MINNESOTA DEPARTMENT OF HEALTH 2011 FOODBORNE, WATERBORNE, AND ANIMAL CONTACT OUTBREAKS AND GASTROENTERITIS OUTBREAKS DUE TO OTHER TRANSMISSION ROUTES

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MINNESOTA DEPARTMENT OF HEALTH
2011 OUTBREAK SUMMARY

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Preface

In 2011, the format of the Minnesota Department of Health's annual gastroenteritis outbreak summary was expanded to include waterborne outbreaks of any disease syndrome (i.e., not just gastroenteritis). Additionally, the category "Outbreaks with Other or Unknown Routes of Transmission" was divided into "Animal Contact Outbreaks," "Gastroenteritis Outbreaks due to Person-to-Person Transmission," and "Gastroenteritis Outbreaks with Unknown Transmission Route."

Definitions

Confirmed Foodborne Outbreaks

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

Confirmed outbreaks may be classified as:

1. Laboratory-Confirmed Agent: Outbreaks in which laboratory evidence of a specific etiologic agent is obtained.

2. Epidemiologically Defined Agent: Outbreaks in which the clinical and epidemiologic evidence defines a likely agent, but laboratory confirmation is not obtained.

3. Outbreak of Undetermined Etiology: Outbreaks in which laboratory confirmation is not obtained and clinical and epidemiologic evidence cannot define a likely agent.

Probable Foodborne Outbreaks

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

Confirmed and Probable Waterborne Outbreaks

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

Animal Contact and Environmental Outbreaks

Outbreaks are considered to be due to animal contact if two or more persons experience a similar illness after exposure to an animal or animal environment. Other outbreaks with environmental sources (e.g., blastomycosis, histoplasmosis) are also included in this category.

Gastroenteritis Outbreaks due to Person-to-Person Transmission

These outbreaks are defined as two or more cases of gastrointestinal illness related by time and place in which an epidemiologic evaluation suggests either person-to-person transmission occurred.

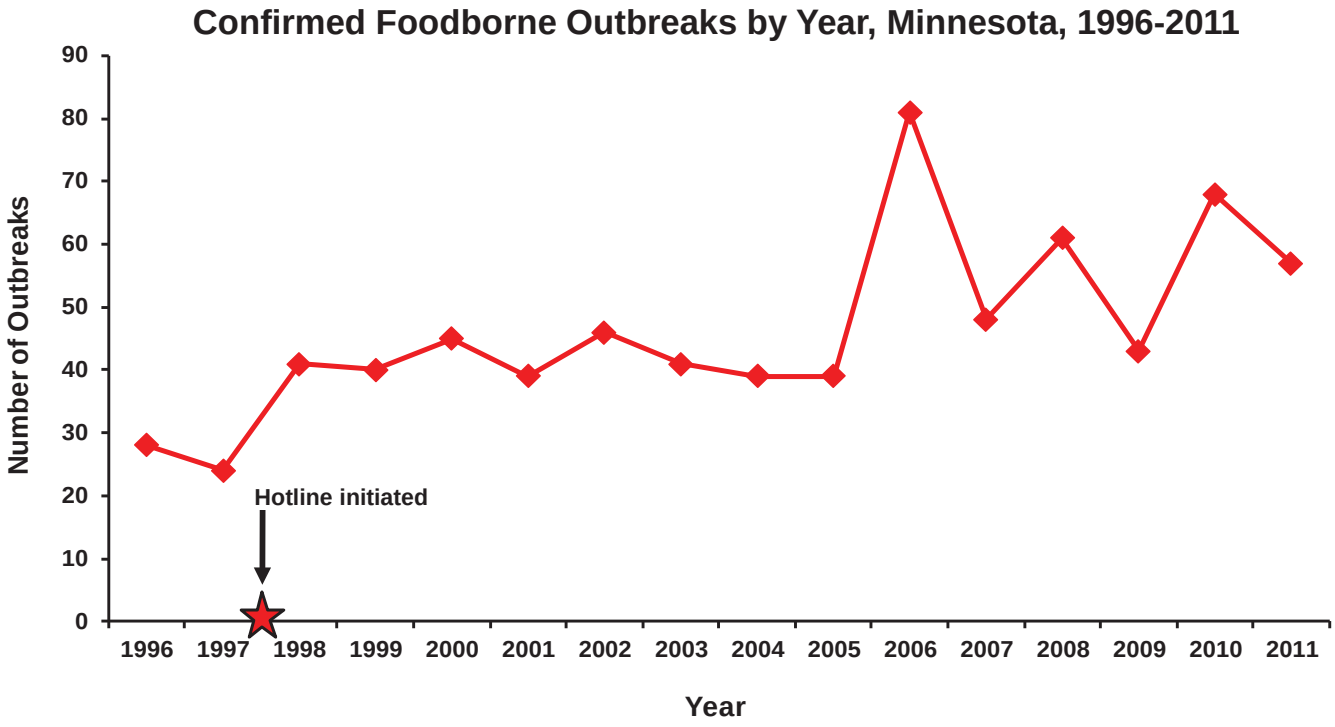
Gastroenteritis Outbreaks with Unknown Transmission Routes

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

Summary

In 2011, the Minnesota Department of Health (MDH) Acute Disease Investigation and Control Section identified a total of 178 outbreaks that were due to foodborne, waterborne, or animal contact transmission, or that were gastroenteritis outbreaks due to person-to-person or unknown route of transmission; these outbreaks involved at least 4,364 cases of illness. The 178 outbreaks were classified as follows: 57 confirmed foodborne outbreaks, 7 probable foodborne outbreaks, 5 animal contact outbreaks, 2 confirmed waterborne outbreaks, and 107 outbreaks with person-to-person or unknown route of transmission (see page 1 for definitions). The median annual number of confirmed foodborne outbreaks from 1996-2011 was 41 (range, 24 to 81). The median number of cases identified per confirmed foodborne outbreak in 2011 was 9 (range, 1 to 209).

In 2011, 34 (60%) of the 57 confirmed foodborne outbreaks were initially reported to MDH or local public health agencies via phone calls from the public. Nineteen (33%) outbreaks were identified through routine laboratory-based surveillance of reportable bacterial pathogens, two (4%) were identified through a report from a physician, and two (4%) were identified through a report from an institution.



Of the 57 confirmed foodborne outbreaks, 29 (51%) were either laboratory-confirmed (n=25) or epidemiologically defined (n=4) outbreaks of norovirus gastroenteritis. There were 10 (18%) confirmed foodborne outbreaks caused by *Salmonella*, 3 (5%) by *E. coli* O157:H7, 2 (4%) by *Clostridium perfringens*, and 1 (2%) each by *Campylobacter coli*, *Campylobacter jejuni*, enteroaggregative *E. coli*, enterotoxigenic *E. coli*, *Staphylococcus aureus*, *Trichinella spiralis*, *Vibrio parahaemolyticus*, and Shiga toxin-producing *E. coli* combined with *Cryptosporidium parvum*. The remaining five (9%) confirmed foodborne outbreaks were classified as suspected bacterial intoxications (caused by *Clostridium perfringens*, *Bacillus cereus*, or *Staphylococcus aureus*).

The predominance of norovirus as a cause of foodborne disease outbreaks in 2011 continues a pattern that has been observed for three decades in Minnesota. During 1981-2011, 500 (53%) of 946 confirmed outbreaks of foodborne disease were due to norovirus, while 217 (23%) confirmed foodborne outbreaks were cause by infectious bacterial pathogens such as *Salmonella*, *E. coli* O157, or *Campylobacter*.

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 foods items, minimizing environmental contamination, and excluding ill employees from work until 72 hours after recovery.

There were 10 confirmed foodborne outbreaks caused by *Salmonella* in 2011. Five salmonellosis outbreaks were associated with commercially distributed products including papaya, organic eggs, ground turkey, iceberg lettuce, and cantaloupe. Two outbreaks were associated with single restaurants, and two outbreaks were associated with private events (a wedding reception and a family barbeque). The remaining salmonellosis outbreak was associated with meat from a live animal market.

MDH identified three foodborne outbreaks caused by *E. coli* O157:H7 in 2011; two were associated with the consumption of commercial products, including pre-packaged salad and lettuce consumed at a restaurant. The remaining *E. coli* O157:H7 outbreak was associated with a bridal shower held at a church.

Two confirmed foodborne outbreaks of campylobacteriosis were identified in 2011. One was caused by *Campylobacter jejuni*, and one was caused by *Campylobacter coli*. Both were associated with raw milk from Minnesota farms.

There was one outbreak of non-O157 Shiga toxin-producing *E. coli* and *Cryptosporidium parvum* infections associated with consumption of unpasteurized apple cider at an apple orchard.

An outbreak of enteroaggregative *E. coli* infections was associated with an event held at a hotel. Ham and cheese wraps were implicated as the vehicle.

An outbreak of entertoxigenic *E. coli* infections was associated with multiple correctional facilities. Neither the vehicle nor the source of the contamination was identified.

An outbreak of *Trichinella spiralis* infections was associated with a wild boar killed at a hunting preserve in Iowa.

Routine surveillance detected one outbreak of *Vibrio parahaemolyticus* infections. This outbreak was associated with consumption of raw oysters at a restaurant that were likely contaminated at the harvest site.

Eight of the confirmed foodborne outbreaks identified in Minnesota in 2011 were due to laboratory-confirmed or suspected bacterial intoxications caused by pathogens such as *Clostridium perfringens*, *Bacillus cereus*, or *Staphylococcus aureus*. These outbreaks often lack laboratory confirmation, as

the resulting illnesses typically are of short duration. A recurring theme in outbreaks of bacterial intoxications is improper time and temperature control of potentially hazardous food items such as meats, rice, and sauces, which allows for the proliferation of organisms that produce these enterotoxins.

There were two waterborne outbreaks identified by MDH in 2011. One outbreak of cryptosporidiosis was associated with a school swimming pool, and one outbreak of Pontiac fever was assocated with a recreation center spa pool.

There were five outbreaks due to animal contact: *Campylobacter jejuni* infections associated with masonry work at a dairy farm; *E. coli* O157:H7 infections associated with a county fair; *Salmonella* Altona infections associated with contact with baby chicks; *Salmonella* Sandiego infections associated with contact with turtles; and *Salmonella* 4,12:i:- infections associated with frozen feeder rodents.

There were 107 gastroenteritis outbreaks with person-to-person or unknown transmission routes in 2011. 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.

Confirmed Foodborne Outbreaks

(1)
Norovirus Gastroenteritis Associated a Restaurant

January Hennepin County

On January 3, 2011, the Minnesota Department of Health (MDH) foodborne illness hotline received a complaint of gastrointestinal illness from a party of three individuals who had eaten at a restaurant in Excelsior on January 1. On that same date, the Hennepin County Human Services and Public Health Department (HSPHD) epidemiology unit received a call from the restaurant's manager reporting two additional illness complaints from two parties who also ate at the restaurant on January 1. MDH notified the HSPHD epidemiology and environmental health units on January 3, and an investigation was initiated.

MDH interviewed the original complainant. HSPHD epidemiologists interviewed other restaurant patrons about food consumption and illness history. A case was defined as a restaurant patron who subsequently developed vomiting and/or diarrhea (≥3 loose stools in a 24-hour period) after eating at the restaurant. Stool samples collected from consenting complainant group members were submitted to the MDH Public Health Laboratory for bacterial and viral testing.

HSPHD sanitarians visited the restaurant on January 4 to evaluate food preparation and handling procedures and to interview food workers about illness history and work duties.

Three patrons from two of the complainant groups (three separate households) were interviewed, and all three met the case definition. All cases reported cramps, diarrhea, and fever; two (67%) reported vomiting; and none reported bloody stools. The median incubation period was 38 hours (range, 32 to 40 hours). The median duration of illness was 18 hours (range, 10 to 31 hours). Stool specimens collected from two cases tested positive for norovirus GI.

A lack of non-ill controls precluded a statistical analysis of specific food exposures. Two (67%) of the cases ate a variety of appetizers (chicken wings, steak bites, and green beans) and drank tap beer. The third case only drank a mai tai with fresh fruit garnish. The third case reported that several of his friends also had drinks and appetizers at the restaurant on January 1, and many had subsequent gastrointestinal illness. HSPHD epidemiology requested that he pass along the unit's telephone number to his acquaintances, but no calls were received.

Three additional dining parties reported illness to the restaurant during the course of the outbreak investigation, but none of these patrons could be reached for interview. According to the restaurant manager, two patron groups who dined on January 1 reported gastrointestinal illness. The first group was celebrating a birthday party, and most patrons just had beverages; at least two patrons in this group reported subsequent gastrointestinal symptoms. The other patron group shared appetizers and flatbread pizzas, and several reported subsequent gastrointestinal illness. A third complainant group of four patrons dined on January 3 and ate firecracker shrimp and two types of sandwiches and became ill with gastrointestinal symptoms a few days after the meal.

Illness histories and job duty information were obtained from the 48 restaurant employees who worked on January 1. Five employees reported having had gastrointestinal illness previous to or on the implicated meal date. A dishwasher reported vomiting and cramps beginning on December 23 and ending on December 29; a bartender reported diarrhea and cramps beginning on December 30 and ending on January 2; a server who cut garnishes while not wearing gloves reported diarrhea and cramps starting on December 30 and ending on January 3; a server who set up the dining room and served tables reported diarrhea, vomiting, and cramps beginning on January 1 and ending on January 5; and another employee who worked in the kitchen and on the grill reported vomiting beginning and resolving on January 1.

In addition to food workers reporting illness previous to and on the implicated meal date, several secondary transmission food worker cases were identified during the course of the outbreak investigation. Four food workers reported gastrointestinal illness with onsets ranging from January 3 to January 5. Restaurant management screened employees daily for gastrointestinal symptoms and excluded all ill employees for 72 hours after the resolution of the last symptom.

HSPHD sanitarians noted overall compliance with food code requirements for food preparation; however, education was provided to eliminate bare-hand contact with ready-to-eat foods. 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.

This was a foodborne outbreak of norovirus gastroenteritis associated with eating at a restaurant. The vehicle of transmission was not identified, but the source of contamination was one or more of the ill food handlers who reported gastrointestinal symptoms previous to or on the implicated meal dates and who had contact with ready-to-eat foods.

(2)
Norovirus Gastroenteritis Associated a Workshop held at a Restaurant

January Stevens County

On January 19, 2011, a call was received on the Minnesota Department of Health (MDH) foodborne illness hotline regarding a workshop that had taken place on January 12 at a restaurant in Morris. The complainant reported illness among the group who had put on the workshop and was unsure whether those attending the workshop had also become ill. An investigation was initiated immediately.

MDH Environmental Health Services (EHS) sanitarians visited the restaurant on January 20 to evaluate food preparation and handling procedures, interview food workers, and determine if there were other meetings or conferences at the restaurant. No other such events had occurred. MDH staff obtained a list of workshop attendees from the workshop organizer. The attendees were interviewed about food consumption at the event and illness history. A case was defined as an attendee of the workshop at the restaurant who subsequently developed vomiting or diarrhea (≥3 loose stools in a 24-hour period). Stool samples collected from consenting workshop attendees and employees were submitted to the MDH Public Health Laboratory for bacterial and viral testing.

