this outbreak (NY, 14; CA, 8; PA, 5; CO, 5; WA, 4; MD, 4; NJ, 3; VT, 3; CT, IN, MA, NC, NH, OR, TX, WI, 2 each; IL, LA, TN, MI, MN, SC, VA, 1 each). The case from Minnesota was an 11-month-old female. She had bloody

diarrhea and a fever of 102.9° F during her illness. She was not hospitalized. The case's parents reported shopping at an organic co-op in the Twin Cities metropolitan area. This was a common theme among the majority of case interviews nationwide.

Of all cases in this outbreak, 39 (76%) of 51 cases reported bloody diarrhea, and six were hospitalized. There were no deaths. Fifty-five percent of cases were female, and the median age was 1.3 years (range, 10 months to 47 years). Sixty-four (93%) of the sixty-nine cases were aged 10 months to 3 years. One adult patient was a secondary case to her child and did not eat the implicated product.

Thirty-six cases were interviewed as part of the case-control study. Thirty-four of 35 child-cases reported consuming the packaged snack compared to eight of 29 controls (matched odds ratio, 23.3; $p < 0.001$). The packaged snack was a puffed rice snack coated with a vegetable seasoning. It was a bagged product marketed to children and families as a healthy alternative snack food and was found in various stores, including organic grocery stores and co-ops. No other foods were statistically associated with illness.

Fifty-one of 52 cases reported consuming the packaged snack. Forty-seven of these cases reported consuming it in the week prior to onset of illness. The packaged snack was collected from case-households in 11 states, and three states collected product from retail stores for testing. The outbreak strain of *S.* Wandsworth was isolated from the packaged snack in five states. The MDA laboratory was the first laboratory to isolate *S.* Wandsworth from the product. Additional serotypes of *Salmonella* were also isolated, including Typhimurium, Kentucky, and Haifa. The MDA laboratory was also the first to isolate *S.* Typhimurium in the product; they also isolated *Enterobacter sakazakii*.

FDA contacted the production facilities for the packaged snack. The company suspended production of the product and issued a voluntary recall on June 28. On July 2, the recall was expanded to include other foods produced with the same ingredients used in the packaged snack.

Environmental samples taken at the production facilities by the FDA were negative for *Salmonella.* Samples of the packaged snack and the seasoning mix sprayed onto the product after the final kill step tested positive for the outbreak subtype of *S.* Wandsworth. Individual spices tested negative with the exception of broccoli powder, which also yielded the outbreak subtype of *S.* Wandsworth.

Eighteen cases of *S.* Typhimurium from nine states (but not Minnesota) were also identified in this outbreak. These case-isolates were indistinguishable by PFGE from the strain of *S.* Typhimurium identified in the packaged snack. Fourteen cases reported consuming the packaged snack; 12 had consumed the product in the week prior to illness onset.

This was a multi-serotype outbreak of salmonellosis associated with the consumption of a packaged snack. Products such as seasoning mixes made from dried vegetables should not be used in ready-to-eat foods without prior heat-processing. *Salmonella* spp. can survive in very dry environments, and the snack was heat processed, coated with vegetable seasoning, and then bagged for consumption as a ready-to-eat food. Commercial snack foods containing dried but not

heat-treated raw ingredients such as vegetables are vulnerable to contamination. Continued monitoring and education of the food processing industry are needed to ensure that only pathogen-free materials are added to ready-to-eat foods after the heat-treatment step. Routine and rapid subtyping of bacterial isolates, coupled with a vigorous epidemiological response, were critical to identifying and abating this multi-state outbreak.

(11)
Norovirus Gastroenteritis Associated with a Restaurant

April Dakota County

On April 17, 2007, the Minnesota Department of Health (MDH) foodborne illness hotline received a complaint of gastrointestinal illness among 16 of 19 co-workers who had eaten at a restaurant in Eagan, Minnesota on April 13. They had ordered food off the menu and had a range of food items including sandwiches, hamburgers, French fries, wings, and mashed potatoes. The complainant reported that the co-workers had no other recent meals or events in common. MDH Environmental Health (EH) was notified and an outbreak investigation was initiated.

A list of exposed co-workers was obtained from the original complainant, and staff from MDH interviewed these patrons to obtain information on food/beverage consumption and illness history. A case was defined as a restaurant patron who subsequently developed vomiting and/or diarrhea ($\geq$3 loose stools in a 24-hour period). Stool specimens were obtained from two patrons and submitted to the MDH Public Health Laboratory (PHL) for bacterial and viral testing.

An MDH sanitarian inspected the restaurant on April 17 and provided recommendations to prevent ongoing transmission of foodborne illness. All employees were contacted for interview regarding recent illness history and job duties. Credit card receipts from the meal date in question were obtained from the restaurant.

Illness histories and exposure information were obtained from 22 patrons. Of these, 14 (63%) met the case definition; 13 cases were from the original complaint group and one case was a credit card receipt patron who was contacted by MDH for interview. Of the 14 cases, 12 (86%) of 14 reported diarrhea, 10 (71%) of 14 reported vomiting, eight (57%) of 14 cramps, four (31%) of 13 reported fever, and one (8%) of 13 reported bloody diarrhea. The median incubation period was 33 hours (range, 8 to 44 hours). The median duration of illness was 63 hours (range, 21 to 96 hours) for the 11 people who had recovered at the time of interview. One of two stool samples collected tested positive for norovirus genogroup I.

No food items were statistically associated with illness.

Upon inspection of the restaurant, the sanitarian noted six critical items in the inspection report. These items included not excluding food employees with vomiting or diarrhea, not washing hands between soiled and clean dish handling, food being cooled was not meeting cooling guidelines, sanitizers were below required levels, utensils that were being stored as clean were soiled, and storage of raw chicken above beef steaks created a cross-contamination situation. Sixty-five employees were interviewed; five reported nausea in the previous 2 weeks and four

servers reported vomiting and/or diarrhea in the previous 2 weeks. Two of the four food workers with vomiting and/or diarrhea reported illness on April 14, one reported illness on April 13, and one did not recall the date of their illness. The sanitarian discussed with restaurant staff the importance of handwashing for the prevention of norovirus. Additionally, the restaurant was informed that any employee with vomiting and/or diarrhea must be excluded from working for 72 hours after the resolution of symptoms. A stool kit was delivered to one employee but it was not returned to MDH.

This was a foodborne outbreak of norovirus gastroenteritis associated with a restaurant. A specific food vehicle was not identified and the ultimate source of the outbreak was not confirmed. However, there was evidence of gastrointestinal illness among food workers. The most plausible source was an infected food worker who had contact with one or more ready-to-eat food items.

(12)
Norovirus Gastroenteritis Associated with a Caterer/Restaurant

April Hennepin County

On April 23, 2007, the Minnesota Department of Health (MDH) received a report of illnesses among guests of a wedding that was held on April 21. The initial complaint was received by a sanitarian with the City of Brooklyn Park Public Health Division (BPPHD) and MDH was immediately notified. It was reported that many of the 47 guests of the groom's dinner on April 20 had developed vomiting and diarrhea the following day. The groom's dinner was held at a country club in Brooklyn Park, Minnesota. The food for the groom's dinner was provided by a caterer part of the country club. On April 24 and 25, the MDH foodborne illness hotline received two independent illness complaints from patrons of a restaurant, which is also part of the country club, with meal dates of April 20 and April 21. The food served at the restaurant is prepared by the same food service facility as that of the caterer. An investigation was initiated.

The groom's family provided MDH with a list of individuals who attended the groom's dinner and/or wedding reception. Attendees were interviewed by MDH staff regarding illness history and consumption of food and beverages at both events. Members of the independent complaints were interviewed regarding illness history and foods eaten at the restaurant. A case was defined as an individual who was either a member of the wedding group or who had otherwise eaten at the restaurant, and subsequently became ill with vomiting and/or diarrhea ($\geq$3 loose stools in a 24-hour period). Stool samples from four ill wedding attendees and three individuals representing the two independent complaints were submitted to MDH Public Health Laboratory (PHL) for bacterial and viral testing.

On April 23, BPPHD contacted and visited the country club to review and observe food preparation and handling procedures, establishment employee work/illness report records, and interview employees to assess the potential for ongoing illness transmission. In addition, information relevant to the investigation was requested from the Director, including a list of menu items served at the groom's dinner, employees who prepared food for or worked the event (including job duties, work schedules, etc.), contact names of other events held that weekend,

and food/beverages served. Names and phone numbers of employees not present during the on-site interview were obtained; calls were made to the remaining employees that worked at the facility that weekend and the days prior. Stool samples from two caterer employees were submitted to MDH PHL for bacterial and viral testing.

Thirty wedding guests were interviewed, and 15 (50%) met the case definition. Fourteen cases (93%) had vomiting, 13 (86%) diarrhea, nine (60%) cramping, and eight (53%) fever. The median incubation period from the groom's dinner was 31 hours (range, 21.5 to 42.5 hours). Among cases that had recovered at the time of interview (n = 11), the median duration of illness was 53.5 hours (range, 20 to 108 hours).

Illness was significantly associated with attending the groom's dinner (15 of 15 cases vs. 4 of 11 controls; odds ratio, undefined; $p < 0.001$), and eating salad at the groom's dinner (15 of 15 cases vs. 1 of 4 controls; odds ratio, undefined; $p = 0.004$). No other foods were associated with illness.

In the two independent complaint groups, five of six individuals met the case definition, and the sixth person reported mild symptoms that did not meet the case definition. One group consisted of two individuals who dined together at the restaurant on April 20. Both cases reported vomiting, cramps, and fever; one reported diarrhea. Neither case reported bloody stools. The incubation period for both cases was 21 hours. Neither case had recovered at the time of interview. Both of these cases ate a club sandwich; one had fries, one had a pickle, one had a diet coke with ice, and one had water with ice. The other independent complainant group consisted of four individuals who dined together at the restaurant on April 21. Three cases were identified from this group; all three cases reported diarrhea and cramps and two reported vomiting; none reported bloody stools. The cases were unsure whether they had fever, but one reported chills and sweating. The median incubation period for these three cases was 23 hours (range, 20 to 26 hours). The one case who had recovered at the time of interview had illness duration of 24 hours. One of the cases from this complaint had a cobb salad, one had a chicken wrap, one had a Rueben sandwich and fries, and one had a prime rib sandwich; cases consumed a variety of beverages, including two that had water.

Seven stool specimens tested by MDH PHL were positive for norovirus genogroup II. These specimens included four from ill wedding attendees, three from individuals representing the two independent complaints, and one from an employee from the catering company. All seven positive norovirus samples had an identical nucleic acid sequence.

On Friday, April 27, BPPHD discussed food handling procedures in detail with the Executive Chef and Director. As a routine measure, safeguards were emphasized during the interview in regards to the foodborne illness investigation. In addition, the country club management implemented a "check-in" policy for employees during this period to interview all staff before they started work.

Twelve employees (six servers, two food workers, and four management/sales staff) reported experiencing gastrointestinal illness symptoms at some point during April 15 through April 23.

The employee who tested positive for norovirus was a server. One of the two food workers who reported illness personally prepared and plated salads for the groom's dinner while ill.

The establishment did have an illness log and an employee exclusion policy. They were in compliance with handwashing practices, and also limit bare-hand contact with the use of gloves and utensils. However, the employee who prepared and plated the salads possibly may have used bare-hand contact during the process.

Three forms of lettuce were used for the groom's dinner (Iceberg, Romaine, and mixed greens). All lettuce items were received, shredded, and required handling for salad preparation. Cucumbers were sliced, whole-small cherry tomatoes were added, and all items were plated by the food worker. According to management, due to the size of the groom's dinner, only one food worker was needed for plating. Croutons and salad dressing were added by the servers prior to service.

This was an outbreak of norovirus gastroenteritis associated with a country club caterer. Salad was the vehicle for guests at a groom's dinner. Cases also occurred among patrons of the country club restaurant, independent of the groom's dinner. Given the implication of salad as the vehicle for the groom's dinner, lettuce used on a variety of sandwiches and in salad was the likely vehicle for the restaurant's patrons. The ultimate source of the outbreak was one or more ill employees of the caterer. Numerous ill employees were identified, and norovirus infection was confirmed in one. Some of the food workers worked while ill, including the employee that prepared and plated the salad for the groom's dinner.

(13)
Suspected Foodborne Bacterial Intoxication Associated with a Church Potluck

April Norman County

On April 30, 2007, the Minnesota Department of Health (MDH) foodborne illness hotline received a report of gastrointestinal illness in a church group that had attended a potluck dinner at a church in Twin Valley, Minnesota on April 29, 2007. Foods served at the pot luck included sliced pork, buns, potato salad, Jell-O salad, taco hot dish, baked beans, corn nibblets, scalloped and au gratin potatoes, cole slaw, cheese cake, white cake with Heath Bar, and chocolate cake. Beverages included coffee and water. An investigation was initiated.

Epidemiologists from MDH obtained a partial list of 20 attendees on May 2, and interviewed them to obtain food/beverage consumption and illness histories. A case was defined as a potluck attendee with vomiting and/or diarrhea (≥3 loose stools in a 24-hour period). One stool sample collected from an ill individual several days after clinical signs had resolved was tested for bacterial pathogens, viral pathogens, and the enterotoxins of *Bacilus cereus* and *Clostridium perfringens* by the MDH Public Health Laboratory.

Of the 19 potluck attendees interviewed, 13 (68%) met the case definition. Thirteen cases reported diarrhea, seven (54%) abdominal cramps, two (15%) fever, two (15%) vomiting, and one (8%) blood in the stools. The median incubation period was 10.5 hours (range, 7.5 to 20

hours), and the median duration of illness was 12 hours (range, 1 to 38 hours). One case visited their health care provider, and an additional case was hospitalized for 3 days. The one stool specimen received tested negative for *Bacillus cereus*, *Clostridium perfringens,* norovirus*, Campylobacter, E. coli* O157:H7*, Salmonella, Shigella,* and *Yersinia.*

No food was statistically associated with illness. This was likely because of the small number of well controls and the fact that most people ate most of the foods.

This was a foodborne outbreak of gastrointestinal illness associated with a church potluck meal. An etiology was not identified, but the symptoms, incubation period, and duration of illness were consistent with foodborne bacterial intoxications caused by *Clostridium perfringens* or the diarrheal form of *Bacillus cereus*. A specific food vehicle could not be confirmed.

(14)
Suspected Foodborne Bacterial Intoxications Associated with a Restaurant

April Anoka County

On May 4, 2007, Anoka County Community Health and Environmental Services Department (ACCHESD) and the Minnesota Department of Health (MDH) received a report from a restaurant in Anoka, Minnesota of a complaint of illness among a group of four people who ate at the restaurant on April 29. The complainant had called ACCHESD and stated that three of the four meal companions from two separate households had become ill with gastrointestinal symptoms after eating at the restaurant. The ill complainants reported no other recent common meals or events. An investigation was initiated immediately.

On May 4, an ACCHESD sanitarian inspected the facility focusing on food preparation practices and temperature control. A limited credit card receipt list of patrons that dined on April 29 was available from the restaurant. The original complainants and credit card patrons were interviewed about their food consumption and illness histories using a standard questionnaire. Interviewees were also asked about how they ordered their prime rib or steak (rare, medium-rare, medium well-done, or well-done). A case was defined as a person who ate at the restaurant on April 29 and subsequently became ill with vomiting and/or diarrhea (≥3 loose stools in a 24-hour period) within 2 days of their meal. No stool specimens were obtained for testing.

Illness histories and exposure information were obtained from 21 patrons. Five (24%) cases were identified; all three ill patrons from the original complaint and two credit card receipt patrons met the case definition. Three people reported illness but did not meet the case definition, and thus were excluded from further analysis.

All of the cases experienced diarrhea and cramps; none reported vomiting, fever, or bloody stools. The median incubation period was 10.5 hours (range, 6.5 to 14.5 hours). The median duration of illness was 30 hours (range, 28 to 54 hours). No stool samples were collected as the complaint was received 7 days after the meal.

All five cases reported eating prime rib, house salad, and bread. Eating prime rib was statistically associated with illness (5 of 5 cases vs. 6 of 16 controls; odds ratio, undefined; p = 0.04). Two of five cases reported ordering their prime rib rare or medium rare and the other three did not remember how they ordered their prime rib. Only one of six controls that ordered prime rib reported ordering their prime rib medium-rare; the other five controls reported ordering their prime rib medium-well.

An ACCHESD inspector reviewed food flows and food preparation practices on May 4 and again on May 7. No violations were noted during inspection. However, because both of these inspections occurred during the day when the restaurant was not open, hot holding equipment could not be examined while it was in use. Upon recommendation from the inspector, hot holding equipment was examined by a company technician; some repairs were made to a back-up hot holding device that was likely in use on April 30th.

This was an outbreak of suspected foodborne bacterial intoxications associated with consumption of prime rib at a restaurant. The symptoms, incubation period, and the vehicle of prime rib are characteristic of an outbreak of *Clostridium perfringens* intoxications. However, the diarrheal form of *Bacillus cereus* can not be completely ruled out with out laboratory testing. Factors contributing to the outbreak were not definitively identified. However, malfunctioning hot holding equipment may have led to the amplification of bacteria in the prime rib.

(15)
Salmonella Agona Infections Associated with a Restaurant

May-July Hennepin County

On July 25, 2007, the Minnesota Department of Health (MDH) notified the Hennepin County Public Health Department (HCPHD) epidemiology and environmental health units of three *Salmonella* Agona cases identified through MDH's routine laboratory surveillance system. Isolates from the three cases were indistinguishable by pulsed-field gel electrophoresis (PFGE). All three cases indicated consuming a meal at a restaurant in Brooklyn Center, Minnesota during May or July. An investigation was initiated immediately.

All *Salmonella* cases reported to MDH are routinely interviewed about food consumption and other potential exposures as part of enteric disease surveillance in Minnesota. Patron cases were defined as persons who had *S.* Agona isolated from a stool culture or who had fever and diarrhea (≥3 loose stools in a 24-hour period) and who reported eating at the restaurant since May 18 (and prior to onset of symptoms). Suspect cases were those who had eaten at the restaurant since May 18 and subsequently developed mild gastrointestinal symptoms (i.e., one to two loose stools) 6 to 72 hours after eating at the restaurant.

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 credit card receipts who reported no gastrointestinal symptoms.

On July 25, HCPHD sanitarians worked with interpreters to conduct an environmental assessment of the restaurant and began interviewing employees about recent gastrointestinal illness. HCPHD sanitarians finished interviewing all 12 employees on July 26. Two consecutive negative *Salmonella* stool cultures collected at least 24 hours apart were required of each food worker. Environmental samples were taken from several locations in the kitchen and restaurant. Subsequent environmental health interventions occurred at the facility on August 1, 7, and 8. A list of patrons from July 5, 10, 12, and 20-25 was obtained from the restaurant. HCPHD epidemiologists called patrons to ascertain illness history and food consumption at the restaurant. The three initial cases were re-interviewed by MDH using a form containing restaurant-specific questions.

On July 27, MDH notified HCPHD of a fourth *S.* Agona case reported by a hospital laboratory. This case's isolate was indistinguishable from initial restaurant case isolates by PFGE; however, this case could not be reached for interview.

No culture-confirmed patron cases were identified in addition to the three cases identified through laboratory surveillance and interviewed by MDH. Seven patrons reported diarrhea; however, for each of these individuals, onset was less than 6 hours following the meal at the restaurant, and none reported fever. One suspect case was identified who reported diarrhea beginning 24 to 48 hours after a meal at the restaurant with symptoms lasting for about 1 week. This patron denied fever and did not submit a stool sample. Forty-five patrons with no reported illness were interviewed.

Analysis was limited to the three patron cases only. Of these cases, all reported diarrhea, two (67%) fever, and two (67%) cramps. None reported nausea, vomiting, or bloody diarrhea. One of the cases was hospitalized for 2 days. Meal dates for the cases included May 18 and July 5; the third patron case could not recall the exact meal date (reported meal occurred sometime from July 10 to July 12). The median incubation period was 82.0 hours (range, 72 to 121 hours). The median duration of illness for the two cases who had recovered at the time of interview was 8.5 days (range, 7 to 10 days).

Patron cases had eaten a variety of foods from the Mongolian BBQ area, hot buffet and cold buffet lines, including rice, noodles, chicken entrees, pork entrees, beef entrees, shrimp entrees, appetizers, vegetables, fruit, ice cream, and other desserts. Due to the wide variety of foods served at the buffet, food item recall was difficult for both cases and controls. No food or beverage items were significantly associated with illness.

Three food workers at the restaurant tested positive for *S.* Agona of the outbreak PFGE subtype. 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*. None of these food workers reported recent symptoms of gastrointestinal illness. The other nine food workers tested negative for *Salmonella*; only one of these employees had reported recent illness consisting of "stomach problems" without vomiting or diarrhea.

HCPHD sanitarians made an initial visit to the facility on July 25 to discuss proper handwashing and handling of food items. Items of concern, such as food storage, inadequate utensil washing

and disinfection, and cross-contamination were identified and addressed. Environmental health staff returned to the restaurant on July 26 to collect environmental samples from several locations in the kitchen and restaurant. After learning of the first *Salmonella*-positive food worker (a restaurant manager who reported little contact with food items), HCPHD sanitarians visited the restaurant again on August 1 to conduct intensive employee handwashing training, discuss stool results and exclusion of positive food workers, and inform management that a thorough environmental cleaning of the entire facility must occur immediately. The restaurant voluntarily closed on the evening of August 1 in order to comply with this order. Environmental sampling results were available on August 2. All samples were negative for *S*. Agona. One sample collected from the sink used to wash vegetables and shrimp was positive for *S*. Aberdeen.

On August 7, when MDH notified HCPHD epidemiology staff of the second and third food workers (the sushi chef and a general food worker) who tested positive for *S*. Agona, HCPHD sanitarians responded by closing the facility again. All open and prepared foods were discarded and another thorough environmental cleaning of the entire facility was ordered. Additional violations were identified including patron ice cream self-service, use of domestic equipment in the kitchen, improper storage of sauce in large plastic garbage cans, and inappropriate food storage and labeling. All three positive food workers were excluded from the restaurant. While speaking with these employees about exclusion, HCPHD staff learned that all three were related and lived in the same household; therefore, environmental health staff provided additional education about good hygiene and food handling practices in the home. A follow-up inspection was conducted on August 8. Environmental cleaning and food disposal was appropriate and the restaurant was allowed to re-open.

This was an outbreak of *S.* Agona infections associated with consuming a meal at the restaurant. The outbreak was identified through the MDH routine laboratory surveillance system. A specific food vehicle was not identified. Asymptomatically infected food workers were the likely source of *Salmonella* transmission to patrons.

(16)
Norovirus Gastroenteritis Associated with a Restaurant

June Hennepin County

On June 11, 2007, the Minnesota Department of Health (MDH) foodborne illness hotline received a complaint of gastrointestinal illness in five individuals who were part of a group of 19 people who had eaten lunch at a restaurant in Eden Prairie on June 9. The complainant group was made up of youth basketball players and their families who attended several basketball games at a local high school over the weekend of June 9. No food items were served at the basketball games. MDH notified Hennepin County Public Health Department (HSPHD) epidemiology and environmental health units on June 11, and an investigation was initiated.

HSPHD epidemiology staff interviewed members of the original complaint group about illness history and food consumption at the restaurant. A case was defined as a member of the complainant group who became ill with vomiting and/or diarrhea (≥3 loose stools in a 24-hour

period) since June 9. Stool specimens from two complainants were obtained for bacterial and viral testing at MDH.

On June 12, 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.

Of the complainant group of 19 persons, five (26%) persons from four separate households met the case definition. All five cases reported diarrhea, four (80%) cramps, and four (80%) vomiting; none reported fever or bloody stools. The median incubation period from the restaurant meal was 30.5 hours (range, 29 to 33.5 hours). All five ill patrons were still experiencing symptoms at the time of interview (at the time of interview cases had each experienced ~15 hours duration of symptoms). Three of the cases (Cases A, B, and C) were 15-year-old females; the other two cases were an adult male (Case D) and an elderly female (Case E). Cases A, B, and C all played on the same basketball team. Additionally, Cases A and B ate at another restaurant in Apple Valley on Friday, June 8. Cases A and C were at the same sleep-over party on the evening of Saturday, June 9, and Cases A and C attended a graduation open-house on the afternoon of Sunday, June 10. Despite the multiple common exposures of Cases A, B, and C, the only potential exposures these cases shared with Case D and Case E were the basketball games and lunch at the Eden Prairie restaurant on June 9. Stool samples were submitted by two of the ill patrons to the MDH laboratory and were positive for norovirus genogroup II, and negative for bacterial enteric pathogens. Both viral sequences were identical.

All five cases consumed a sub-style sandwich from the restaurant for lunch. Sandwich topping recall was minimal. Sandwich items included: chicken (1 case), ham (2 cases), roast beef (2 cases), turkey (2 cases), lettuce (5 cases), black olives (4 cases), cheese (2 cases), cucumber (1 case), green pepper (2 cases), mayonnaise (3 cases), mustard (1 case), oil (1 case), onions (1 case), pickles (2 cases), and tomatoes (2 cases). Three of the cases also ate pre-packaged potato chips. Beverages included fountain drinks with ice (4 cases); the other ill patron drank bottled water brought from home.

The other members of the group were interviewed and none reported illness. These patrons also ate sub-style sandwiches including all of the toppings listed above, pre-packaged potato chips, fountain beverages with ice, and bottled water. No specific ingredients were statistically associated with illness.

The HSPHD sanitarian contacted restaurant management via telephone on June 11. Management had not received any other reports of patron illness, but had one employee who had called in sick that day. Due to the possibility of ongoing transmission to patrons or employee-to-employee transmission, HSPHD sanitarians inspected the restaurant on June 12 and began interviewing employees.

Upon inspection, the HSPHD sanitarian noted overall compliance with food code requirements and no critical violations. Preparation and handling of foods 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.

Of the nine employees, eight were interviewed (one did not return several messages; however, this employee had not worked in the week prior to June 9). One employee reported illness after both working and eating a sandwich at Subway on June 9. This employee experienced 1 hour of vomiting and 14.5 hours of diarrhea and cramping beginning on the evening of June 10 and resolving on June 11. This employee's incubation period was 33 hours following her meal at Subway on June 9. Based on her incubation period, it is likely that she was exposed in a similar timeframe as the patron cases. There may have been a previously ill food worker; however, no other employees reported illness. A stool specimen kit was sent to the ill food worker; however, she did not submit a sample.

This was an outbreak of norovirus gastroenteritis associated with eating at a restaurant in Eden Prairie. The vehicle of transmission was not identified. The source of contamination was likely an ill or recently ill food worker.

(17)
Scombroid Fish Poisoning Associated with a Restaurant

June Hennepin County

On June 27, 2007, Hennepin County Public Health Protection -- Epidemiology (HCPHP) and the Minnesota Department of Health (MDH) were notified by the Minneapolis Division of Environmental Health (MDEH) of a number of complaints of scombroid-like illness following meals at a restaurant. The owner of the restaurant had received four separate complaints of related illness involving five patrons and notified MDEH. Meal dates ranged from June 22 to June 24, and all patrons reported eating a tuna burger. An investigation was initiated.

Restaurant management provided the names and contact information for the five people that had reported illness following their meal at the restaurant. In addition, names were collected from credit card receipts for patrons that purchased a tuna burger from June 22 to June 24. These patrons were interviewed by HCPHP epidemiologists about food consumption and illness histories using a standard questionnaire. A case was defined as a person who ate a meal at the restaurant and subsequently became ill with scombroid-like symptoms within 12 hours of the meal.

Of the patrons that were interviewed, four (67%) met the case definition. Symptoms distribution was as follows: all four reported headache, facial and/or upper body flushing, and rapid pulse, three (75%) dizziness, three (75%) nausea, three (75%) diarrhea, two (50%) fatigue, two (50%) sweating, two (50%) tingling sensations of the mouth or throat, two (50%) full body flushing, one (25%) vomiting, and one (25%) cramps. The median incubation period was 45 minutes (range, 30 to 90 minutes) and the median duration of illness was 8 hours (range, 2 to 26 hours). No additional cases were identified through credit card receipts.

The owner of the restaurant stated that the restaurant stopped serving the tuna burger on June 24, once they received a second report of illness. On June 27, a MDEH sanitarian visited the restaurant to obtain information about food preparation, storage procedures, and temperature issues. MDEH sanitarians reviewed the flow of food and the tuna burger preparation and serving processes and did not find any evidence of mishandling. The restaurant receives raw, frozen, skinless tuna steaks from the distributor. The steaks are thawed under cold running water for approximately 30 minutes, ground, mixed with seasonings and spices, and then placed in the line cooler. The manager reported that when he checked the temperature of the line cooler after the tuna burgers were removed, it was found to be at 47° F. The refrigerator fan was partially blocked with a piece of plastic wrap. There were no temperature records for the days in question. At the time of the visit, the cooler was found to be at 42-43° F. Samples of leftover tuna burger and raw, frozen, skinless tuna were collected for histamine testing. These samples were tested by the Food and Drug Administration (FDA) and were negative for histamine. MDEH staff and the Minnesota Department of Agriculture were not aware of any other cases of illness associated with consumption of tuna.

This was an outbreak of scombroid poisoning associated with a restaurant. The source of the outbreak was tuna that was ground and prepared into tuna burgers. It is well known that histamine levels can vary considerably within the same cut of fish, thus explaining why patrons were not uniformly affected. The cause of temperature abuse of the tuna was not identified and may have occurred prior to receipt of the tuna by the restaurant.

(18)
Salmonella Montevideo Infections Associated with a Deli

July 2007-March 2008 Wadena County

Starting in June, 2007, the Minnesota Department of Health (MDH) conducted an investigation into possible sources of an increase in the number of *Salmonella enterica* serotype Montevideo isolates with indistinguishable pulsed-field gel electrophoresis (PFGE) patterns identified through routine surveillance. The PFGE pattern was designated SMON42. This outbreak was found to be associated with exposure to chickens that had originated from a single outstate hatchery. Almost all *S*. Montevideo SMON42 cases identified in Minnesota in May and June of 2007 reported having contact with young chickens or their environment (see epidemic curve). As the year progressed, *S*. Montevideo SMON42 cases continued to be identified. In July and August, fewer individuals with this subtype reported exposure to young poultry in the week prior to illness onset; after August, none of the SMON42 cases reported chicken contact. In particular, SMON42 cases were being identified primarily among residents of Wadena, Minnesota or the surrounding area. During the fall and winter, SMON42 cases were being reported from this area almost on a monthly basis. As of March 2008, SMON42 had been isolated from nine Wadena or Otter Tail County residents since July 2007 who did not report poultry contact (see epidemic curve). This suggested that there was an ongoing source of SMON42 in that area. MDH initiated a second investigation.

Cases were identified through routine laboratory surveillance. Cases were defined as Wadena or Otter Tail County residents who had culture-confirmed infection with *S*. Montevideo SMON42

since July 1, 2007, and who did not report contact with poultry in the week prior to illness onset. Interviews about illness history and potential exposures, including animal contact and food consumption, in the 7 days prior to illness onset were conducted.

Minnesota Department of Agriculture (MDA) and MDH representatives visited a deli in Wadena on March 31, 2008. Environmental and food samples were collected and were tested at the MDA laboratory. All employees were required to submit two stool specimens to the MDH Public Health Laboratory for *Salmonella* testing. Food workers who tested positive for *Salmonella* were completely restricted from their work duties and required to continue to submit stool samples until two consecutive specimens collected at least 24 hours apart tested negative for *Salmonella*. All food workers were interviewed with a standard questionnaire about their job responsibilities and history of gastrointestinal symptoms since June 2007. Employees were also asked about possible poultry contact. Duration of *Salmonella* shedding in the stool was defined as the number of days from the collection date of the first positive specimen until the collection date of the last positive stool specimen. If specimen collection date was not available, date received in laboratory was used instead.