There were 9 workshop staff and 32 workshop attendees. MDH was able to interview 30 (73%) of those involved with the workshop. Twenty-two (73%) met the case definition. Five people reported illness

but did not meet the case definition and thus were excluded from further analysis. Eighteen cases (82%) reported vomiting, 17 (77%) reported diarrhea, 11 (50%) reported cramps, 8 (36%) reported fever, and none reported bloody stools. The median incubation period from the buffet lunch was 34 hours (range, 27 to 52 hours). The median duration of illness for the 20 cases who had recovered at the time of the interview was 46 hours (range, 23 to 84 hours). Three stool samples were submitted for testing and one tested positive for norovirus GI.

Workshop attendees were offered coffee, water, soda and an assortment of donuts at the start of the meeting and cookies for an afternoon snack. The donuts and cookies were brought in from a local bakery. The buffet lunch, which consisted of roast beef, roast pork, a dinner roll, mashed potatoes, gravy, and corn was prepared and served at the restaurant. The small number of non-ill controls precluded a meaningful statistical analysis of specific food items served at the lunch.

MDH EHS sanitarians interviewed all 20 restaurant employees in order to assess illness. Five reported recent gastrointestinal illness. A server had an onset of January 1 and a recovery date of January 2, with symptoms of vomiting and fever. A cook/custodian had an onset of January 8 and a recovery date of January 10, with symptoms of vomiting and diarrhea. Another server had an onset of January 9 and a recovery date of January 10, with symptoms of vomiting, diarrhea, cramps, and a fever. A cook had an onset of January 10 and a recovery date of January 11, with symptoms of diarrhea. A server/bartender had an onset date of January 15 and a recovery date of January 16, with symptoms of vomiting, diarrhea, and cramps. The employees with onsets on January 8, 9, and 10 worked on January 12; one of these employees reported preparing the dinner rolls, gravy, and corn for the lunch served on January 12. A stool kit was sent to this employee but was not returned.

During the investigation sanitarians and restaurant management established a screening protocol for employee illness. The sanitarian also discussed the importance of handwashing and not working while ill and for 72 hours after resolution of symptoms for the prevention of norovirus transmission.

This was a foodborne outbreak of norovirus gastroenteritis associated with a restaurant in Morris. No specific food vehicle was identified. The source of the contamination likely was one or more of the several food workers who had recent gastrointestinal illness and worked on January 12.

(3)
Norovirus Gastroenteritis Associated with a Private Gathering

January Mower County

On January 28, 2011, the Minnesota Department of Health (MDH) foodborne illness hotline received a complaint of gastrointestinal illness among a group of individuals who had attended a lunch in a private home following a baptism on January 23. The food served at the lunch included sub sandwiches from a restaurant in Austin, potato salad, chips, fruit, and cupcakes. MDH Environmental Health Services (EHS) was contacted and an investigation was initiated.

MDH EHS sanitarians visited the restaurant on February 1 to evaluate food preparation and handling procedures and to interview food workers. Credit card receipts for additional patrons were not available. MDH staff interviewed individuals who attended the lunch from a list provided by the complainant. A case was defined as a baptism lunch attendee who developed vomiting or diarrhea (≥3 loose stools

in a 24-hour period) after eating at the lunch. Stool samples collected from consenting attendees were submitted to the MDH Public Health Laboratory for bacterial and viral testing.

Ten lunch attendees were interviewed and six met the case definition. One attendee reported illness that did not meet the case definition and was excluded from analysis. All six cases reported diarrhea, five (83%) reported fever, four (67%) reported vomiting, four (67%) reported cramps, and none reported bloody stools. The median incubation period for the cases was 38 hours (range, 9 to 45 hours). The median duration of illness was 38 hours (range, 24 to 48 hours). One stool sample submitted by a patron tested positive for norovirus GII.

Foods served at the lunch included sub sandwiches, chips, potato salad, cantaloupe, pineapple, honeydew, and cupcakes. The potato salad and fresh fruit were prepared at the home were the lunch was held. The sub sandwiches were prepared at the restaurant and included lettuce, tomato, onion, pickles and mayo on the side. The small number of non-ill controls prevented a meaningful statistical analysis of specific food exposures. All six cases and all three controls reported eating sub sandwiches. Five cases and all three controls reported eating potato salad and cupcakes.

MDH EHS sanitarians interviewed six restaurant employees. One employee reported that their child was ill with vomiting and diarrhea on January 21 and that they vomited once on January 26. This employee filled the cold rail and did baking from January 21 through 25. The restaurant did not maintain an employee illness log. Employees were observed wearing gloves when handling ready-to-eat foods. The sanitarian discussed the importance of handwashing for the prevention of norovirus transmission, and the restaurant implemented the use of an employee illness log.

This was a foodborne outbreak of norovirus gastroenteritis associated with a private event. The specific food vehicle was not identified and the source of the contamination was not determined. A food worker who reported ill family members and subsequently became ill was a possible source, but this was not confirmed.

(4)
Norovirus Gastroenteritis Associated with a Restaurant

February Hennepin County

On February 9, 2011, the Minnesota Department of Health (MDH) foodborne illness hotline received a complaint of gastrointestinal illness in two patrons from a party of three individuals who had eaten at a restaurant in Plymouth on February 6. MDH notified the Hennepin County Human Services and Public Health Department (HSPHD) epidemiology and environmental health units on February 9, and an investigation was initiated.

MDH interviewed the original complainant group. HSPHD epidemiologists interviewed other restaurant patrons identified from credit card receipts from February 6 about food consumption and illness history. A case was defined as a restaurant patron who subsequently developed vomiting and/or diarrhea (≥3 loose stools in a 24-hour period) after eating at the restaurant. Stool samples collected from consenting complainant group members were submitted to the MDH Public Health Laboratory for bacterial and viral testing.

HSPHD sanitarians visited the restaurant on February 10 to evaluate food preparation and handling procedures and to interview food workers about illness history and work duties.

Twenty-eight patrons were interviewed by HSPHD epidemiologists, and five (18%) met the case definition. Four (80%) cases reported diarrhea, four (80%) reported vomiting, three (60%) reported cramps, three (60%) reported fever, and none reported bloody stools. The median incubation period was 39 hours (range, 34 to 53 hours). The median duration of illness was 15 hours (range, 0.2 to 36 hours). A stool specimen collected from one case tested positive for norovirus GII. A stool specimen collected from another case 18 days after the case's onset of illness tested negative for norovirus. Two additional persons reported illness that did not meet the case definition. In addition, another case reported an incubation period of only 2 hours; because this is too short of an incubation for norovirus infection, this case was excluded from analyses.

The cases consumed a variety of foods. Four (80%) of the cases consumed some type of sushi. Sushi types included salmon roll (2 cases), tuna roll (1 case), California roll (1 case) and a sushi boat, which is made up of an assortment of sushi rolls (1 case). Other food items included shrimp teriyaki (2 cases), spring rolls (2 cases), shrimp hibachi dinner (1 case), a side of fried rice (1 case), a side of white rice (1 case), and a side of vegetables (1 case).

Twenty controls were interviewed and also reported eating a wide variety of foods. No food item was statistically significantly associated with illness.

Illness histories and job duty information were obtained from the 16 restaurant employees. No employees reported having had gastrointestinal illness previous to or on the implicated meal date. The head sushi chef reported abdominal pain February 4 through February 6, but denied stomach cramps, vomiting, or diarrhea. This employee only worked at the restaurant for 10 days, and February 6 was his last day of work.

HSPHD sanitarians noted several critical violations when conducting an inspection of the restaurant. Critical violations included no employee illness log; no record of proper freezing of raw fish for parasite destruction; a container of crunchy topping used to coat sushi pieces was held at room temperature instead of being refrigerated; sushi rice was held out of temperature control for more than 4 hours; a metal bowl used to mix sushi rice was not properly washed, rinsed and sanitized; and plastic wrap used to cover some of the bamboo sushi mats was not changed at least every 4 hours. Several non-critical violations were also noted, including reuse of single-use gloves, using a bare bamboo mat to roll sushi, use of a domestic microwave, inadequate food storage containers, and improper storage of wiping cloths. The sanitarians provided steps to correct the critical and non-critical violations and 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.

This was a foodborne outbreak of norovirus gastroenteritis associated with eating at a restaurant. The vehicle of transmission was not identified; however, most cases ate sushi. It is possible that the sushi chef who reported mild symptoms was the source of contamination. Reusing single-use gloves and improper sanitizing of bowls and utensils could have contributed to contamination of food.

(5)
Salmonella Agona Infections Associated with Papayas Imported from Mexico

February-March Multiple counties/Multiple states

From February through April, 2011, the Minnesota Department of Health (MDH) Public Health Laboratory identified three *Salmonella* Agona isolates with MDH pulsed-field gel electrophoresis (PFGE) pattern designation SA110. The first case, identified in February, refused an interview. Two additional cases occurred in March and April. On April 8, PulseNet, the national molecular subtyping network for foodborne bacterial disease surveillance, announced that there were matches to two closely related PFGE patterns in nine states. On April 13, the CDC initiated a multi-state investigation. At that time, there were 18 cases in 10 states.

In Minnesota, a case was defined as a Minnesota resident with laboratory-confirmed infection with *S.* Agona PFGE subtype SA110.

Cases were interviewed by phone regarding illness history and potential exposures. A questionnaire developed by CDC was used in addition to the Minnesota routine surveillance form.

Information collected from case interviews was shared with CDC, other states, and the United States Food and Drug Administration (FDA).

CDC coordinated a multi-state investigation of cases. FDA conducted the traceback investigation and initiated recalls.

Three cases with a *S.* Agona SA110 infection were identified in Minnesota. The cases had illness onset on February 11, March 15, and March 29. None of the cases were hospitalized, and all recovered. A detailed symptom history was collected for two of the cases. Both cases reported diarrhea, fever and cramps; one reported bloody stools; none reported vomiting. Travel history was obtained on all three cases, and two reported travel to Mexico in the week prior to their illness; one traveled to Cancun, and the other traveled to Cabo San Lucas.

Nationally, 106 cases with the four outbreak strains of *S.* Agona were reported from 25 states: Arkansas, Arizona, California, Colorado, Georgia, Illinois, Indiana, Kentucky, Louisiana, Massachusetts, Minnesota, Missouri, Nebraska, Nevada, New Jersey, New Mexico, New York, Ohio, Oklahoma, Pennsylvania, Tennessee, Texas, Virginia, Washington, and Wisconsin. Illness onset dates ranged from January 17 to August 25, 2011. The median age of cases was 2 years (range, <1 year to 91 years). Thirty-nine percent of cases were younger than 5 years of age. Fifty-six percent were female. Eleven persons reported travel to Mexico in the week before they became ill. Ten cases were hospitalized. No deaths were reported [1].

Among 56 cases with available information, 57% reported consuming papayas in the week before illness onset. This was significantly different compared with results from a survey of healthy persons in which 11% of persons of Hispanic/Latino ethnicity and 3% of non-Hispanic/Latino ethnicity reported consuming papaya in the 7 days before they were interviewed. Places and dates of papaya purchase information was collected from cases and used to conduct traceback investigations. A single supplier of papayas from Mc Allen, Texas was identified as the source of papayas purchased by cases. The FDA

conducted testing of payapas at the distributor in Texas, and isolated *S.* Agona of the outbreak PFGE pattern from two papayas [1].

As a result of the investigation, the supplier recalled papayas on July 23, 2011.

FDA continued testing of papayas imported from Mexico, and from May 12, 2011, to August 18, 2011, FDA found a 15.6% *Salmonella* contamination rate. The positive samples were from 28 different firms and include nearly all the major papaya producing regions in Mexico.

This was a multi-state outbreak of *S.* Agona infections associated with consumption of papaya imported from Mexico. The outbreak led to a papaya recall. Three cases associated with this outbreak were identified in Minnesota.

Reference

1. Centers for Disease Control and Prevention. Multistate Outbreak of Human *Salmonella* Agona Infections Linked to Whole, Fresh Imported Papayas http://www.cdc.gov/salmonella/agona-papayas/082911/index.html

(6)
Norovirus Gastroenteritis Associated with a Restaurant

February Hennepin County

On February 15, 2011, the Minnesota Department of Health (MDH) foodborne illness hotline received a complaint of gastrointestinal illness regarding a party of 25 individuals from several different businesses who had eaten a catered box lunch together on February 9, 2011. The lunch was catered by a restaurant in Maple Grove and consumed at a company in Brooklyn Park. MDH notified the Hennepin County Human Services and Public Health Department (HSPHD) epidemiology and environmental health units on February 15, and an investigation was initiated.

A list of business lunch attendees was obtained from the organizer, and HSPHD epidemiologists interviewed lunch attendees about food consumption and illness history. A list of customers from February 9 was obtained from the restaurant, and HSPHD epidemiology also interviewed the additional patrons about food consumption and illness history. A case was defined as an individual who either attended the business lunch or who had otherwise eaten food from the restaurant and who subsequently developed vomiting and/or diarrhea (≥3 loose stools in a 24-hour period). A stool sample collected from a consenting complainant group member was submitted to the MDH Public Health Laboratory for bacterial and viral testing.

HSPHD sanitarians visited the restaurant on February 15 to evaluate food preparation and handling procedures and to interview food workers about illness history and work duties.

There were no other shared meals identified among the catered lunch group. All 25 individuals in the group were interviewed and 13 (52%) met the case definition. One person was found to have not eaten the meal and another person reported symptoms but did not meet the case definition; both were excluded from analysis. Twelve cases (92%) reported diarrhea, nine (69%) reported cramps, eight (62%) reported vomiting, four (31%) reported fever, three (23%) reported headache, and none reported bloody stools.

The median incubation period from the lunch was 37.5 hours (range, 21 to 50 hours). The median duration of illness was 33 hours (range, 9 to 75 hours). A stool specimen collected from a case tested positive for norovirus GII.

The catered meal included three varieties of sandwich (ham, turkey, dagwood), a bag of chips, half an orange, and a cookie. Canned pop was also available. The food items were set out and individuals served themselves. None of the individual food items from the box lunch were found to be significantly associated with illness.

Twenty-nine other patrons were identified from the list of customers provided by the restaurant. Two of these patrons met the case definition. Both cases reported diarrhea and cramps; none reported vomiting, fever, or bloody stools. The median incubation period from the meal was 14.5 hours (range, 12 to 17 hours). The median duration of illness was 67 hours (range, 59 to 75 hours).

The two restaurant patron cases both reported eating a chef salad.

Illness histories and job duty information were obtained from the 19 restaurant employees. No employees reported having had gastrointestinal illness previous to or on the implicated meal date.

HSPHD sanitarians noted several critical violations when conducting an inspection of the restaurant. Critical violations included failure to wash hands after every possible contamination, some refrigerated ready-to-eat foods not date marked, and the slicer not cleaned or sanitized properly. Several non-critical violations were also noted, including the use of gloves after food preparation was complete, a beverage cooler being used for ready-to-eat foods, a thermometer not found in all coolers, reuse of food containers that are not NSF/commercial grade, gaskets for the reach-in cooler not properly maintained, gaps between hand sinks and the wall not properly caulked, some surfaces found to be unclean, no fingernail brush available at hand sink, sanitary towels missing at hand sink, lack of signage at hand sinks, improper storage of clothing, and a low-light level in parts of the walk-in cooler. The sanitarians provided steps to correct the critical and non-critical violations and 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 no reports of employee illness.

This was a foodborne outbreak of norovirus gastroenteritis associated with eating food from a restaurant. The vehicle of transmission and source of transmission were not identified.