Employees from MDH and the Minnesota Board of Animal Health (BAH) visited the home of one deli employee who reported owning chickens, to obtain samples from the animals and their environment. Cloacal swabs were taken from the chickens, and environmental samples from dust and litter were also collected. Samples were tested for the presence of *Salmonella* at the State Poultry Testing Laboratory.

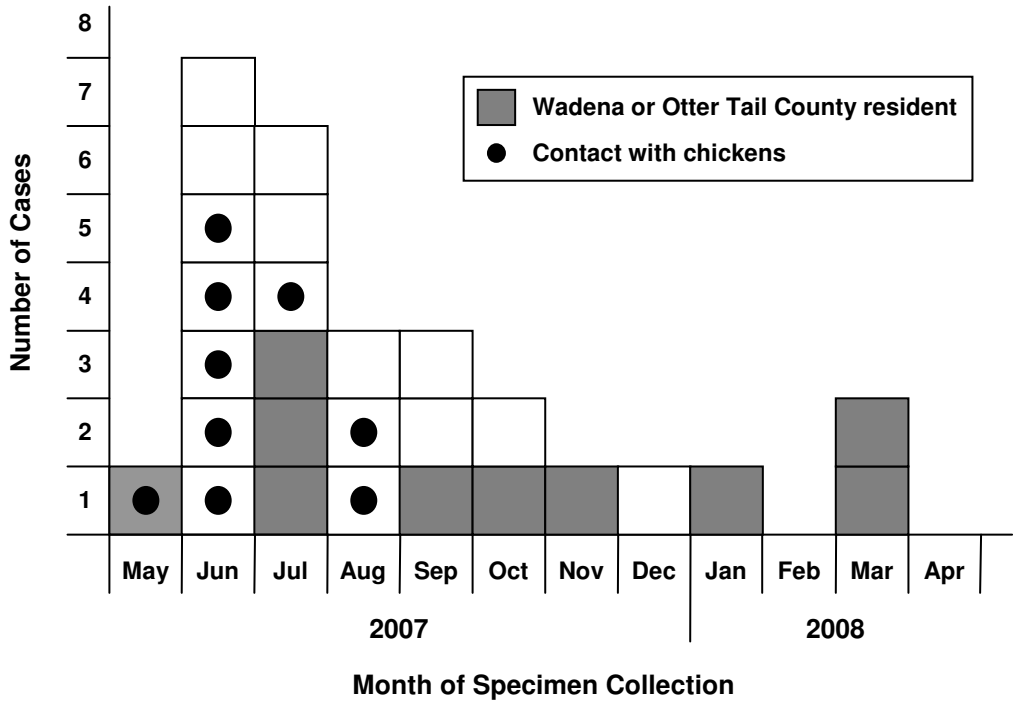
From June 2007 to March 2008, the MDH PHL identified nine isolates of S. Montevideo subtype SMON42 from individuals that resided in Wadena or Otter Tail County who did not report chicken contact (see epidemic curve). The median age of cases was 53 years (range, 22 to 76 years), and five (56%) were male. Eight (89%) of the case isolates were from stool and one (11%) was from urine. Illness onset dates ranged from July 11, 2007 to March 23, 2008 for the eight cases who could be reached for interview. Of these eight cases, seven (88%) had diarrhea, two (29%) vomiting, and none bloody diarrhea. Three (38%) of the cases were hospitalized for a median duration of 4 days (range, 2 to 6 days).

Routine interviews revealed that all cases shopped at one grocery store in Wadena, with two cases specifically reporting consuming foods prepared at the grocery store's deli. All deli employees were interviewed, and two were subsequently found to be infected with SMON42. One of the positive food workers reported having a diarrheal illness that was accompanied by a fever in August 2007. This employee visited a health care provided and was diagnosed with bacterial gastroenteritis, but no stool specimen was collected during this time. The other positive food worker reported not being ill with gastrointestinal symptoms since June 2007, but did have a spouse that experienced diarrhea a few weeks in duration in July 2007. Both employees had restricted work duties until two negative stool samples had been collected; the duration of shedding was 14 and 19 days, respectively.

One of the positive employees reported having chickens at home. Because SMON42 had been linked to chickens in the past, staff from MDH and the BAH visited the home of this employee to test the flock and their environment. Twenty-five chickens were sampled from the employee's

household, and the samples were combined into five tubes for testing. Salmonella was not cultured from any of the tubes. Additional tubes containing material from dust and litter samples collected at this household also did not yield Salmonella.

Cases of *Salmonella* Montevideo SMON42 Infection in Minnesota, May 2007 to March 2008, by Month of Specimen Collection



Twenty-two samples of cheese, turkey, ham, corned beef, roast beef, and salami were collected from the deli and tested by MDA, along with 14 environmental swabs from the slicers, cutting boards, scale, wrapping station, hot and cold cases, and coolers. All food and environmental samples were negative for *Salmonella*.

This was an outbreak of *S*. Montevideo SMON42 infections associated with consumption of food items from a grocery store in Wadena, Minnesota. The source of the outbreak was most likely one or more infected food workers at the grocery store deli. All food and environmental samples collected from the deli were negative for *Salmonella*. After the two positive employees were restricted from their duties in food service, no additional cases from Wadena or Otter Tail County were identified.

(19)
E. coli O157:H7 Infections Associated with Retail Steaks

July-August Ramsey County

On July 5, 2007, the Minnesota Department of Health (MDH) Public Health Laboratory (PHL) identified two *Escherichia coli* O157:H7 (O157) isolates that had indistinguishable pulsed-field gel electrophoresis (PFGE) patterns. The pattern, designated subtype MN284, had only been seen once before in Minnesota, in 1998. The cases were interviewed by an MDH epidemiologist about illness history and potential exposures. Both cases reported consuming steaks in the 7 days prior to illness onset that had been purchased from the same warehouse retail chain outlet in White Bear Lake. An investigation was initiated.

Cases were identified through routine laboratory surveillance. Phone interviews regarding illness history and potential exposures were conducted for all cases. The warehouse retail chain customer identification numbers were collected from consenting cases and used by the Minnesota Department of Agriculture (MDA) to determine brand name and purchase dates for the steak products.

Cases were defined as Minnesota residents with laboratory-confirmed O157 infection with the outbreak PFGE subtype and an illness onset date since June 20, 2007. Additional case finding was attempted by contacting individuals known to have purchased the steak product that was ultimately implicated. The warehouse retail chain provided MDH with a list of customers who purchased the implicated steak product at the White Bear Lake location from June 20 to June 22, 2007. The customers were interviewed about consumption history (including preparation methods, meal dates and information on who consumed) as well as any gastrointestinal symptoms experienced after consumption of the steaks.

Leftover steak product was collected if available, and was submitted to the MDA laboratory for O157 testing. MDA, in conjunction with the United States Department of Agriculture (USDA), performed a traceback to determine the source of the steaks.

The cluster was reported on the PulseNet web board on July 27, 2007, to ascertain potential cases in other states.

One additional O157 case with an isolate of the subtype MN284 was identified in Minnesota during this investigation. The individual was a sibling of the index case, and was considered to represent a secondary infection. All three cases were female, and the median age was 13 years (range, 5 to 13 years). Illness onset dates ranged from June 27 to July 6, 2007. All three cases developed bloody diarrhea, two (67%) cases had a fever, and one (33%) case had vomiting. All three cases were hospitalized, for a median duration of 3 days (range, 3 to 4 days). None of the cases developed hemolytic uremic syndrome.

None of the cases had leftover steak product or packaging materials. The warehouse retail chain identification numbers were collected from the two case households. Customer records indicated that the two households had purchased the same steak product, labeled “beef loin bottom butt

sirloin ball tip steak", at the White Beak Lake warehouse retail chain outlet on June 21, 2007, within 3 hours of each other. The two households had no other beef products in common from the time period when the items consumed before illness onset were purchased (June 16-June 21).

The warehouse retail chain provided MDH with a list of 33 customers who had purchased the beef loin bottom butt sirloin ball tip steak. Of the 20 (61%) customers interviewed, 16 (80%) reported having consumed the product. Four (20%) purchased the product on June 20, three (15%) purchased the product on June 21, and 13 (65%) purchased the product on June 22. No illnesses compatible with O157 infection were reported by these customers.

Leftover product was collected from one customer who purchased steak on June 22; O157 was not isolated from this product. No other products were available for testing.

Ten O157 isolates with indistinguishable PFGE patterns were reported from four states other than Minnesota (California, Colorado, Iowa, and Nevada) during this investigation. The median age for corresponding patients was 13.5 years (range, 3 to 87 years). Isolation dates for cases outside of Minnesota ranged from June 3 to July 6, 2007. None of the cases interviewed reported consumption of the warehouse retail chain brand steaks during the exposure time period.

The traceback revealed that steaks consumed by the Minnesota cases originated from one of two beef processing companies in Kansas: Company A or Company B. The outbreak strain of O157 was also isolated from a ground beef sample collected by the USDA from a beef processing plant in Minnesota on June 20, 2007. Follow-up by USDA officials revealed that the positive product came only from cattle slaughtered in that same facility. The positive product was not directly related to the Minnesota cases; however, the Minnesota plant had recently received meat from Company A. According to the plant and USDA, the meat from Company A was not used in the production of the ground beef that tested positive for the outbreak strain of O157. No additional source information was provided to MDH.

Three cases of *E. coli* O157:H7 infection in Minnesota were associated with the consumption of sirloin ball tip steaks purchased from a warehouse retail chain. In Minnesota, steaks were implicated through routine surveillance interviews and the use of customer records accessed through identification numbers. No cases outside of Minnesota were linked to consumption of this product. The source of the steaks was one of two beef processing companies in Kansas. Of these two companies, one was more likely the source because it had supplied beef to a smaller processing plant in Minnesota from which a ground beef O157 isolate of the outbreak PFGE subtype was identified during the same time period as the steak outbreak.

(20)
Suspected Foodborne Bacterial Intoxications Associated with a Wedding Reception

July Hennepin County

On July 26, 2007, the Minnesota Department of Health (MDH) foodborne illness hotline received an illness complaint associated with a wedding reception that was held in St. Louis Park on July 14. The complainant reported approximately 25 illnesses among the 150 reception attendees. Fried chicken, baked chicken, smoked beef, cooked vegetables, rolls, cake, and punch were served. The chicken and beef were prepared at a private home and then reheated at the reception. An investigation was initiated on July 26.

MDH staff obtained a list of individuals who attended the wedding reception and conducted phone interviews with guests to obtain information on illness history and consumption of foods/beverages at the reception. A case was defined as a wedding reception attendee who developed vomiting and/or diarrhea (≥3 loose stools in a 24-hour period) following the event. A stool sample collected from one ill wedding reception attendee was submitted to the MDH Public Health Laboratory for bacterial culture, toxin testing, and viral testing.
Of the 59 reception attendees interviewed, 32 (54%) individuals met the case definition; seven additional individuals reported gastrointestinal illness symptoms but did not meet the case definition and were excluded from further analysis.

Thirty-one (97%) cases reported diarrhea, 27 (84%) cramps, four (13%) vomiting, four (13%) fever, and one (3%) bloody diarrhea. The median incubation period for the 26 cases reporting a specific onset time was 5 hours (range, 1 to 21 hours). Duration of illness information was available for 28 cases; the median duration was 41 hours (range, 3 to 103 hours).

Univariate analysis showed that consuming the smoked beef (26 of 31 cases vs. 8 of 18 controls; odds ratio [OR], 6.50; 95% confidence interval [CI], 1.43 to 31.7; $p = 0.01$) and rolls (26 of 31 cases vs. 8 of 18 controls; OR, 6.50; 95% CI, 1.43 to 31.7; $p = 0.01$) were statistically associated with illness. Rolls and smoked beef were perfectly correlated, which prevented the calculation of an adjusted measure of association for the two food items. Attendance at other wedding-associated events, such as the groom's dinner or bridal shower, was ruled out since a very low proportion of cases attended those events.

Persons that prepared the smoked beef, baked chicken, and fried chicken were interviewed; this revealed several likely temperature violations. One person prepared beef, baked chicken and fried chicken. That person reported that the beef was cooked in a smoker for 4 to 5 hours the day before the wedding reception. A meat thermometer was not used. The beef was cooled on the counter for approximately 20 minutes before being placed in a household refrigerator. The weight of the cut of beef was unknown to the cook, except that it was "big". The beef was taken to the reception site the next day, where it was refrigerated. Chicken was baked the night before and given to the bride immediately after cooking. The bride refrigerated it at her home. The next day she took it to the wedding reception site, where it was reheated for 45 minutes. The fried chicken was cooked the morning of the reception and brought to the reception site immediately after cooking. It is unknown if it was heated or for how long it was held before serving.

A second person also reported baking chicken and beef. The chicken was baked and kept in the refrigerator. That person also reported cooking some of the beef early in the morning of the wedding reception and giving the cooked meats to the groom to bring to the reception site. She thought they had been refrigerated there but was not sure. When asked if a meat thermometer was used, the person said she did not know.

All of the beef was reheated at the reception but was characterized as only being warm after it was reheated. It was not sliced immediately after reheating.

No viral or bacterial organisms were recovered from the one stool sample that was submitted to MDH. The delayed notification of MDH likely prevented the recovery of possible bacterial intoxication pathogens.

This was a foodborne outbreak of bacterial intoxications associated with smoked beef served at a wedding reception. A specific etiology was not identified due to delayed notification of the outbreak and a lack of stool samples returned for testing. However, the distribution of incubations, clinical signs and symptoms, and a vehicle of smoked beef are most compatible with *Clostridium perfringens* or the diarrheal form of *Bacillus cereus*. The potential for temperature abuse during the preparation of the smoked beef was identified. The outbreak most likely resulted from improper cooling and reheating procedures used during the storage and preparation of smoked beef, allowing for bacteria proliferation.

(21)
Norovirus Gastroenteritis Associated with a Golf Club

July Dakota County

On July 30, 2007, the Minnesota Department of Health (MDH) foodborne illness hotline was notified by the Assistant General Manager of a country club in Lakeville, Minnesota of several ill patrons following a 3-day golf tournament. The manager stated that 14 people from a group of 120 had developed symptoms of gastrointestinal illness during the tournament events, held July 26 through July 28. The manager also noted that several country club employees had become ill with gastrointestinal symptoms. Sanitarians from MDH were notified, and an outbreak investigation was initiated.

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

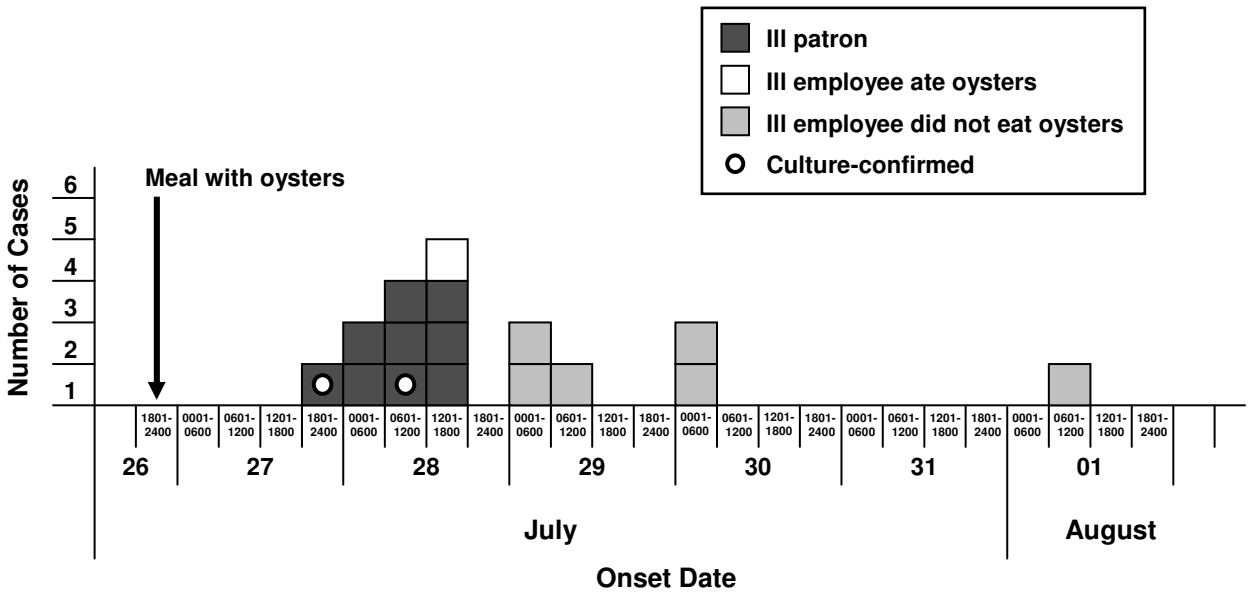
Sanitarians from MDH visited the country club to evaluate food preparation and handling procedures and to interview staff regarding recent illness and job duties.

Illness histories and exposure information were obtained from 23 (19%) of 120 tournament attendees; nine (45%) cases were identified. One attendee reported illness but did not meet the case definition, and thus was excluded from further analysis.

Of the nine cases, all nine reported diarrhea, seven (78%) vomiting, four (44%) cramps, and two of eight (25%) fever. The median duration of illness was 18 hours (range, 2 to 121 hours). Both stool samples tested positive for norovirus genogroup I. Nucleic acid sequencing was conducted on both of the positive norovirus samples; the nucleic acid sequences were identical.

Among tournament event attendees, consumption of raw oysters at the July 26 evening cocktail reception was statistically associated with illness (8 of 9 cases vs. 4 of 13 controls; odds ratio, 18.0; 95% confidence interval, 1.3 to 555; p = 0.01). The median incubation period from the July 26 evening cocktail reception was 38 hours (range, 26 to 43 hours) (see epidemic curve). No other food item or meal was statistically associated with illness. Many ill tournament attendees continued to attend golfing events and meals at the country club while ill.

Norovirus Gastroenteritis Cases Associated with Raw Oysters, by Illness Onset Date



Illness histories and exposure information, including job duties and food/beverage consumption, were obtained from 47 country club employees. Seven (15%) ill employees were identified. One employee reported mild illness, and thus was excluded from further analysis. Of the seven ill employees, six (86%) reported diarrhea, six (86%) reported vomiting, five (71%) reported cramps, and three (43%) reported fever. The median duration of illness was 45 hours (range, 9 to 72 hours). Only one ill employee consumed raw oysters. This employee was the first employee to become ill and performed various managerial duties throughout the country club. Ill employees performed a variety of job duties, most of which did not include contact with any food operations at the facility.

The oysters were individually quick frozen (IQF) half shell oysters from a harvesting company in Dickinson, Texas and distributed by a company in Minnetonka, Minnesota. Due to an inventory control problem at the distributor, the Food and Drug Administration (FDA) was unable to determine the exact lot the implicated oysters came from. However, they were able to determine that the oysters delivered to the country club may have come from one of three lots harvested from San Antonio Bay on February 5 or one of two other lots. There were no shellfish tags with the oysters since they were on the half shell, and the country club had discarded all leftover oysters on July 28.

The harvesting company issued a voluntary recall on August 9 of the three potentially implicated lots harvested from San Antonio Bay. MDH Environmental Health staff contacted all restaurants that had received the recalled lots and instructed them to return the product to the distributor. FDA tested oysters from four suspected lots, including the three that were recalled; all specimens were negative for norovirus genogroups I and II.

This was an outbreak of norovirus gastroenteritis associated with consumption of raw oysters at a country club. The oysters were most likely harvested from contaminated waters. The outbreak resulted in a voluntary recall and potentially contaminated lots being returned to the distributor. Many tournament event attendees continued to attend events while ill, which may have led to secondary transmission to the country club employees.

(22)
Scombroid Fish Poisoning Associated with a Restaurant

July Hennepin County

On July 27, 2007, Minnesota Department of Health (MDH) communicable disease staff received a call from an emergency department doctor about a possible scombroid intoxication in a patient currently in the emergency department. MDH staff talked to the patient and assessed her illness. She had eaten at a Bloomington restaurant approximately 30 minutes prior to her onset of symptoms. City of Bloomington Environmental Health staff were contacted and an investigation was immediately initiated.

MDH staff interviewed the original complainant about food consumption and illness history. A case was defined as someone with flushed features and racing heart after eating at the Bloomington restaurant.

A Bloomington environmentalist visited the restaurant on July 27, and conducted an environmental assessment.

The initial case was the only one reported with symptoms of scombroid intoxication. This case had eaten a deli fishwich, made with battered mahi-mahi, approximately 30 minutes prior to her symptom onset. The case's meal companion had shared spinach and artichoke dip with the case and had eaten a house salad. She had no symptoms of illness. Patron names could not be obtained from the restaurant.

City of Bloomington environmentalists visited the restaurant on July 27 and discussed handling practices of the mahi-mahi. No temperature violations were found at the restaurant. One sample of mahi-mahi that had been prepared was sent to the Food and Drug Administration (FDA) for testing. Results showed normal levels of histamine in this particular portion of Mahi-mahi. The restaurant stopped serving mahi-mahi from this shipment. The Minnesota Department of Agriculture checked temperature logs at the distributor who received the fish from a company in Taiwan. Temperature control records at the distributor showed no violations.

A case of Scombroid intoxication was reported in a person who consumed mahi-mahi at a Bloomington restaurant. Additional illnesses were not discovered from the restaurant. Temperature abuse may have occurred in the shipping of the mahi-mahi; however, no temperature violations were documented at the distributor or the restaurant, and one sample tested by the FDA contained normal levels of histamine.

(23)
Salmonella Enteritidis Infections Associated with a Restaurant

August Hennepin County

On August 21, 2007, the Minnesota Department of Public Health (MDH) notified Hennepin County Public Health Protection (HCPHP) of an outbreak of *Salmonella* Enteritidis infections. MDH had identified six case isolates of *S.* Enteritidis, with indistinguishable pulsed-field gel electrophoresis (PFGE) patterns (designated subtype SE43) through routine surveillance. Four of the cases that had been interviewed indicated having eaten at a restaurant in Maple Grove. An investigation was immediately initiated.

MDH epidemiologists interviewed cases as they were identified through routine surveillance. Interviews were conducted with a standard *Salmonella* interview form as well as a supplemental outbreak form. Credit card receipts were requested from the restaurant; however, the billing system recorded the credit card number only, so receipts were not a resource for identifying additional patrons.

On August 21, HCPHP sanitarians inspected the restaurant, focusing on food preparation practices and employee health and hygiene. Management had not received any reports of patron illness and currently did not have any ill employees. HCPHP sanitarians noted overall compliance with food code requirements and no critical violations. Preparation and handling of foods was discussed with restaurant management.

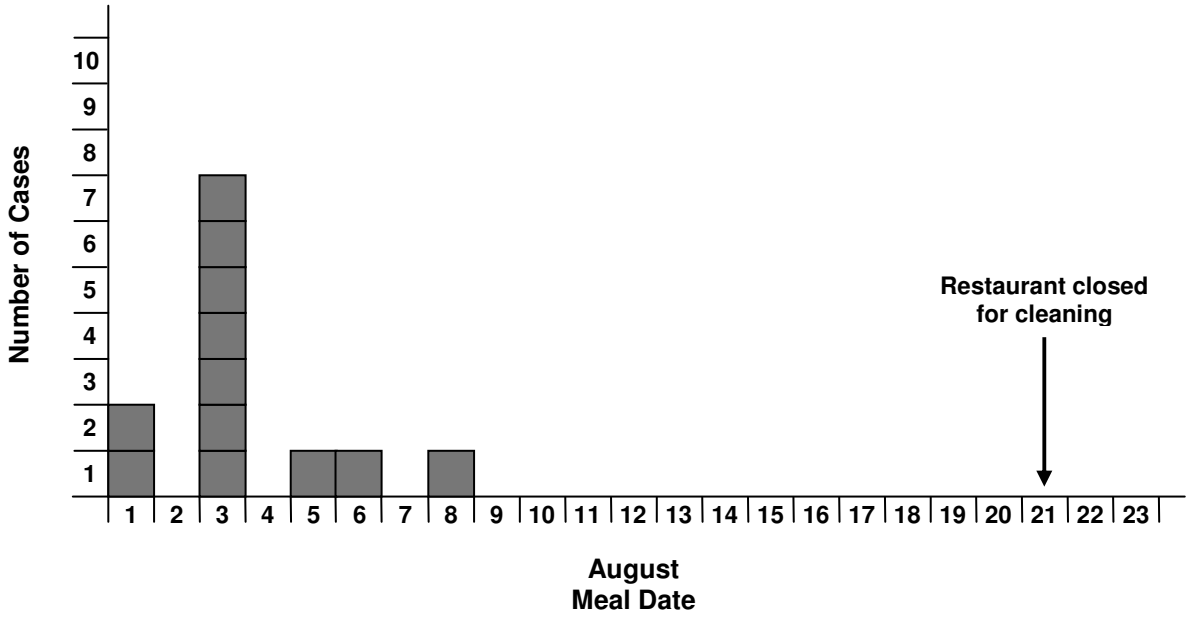
A confirmed case was defined as a person who had *S.* Enteritidis isolated from stool cultures and who reported eating at the restaurant since August 1, 2007. A probable case was defined as a person who ate a meal at the restaurant on August 1, 2007 or later and subsequently became ill with diarrhea (≥3 loose stools in a 24-hour period) lasting 3 or more days.

An ingredient specific case-control study was conducted to evaluate particular food items at the restaurant that may have been associated with illness. Controls were well meal companions of cases.

A total of 31 patrons were interviewed. Of these, 16 confirmed cases and two probable cases were identified. The remaining 13 patrons were controls. Analysis was limited to confirmed cases only. Of the 16 confirmed cases, all had diarrhea, 14 (88%) cramps, 12 (75%) fever, eight (57%) blood in their stool, and three (19%) vomiting. Two (13%) of the cases were hospitalized. Eleven cases (69%) were male. The median age of cases was 36.5 years (range, 9 to 71 years).

Meal dates among confirmed cases ranged from August 1 to 8 (see epidemic curve). Of the 12 cases who could recall meal dates, seven (58%) dined on August 3. The median incubation period was 74.5 hours (range, 15 to 212 hours). The earliest onset of illness was August 5. The median duration of illness was 203 hours.

Salmonella Enteritidis Outbreak Cases Associated with a Restaurant, by Meal Date



Cases had eaten a variety of foods, including burritos, tacos, quesadillas, nachos, chips and a variety of salsas. By univariate analysis, salsa (14 of 14 cases vs. 9 of 13 controls; odds ratio [OR], undefined; $p = 0.04$), medium garden salsa (9 of 14 cases vs. 1 of 11 controls; OR, 19.8; 95% confidence interval [CI], 1.58 to 560.9; $p = 0.006$) and canned tomatoes (used in several salsas) (12 of 14 cases vs. 2 of 12 controls; OR, 30.0; 95 % CI 2.62 to 583.3; $p < 0.001$) were significantly associated with illness.

HCPHP sanitarians conducted an onsite inspection, interviewed employees for current or past illness, provided education regarding proper handwashing and food handling, and stressed environmental cleaning. All opened or handled ready-to-eat foods were discarded. All employees were interviewed for past or current illness. One employee did indicate having symptoms of diarrhea and vomiting. This occurred 3 months earlier, and again, 2 weeks prior to the interview

(August 8). However, based on information collected by the health care provider the employee had seen, this illness was likely due to a different health condition. In addition, all employees were required to submit stool culture specimens for *Salmonella* testing until two consecutive specimens were tested negative for *Salmonella*. All stool specimens were negative for *Salmonella*. In addition, environmental sampling was conducted on August 21 in conjunction with MDH. All environmental samples were negative.

This was an outbreak of *Salmonella* Enteritidis infections associated with consumption of salsa at the restaurant. The outbreak was identified through routine disease surveillance. No clear source of the illness was identified. The outbreak PFGE subtype of *S*. Enteritidis is known to be associated with broiler chickens. Therefore, cross contamination of salsa from raw chicken at the restaurant is a plausible mechanism for this outbreak. However, the environmental investigation conducted ≥2 weeks after the implicated meal dates did not confirm this or identify ongoing issues with cross contamination. There was no evidence that food workers may have played a role in the transmission.

(24)
Vibrio parahaemolyticus Infection Associated with Raw Oyster Consumption at a Restaurant

August Hennepin County

On August 13, 2007, the Minnesota Department of Health (MDH) Public Health Laboratory received an isolate of *Vibrio parahaemolyticus* recently collected from a Minnesota resident. A routine surveillance interview revealed that the case had consumed raw oysters at a restaurant in Minneapolis, Minnesota on August 4, 2007, and began experiencing gastrointestinal symptoms the following day. Hennepin County Public Health Protection -- Epidemiology (HCPHP) and the Minneapolis Division of Environmental Health (MDEH) were notified, and an investigation was initiated.

Epidemiologists from HCPHP interviewed restaurant patrons to obtain information on food/beverage consumption and illness history. A case was defined as an individual who had *V. parahaemolyticus* isolated from a stool culture or who developed vomiting and/or diarrhea (≥3 loose stools in a 24-hour period) following a meal at the restaurant.

MDEH staff visited the restaurant on August 21, 2007, to conduct an environmental assessment of the restaurant. Credit card receipts for additional patrons who dined at the restaurant on August 4 were collected. MDEH staff also collected tags for oysters that would have been in use at the restaurant on this meal date. This information was forwarded on to the United States Food and Drug Administration (FDA) to facilitate traceback of the product.

Illness histories and exposure information were obtained from 11 patrons who dined at the restaurant on August 4. Only the original *V. parahaemolyticus* case met the case definition; this case reported experiencing bloody diarrhea and cramps starting 24 hours after eating at the restaurant. Illness duration information was not available.

None of the 10 patrons identified through credit card receipts who could be contacted reported becoming ill after eating at the restaurant. However, none of these patrons reported consuming raw oysters. Attempts to contact the approximately 40 remaining credit card receipt patrons were unsuccessful.

According to the evaluation performed by MDEH, there were two shipments of oysters that may have been served at the restaurant on August 4. These were received at the restaurant on August 2 and 3, respectively. Each shipment contained two types of oysters, and tags were available for three of the four shipment/type combinations. The product that the restaurant did not have tag information for was shucked and cooked prior to be served and would not have been served raw to patrons. Each shipment includes approximately 120 oysters, and the restaurant reported going through about one shipment per day. MDEH staff identified minor issues during their inspection of the restaurant, such as concerns regarding cleaning and a hand sink that did not have working hot water, but no food preparation or handling violations were observed.

The oysters in use at the restaurant during this time period had been harvested in Washington and came from a Minneapolis distributor. MDH and FDA staff did not receive any additional reports of illness regarding oysters from this area during the investigation.

(25)
Cryptosporidiosis Associated with a Family Picnic

September Mille Lacs County

Two cases of *Cryptosporidium* infection among extended family members were reported to the Minnesota Department of Health (MDH) through routine surveillance in late September 2007. Routine surveillance interviews revealed that the cases' only common exposure had been a family picnic on September 1 at a family member's home in Mille Lacs County. An outbreak investigation was initiated on October 5.

A list of names and phone numbers of picnic attendees was obtained from the party host. Epidemiologists from MDH interviewed attendees to obtain information on food/beverage consumption, animal exposures, and illness history. A case was defined as a person who attended the picnic and subsequently developed either a laboratory confirmed *Cryptosporidium* infection, or diarrhea ($\geq$3 loose stools in a 24-hour period) for 3 or more days.

Illness histories and exposure information were obtained from 23 people. Five cases were identified, including two with a stool specimen that tested positive for *Cryptosporidium*. One positive specimen was received by the MDH Public Health Laboratory; *Cryptosporidium parvum* subtype BGP3 was identified in this specimen.

Of the five cases, all reported diarrhea, four (80%) weight loss, three (60%) cramps, and one (20%) vomiting. No one reported fever. The median incubation period was 8 days (range, 4 to 11 days). The median duration of illness was 14 days (range, 6 to 25 days) for the four cases who had recovered at the time of interview. Two cases were hospitalized, for 6 and 10 days respectively.

Consumption of baked beans at the picnic was significantly associated with illness (4 of 5 cases vs. 2 of 18 controls; odds ratio, 32.0; 95% confidence interval, 1.6 to 1,471; p = 0.007). No other food item was statistically associated with illness. The baked beans had been brought to the picnic in the original cans by a picnic attendee. They were prepared at the home of the picnic host by one of the cases, who reported having gastrointestinal symptoms prior to the picnic.

This was a foodborne outbreak of cryptosporidiosis associated with a family picnic. Baked beans were implicated as the vehicle of transmission. An ill picnic attendee most likely contaminated the beans during preparation.

(26)
Salmonella I 4, 5, 12:i:- Infections Associated with Pot Pies

September-October — Multiple counties/Multiple states

On June 6, 2007, the Pennsylvania Department of Health identified 4 isolates of *Salmonella* I 4, 5, 12:i:- with indistinguishable pulsed-field gel electrophoresis (PFGE) patterns. Throughout July, August, and September, additional isolates from cases were identified in several states. On September 10, one case with a matching isolate to this cluster was interviewed by staff at the Minnesota Department of Health (MDH). The MDH Public Health Laboratory (PHL) identified more cases in September and October, and interviews of cases continued.

A case was defined as a person who had a *S.* I 4, 5, 12:i:- isolate that matched the outbreak PFGE pattern (TM19), and illness onset since August 1, 2007. Minnesota cases were interviewed with a broad-based exposure questionnaire and re-interviewed several times about various foods consumed. The first Minnesota case was interviewed on September 10 using the standard *Salmonella* questionnaire, and contacted again later that month and in October along with the other 6 reported cases using an iterative interview method to ask cases questions based upon information gathered from other cases. One case household was visited, and food samples were tested by the Minnesota Department of Agriculture (MDA) using the Bacterial Analytical Manual (BAM) methodology for food testing published by the Food and Drug Administration (FDA).

Hypothesis generating questionnaires were conducted by the Centers for Disease Control and Prevention (CDC) and other states throughout August and September. By September 19, a focused case questionnaire had been developed to look specifically at chicken and egg exposures. A case-control study was started by the CDC on October 3, 2007 to evaluate these food items. Neighborhood controls were used and were age-matched to the cases.

On October 3, one Minnesota case noted on her initial interview that she had eaten a particular food item several times in the week prior to her illness. On October 4, a previously interviewed Minnesota case was contacted again and also had consumed the product of interest. A third case was interviewed for the first time later on October 4, and also had eaten this food. CDC and other states were notified on October 4 of this finding, and some states began asking their cases about this food item. By October 5, several states had data implicating the outbreak vehicle.

Food samples were collected from a Minnesota case household by MDH staff and tested by the MDA laboratory. Additional samples were collected from stores and from complainants to the MN foodborne illness hotline who had pot pies in their homes and processed as described above.

Consumption information about the implicated food product was given to the United States Department of Agriculture Food Safety and Inspection Service (USDA-FSIS) for traceback purposes. FSIS staff assessed the facility that manufactured the implicated product. Investigators took samples of product at the production plants. All FSIS samples were processed at USDA laboratories.

Four hundred one cases from 41 states were identified in this outbreak. The seven cases from Minnesota had a median age of 14 (range, 1 to 53). All seven cases reported diarrhea, six (86%) fever, six (86%) cramps, three (43%) bloody stools, and three (43%) vomiting. One case was hospitalized.

USDA-FSIS contacted the production facility for Brand A and generic store brand pot pies on October 8. The company suspended production of the product on October 9, and issued a voluntary recall on October 11.

Several states and USDA-FSIS tested pot pies for *Salmonella*. No Minnesota samples tested positive, but turkey pot pies in other laboratories did test positive for the outbreak subtype of *S.* I 4, 5, 12:i:-.

Cooking instructions on the pot pie boxes conflicted with advertised instructions on the front of the box that noted that pies could be ready in the microwave in as little as four minutes. The full cooking instructions, if followed appropriately, would take at least seven minutes. Of 127 cases who were asked about microwave practices, 96 (76%) cooked their pot pie in the microwave. At least 68% of these people did not allow the pot pie to stand for 3 minutes after cooking, which was part of the full instructions on the back of the box.

This was a multi-state outbreak of salmonellosis associated with the consumption of Brand A and other generic brands of pot pies. PFGE subtyping in conjunction with timely interviews of cases was critical in identifying the cause of this ongoing outbreak. Prepared but not ready-to-eat products such as pre-browned, breaded chicken products have been a vehicle for illness in previous outbreaks. Similar labeling issues occur repeatedly with these types of microwavable foods. The labels for this product were changed after the outbreak to specifically ask consumers to thoroughly cook the product, cook only one pot pie at a time, check the wattage of the microwave in use, and check the internal pie temperature after cooking. In December, 2007, the Brand A and generic store brand plant resumed production of pot pies.

(27)
Norovirus Gastroenteritis Associated with a Restaurant

September Anoka County

On September 18, 2007, the Minnesota Department of Health (MDH) foodborne illness hotline received a complaint of gastrointestinal illness among two members from the same household who had eaten at a restaurant in Coon Rapids, Minnesota on September 14. Sanitarians from the Anoka County Community Health and Environmental Services Department (ACCHES) were notified. ACCHES informed MDH that on September 16 an employee had been sent home after vomiting at work. MDH and ACCHES initiated an outbreak investigation.

A list of patrons from September 14 and 15 was obtained from the restaurant. Epidemiologists from MDH interviewed restaurant patrons to obtain information on food/beverage consumption and illness history. A case was defined as a restaurant patron who subsequently developed vomiting and/or diarrhea ($\geq$3 loose stools in a 24-hour period). Stool specimens were obtained from one patron and four employees and submitted to MDH for bacterial and viral testing.

A sanitarian from ACCHES visited the restaurant to evaluate food preparation and handling procedures and to interview staff regarding recent illness and job duties. Upon inspection of the restaurant, an ACCHES sanitarian found that the restaurant had received an additional complaint of illness from a separate party on September 16. The second complainant stated that six of seven members in their party had symptoms of gastrointestinal illness after eating at the restaurant on September 15. Additionally, there was no employee illness log on file at the restaurant.

Illness histories and exposure information were obtained from 46 patrons. Eight (17%) cases were identified. One person reported illness but did not meet the case definition, and thus was excluded from further analysis.

All eight cases reported cramps, seven (88%) diarrhea, six (75%) vomiting, and three of six (50%) fever. The median incubation period was 29.5 hours (range, 2 to 53 hours). The median duration of illness was 44.5 hours (range, 32.5 to 77 hours) for the five people who had recovered at the time of interview. The stool sample submitted by the one patron tested negative for bacterial and viral pathogens.

Having jack cheese added to a side dish was significantly associated with illness (7 of 8 cases vs. 3 of 36 controls; odds ratio, 77.0; 95% confidence interval, 5.5 to 2,491; $p < 0.001$). No other food item was statistically associated with illness.

Thirty-three employees were interviewed. Aside from the employee who had been vomiting at work on September 16, no employees reported being recently ill with any gastrointestinal symptoms. However, after the restaurant's corporate office heard of the epidemiological association between illness and having had jack cheese added to a side dish, all workers who had contact with the jack cheese were restricted from working until they submitted a stool sample.

One employee tested positive for norovirus genogroup II. The stool samples submitted by the other three employees were negative for norovirus, *Campylobacter*, *Salmonella*, *Shigella*, and *E. coli* O157. The positive employee reported performing multiple job duties, including putting jack cheese on side dishes.

This was a foodborne outbreak of norovirus gastroenteritis associated with a Coon Rapids restaurant. The jack cheese that was added to various side dishes was implicated as the vehicle of transmission. One or more ill employees were responsible for contaminating the cheese. As a result of the outbreak, the restaurant instituted an employee illness log and a new procedure for promptly reporting customer complaints of illness.

(28)
Foodborne Bacterial Intoxications Associated with a Church Festival

September Dakota County

On September 18, 2007, the Minnesota Department of Health (MDH) foodborne illness hotline received an illness complaint associated with a church festival that was held in Inver Grove Heights the previous weekend. Upon contacting the parish administrator, MDH learned that there had been more than 20 reports of illness from multiple households. The festival involved three separate food service events: a wine tasting event with appetizers on September 14, a taco dinner on September 15, and a pork roast dinner on September 16. The food for all three events was prepared in the church kitchen and served by volunteers. The taco dinner included beef, lettuce, tomato, and cheese served in a taco shell with salsa and sour cream, refried beans, rice, and various beverages. The pork dinner included sliced pork roast with gravy, mashed potatoes with gravy, green beans, cole slaw, corn, dressing, and rolls. Barbecue pork sandwiches, hot dogs, and bratwurst were also available for purchase at the pork dinner. Extra items such as French fries, caramel apples, nachos, mini donuts, and cotton candy were available for purchase at both meals. The event was open to the general public, and as many as 1,000 people may have been served at each of the two dinners. MDH initiated an investigation on September 18.

MDH Environmental Health (EH) staff assessed food preparation practices at the church. The church provided MDH with a list of complainants and festival volunteers. MDH staff interviewed volunteers and attendees of the church festival, many of whom were able to provide contact information for other attendees. A case was defined as a church festival attendee with vomiting and/or diarrhea (≥3 loose stools in a 24-hour period) following the event. Stool samples were collected from six ill festival attendees and submitted to the MDH Public Health Laboratory for bacterial, viral, and toxin testing.

Interviews were completed for 49 festival attendees. Twenty-three (47%) individuals met the case definition; five additional individuals reported gastrointestinal illness symptoms but did not meet the case definition and were therefore excluded from further analyses.

The median incubation period (for 21 cases who reported a specific meal time) from the pork roast dinner on September 16 was 12 hours (range, 2 to 66 hours). Duration of illness information was available for 19 cases; the median duration was 13 hours (range, 3 to 57 hours).

All cases reported diarrhea, 18 (78%) cramps, two (9%) fever, one (5%) bloody diarrhea, and none vomiting.

Consumption of each food item served as part of the pork roast dinner on September 16 (except the dressing) was significantly associated with illness; these items included the pork roast (23 of 23 cases vs. 8 of 21 controls; odds ratio [OR], undefined; $p < 0.001$), gravy (23 of 23 cases vs. 7 of 21 controls; OR, undefined; $p < 0.001$), mashed potatoes (23 of 23 cases vs. 7 of 21 controls; OR undefined; $p < 0.001$), green beans (18 of 23 cases vs. 4 of 21 controls; OR, 15.3; 95% confidence interval [CI], 2.9 to 87.7; $p < 0.001$), coleslaw (16 of 23 cases vs. 4 of 21 controls; OR, 9.7; 95% CI, 2.0 to 52.1; $p = 0.002$), and corn (16 of 23 cases vs. 5 of 21 controls; OR, 7.3; 95% CI, 1.6 to 35.1; $p = 0.006$). Multivariate analysis could not be performed because of the high correlation among the food items (they were all served together on one plate) and because of zero cell-counts for some variables.

The assessment by MDH EH revealed multiple instances of temperature violations related to preparation of the pork dinner that was served on September 16 (Sunday). Three hundred and fifty pounds of pork loin were cooked beginning at 9:00 p.m. on September 15 (Saturday). Two reach-in coolers were available for cooling and storing all the pork, which was not divided into smaller portions to facilitate cooling. Some of the pork was stored at room temperature for multiple hours before being wrapped tightly and placed in the coolers. The drippings from the pork loins were gathered in a large soup kettle, wrapped tightly, and placed in one of the reach-in coolers. The pork was removed from the coolers and sliced beginning at 6:00 a.m. on Sunday, drizzled with the collected drippings, placed in hot holding units for reheating, and then stored in chafing dishes for service. The drippings were also used to make gravy. Temperatures were not taken at any time after the cooking process to ensure that proper cooling took place or that hot holding requirements were met. The mashed potatoes were prepared from a powdered mix, the green beans and corn were canned, and the cole slaw was mixed as needed beginning an hour before the main meal service.

All six stool samples were positive for *Clostridium perfringens* enterotoxin A. In addition, *C. perfringens* was isolated from all six stool samples. Five distinct pulsed-field gel electrophoresis (PFGE) patterns of *C. perfringens* were identified from the six positive samples. One sample yielded two different PFGE patterns; each of these patterns was indistinguishable from an isolate from one other case in the outbreak.

This was a foodborne outbreak of *Clostridium perfringens* intoxications associated with a pork dinner served as part of a church festival. The pork roast and gravy made from the pork drippings were implicated as the outbreak vehicles. The outbreak most likely resulted from improper cooling procedures and improper hot- and cold-holding temperatures which created an environment in which *C. perfringens* proliferated and survived in the pork roast and drippings.

(29)

E. coli O157:H7 Infections Associated with Premade Hamburger Patties

September-October Multiple counties/Multiple states

On September 17, 2007, the Minnesota Department of Health (MDH) was notified of a patient who presented to an emergency department with bloody diarrhea and was subsequently diagnosed with hemolytic uremic syndrome (HUS). The patient tested positive for *Escherichia coli* O157:H7 (O157) at a clinical laboratory, and the isolate was submitted to MDH. The isolate was subtyped by pulsed-field gel electrophoresis (PFGE) at the MDH Public Health Laboratory (PHL), and given the subtype designation MN744. A routine surveillance interview revealed that the case had consumed a hamburger at a large gathering 3 days prior to illness onset. The case reported that the hamburger was not fully cooked, having noticed that the middle was still pink. The source hamburger patties were premade and had been purchased at a retail warehouse chain. No leftover product was available for testing, and the packaging had been discarded. No other illnesses were reported from individuals who attended this event.

On October 3, 2007, the MDH PHL identified two additional O157 isolates through routine surveillance that were also PFGE subtype MN744. One isolate was from the sibling of the index case and was considered to represent a secondary infection. The second isolate was from a post-diarrheal HUS case who reported consumption of premade hamburger patties purchased from the retail warehouse chain (but at a different outlet from the one reported by the index case). This case also reported that leftover product and packaging were still available. Further contact with the index case revealed that the two cases had consumed the same brand of hamburger patties.

Additional cases were identified through routine laboratory surveillance, HUS surveillance, and calls from the public. Phone interviews were conducted with all cases to collect information regarding symptom history and food exposures. The retail warehouse chain's customer identification numbers were collected from consenting cases to obtain or verify brand and purchase date information.

The case definition included individuals with: 1) a laboratory-confirmed O157 infection with the outbreak PFGE subtype; 2) an illness onset date since September 1, 2007; and 3) a reported history of consuming the retail warehouse chain's brand of hamburger patties in the 7 days prior to illness onset. The case definition also included individuals who did not have culture-confirmed infection with O157 of the outbreak PFGE subtype if they met the following criteria: 1) development of bloody diarrhea or HUS with onset since September 1, 2007; 2) a reported history of consuming the retail warehouse chain's brand of hamburger patties in the 7 days prior to illness onset; and 3) the outbreak PFGE subtype of O157 was cultured from leftover patties of the implicated product. Serum samples were collected from two of the three cases meeting the latter criteria and submitted to the Centers for Disease Control and Prevention (CDC) for O157 serology.

When available, leftover ground beef patties and/or packaging were collected from case households. Information that was provided from packaging included product name, unit size, the United States Department of Agriculture (USDA) establishment number, the best-if-used-by

(BIUB) date, the production line number, and the production time. The Minnesota Department of Agriculture (MDA) Laboratory tested each product submitted for the presence of O157 by polymerase chain reaction (PCR) and culture. If O157 was isolated, isolates were submitted to the MDH PHL for PFGE testing.

On October 4, 2007, MDH collected product and packaging materials from the second case household and submitted the product to the MDA Laboratory for testing. Production details, which were printed on the bottom of the package, were then available. Later that day, MDH epidemiologists were notified of a fourth O157 isolate with the PFGE pattern MN744. This case was interviewed immediately and also reported consumption of the retail warehouse chain's brand of hamburger patties (a third outlet). Information from the packaging materials was acquired from the fourth case on October 5. The two boxes of patties obtained were produced on the same day and same line, within 1 minute of each other. Because of this link, MDH and MDA issued a health alert and press release that day to notify the public of these findings. A recall of approximately 850,000 pounds of ground beef closely followed these alerts on October 5.

Case identification continued after the press release had been issued. In total, 11 cases were identified in Minnesota during the investigation. The median age was 19 years (range, 1 to 85 years) and seven (63%) cases were male. Onset dates ranged from September 10 to October 8. All cases had diarrhea, 10 (90%) bloody diarrhea, seven (63%) were hospitalized, seven (63%) abdominal pain or cramping, seven (63%) fever, six (54%) vomiting, and four (36%) developed HUS. The median duration of hospitalization for cases without HUS was 4 days (range, 3 to 4 days). For cases with HUS, the median duration of hospitalization was 21.5 days (range, 8 to > 60 days). At the time of this report, one case remained hospitalized in critical condition.

Three of the 11 cases did not have culture-confirmed O157 infection. One of these cases had HUS. Stool samples were collected from these cases and were tested at either a clinical laboratory or the MDH PHL. All stool samples were negative for O157; however, all cases had been treated with antibiotics just prior to or at the time of specimen collection. Serum was collected from two of these three cases and tested for O157 antibody. One of these cases had a positive IgG titer for O157. The other case had antibody levels that were considered negative, but antibiotic treatment could have affected the antibody response.

All 11 O157 cases with isolates of the PFGE subtype MN744 reported to the MDH during the investigation had consumed the retail warehouse chain's brand of hamburger patties in the 7 days prior to illness onset. Of these, 10 cases consumed the product grilled in patty form, and one case reported consuming the product slow-cooked in chili. The products were purchased from four different retail warehouse chain locations, three of which were in the Minneapolis-St. Paul metropolitan area.

The implicated ground beef patties were packaged in boxes containing 18, 1/3-lb frozen, premade patties, for a total net weight of 6 pounds. Leftover product was collected from six case households. Of these, three had original packaging material available as well. Packaging material revealed that the three products were produced on the same day; all three had a BIUB date of 2/12/08. Two of these products were produced on the same line (L5) within 1 minute of each

other (11:58 and 11:59). The third product was produced on a different line (L6), but had a similar time stamp (11:57).

All product samples collected from case households were positive for the outbreak PFGE subtype of O157. No additional PFGE subtypes were isolated from the six product samples submitted from case households. Second enzyme PFGE testing revealed that all human and ground beef isolates were indistinguishable by the second enzyme as well (designated ECB13).

There were 36 additional O157 isolates reported from 14 other states that had PFGE patterns indistinguishable from the outbreak subtype pattern. Onset dates for all patients nationwide ranged from August 1 to October 8, 2007. The outbreak subtype of O157 was cultured from implicated ground beef by public health laboratories in California, South Carolina, Tennessee, and Wisconsin. Two additional HUS cases had been identified at the time this report, both from Tennessee. Ten of the 20 (50%) cases from states other than Minnesota that reported consuming ground beef in the week prior to becoming ill specifically reported consuming the implicated product.

This was a multi-state outbreak of *E. coli* O157:H7 infections associated with the consumption of premade, frozen ground beef patties purchased from a retail warehouse chain's outlets. Eleven cases were identified in Minnesota, including four cases of HUS. The investigation resulted in a recall of approximately 850,000 pounds of ground beef. Routine PFGE subtyping of O157 isolates combined with routine interviewing of cases, including detailed questions about consumption of ground beef (i.e., brand and purchase locations), enabled identification of the outbreak vehicle with a small number of cases.

(30)
Scombroid Fish Poisoning Associated with a Restaurant

September Hennepin County

On September 21, 2007, the Minnesota Department of Health (MDH) foodborne illness hotline received a complaint from a possible scombroid poisoning case who had visited the a local hospital emergency room on the evening of September 20 after eating mahi-mahi cakes at a restaurant. On September 21, MDH notified Hennepin County Public Health Department (HSPHD) epidemiology and the Minneapolis Division of Environmental Health (MDEH), and an investigation was initiated.

On September 21, a MDEH sanitarian contacted restaurant management and the head chef to obtain information about food preparation, storage procedures, and temperature issues. On September 24, MDEH staff requested a list of patrons who had eaten mahi-mahi cakes on September 19, 20, and 21. HSPDH epidemiologists began interviewing these patrons on September 25.

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

The restaurant's management identified receipts for 42 dining parties where at least one member of the party purchased mahi-mahi cakes. HSPHD epidemiologists were able to located telephone information for 17 of the dining parties based on a name listed on the credit card receipt or reservation list. Seven of these dining party contacts were reached via telephone; 14 people from these seven dining parties were interviewed. Of the fourteen patrons interviewed, none had a scombroid-like illness, but only six had eaten the mahi-mahi cakes.

The only scombroid case associated with the restaurant was the original case reported to the MDH. This 40 year-old female had a 2 hour incubation period following her meal of mahi-mahi cakes and wine. Symptoms included vomiting, cramps, sweating, facial flushing, and muscle weakness. The case presented at the emergency room and received IV fluids. Three other patrons dined with the case and did not experience any symptoms; however, none of these people ate the mahi-mahi cakes.

MDEH sanitarians reviewed the flow of food and mahi-mahi preparation and serving processes and did not find any evidence of mishandling or temperature abuse that would account for or contribute to this outbreak. No remaining samples of the mahi-mahi served on September 20 were available for histamine testing.

This was a case of scombroid poisoning associated with a restaurant. The source of the outbreak was mahi-mahi. No additional cases were identified. It is well known that histamine levels can vary considerably within the same cut of fish, thus explaining why patrons were not uniformly affected.

(31)
Suspected Norovirus Gastroenteritis Associated with a Wedding Reception

September Washington County

On September 25, 2007, the Minnesota Department of Health foodborne illness hotline received a complaint about 12 people developing vomiting and diarrhea following a wedding in Afton, Minnesota on September 22. Events included a wedding cruise and brunch on the St. Croix River followed by a reception at the bridal party's house. Foods served on the wedding cruise included pasta salad, scrambled eggs, sausage, chicken, grouper, potatoes, Caesar salad, assorted fresh fruit, pastries and cheesecake. Foods served at the reception included build-your-own deli sandwich with assorted sliced meats, cheeses, breads, hummus, guacamole, pasta salad, assorted fresh fruit, and wedding cake. The wedding cruise food was prepared by a restaurant in Afton, Minnesota while the reception food was purchased at a grocery store in Woodbury, Minnesota. The wedding cake was made by the bridal party's family. The Washington County Department of Public Health & Environment (WCPHE) was notified, and an investigation was initiated.

A list of wedding and reception attendees (the two groups were identical) was obtained from the sister of the bride. Guests were interviewed by phone about food consumption and illness history. A case was defined as a person who developed vomiting and/or diarrhea (≥3 loose stools in a 24-hour period) after the reception. Kits were offered to ill persons for stool sample testing, but no one agreed to submit a sample. An environmental health specialist from WCPHE visited

the restaurant (including the cruise ship) on several occasions over the course of the investigation and assessed food preparation and handling procedures, interviewed staff (including the ship's crew) regarding recent illness, wrote orders, and observed compliance with written orders.

A total of 22 guests (including the bridal party) attended the wedding cruise and reception. Twenty-one (95%) attendees were interviewed. Of these, 12 (57%) met the case definition, six (29%) reported no symptoms, and three (14%) reported mild gastrointestinal symptoms which preceded the event and were excluded from analysis. Of the 12 cases, all 12 had abdominal pain, 10 (83%) diarrhea, six (50%) vomiting, and two (17%) fever. The median incubation period was 32 hours (range, 19 to 54 hours, which may include some secondary cases). The median duration of illness was 39 hours (range, 24 to 86 hours).

None of the foods served on the wedding cruise were statistically associated with illness. Two food items served at the house reception were statistically associated with illness including assorted fresh fruit and wedding cake. Nine (90%) of 10 persons who ate assorted fresh fruit at the house reception became ill, versus three (38%) of eight persons who did not eat assorted fresh fruit (relative risk [RR], 2.4; 95% confidence interval [CI], 1.13 to 5.09; p = 0.02). Further analysis by type of fruit was prohibitive given the small number of subjects. Eleven (92%) of 13 persons who ate wedding cake became ill, versus one (20%) of five persons who did not eat wedding cake (RR, 4.2; 95% CI, 1.38 to 12.9; p = 0.01). No other food items or wedding events were associated with illness.

Restaurant and cruise ship employees were interviewed in person or by phone about food consumption, work and illness history. None of the restaurant or cruise ship employees reported recent illness.

This was an outbreak of suspect norovirus gastroenteritis among guests of a wedding event. Assorted fresh fruit and wedding cake consumed at the house reception were statistically associated with illness. The source of the contamination likely was one or more wedding reception guests, as gastrointestinal illness was reported among some of the guests prior to the event. However, this was not confirmed, as none of the previously ill guests were reportedly involved in the preparation or serving of the implicated food items.

(32)
Salmonella Typhimurium Infections Associated with a Restaurant

October Olmsted County

On October 16, 2007, the Minnesota Department of Health (MDH) Public Health Laboratory (PHL) identified seven case isolates of *Salmonella* Typhimurium with indistinguishable pulsed-field gel electrophoresis patterns (subtype designated TM5b) through routine surveillance. One of the first cases interviewed reported eating at a restaurant in Rochester, Minnesota on October 3. The same day, the MDH foodborne illness hotline received a complaint of gastrointestinal illness from a patron who had eaten at the same restaurant on October 4. MDH and Olmsted County Public Health Services (OCPHS) initiated an outbreak investigation on October 16.

MDH staff interviewed all complainants and *Salmonella* Typhimurium TM5b cases that were identified through routine surveillance. An ingredient-specific case-control study was conducted. Well-meal companions and credit card receipts were used to recruit controls. A confirmed case was defined as a person who had *S.* Typhimurium with an isolate that matched the outbreak PFGE subtype cultured from a stool specimen and who had a history of eating at the restaurant in Rochester since October 1. A probable case was defined as a person with diarrhea (≥3 loose stools in a 24-hour period) of at least 2 days duration following a meal at the Rochester restaurant since October 1. Additional stool samples were not collected from ill patrons identified through credit card receipts, unless the patron worked in a food establishment or provided care to immunocompromised individuals.

OCPHS staff visited the restaurant on October 16 and interviewed all 10 employees of the restaurant to assess illness and exposure histories and work assignments. Stool specimens were requested from all employees. Stool specimens were sent to the MDH PHL for *Salmonella* culture. An assessment of food preparation and hygiene practices was completed on October 16 using the principles of Hazard Analysis Critical Control Points and Active Managerial Control. A follow-up assessment was completed on October 17 to assess food flow processes of implicated foods. Environmental samples were taken and sent to the MDH PHL for culture. The tomato slicer was also disassembled and sent to the MDH PHL to be swabbed and cultured. Invoices from the supplier for the restaurant were obtained to facilitate product trace back.

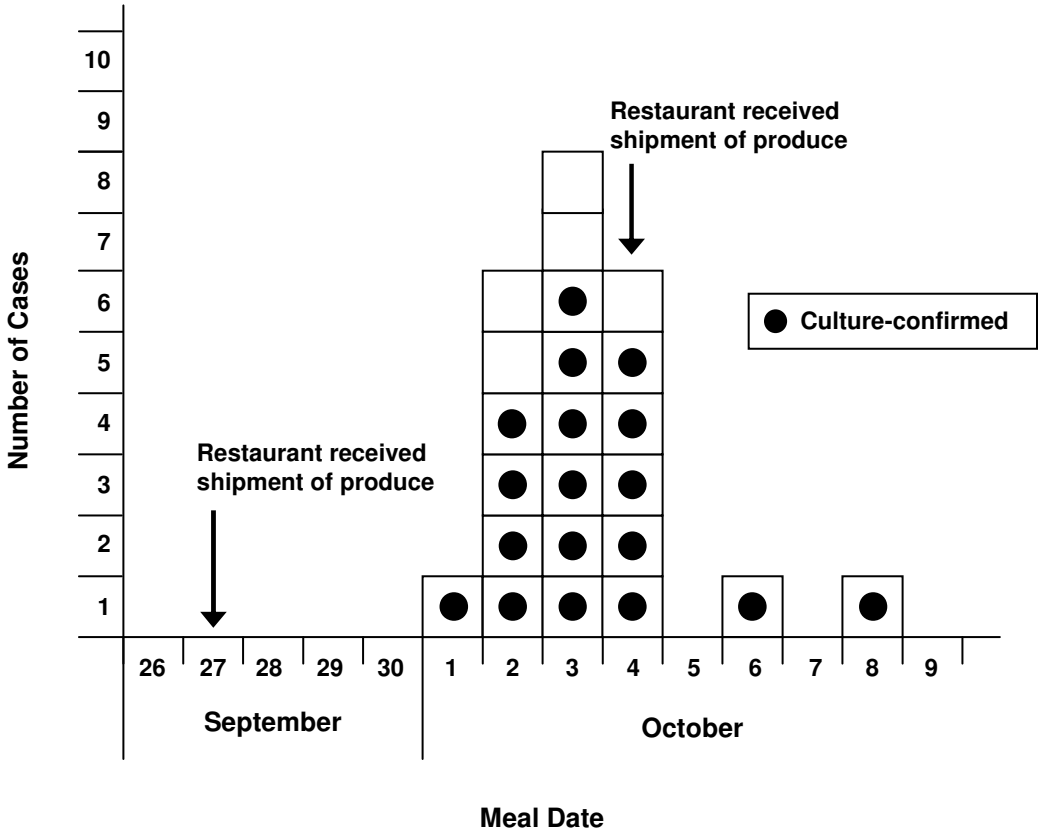
Employees without symptoms of vomiting and/or diarrhea were excluded from work pending a negative stool specimen for *Salmonella.* Employees that had experienced vomiting and/or diarrhea since October 1 were excluded from work pending two consecutive stool specimens that were negative for *Salmonella*. Employees from other locations were brought into the restaurant to work once the establishment had been cleaned and new product obtained.

Twenty-three cases were identified, 18 of which were culture-confirmed. Three additional patrons reported gastrointestinal illness symptoms but did not meet the case definition; these were excluded from further analysis. Seventeen of the 18 culture-confirmed cases had isolates that were indistinguishable by PFGE using two enzymes (designated subtype TM5bB8). The isolate from the other case differed by one band by the first enzyme and was indistinguishable from the other isolates by the second enzyme.

The median incubation period for cases was 57 hours (range, 12 to 120 hours). All cases reported diarrhea, 20 (91%) of 22 cramps, 17 (77%) of 22 fever, 12 (57%) of 21 bloody diarrhea, and five (22%) vomiting. Duration of illness information was available for eight cases; the median duration was 153 hours (range, 48 to 207 hours). One case was hospitalized for 2 days.

Meal dates ranged from October 1 to October 8, but most cases reported meal dates of October 2 to October 4 (see epidemic curve).

Salmonella Typhimurium Cases Associated with a Sandwich Restaurant, by Meal Date



Thirty-four controls were recruited from well-meal companions and credit card receipts. In the ingredient-specific case-control study, consumption of tomatoes, lettuce, and raw onions were all associated with illness in the univariate analysis. Nineteen of 21 cases consumed tomatoes vs. 13 of 34 controls (odds ratio [OR], 15.3; 95% confidence interval [CI], 2.7 to 115.8; $p < 0.001$); 18 of 21 cases consumed lettuce vs. 16 of 34 controls (OR, 6.8; 95% CI, 1.4 to 35.9; $p = 0.004$); and, 16 of 21 cases consumed raw onions vs. 11 of 32 controls (OR, 6.1; 95% CI, 1.5 to 26.2; $p = 0.003$). However, stepwise logistic regression converged to a model containing only the tomato variable (adjusted OR, 31.7; 95% CI, 3.7 to 267.7; $p = 0.002$).