(7)

Salmonella Enteritidis Infections Associated with Pollo Guisado at a Wedding

February Dakota County

On February 22, 2011, the Minnesota Department of Health (MDH) Public Health Laboratory identified three *Salmonella* Enteritidis clinical isolates with the same pulsed-field gel electrophoresis (PFGE) Minnesota pattern (SE77B52). The isolates were from residents of Burnsville, Minneapolis, and Monticello. An outbreak investigation was initiated.

Cases were identified through routine laboratory surveillance and were defined as Minnesota residents with laboratory-confirmed *Salmonella* Enteritidis infection with PFGE subtype SE77B52 and specimen collection dates on or after February 1, 2011.

Phone interviews regarding illness history and potential exposures were conducted for all cases using the Minnesota routine *Salmonella* surveillance interview form.

Three cases with *Salmonella* Enteritidis SE77B52 isolates were identified. Dates of illness onset were February 13 and February 14. The median age of cases was 39 years (range, 33 to 56 years). All three cases reported Hispanic ethnicity and spoke only Spanish. All three cases reported diarrhea, two (67%) reported fever, and one (50%) reported vomiting. Duration of illness for the two cases who had recovered at the time of the interview were 5 and 7 days, respectively. None of the cases were hospitalized.

The first case reported attending a wedding at a rented hall on February 12, but was unsure of the exact location. The other two cases also reported attending a wedding the same day, but were also unable to provide the exact name or location of the hosting venue. All three cases reported similar locations, identical event dates, and identical food menus, indicating that they all attended the same wedding. Foods served at the event included potato salad, rice, fried chicken, and a chicken dish cooked in a red sauce (pollo guisado). All three cases reported that the chicken in the pollo guisado was visibly raw in the middle, and all three reported consuming the dish anyway. None of the food was professionally catered, and the pollo guisado was prepared by a friend of the bride and groom.

None of the cases were willing to provide any contact information for wedding hosts. Since a guest list could not be obtained, MDH was not able to conduct interviews of any additional wedding guests. Based on location descriptions of the cases, MDH suspected that the hosting venue was a community center in Apple Valley. This venue confirmed that a large Hispanic wedding was held there on the date that the cases reported. The venue was unable to definitively confirm that this was the same wedding or to provide contact information for attendees. The hall had a non-catering kitchen, which is consistent with reports that the wedding was not professionally catered.

One case reported that several other wedding guests were ill, including her daughter, who also attended the wedding. A second case also reported his wife had a similar illness lasting about 2 weeks, with illness onsets on the same date as his.

This was an outbreak of *Salmonella* Enteritidis infections associated with a wedding reception. The vehicle was likely undercooked pollo guisado, a chicken dish served at the wedding.

(8)
Norovirus Gastroenteritis Associated with an Event Center

February Dakota County

On February 23, 2011, the Minnesota Department of Health (MDH) foodborne illness hotline received a complaint of gastrointestinal illness among a group of individuals who attended a birthday party at an event center in Burnsville on February 20. An investigation was initiated immediately.

In November, 2010, the event center in Burnsville had been investigated following an illness complaint. That investigation revealed that the manager had been preparing sub sandwiches in her home in violation of the facilities' license. The facility was ordered to cease this practice.

A Minnesota Department of Agriculture (MDA) inspector visited the establishment on February 24 to discuss food preparation and handling procedures at the facility, interview staff, and collect contact information for groups that had gatherings at the facility from February 18 through February 21. MDH staff interviewed individuals from the complainant party and event organizers about food consumption and illness history. Separate analyses were conducted for each party reporting multiple illnesses among attendees. A case was defined as an event center patron who developed vomiting and/or diarrhea (≥3 loose stools in a 24-hour period) after eating at the facility. Stool samples collected from consenting patrons were submitted to the MDH Public Health Laboratory for bacterial and viral testing.

Twenty-two individuals from the original complainant group were interviewed and nine (41%) met the case definition. One group member reported illness that did not met the case definition and was excluded from analyses. Eight (89%) cases reported diarrhea and cramps, seven (78%) reported vomiting, four (44%) reported fever, and none reported bloody stools. The median incubation period was 33 hours (range, 9 to 46 hours). The median duration of illness for the six cases who had recovered at the time of interview was 15 hours (range, 6 to 51 hours). Both stool samples submitted by ill group members tested positive for norovirus GII.

By univariate analysis, consuming a sub sandwich (9 of 9 cases vs. 6 of 12 controls; odds ratio [OR], undefined; 95% confidence interval [CI], undefined; $p = 0.02$), turkey (7 of 9 cases vs. 3 of 12 controls; OR, 10.5; 95% CI, 1.0 to 141; $p = 0.03$), any side (8 of 9 cases vs. 3 of 12 controls; OR, 24.0; 95% CI, 1.63 to 1179; $p = 0.01$), green peppers (4 of 8 cases vs. 0 of 12 controls; OR, undefined; 95% CI, undefined; $p = 0.01$), and tomatoes (5 of 8 cases vs. 0 of 12 controls; OR, undefined; 95% CI, undefined; $p = 0.004$) were significantly associated with illness. A multivariate analysis using logistic regression was unable to be performed due to the high degree of colinearity between reported turkey, tomato, and green pepper consumption.

Event organizers for 14 additional groups that held gatherings in which food was served at the event center from February 18 through 21 were contacted. Three group organizers reported that group members were ill with gastrointestinal illness; all three held events at the facility on February 21. Two of the groups reported only one ill individual. One of the ill individuals only consumed cake and drank soda from the facility; the other did not consume any food from the facility but did drink a juice box and water from a water pitcher.

The event organizer for the third group that held a party at the event center on February 21 reported a number of illnesses among the group and provided contact information for the other attendees. Fourteen individuals from this group were interviewed, and nine (64%) met the case definition. Two cases reported illness onsets >60 hours after the party. They were attributed to secondary infection and were excluded from the analysis of exposures. Two additional individuals reported illness that did not met the case definition and were excluded from analyses. Six (67%) cases reported vomiting and cramps, four (44%) reported fever, two (22%) reported diarrhea, and none reported bloody stools. The median incubation period was 36 hours (range, 29 to 84 hours). The median duration of illness for the seven cases that had recovered at the time of interview was 36 hours (range, 12 to 57 hours). The small number of non-ill controls from this group prevented a meaningful statistical analysis of specific food exposures.

However, of the 14 additional groups that were contacted, this was the only group that reported consuming sub sandwiches.

MDH staff interviewed 13 facility employees; six reported recent gastrointestinal illness. Employees reported becoming ill on February 18 (n=1), 22 (n=1), and 23 (n=4). The employee that was ill prior to the events reported an onset of cramping on February 18 and no vomiting or diarrhea. This employee served sub sandwiches on February 21, but reported not doing any food preparation. Event center staff were also questioned about food preparation practices. Three employees reported that the sandwich platters were made in the employee break room or at the manager's home. The MDA inspector questioned the manager about food preparation and where the food provided to the groups originated. The manager stated that the sandwiches were purchased pre-made from a grocery store in New Prague. However, when the inspector contacted the grocery store, no orders for pre-made sub sandwiches were filled from February 18 through 21. Further more, photographs provided by the complainant indicated that food leftover from the meal was packaged in "Grocery Store X Dollar Bun" plastic bags. This suggested that sandwiches were not purchased pre-made, and that the sandwiches were indeed prepared by event center staff. The establishment was ordered to immediately cease on-site food preparation and food preparation in an unlicensed kitchen.

This was a foodborne outbreak of norovirus gastroenteritis associated with an event center in Burnsville. Sub sandwiches were identified as the vehicle. Preparation of the sub sandwiches was found to be taking place at the establishment or in the manager's home in direct violation of the facility's license. A number of employee illnesses were identified and the source of the contamination was likely an infected employee.

(9)
Suspected Norovirus Gastroenteritis Associated with a Restaurant

February Dakota County

On March 4, 2011, the Minnesota Department of Health (MDH) foodborne illness hotline received three independent complaints of gastrointestinal illness from individuals who had attended birthday parties at a restaurant in Burnsville on February 25 and 26. Two of the complainants attended the same party, from which 10 of 12 attendees had reportedly become ill with vomiting and/or diarrhea. The third complainant attended a separate party, from which 4 of 12 party attendees had reportedly become ill. One of the complainants reported that when they had called the establishment to report their illness, the employee they spoke with informed them that several employees had also been sick with similar symptoms. MDH Environmental Health Services (EHS) was notified and an investigation was initiated.

A list of party attendees of one of the birthday parties was obtained from the party organizer; attempts to contact the organizer of the other party were unsuccessful. Epidemiologists from MDH interviewed birthday party attendees about food/beverage consumption and illness history. A case was defined as a restaurant patron who subsequently developed vomiting and/or diarrhea (≥3 loose stools in a 24-hour period).

A sanitarian from MDH EHS spoke with the manager of the establishment to assess employee illness and implement control measures.

Illness histories and exposure information were obtained from 10 restaurant patrons. Nine (90%) cases were identified. One person reported illness but did not meet the case definition, and thus was excluded from further analyses. No patrons agreed to stool testing.

Six (67%) cases reported diarrhea, five (56%) reported vomiting, five (56%) reported cramps, and three (33%) reported fever. The median incubation period was 37 hours (range, 24 to 49 hours). The median duration of illness was 59 hours (range, 27 to 107 hours) for the four cases who had recovered at the time of interview.

Due to the limited menu and lack of non-ill controls, a meaningful statistical analysis could not be performed. Foods consumed by the patrons included pizza, soda, water, ice, and brownies. The brownies were brought in by a patron but were cut and served by restaurant employees.

In discussions with an EHS sanitarian, the manager confirmed that a number of employees had been sick with vomiting and/or diarrhea with onsets of February 27 and 28, including food workers. At the start of the investigation sanitarians and management established a screening protocol for employee illness. All employees with vomiting and/or diarrhea were excluded from work until 72 hours after the resolution of symptoms. Management reported no known incidents of public vomiting or diarrhea that required clean-up at the establishment. All hard surfaces, including the play area and video game machines, were cleaned with a quaternary sanitizer approved for norovirus. Food workers were re-educated on not handling any food products with bare hands and management was instructed to more strictly monitor handwashing.

This was a foodborne illness outbreak associated with a restaurant. The etiologic agent was not confirmed; however, the symptoms and incubation periods were characteristic of norovirus gastroenteritis. The source of contamination was not identified but most likely was one or more ill or recently ill food workers.

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(10)
Norovirus Gastroenteritis Associated with a Church Dinner

March Ramsey County

On March 9, 2011, the Minnesota Department of Health (MDH) foodborne illness hotline received a report of four separate medical emergency calls due to gastrointestinal illness in people who lived at a senior apartment complex in New Brighton. All four ill individuals had attended a Swedish meatball dinner at a church in Mounds View on March 6. That same day, MDH contacted the church, and the pastor reported receiving several complaints of illness from individuals who attended the church dinner. Approximately 120 persons attended the event. MDH notified the Ramsey County Public Health Department and an investigation was initiated.

MDH obtained a list of dinner attendees and interviewed them about food consumption and illness history. A case was defined as a person who attended the church dinner and subsequently developed vomiting and/or diarrhea (≥3 loose stools in a 24-hour period). Stool specimens from consenting attendees were submitted to the MDH Public Health Laboratory for bacterial and viral testing.

MDH also obtained a list of persons that prepared food for or served food at the church dinner. Additionally, all persons interviewed were asked if they prepared or served food at the event. Eight people reported that they helped prepare the food and five reported serving food during the dinner.

On March 14, Ramsey County sanitarians inspected the church kitchen and spoke with the dinner coordinator and the pastor. The sanitarians provided norovirus education and conducted an environmental health assessment of the kitchen focusing on food handler illness, food flow, food preparation, and food storage procedures.

Eighty-eight church dinner attendees were interviewed, and 53 (60%) met the case definition. Fifty-two cases (98%) reported diarrhea, 39 (74%) reported vomiting, 25 (47%) reported cramps, 18 (34%) reported fever, and none reported bloody stools. The median incubation period was 33 hours (range, 8 to 84.5 hours). The median illness duration was 65.5 hours (range, 4 to 162 hours). Six cases visited a medical provider, four were taken to an emergency room, four were transported by ambulance, and five were hospitalized overnight. The median duration of hospitalization was 3 days (range, 2 to 5 days).

Five stool specimens were submitted and all tested positive for norovirus GII. All specimens tested negative for *Campylobacter*, *Salmonella*, Shiga toxin-producing *E. coli*, *Shigella*, and *Yersinia*.

Eight people prepared food for the event. Some food items were prepared at private homes and some were prepared at the church. Food items prepared at the church included Swedish meatballs, mashed potatoes, coleslaw, green beans, buns, gravy (white and brown), cranberry sauce, ice cream, M&M's, milk, coffee, Hawaiian punch, and bottled water. Lefse, dressing for the coleslaw, and cookies were prepared at private homes. All the foods were pre-plated and served, except for lefse and buns which were self-serve.

None of the persons who prepared or served the food reported illness prior to food preparation or the event, and none reported having ill household members prior to or during food preparation. No food item was significantly associated with illness.

There were no reports of vomiting at the event. Of the 88 dinner attendees interviewed, no one reported being ill during or prior to the event.

Although the church did not have a kitchen licensed by Ramsey County, as a result of this outbreak, the church planned on working with the sanitarians to obtain special events licenses for future food events. Ramsey County sanitarians stressed the importance of proper handling of food and beverages, use of gloves when handling ready-to-eat foods, good handwashing, thorough cleaning and disinfection, and exclusion of ill food handlers. The church did not have a handwashing sink in the kitchen at the time of the investigation, but planned on adding one to ensure frequent handwashing.

This was a foodborne outbreak of norovirus gastroenteritis associated with a Swedish meatball dinner held at a church. The attack rate of 60% was very high, indicating extensive contamination of one or

more food items. However, a specific vehicle of transmission and source of contamination were not identified.

(11)
Norovirus Gastroenteritis Associated with a Restaurant

March Dakota County

On March 14, 2010, the Minnesota Department of Health (MDH) foodborne illness hotline received a complaint of gastrointestinal illness among a group of four individuals who ate lunch at a restaurant in Eagan on March 10. An investigation was initiated immediately.

MDH Environmental Health Services sanitarians visited the restaurant on March 14 to evaluate food preparation and handling procedures, interview food workers, and collect credit card receipts for additional patrons. MDH staff interviewed patrons identified from credit card receipts about food consumption and illness history. A case was defined as a restaurant patron who developed vomiting or diarrhea (≥3 loose stools in a 24-hour period) after eating at the restaurant. Stool samples collected from consenting restaurant patrons were submitted to the MDH Public Health Laboratory for bacterial and viral testing.

Twenty-one restaurant patrons were interviewed; five met the case definition (including three from the original complaint and two identified through credit card receipts). Four additional patrons reported illness that did not met the case definition and were excluded from analysis. The median incubation period for the cases was 34 hours (range, 30.5 to 44 hours). The median duration of illness was 53 hours (range, 20 to 94 hours). All five cases reported diarrhea and vomiting, two (40%) reported cramps and fever, and none reported bloody stools. Stool samples submitted by five ill patrons tested positive for norovirus GII. Nucleic acid sequencing was conducted on all five positive norovirus samples; the nucleic acid sequences were identical.