The restaurant reported that the tomatoes were delivered once a week, and they came into the establishment with first-use and second-use stickers on the boxes (produce shipment dates are indicated on the epidemic curve above). The first-use tomatoes were put into the cooler immediately, and the second-use tomatoes were put on a shelf at room temperature to further ripen. Once the first-use tomatoes were consumed the second-use tomatoes were put into the cooler and prepared for use. When the tomatoes were removed from the cooler they were sprayed with water in the vegetable preparation sink. The tomatoes were then cored and sliced with the manual slicer. Layers of tomato slices were placed in a covered container separated by freezer paper. The container was date-marked and put into the cooler for 48 hours prior to use.

All tomatoes were reported to be handled with gloved hands when preparing sandwiches (observations by OCPHS were consistent with this report).

Gastrointestinal symptoms were reported by four restaurant employees; however, one of these reported very mild symptoms that did not include vomiting or diarrhea. Two employees reported onset on October 3, one reported onset on October 4, and one had an unclear onset date in "early October." The employee with an unclear onset date did not work in the facility from September 25 through October 9; however, that employee did eat a sandwich from the restaurant during that time period. Two of the employees who reported illness, including the one with an onset date of October 4 and the one with an unclear onset date, tested positive for *S.* Typhimurium TM5b (those employees were excluded from work pending two consecutive negative tests). All of the ill food workers reported having eaten multiple meals, including tomatoes, at the restaurant prior to their illness onsets. None of the employees reported working while symptomatic.

Environmental assessments on October 16 and 17 revealed that the restaurant does not receive any raw meat products. All surfaces and equipment were properly washed and sanitized. No critical violations were observed. All temperatures in cold holding units were below 41° F, and each unit had a thermometer in it and was reported to be checked multiple times a day. All hot holding units were holding product above 140° F. The manager reported that restaurant procedures required a thermometer to check products held in the units three times a day, and that all temperature checks are logged. The handwashing station in the production area was conveniently located. The manager reported that employees had been instructed not to come into work when ill with vomiting or diarrhea and that they were required to report illnesses to the manager. Employee illnesses were recorded in a log. A cutting board that was stored behind the three compartment sink was washed and sanitized and removed from being stored behind the sink. Another cutting board that was on the prep table was discarded.

Environmental samples taken at the restaurant and those taken from the tomato slicer were negative for *Salmonella.* Disassembly and examination of the tomato slicer revealed visible food residue, and the slicer appeared to be difficult to clean because of the configuration of the blades.

Six sporadic cases of *S.* Typhimurium TM5b infection were identified in other states through PulseNet from September 11 through October 30; of the three that had second enzyme PFGE tests run on them, two matched by second enzyme and one differed by one band. An association with tomato consumption was not established for any of these cases. One cluster of *S.* Typhimurium TM5b cases from September through December was identified in Virginia, but the isolates were different from the restaurant outbreak subtype by the second enzyme.

This was an outbreak of *S.* Typhimurium infections associated with consumption of tomatoes at a restaurant. The tomatoes were likely already contaminated when they entered the restaurant. Based on case meal dates and produce receipt records, the most likely scenario is that the outbreak was due to second-use tomatoes that entered the restaurant on September 27. These tomatoes were stored at room temperature for ripening before being used beginning around October 1. Any prior contamination could have amplified during this ripening period. Tomatoes used during the outbreak period were not available for testing.

Cross contamination of tomatoes from meat was ruled out as a cause of this outbreak, as the restaurant does not receive any raw meat products. Ill food workers were identified, including two that were confirmed with the outbreak subtype of *S.* Typhimurium; however, these food workers were likely victims of the outbreak rather than a source of *Salmonella* for patrons. Several patron cases reported meal dates prior to food worker illness onset dates. In addition, handwashing, glove use, and ill employee exclusion policies and practices were found to be appropriate by OCPHS.

(33)
Norovirus Gastroenteritis Associated with a Restaurant

October Redwood County

On October 26, 2007, the Minnesota Department of Health (MDH) received a report from Redwood-Renville Community Health Services (CHS) of gastrointestinal illness among a group of co-workers that had eaten at a restaurant in Redwood Falls on October 22 and 23. The complainants reported no other recent common food exposures. Upon follow-up with the restaurant, another complaint of illness in a patron and three ill food workers were reported. An investigation was initiated on October 26. On October 31, local media reports on the outbreak investigation prompted multiple calls to the MDH foodborne illness hotline.

An environmental health specialist from Redwood-Renville CHS visited the restaurant to interview staff regarding recent illness and evaluate food preparation and handling procedures. All food workers at the restaurant were interviewed about illness history and work duties. Cases were ascertained through complaint calls to Redwood-Renville CHS and to the MDH foodborne illness hotline. A case was defined as a restaurant patron who developed vomiting and/or diarrhea (≥3 loose stools in a 24-hour period) 12 to 60 hours later. Eight stool samples, including three collected from ill food workers, were submitted to the MDH Public Health Laboratory for bacterial and viral testing.

Of the 78 restaurant patrons interviewed, 43 (55%) met the case definition; 25 additional patrons reported gastrointestinal illness symptoms but were excluded from analysis because they were likely secondary cases or their illness onset occurred less than 12 hours or more than 60 hours after their exposure to the restaurant.

Thirty-eight (88%) cases reported diarrhea, 27 (63%) vomiting, and 20 (47%) fever. The median incubation period for the 32 cases reporting a specific onset time was 33 hours (range, 14 to 55 hours). Duration of illness information was available for 21 cases; the median duration was 59 hours (range, 29 to 130 hours). Meal dates of cases were October 22 through October 27, with 26 (58%) of the cases reporting meal dates on October 25 or 26. No specific food items were significantly associated with illness.

Redwood-Renville CHS and MDH staff interviewed 26 restaurant employees; 14 ill food workers were identified with onset dates from October 17 to October 29. Two employees reported vomiting at work on October 24 and October 25, and another employee reported working while having diarrhea on October 25.

Interventions at the restaurant included mandating the management to continue to screen all employees when they presented to work to identify employees that developed illness and exclusion of employees who exhibited any gastrointestinal symptoms for at least 72 hours after symptoms resolved. The establishment was ordered to discard all open packages of food (lettuce, tomatoes, bacon, cheese slices, dressing, onions, pickles, soups, and other foods). They were also given strict cleaning orders to wash, rinse and sanitize every surface using a strong chlorine (bleach) solution. Mandatory glove use when preparing ready-to-eat foods was implemented. Although the establishment had a history of proper handwashing during inspections, the environmental health specialist emphasized the importance of good handwashing, of minimizing bare-hand contact with ready-to-eat foods, and the need for ill employees to stay home while ill. Because of the scope of the outbreak, the environmental health specialist contacted every restaurant in the area and asked them to be vigilant for employee illness, exclude ill employees from work, and implement mandatory glove use when handling ready-to-eat foods.

Two of five patron stool samples tested positive for norovirus, and three of three food worker samples submitted tested positive for norovirus. All five stool samples had identical genetic sequences of norovirus.

This was an outbreak of norovirus gastroenteritis associated with a restaurant. A specific food vehicle was not identified; this is consistent with food contamination by multiple ill food workers being the cause of the outbreak. Corrective actions were taken at the restaurant, including sanitizing the restaurant, disposing of foods that may have come in contact with the hands of employees, implementing the use of gloves, and excluding ill food workers.

(34)
Enterotoxigenic *E. coli* Infections Associated with a Conference

October Cass County

On November 2, 2007, the Minnesota Department of Health (MDH) foodborne illness hotline received a complaint of gastrointestinal illness from an attendee of a conference held at a Brainerd resort from Friday, October 26, to Sunday, October 28. The attendee reported that there were approximately 500 conference attendees and that other conference attendees were also ill. MDH initiated an investigation on November 2.

MDH Environmental Health (EH) staff assessed food preparation practices at the resort and interviewed all food workers. The resort provided MDH with contact information for the organizer of the conference, and MDH subsequently requested a list of conference attendees from the organizer. MDH staff emailed all conference attendees requesting that they contact MDH for interviews about the event and illness history. MDH interviewed attendees of the conference by telephone. A case was defined as a conference attendee who developed vomiting and/or diarrhea (≥3 loose stools in a 24-hour period) following the beginning of the conference. Stool samples were collected from ill conference attendees and submitted to the MDH Public Health Laboratory for bacterial, viral, and toxin testing. Recipes were also collected from the resort so that ingredient-specific analyses could be performed. On November 21, MDH collected

left over dried parsley and submitted it to the Minnesota Department of Agriculture laboratory for testing. A follow-up questionnaire was sent via email to conference participants 5 weeks after the initial investigation was started in an attempt to ascertain more complete illness duration information.

Illness histories and exposure information were obtained from 141 conference attendees. Of these, 66 (46%) met the case definition. All cases had diarrhea, 52 (79%) of 66 cramps, 23 (38%) of 61 fever, six (9%) of 66 vomiting, and six (10%) of 63 bloody diarrhea. One case was hospitalized for 2 days.

The median duration of illness was 108 hours (range, 16 to 221 hours) for the 18 people who had recovered at the time of interview or who had opted to return a follow-up questionnaire. All seven stool samples collected from conference attendees tested positive for enterotoxigenic *E. coli* (ETEC) serotype O169; all of the ETEC isolates were indistinguishable by pulsed-field gel electrophoresis (PFGE). All seven stool samples tested negative for norovirus, *Campylobacter*, *Salmonella*, *Shigella*, and *E. coli* O157.

No single meal was associated with illness. There were three cases that had only consumed food at lunch on October 27, one case that had only consumed food at dinner on October 27, and one case that only consumed food at dinner on October 26 and breakfast on October 27. Numerous food items served at different meals were statistically associated with illness (Table 1).

Table 1. Food items approaching or reaching statistical significance

Date	Meal	Food Item	Case	Control	Odds Ratio	95% Confidence Interval	p-value
Oct. 26	Dinner	Dip	24/48	16/54	2.38	1.05 to 5.36	0.035
		Mashed potatoes	41/50	33/52	2.62	1.05 to 6.56	0.036
		Raw vegetables	34/49	26/51	2.16	0.89 to 5.38	0.060
		Cooked vegetables	36/47	28/48	2.34	0.96 to 5.67	0.057
Oct. 27	Breakfast	Coffee	36/48	22/49	3.68	1.55 to 8.72	0.003
		Tea	5/47	0/50	Undefined	Undefined	0.012
		Milk	15/47	7/50	2.88	1.05 to 7.88	0.035
	Lunch	Salad dressing	33/54	11/43	4.57	1.90 to 11.0	< 0.001
		Croutons	18/55	6/50	3.57	1.28 to 9.91	0.012
		Chicken parmesan	45/65	30/59	2.18	1.04 to 4.53	0.037
		Tomato cucumber salad	27/60	14/49	2.05	0.92 to 4.56	0.078
	Dinner	Tomatoes	26/42	16/40	2.44	1.00 to 5.92	0.047
		Parsley potatoes	44/47	35/44	3.77	0.95 to 15.0	0.064
		Coffee	25/46	13/44	2.84	1.19 to 6.77	0.017
		Tea	6/46	0/44	Undefined	Undefined	0.013
Oct. 28	Breakfast	Coffee	31/41	14/33	4.21	1.56 to 11.3	0.004

After multivariate analysis using logistic regression with variables that were significant at the 0.05 level in analysis, no foods remained independently associated with illness.

Dried parsley was listed as an ingredient in salad dressings, chicken parmesan, parsley potatoes, tomato cucumber salad, and possibly dip. There were no other ingredients common between these dishes.

Leftover dried parsley collected from the resort and submitted to MDA for testing was negative for ETEC. However, there was some bacterial growth that was observed during testing, which suggested that the parsley was not irradiated. Invoices from the dried parsley were collected; the supplier was in Monticello, Minnesota. A trace forward on the parsley was attempted, but there was little information on other large parties that might have consumed this product, and no additional illnesses associated with the dried parsley were found.

All of the resort's kitchen employees that worked at the conference were interviewed about illness by a MDH sanitarian; five employees reported gastrointestinal illness. Four of the five workers reported being ill at the same time as the conference attendees and reported consuming the foods served to conference attendees. Stool specimens were collected from these four food workers. Stool samples from two of these food workers were positive for ETEC. One server reported becoming ill during a shift on October 27 with nausea and vomiting and reported going home. This server was not tested.

Isolates from the food workers were serotype O169. Furthermore, all isolates were indistinguishable from conference attendees by PFGE.

This was an outbreak of enterotoxigenic *E. coli* (ETEC) infections associated with a conference held at a resort. The specific vehicle of transmission was not confirmed. Multiple foods served at the conference were statistically associated with illness. The one common ingredient in several of these foods was dried parsley; however, contamination of the parsley was not confirmed through laboratory testing. One limitation of this investigation was that controls were not selected randomly, but were self-selected; cases were more likely to call MDH for an interview than were controls. In addition, many of the controls that did call MDH for interview had called because they knew a case. This non-random control selection and the potential for recall bias limited the conclusions of the investigation. As a consequence of recall bias and the severity of symptoms experienced by cases, it is possible that cases were more likely to remember specific foods and drinks than controls, leading to elevated odds ratios for many items. In addition, the use of parsley in some food items was unclear and also was a limitation of the case-control study. The ultimate source of the outbreak was not determined; however, the most plausible source was contaminated dried parsley.

(35)
Norovirus Gastroenteritis Associated with a Restaurant

November Redwood County

On November 5, 2007, the Minnesota Department of Health (MDH) foodborne illness hotline and Redwood-Renville Community Health Services (CHS) received five independent reports of gastrointestinal illness among individuals who had eaten at Restaurant A in Redwood Falls on November 3. Additionally, an emergency room clinician reported seeing a high number of people with gastrointestinal symptoms who reported eating at Restaurant A. A norovirus outbreak had occurred in Redwood Falls associated with a different restaurant (Restaurant B) the previous week, and local media reports on that outbreak investigation had prompted multiple calls to the MDH foodborne illness hotline. An investigation was initiated on November 5.

An environmental health specialist from Redwood-Renville CHS visited the restaurant to interview staff regarding recent illness and evaluate food preparation and handling procedures. All food workers at the restaurant were interviewed about illness history and work duties. Cases were ascertained through complaint calls to Redwood-Renville CHS and to the MDH foodborne illness hotline. A case was defined as a restaurant patron who developed vomiting and/or diarrhea (≥3 loose stools in a 24-hour period) 12 to 60 hours later. Three stool samples, including two collected from ill food workers, were submitted to the MDH Public Health Laboratory for bacterial and viral testing.

Of the 26 restaurant patrons interviewed, 18 (69%) met the case definition; an additional seven patrons reported gastrointestinal symptoms but did not meet the case definition and were therefore excluded from analyses. Seventeen (94%) cases reported diarrhea, 15 (83%) vomiting, and 12 (67%) fever. The median incubation period was 28 hours (range, 15.5 to 53 hours). Duration of illness information was not available. Among the 16 cases that ate at the restaurant only once before their illness, 12 (75%) of the cases ate there on November 3, one (6%) on November 4, and three (19%) on November 5. No specific food items were significantly associated with illness.

Redwood-Renville CHS and MDH staff interviewed 34 restaurant employees; 12 reported illness, with onset dates from October 25 to November 6. Four employees worked while they were still ill. One of the two employees with the earliest onset of illness reported eating at Restaurant B during the Restaurant B outbreak period and 1 to 2 days before onset of illness.

The restaurant was mandated to continue to screen all employees when they presented to work and exclude employees who exhibited gastrointestinal symptoms for at least 72 hours after symptoms resolved.

On October 26, during the investigation of Restaurant B, the environmental health specialist had implemented a mandatory glove use policy for all restaurants in the community. The environmental health specialist had a lengthy discussion about employee illness and glove use with Restaurant A management at that time. Glove use was reportedly implemented in Restaurant A on November 1.

The establishment was ordered to discard all open packages of food. They were also given strict cleaning orders to sanitize every surface using a strong chlorine (bleach) solution. Mandatory glove use to prepare ready-to-eat foods was continued. The environmental health specialist emphasized the importance of good handwashing, of minimizing bare-hand contact with ready-to-eat foods, and the need for ill employees to stay home while ill.

Two of the three submitted stool samples tested positive for norovirus, one from an ill employee and one from a patron. Both stool samples had identical genetic sequences of norovirus, which were also identical to the viral sequence of the previous outbreak in Restaurant B.

This was an outbreak of norovirus gastroenteritis associated with a restaurant. A specific food vehicle was not identified. Contamination by multiple ill food workers was identified as the likely source of the outbreak. Despite being contacted directly prior to the identification of the outbreak, the management at the restaurant failed to implement measures that would have prevented or minimized the extent of the outbreak.

(36)
Suspected Norovirus Gastroenteritis Associated with a Restaurant

November Dakota County

On November 29, 2007, the Minnesota Department of Health (MDH) foodborne illness hotline received a complaint of gastrointestinal illness among five of six co-workers who had ordered food from a restaurant in Eagan, Minnesota on November 14. MDH Environmental Health was notified, and an outbreak investigation was initiated.

A list of exposed co-workers was obtained from the original complainant, and epidemiologists from MDH interviewed these patrons to obtain information on food/beverage consumption and illness history. A case was defined as a restaurant patron who subsequently developed vomiting and/or diarrhea ($\geq$3 loose stools in a 24-hour period). No stool specimens were collected due to the length of time that had elapsed since the patrons' illnesses and the complaint.
A sanitarian from MDH 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 five co-workers; four (80%) cases were identified. All four cases reported diarrhea, three (75%) cramps, and two (50%) vomiting. The median incubation period was 34.5 hours (range, 31 to 41 hours). The median duration of illness was 46 hours (range, 31 to 70 hours).

Cases reported eating three different types of sandwiches. All cases reported having lettuce and tomato added to their sandwiches.

Upon inspection of the restaurant, the sanitarian observed employees having bare-hand contact with ready-to-eat foods. No employees reported being recently ill with any gastrointestinal symptoms.

This was a foodborne outbreak associated with consuming a meal from a restaurant. The etiologic agent was not identified, but the distribution of incubation periods and symptoms were characteristic of norovirus gastroenteritis. The source of contamination was not identified; however, the most likely vehicle was one or more ready-to-eat food ingredients in the sandwiches.

(37)
Norovirus Gastroenteritis Associated with a Restaurant

November Hennepin County

On November 27, 2007, the Minnesota Department of Health (MDH) foodborne illness hotline received a complaint of illness among employees of a law firm (Firm A) that ate meals catered by a restaurant in Minneapolis. The initial report indicated that eight of 12 patrons that ate meals on November 19 and 20, 2007, became ill. Another complaint of illness was reported to Hennepin County Public Health Protection – Epidemiology (HCPHP) the same day from another law firm (Firm B) that had a meal catered by the facility on November 21. A full investigation was initiated on November 27 by HCPHP and the Minneapolis Division of Environmental Health (MDEH). On November 28, HCPHP received another complaint from a third law firm (Firm C) that had a meal catered by the facility on November 21.

A case was defined as a person who ate food from the restaurant since November 19 and subsequently became ill with vomiting and/or diarrhea (≥3 loose stools in a 24-hour period). Patrons were identified by working with a contact person at each firm who provided the names and contact information of people who ate catered meals. Stool specimen kits were delivered to six cases.

MDEH sanitarians visited the facility on November 27 to conduct an inspection. The environmental health assessment of the restaurant focused on employee health and norovirus prevention education. The next morning, they revisited the facility to conduct employee interviews and gather information about job duties.
Twenty-seven patrons from Firms A, B and C were interviewed by HCPHP epidemiologists. Seventeen cases were identified. Two cases from different firms tested positive for norovirus; viral sequences were identical.

Of the 17 cases, 16 (94%) reported diarrhea, 16 (94%) vomiting, 15 (88%) cramps, and 11 (65%) fever. The median incubation period was 32 hours (range, 9.5 to 75 hours). The median duration of illness was 40 hours (range, 8 to 58 hours).

Cases had eaten a variety of foods including prepared sandwiches, salads, desserts, boxed lunches, and deli trays. Some of the meals were prepared for the individual, while others consisted of shared items (self-serve salads and sandwich trays). No food items were significantly associated with illness.

When MDEH visited the facility on November 27 to conduct an inspection, it was noted that the employees needed additional food safety education. In addition, MDEH made plans to help the facility with a self-assessment. Ten of ten employees were interviewed, and no employees reported having any recent illness. The restaurant had not received any additional reports of illness.

In order to determine whether or not there was any ongoing transmission, MDEH requested a list of catering orders that were served on November 26. Three of the firms that placed orders for that day were contacted by HCPHP epidemiologists and none knew of illness in their groups. It was noted that the facility did not have an organized system for recording placed orders.

This was an outbreak of norovirus gastroenteritis associated with a restaurant in Minneapolis. A specific food vehicle was not identified. Although no ill food workers were documented, unidentified infected food workers or contaminated surfaces may have played a role in transmission of norovirus to patrons. The establishment was instructed on the importance of limiting bare-hand contact of food items, frequent handwashing, and excluding ill food workers for 72 hours following symptom resolution.

(38)
Norovirus Gastroenteritis Associated with a Restaurant

November Ramsey County

On November 26, 2007, the Minnesota Department of Health (MDH) foodborne illness hotline received a complaint about a restaurant in Roseville, Minnesota. The complainant reported that approximately 18 of 25 co-workers became ill after consuming a lunch that was partially catered by the restaurant on November 21, 2007. The restaurant provided four types of sandwiches (club, turkey, roast beef, ham), all containing lettuce, tomato, onion, and cheese. A club sandwich without any toppings was also supplied. Potluck items, including baked beans, store bought potato salad, chips, and homemade egg rolls, were also available for consumption. The original complainant did not experience symptoms after this meal, but did report that his wife became ill after consuming a sandwich leftover from this event. Ramsey County Environmental Health was notified of the complaint, and an investigation was initiated.

The complainant provided MDH with a list of co-workers who had attended this event. All attendees were interviewed regarding food consumption and illness history. Family members were also interviewed if the attendee reported bringing leftovers home from the event. A case was defined as a person with vomiting and/or diarrhea (≥3 loose stools in a 24-hour period) after consuming food from the event. Stool samples were collected from consenting cases, and submitted to the MDH Public Health Laboratory (PHL) for bacterial and viral testing.

Restaurant employees were interviewed regarding any gastrointestinal symptoms experienced since November 1, 2007, as well as job duties and work history for the week prior to and including the date of the implicated meal. It was requested, but not required, for food workers that reported experiencing symptoms during this time period to submit a stool sample to the MDH PHL.

Twenty-nine people who consumed items from this meal, including three spouses, were interviewed. Of these, 21 (72%) met the case definition. Onset dates ranged from November 21 to November 24, 2007, and the median incubation period was 34 hours (range, 1.5 hours to 3 days). Eighteen (86%) cases reported experiencing diarrhea, 11 (52%) vomiting, eight (42%) fever, and one (5%) bloody diarrhea. No cases were hospitalized for their illness. The median duration of illness was 2 days (range, 12 hours to 4 days).

All individuals who reportedly prepared or purchased potluck meal items were interviewed; none reported experiencing illness or having ill household members in the week prior to this meal. Ham from the restaurant's sandwiches was the only item that was significantly associated with illness (17 of 19 cases vs. 4 of 8 controls; odds ratio, 8.5; 95% confidence interval, 1.1 to 63.9; $p = 0.04$).

Two of the three stool samples received by MDH PHL tested positive for norovirus. One of the positive samples was from a coworker who attended the event, and the other was from a spouse who consumed a leftover sandwich. Nucleic acid sequencing was conducted on both of the positive norovirus samples; the nucleic acid sequences were identical.

Initial contact with the restaurant by Ramsey County Environmental Health staff revealed that there were no reports of employee illness during this time period. All employees are required to wear gloves while handling food. Tomatoes are the only food item further altered in the restaurant; restaurant employees are responsible for washing and slicing them. All other food handling involves transferring the item from it's packaging into its respective container from where it will be served. Contact specifically with the ham involves separating the meat from its packaging before it is placed into a serving container. No improper food handling practices were observed by the sanitarian.

All nine restaurant employees were interviewed by MDH staff. Two (22%) employees reported experiencing gastrointestinal symptoms during the time period investigated. One employee had illness onset the night prior to the date of the implicated meal. This employee worked on their onset date as well as the next day, when the catered sandwiches were prepared. The other employee had illness onset the day the sandwiches were prepared, but reportedly stayed home from work that day. According to the restaurant, only two employees were responsible for preparing the sandwiches that catered this event; neither employee reported illness. One of the ill employees agreed to submit a stool sample, but the sample was never received at MDH PHL.

This was an outbreak of norovirus gastroenteritis associated with consumption of sandwiches from a restaurant in Roseville; ham was statistically implicated as the vehicle. Ill restaurant employees were identified, and these individuals had been present at the restaurant the night prior to as well as the day of preparation of the implicated sandwiches. Therefore, the most plausible source of this outbreak was an ill food worker.

(39)
Norovirus Gastroenteritis Associated with a Restaurant

November Ramsey County

On November 26, 2007, the Minnesota Department of Health (MDH) foodborne illness hotline received a complaint of gastrointestinal illness among two members from the same household who had eaten at a restaurant in Roseville, Minnesota on November 24. On November 29, the MDH foodborne illness hotline received a second complaint of gastrointestinal illness among two members from the same household who had eaten at the same restaurant on November 25. Sanitarians from Ramsey County Environmental Health (RCEH) were notified, and an outbreak investigation was initiated.

A list of restaurant patrons from November 24 and 25 was obtained from credit card receipts. Epidemiologists from MDH interviewed patrons to obtain information on food/beverage consumption and illness history. A case was defined as a restaurant patron who subsequently developed vomiting and/or diarrhea ($\geq$3 loose stools in a 24-hour period). Stool specimens were obtained from two patrons and submitted to MDH Public Health Laboratory for bacterial and viral testing.

A sanitarian from RCEH visited the restaurant on November 29 to evaluate food preparation and handling procedures. MDH staff interviewed restaurant staff regarding recent illness history and job duties.

Illness histories and exposure information were obtained from 19 patrons. Six (32%) cases were identified. Two people reported illness but did not meet the case definition, and thus were excluded from further analysis.

All six cases reported vomiting, four of five (80%) cramps, four (67%) diarrhea, and four (67%) fever. The median incubation period was 32 hours (range, 27 to 41 hours). The median duration of illness was 51 hours (range, 48 to 102 hours) for the three people who had recovered at the time of interview. Both stool samples (from the same complaint group) tested positive for norovirus genogroup II.

Cases reported eating a variety of salads, side dishes, and entrees. No food item was statistically associated with illness.

Upon inspection of the restaurant, an RCEH sanitarian found five critical violations and three non-critical violations. The sanitarian observed employees not following proper handwashing procedures and having bare-hand contact with ready-to-eat foods. The sanitarian discussed with restaurant staff the importance of handwashing for the prevention of norovirus. Additionally, the restaurant was reminded that any employee with vomiting and/or diarrhea must be excluded from working for 72 hours after the resolution of symptoms.

Seventy-three employees were interviewed; no employees reported being ill or having a household member ill with gastrointestinal symptoms.

Two weeks prior to the outbreak, the restaurant had initiated a handwashing campaign in response to the increase in norovirus activity in Minnesota. As a result of the outbreak, the restaurant chain's corporate wellness division attempted to further increase handwashing among employees through an incentive program. The division also interviewed all employees regarding any recent illness following the initiation of the outbreak investigation.

This was a foodborne outbreak of norovirus gastroenteritis associated with a restaurant. A specific food vehicle was not identified. The ultimate source of the outbreak was not determined. However, the most plausible source was an unrecognized infected food worker who had contact with one or more ready-to-eat food items. Documented problems with handwashing and bare-hand contact with ready-to-eat foods likely contributed to the outbreak.

(40)
Norovirus Gastroenteritis Associated with a Business Meeting

November Washington County

On December 3, 2007, the Washington County Department of Public Health & Environment (PHE) received a complaint regarding eight of 11 employees developing vomiting and/or diarrhea following an employee business meeting held at a restaurant and hotel complex in Oakdale, Minnesota on November 27 and 28. Business meeting meals included a breakfast, buffet lunch and afternoon break on November 27, and breakfast and box lunch on November 28. Foods served at the business meeting include continental breakfast (bakery goods) on both days, luncheon buffet (house salad, pasta salad, potato salad, build-your-own deli sandwiches), and box lunches. The food was prepared by a restaurant in Oakdale, Minnesota and served in an adjacent hotel conference room. No foods or beverages were served to the business guests from external sources.

A list of business employees who attended the meetings was developed by the business manager, and a list of all restaurant and hotel employees was compiled by the general manager of the hotel and restaurant complex. Business guests were interviewed by phone about food consumption and illness history. A case was defined as a person with vomiting and/or diarrhea (≥3 loose stools in a 24-hour period) after the business conference. Stool kits were sent to ill persons who consented to submitting a stool sample. Restaurant and hotel employees were interviewed in person or by phone about food consumption, work duties, and illness history. Environmental health specialists from PHE visited the restaurant on several occasions over the course of the investigation to assess food preparation, handling procedures, writing orders, and to observe compliance with written orders. The restaurant voluntarily closed to adequately respond to the department's orders.

A total of 15 guests attended the business meeting. Of 13 guests who were interviewed, six (46%) met the case definition. All cases had diarrhea and abdominal pain, four (67%) vomiting, and two (33%) fever. The median incubation period from the luncheon buffet was 40 hours (range, 15 to 65 hours). The median duration of illness was 35 hours (range, 20 to 52 hours). Two stool kits were sent to ill cases; none were returned to the Minnesota Department of Health

(MDH) Public Health Laboratory (PHL). Restaurant and hotel guests, unaffiliated with the business meeting, were not interviewed. Given the limited number of guests interviewed, no specific food items were statistically associated with illness.

Fifty individuals were employed by the restaurant and hotel complex. Of the hospitality complex staff, a total of 40 staff (80%) were interviewed. Eight staff (20%) had been ill prior to, during or within several days following the business meeting event at the hotel/restaurant complex. Onset dates ranged from November 26 to December 5. Of the ill staff, seven were restaurant employees (line cooks, banquet/buffet servers, managers). The eighth ill employee was the hospitality complex general manager; this person had no exposure to the kitchen but shared the buffet luncheon with the business guests. This employee's onset date and time was consistent with that of the guests.

Five stool kits were given to ill employees. Three kits were returned to the MDH PHL for testing. Two of three samples tested positive for norovirus (food worker and complex manager). The third sample was negative for viral and bacterial enteric pathogens.

This was an outbreak of norovirus gastroenteritis among guests attending a business meeting. The vehicles of transmission were most likely luncheon buffet items served on November 27, 2007. Several food workers had been ill prior to and during food preparation and service for the buffet meal. Environmental health staff identified numerous food handling procedures and personal hygiene infractions during their assessment of the facilities. Therefore, the most plausible source of this outbreak was an ill food worker.

(41)
Salmonella Newport Infections Associated with an Office Potluck

December — Multiple counties

On December 14, 2007, the Minnesota Department of Health (MDH) Public Health Laboratory (PHL) identified two *Salmonella enterica* serotype Newport isolates with indistinguishable pulsed-field gel electrophoresis (PFGE) patterns through routine surveillance. The PFGE subtype was designated NEW136. It was determined through routine interviews that the two cases worked for the same employer, and that multiple employees had become ill after an office potluck event held on November 28. An investigation was initiated.

Lists of exposed employees and foods served at the potluck were obtained, and staff from MDH interviewed employees to obtain information on food/beverage consumption and illness history. Cases were also identified through routine laboratory surveillance. A case was defined as an individual who attended the potluck meal on November 28 and subsequently developed vomiting and/or diarrhea (≥3 loose stools in a 24-hour period), or who had culture-confirmed infection with *S*. Newport NEW136. No additional stool samples were collected.

Illness histories and exposure information were obtained from 21 employees. Of these, 11 (52%) met the case definition. One person reported illness but did not meet the case definition, and thus was excluded from further analysis.

Of the 11 cases, all reported diarrhea, 10 (91%) cramps, seven (64%) fever, four (36%) bloody diarrhea, and one (9%) vomiting. The median incubation period was 46 hours (range, 28 to 151 hours). The median duration of illness was 8 days (range, 3 to 14 days) for the seven people who had recovered at the time of interview.

Two of the 11 individuals who met the case definition had incubation periods longer than 3 days. These cases were removed from subsequent analysis due to the possibility that they represented secondary infections from person-to-person transmission within the office. After excluding these two cases, the median incubation period for the remaining nine cases was 44 hours (range, 28 to 71 hours).

Foods available at the potluck meal included sandwiches containing barbequed pork or chicken, coleslaw, a vegetable tray (with carrots, broccoli, cauliflower, tomatoes, and dip), chips, cookies, and cheesecake. All items were store-bought except for the barbequed pork and cheesecake, which were homemade. The barbequed pork was prepared from raw pork steaks and cooked in a roasting pan. The chicken was canned. The coleslaw was bagged and prepared at the office. The vegetables, chips, and cookies were not handled before being served.

No food item was statistically associated with illness. However, four of the items did have elevated odds ratios (> 4.0). These items were the veggie dip (4 of 6 cases vs. 1 of 5 controls; odds ratio [OR], 8.0; $p = 0.2$), cookies (4 of 8 cases vs. 1 of 8 controls; OR, 7.0; $p = 0.3$), chips (8 of 9 cases vs. 5 of 8 controls; OR, 4.8; $p = 0.3$), and salsa (3 of 8 cases vs. 1 of 8 controls; OR, 4.2; $p = 0.6$). MDH was able to contact the two employees who purchased and/or prepared items for the event; neither employee reported experiencing gastrointestinal illness or having ill household members in the week prior to this event.

This was an outbreak of *S*. Newport infections associated with an office potluck. A specific food vehicle was not identified. The ultimate source of the outbreak was not determined. No additional cases of *S*. Newport infection were identified through surveillance during this time period, supporting that this outbreak was an isolated event and not associated with a commercially distributed product.

(42)
Norovirus Gastroenteritis Associated with a Catered Meal

December Hennepin County

On December 10, 2007, the Minnesota Department of Health (MDH) foodborne illness hotline received a complaint of illness among a group of co-workers that ate meals catered by a restaurant in Minneapolis. The initial report indicated that eight of 18 patrons who ate meals on December 6 became ill. A full investigation was initiated on December 10 by Hennepin County Public Health Protection (HCPHP) and the Minneapolis Division of Environmental Health (MDEH).

A case was defined as a person who ate food from the restaurant since December 6 and subsequently became ill with vomiting and/or diarrhea (≥3 loose stools in a 24-hour period). Patrons were identified by working with a contact person at the agency who provided the names and contact information of people who ate the catered meal. Stool specimen kits were delivered to one case.

Minneapolis Division of Environmental Health (MDEH) sanitarians visited the facility on December 10 to conduct an environmental health assessment of the restaurant that focused on employee health and norovirus prevention education. They conducted employee interviews and collected the catering list from December 6.

Twenty patrons from the catered meal were interviewed by HCPHP epidemiologists. Eight cases were identified. Of the eight cases, seven (88%) reported diarrhea, seven (88%) vomiting, 7 (88%) cramps, and four (50%) fever. The median incubation period was 33 hours (range, 29 to 39.5 hours). The median duration of illness was 71.5 hours (range, 48 to 85 hours). One case submitted a stool specimen that was positive for norovirus.

Cases had eaten a variety of foods, including baked beans, lettuce salad, barbeque chicken, pork, and beef sandwiches, potato salad and breads. The food items were set out buffet-style and each person served themselves. No food items were significantly associated with illness.

Twenty-three employees were interviewed by MDEH, and none reported having any recent gastrointestinal illness symptoms. The restaurant had not received any additional reports of illness.

In order to determine whether or not there was any ongoing transmission, MDEH requested a list of catering orders that were served on December 6. Several of the firms that placed orders for that day were contacted by HCPHP epidemiologists and none knew of illness in their groups. Those orders involved roughly 300 meals.

This was an outbreak of norovirus gastroenteritis associated with a Minneapolis restaurant. A specific food vehicle was not identified. Although no ill food workers were documented, unidentified infected food workers may have played a role in transmission of norovirus to patrons. In addition, since the meal was served buffet-style, contamination by an infected patron is also a possibility. The establishment was instructed on the importance of limiting bare-hand contact of food items, frequent handwashing, and excluding ill food workers for 72 hours following symptom resolution.

(43)
Norovirus Gastroenteritis Associated with a Restaurant

December Hennepin County

On December 13, 2007, the Minnesota Department of Health (MDH) received information from a private environmental health consultant regarding complaints of gastrointestinal illness among four separate groups of people who had eaten meals at a restaurant in Minneapolis on December 7 and December 8, 2007. The consultant was working with the restaurant manager to gather information about complainants' incubations and symptoms. MDH notified the Hennepin County Public Health Department (HSPHD) epidemiology and Minneapolis Division of Environmental Health (MDEH) units, and an investigation was initiated.

HSPDH epidemiology staff reviewed the preliminary complainant interviews previously conducted by the restaurant manager and re-interviewed members of the four complaint groups about illness history and food consumption at the restaurant. A list of patrons who ate on December 11 was obtained from the restaurant; epidemiologists called patrons from this list to collect illness history and food consumption and to look for ongoing disease transmission. A case was defined as a person who ate at the restaurant since December 7, and subsequently became ill with vomiting and/or diarrhea (≥3 loose stools in a 24-hour period). Stool kits were sent to complainants and tested for bacterial and viral pathogens at the MDH Public Health Laboratory (PHL).

On December 13, MDEH sanitarians inspected the restaurant and interviewed employees about illness history and work duties. The environmental health assessment of the restaurant focused on employee illness, flow of food, food preparation, and food storage procedures. Stool kits were also given to ill employees for testing at the MDH PHL.

Each of the four original complaint groups consisted of individuals from separate households who had no other meals or events in common. Eleven of the 23 patrons in Group A were interviewed, as were all four patrons in Group B, two of the four patrons in Group C, and six of the 17 patrons in Group D. Eighteen additional patrons who ate on December 11 were also interviewed.

Of the 41 patrons interviewed, 19 (46%) met the case definition. Sixteen (84%) reported diarrhea, thirteen (68%) cramps, and eleven (58%) vomiting. The median incubation was 24 hours (range, 7 to 48 hours). The median duration of illness was 29.5 hours (range, 1 to 82 hours). Ten cases were female. The median age was 46.5 years (range, 27 to 58 years). One ill patron visited an emergency room for rehydration and pain management; no cases were hospitalized. Stool samples were submitted by two of the ill patrons to the MDH PHL; both were positive for norovirus with matching nucleic acid sequences (NLV336).

The patrons interviewed consumed a wide variety of food items, with some dining parties sharing several items. Both ill and non-ill patrons reported eating various lettuce salads, appetizers (calamari, shrimp, crab cakes, fried vegetables), main entrées (steaks, scallops, fish, pork dishes), and desserts (ice cream, cakes, doughnuts). Beverages included ice water, bottled

sparkling water, wine, and other alcoholic beverages. No specific food items were statistically associated with illness.

MDEH staff inspected the restaurant on December 13 and began interviewing employees. All 75 employees were interviewed and 16 had recent gastrointestinal symptoms; the earliest employee onset was December 9, and no employees reported illness on the implicated meal dates (December 7 and 8). Fourteen (88%) employees reported vomiting, 13 (81%) reported cramping, and 12 (75%) reported diarrhea. The median duration of illness was 29 hours (range, 12 to 67 hours). The ill employees had various jobs within the restaurant, ranging from hostess to server to cook. Stool samples were submitted by three of the ill employees to the MDH PHL; all three were positive for norovirus. One employee norovirus sample was sequenced; it matched the patron sequences.

During their interviews, MDEH sanitarians learned that the restaurant provides a daily "employee lunch" for restaurant staff to eat before the restaurant opens for dinner. The shared "employee lunch" was further investigated to determine if ill employees had been exposed to contaminated food; however, only two ill employees reported eating the staff meal on December 6 and December 7. Additionally, a non-ill restaurant employee reported that her boyfriend (who is not a restaurant employee) had vomiting and diarrhea beginning on December 8, 2007. The boyfriend was interviewed by MDEH about his symptoms and submitted a stool sample to MDH PHL, which was negative for norovirus.

The MDEH sanitarians noted overall compliance with food code requirements for food preparation. The restaurant was very clean; but employees had been working with their private environmental health consultant for 2 days before MDEH sanitarians inspected the restaurant. The sanitarians 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 and all ill employees were excluded from working at the restaurant for 72 hours following their last gastrointestinal symptom.

This was an outbreak of norovirus gastroenteritis associated with consuming a meal at a restaurant in Minneapolis. It is likely that several food items were contaminated by an ill or previously ill food worker who did not identify their symptoms or the correct onset date of their symptoms during interview.

(44)
Norovirus Gastroenteritis Associated with a Conference

December Dakota County

On December 13, 2007, the Minnesota Department of Health (MDH) foodborne illness hotline received an illness complaint from an employee who reported that 11 co-workers had become ill after attending an all-day work conference at an Eagan, Minnesota conference center on December 11. Forty-one people attended the event, which included breakfast and lunch that were prepared and served onsite. Breakfast consisted of assorted breads, cut fruit, and assorted beverages. Lunch included bread, deli meats and cheeses, lettuce, tomatoes, onion, coleslaw, pasta salad, turkey wild rice soup, and various beverages. The event also included a cash bar service in the late afternoon. MDH Epidemiology and Environmental Health initiated an investigation on December 13.

A case was defined as a person with vomiting and/or diarrhea (≥3 loose stools in a 24-hour period) within 60 hours of the end of the event (5:00 pm on December 11). The company provided a list of event attendees and their contact information. Stool samples were collected from two event attendees and submitted to the MDH PHL for bacterial and viral testing.

On December 14, an MDH Environmental Health sanitarian completed a full facility inspection and interviewed all three food workers that worked at the December 11 event. A stool kit was provided to one ill food worker, but was not returned to the MDH Public Health Laboratory (PHL) for testing.

Phone interviews were completed for 37 event attendees. Eleven attendees met the case definition. An additional six attendees reported gastrointestinal illness symptoms, but did not meet the case definition and thus were excluded from further analysis. The median incubation period for cases, calculated from lunch time, was 30 hours (range, 8 to 43 hours). All cases reported vomiting, eight (80%) of 10 cramps, seven (70%) of 10 fever, seven (64%) diarrhea, and one (11%) of 9 bloody diarrhea. Duration of illness information was available for seven cases; the median duration of illness was 69 hours (range, 42 to 134 hours). None of the cases were hospitalized. Both attendee stool specimens tested positive for norovirus.

Consumption of two food items were independently statistically associated with illness. These included ice at lunch (10 of 11 cases vs. 9 of 20 controls; odds ratio [OR], 12.2; 95% confidence interval [CI], 1.1 to 312.4; $p = 0.01$) and turkey wild rice soup (10 of 11 cases vs. 8 of 20 controls; OR, 15.0; 95% CI, 1.4 to 386.4; $p = 0.007$). Stepwise logistic regression converged to a model containing only the turkey wild rice soup variable (OR, 15.0; 95% CI, 1.6 to 141.2; $p = 0.018$).

Interviews were completed for all three facility food workers. One employee reported having symptoms of nausea, fever, and diarrhea beginning on December 8. In addition, the employee reported that a household member had also been ill with vomiting and diarrhea in the few weeks preceding the employee's illness. That employee returned to work on December 11, and prepared the coleslaw, pasta salad, and soup for the event that day. The environmental health

investigation report from December 14 indicated that the facility did not have a food manager certification posted for the person in charge, stated that the meat slicer was not properly cleaned, and ordered the exclusion of any employees ill with vomiting or diarrhea.

This was a foodborne outbreak of norovirus gastroenteritis associated with a conference at a conference center in Eagan, Minnesota. Turkey wild rice soup was implicated as the probable vehicle. Transmission likely occurred from the ill food worker who prepared the soup. It is possible that transmission also occurred through other vehicles (such as the ice).

(45)
Norovirus Gastroenteritis Associated with a Restaurant

December Ramsey County

On December 31, 2007, the Minnesota Department of Health (MDH) foodborne illness hotline received a complaint of gastrointestinal illness among nine of 15 co-workers who had eaten at a restaurant in St. Paul, Minnesota on December 28. The complainant reported that the co-workers had no other recent meals or events in common. Sanitarians from the City of St. Paul were notified, and an outbreak investigation was initiated.

A list of exposed co-workers was obtained from the original complainant, and staff from MDH interviewed these patrons to obtain information on food/beverage consumption and illness history. A case was defined as a restaurant patron who subsequently developed vomiting and/or diarrhea ($\geq$3 loose stools in a 24-hour period). Stool specimens were obtained from three patrons and submitted to MDH Public Health Laboratory (PHL) for bacterial and viral testing.

An MDH sanitarian spoke with the manager at the restaurant on December 31 and provided recommendations to prevent ongoing transmission of foodborne illness. A sanitarian from the City of St. Paul visited the restaurant on January 3, 2008 to evaluate food preparation and handling procedures. MDH staff interviewed restaurant employees regarding recent illness history and job duties. Credit card receipts from the meal date in question were obtained from the restaurant, but no additional patrons could be contacted.

After initiation of the investigation, on January 7 City of St. Paul and MDH staff were notified of an additional complaint of gastrointestinal illness from a function that received catered food from the same restaurant location on December 28. A list of attendees was provided to MDH staff; follow-up methods were identical to those described above.

Illness histories and exposure information were obtained from 21 patrons. Of these, 17 (81%) met the case definition. Of the 17 cases, 16 (94%) reported vomiting, 16 (94%) diarrhea, 14 (82%) cramps, 10 (63%) fever, and one (6%) bloody diarrhea. The median incubation period was 25 hours (range, 14.5 to 32.5 hours). The median duration of illness was 66.5 hours (range, 20.5 to 137 hours) for the 12 people who had recovered at the time of interview. All three stool samples (from the same complaint group) tested positive for norovirus genogroup II.

Cases from the first complaint group ordered sandwiches off the menu, while cases from the second group only had premade sandwiches available. No food item was statistically associated with illness, either within the separate groups or among all patrons.

Upon inspection of the restaurant, the sanitarian observed employees having bare-hand contact with ready-to-eat foods, as is the custom for most of the establishments in this chain of restaurants. The sanitarian discussed with restaurant staff the importance of handwashing for the prevention of norovirus. Additionally, the restaurant was informed that any employee with vomiting and/or diarrhea must be excluded from working for 72 hours after the resolution of symptoms.

Fourteen (88%) of 16 employees were interviewed by City of St. Paul and MDH staff; only one employee reported experiencing gastrointestinal symptoms during this time period. The employee was unclear of the exact onset date, and had reported at the time of contact that the symptoms of nausea, vomiting, and diarrhea had been present for about 2 weeks. This employee did not report working on the meal date in question. A stool kit was delivered to this employee, but it was not returned to the MDH PHL.

This was a foodborne outbreak of norovirus gastroenteritis associated with a St. Paul restaurant. A specific food vehicle was not identified; the paucity of controls prevented a meaningful statistical analysis. The ultimate source of the outbreak was not determined. However, the most plausible source was an infected food worker who had contact with one or more ready-to-eat food items. Bare-hand contact with ready-to-eat foods likely contributed to the outbreak.

(46)
Norovirus Gastroenteritis Associated with a Restaurant

December Hennepin County

On January 2, 2008, the Minnesota Department of Health (MDH) foodborne illness hotline received a complaint of illness among four members of a party of five that had eaten at a restaurant in Minneapolis, Minnesota on December 30, 2007. The party shared a sushi platter. In addition, the members of this party had several other shared meals, as well as household contact. At that time, the Minneapolis Division of Environmental Health (MDEH) gathered additional information from the facility; the facility had no other patron complaints of illness and reported that two employees had recently called in sick with a fever.

On January 4, 2008, MDH received a second complaint of illness from a party of two individuals from the same household that had eaten take-out from the restaurant on December 31. A full investigation was initiated by Hennepin County Public Health Protection (HCPHP) and MDEH.

On January 7, 2008, a third complaint was received by MDH. This complaint involved a party of four that had dined at the restaurant on December 31 and included a husband and wife who were both hospitalized overnight.

MDEH visited the facility on January 5, 2008, to conduct an environmental health assessment of the restaurant that focused on employee health and norovirus prevention education. Employee interviews were conducted to determine if any employees had been ill recently and to gather information about job duties.

A case was defined as a person who ate food from the restaurant since December 30, 2007, and subsequently became ill with vomiting and/or diarrhea (≥3 loose stools in a 24-hour period). Patrons were identified from the three complaints received by MDH as well as from credit card receipts. Stool specimen kits were delivered to three cases.

Eleven patrons were interviewed by either MDH or HCPHP epidemiologists. Ten of these persons were part of the three complaint groups. Only one patron was identified and interviewed through credit card receipts provided by the restaurant. Of the 11 interviewed patrons, nine met the case definition. Of the nine cases, eight (89%) reported diarrhea, five (56%) vomiting, five (56%) cramps, two (22%) fever, and one (11%) bloody diarrhea. The median incubation period was 30 hours (range, 24 to 42 hours). The median duration of illness was 32 hours (range, 24 to 72 hours). Two cases were hospitalized overnight. All three cases tested positive for norovirus. Viral sequencing on positive samples from individuals representing two different complaint groups yielded an identical nucleic acid sequence.

All cases had eaten various sushi rolls or raw fish; other foods eaten include miso soup, edamame, and beverages. Food-specific statistical analysis was limited by the lack of sufficient controls.

On January 2, MDEH contacted the facility regarding the complaint of alleged foodborne illness. The facility maintains an onsite employee illness log. There are a total of nine employees at the establishment. Two servers did call in sick on December 31; no other ill employees were reported. No calls from ill patrons had been received.

MDEH conducted a full inspection on Saturday, January 5, and also conducted employee interviews. All foods were delivered from approved sources; copies of invoices were collected. The inspection identified two minor violations (trash can impeding access to the hand sink, improper strengths of sanitizing solutions). Otherwise, the facility was in compliance with food safety regulations. Of the two employees that called in with illness on December 31, one reported several episodes of vomiting but felt that the episodes resulted from an over-indulgence in alcohol the night before. The second employee reported experiencing diarrhea on December 31. He had worked as a server during December 29-30; he did not report doing any direct food handling or food preparation.

This was an outbreak of norovirus gastroenteritis associated with eating at a restaurant. The outbreak was identified through the MDH foodborne illness hotline. No specific food vehicle was identified; sushi may have served as the vehicle, but this was not confirmed. Employee illness may have played a role in the transmission of norovirus to patrons, but this was not confirmed through the identification of ill food workers that contacted food during the implicated meal dates.

(47)
Norovirus Gastroenteritis Associated with Raw Oyster Consumption

December Sherburne County

On January 4, 2008, the Minnesota Department of Health (MDH) foodborne illness hotline received a complaint of gastrointestinal illness among two individuals from separate households who had attended a gathering at a private home on New Year's Eve. The complainants reported that they had consumed raw oysters purchased at a grocery store in Big Lake. The Minnesota Department of Agriculture (MDA) was notified, and an outbreak investigation was initiated.

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

Illness histories and exposure information were obtained from the four guests at the gathering. Two (50%) cases were identified. Both cases reported diarrhea, vomiting, cramps, and fever. The median duration of illness was 18 hours (range, 2 to 121 hours). Both stool samples tested positive for norovirus genogroup II. Nucleic acid sequencing was conducted on both of the positive norovirus samples; the nucleic acid sequences were identical.

Both cases reported eating raw oysters at the gathering; the two guests that did not become ill did not consume the oysters. The oysters were shucked raw oysters purchased in bulk from the grocery store in Big Lake. The complainants had no remaining product available, and the grocery store had also discarded all remaining oysters.

This was an outbreak of norovirus gastroenteritis associated with consumption of raw oysters at a private home. The oysters were most likely harvested from contaminated waters.

Probable Foodborne Outbreaks

(1)
Norovirus Gastroenteritis Probably Associated with a Restaurant

February Hennepin County

On February 28, 2007, the City of Brooklyn Park Code Enforcement and Public Health Division (CEPH) and the Minnesota Department of Health (MDH) received a report of illness among a group of seven people who went to the a restaurant in Brooklyn Park, Minnesota on February 25. According to the complainant, only four of the seven ate at the restaurant, and only these four became ill. An investigation was initiated.

MDH interviewed members of the complainant group by phone about illness history, food consumption at the restaurant, and other possible recent common exposures. Credit card receipts from the restaurant did not have names, so additional patrons could not be interviewed. 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. Stool kits were provided to four people; three were returned to MDH for testing.

CEPH inspected the restaurant and interviewed employees. The only employee who was not interviewed worked only 1 day during the previous 2 week period (on February 18).

Six of the seven members of the complainant group were interviewed, and four (57%) met the case definition. All four cases had vomiting, abdominal cramps, and low-grade fever, and two (50%) had diarrhea. None of the cases reported bloody stools. The median incubation period was 36.5 hours (range, 30 to 44 hours). The durations of illness were 18 hours and 37 hours, respectively, for the two cases who had recovered at the time of interview. All three stool samples that were submitted to MDH were positive for norovirus.

Three cases had soft shell tacos. One case also had a crunch wrap supreme and cheese fiesta potatoes. One case had chalupas. Three cases had pop with ice. Of the two non-ill members of the group who were interviewed, one had cinnamon twists and pop with ice, and the other did not consume anything.

Interviews with members of the group revealed that they had also attended a large church group function with approximately 80 people that same evening. The church Youth Program director indicated that pop and cookies were served at this function. One of the complainant group members reported that ice cream was served at the function, but this was not confirmed. All of the cases denied eating anything at the church function.

On inspection of the restaurant by CEPH on February 28, the restaurant stated that no other foodborne illness complaints were received. No employees reported being ill with vomiting or diarrhea within the past 2 weeks. Overall sanitation was good. The facility and operation appeared in general compliance with food and beverage regulations. Both hand sinks were operational and stocked with soap, hand sanitizer, single service towels and a fingernail brush.

Employees were observed washing their hands, and proper procedures were followed. A Food Safety Review Check List is filled out at the restaurant three times per day. Food safety issues are addressed; these include the manager on duty observing whether sick employees are present, and if proper handwashing procedures are followed. The items are checked off if in compliance. Completion of the checklist for those two items on the February 25 form was verified. A fact sheet was found taped next to hand sink stating "Are you good to go?" It includes symptoms and communicable diseases that would preclude workers from working while ill. It is written in both English and Spanish. Finally, the hot food temperatures were all above 140º F and the cold holding units were maintained at less than 41° F.

Employee interviews conducted by CEPF also indicated that none of the employees reported being ill with gastrointestinal symptoms during the past 2 weeks. One employee stated that his child was ill with vomiting and fever for about 24 hours; the employee could not remember if the child's illness was 1 or 2 weeks prior. The employee also didn't feel well; however, he did not have any gastrointestinal illness symptoms. He worked on Thursday, February 22 but did not work again until February 27.

This was an outbreak of norovirus gastroenteritis among a group that ate at a restaurant in Brooklyn Park, Minnesota. However, the restaurant was not confirmed as the source of the illnesses. Person-to-person or foodborne transmission at the church youth event could not be ruled out.

(2)

Salmonella Muenchen Infections Probably Associated with a Commercial Product

April-May Multiple counties/Multiple states

On May 16, 2007, the Minnesota Department of Health Public Health Laboratory identified a cluster of four *Salmonella* Muenchen isolates with indistinguishable pulsed-field gel electrophoresis (PFGE) patterns (subtype designated SMU76). An investigation was initiated on May 16.

All Minnesota cases were interviewed with a standard questionnaire and were re-interviewed regarding suspicious exposures identified during interviews of subsequent cases. Other states and the Centers for Disease Control and Prevention (CDC) conducted hypothesis-generating interviews with cases throughout May and early June.

Nationally, 183 cases of *Salmonella* Muenchen with PFGE subtype SMU76 were identified in 19 states with illness onsets ranging from April 1 to May 25, peaking on May 5. The median age of the cases was 40 years (range, 1 to 81 years) and 58% were female. A total of 14 cases were identified among Minnesota residents. Illness onsets for the Minnesota cases ranged from May 4 to May 18. The median age of the cases was 46 years (range, 22 to 81 years) and eight (57%) were female. All cases reported diarrhea, 11 (79%) fever, and four (29%) bloody stool. Five (39%) cases were hospitalized, for a median of 8 days (range, 6 to 16 days).

On June 27, the CDC closed the investigation without identifying a source of infection.

This was a probable foodborne outbreak of *Salmonella* Muenchen. Even though a specific food vehicle was not identified, it is likely that only a commercially distributed food item could explain such a large, widespread outbreak.

(3)
Suspected Foodborne Bacterial Intoxications Probably Associated with a Restaurant

May Hennepin County

On May 25, 2007, the Minnesota Department of Health (MDH) foodborne illness hotline received a complaint of illness in two individuals who ate together at a restaurant in Minneapolis, Minnesota on May 24. The two individuals did not report any other common exposures. The Minneapolis Division of Environmental Health was notified of the complaint and an investigation was initiated on May 25.

MDH interviewed the two individuals by phone about illness history, food consumption, and other possible recent exposures. 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 kits were provided to both individuals, and both were returned to MDH for testing.

Minneapolis Environmental Health conducted an inspection of the restaurant on May 26 and inquired about ill employees and other patron complaints. Credit card receipts were not obtained from the restaurant.

Both members of the complainant group met the case definition. The cases ate at 9:00 p.m. on May 24. The incubation periods for the cases were 2.5 and 13 hours, respectively. Both cases had diarrhea (beginning 11 and 13 hours after eating at the restaurant, respectively), cramps, and nausea. Neither case reported vomiting or fever. Both cases reported ongoing illness at the time of interview. The two cases shared an entrée at the restaurant, and no other orders of that same entrée were served that evening at the restaurant. The entrée was seared tuna (partially cooked) which was prepared to order and served on top of a mixed green salad with dressing. The entrée was served with miso soup and rice.

The stool samples provided by the cases were negative for *Salmonella*, *E. coli* O157:H7, *Campylobacter*, *Shigella*, *Yersinia,* and norovirus. The samples were also negative for toxin-producing bacteria and toxins. However, too much time may have elapsed between onset of illness and the collection date to have allowed detection of toxins or toxin-producing bacteria.

The inspection that was conducted by Minneapolis Environmental Health found no temperature violations with the food items that were consumed by the two cases. The inspector verified the shipping records for the fish, and no freezing records were necessary to serve the partially cooked fish because of the species (Yellowfin Tuna). No other patron complaints or ill employees were reported by the facility.

This was an outbreak of gastroenteritis possibly associated with a restaurant in Minneapolis, Minnesota. The epidemiologic and clinical characteristics of the cases were consistent with

foodborne bacterial intoxications caused by *Clostridium perfringens* or the diarrheal form of *Bacillus cereus.* However, laboratory testing was not able to confirm this. It is possible that temperature abuse occurred with the tuna that was consumed, but this was not verified through the facility inspection.

(4)
Norovirus Gastroenteritis Probably Associated with a Restaurant

May Crow Wing County

On May 30, 2007, the Minnesota Department of Health (MDH) foodborne illness hotline received an illness complaint about a restaurant in Baxter, Minnesota. The complainant stated that three individuals from separate households had eaten at the restaurant on the evening of May 24, and two later became ill with gastrointestinal symptoms. The ill complainants reported no other common meals or events. MDH initiated an investigation on May 30.

MDH staff interviewed the complainants and food workers at the restaurant about food consumption and illness history. A case was defined as a person with vomiting or diarrhea (≥3 loose stools in a 24-hour period) after the meal. Stool samples were collected from the two ill complainants and submitted to the MDH Public Health Laboratory for bacterial and viral testing. One food worker who reported vomiting and diarrhea in the same time period also submitted a stool specimen. Credit card receipts were obtained from May 23, 24 and 25, and MDH staff attempted to interview additional patrons.

Phone interviews were completed for eight patrons contacted via credit card receipts; three ate at the restaurant on May 23, three on May 24, and two on May 25. Three restaurant patrons, including both members of the original complainant group, met the case definition. One of these patrons, however, was not included in analysis due to the inability to rule out secondary transmission from a family member who had developed similar symptoms prior to eating at the restaurant. The two cases that were included in the analysis reported consuming quesadillas, enchiladas, chips and salsa, garlic mashed potatoes, and margaritas. The garlic mashed potatoes and chips and salsa were shared between the cases.

The median incubation period was 33 hours (range, 32 to 34 hours). Both cases reported vomiting, diarrhea, and fever. Neither case reported bloody stools or was hospitalized. Illness duration was only available for one case and was reported as 81 hours. One case tested positive for norovirus. Bacterial results were negative for both samples.

Consumption of garlic mashed potatoes was significantly associated with illness (2 of 2 cases vs. 0 of 8 controls; odds ratio, undefined; $p = 0.02$); however, five of the controls had meal dates on May 23 or May 25 while the two cases dined at the restaurant on May 24.

Interviews were completed for 61 of 63 (97%) restaurant employees. One food worker reported nausea and vomiting with onset on May 26. A stool specimen was collected from this food worker and was negative for viral and bacterial pathogens. No employees reported illness in the week prior to the meal date in question.

This was a probable foodborne outbreak of norovirus gastroenteritis associated with a restaurant. The fact that the ill persons were from two separate households and denied any other common meals suggests a link to the restaurant. In speaking with restaurant employees, there was information indicating that multiple employees may have been ill; however, this was not confirmed. The source of contamination and mode of transmission could not be determined.

(5)
Norovirus Gastroenteritis Probably Associated with a Restaurant

June Winona County

On June 20, 2007, the Minnesota Department of Health (MDH) foodborne illness hotline received an illness complaint about two restaurants in Winona, Minnesota. Upon following up with the two restaurants, Winona County Environmental Health learned about illness in multiple food workers at one of the restaurants. The complainant stated that they ate alone at this restaurant on the evening of June 16, and later became ill with gastrointestinal symptoms. MDH and Winona County initiated an investigation on June 21.

MDH and Winona County staff interviewed the complainant and food workers at the restaurant about food consumption and illness history. A case was defined as a person with vomiting and/or diarrhea (≥3 loose stools in a 24-hour period) within 60 hours of eating at the restaurant. Credit card receipts were obtained from the restaurant for June 15 to 18, and MDH staff attempted to interview additional patrons. Stool samples were not collected from ill patrons, but stool samples were collected from three ill food workers and submitted to the MDH Public Health Laboratory for bacterial and viral testing.

Phone interviews were completed for 21 patrons contacted through credit card receipts. Four patrons who were interviewed ate at the restaurant on June 15, eight ate on June 16, six ate on June 17, and three ate on June 18. Three restaurant patrons, including the original complainant, met the case definition. Four patrons reported gastrointestinal illness symptoms, but did not meet the case definition.

All three cases reported diarrhea, 2 (100%) of 2 reported cramps, 1 (33%) of 3 reported vomiting, none reported fever, and none were hospitalized. The median incubation period for cases was 15 hours (range, 11 to 32 hours). Illness duration information was available for two of the cases. Duration of illness was 52 and 55 hours, respectively. The meal dates for the three cases were June 15, June 16 and June 17. No food items were significantly associated with illness.

Interviews were completed for all restaurant employees. Five employees reported being ill with vomiting and/or diarrhea between June 10 and June 21. Two of the three stool specimens collected from food workers were positive for norovirus. Two food workers reported illness in the week prior to the cases' meal dates; however, one was on vacation during that time period and was not working at the restaurant. The other food worker reported being ill with diarrhea on June 10 and June 11, and also reported working at the restaurant during that time period and preparing food.