By univariate analysis, consuming parmesan artichoke dip was significantly associated with illness (3 of 5 cases vs. 0 of 11 controls; odds ratio, undefined; 95% confidence interval, undefined; $p = 0.02$).

MDH EHS sanitarians interviewed 36 restaurant employees, and six reported recent gastrointestinal illness. Employees reported becoming ill on March 9 (n=3) and March 14 (n=2). One employee reported not knowing their illness onset date. Of the three employees who became ill on March 9, a manager and a server reported working on March 10. All employees with vomiting and/or diarrhea were excluded from work until 72 hours after the resolution of symptoms. The sanitarian observed bare-hand contact with ready-to-eat foods. During the investigation sanitarians and restaurant management established a screening protocol for employee illness. The sanitarian also discussed the importance of handwashing for the prevention of norovirus transmission.

This was a foodborne outbreak of norovirus gastroenteritis associated with a restaurant in Eagan. Artichoke dip was identified as a vehicle. The source of the contamination was likely an ill food worker.

(12)
Suspected Bacterial Intoxications Associated with a Restaurant

March Anoka County

On March 16, 2011, the Minnesota Department of Health (MDH) foodborne illness unit received a call from an individual who had dined a restaurant in Blaine on March 15 with two other individuals from separate households. According to the complainant, all had become ill with vomiting several hours after eating their meal. Sanitarians from Anoka County Community Health and Environmental Services (ACCHES) were notified on March 16, and an investigation was initiated.

Epidemiologists from MDH interviewed the original complainants about food/beverage consumption and illness history. A case was defined as a restaurant patron who developed vomiting and/or diarrhea (≥3 loose stools in a 24-hour period) after eating at the restaurant.

Sanitarians from ACCHES visited the restaurant to evaluate food preparation procedures. No credit card receipts or customer contact information was available, so additional patrons could not be assessed for recent illness or food consumption history.

Illness histories and exposure information were obtained from three restaurant patrons. All three patrons met the case definition. All three cases reported vomiting, and the only case that answered the question reported cramps. No one reported diarrhea or fever. All three cases reported an incubation period of 6 hours. The median duration of illness was 10.5 hours for the one case who had recovered at the time of interview.

Cases reported eating beef fried rice, sweet and sour chicken, and orange chicken.

ACCHES sanitarians noted several violations when conducting an inspection of the restaurant on March 17. Approximately 80 pounds of rice had been cooked on March 16 and cooled overnight in five large tubs with tight fitting lids inside of the walk-in cooler. At lunch time on March 17, an ACCHES sanitarian determined the tubs of rice to have temperatures between 53-63° F. Restaurant staff had not taken temperatures of fried rice to be served. Education was provided on proper cooling methods, the time frame for the cooling of potentially hazardous foods, and the proper use of cooling logs.

This was a foodborne outbreak associated with a restaurant in Blaine. Illnesses were most compatible with a bacterial intoxication such as that caused by the emetic form of *Bacillus cereus*; however, the etiology of the outbreak could not be confirmed. The vehicle of transmission was not confirmed, but fried rice was the most plausible source. The outbreak most likely resulted from improper cooling procedures and improper hot- and cold-holding temperatures, which created a favorable environment for proliferation of the bacteria and elaboration of the toxin.

(13)
Clostridium perfringens Intoxications Associated with a Correctional Facility

March — Anoka County

On March 17, 2011, the Minnesota Department of Health (MDH) was notified by Anoka County Community Health and Environmental Services (ACCHES) of gastrointestinal illnesses in inmates at a juvenile correctional facility. The facility's nurse reported that approximately 28 of 30 juvenile inmates and one staff developed diarrhea and vomiting with onsets in the middle of the previous night. An investigation was initiated on March 17. Although initially it was reported that the illnesses were limited to inmates in the juvenile correctional facility, on March 22 a staff person from the workhouse within the same county correctional system contacted ACCHES to report that he had been ill with gastrointestinal illness with onset late on March 16, and that several workhouse inmates that worked in the painting and laundry crews had experienced gastrointestinal illness around that time.

MDH epidemiology staff contacted the juvenile correctional facility nurse to ascertain if all the illnesses occurred within one area of the facility or several separate areas, and to discuss possible common exposures, such as activities or foods, among the inmates. MDH epidemiology staff interviewed all inmates and some staff from the juvenile correctional facility about illness history and food consumption from March 14 through March 16. A case was defined as a correctional facility inmate or staff person who became ill with vomiting or diarrhea (≥3 loose stools in a 24-hour period) on or after March 16.

The ACCHES Correctional Health Evaluator contacted all health staff at the correctional facilities to ascertain if there were cases of gastrointestinal illness at other locations served by the same central kitchen.

ACCHES Environmental Health Specialists visited the central kitchen in Anoka on March 17 to evaluate food preparation and handling procedures. Inmates and staff responsible for food preparation were interviewed about recent history of gastrointestinal illness. Food handling procedures were also evaluated at the juvenile correctional facility. Additional discussions with kitchen staff were held from March 17 through March 23.

Stool specimens were submitted to the MDH Public Health Laboratory for testing.

Thirty-seven persons were interviewed, including 26 juvenile inmates from three "pods" or separate areas, eight workhouse inmates, two juvenile facility staff, and one workhouse staff. Two were excluded from analysis because they had mild illness that did not meet the case definition. Among the remaining 35 persons, 32 (91%) met the case definition. All of the cases had diarrhea, 28 (88%) had cramps, 8 (25%) had vomiting, 4 (13%) had fever, and 4 (13%) had blood in the stool. All of the cases had illness onset from March 16 at 7:00 p.m. to March 17 at 7:00 a.m. The median incubation period calculated from dinner on March 16 was 8 hours (range, 0.5 to 13 hours). Among the 13 cases who had recovered at the time of the interview, the median duration was 24 hours (range, 3 to 51 hours). All of the cases that vomited were under the age of 18 years. The illness attack rate at the juvenile correctional facility was 92%.

Four stool samples from cases at the juvenile correctional facility tested positive for *Clostridium perfringens* enterotoxin A. Three were positive for *C. perfringens* by culture, and isolates were

indistinguishable by pulsed-field gel electrophoresis. Of the three specimens that were positive for *C. perfringens* by culture, one also grew a very small amount of *Staphylococcus aureus* (two colonies), and was positive for *S. aureus* enterotoxin D.

By univariate analysis, eating scalloped potatoes and ham for dinner on March 16 (32 of 32 cases vs. 1 of 3 controls; odds ratio [OR], undefined; 95% confidence interval [CI], 3.91 to undefined; p = 0.01), and drinking juice served for breakfast on March 14 (19 of 26 cases vs. 0 of 3 controls; OR, undefined; 95% CI, undefined; p = 0.03), were significantly associated with illness. Multivariate analysis could not be conducted. However, not all interviewed cases had breakfast on Monday, and the time period from Monday breakfast to the illness onsets is inconsistent with bacterial intoxications caused by *C. perfringens*.

The environmental health evaluation revealed that all the food was prepared centrally at the correctional food service kitchen located in the city of Anoka. The scalloped potatoes and ham were made in a tilting steam-jacketed kettle the same day as service. Dried potatoes were added to boiling water in the kettle and reconstituted in about 15 minutes. Roux made of melted butter and flour was added from an adjacent kettle, and then diced ham (diced the previous day) was added. The production log showed that the food reached 180° F. The food was cooked between noon and 1:00 p.m., transferred to a hot-holding cabinet, and held between 1:00 p.m. and 3:00 p.m. Although the cabinet has a large digital temperature display, the holding temperature was not noted on the log. The food was then transferred to insulated transfer containers and delivered to five locations within the Corrections Department, including the workhouse and the juvenile correctional facility, between 3:00 p.m. and 3:30 p.m. It was then held hot at each of the kitchens from arrival until served. The workhouse inmates reported eating immediately after the food arrived. At the juvenile correctional facility, the food was served between 5:30 p.m. and 6:30 p.m. During the investigation, the kitchen staff at the juvenile correctional facility reported that a safety mechanism was triggered and turned the oven off at some point after the food arrived but before it was served, but the staff did not notice the problem until later. The three "pods" in the juvenile correctional facility were served out of the same large pan of food.

This was an outbreak of *Clostridium perfringens* intoxications associated with eating scalloped potatoes and ham on March 16. Illnesses were identified at two of five facilities served by a central kitchen, suggesting that a problem occurred at the central kitchen. The food most likely was not kept at the correct holding temperature. The workhouse inmates consumed the food upon arrival, precluding the opportunity for additional temperature abuse on-site. Additional temperature abuse at the kitchen at the juvenile facility likely contributed to the high attack rate among juvenile inmates. Since the absence of illnesses at the other three Corrections Department facilities was ascertained by asking each facility's nurse rather than speaking to inmates directly, it is possible that illnesses also occurred at those three facilities and were not reported to or detected by the nursing staff.

(14)
Trichinella spiralis Infections Associated with Wild Boar Meat

March — Winona County

On April 19, 2011, the Minnesota Department of Health (MDH) received a report from an infection preventionist at a local hospital of presumptive trichinellosis in a 50 year-old male with a history of wild boar consumption. A public health investigation was initiated immediately.

The index-patient was interviewed with a standard questionnaire regarding illness signs and symptoms, meat preparation and consumption, and travel history in the previous 2 months. Additional ill persons identified by the index-patient were also interviewed. Medical records from all ill individuals were reviewed. Laboratory testing of patient serum collected during routine patient care and the public health investigation for *Trichinella*-specific antibodies was conducted at the Centers for Disease Control and Prevention (CDC). Parasitological studies were performed on implicated meat products at CDC, the United States Department of Agriculture (USDA) Agricultural Research Service (ARS) and the University of Minnesota. A wet mount was made from meat and examined microscopically for *Trichinella* larvae. Confirmation to the species level was performed using a multiplex polymerase chain reaction (PCR). The larval concentration in several meat products was determined by counting the larvae found in 1-gram samples of partially digested muscle. Larvae infectivity was determined by orally inoculating larvae recovered from each tissue digestion into five Swiss-Webster mice.

On April 4, 2011, the index-patient presented to an urgent care clinic with a history of severe retro-orbital pain refractory to acetaminophen and ibuprofen therapy, and leg weakness lasting greater than a week. A complete blood count (CBC) without differential and basic chemistry panel were unremarkable. On April 6, he again presented to urgent care with worsening symptoms, burning sensations in his arms and legs, and joint and muscle pain. He began doxycycline treatment for the presumptive diagnosis of Lyme disease.

On April 10, the index-patient was hospitalized with 2 weeks of persistent retro-orbital headache, discomfort on movement of his eyes, fever, chills, and burning pain in his muscles, especially with flexing and extending his ankles, or bending his knees. At that time, an infectious disease physician was consulted by telephone. Upon further questioning, the patient revealed he recently consumed wild boar meat. Physical examination demonstrated muscle tenderness, including pain in the masseter muscles and in the thighs. Initial laboratory testing results were notable for a normal peripheral total white blood cell count (WBC) (9,200 cells/mm^3; expected range: 4,500-11,000 cells/mm^3) with an eosinophilia (1,400 cells/mm^3; expected range: 200-600 cells/mm^3), elevated creatine phosphokinase (CK) (887 international units (IU)/L; expected range: 49-397 IU/L), and elevated aspartate aminotransferase (AST) (101 IU/L; expected range: 15-41 IU/L)), alkaline phosphatase (ALP) (194 IU/L; expected range: 38-126 IU/L), and alanine transaminase (ALT) (194 IU/L; expected range: 17-63 IU/L). Antibody titers for Lyme disease, Hepatitis A, B, and C, mononucleosis, and *Trichinella* spp. and polymerase chain reaction (PCR) for influenza A and B were negative. The index-patient was empirically treated with methylprednisolone and a tapered prednisone regimen. The index-patient's symptoms and clinical laboratory values began to improve within 24 hours of initiating therapy. The index-patient was discharged on April 12 with a diagnosis of febrile illness and eosinophilia after a 3-day hospital stay.

On April 13, the index-patient returned to the emergency room with severe muscle pain and fever despite prednisone therapy. Physical exam again demonstrated generalized and persistent muscle tenderness. Laboratory testing results were notable for a normal total WBC (9,600 cells/mm^3) with a marked eosinophilia (3,900 cells/mm^3), elevated myoglobin levels (612ng/ml; expected range: 17.4-106 ng/ml), elevated CK (792 IU/L), and elevated AST (115 IU/L), ALP (156 IU/L), and ALT (154 IU/L). He was diagnosed with myositis and his prednisone dosage was increased.

Due to the patient's concern about dermatomyositis, a condition a sibling had, an infectious disease consultant examined the patient on April 14. A left sartorius muscle biopsy was performed and many

Trichinella spp. larvae were observed when examined microscopically. Repeat examination of the previous computerized tomography imaging demonstrated rectus eye muscle edema.

Following the trichinellosis diagnosis, the index-patient began albendazole treatment in addition to the prednisone therapy that preceded the diagnosis. The following day, the index-patient developed atrial fibrillation with a heart rate of 130 beats per minute. An initial dose of diltiazem failed to convert the atrial fibrillation to a normal sinus rhythm. Normal sinus rhythm was achieved by electrical cardioversion.

Patient interviews revealed that the index-patient and his 10 year-old son had traveled to a wild game farm in Montour, Iowa on March 11. At the wild game farm, the index-patient had killed a wild boar, which was then field dressed by the farm staff, cut into quarters, and packed in coolers for transport. On March 14, he and two of his sons, including the son who went hunting, processed the meat into meal size portions. The index-patient and his son who went hunting did not wear gloves, while his older son wore rubber gloves when cutting the raw meat. Both the index-patient and his younger son reported consuming food and drink while processing the meat. All of the meat was placed in a home freezer. The index-patient reported developing gastrointestinal symptoms including nausea and abdominal pain on March 16 following the meat processing. On March 20, his wife prepared two wild boar roasts for the family. All six family members, including the index-patient, consumed the roasts. The family reported the roasts were "well-done" and "dry" but did not use a meat thermometer to record the internal cooking temperature. The index-patient's gastrointestinal symptoms continued. He then developed a headache on March 30 and sought the above mentioned medical care 15 days following the meal.
The index-patient's son who went on the hunting trip developed influenza-like symptoms including fever, headache, cough and generalized malaise on April 6. The son was seen in an outpatient clinic, diagnosed with influenza, pharyngitis, and bronchitis and prescribed amoxicillin. In response to the outbreak investigation, the son was re-examined on April 19 by the infectious disease specialist and found to have moderate calf tenderness. Laboratory results revealed a normal WBC (9,020 cells/mm3; expected range: 4,500 to 13,500 cells/mm3) with an eosinophilia (2,600 cells/mm^3; expected range: 0 to 1000 cells/mm^3) and an elevated CK (798 IU/L). He was treated with albendazole and a tapering prednisone regimen with no ill effects.

None of the remaining family members reported any signs or symptoms consistent with trichinellosis. All were examined concurrently to the younger son, and none had any remarkable exam or laboratory findings.

All six family members consented to blood collection for *Trichinella* serology testing 1 month after wild boar consumption. The index-patient and his younger son who went on the hunting trip and handled raw meat with their hands were both positive for *Trichinella* spp. IgG antibody, despite the index-patient having had an initial negative test result. The remaining family members were seronegative and refused convalescent sample collection.