This was a probable foodborne outbreak of norovirus gastroenteritis associated with a restaurant in Winona, Minnesota. The fact that multiple patrons and employees were ill with symptoms consistent with norovirus indicates that some transmission probably occurred at the restaurant. However, virus genotypes between employees and patrons could not be compared since stool specimens were not received from ill patrons. Also, incubation periods among the patrons varied, indicating that transmission by some other means may have been taking place in the community.

(6)
Gastroenteritis Probably Associated with a Restaurant

June Hennepin County

On June 20, 2007, the Minneapolis Division of Environmental Health (MDEH) received a report of possible foodborne illness from the chef at a restaurant in Minneapolis, Minnesota. The restaurant had received a complaint from the organizer of a business dinner party held on June 18. The initial report indicated that eight out of a party of 38 were ill. MDEH notified Hennepin County Public Health Protection – Epidemiology (HCPHP) and the Minnesota Department of Health (MDH), and an outbreak investigation was initiated.

A list of party attendees that reported having illness was requested. Attendees were interviewed about food/beverage consumption and illness histories using a standard questionnaire. A case was defined as a party attendee who subsequently developed vomiting and/or diarrhea ($\geq$3 loose stools in a 24-hour period). Two stool sample collection kits were delivered to ill party attendees; however, no specimens were returned to the MDH Public Health Laboratory.

MDEH conducted an inspection of the facility. A list of food items served at the implicated meal was obtained.

Illness histories and exposure information were obtained from seven party attendees. Three (43%) cases were identified. Of the three cases, all reported diarrhea, two (67%) nausea, two (67%) fever/chills, and one (33%) cramps. The median incubation period was 9 hours (range, 3 to 12 hours). The median duration of illness was 36 hours (range, 24 to 48 hours).

Attendees reported eating a variety of foods: several appetizers, salad, several main courses, mashed potatoes, seasoned vegetables, and several desserts. Due to the limited number of patrons that were interviewed, no food-specific analysis was performed. Attendees reported no other shared meals.

During an onsite inspection of the restaurant, no critical violations were identified, and the restaurant was in compliance with food safety regulations. The restaurant described preparation methods for the food items served at the dinner, as well as provided information regarding the suppliers of the food items. No employees had reported any illness, and the restaurant had not received any other complaints of patron illness.

This was a probable foodborne outbreak associated with a business dinner party at a restaurant in Minneapolis. Neither a pathogen nor a vehicle of infection was identified. Clinical characteristics of the reported illnesses were not entirely consistent with common foodborne illnesses that could

have been due to exposure at the restaurant. There was not enough evidence to confirm that food at the restaurant was the source of the illnesses.

(7)
Suspected Viral Gastroenteritis Probably Associated with a Restaurant

July Hennepin County

On July 31, 2007, the Minnesota Department of Health (MDH) foodborne illness hotline received a complaint about a restaurant in Minneapolis, Minnesota. The complainant reported that four of five complainants from four different households became ill after consuming dinner at the restaurant on July 24. Hennepin County Public Health Protection - Epidemiology (HC Epi) and Minneapolis Environmental Health (MEH) were notified of the complaint and an investigation was initiated.

On August 1, 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 July 24 and subsequently became ill with vomiting and/or diarrhea (≥3 loose stools in 24-hour period).

An MEH environmentalist visited the restaurant on August 1 to evaluate food preparation and handling procedures. Restaurant employees were interviewed regarding any gastrointestinal symptoms experienced, food consumption, and job duties performed from July 17 to July 24. A list of 23 patrons who dined at the restaurant on July 24 and had paid for their meal using a credit card was supplied by the restaurant. The original complainants and credit card patrons were interviewed about their food consumption and illness histories using a standard questionnaire. A stool kit was sent to one patron but no specimen was submitted to MDH for bacterial and viral testing.

Illness histories and exposure information were obtained from 12 patrons. Of the 12 people interviewed, only the four (33%) original complainants met the case definition. All four cases had diarrhea, three (75%) vomiting, two (50%) cramps, and two (50%) fever. The median incubation period was 24.5 hours (range, 7 to 31.5 hours). The median duration of diarrhea was 18 hours (range, 5 to 52 hours).

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 tacos (pork, steak, beef, chicken) with toppings of onions, cilantro, lettuce, cheese, chips, salsa, and guacamole. Controls ate combination of tacos with onion, cilantro, cheese, chips, salsa, guacamole, and chicken enchiladas.

Seven of nine employees were interviewed; none of the employees reported any recent gastrointestinal illness symptoms. The food manager spoke with all the employees about the importance of not working ill.

On July 31, 2007, an MEH Code Compliance Officer inspected the restaurant and discussed the complaint with the person in charge. There were no ill employees and no entries in the employee

illness log. The hand sinks were found stocked with soap, towel and nailbrush during the inspection. The establishment serves two kinds of tacos, including one with onions and cilantro and the other with lettuce, tomatoes, cheese, refried beans, and rice. The cook stated they made refried beans and rice daily, but refried beans were found at 43-45° F in the walk-in cooler that had been made 2 days earlier and stored in a 1-2 gallon container. These beans were discarded on-site. Rice was being made during the inspection. The establishment also makes its own salsa weekly (3 gallon batches); the salsa is reheated each day and served hot.

This was a probable outbreak of suspected viral gastroenteritis associated with a restaurant in Minneapolis. The vehicle was not determined. There were many cold food items that were served with the tacos (cilantro, lettuce, onions, tomatoes, cheese, and guacamole) that could have been contaminated by a recently ill food worker. However, there was no evidence of this identified in the environmental health investigation.

(8)
Norovirus Gastroenteritis Probably Associated with a Restaurant

October Ramsey County

On October 5, 2007, the Minnesota Department of Health (MDH) foodborne illness hotline received a call reporting suspected foodborne illness resulting from a meal at a restaurant in St. Paul, Minnesota. The complainant stated that two individuals from two separate households became ill after eating at this restaurant on September 30, and that there were no other common recent events or meals between the ill meal companions. City of St. Paul Environmental Health staff were notified and an investigation was initiated.

MDH interviewed the complainants about food consumption and illness history. A sanitarian from the City of St. Paul interviewed all the food workers at the restaurant. A case was defined as a person with vomiting and/or diarrhea (≥3 loose stools in a 24-hour period) after eating at the restaurant. Credit card receipts were not made available to MDH. Stool samples were collected from the ill complainants and submitted to the MDH Public Health Laboratory for bacterial and viral testing. A sanitarian from City of St. Paul inspected the restaurant, focusing on employee illness.

Since credit card receipts were not made available to MDH, only the two original complainants were interviewed; both individuals met the case definition. Both cases had diarrhea and cramps, one vomiting, and one fever. The median incubation period was 32 hours (range, 26 to 38 hours). The median duration of illness was 45 hours (range, 39 to 51 hours). Two stool samples were submitted by the cases; both tested positive for norovirus.

Cases reported eating muffins, Florentine chicken strata, potatoes, hollandaise sauce, and fresh fruit; food was shared between the two cases.

No restaurant employees reported gastrointestinal illness. There were no critical items noted in the inspection. Education about norovirus, the importance of reporting illness to management, and excluding ill food workers from handling food were emphasized. There was also a focus on handwashing education.

This was a probable foodborne outbreak of norovirus gastroenteritis associated with a restaurant in St. Paul, Minnesota. The vehicle of transmission and source of contamination was not identified. Prevention measures were taken at the restaurant, including handwashing education.

(9)
Suspected Norovirus Gastroenteritis Probably Associated with a Restaurant

November Dakota County

On November 27, 2007, the Minnesota Department of Health (MDH) foodborne illness hotline received an illness complaint about a restaurant in Apple Valley, Minnesota. Two individuals stated they ate at the restaurant during the evening on November 15 and later became ill with gastrointestinal symptoms. Both complainants reported eating a hamburger with lettuce and onions, fries, and a glass of beer. The complainants were not related and had no other recent meals or events in common. The MDH sanitarian contacted the restaurant to inquire about employee illness and other patron complaints, and then conducted a complete inspection on November 30.

The complainants reported symptoms of vomiting, diarrhea, and cramps beginning 28 and 29.5 hours, respectively, after the meal consumption. The restaurant did not receive any other complaints of illness. No employees reported gastrointestinal illness. The employee illness log indicated that one of the bar staff had called in sick on November 9, but symptom information was not available. Relevant inspection violations included improper equipment sanitizing frequency, improper handwashing, and improper glove use.

This was a probable foodborne outbreak associated with a restaurant in Apple Valley, Minnesota. The fact that two patrons with no other potential exposures in common were ill with symptoms and incubation periods consistent with norovirus suggested that the restaurant was the likely source of the illness. However, this could not be confirmed, in part due to the delay in reporting of the illnesses.

(10)
Suspected Norovirus Gastroenteritis Probably Associated with a Restaurant

December Hennepin County

On December 3, 2007, the Minnesota Department of Health (MDH) foodborne illness hotline received a complaint of gastrointestinal illness among a group of three people that had eaten lunch at a restaurant in Long Lake, Minnesota on November 28. After interviewing all three people in the party on December 3, MDH notified the Hennepin County Public Health Department (HSPHD) epidemiology and environmental health units, and an investigation was initiated.

MDH staff interviewed the three members of the complaint group about illness history and food consumption at the restaurant. A case was defined as a person who ate at the restaurant on

November 28 and subsequently became ill with vomiting and/or diarrhea (≥3 loose stools in a 24-hour period).

On December 4, HSPHD sanitarians inspected the restaurant and interviewed employees about illness history and work duties. The environmental health assessment of the restaurant focused on employee illness, flow of food, food preparation, and food storage procedures.

The three complainants had no other common meal exposures except for their lunch meal at the restaurant in Long Lake. All three persons in the complaint met the case definition and reported diarrhea and cramps; two (67%) of the cases reported vomiting. Incubations were 34, 37, and 40 hours. Duration of illness was 75 hours for one of the complainants; the other two cases were still experiencing symptoms at the time of interview. None of the cases submitted stool samples.

All three ill patrons ate a crispy chicken sandwich (with lettuce, tomato, and mayo) with French fries, soda, and ice.

HSPHD staff contacted restaurant management via telephone on December 3. The restaurant had not received any other reports of patron illness and did not have any employees who were currently ill. HSPHD sanitarians inspected the restaurant on December 4 and began interviewing employees.

Of 14 total employees, nine (64%) were interviewed and none reported any gastrointestinal symptoms between November 25 and December 1, 2007; however, one employee reported that a 1-year-old child in her household vomited on November 27 and had diarrhea on November 28. This particular employee worked in the "special board" area at the restaurant on the implicated meal date and was preparing chicken sandwiches; she denied having any symptoms of vomiting or diarrhea and did not subsequently become ill according to the manager.

The HSPHD sanitarians noted overall compliance with food code requirements for food preparation; however, they did observe one incident of bare-hand contact with a ready-to-eat food. The sanitarians 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 and had no subsequent employee illness.

This was a probable foodborne outbreak of gastroenteritis among a group who ate at a restaurant in Long Lake. The etiology was not confirmed, but the distribution of incubations and symptoms was characteristic of norovirus gastroenteritis. A food worker who had an ill family member was a plausible source of contamination, but this was not confirmed through laboratory testing.

(11)
Suspected Bacterial Intoxications Probably Associated with a Restaurant

December Ramsey County

On December 10, 2007, the Minnesota Department of Health (MDH) foodborne illness online complaint system received an email reporting suspected foodborne illness resulting from a meal at a restaurant in St. Paul, Minnesota. The complainant stated that seven of 15 individuals from separate households became ill after eating at this restaurant on December 8, and that there were no other common recent events or meals between the ill meal companions. Foods consumed during this meal included artichoke dip, a fried walleye appetizer, cheese bread, fettuccini alfredo, hamburgers, salads, and rolls. City of St. Paul Environmental Health staff were notified and an investigation was initiated.

The original complainant provided MDH staff with names and contact numbers for the 15 individuals who dined together on December 8. Persons in the party were interviewed about food consumption and illness history. A case was defined as a person who ate at the restaurant on December 8 and subsequently developed vomiting and/or diarrhea (≥3 loose stools in a 24-hour period). Persons meeting the case definition were asked to submit stool samples to MDH Public Health Laboratory (PHL) for bacterial, viral, and toxin testing. A sanitarian from City of St. Paul inspected the restaurant, focusing on food preparation and storage practices.

Of the 15 individuals who attended this meal, four (27%) met the case definition. Six additional people reported gastrointestinal symptoms but did not meet the case definition, and thus were excluded from further analysis.

All four cases reported diarrhea and cramps, and two (50%) vomiting. None of the cases had fever or bloody stools. The median incubation period was 3.5 hours (range, 1 to 5 hours). The median duration of illness was 57 hours (range, 35 to 79 hours) for the two cases who had recovered at the time of interview. No stool samples were submitted by the cases.

Cases reported eating a variety of appetizers and entrees, and food was shared between multiple attendees. No food item was statistically associated with illness.

The sanitarian questioned restaurant staff on food preparation and storage procedures for two of the foods served at this meal (the fried walleye appetizer and artichoke dip). The cooling and reheating procedures described by the staff were satisfactory. The sanitarian discussed with restaurant staff the importance of proper storage and food handling techniques in the prevention of foodborne illness.

This was a probable outbreak of foodborne illness associated with a restaurant in St. Paul. Neither a pathogen nor a vehicle of infection was identified. The distribution of symptoms, incubation periods, and durations was most compatible with foodborne intoxication; however, these parameters were not typical of those associated with any single, recognized cause of foodborne intoxications. There was not enough evidence to confirm that food at the restaurant was the source of the illnesses.

(12)
Gastroenteritis Probably Associated with a Restaurant

December Hennepin County

On December 26, 2007, the Minnesota Department of Health (MDH) received an illness complaint from a member of a group of 16 people who had eaten at a restaurant in Bloomington (Restaurant A) on the evening of December 22. Group members ate a variety of items from the menu and the salad bar. The group later gathered at a private residence where they ate an ice cream cake purchased from a restaurant in Richfield (Restaurant B), as well as a homemade cake. Nine of the group members later became ill with various symptoms including diarrhea, vomiting, nausea, and fever. MDH and the City of Bloomington Environmental Health (CBEH) initiated an outbreak investigation on December 26.

MDH staff interviewed members of the party with an open-ended questionnaire to assess illness and food consumption histories. A case was defined as a member of the party who experienced vomiting and/or diarrhea (≥3 loose stools in a 24-hour period) following the meals on December 22. Stool kits were delivered to two cases, and both were returned to the MDH Public Health Laboratory for bacterial and viral testing. CBEH staff conducted an inspection of Restaurant A on December 28 which focused on employee hygiene, food handling, and equipment sanitation. CBEH also interviewed facility staff to assess work schedules and illness histories. In addition, CBEH assessed food worker illness histories and ice cream cake preparation practices at the Restaurant B.

Seven (44%) of 16 party members interviewed met the case definition. Two party members reported gastrointestinal symptoms but did not meet the case definition and therefore were excluded from further analysis. Four (57%) cases were female. Three (43%) cases were 5 to 19 years of age, two (29%) were 20 to 49 years of age, and two (29%) were ≥ 50 years of age. The median incubation period was 55 hours (range, 50-66 hours). Duration of illness information was available for two cases (the other five cases had ongoing illness at the time of interview); the durations of illness for the two cases were 9.5 hours and 36 hours, respectively. Five (71%) cases reported vomiting, five (71%) reported diarrhea, four (57%) reported cramps, and three of six (50%) reported fever. No cases reported bloody stools or were hospitalized.

Twenty-three Restaurant A staff members were interviewed and none reported illness on the meal date or for the 6 days prior. The environmental health investigation revealed no risk factors or critical violations out of compliance.

Both stool samples tested negative for bacteria (*Salmonella*, *Shigella*, *Campylobacter*, *E. coli* O157:H7, and *Vibrio*) and viruses (norovirus, astrovirus, hepatitis A, rotavirus, and adenovirus). One of the samples tested positive for two *E. coli* virulence factors by PCR, eaeA and Eagg. By univariate analysis no food items consumed on December 22 were associated with illness.

This was a probable foodborne outbreak of gastroenteritis. The causative agent was not confirmed. The source of contamination and vehicle of transmission were not identified. None of the food items consumed at Restaurant A or at the private residence on December 22 were confirmed as the source of illness.

Confirmed Waterborne Outbreaks

(1)
Cryptosporidiosis Associated with a Pool

July Goodhue County

On July 26, 2007, the Minnesota Department of Health (MDH) Acute Disease Investigation and Control Section received a call from the manager of a fitness center in Red Wing, Minnesota, reporting four illnesses among attendees of a children's day camp. Most of the camp activities took place at a local park, and included arts and crafts and science-based projects. No animal contact took place during camp activities. As part of the camp, the children also swam daily in the recreational pool at the fitness center. There are two other pool facilities at the fitness center, a lap pool and a hot tub. The fitness center voluntarily closed and super chlorinated all pool facilities on July 26. An outbreak investigation was initiated on July 26 in collaboration with Goodhue County Environmental Health.

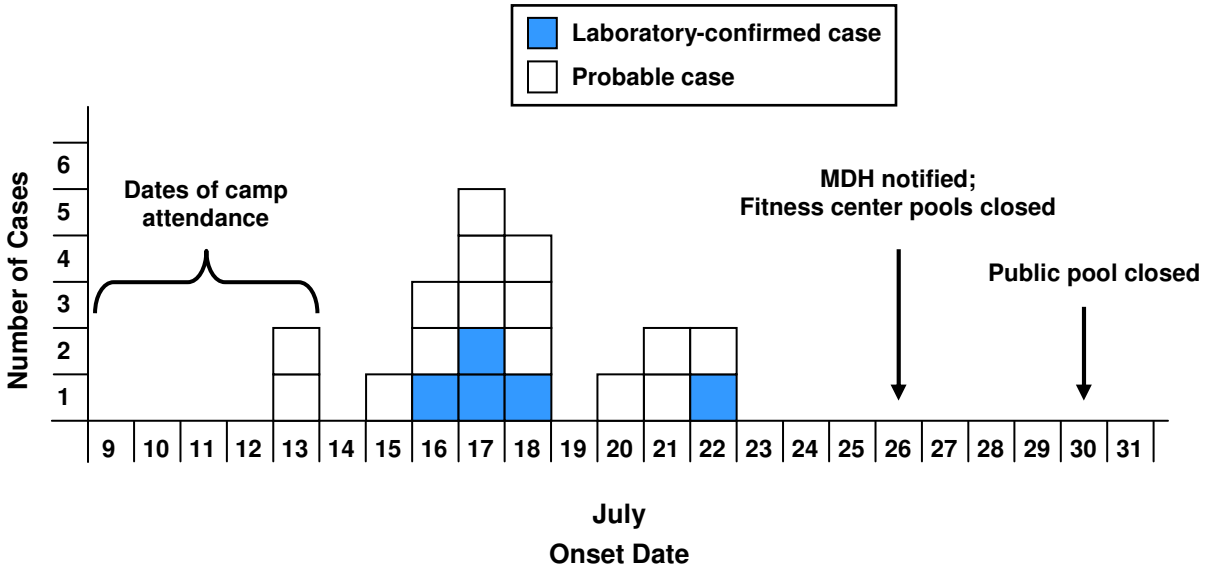
Contact information for all day camp attendees and fitness center staff was provided to MDH by the fitness center. MDH staff interviewed camp attendees and fitness center staff about their illness and exposure histories. Cases of cryptosporidiosis from the Red Wing area that came through routine surveillance were also interviewed to determine if they had exposure to the pools at the fitness center.

A case was defined as a Red Wing fitness center pool user with laboratory-confirmed *Cryptosporidium* infection (confirmed case), or diarrhea for at least 3 days duration (probable case). Diarrhea was defined as three or more loose stools in a 24-hour period.

Illness histories and exposure information were obtained from 48 people, including 35 day camp attendees and 13 fitness center staff. Twenty cases were identified, including five cases with a stool specimen that tested positive for *Cryptosporidium*. Four people reported gastrointestinal illness symptoms but did not meet the case definition, and thus were excluded from further analysis. Four positive specimens were received by the MDH Public Health Laboratory, and *Cryptosporidium parvum* was identified in all four. Molecular subtyping was successful for four positive specimens, all of which were identified as *parvum* subtype BGP5.

One of the cases was a fitness center staff member who was not involved with the day camp, but did have contact with the pools. The other 19 cases, including all five confirmed cases, were day camp attendees. Twelve (60%) of the cases were female. The median age of the cases was 7 years (95% of the cases were age 10 years or younger). All 20 cases reported diarrhea and abdominal cramps, nine (53%) of 17 fever, four (20%) of 20 vomiting, and one (5%) of 19 bloody diarrhea. Two cases reported being seen in an emergency room, but no cases were hospitalized. Illness onset dates ranged from July 13 to July 22 (see epidemic curve). The median duration of illness was 6.5 days (range, 3 to 10 days).

Cryptosporidiosis Cases Associated with a Pool, by Illness Onset Date



All pools at the fitness center were reopened on July 31. All fitness center staff members were instructed not to re-enter the pools for 2 weeks following resolution of symptoms. Goodhue County also provided sign-in sheets, cryptosporidiosis fact sheets, and posted signs to prevent patrons from re-entering the pools for 2 weeks following illness. Goodhue County circulated a health alert to doctors and clinics in the area to provide information about cryptosporidiosis symptoms, treatment, and prevention.

Review of the pool logs for all three pools at the fitness center indicated that both the lap pool and the recreational pool were within state regulatory limits for pH and free chlorine levels from July 1 until the day they were closed. The lowest free chlorine level (1.0 ppm) measured during that time period occurred on July 10, the second day of camp. The hot tub was within state regulatory limits for free chlorine during the same time period; however, the pH exceeded the upper regulatory limit on 5 separate days. The pool records did not indicate the level of combined chlorine or the turnover rate in the pools and hot tub during this time period.

Swimming in the recreational pool was not statistically associated with illness, as very few people interviewed did not swim in the pool. Only one case reported that they did not swim in the recreational pool (but did swim in the lap pool).

During the epidemiologic investigation, one case reported swimming in a public pool in Red Wing area while experiencing diarrhea. Other children exposed to the fitness center pool also likely swam in this public pool; therefore, the public pool was closed and super chlorinated on July 30. It reopened August 1.

This was an outbreak of cryptosporidiosis associated with a fitness center in Red Wing, Minnesota. The most plausible source of the outbreak was the recreational pool at the fitness

center. Although the original source of contamination was not identified, an infectious swimmer likely introduced the parasite into the pool.

(2)
Cryptosporidiosis Associated with a Hotel Water Park

September Wright County

On October 8, 2007, the Minnesota Department of Health (MDH) Environmental Health division received a phone call from a guest who had stayed at a hotel in Otsego, Minnesota on September 22 and 23. The caller reported her child had been diagnosed with *Cryptosporidium* and believed they had been exposed at the hotel water park. The caller also reported that three other members from their party, including one from a separate household, also had symptoms consistent with cryptosporidiosis. When the hotel was contacted, it was discovered that on the evening of September 22 there had been two accidents in the water park. At 6:30 p.m. there was a fecal accident in the lazy river; the water park was closed and 12 gallons of liquid chlorine were added for an hour before adding De-Chlor at 7:40 p.m. The water park reopened at 7:55 p.m. A vomiting accident then occurred in the wading pool at 9:15 p.m., at which time the water park was closed for the remainder of the evening and super-chlorinated overnight. The water park reopened September 23 at 8 a.m. The MDH Acute Disease Investigation and Control Section was contacted, and an outbreak investigation was initiated.

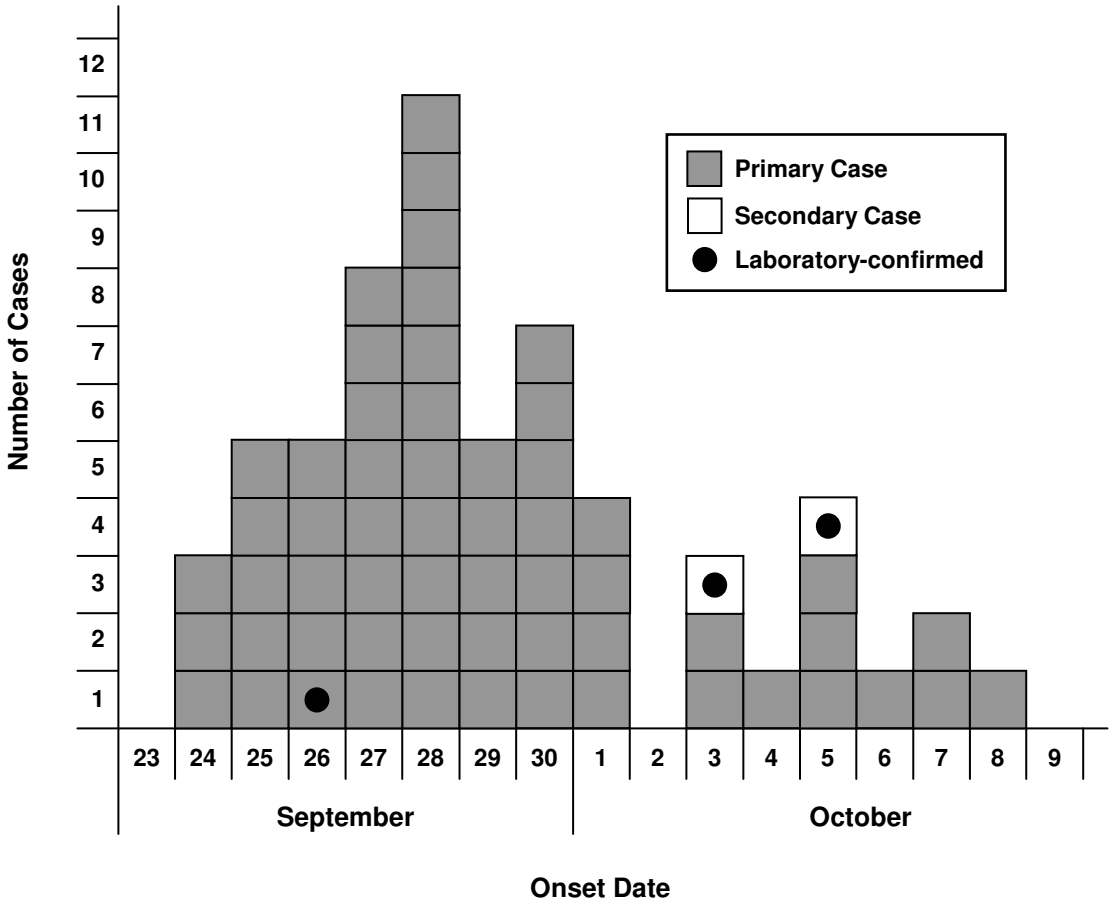
A list of names and phone numbers of hotel guests from September 22 and 23 was obtained from the hotel. Names of additional water park users from September 22 and 23 were also obtained from credit card receipts and birthday party reservation lists. Epidemiologists from MDH interviewed hotel guests and water park users to obtain information on water park usage and illness history. A primary case was defined as a water park user who subsequently developed either a laboratory-confirmed *Cryptosporidium* infection or diarrhea ($\geq$3 loose stools in a 24-hour period) or vomiting lasting 3 or more days. A secondary case was defined as a laboratory-confirmed *Cryptosporidium* infection or diarrhea or vomiting of at least 3 days duration in a household member of a primary case.

On Tuesday, October 9, all three pools at the water park complex were superchlorinated at 20 ppm for 24 hours. The water park is not regularly open Monday morning through Thursday afternoon during the school year.

Illness histories and exposure information were obtained from 116 water park guests. Fifty-eight primary cases were identified, including one with a stool specimen that tested positive for *Cryptosporidium*. Two secondary cases were also identified, both laboratory confirmed. Twelve guests reported illness but did not meet the case definition, and thus were excluded from further analysis. Three positive specimens were received by the MDH Public Health Laboratory, and *Cryptosporidium hominis* was identified in all three. Subtyping was successful on two of the specimens (both from secondary cases); one specimen was identified as HGP4 and the other as HGP16.

Of the 58 primary cases, 53 (91%) reported diarrhea, 50 (88%) of 57 cramps, 26 (46%) of 57 vomiting, 18 (32%) of 56 fever, and 13 (27%) of 48 weight loss. The median incubation period was 6 days (range, 2 to 16 days) (see epidemic curve). The median duration of illness was 5 days (range, 3 to 17 days) for the 17 cases who had recovered at the time of interview. Six (10%) of the 58 primary cases sought medical care from their health care provider. Three (50%) of the six health care providers requested a stool specimen. Two (67%) of the three patients submitted a stool sample.

Cryptosporidiosis Cases Associated with a Hotel Water Park, by Illness Onset Date



Going in any of the water park pools on September 22 was significantly associated with illness (55 of 58 cases vs. 31 of 44 controls; odds ratio [OR], 7.7; 95% confidence interval [CI], 1.8 to 37.6; $p < 0.001$). Both the wading pool (53 of 57 cases vs. 25 of 45 controls; OR, 10.6; 95% CI, 2.9 to 41.8; $p < 0.001$) and the lazy river pool (53 of 58 cases vs. 24 of 44 controls; OR, 8.8; 95% CI, 2.7 to 31.1; $p < 0.001$) were significantly associated with illness. Going in the hot tub was not statistically associated with illness. Getting one's face wet (54 of 58 cases vs. 26 of 46 controls; OR, 10.4; 95% CI, 2.9 to 40.8; $p < 0.001$) and swallowing water (42 of 52 cases vs. 10 of 45 controls; OR, 14.7; 95% CI, 4.9 to 45.6; $p < 0.001$) were significantly associated with illness.

On September 23, going in the wading pool (35 of 58 cases vs. 12 of 46 controls; OR, 4.3; 95% CI, 1.7 to 11.1; $p < 0.001$), getting one's face wet (36 of 58 cases vs. 18 of 45 controls; OR, 2.5; CI, 1.02 to 6.0; $p = 0.03$), and swallowing water (29 of 53 cases vs. 4 of 44 controls; OR, 12.1; 95% CI, 3.4 to 47.0; $p < 0.001$) were statistically associated with illness. Going in the lazy river pool or the hot tub on September 23 were not significantly associated with illness.

Ninety-seven (84%) of the water park users interviewed stayed overnight at the hotel at least one night, 14 (12%) were birthday party attendees, and five (4%) were day users. Attack rates [AR] were similar across water park user groups; hotel guests, AR = 55% (47/86); day users, AR = 60% (3/5), and birthday party attendees, AR = 62% (8/13).

Upon inspection, all three water park 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. An extensive Environmental Health Outbreak Investigation Survey of the three pools at the hotel water park complex was conducted by an MDH Environmental Health sanitarian. The survey included information on the physical description of the pool, water flow and treatment, associated physical facilities, facility management, recent developments at the facility, and a field assessment of the chemical levels.

This was a waterborne outbreak of cryptosporidiosis associated with a hotel water park. Although the original source of contamination was not confirmed, an infectious water park user most likely introduced the parasite into the pool, possibly during the fecal accident that was documented on September 22.

(3)
Cryptosporidiosis Associated with a Fitness Center

November-December Blue Earth County

Routine surveillance interviews of two *Cryptosporidium* cases conducted by the Minnesota Department of Health (MDH) Acute Disease Investigation and Control Section in early December 2007 revealed that both cases had swam at the Mankato fitness center multiple times in the 2 weeks prior to illness onset. MDH Environmental Health was contacted on December 17, and an outbreak investigation was initiated.

On December 17, both pools and the hot tub at the Mankato fitness center were voluntarily closed in order to be superchlorinated at 20 ppm for 8 hours.

Contact information for swimming lesson participants and aquatics staff was provided to MDH by the fitness center. MDH staff interviewed swimming lesson participants about their illness and exposure histories. Cases of cryptosporidiosis from the Mankato area that were identified through routine surveillance were interviewed to determine if they had exposure to the pools at the fitness center. A primary case was defined as a fitness center pool user who subsequently developed either a laboratory-confirmed *Cryptosporidium* infection or diarrhea ($\geq$3 loose stools in a 24-hour period) or vomiting lasting 3 or more days. A secondary case was defined as a laboratory-confirmed *Cryptosporidium* infection or diarrhea or vomiting of at least 3 days

duration in a household member of a pool user, with illness onset after the household member pool user.

Illness histories and exposure information were obtained from 146 pool users. Thirty-one primary cases were identified, including seven with a stool specimen that tested positive for *Cryptosporidium*. Two secondary cases were also identified; both of these had laboratory-confirmed *Cryptosporidium* infections. Twenty-nine pool users reported illness but did not meet the case definition, and thus were excluded from further analysis. Nine positive specimens were received by the MDH Public Health Laboratory, and *Cryptosporidium hominis* subtype HGP15 was identified in all nine.

Of the primary cases, 29 (97%) of 30 reported diarrhea, 21 (78%) of 27 cramps, 16 (57%) of 28 vomiting, and eight (28%) of 29 fever. The median incubation period could not be determined because cases swam at the pools more than once in the 2 weeks prior to illness onset. However, cases had illness onset dates that spanned more than a 5-week time period (see epidemic curve). The median duration of illness was 7 days (range, 1 to 15 days) for the 13 cases who had recovered at the time of interview. Eleven (46%) of 24 primary cases reported seeking medical care from their health care provider. No cases were hospitalized.

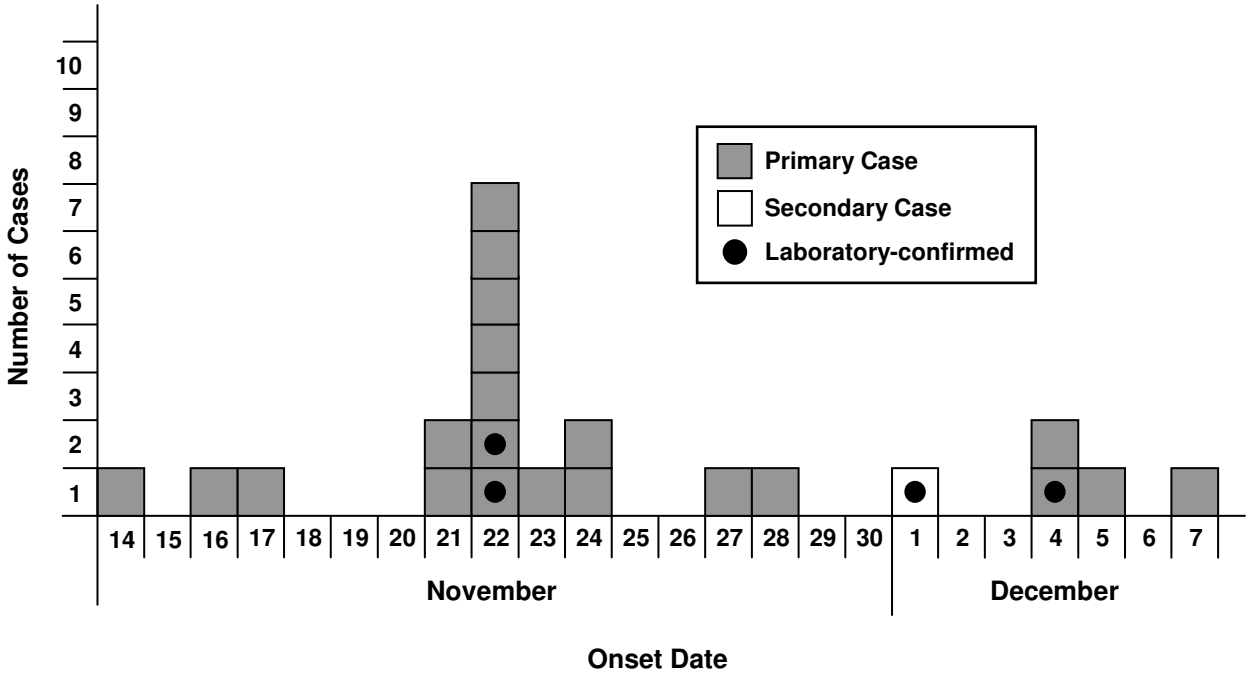
Neither use of the pools nor the hot tub was statistically associated with illness. Going in either of the pools or the hot tub on a particular day of the week was also not statistically associated with illness.

Upon inspection of the pools and hot tub on December 17, there were several deficiencies identified. After reviewing the pool logs, it was apparent that all of the pools were not tested on a daily basis and the records of the pool's operation and routine maintenance were grossly inadequate. Furthermore, review of the pool records indicated that on several occasions within the previous month at least one of the complex's pools had a free chlorine residual of zero, with no notes indicating that any corrective action had been taken. The free chlorine level on December 17 in the hot tub was measured at greater than 20 ppm, more than four times the state guidelines. Also on December 17 the combined chlorine level in the Taylor pool measured 3.5 ppm; well beyond the state guidelines of 0.5 ppm.

An extensive Environmental Health Outbreak Investigation Survey of the three pools at the complex was also conducted by an MDH Environmental Health sanitarian. The survey included information on the physical description of the pool, water flow and treatment, associated physical facilities, facility management, recent developments at the facility, and a field assessment of the chemical levels.

All pools at the fitness center were reopened on December 19. Sign-in sheets were posted at the pools to prevent patrons from re-entering the pools for 2 weeks following the resolution of gastrointestinal symptoms.

Cryptosporidiosis Cases Associated with a Fitness Center, by Illness Onset Date



This was a waterborne outbreak of cryptosporidiosis associated with fitness center pools. Although the original source of contamination was not confirmed, an infectious pool user most likely introduced the parasite into the pool. Improperly maintained chlorine levels helped facilitate the survival of the parasite in the pools, leading to a protracted amount of time during which pool users were at risk for becoming infected.

Outbreaks with Other Routes of Transmission:
Outbreaks Due to Animal Contact

(1)
Salmonella Typhimurium Infections Associated with Frozen Rats Fed to Snakes

February — Benton County/Multiple states

On February 21, 2007, the Minnesota Department of Health (MDH) interviewed a *Salmonella* Typhimurium case detected through routine surveillance who reported purchasing frozen rats to feed a red-tailed boa. The case reported purchasing these rats from a pet store that is part of a national chain in St. Cloud, Minnesota. On April 9, the Centers for Disease Control and Prevention (CDC) e-mailed Minnesota, New York, Alaska, Tennessee, Washington, Maryland, Utah, North Carolina, and Georgia to announce a pulsed-field gel electrophoresis (PFGE) cluster of *S*. Typhimurium cases posted to PulseNet. The Washington Department of Health had three cases that reported handling reptiles prior to their illness; two of the three cases purchased rodents to feed snakes. One pet snake was tested and was positive for *S.* Typhimurium with a pattern indistinguishable from that of the cases. A traceback investigation was conducted, and the frozen rats had been purchased from the same pet store franchise. The frozen rodent supplier for this pet store was located in Jonesville, Florida. A Maryland case also reported exposure to an albino snake and frozen rats used to feed the snake; the rats had also been purchased at the same pet store chain. An investigation into the source of the Minnesota rodents was initiated.

The Minnesota Department of Agriculture (MDA) was contacted. On April 12, MDA staff visited the pet store in St. Cloud where the frozen rats used to feed the red-tailed boa were purchased. A traceback investigation was conducted.

The Minnesota case had an onset date of February 2, 2007. Symptoms included diarrhea and a fever of 103.0° F. There was no vomiting or blood in the stool. The duration of illness was 5 days; the case was not hospitalized.

The traceback investigation lead to the same supplier of the frozen rats in Jonesville, Florida. The CDC was notified of these results.

This was an outbreak of *S*. Typhimurium infections associated with commercially distributed frozen rodents used to feed snakes. The supplier of the frozen rats was located in Jonesville, Florida. Transmission likely occurred through contact with the frozen rats, the snakes, and/or contact with environmental surfaces indirectly contaminated by the rats or snakes.

(2)
Salmonella Montevideo Infections Associated with Chicken Contact

May-August Multiple counties/Multiple states

On June 11, 2007, the Minnesota Department of Health (MDH) Public Health Laboratory (PHL) identified two *Salmonella enterica* serotype Montevideo isolates with indistinguishable pulsed-field gel electrophoresis (PFGE) patterns through routine surveillance. The PFGE subtype was designated SMON42. The two cases resided in different counties. It was determined through routine interviews that the two cases had been exposed to chickens that originated from the same mail-order hatchery in Iowa. An investigation was initiated.

Cases were identified through routine laboratory surveillance, and were defined as Minnesota residents who had culture-confirmed infection with *S*. Montevideo SMON42 since May 1, 2007 and who reported exposure to chickens in the week before becoming ill. Interviews about illness history and potential exposures, including animal contact and food consumption, in the 7 days prior to illness were conducted. Cases were also asked questions regarding the source of their chickens.

Employees from MDH and the Minnesota Board of Animal Health (BAH) visited the homes of the first two cases to obtain samples from the chickens and the environment. Only one of the households still had live chickens available for testing. Cloacal swabs were taken from the chickens, and environmental samples (from dust and litter) were also collected at this household. At the second household, only litter samples were obtained. Samples were tested for the presence of *S*. Montevideo at the BAH laboratory, and positive samples were sent to MDH PHL for PFGE subtyping. The BAH also identified source hatcheries for the feed stores where cases reportedly purchased chickens.

MDH posted this cluster to the national PulseNet web board on June 15, 2007.

From May to December 2007, the MDH PHL identified 24 isolates of *S*. Montevideo subtype SMON42. Of these, nine (38%) reported exposure to chickens during the 7 days prior to illness onset, and were therefore defined as cases. The cases resided in multiple counties: one (11%) each in Anoka, Beltrami, Benton, Cass, Isanti, Le Sueur, Morrison, Waterville, and Winona. The median age of cases was 33 years (range, 1 to 71 years), and seven (78%) were male. Eight (89%) of the case isolates were from stool and one (11%) was from urine. Illness onset dates ranged from May 8 to August 9, 2007; all cases had diarrhea, three (33%) had bloody diarrhea, and three (33%) had vomiting. None of the cases were hospitalized.

Known purchase dates for the chickens ranged from March to June, 2007. One case had ordered the chickens through the mail, while all others had purchased their chickens at a feed store. In every situation, chickens were acquired for human consumption.

Thirty chickens were sampled from the first case household, and the 30 samples were combined into six tubes for testing. *S*. Montevideo was cultured from all six tubes. Two additional tubes containing material from dust samples collected at this household also yielded *S*. Montevideo.

None of the litter samples taken from either the first or second case households yielded *Salmonella*. All *S.* Montevideo isolates were PFGE subtype SMON42. No other serotype or subtype of *Salmonella* was isolated from chicken or environmental samples.

The case from the household where positive chickens were identified did not report direct contact with the chickens. However, the case was allowed to enter the barn where the chickens were kept.

One source hatchery was identified in this investigation: a hatchery located in Rudd, Iowa. This facility is a mail-order hatchery from which various poultry species can be delivered to private homes or agricultural feed stores in multiple states. All nine cases with reported chicken contact had been exposed to chickens that originated from this hatchery. Public health officials from the Iowa Department of Agriculture visited the hatchery on July 17, 2007 to assess their practices. No samples were collected from the hatchery during the visit, but education was conducted and an egg supply list obtained.

During the time period of the Minnesota investigation, 33 *S.* Montevideo isolates of the outbreak PFGE subtype were identified in 15 other states. Fourteen (93%) of 15 cases with available exposure information reported contact with young poultry prior to illness onset. Five potential source hatcheries for chickens purchased by cases in other states were identified, including the facility in Rudd, Iowa.

This was an outbreak of *S*. Montevideo infections associated with chickens traced to a single hatchery. All cases reported purchasing the birds to raise for meat. Almost all *S*. Montevideo SMON42 cases identified in Minnesota in May and June reported having contact with young poultry or their environment. As the year progressed, however, fewer individuals with this subtype reported exposure to young poultry in the 7 days before illness onset (and were therefore not considered part of the outbreak). It is possible that once introduced into Minnesota via poultry from the Iowa hatchery, this subtype of *S.* Montevideo began to circulate in communities through other means, such as person-to-person transmission. Geographical clustering of reported SMON42 infections in the same Minnesota counties represented by cases with exposure to chickens lends support to this hypothesis.

The Iowa hatchery was also the source of chickens implicated in a *S*. Montevideo outbreak in Minnesota in 2000; the subtype in that outbreak, SMON5, is only one band different from SMON42 by PFGE. Contact with poultry, particularly with young birds, is a well known risk factor for *Salmonella* infections in humans.

(3)

Escherichia coli O157:H7 Infections Associated with Exposure to Cattle at the Minnesota State Fair

August-September Ramsey county

During August and September 2007, seven clinical isolates of *Escherichia coli* O157:H7 with pulsed-field gel electrophoresis (PFGE) subtypes that differed by one to two bands were identified by the Minnesota Department of Health (MDH) Public Health Laboratory (PHL) through routine surveillance. During routine interviews, all of the cases reported attending the Minnesota State Fair prior to illness onset. Six cases reported observing or handling animals in the cattle barn at the fair. An investigation was initiated.

All Shiga toxin-producing *E. coli* (STEC) cases are interviewed about food consumption and other potential exposures as part of routine surveillance. Interviews of STEC cases that are similar by PFGE are compared to identify potential common exposures. For this investigation, a case was defined as an individual from whom STEC was isolated since August 23, 2007, and who had an epidemiological link to the cattle barn at the Minnesota State Fair. Serotyping and PFGE subtyping were performed on available samples. Stool specimen collection kits were sent to case households that still had cattle available for testing. Animal samples were also tested at the MDH PHL.

Three PFGE subtypes of E. coli O157:H7 and one STEC sample of an unknown serotype were identified from eight individuals who met the case definition. Investigations into the potential sources of illness first occurred within clusters composed of cases with indistinguishable PFGE patterns. Two cases had the PFGE pattern MN1017. During initial interviews on September 5 and 6, both cases reported attending the 4H events held in the cattle barn during the week prior to illness onset. One case reported showing a steer in the 1,400 pound category from August 22 to August 27, while the other case reported that a sibling had shown Holstein steers in the 1,400 and 1,200 pound categories from August 22 to August 26. These occurred in the same location in the cattle barn: the southwest corner, referred to as the Dakota County area. One of the cases also reported that cattle from various categories may have come in contact with each other while being held overnight. None of the cows from either of the two case households were available for testing.

The PFGE pattern MN299 was isolated from four cases. When this cluster was first identified among three Minnesota residents, a PulseNet search was performed to determine if there had been isolates with indistinguishable patterns recently identified in additional states. Only one match was identified, in California; however, it was eventually discovered that this case was actually a Wisconsin resident. Interviews conducted from September 14 to October 5 revealed that all cases could be linked to the Minnesota State Fair. Dates of attendance ranged from August 23 to August 26. Three of the four cases specifically reported exposure to the cattle barn; the fourth case reported walking through the fairgrounds, but did not report entering any animal barn or having any animal contact. Once this connection was identified, this PFGE pattern was compared to MN1017 to determine how similar the two strains were. The PFGE patterns were found to be one band different.

One case had the PFGE pattern MN1019. This subtype was one band different from MN299 and two bands different from MN1017. This case was first interviewed on September 23 and reported exposure to cows and calves at home, including caring for a calf that eventually died. This case did not initially report attending the Minnesota State Fair. Due to the PFGE subtype connection described above, the case was called back and asked about attendance at the State Fair, as well as if any of the cattle had been shown at this event. The case did attend the State Fair on August 23 and 25, and the case's sibling had shown one of the animals on August 23. The sibling showed a heifer in the February junior yearly category in the cattle barn, in the Beltrami County section. The animal was still available for testing, and a specimen collection kit was sent to the case household. Shiga toxin genes were identified in a sweep taken from the sample, but no Shiga toxin-producing colony could be isolated; therefore, information on serotype and subtype could not be determined.

The final case was reported to MDH as an STEC case, but since the sample was never received by the MDH PHL, information on serotype and subtype was not available. An interview conducted on October 24 revealed that the case had attended the Minnesota State Fair on August 24. The case reported contact with a cow that was being shown by a relative in the Winona County section of the cattle barn during the 4H event.

Of the seven STEC cases with exposure to the cattle barn, six had available symptom information. Of these, all reported bloody diarrhea, five (83%) cramps, four (67%) vomiting, and one (17%) fever. None of the cases were hospitalized. Onset dates ranged from August 26 to September 9. The median incubation period for four cases that had single day exposure was 4.5 days (range, 2 to 13 days). The durations of illness for the two cases that had recovered at the time of interview were 7 and 9 days.

This was an outbreak *E. coli* O157:H7 infections among attendees at the Minnesota State Fair. No environmental samples were collected, as the association was identified well after the event had concluded. The common exposure among the attendees was visiting the cattle barn. Increased efforts to educate fair attendees about the risks of zoonotic disease transmission at fairs and appropriated prevention measures (e.g., handwashing) are warranted. Specific targets for educational efforts should include fair attendees who show animals and attendees who visit relatives or friends who are showing animals.

(4)
Campylobacter upsaliensis Infections Probably Associated with Cats from a Humane Society

September — Olmsted County

In September 2007, two cases of *Campylobacter upsaliensis* infections from Olmsted County were reported to the Minnesota Department of Health (MDH) through routine *Campylobacter* surveillance. During 1996 – 2007, a median of three *C. upsaliensis* cases were reported to MDH each year. Routine surveillance interviews revealed that both cases, a 1-year-old male and a 63-year-old female, had contact with cats a humane society in Rochester. An outbreak investigation was initiated on September 5.

A list of staff and volunteers was obtained from the humane society. Epidemiologists from MDH interviewed humane society staff and volunteers about illness history, job duties, and animal contact. A case was defined as a person who had *C. upsaliensis* isolated from stool, or who had diarrhea (≥3 loose stools in a 24-hour period) lasting ≥48 hours and who reported having contact with a cat from the humane society in the week prior to onset of symptoms. Three stool samples were received at the MDH Public Health Laboratory for *Campylobacter* species testing.

Epidemiologists from MDH and veterinarians from the University of Minnesota visited the humane society to collect stool specimens from cats at the facility. Samples were tested for *Campylobacter* using the Anoxomat system at the MDH Public Health Laboratory. Pulsed-field gel electrophoresis (PFGE) was performed on all *C. upsaliensis* isolates.

Illness histories and exposure information were obtained from 50 humane society staff and volunteers. Two (4%) additional cases were identified. One person reported illness but did not meet the case definition, and thus was excluded from further analysis.

Of the four total cases (two identified through routine surveillance and two identified through calling staff/volunteers), all reported diarrhea, two (50%) cramps, and one (25%) bloody diarrhea. None reported vomiting or fever. Cases reported onset dates ranging from the end of May to the beginning of September, with illnesses lasting from 2 weeks to 3 months. Two cases had a stool specimen test positive for *C. upsaliensis*; the two isolates did not match by PFGE. The sample received from a third case was negative for *Campylobacter* species.

No specific job duties or activities at the humane society or while fostering an animal were statistically associated with illness. Specific recommendations were given to the humane society to remind all staff and volunteers about practicing proper handwashing following contact with animals or the animal environments.

Forty stool specimens and two rectal swabs were obtained from 66 cats housed at the humane society. Three stool specimens (two from individual cats and one pooled sample from two cats) and one rectal swab tested positive for *C. upsaliensis*. No feline isolates matched by PFGE, nor did any feline isolates match either of the human isolates. The five cats that tested positive had a median age of 5 months (range, 3 months to 18 years). The positive cats were housed in four different rooms at the humane society. Two of the positive cats were new to the humane society, and thus were in quarantine from other cats. There was no association between positive cats and age, gender, where they were housed, or stool consistency.

This was a probable outbreak of *Campylobacter upsaliensis* infections associated with contact with cats from a humane society. Contact with cats has previously been shown to be a risk factor for *C. upsaliensis* infection. The fact that the PFGE patterns were not indistinguishable indicates multiple sources for the cats' infections. Although we were unable to directly link the human infections to the cats, the animals tested were not the same cats the cases had contact with since they had since been adopted. Recommendations emphasized staff and volunteer handwashing instruction and supervision.

Confirmed Foodborne Outbreaks
Minnesota, 2007

Outbreak Number	Month	Setting	No. Cases	No. Laboratory-Confirmed	Vehicle	Agent	Contributing Factor	County
1	Jan	Restaurant	12	5	Unknown	Norovirus	Ill food worker	Pine
2	Jan	Restaurant	15	15	Unknown	Hepatitis A virus	Likely contaminated product or infected food worker	Hennepin
3	Jan	Restaurant	11	3	Prime rib	*Clostridium perfringens* enterotoxin	Time/temperature abuse	Anoka
4	Jan	Restaurant	8	1	Sub-style sandwiches	Norovirus	Ill food worker	Hennepin
5	Feb	Restaurant	10	3	Unknown	Norovirus	Likely ill food worker	Ramsey
6	Mar	Restaurant	9	2	Unknown	Norovirus	Ill food worker	Mower
7	Mar-May	Commercial product	10	10	Ground beef	*E. coli* O157:H7	Contaminated product	Multiple counties
8	Mar-Apr	Restaurant	8	8	Unknown	Hepatitis A virus	Likely infected food worker	Murray
9	Mar-Apr	Commercial product	11	11	Leafy greens	*Salmonella* Typhimurium	Contaminated product	Multiple counties
10	Apr-Jul	Commercial product	1	1	Packaged snack	*Salmonella* Wandsworth	Contaminated product	Dakota
11	Apr	Restaurant	14	1	Unknown	Norovirus	Ill food worker	Dakota
12	Apr	Catered meal	20	6	Salad	Norovirus	Infected food worker	Hennepin
13	Apr	Church potluck	13	0	Unknown	Suspected bacterial toxin	Likely time/temperature abuse	Norman
14	Apr	Restaurant	5	0	Prime rib	Suspected bacterial toxin	Likely time/temperature abuse	Anoka
15	May-Jul	Restaurant	3	3	Unknown	*Salmonella* Agona	Likely infected food worker	Hennepin
16	Jun	Restaurant	5	2	Unknown	Norovirus	Likely ill food worker	Hennepin
17	Jun	Restaurant	4	0	Tuna burger	Scombroid toxin	Likely time/temperature abuse	Hennepin

Confirmed Foodborne Outbreaks
Minnesota, 2007 (continued)

Outbreak Number	Month	Setting	No. Cases	No. Laboratory-Confirmed	Vehicle	Agent	Contributing Factor	County
18	Jul 07-Mar 08	Grocery store delicatessen	9	9	Unknown	*Salmonella* Montevideo	Infected food worker	Wadena
19	Jul-Aug	Commercial product	3	3	Steak	*E. coli* O157:H7	Contaminated product	Ramsey
20	Jul	Wedding reception	32	0	Smoked beef	Suspected bacterial toxin	Time/temperature abuse	Hennepin
21	Jul	Golf club restaurant	9	2	Raw oysters	Norovirus	Contaminated harvest site	Dakota
22	Jul	Restaurant	1	0	Mahi-mahi	Scombroid toxin	Likely time/temperature abuse	Hennepin
23	Aug	Restaurant	18	16	Salsa	*Salmonella* Enteritidis	Likely cross-contamination	Hennepin
24	Aug	Restaurant	1	1	Raw oysters	*Vibrio parahaemolyticus*	Likely contaminated harvest site	Hennepin
25	Sep	Family picnic	5	2	Baked beans	*Cryptosporidium parvum*	Likely infected attendee	Mille Lacs
26	Sep-Oct	Commercial product	7	7	Pot pies	*Salmonella* I 4, 5, 12:i:-	Contaminated product	Multiple counties
27	Sep	Restaurant	8	0	Cheese	Norovirus	Infected food worker	Anoka
28	Sep	Church festival	23	6	Pork roast, gravy	*Clostridium perfringens* enterotoxin	Time/temperature abuse	Dakota
29	Sep-Oct	Commercial product	11	8	Premade hamburger patties	*E. coli* O157:H7	Contaminated product	Multiple counties
30	Sep	Restaurant	1	0	Mahi-mahi	Scombroid toxin	Likely time/temperature abuse	Hennepin
31	Sep	Wedding reception	12	0	Fruit, wedding cake	Suspected norovirus	Likely infected attendee	Washington
32	Oct	Restaurant	23	18	Tomatoes	*Salmonella* Typhimurium	Contaminated product	Olmsted
33	Oct	Restaurant	43	2	Unknown	Norovirus	Infected food worker	Redwood

Confirmed Foodborne Outbreaks
Minnesota, 2007 (continued)

Outbreak Number	Month	Setting	No. Cases	No. Laboratory-Confirmed	Vehicle	Agent	Contributing Factor	County
34	Oct	Conference	66	7	Dried parsley (suspected)	Enterotoxigenic *E. coli*	Likely contaminated product	Cass
35	Nov	Restaurant	18	1	Unknown	Norovirus	Infected food worker	Redwood
36	Nov	Restaurant	4	0	Unknown	Suspected norovirus	Unknown	Dakota
37	Nov	Restaurant	17	2	Unknown	Norovirus	Unknown	Hennepin
38	Nov	Restaurant	21	2	Ham	Norovirus	Ill food worker	Ramsey
39	Nov	Restaurant	6	2	Unknown	Norovirus	Unknown	Ramsey
40	Nov	Business meeting	6	0	Unknown	Norovirus	Infected food worker	Washington
41	Dec	Office potluck	11	2	Unknown	*Salmonella* Newport	Unknown	Multiple counties
42	Dec	Restaurant (catered)	8	1	Unknown	Norovirus	Unknown	Hennepin
43	Dec	Restaurant	19	2	Unknown	Norovirus	Infected food worker	Hennepin
44	Dec	Conference	11	2	Turkey wild rice soup	Norovirus	Ill food worker	Dakota
45	Dec	Restaurant	17	3	Unknown	Norovirus	Likely ill food worker	Ramsey
46	Dec	Restaurant	9	3	Unknown	Norovirus	Unknown	Hennepin
47	Dec	Private event	2	2	Raw oysters	Norovirus	Likely contaminated harvest site	Sherburne

TOTAL: 47

Confirmed Waterborne Outbreaks
Minnesota, 2007

Outbreak Number	Month	Setting	No. Cases	No. Laboratory-Confirmed	Vehicle	Agent	Contributing Factor	County
1	Jul	Fitness center swimming pool	20	5	Recreational water	*Cryptosporidium parvum*	Likely ill swimmer	Goodhue
2	Sep	Hotel water park	60	3	Recreational water	*Cryptosporidium hominis*	Likely ill swimmer	Wright
3	Nov-Dec	Fitness center swimming pools	33	9	Recreational water	*Cryptosporidium hominis*	Likely ill swimmer	Blue Earth

TOTAL: 3

Outbreaks with Other or Unknown Routes of Transmission
Minnesota, 2007

Outbreak Number	Month	Setting	No. Cases	No. Laboratory-Confirmed	Vehicle	Agent	County
1	Jan	Nursing home	36	3	Person-to-person (PTP)	Norovirus	Cass
2	Jan	Nursing home	23	0	PTP	Suspected norovirus	Benton
3	Jan	Nursing home	8	0	Unknown	Unknown	Washington
4	Jan	Nursing home	Unknown	0	Unknown	Unknown	Benton
5	Jan	Nursing home	23	0	PTP	Suspected norovirus	Ramsey
6	Jan	Nursing home	16	0	PTP	Suspected norovirus	Clay
7	Jan	Nursing home	62	0	PTP	Suspected norovirus	Nobles
8	Jan	Nursing home	49	0	PTP	Suspected norovirus	Hennepin
9	Jan	Nursing home	58	0	PTP	Suspected norovirus	Crow Wing
10	Jan	School	40	0	Unknown	Suspected norovirus	Kandiyohi
11	Jan	School	80	0	PTP	Suspected norovirus	Hennepin
12	Jan	School	105	0	Unknown	Suspected norovirus	Crow Wing
13	Jan	Nursing home	21	0	PTP	Suspected norovirus	Rice
14	Jan	Nursing home	20	0	PTP	Suspected norovirus	Winona
15	Jan	Nursing home	22	0	PTP	Suspected norovirus	Polk
16	Jan	Nursing home	61	0	PTP	Suspected norovirus	Olmsted
17	Jan	School	74	0	PTP	Suspected norovirus	Ramsey
18	Jan	Nursing home	41	0	PTP	Suspected norovirus	Dakota
19	Jan	Nursing home	38	0	PTP	Suspected norovirus	Polk
20	Jan	Restaurant	6	2	PTP	Norovirus	Hennepin

Outbreaks with Other or Unknown Routes of Transmission
Minnesota, 2007 (continued)

Outbreak Number	Month	Setting	No. Cases	No. Laboratory-Confirmed	Vehicle	Agent	County
21	Feb	Animal/private home	1	1	Animal contact	*Salmonella* Typhimurium	Benton
22	Feb	Nursing home	23	0	PTP	Suspected norovirus	Houston
23	Feb	Assisted living	18	0	PTP	Suspected norovirus	Hennepin
24	Feb	Nursing home	52	0	PTP	Suspected norovirus	Chisago
25	Feb	Nursing home	29	0	Unknown	Suspected norovirus	Hennepin
26	Feb	Assisted living	12	0	PTP	Suspected norovirus	Hennepin
27	Feb	Nursing home	19	0	PTP	Suspected norovirus	McLeod
28	Feb	Hotel	25	2	Unknown	Norovirus	Olmsted
29	Feb	Restaurant	6	2	Unknown	Norovirus	St. Louis
30	Feb	Nursing home	Unknown	0	Unknown	Unknown	Olmsted
31	Mar	Nursing home	18	0	PTP	Suspected norovirus	Rice
32	Mar	Assisted living	11	0	PTP	Suspected norovirus	Goodhue
33	Mar	Nursing home	50	0	PTP	Suspected norovirus	Hennepin
34	Mar	Nursing home	33	0	PTP	Suspected norovirus	Hennepin
35	Mar	School	49	4	PTP	Norovirus	Scott
36	Apr	Nursing home	Unknown	0	Unknown	Unknown	St. Louis
37	Apr	Nursing home	22	0	PTP	Suspected norovirus	Murray
38	Apr	Nursing home	13	0	PTP	Suspected norovirus	Hennepin
39	Apr	Restaurant/reception	6	0	Unknown	Suspected norovirus	Hennepin
40	May	Restaurant	Unknown	2	PTP	Norovirus	Hennepin

Outbreaks with Other or Unknown Routes of Transmission
Minnesota, 2007 (continued)