Tissue from the index-patient's muscle biopsy, along with a roast, breakfast sausage, and bratwurst from the wild boar were submitted to CDC for *Trichinella* identification. Encapsulated *Trichinella* larvae were visualized in the index-patient's muscle biopsy and in a wet mount of the roast. The index-patient's biopsy specimen and samples of breakfast sausage and bratwurst were positive for *T. spiralis* by multiplex-PCR. Tissue digestion was performed at both the USDA ARS and the University of Minnesota on 1-gram samples of ham roast, breakfast sausage and bratwurst. Larvae were identified from all

samples and digestion results varied from 12 to 36 larvae per gram with the highest concentration found in the bratwurst. Mouse inoculation results demonstrated that the larvae were not infective; however, the meat products had been frozen in the family freezer for 38 days at the time of sample collection, which may have killed the larvae.

On May 2, 2011, Iowa Meat and Poultry Bureau compliance officers visited the game farm and interviewed the owner about the hunting and carcass handling processes. The farm was licensed by the Iowa Department of Natural Resources as a game preserve and offered guided hunts for elk, deer, sitka, buffalo, wild rams, wild goats, and wild boars. Approximately 100 Russian wild boars were raised on 11 acres and fed a diet of soybean meal and corn. However, the animals could be cannibalistic if one of the wild boars died and the owner did not remove the carcass immediately. In addition, the boars had opportunities to consume other wildlife. The owner confirmed that farm staff bled out, eviscerated, and removed the hide after the animals were killed by the hunters. Additional meat processing was available upon request, in violation of Iowa regulations. Once notified of this violation, the owner agreed to discontinue the further processing of wild boars and to warn future hunters about the risks of acquiring *Trichinella* infection when consuming wild boar by offering hunters trichinellosis fact sheets.

This was a trichinellosis outbreak associated with wild boar consumption that was harvested at a wild game farm. The exact exposure of the index-patient and his son is unknown. However, the evidence suggests that cross-contamination during processing of the wild boar meat rather than consumption of undercooked meat was the exposure that led to the outbreak.

Reference

1. Holzbauer S, Agger W, Hall R, Johnson G, Schmitt D, Garvey A, Bishop H, Rivera H, de Almeida M, Hill D, Stromberg B, Lynfield R, Smith K. Outbreak of *Trichinella spiralis* infections associated with consumption of wild boar hunted at a game farm in Iowa. *Clin Infect Dis*. 2014 Dec 15;59(12):1750-6.

(15)
Salmonella Heidelberg Infections Associated with Ground Turkey

March — Multiple counties/Multiple states

In April 2011, the Minnesota Department of Health (MDH) Public Health Laboratory identified a *Salmonella* Heidelberg isolate with MDH pulsed-field gel electrophoresis (PFGE) pattern designation SH24; this PFGE pattern matched a ground turkey isolate collected by the Minnesota Department of Agriculture as part of the National Antimicrobial Resistance Monitoring System (NARMS) retail food study. The case refused to answer most of the questions in an interview. On May 19, PulseNet, the Centers for Disease Control and Prevention (CDC) PFGE laboratory, noticed matches in multiple states. By May 26, 30 cases had been reported in 17 states, and the CDC initiated a multi-state investigation. On that day, MDH provided information on the ground turkey isolate (e.g., specimen collection date, brand name, and antimicrobial resistance pattern) to CDC epidemiologists.

In Minnesota, a case was defined as a Minnesota resident with laboratory-confirmed infection with *S.* Heidelberg PFGE subtype SH24 or SH92. The second PFGE subtype pattern was added to the case definition based on a positive result from product collected from a case in another state as a result of the investigation.

Cases were contacted for an interview by phone regarding illness history and potential exposures. A questionnaire developed by CDC was used in addition to the Minnesota routine surveillance form.

Information collected from case interviews and information regarding the NARMS retail sample was shared with CDC, other states, and the United States Department of Agriculture Food Safety and Inspection Service (USDA-FSIS).

CDC coordinated a multi-state investigation of cases. USDA-FSIS conducted the plant investigation and initiated recalls.

Two cases, one with a *S.* Heidelberg SH24 infection and one with SH92 were identified in Minnesota. The two cases had illness onset on March 22 and 24, respectively. Both cases were hospitalized, for 1 and 5 days, respectively. Both cases recovered. A detailed symptom history was collected for the case with the *S.* Heidelberg SH92 infection. *S.* Heidelberg SH92 was recovered from a urine specimen from that case. The case had fever and blood in the urine, but denied having diarrhea or vomiting. The *S.* Heidelberg SH92 case was interviewed on March 30, before knowing that he was part of the outbreak. The case reported eating ground turkey in the week prior to illness, but did not know the brand name. The case was re-interviewed on August 8 using CDC's multi-state outbreak investigation form. The case reiterated that he had consumed ground turkey of unknown brand. The *S.* Heidelberg SH24 case refused to answer most questions regarding exposures, but it was determined that neither case traveled in the 7 days prior to their illness.

Antimicrobial susceptibility testing was conducted on the *S.* Heidelberg SH24 isolate, and it was resistant to ampicillin, gentamicin, streptomycin and tetracycline.

The ground turkey isolate was collected from a grocery store as part of NARMS sampling on March 7. It was Brand A. The isolate was resistant to ampicillin, gentamicin, streptomycin and tetracycline.

Nationally, 136 cases with the two outbreak strains of *S.* Heidelberg, SH24 (n=109) and SH92 (n=27), were reported from 34 states: Alabama, Arkansas, Arizona, California, Colorado, Connecticut, Georgia, Illinois, Indiana, Iowa, Kansas, Kentucky, Louisiana, Massachusetts, Maryland, Michigan, Minnesota, Mississippi, Missouri, Nebraska, Nevada, New Jersey, New York, North Carolina, Ohio, Oklahoma, Oregon, Pennsylvania, South Dakota, Tennessee, Texas, Utah, Vermont, and Wisconsin [1]. Illness onset dates were between February 27 and September 13, 2011. The median age of cases was 23 years (range, <1 year to 90 years). Fifty-five percent were male. Among the 94 cases with available information, 37 (39%) were hospitalized. One death was reported.

Among the 94 cases with available information, 51 (54%) reported consuming ground turkey. This proportion was significantly higher than the results from a FoodNet survey of healthy persons in which 11% of persons interviewed reported consuming ground turkey in the 7 days before they were interviewed. Of the 13 *S.* Heidelberg SH92 cases that were interviewed, 12 (92%) reported consumption of ground turkey in the 7 days before their illness began [1].

In addition to the Minnesota NARMS samples, four NARMS ground turkey samples collected in other states between March 7 and June 27 yielded *S.* Heidelberg SH24, and one NARMS sample yielded *S.* Heidelberg SH92. The brand name for the positive ground turkey samples was Brand A, and all of the

positive products originated from a common food-production establishment, Cargill Meat Solutions Corporation in Springdale, Arkansas. A sample of leftover unlabeled frozen ground turkey from the home of a case in Ohio yielded both outbreak strains on July 29 [1].

Antibiotic resistance information was available for isolates from 12 samples of ground turkey collected at retail and from 23 cases. The isolates from the ground turkey samples were resistant to ampicillin, streptomycin, tetracycline, and gentamicin. All isolates from humans for which antimicrobial susceptibility testing was conducted were also resistant to ampicillin and tetracycline, and some were also resistant to gentamicin and streptomycin [1].

On July 29, USDA-FSIS released a public health alert for frozen or fresh ground turkey products. On August 3, Cargill Meat Solutions recalled 36 million pounds of ground turkey products produced at the Springdale, Arkansas plant.

This was a multi-state outbreak of *S.* Heidelberg infections associated with consumption of ground turkey products produced by Cargill Meat Solutions. The outbreak led to a ground turkey product recall. Two cases associated with this outbreak were identified in Minnesota.

Reference

1. Centers for Disease Control and Prevention. Multistate Outbreak of Human *Salmonella* Heidelberg Infections Linked to Ground Turkey. http://www.cdc.gov/salmonella/heidelberg/index.html

(16)
Suspected Bacterial Intoxications Associated with a Restaurant

April — Hennepin County

On April 11, 2011, the Minnesota Department of Health (MDH) foodborne illness hotline received two independent complaints of gastrointestinal illness among individuals who ate at a restaurant in Bloomington on April 8. The City of Bloomington Environmental Health Division (CBEHD) was notified and an investigation was initiated immediately.

CBEHD sanitarians visited the restaurant on April 11 to evaluate food preparation and handling procedures. Credit card receipts were not available. MDH staff interviewed the complainants and their meal companions about food consumption and illness history. A case was defined as a restaurant patron who developed vomiting or diarrhea (≥3 loose stools in a 24-hour period) after eating at the restaurant. Leftover fried rice collected from consenting patrons was submitted to the MDH Public Health Laboratory (PHL) for testing. No stool specimens were tested.

Five restaurant patrons were interviewed; three (60%) met the case definition. All three cases reported diarrhea and vomiting, one (33%) reported cramps, and none reported fever or bloody stools. The median incubation period for the cases was 1 hour (range, 0.5 to 3.5 hours). The duration of illness for the two cases who had recovered by the time they were interviewed was 7.5 and 11 hours. Leftover fried rice collected from complainant's homes was negative for *Staphylococcus aureus*. One colony of *Bacillus cereus* was isolated from fried rice. However, that colony tested negative for the emetic toxin gene by PCR. Currently, the MDH PHL is unable to test directly for the *Bacillus cereus* emetic toxin in food.

The small number of cases and non-ill controls precluded a meaningful statistical analysis of specific food exposures. However, all three cases and no controls reported consuming fried rice.

CBEHD sanitarians inspected the restaurant on April 11. Cooked rice was observed being held in an improperly functioning cold well for up to 2 hours prior to being fried. On a previous inspection on April 4, cooked rice was observed at 92° F in the cold well with an ambient cold well temperature of 62° F. The sanitarians ordered the cold well to be repaired and to discontinue holding cooked rice in the cold well until repaired. On a follow-up inspection on April 14, the cold well was repaired and functioning properly.

This was a foodborne outbreak of bacterial intoxications associated with a restaurant in Bloomington. Fried rice was the likely vehicle. Although the etiology was not confirmed, the symptoms, incubation periods, and likely vehicle of fried rice are characteristic of the emetic form of *Bacillus cereus*. Malfunctioning cold hold equipment likely led to the amplification of bacteria and toxin production in the rice.

(17)
Norovirus Gastroenteritis Associated with a Camp

April Beltrami County

On April 19, 2011, the Minnesota Department of Health (MDH) foodborne illness hotline received an illness complaint associated with attending a basket making workshop at a camp in Bemidji, Minnesota from April 15 through 17. The complainant reported that at least 10 of 44 people in attendance had become ill with vomiting and diarrhea during or after the workshop. MDH Environmental Health Services was contacted and an investigation was initiated.

On April 21, an MDH sanitarian visited the camp to evaluate food preparation and handling procedures, interview food workers, and determine if there were reports of illness among other camp attendees. A list of workshop attendees was provided by the workshop organizer. Attendees were interviewed by MDH staff about food consumption and illness history. A case was defined as a workshop attendee who subsequently developed vomiting or diarrhea (≥3 loose stools in a 24-hour period). Stool samples collected from consenting workshop attendees and food workers were submitted to the MDH Public Health Laboratory for bacterial and viral testing.

Illness histories and exposure information were obtained from 34 of 44 workshop attendees. Of these, 21 (62%) individuals met the case definition. Two cases had illness onset on April 16, four had illness onset on April 17 and 15 had illness onset on April 18. The median duration of illness for the 11 cases who had recovered at the time of the interview was 44 hours (range, 7 to 82 hours). Seventeen (81%) cases reported vomiting, 15 (71%) reported diarrhea, 10 (50%) reported cramps, 5 (24%) reported fever and none reported bloody stools. Three stool samples submitted by ill workshop attendees tested positive for norovirus GI.

MDH sanitarians interviewed the three food workers dedicated to the basket making workshop and inspected the kitchen used to prepare the meals. One food worker reported vomiting and diarrhea on April 15. A second food worker became ill with diarrhea on April 18. The food worker with illness onset

on April 15 did not work that day but did work on Saturday, April 16. That food worker's job duties included salad and vinaigrette preparation, peeling and cutting potatoes, slicing bread, serving food and washing the dishes.

Stool samples submitted by both ill food workers also tested positive for norovirus GI. Nucleic acid sequencing was conducted on all five norovirus-positive attendee and food worker samples, and the resulting sequences were all identical.

The MDH sanitarian inquired about illness among other camp attendees and food workers. During that weekend four other camps were in operation. There were no other complaints of illness among attendees. However, there was one report of an ill food worker in a different camp from where the basket weaving workshop took place.

Two workshop attendees became ill on Saturday, April 16. Three classes, in separate classrooms, were offered each day of the workshop. One attendee who became sick on April 16 vomited during a class and had several other classmates attending to her and cleaning up the room. Four attendees who later became ill had been in the classroom when the case vomited. Two of these cases had stool samples positive for norovirus GI. The median incubation period from onset of the first case was 30.5 hours (range, 16.5 to 37.5 hours).

Incubation periods were calculated from several different meal dates and times. The ill food worker prepared meals on Saturday, April 16. The median incubation period from Saturday's breakfast was 41.5 hours (range, 5.5 to 49 hours). The median incubation period from Saturday's lunch was 38 hours (range, 1 to 45 hours). The median incubation period from Saturday's dinner was 32 hours (range, -5 to 39 hours). Two attendees were already ill at the time of Saturday's dinner; one of them ate dinner and one did not.

By univariate analysis, eating breakfast on Saturday (19 of 21 cases vs. 3 of 10 controls; odds ratio [OR], 22.2; 95% confidence interval [CI], 2.3 to 276; Fisher's exact $p = 0.001$), eating lunch on Saturday (21 of 21 cases vs. 5 of 10 controls; OR, undefined; Fisher's exact $p = 0.001$), and eating dinner on Saturday (19 of 21 cases vs. 4 of 10 controls; OR, 14.3; 95% CI, 1.6 to 174; Fisher's exact $p = 0.01$) were significantly associated with illness.

This was a foodborne outbreak of norovirus gastroenteritis associated with a camp. A specific food vehicle was not identified but the primary source of transmission was an infected food worker who contaminated one or more ready-to-eat foods. A food worker who prepared the meals on April 16 became ill on April 15 and subsequently tested positive for norovirus GI with a sequence that was identical to positive samples from ill attendees and also a second food worker who became ill on April 18. The distribution of incubations suggests that most cases were exposed on April 16. There were two attendees whose incubation periods do not fit with exposure on Saturday because they became ill on Saturday. These attendees could have been exposed to norovirus prior to attending the workshop or on Friday night. Four cases were in the room at the time that one of the Saturday onset cases vomited in class. Therefore some person-to-person transmission could have occurred in addition to the documented foodborne transmission.

(18)
Norovirus Gastroenteritis Associated with a Hotel

May Hennepin County

On May 3, 2011, the City of Bloomington Environmental Health (CBEH) received a report from management at the a hotel that a number of individuals who had stayed at the hotel, including a mission group, or attended a benefit auction held at the hotel on April 30 had developed gastrointestinal illness. The Minnesota Department of Health (MDH) was contacted and an investigation was initiated immediately.

CBEH sanitarians visited the hotel on May 3 to evaluate food preparation and handling procedures, interview food workers, and collect contact information for groups that held events at the hotel from Friday, April 29 through Monday, May 2. MDH staff interviewed hotel guests about food consumption and illness history. Hotel guests who attended a benefit auction held on Saturday, April 30 received an email from the auction organizers which included MDH contact information. A case was defined as a hotel guest who developed vomiting or diarrhea (≥3 loose stools in a 24-hour period) after eating food prepared at the hotel. Stool samples collected from consenting hotel guests and employees were submitted to the MDH Public Health Laboratory for bacterial and viral testing.

MDH staff interviewed 113 hotel guests, including 100 auction attendees, 8 members of a mission group, and 5 independent complainants. Sixty-one (54%) guests met the case definition. Eighteen additional guests reported illness that did not met the case definition and were excluded from analysis. Hotel guests reported illness onsets from April 30 through May 4. The median incubation period for the ill auction attendees was 37 hours (range, 9 to 87 hours). Incubation periods could not be calculated for the mission group or the independent complainants as they reported multiple meals at the hotel. The median duration of illness was 46 hours (range, 4 to 96 hours). Forty-six (77%) cases reported diarrhea, 42 (70%) reported cramps, 39 (65%) reported vomiting, 18 (30%) reported fever, and none reported bloody stools. Stool samples submitted by five ill auction attendees tested positive for norovirus GII.

Due to a lack of non-ill controls among the mission group and other hotel guests, analysis of food exposures was restricted to auction attendees. By univariate analysis, consuming fresh fruit skewers was significantly associated with illness (40 of 48 cases vs. 18 of 34 controls; odds ratio [OR], 4.4; 95% confidence interval [CI], 1.4 to 14.1; $p = 0.003$).

CBEH sanitarians interviewed 69 hotel employees. Seven, including three restaurant staff, reported recent gastrointestinal illness. A bartender reported developing diarrhea on April 28 and did not return to work until May 1. A bartender/server reported developing diarrhea and vomiting the morning of May 1 and reported working that day as a server. A server reported developing diarrhea on May 2. One banquet staff member became ill on May 2 after bartending at the benefit auction. Additional hotel staff, including an engineer, shuttle driver, and executive assistant reported illness onsets of May 1. One employee, who prepared fresh fruit served at the breakfast buffet on May 3, reported an ill household member with an illness onset of May 2. A dishwasher who was not interviewed reported an illness onset of May 3. One stool specimen submitted by the bartender who worked at the benefit auction tested positive for norovirus GII. The hotel reported that fresh fruit is peeled the night before and then sliced right before being served. The two employees that prepared the fruit skewers for the auction did not

report illness. Of note, the hotel has an employee cafeteria with a hot and cold buffet, and all employees working a full shift receive a meal from the buffet.

Nucleic acid sequencing was conducted on the five positive norovirus samples from auction attendees and the one norovirus sample from the ill hotel employee; the nucleic acid sequences were identical.

All employees with vomiting and/or diarrhea were excluded from work until 72 hours after the resolution of symptoms. The sanitarians observed bare-hand contact with ready-to-eat foods. During the investigation, sanitarians and restaurant management established a screening protocol for employee illness. The sanitarians also stressed the importance of handwashing for the prevention of norovirus transmission and ordered surfaces to be disinfected.

This was a foodborne outbreak of norovirus gastroenteritis associated with a hotel in Bloomington. While fresh fruit skewers were identified as the vehicle among auction attendees, the original source of contamination was not identified. Since the fruit on the skewers was peeled and cut at the hotel, it is more plausible that a food worker was the source of the contamination as opposed to the fruit being contaminated prior to arriving at the hotel. Hotel employees with illness onsets from April 28 through May 3 were identified, and transmission of norovirus from ill food workers to hotel guests was more evident later in the outbreak.

(19)
Norovirus Gastroenteritis Associated with a Funeral Luncheon at a Church

May Dakota County

On May 3, 2011, the Minnesota Department of Health (MDH) foodborne illness hotline received a report of gastrointestinal illness among individuals who attended a luncheon following a funeral at a church on April 30. The complainant reported that 175 people had attended the luncheon and at least 12 people had become ill with vomiting and diarrhea. MDH Environmental Health Services was contacted and an investigation was initiated.

On May 5, a MDH sanitarian met with one of the pastors at the church. While the Minnesota Department of Health does not license the church, the luncheon organizer agreed to provide a list of people who either prepared or helped serve food, and their contact information. MDH sanitarians interviewed food helpers regarding illness, foods prepared, and what foods they ate at the luncheon. The original complainant provided MDH with a partial list of luncheon attendees. Attendees were interviewed by MDH staff about food consumption and illness history. A case was defined as someone who had attended the luncheon and subsequently developed vomiting and/or diarrhea (≥3 loose stools in a 24-hour period). The MDH Public Health Laboratory tested stool samples collected from consenting luncheon attendees for bacterial and viral pathogens.

Illness histories and exposure information was obtained from 61 funeral luncheon attendees; 31 (50%) met the case definition. Seventeen (57%) of 30 food helpers were interviewed, and none reported illness prior to the funeral luncheon. However, seven (23%) food helpers reported illness afterward and met the case definition. The majority of food helpers also attended the funeral and ate at the luncheon. Illness onsets ranged from April 30 to May 5. The median incubation period from the luncheon was 36 hours (range, 6.5 to 106 hours). The median duration of illness for the 15 people who had recovered at the time

of the interview was 33 hours (range, 3 to 84 hours). Thirty (97%) cases reported diarrhea, 23 (74%) reported vomiting, 13 (42%) reported fever, 11 (35%) reported cramps, and 2 (6%) reported bloody stools. Three of four stool samples submitted by ill luncheon attendees tested positive for norovirus GII.

A complete list of foods served at the luncheon was not available initially; therefore, not all interviewed attendees were asked about all food items. The lunch was comprised of food items that had been purchased from a grocery store as well as items prepared by volunteers at home. The following items were served at the luncheon: sliced ham and turkey, buns, American and Swiss cheese, pickles, olives, veggie tray with dip, fresh fruit tray, 12 different salads donated by the congregation, a variety of dessert bars also donated by the congregation, and coffee and punch.

By univariate analysis, consumption of buns (28 of 31 cases vs. 17 of 25 controls; odds ratio [OR], 4.4; 95% confidence interval [CI], 0.9 to 28.5; p = 0.048), white cheese (19 of 29 cases vs. 8 of 23 controls; OR, 3.6; 95% CI, 1 to 13.2; p = 0.03), mayo (18 of 30 cases vs. 4 of 25 controls; OR, 7.9; 95% CI, 1.9 to 38.1; p = 0.001), pickles (9 of 20 cases vs. 3 of 20 controls; OR, 4.7; 95% CI, 0.9 to 31.3; p = 0.04), potato salad (14 of 30 cases vs. 5 of 24 controls; OR, 3.3; 95% CI, 0.9 to 14.2; p = 0.05), Caesar salad (8 of 18 cases vs. 2 of 20 controls; OR, 7.2; 95% CI, 1.1 to 78.1; p = 0.03), Bok choy salad (5 of 17 cases vs. 0 of 15 controls; OR, undefined; p = 0.02), and water (15 of 31 cases vs. 4 of 25 controls; OR, 4.9; 95% CI, 1.2 to 23.7; p = 0.01) were significantly associated with illness. In a multivariate analysis that included all of the significant variables from the univariate analysis, only potato salad (adjusted OR [aOR], 21.5; 95% CI, 1.5 to 303.2; p = 0.02) remained independently associated with illness. Caesar salad (aOR, 31.7; 95% CI, 0.7 to >999; p = 0.08) approached significance. Using stepwise logistic regression model selection both the Caesar salad (OR, 19.6; 95% CI, 1.6 to 235.7; p = 0.02) and potato salad (OR, 8; 95% CI, 1.2 to 52.4; p = 0.03) remained independently associated with illness. These two food items were prepared by different people.

This was a foodborne outbreak of norovirus gastroenteritis associated with a luncheon at a church following a funeral service. Caesar salad and potato salad were identified as the vehicles of transmission. While no food helpers reported illness prior to the luncheon, many food helpers were not interviewed, and contamination by one of more unidentified ill food helpers is the most plausible source of contamination.

(20)
Salmonella 4,[5],12:i:- Infections Associated with Live Animal Markets

May 2011-July 2012 Dakota County

Beginning in May 2011, the Minnesota Department of Health (MDH) observed an increase in *Salmonella* 4,[5],12:i:- isolates with pulsed-field gel electrophoresis (PFGE) pattern TM918 (CDC designation JPXX01.1314) received through routine disease surveillance. During routine interviews, many cases reported exposure to one of three independently owned adjacent live animal markets (LAM) located in South St. Paul.

Customers visit these markets to select a live animal (goat, sheep, pig, cow, or poultry), usually for immediate slaughter and processing on-site. The markets are licensed by the Minnesota Department of Agriculture (MDA) to operate as custom-exempt meat-processing facilities. This designation includes regular, but not continuous, inspection for sanitation and construction. Custom-exempt facilities may

process meat only for the owner of the animal; the markets may not sell cuts of meat to customers or restaurants. Customers at the markets frequently handle the carcasses extensively at the facilities during processing. An investigation was initiated, with a focus on Market A, which is the largest of the three markets and which was more frequently reported by cases.

A case was defined as an individual from whom *S.* 4,[5],12:i:- TM918 was isolated between May 1, 2011 and July 31, 2012. Individuals with *Salmonella* infections of other serotypes during this same time period that matched any environmental isolate collected at Market A were also classified as cases.

Market-associated cases were defined as cases who reported exposure to one of the South St. Paul LAMs prior to illness onset. Due to background occurrence of sporadic cases with these patterns and the temporal spread of this outbreak, market-associated cases were used in most analyses.

Exposure to a LAM was defined as visiting a LAM facility, handling meat purchased at a LAM, or living in or visiting a household where meat purchased at a LAM was prepared or served. LAM exposure reported in the several months prior to illness onset was counted.

On August 9, 2011, MDA staff collected 40 environmental swab samples from the live animal and slaughter rooms at Market A. Swabs were tested for *Salmonella* at the MDA laboratory; one isolate from each serotype of *Salmonella* identified in these samples was sent for PFGE subtyping at the MDH Public Health Laboratory (PHL).

Cases were interviewed with a supplemental questionnaire detailing exposures to a LAM or to meat purchased from a LAM, including meat handling and preparation procedures.

Twenty-six *S.* 4,[5],12:i:- TM918 cases were identified through routine surveillance from May 2011 through July 2012; illness onsets ranged from May 3, 2011 to July 5, 2012. Of the 23 cases who could be interviewed, 14 (61%) reported exposure to Market A, one of the other two markets, or more than one of these markets.

Salmonella enterica was found in 21 of 40 (53%) environmental swabs collected at Market A on August 9, 2011. Ten serotypes were identified; *S.* 4,[5],12:i:- TM918 was found in a swab taken from a wooden post inside a live animal holding pen. *S.* Adelaide (PFGE subtype ADL16) was found in six swabs, *S.* Infantis (SIN87) in six, *S.* Rissen (RIS6) in five, *S.* Anatum (SAN39) in three, *S.* Derby (DRB36) in three, *S.* Ohio (OHO7) in two, *S.* Chailey (CHAI2) in one, *S.* Give (GIV2) in one, and *S.* Johannesburg (JOH4) in one. *S.* 4,[5],12:i:- PFGE subtype TM1100 was found in one sample. Some swabs tested positive for multiple *Salmonella* serotypes. Positive samples were from the pig/sheep/goat slaughter room and customer processing area, the cattle slaughter room and customer processing area, and the live animal holding pens.

Eight additional human cases whose isolate matched a *Salmonella* isolate from a Market A sample by PFGE were identified through routine surveillance from May 2011 through July 2012. Of these eight cases (three *S.* Infantis, two *S.* Rissen, one *S.* Ohio, one *S.* Adelaide, and one *S.* Chailey), four (one *S.* Infantis, two *S.* Rissen, and one *S.* Ohio) of seven (57%) reported exposure to one of the LAMs.

Of the 18 market-associated cases, 11 (61%) were Hmong or Asian, 6 (33%) were Black, and 1 (6%) was Hispanic. The median age of cases was 1 year (range, 1 month to 64 years). Nine (50%) cases were <1 year old, and eight (44%) were female. Six (33%) cases were hospitalized.

All 18 market-associated cases visited or lived in a household where meat from the markets was prepared. Only four (22%) market-associated cases directly visited the markets, and four (including two who visited the markets) reported eating meat purchased at a LAM. Rates of LAM patronage among affected racial or ethnic groups are not known.

The Minnesota cases were included in a 2011-2012 national cluster investigation of approximately 167 *S.* 4,[5],12:i: - cases from 37 states. Nationally, 54% of cases were Asian, Black, or Hispanic, and 76% reported exposure to livestock or pork. Subclusters in other states were associated with live pig exposure (Texas) and a LAM (California).

MDA and MDH staff visited the markets frequently following detection of the outbreak to conduct inspections, provide recommendations to prevent disease transmission, and to post hand hygiene signs and other educational materials. The LAMs were the focus of MDH's "Healthy Markets" campaign in 2012 that focused on basic food safety messages such as "cook", "clean", "chill", and "separate". The campaign was part of H3N2v influenza outreach at the markets. MDH staff handed out fliers and buttons, spoke on Hmong radio, and staffed booths at Hmong cultural fairs.

MDH and MDA are working with the City of Minneapolis and community organizations to conduct focus groups with members of the Twin Cities Somali and Latino communities. Information gathered about food handling practices and food safety beliefs in these communities will be used to design future disease prevention measures that will be both effective and accepted by these communities. Focus groups with Hmong community members are anticipated in the future.

The LAM venue is a unique setting that exposes customers to high risk situations for foodborne illness. Live animals at the markets are stored on-site, and the markets do not operate an all-in, all-out policy to limit transmission among live animals. Potential for contamination of processed meat from carcasses or live animal areas is high. Customers can have contact with intestines and other internal organs that may be highly contaminated, and can bring them home. Meat is not routinely wrapped in packaging for transport; customers may use plastic bags or place raw meat and organs directly in laundry baskets or coolers. Additionally, further processing of carcasses or large amounts of meat at home poses substantial risk of contamination of environmental surfaces and spread to household members. Cultural traditions such as washing meat and eating undercooked or raw meat may also play a role.

This was an outbreak caused by multiple *Salmonella* serotypes identified through routine disease surveillance and associated with direct or indirect exposure to live animal slaughter markets. The proportion of cases without direct market exposure suggests heavy contamination of carcasses and meat and unsafe meat handling/preparation at home. The live animal market setting is a unique exposure that disproportionally affects minority populations and calls for further ethnically appropriate efforts to prevent disease transmission.

(21)
Norovirus Gastroenteritis Associated with a Wedding

May Wright County

On May 10, 2011, the Minnesota Department of Health (MDH) foodborne illness hotline received a complaint of gastrointestinal illness in people who attended a wedding in Annandale on May 6. The wedding was held at a park and was catered. Approximately 120 persons attended the wedding. The MDH St. Cloud district office was notified on May 10, and an investigation was initiated.

MDH obtained a list of wedding attendees and interviewed them about food consumption and illness history. A case was defined as a person who attended the wedding and subsequently developed vomiting and/or diarrhea (≥3 loose stools in a 24-hour period). Stool specimens were submitted to the MDH Public Health Laboratory for bacterial and viral testing.