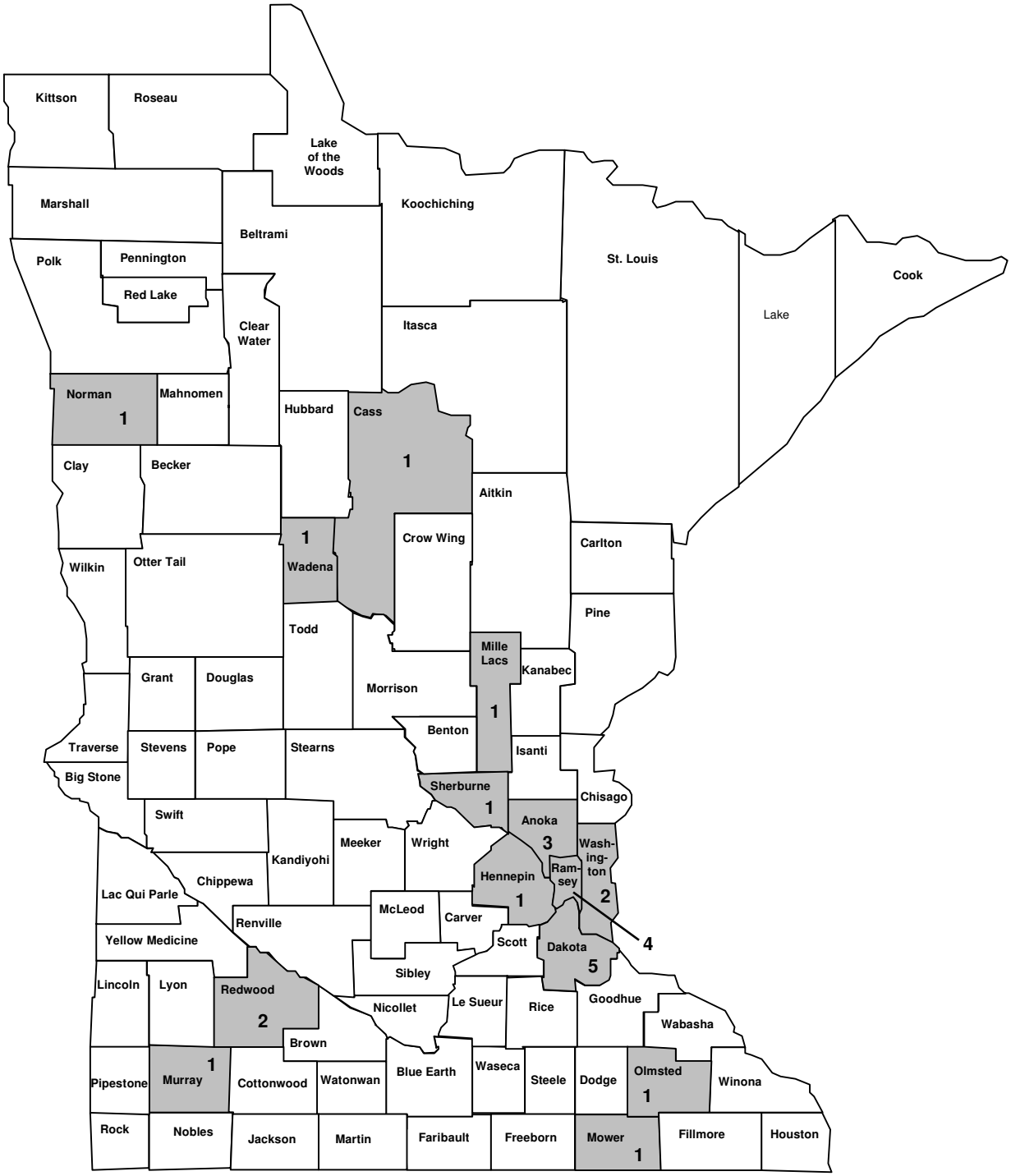
Outbreak Number	Month	Setting	No. Cases	No. Laboratory-Confirmed	Vehicle	Agent	County
41	May	Community	22	3	PTP	Norovirus	Ramsey
42	Jun	Community	Unknown	21	PTP	*Shigella sonnei*	Beltrami
43	May - Aug	Community	9	9	Animal contact	*Salmonella* Montevideo	Benton
44	Jun	Wedding reception	3	2	PTP	Norovirus	Lyon
45	Jun	Daycare	Unknown	8	PTP	*E. coli* O157:H7	Ramsey
46	Jul	Workplace	13	1	Unknown	Norovirus	Hennepin
47	Jul	Camp	33	0	PTP	Suspected norovirus	Aitkin
48	Jul	Wedding reception	Unknown	0	Unknown	Unknown	Morrison
49	Jul	Camp	12	1	PTP	Norovirus	Hennepin
50	Jul	Private	7	0	Unknown	Suspected norovirus	Douglas
51	Aug	Daycare	Unknown	2	PTP	*Shigella sonnei*	Hennepin
52	Aug	Daycare	9	2	PTP	*Shigella sonnei*	Hennepin
53	Aug	Daycare	Unknown	3	PTP	*Shigella sonnei*	Ramsey
54	Aug	Daycare	Unknown	4	PTP	*Shigella sonnei*	Anoka
55	Aug- Sep	Fair	7	7	Animal contact	*E. coli* O157:H7	Ramsey
56	Aug	Restaurant	2	0	Unknown	Unknown	Beltrami
57	Aug	Daycare	Unknown	2	PTP	*Cryptosporidium hominis*	Swift
58	Aug	Private	Unknown	2	Unknown	Hepatitis A	Ramsey
59	Sep	Animal shelter	4	4	Animal contact	*Campylobacter upsaliensis*	Olmsted
60	Sep	Neighborhood party	16	2	PTP	*Cryptosporidium hominis*	Hennepin

Outbreaks with Other or Unknown Routes of Transmission
Minnesota, 2007 (continued)

Outbreak Number	Month	Setting	No. Cases	No. Laboratory-Confirmed	Vehicle	Agent	County
61	Sep	Jail	7	1	PTP	Norovirus	Olmsted
62	Oct	School	72	0	Unknown	Suspected norovirus	Goodhue
63	Oct	School	47	0	Unknown	Suspected norovirus	Ramsey
64	Dec	School	98	0	PTP	Suspected norovirus	Carver
65	Dec	School	50	0	Unknown	Suspected norovirus	Hennepin
66	Dec	School	20	0	Unknown	Suspected norovirus	Dakota
67	Dec	Nursing home	143	1	PTP	Norovirus	Hennepin
68	Dec	Private	Unknown	1	PTP	Norovirus	Dakota

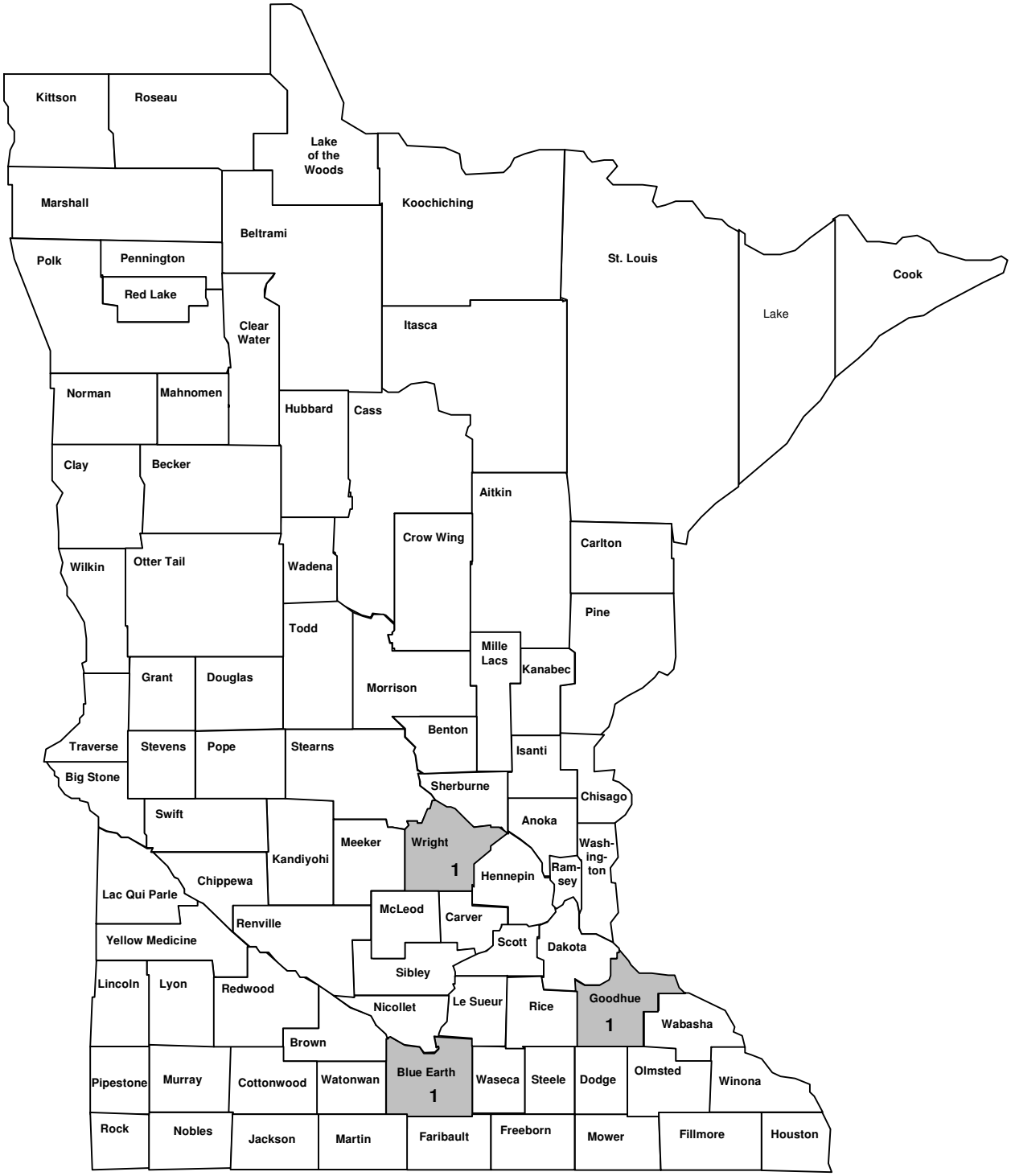
TOTAL: 68

Confirmed Foodborne Outbreaks by County, Minnesota, 2007 (n=47*)

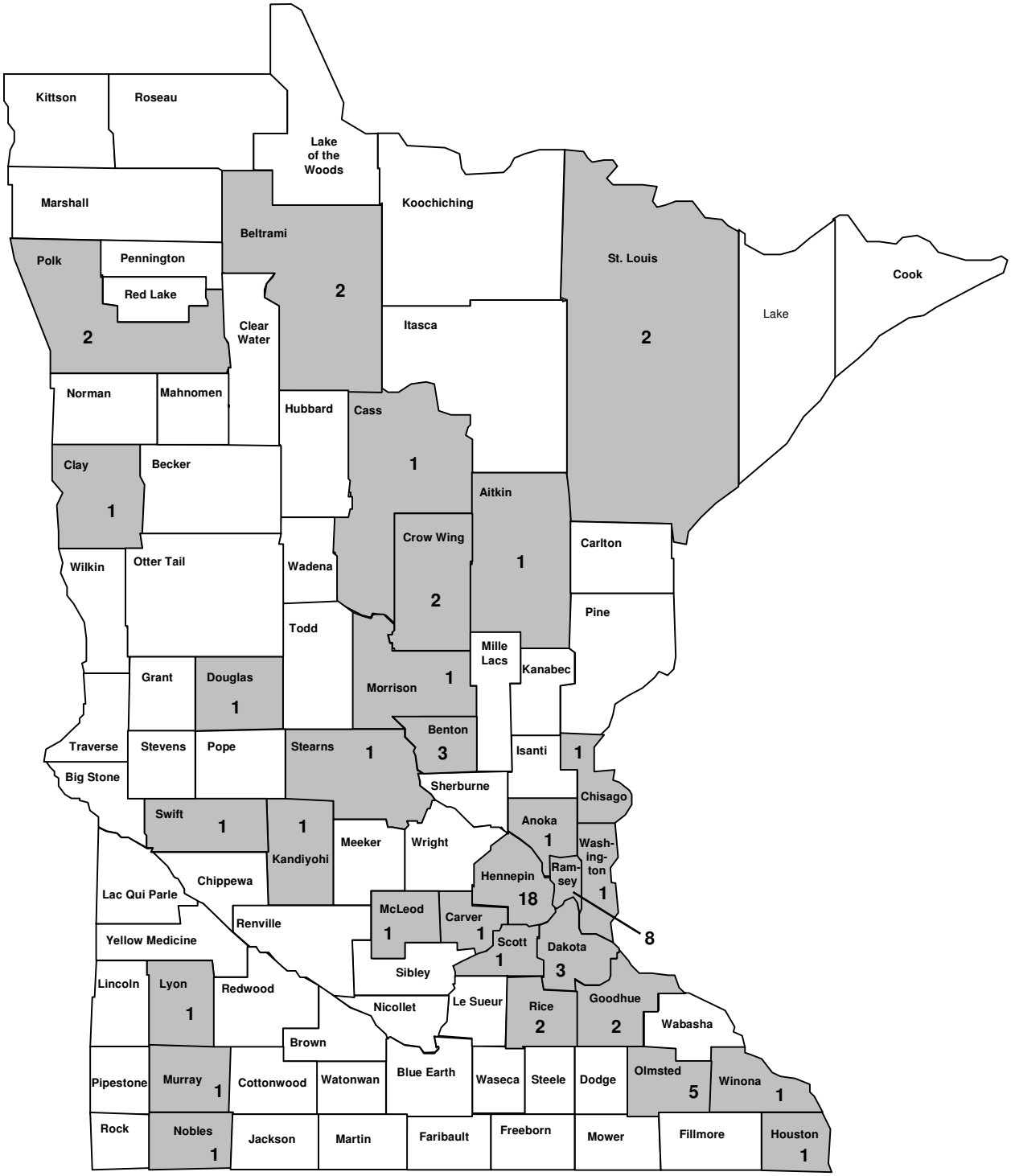


*** The total number of confirmed outbreaks in 2007 was 47; however, the numbers on the map add up to 41. The remaining six outbreaks (#7, #9, #10, #26, #29, and #41) involved multiple counties.**

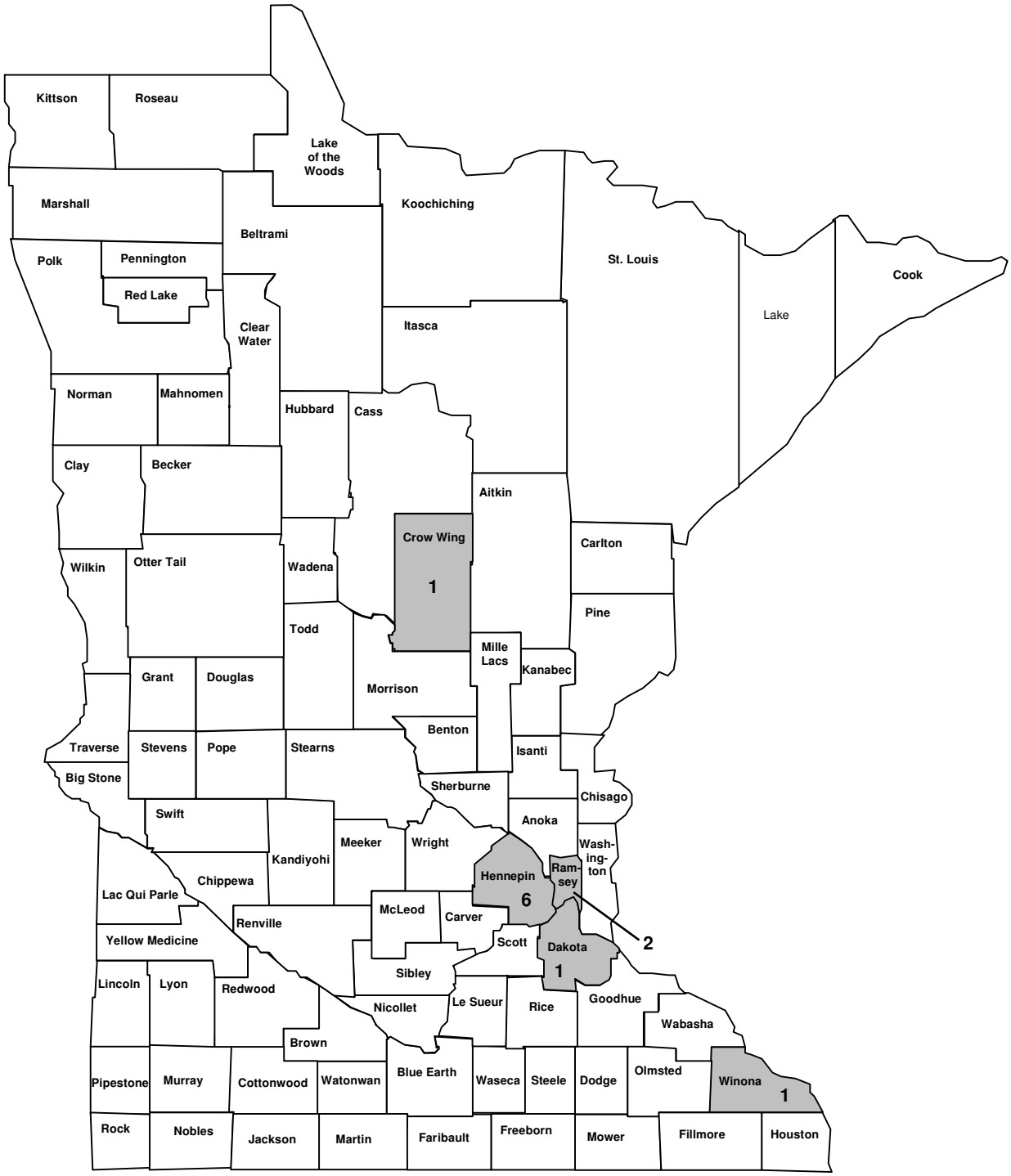
Confirmed Waterborne Outbreaks by County, Minnesota, 2007 (n=3)



Outbreaks with Other or Unknown Routes of Transmission by County, Minnesota, 2007 (n=68)



Probable Foodborne Outbreaks by County, Minnesota, 2007 (n=12*)



*** The total number of probable outbreaks in 2007 was 12; however, the numbers on the map add up to 11. The remaining outbreak (#2) involved multiple counties.**

Foodborne Illness Complaints, Minnesota, 2007

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	4	0	4
Albert Lea, City of	0	0	0
Anoka County	55	11	66
* Becker County	6	0	6
* Beltrami County	6	0	6
* Benton County	2	0	2
Big Stone County	0	0	0
Bloomington/Richfield	87	13	100
* Blue Earth County	4	0	4
Brooklyn Park, City of	19	3	22
Brown County	3	0	3
* Carlton County	3	0	3
* Carver County	16	0	16
* Cass County	1	0	1
Chippewa County	0	0	0
* Chisago County	2	0	2
Clay County	0	0	0
* Clearwater County	0	0	0
* Cook County	0	0	0
Cottonwood County	0	0	0
* Crow Wing County	18	0	18
Crystal, City of	8	0	8
* Dakota County	115	0	115

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	5	0	5
Duluth, City of	0	0	0
Edina, City of	39	8	47
Faribault County	0	0	0
* Fillmore County	0	0	0
* Freeborn County	4	0	4
Goodhue County	8	0	8
* Grant County	0	0	0
Hennepin County	151	8	159
* Houston County	0	0	0
* Hubbard County	0	0	0
* Isanti County	1	0	1
* Itasca County	1	0	1
* Jackson County	0	0	0
* Kanabec County	2	0	2
Kandiyohi County	8	0	8
* Kittson County	0	0	0
* Koochiching County	0	0	0
Lac Qui Parle County	0	0	0
Lake County	1	0	1
* Lake of the Woods County	0	0	0
Le Seuer County	2	0	2
Lincoln County	0	0	0

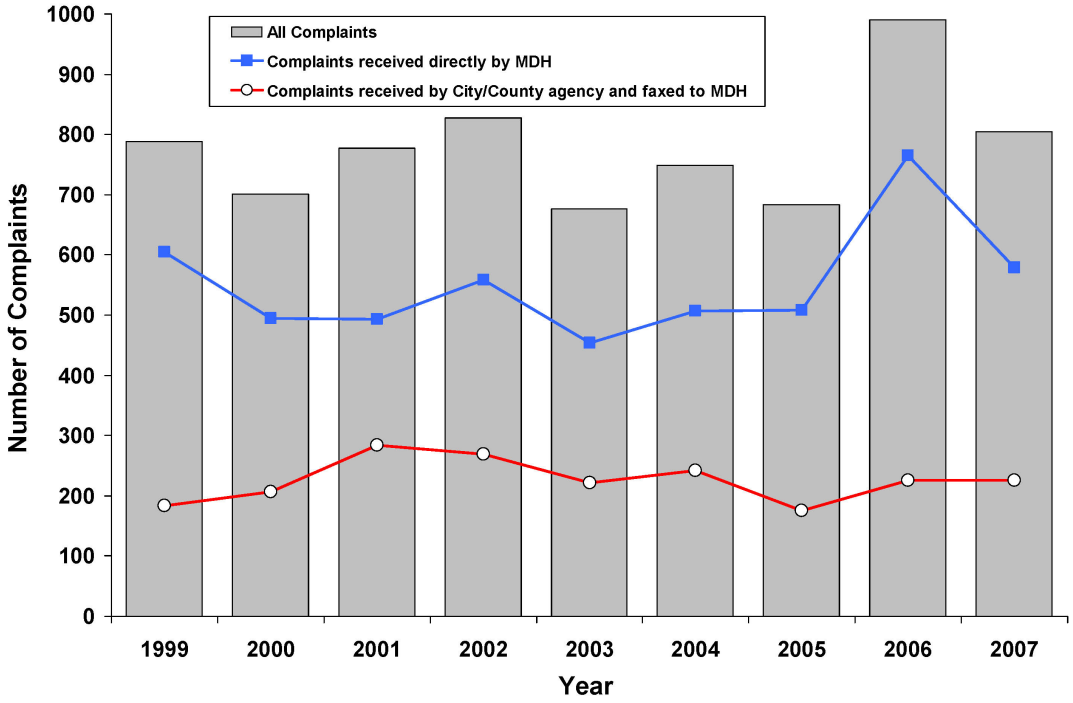
City or County	Foodborne illness complaints faxed from MDH Epi to environmental health agency	Foodborne illness complaints received by MDH Epi from environmental health agency	Total
* Lyon County	7	0	7
* Mahnomen County	4	0	4
Maplewood, City of	28	0	28
* Marshall County	0	0	0
Martin County	0	0	0
* McLeod County	4	0	4
* Meeker County	7	0	7
* Mille Lacs County	4	0	4
Minneapolis, City of	182	13	195
Minnetonka, City of	18	0	18
Moorhead, City of	0	0	0
Morrison County	0	0	0
* Mower County	4	0	4
Murray County	2	0	2
New Brighton, City of	7	0	7
Nicollet County	5	0	5
`Nobles County	0	0	0
* Norman County	1	0	1
Olmsted County	35	107	142
* Otter Tail County	12	0	12
* Pennington County	0	0	0
* Pine County	13	0	13
Pipestone County	0	0	0
* Polk County	2	0	2

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	0	0	0
Ramsey County	81	0	81
* Red Lake County	0	0	0
Redwood/Renville	16	32	48
* Rice County	5	0	5
Rock County	0	0	0
* Roseau County	0	0	0
St. Cloud, City of	22	0	22
St. Louis County	9	13	22
St. Louis Park, City of	30	0	30
St. Paul, City of	158	2	160
* Scott County	25	0	25
* Sherburne County	3	0	3
Pope County	0	0	0
* Sibley County	1	0	1
Stearns County	15	0	15
* Steele County	2	0	2
Swift County	0	0	0
* Stevens County	0	0	0
Todd County	3	0	3
* Traverse County	0	0	0
Wabasha County	0	0	0
Wadena County	0	0	0
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	8	71
Watonwan County	0	0	0
Wayzata, City of	10	0	10
Wilkin County	0	0	0
Winona County	8	0	8
* Wright County	21	0	21
Yellow Medicine County	3	0	3
Bureau of Indian Affairs	25	0	25
FDA	2	0	2
MN Dept of Agriculture	41	0	41
MDH Environmental Health	0	7	7
U of M	1	0	1
USDA	0	0	0
Total	1,459	225	1,684

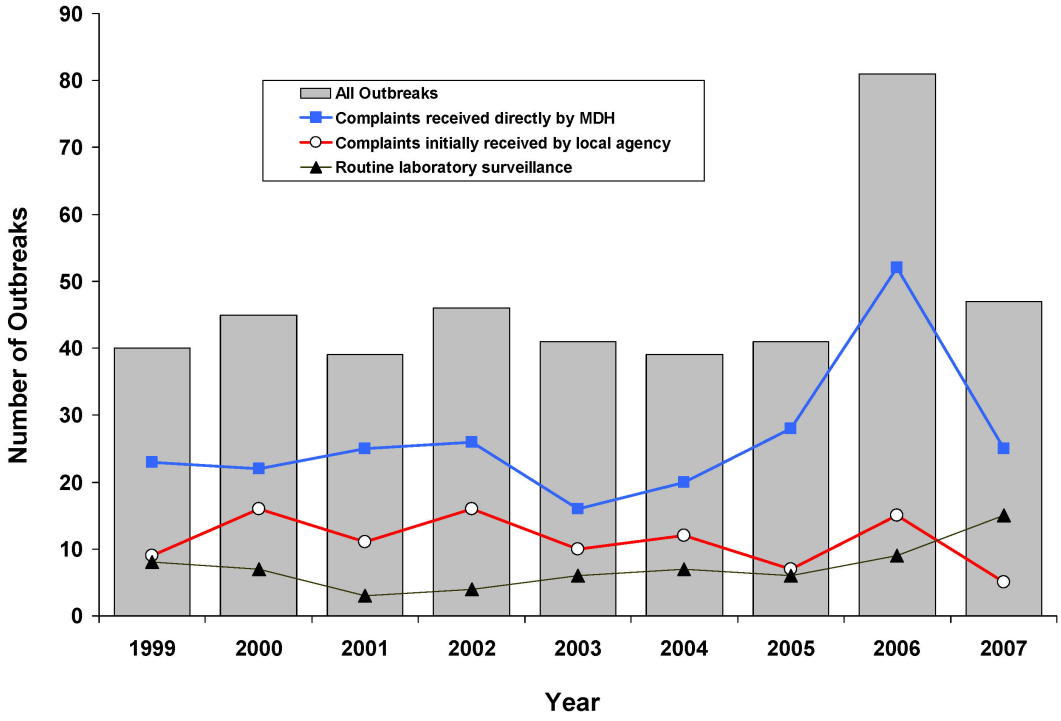
* MDH Environmental Health Services jurisdiction (total number of reports faxed to MDH EHS Metro or District Offices = 296)

Figure 1. Number of Foodborne Illness Complaints per Year, Minnesota, 1999-2007



In 2007, the MDH Acute Disease Investigation and Control Section received 804 foodborne illness complaints. Detailed information on symptoms and a 4-day food history were obtained from each caller (see form on page 119), 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 112). Of the 804 complaints received, 574 (71%) were received directly through the MDH foodborne illness hotline (1-877-FOOD ILL) and 230 (29%) were reported to MDH by local public health agencies (Figure 1). In 2007, 30 (64%) of the 47 confirmed foodborne outbreaks were initially reported to MDH or local public health agencies via phone calls from the public; of those, 25 (83%) were reported directly to MDH (Figure 2).

Figure 2. Confirmed Foodborne Outbreaks by Method of Initial Identification, Minnesota, 1999-2007



Revised: 3/2/2009

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: _____ Email: _____

Home phone: (_____)_____ Work phone: (_____)_____ Cell: (_____)_____

Establishment that the complainant suspects: _____

Number of persons exposed: _____ Number ill: _____

Did complainant call the establishment? : ☐Y ☐N If yes, who did they speak with: _____

**If a retail food product is suspected, please fill out page 4 (Retail Food Product Complaint) in addition to the 4-day food history*

ILLNESS HISTORY Illness Onset: ___/___/___ Time: _____ Recovery: ___/___/___ Time: _____

Vomiting ☐Y ☐N Onset: ___/___/___ Time: _____ Recovery: ___/___/___ Time: _____

Diarrhea ☐Y ☐N Onset: ___/___/___ Time: _____ Recovery: ___/___/___ Time: _____

# of stools per 24-hr. period (max): _____ 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 If yes, date stool submitted: ___/___/___ Hospitalized ☐Y ☐N

FOOD HISTORY

If only one person is ill or if all ill persons live in same household, complete the entire four-day food history.
If more than one person is ill and they live in different households, record only the common meals.

Meal Time	**Date: ___/___/___** *(work backward starting with onset date)*	**Hours to Illness Onset**
Brk: _____	location: _____ food/drinks: _____	_____
	_____	
Lun: _____	location: _____ food/drinks: _____	_____
	_____	
Sup: _____	location: _____ food/drinks: _____	_____
	_____	
Other: _____	location: _____ food/drinks: _____	_____

Meal Time **Date: ____/____/____** **Hours to Illness Onset**

Brk: ______ location: ____________________ food/drinks: _________________________________ _____

____

Lun: ______ location: ____________________ food/drinks: _________________________________ _____

____

Sup: ______ location: ____________________ food/drinks: _________________________________ _____

____

Other: _____ location: ____________________ food/drinks: _________________________________ _____

Meal Time **Date: ____/____/____** **Hours to Illness Onset**

Brk: ______ location: ____________________ food/drinks: _________________________________ _____

____

Lun: ______ location: ____________________ food/drinks: _________________________________ _____

____

Sup: ______ location: ____________________ food/drinks: _________________________________ _____

____

Other: _____ location: ____________________ food/drinks: _________________________________ _____

Meal Time **Date: ____/____/____** **Hours to Illness Onset**

Brk: ______ location: ____________________ food/drinks: _________________________________ _____

____

Lun: ______ location: ____________________ food/drinks: _________________________________ _____

____

Sup: ______ location: ____________________ food/drinks: _________________________________ _____

____

Other: _____ location: ____________________ food/drinks: _________________________________ _____

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 ____

-Page 2-

HISTORY OF OTHERS ILL **Original Complainant's Name:**_____

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

Address: _____ **Phone:** _____

Illness Onset: ____/____/____ Time: _____ Recovery: ____/____/____ Time: _____

Vomiting ☐Y ☐N Onset: ____/____/____ Time: _____ Recovery: ____/____/____ Time: _____

Diarrhea ☐Y ☐N Onset: ____/____/____ Time: _____ Recovery: ____/____/____ Time: _____

# of stools per 24-hr. period (max): _____ Cramps ☐Y ☐N Fever ☐Y ☐N (temp:____) Bloody stools ☐Y ☐N

Other symptoms: _____ Incubation period from common event (hrs): _____

Foods eaten at common event: _____

_____

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

Address: _____ **Phone:** _____

Illness Onset: ____/____/____ Time: _____ Recovery: ____/____/____ Time: _____

Vomiting ☐Y ☐N Onset: ____/____/____ Time: _____ Recovery: ____/____/____ Time: _____

Diarrhea ☐Y ☐N Onset: ____/____/____ Time: _____ Recovery: ____/____/____ Time: _____

# of stools per 24-hr. period (max): _____ Cramps ☐Y ☐N Fever ☐Y ☐N (temp:____) Bloody stools ☐Y ☐N

Other symptoms: _____ Incubation period from common event (hrs): _____

Foods eaten at common event: _____

_____

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

Address: _____ **Phone:** _____

Illness Onset: ____/____/____ Time: _____ Recovery: ____/____/____ Time: _____

Vomiting ☐Y ☐N Onset: ____/____/____ Time: _____ Recovery: ____/____/____ Time: _____

Diarrhea ☐Y ☐N Onset: ____/____/____ Time: _____ Recovery: ____/____/____ Time: _____

# of stools per 24-hr. period (max): _____ Cramps ☐Y ☐N Fever ☐Y ☐N (temp:____) Bloody stools ☐Y ☐N

Other symptoms: _____ Incubation period from common event (hrs): _____

Foods eaten at common event: _____

_____

_____

Original Complainant's Name:_____

RETAIL FOOD PRODUCT COMPLAINT ***(please fill in as much information as you can)***

Name of product (please be specific): _____

Brand of product: _____

Manufacturer and/or distributor information (name and address): _____

_____

Container type, size and weight (18 oz. plastic bottle, 1 lb. paper carton, etc.): _____

USDA establishment number (if a packaged meat product): _____

UPC code (12-digit bar code): _____

Product/Lot/Best if Used By Date (BIUB) code: _____

_____

_____

Purchase location (name of store): _____

Address of purchase location: _____

Purchase date: _____

Does consumer still have the product or other containers of the same product? : _____

_____

Other information: _____

_____

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 to 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 food workers, 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
- Food worker interview forms
- Fact sheets about suspected agents
- Information about handwashing and food worker 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
_____	____	____/____/____
_____	____	____/____/____
_____	____	____/____/____