On May 11, an MDH sanitarian visited the caterer to evaluate food preparation and handling procedures and to interview food workers about illness history and work duties.

Fifty-three wedding attendees were interviewed, and 32 (60%) met the case definition. All 32 cases reported diarrhea, 20 (63%) reported vomiting, 12 (38%) reported cramps, 6 (19%) reported fever, and none reported bloody stools. The median incubation period was 37 hours (range, 8.0 to 71.5 hours). The median illness duration was 47.5 hours (range, 18.0 to 81.0 hours). Two cases visited a medical provider; one of the two cases went to an emergency room and the other case was hospitalized overnight.

Four stool specimens (from three wedding attendees and one employee) were submitted to MDH and all tested positive for norovirus GII. Three of the positive specimens (two attendee specimens and the employee specimen) could be sequenced, and all three had identical nucleic acid sequences. All specimens tested negative for *Campylobacter*, *Salmonella*, Shiga toxin-producing *E. coli*, *Shigella*, and *Yersinia*.

Food items prepared at the caterer included sliced ham, chicken breasts, garlic mashed potatoes, California-blend vegetables, Italian pasta, dinner rolls, pickles, butter, coffee, and lemonade. Cookies and wedding cake were purchased from a bakery in Cold Spring, Minnesota. Tootsie rolls and peanuts were purchased by the wedding party and placed in bowls on the guest tables. Bottled water, beer, and pop were also purchased by the wedding party. All the foods from the caterer were self-serve on a buffet line, except for the head table, for which food was plated and served by the catering staff.

By univariate analysis, consuming garlic mashed potatoes (32 of 32 cases vs. 17 of 21 controls; odds ratio [OR], undefined; 95% confidence interval [CI], undefined; $p = 0.02$) and peanuts (22 of 30 cases vs. 9 of 21 controls; OR, 3.7; 95% CI, 1.1 to 12.3; $p = 0.03$) were significantly associated with illness. A multivariate analysis using logistic regression could not be conducted because of the zero cell in the mashed potato analysis.

Illness histories and job duty information were obtained from the five caterer employees. No employees reported having had gastrointestinal illness previous to or on the implicated meal date. One employee, who prepared the mashed potatoes, vegetables, and noodles for the Italian pasta, initially reported having ill household members over the weekend of the event but later reported that the ill household members

had an onset date similar to the patrons. This employee denied having any illness herself. Another employee (the one who tested positive for norovirus) became ill with an onset date similar to the attendees (incubation period from the reception of 36 hours). This employee reported eating ham, garlic mashed potatoes, dinner rolls, lemonade, wedding cake, and cookies at the wedding reception.

There were no reports of vomiting at the event. Of the 52 dinner attendees interviewed, no one reported being ill during or prior to the event. There was mention of a child being ill the week prior to the event; however, this information could not be verified with the child's parents.

MDH sanitarians stressed the importance of proper handling of food and beverages, use of gloves when handling ready-to-eat foods, good handwashing, thorough cleaning and disinfection, and exclusion of ill food handlers.

This was a foodborne outbreak of norovirus gastroenteritis associated with eating at a wedding dinner. Because 60% of interviewed attendees were ill, there likely was extensive contamination of one or more food items. The likely source of contamination was a food worker who might have been exposed to ill household members before preparing the mashed potatoes.

(22)
Norovirus Gastroenteritis Associated with a Restaurant

May Fillmore County

On May 16, 2011, the Minnesota Department of Health (MDH) foodborne illness hotline received a complaint of gastrointestinal illness among a group of 13 patrons who ate at a restaurant in Fountain. The group consisted of high school seniors who spent the day canoeing before eating at the restaurant. Reportedly, 10 persons became ill with vomiting and/or diarrhea after eating at the restaurant on May 11. On May 17, a second complaint of gastrointestinal illness among a group of four people from two households who also ate at the restaurant on May 11 was received. An investigation was initiated.

MDH epidemiology staff interviewed persons in both complaint groups about illness history and foods eaten at the restaurant.

MDH Environmental Health (EH) specialists visited the restaurant to evaluate food preparation and handling procedures and to inquire about employee illness. Restaurant employees were interviewed about recent history of gastrointestinal illness, job duties and foods eaten at the restaurant.

The restaurant owner was asked to screen employees for gastrointestinal illness when they presented to work during the investigation.

MDH EH specialists requested credit card receipts for patrons who ate at the restaurant on May 11, but the restaurant did not have any.

A case was defined as a person who ate at the restaurant and subsequently developed vomiting and/or diarrhea (≥3 loose stools in a 24-hour period). Stool samples collected from consenting restaurant

patrons and employees were submitted to the MDH Public Health Laboratory for bacterial and viral testing.

Nineteen restaurant patrons were interviewed. Three patrons reported mild gastrointestinal illness that did not meet the case definition; they were excluded from further analysis. Nine of the remaining 16 (56%) met the case definition. Eight (89%) cases reported vomiting, eight (89%) reported abdominal cramps, six (67%) reported diarrhea, two (22%) reported bloody stools, and none reported fever. None of the cases visited a medical provider. The median incubation period was 33 hours (range, 14 to 34 hours). The median duration of illness was 44 hours (range, 33 to 87 hours).

Cases reported eating a variety of foods: hamburgers, chicken strips, sandwiches (pork or Cuban), pickles, onion rings, French fries, ice cream, and beverages. Statistical analysis did not implicate a single food item as being associated with illness.

During the environmental health assessment, one employee was observed as having extensive bare-hand contact with ready-to-eat (RTE) foods (including hamburger buns), items at the bar leaving, and the ice scoop in the ice. The restaurant had been ordered to "limit bare-hand contact with RTE foods, like lettuce" on inspections conducted prior to the outbreak.

Illness histories and job duty information were obtained from all seven restaurant employees. One employee, the employee observed having bare-hand contact with RTE foods, reported having a recent history of gastrointestinal illness, as well as illness in three members of her household. On initial interview, she reported that her illness onset occurred before the meal date of the cases, but on a more formal interview, she reported illness onset as May 13.

MDH sanitarians stressed the importance of proper handling of food and beverages, use of gloves or utensils when handling RTE foods, good handwashing, and exclusion of ill food workers.

MDH collected stool specimens from one case and the restaurant employee that reported illness, and both tested positive for norovirus GII.4 New Orleans, but the viral sequences were different.

This was an outbreak of norovirus gastroenteritis associated with a restaurant in Fountain, Minnesota. A specific food vehicle was not identified. An ill employee that had extensive bare-hand contact with RTE foods was identified, but the illness onset was unclear, and the viral sequence from that employee was different than that of the patrons; therefore, it is unclear if that person was the initial source of the outbreak. However, bare-hand contact with ready-to-eat foods could have played a role in contamination of food.

(23)
Norovirus Gastroenteritis Associated with a Restaurant

May Hennepin County

On May 17, 2011, the City of Edina Health Department received a complaint from a party of three individuals who had dined at a restaurant in Edina on May 14. The complainant reported that all

three individuals had developed symptoms of gastrointestinal illness after their meal. The Minnesota Department of Health (MDH) was notified, and an investigation was initiated on May 18.

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 (≥3 loose stools in a 24-hour period). The restaurant was unable to provide credit card receipts for additional patrons. A stool specimen was obtained from one patron and submitted to MDH for bacterial and viral testing.

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

The City of Edina and MDH each received an additional complaint from parties who had dined at the restaurant on May 14 and 17 before becoming ill with symptoms of gastrointestinal illness. Illness histories and exposure information were obtained from six restaurant patrons. Five (83%) cases were identified.

All five cases reported diarrhea, four (80%) reported vomiting, three (60%) reported cramps, and two (40%) reported fever. The median incubation period was 31.5 hours (range, 28 to 33.5 hours). The median duration of illness was 71.5 hours (range, 36 to 107 hours) for the two cases with known recovery date times. The one stool sample tested positive for norovirus GII.

The small number of cases and lack of non-ill controls prevented a statistical analysis of specific food exposures. However, four of the five cases report eating different kinds of salads.

Illness histories and job duty information were obtained from nine employees. Two employees reported recently having a gastrointestinal illness, with illness onset dates of May 13 and 15. The employee with the May 13 onset reported working while actively having diarrhea. Employees reporting illness performed a variety of job duties at the restaurant, including food preparation. The City of Edina sanitarians stressed the importance of proper handling of food and beverages, use of gloves when handling ready-to-eat foods, proper handwashing, and exclusion of ill employees.

This was a foodborne outbreak of norovirus gastroenteritis associated with a restaurant in Edina. While a specific vehicle was not identified, the presence of ill employees indicates that contamination of ready-to-eat food by an ill food worker was the most plausible source of contamination.

(24)
Suspected Norovirus Gastroenteritis Associated with a Restaurant

May Kandiyohi County

On May 31, 2011, the Minnesota Department of Health (MDH) received a call from the owner of a restaurant in Raymond, Minnesota to report gastrointestinal illness among 20 to 30 people who had eaten at the restaurant on May 28, 2011. An investigation was initiated.

A list of names and phone numbers of people who had become ill was provided by the owner. Cases and healthy meal-companion controls were interviewed by phone about illness history and food/beverage

consumption at the restaurant. Cases were defined as patrons who developed vomiting and/or diarrhea (≥3 loose stools in a 24-hour period) after eating at the restaurant on May 28. MDH staff and Kandiyohi County sanitarians interviewed all food service employees. A case-control analysis was performed to assess the risk of illness associated with specific food items. Cases with incubation periods of >48 hours were excluded. This was done to exclude potential secondary cases from the analysis, as many cases were found to be household contacts of other cases.

Of 21 patrons who ate at the restaurant on May 28, 12 met the case definition. Among cases, reported incubation periods ranged from 12 to 80 hours (median, 34 hours). Three cases reported incubation periods >48 hours and had household contact with another case. Among the nine cases with incubation periods ≤48 hours, median age was 40 years and seven (78%) were male. Vomiting and diarrhea were reported by all nine (100%), and fever by one (11%). The median duration of illness for the four cases who had recovered at the time of the interview was 38 hours (range, 18 to 42 hours). One patron submitted a stool sample, which was negative for norovirus and bacterial pathogens.

Cases and controls reported consuming a variety of foods and beverages available on the menu. No specific food item was significantly associated with illness.

Five food service employees were interviewed, of whom two reported illness. One employee was ill 6 to 8 days prior to the meal date suspected to be the source of the outbreak, and the other became ill on the day of the suspect meal date. Both employees worked as food servers, and one also wrapped silverware.

The owner closed the restaurant temporarily for cleaning and planned to implement screening of food workers upon return to work to enforce exclusion of ill employees. The owner was instructed to discard all ready-to-eat foods prepared by ill food handlers prior to reopening the restaurant.

This was a foodborne outbreak of gastrointestinal illness associated with a restaurant. Norovirus was suspected to be the etiology based on the distribution of incubation periods and symptoms reported by cases. Based on the identification of two ill employees who had handled food at the restaurant, the source of the outbreak likely was one or more infected food workers.

(25)
Staphylococcus aureus Intoxications Associated with a Graduation Party

June — Olmsted County

On June 6, 2011, the Minnesota Department of Health (MDH) foodborne illness hotline received a complaint of gastrointestinal illness among 20 of 150 attendees of a June 4 graduation party in Byron, Minnesota; several guests had sought medical attention at an emergency department during the party due to gastrointestinal illness. Food items served at the event included: pulled pork and pulled beef provided by a restaurant in Rochester; pickles, watermelon, cake, and condiments purchased at a grocery store; and, homemade potato salad. Olmsted County Public Health Services (OCPHS) was notified and an outbreak investigation was immediately initiated.

Environmental Health (EH) specialists from OCPHS visited the restaurant on June 6 to observe food preparation, handling, and temperature holding procedures. Contact information for party attendees was

obtained from the party host. MDH staff conducted interviews with party attendees to obtain information on food consumption, food preparation, and illness history.

A case was defined as a graduation party attendee who subsequently developed vomiting and/or diarrhea (≥3 loose stools in a 24-hour period). Stool samples from consenting attendees were submitted to the MDH Public Health Laboratory (PHL). Leftover food from the graduation party was obtained by OCPHS staff and tested at the MDH PHL for enterotoxins and toxin-producing bacteria.

Of the 64 party attendees interviewed, 14 (22%) met the case definition. One case was the daughter of the party host who had onset of vomiting, cramps, headache, and chills 7 hours after consuming leftover peeled hardboiled eggs on June 5 (she had not consumed potato salad at the party on June 4); this case was excluded from further analyses. Another six (9%) attendees reported mild gastrointestinal illness that did not meet the case definition and were also excluded from further analyses. The median incubation period for cases was 4 hours (range, 1 to 10 hours). For the 11 cases who had recovered at the time of interview, the median duration of illness was 14 hours (range, 1 to 25 hours). Twelve (92%) cases reported vomiting, 10 (77%) diarrhea, 6 (46%) cramps, 5 (39%) fever, and 1 (8%) reported bloody stools. Two cases visited an emergency department and none were hospitalized.

In a univariate analysis, consuming potato salad (13 of 13 cases vs. 23 of 43 controls; odds ratio, undefined; 95% confidence interval lower limit, 2.9; $p = 0.002$) was the only food item significantly associated with illness.

The potato salad was prepared by four people at the house of the party host. Potatoes for the salad were prepared on June 2, 2 nights prior to the party. Forty pounds of potatoes were cut up, boiled, drained, and immediately placed in the refrigerator overnight. The fridge contents, including the milk and potatoes used in the salad, were reportedly warm the next morning. The milk may have been mixed into the salad on this day (June 3). Shell eggs were purchased on the day of the party (June 4), boiled, cooled, peeled, sliced, and added to the potato salad that morning around 8:00 a.m. One potato salad preparer reported that the potatoes were still warm when the lid was removed to add the eggs. The finished potato salad was kept on ice during the graduation party. Extra peeled hard-boiled eggs not used in the potato salad were stored in a plastic bag in the fridge.

One stool sample from an ill attendee was received at the MDH PHL. The attendee's illness onset was on June 4, and the stool sample was collected June 7; the stool was negative for norovirus, *Salmonella*, *Shigella*, *Campylobacter*, Shiga toxin-producing *E. coli*, *Staphylococcus aureus*, and *Bacillus cereus*.

Samples of leftover potato salad and leftover peeled hard-boiled eggs were collected from the fridge of the party host on June 7. Both foods initially tested negative for *S. aureus* and *B. cereus* enterotoxins; however, both food samples were cultured, and 3×10^8 colony-forming units of *S. aureus* per gram of food was isolated from the potato salad, and 6×10^8 CFU/g were isolated from the hard-boiled eggs. Three *S. aureus* colonies from each food sample were tested for toxin production and subtyped; all six produced staphylococcal enterotoxin A and were indistinguishable by pulsed-field gel electrophoresis (subtype MR765). The hard-boiled eggs also grew *B. cereus* on culture (the concentration could not be quantified); the isolates produced the diarrheal type of *B. cereus* enterotoxin. *B. cereus* was not found in the potato salad sample, and case incubation, duration, and symptom profiles were more consistent with those caused by preformed *S. aureus* toxin than the diarrheal form of *B. cereus.*

Centers for Disease Control and Prevention guidelines for confirmation of *S. aureus* as the etiology of an outbreak include the isolation of $\geq 10^5$ CFU/g from an epidemiologically implicated food, provided the specimen is properly handled.

EH specialists identified no food preparation, handling, or temperature abuse issues at the restaurant that provided the pulled meats, with the exception that a cook underestimated the safe cook temperature for ground beef and chicken by 5° F when asked.

This was a foodborne outbreak of *S. aureus* intoxications associated with a graduation party. Potato salad prepared with hard-boiled eggs was identified as the vehicle of transmission. Temperature abuse of the potato salad during preparation likely led to conditions conducive to *S. aureus* replication and formation of enterotoxin A. The source of the *S. aureus* contamination was not identified, but most plausibly occurred during handling/peeling of the hard-boiled eggs and other potato salad ingredients by a food preparer colonized with *S. aureus*.

(26)
Salmonella Newport Infections Associated with a Sandwich Restaurant Chain

June-July — Multiple Counties/Multiple states

From July 10 to July 13, 2011, four *Salmonella* Newport isolates with indistinguishable pulsed-field gel electrophoresis (PFGE) patterns (JJPX1.0011) were identified through routine laboratory surveillance by the Minnesota Department of Health (MDH) Public Health Laboratory. On routine interview, all four cases reported eating at Sandwich Restaurant Chain A at seven different locations, during the week before illness onset. A review of the PulseNet national database revealed that cases with matching PFGE patterns had been identified since June 1 in Alabama, Connecticut, Delaware, Georgia, Illinois, Louisiana, Massachusetts, Maryland, Michigan, Mississippi, Missouri, Montana, North Carolina, North Dakota, New Hampshire, New Jersey, New York, Ohio, Pennsylvania, South Carolina, Vermont, Virginia, Wisconsin, and Wyoming. Because this PFGE pattern is common throughout the southeastern United States, MDH conducted an investigation focusing on states reporting cases outside the southeastern United States.

The first cases identified and interviewed (Minnesota-4, North Dakota-2), were enrolled in a case-control study using a matched design, with four neighborhood controls per case. The primary objective of the study was to assess association of illness with having eaten at Chain A in the week before illness onset. Cases were also asked about specific food items consumed from Chain A. The Minnesota Department of Agriculture coordinated a traceback of produce items received at Chain A restaurants where cases reported purchasing meals in Minnesota, North Dakota, Ohio, Michigan, Wyoming, Connecticut, and Maryland. Because epidemiologic links were not as clear in states outside of Minnesota and North Dakota despite indistinguishable PFGE patterns by two enzymes, multiple locus variable-number tandem repeat analysis (MLVA) was performed on all case isolates from these states in order to provide more refined laboratory discrimination.

The six cases initially identified in Minnesota and North Dakota reported illness onset dates from June 21 to July 4, 2011. Median age was 35 years (range, 17 to 57 years), and all were female. The median incubation period was 6 days (range, 2 to 8 days). Data was not available for two cases due to uncertain meal date. Illness duration was 7 days for the one case who had resolution of symptoms at the time of

interview. Diarrhea was reported by six cases (100%), fever by three (50%), and vomiting by two (33%). One case was hospitalized. All reported Chain A exposure, with meal dates from June 16 to June 30, 2011. Cases were significantly more likely to have eaten at Chain A than controls (6 of 6 cases vs. 4 of 19 controls; matched odds ratio, 8.6; 95% confidence interval, 1.5 to 49.6; p = 0.002). Specific items most frequently consumed at Chain A included cucumbers (6 of 6) lettuce (5 of 6), and tomatoes (4 of 6).

Traceback of produce items received at the restaurants from which these six cases purchased meals revealed that lettuce was provided by multiple west-coast suppliers and therefore was unlikely to be a common vehicle for *S*. Newport in this outbreak. Cucumbers or tomatoes could have come from a common source. However, a single definite source could not be distinguished from the available data. The four candidates included a tomato grower in Florida, a tomato grower in Mexico, or either of two cucumber growers in Georgia. Because produce from the same fields would have passed through distribution and been consumed by the time these sources were identified, further action at the farm or distributor level was not taken. Two additional cases with matching PFGE patterns were identified in Minnesota over the subsequent month, one of whom had eaten at Chain A during the exposure period with a similar onset date to the previously identified cases, and one with a later onset date and no identified Chain A exposure.

A smaller proportion of cases in other states reported Chain A exposures, and illness onset dates differed by up to several weeks from those reported in Minnesota and North Dakota. MLVA typing was performed on seven Minnesota cases, one North Dakota case, and some of the cases from Connecticut, Georgia, Louisiana, Michigan, North Carolina, Ohio, South Carolina, and Wyoming. Minnesota and North Dakota cases were indistinguishable by MLVA. Cases in states outside of Minnesota and North Dakota displayed less than 85% similarity with the outbreak strain by MLVA. Traceback of produce received at Chain A restaurants in other states yielded no common source of produce for all restaurants involved.

This was a foodborne outbreak of *Salmonella* Newport associated with Sandwich Restaurant Chain A restaurants in Minnesota and North Dakota. The likely vehicle was either cucumbers or tomatoes. While not yet validated for differentiation of *S.* Newport strains, MLVA results were consistent with results of epidemiologic and traceback investigations, indicating that the cases in Minnesota and North Dakota were likely to be related, but that cases in other states were not as likely to be part of this outbreak.

(27)
Salmonella Uganda Infections Associated with Cantaloupe

June-July — Rice County/Multiple states

In July, 2011, the Minnesota Department of Health (MDH) Public Health Laboratory identified a *Salmonella* Uganda isolate with MDH pulsed-field gel electrophoresis (PFGE) pattern designation UG1. The case was interviewed about illness and exposures on July 21. On July 22, the South Carolina Department of Health & Environmental Control (SCDHEC) announced that they had identified a cluster of two *S.* Uganda cases with the same PFGE pattern by posting the information to PulseNet (the national molecular subtyping network for foodborne bacterial disease surveillance) information sharing site. On that same day, an MDH epidemiologist contacted SCDHEC to share case exposure information. The SCDHEC epidemiologist reported that they had identified two additional cases, and that all four

of the South Carolina cases reported eating breaded chicken products and cantaloupe. The Minnesota case reported consumption of cantaloupe, but not breaded chicken products. By July 29, 11 cases with matching PFGE pattern had been identified in 7 states; the CDC initiated a multi-state investigation.

In Minnesota, a case was defined as a Minnesota resident with laboratory-confirmed infection with *S.* Uganda PFGE subtype UG1.

Cases were interviewed by phone regarding illness history and potential exposures. A questionnaire developed by CDC was used in addition to the Minnesota routine surveillance form.

Information collected from case interviews was shared with CDC, other states, the Minnesota Department of Agriculture (MDA), and the United States Food and Drug Administration (FDA).

CDC coordinated a multi-state investigation of cases.

One case with a *S.* Uganda UG1 infection was identified in Minnesota. The case was a 3 year-old child with illness onset on June 23, was not hospitalized, and recovered. The case reported diarrhea and cramps, but no bloody stools, vomiting or fever. The case did not travel in the week prior to his illness onset.

Nationally, 13 cases with the outbreak strain of *S.* Uganda were reported from 7 states: Georgia, Indiana, Massachusetts, Minnesota, New York, Oklahoma, and South Carolina. Illness onset dates ranged from June 6 to July 15, 2011. The median age of cases was 59 years (range, 3 year to 78 years). Fifty-four percent were female. Three patients were hospitalized. One death was reported.

Among nine cases with available information, eight (89%) reported consuming cantaloupe in the week before illness onset, and the remaining case said they may have eaten cantaloupe.

A traceback investigation was conducted by MDA by reviewing records and invoices from the retailer where the Minnesota case's cantaloupe was purchased, but without data from other states, the source of the cantaloupes associated with this outbreak could not be identified.

This was a multi-state outbreak of *S.* Uganda infections associated with consumption of cantaloupes. The source of cantaloupes was not identified. One case associated with this outbreak was identified in Minnesota.

(28)
Salmonella Typhimurium Infections Associated with a Restaurant

June-July — Winona County

On July 12, 2011, the Minnesota Department of Health (MDH) Public Health Laboratory (PHL) notified MDH epidemiology staff of four *Salmonella* Typhimurium isolates with indistinguishable pulsed-field gel electrophoresis (PFGE) patterns that were identified through routine surveillance; the subtype was designated TM185. All of the cases resided in Winona, Minnesota. Routine interviews of the cases revealed that three of them had eaten at a restaurant in Winona during the week before their illness

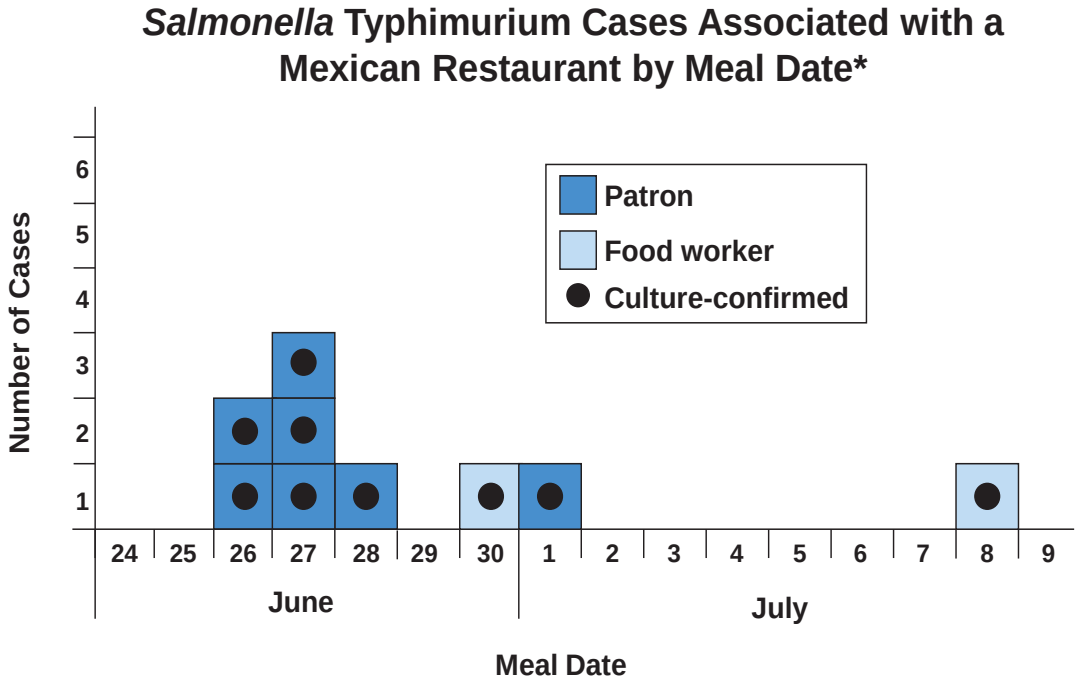
onset; the fourth case was a food worker at the restaurant. Sanitarians from Winona County Community Services (WCCS) were notified on July 13, and an investigation was initiated.

All *Salmonella* cases reported to MDH are interviewed about exposures and food consumption as part of foodborne disease surveillance in Minnesota. Epidemiologists reviewed the information gathered during the interviews of *S.* Typhimurium cases to identify other potential cases associated with eating at the restaurant.

A primary case was defined as a person who reported eating at the restaurant since June 15 and who subsequently had *S.* Typhimurium TM185 isolated from a clinical specimen. A secondary case was defined as an individual who had *S.* Typhimurium TM185 isolated from a clinical specimen after reported close contact with a primary case.

On July 13, WCCS sanitarians conducted an inspection of the restaurant and began interviewing employees. Stool samples were required from all food workers.

Eight primary cases were identified. Two secondary cases were also identified but were excluded from further analysis. All eight primary cases had diarrhea, seven (88%) had cramps, seven (88%) had fever, four (57%) of seven had blood in their stool, and two (25%) had vomiting. The median duration of illness was 9.5 days (range, 7 to 10 days) for the four cases who had recovered at the time of interview. Two cases required hospitalization for their illness, for a median of 4 days (range, 3 to 5 days). Meal dates ranged from June 26 to July 1 (see epidemic curve); the median incubation period was 6 days (range, 3 to 14 days).



*** Note: Meal date unknown for one culture-confirmed patron**

Cases reported eating a variety of food items. Due to the fact that the outbreak occurred during the State of Minnesota government shutdown, no additional case finding or ingredient-specific analyses were conducted.

The July 13 inspection of the restaurant by a WCCS sanitarian identified five critical and six non-critical violations. Violations identified included an observed lack of handwashing, bare-hand contact with ready-to-eat foods, potentially hazardous foods with no date markings, and raw animal foods stored with ready-to-eat foods. Management and employees were educated on proper handwashing, closely monitoring employee illness, proper cleaning and sanitizing of surfaces, storage of raw and ready-to-eat foods, and minimizing bare-hand contact with ready-to-eat foods.

All 24 food workers were interviewed about recent illness and job duties. Three food workers at the restaurant tested positive for *S.* Typhimurium. All of these food workers were excluded from work in food service until two consecutive stools collected at least 24 hours apart tested negative for *Salmonella.* Two of these food workers reported recent symptoms of gastrointestinal illness, with onset dates of June 30 and July 8 (see epidemic curve). One additional food worker reported being recently ill with gastrointestinal illness (unknown onset date), but tested negative for *Salmonella*. The other 19 food workers tested negative for *Salmonella* and reported no recent illness.

This was an outbreak of *Salmonella* Typhimurium infections associated with a restaurant. Due to the fact that the outbreak occurred during the State of Minnesota government shutdown, no additional case finding or ingredient-specific analyses were conducted. The ultimate source of the outbreak was not determined; however, plausible sources include undercooked foods of animal origin, cross-contamination from raw or undercooked foods of animal origin to ready-to-eat foods, or contamination of foods by an infected food worker. There was no evidence of ongoing transmission after ill employees were removed from working and environmental health interventions were put in place at the restaurant.

(29)
Salmonella Muenchen Infections Associated with Iceberg Lettuce

June-July — Multiple counties/Multiple states

On July 11, 2011, the Minnesota Department of Health (MDH) Public Health Laboratory (PHL) determined that two clinical *Salmonella* Muenchen isolates submitted through routine surveillance had indistinguishable pulsed-field gel electrophoresis (PFGE) patterns (Centers for Disease Control and Prevention [CDC] *Xba*I designation JJ6X01.1021; MDH designation SMU104). The cases were both interviewed using the standard MDH *Salmonella* questionnaire. From July 12 through July 15, five additional isolates with the outbreak PFGE pattern were identified by the MDH PHL through routine surveillance. On July 15, the New York State Department of Health reported two *S.* Muenchen isolates with the outbreak PFGE pattern to the national PulseNet database. A multi-state investigation was initiated.

A case was defined as a person from whom *S.* Muenchen with the outbreak PFGE pattern (JJ6X01.1021) was isolated, with a specimen collection date after June 15, 2011. Minnesota cases were interviewed with the standard MDH *Salmonella* questionnaire. In Minnesota, exposures of interest identified during hypothesis generation were compared to non-outbreak *Salmonella* and *E. coli* O157:H7 cases interviewed during the same time period (i.e., case-case comparison design). The Minnesota Department of Agriculture (MDA) initiated traceback investigations of suspect products.

Nationally, 24 cases from 8 states were identified in this outbreak (11 in Minnesota, 7 in New York, and 1 each in Massachusetts, Michigan, Montana, New Jersey, Pennsylvania, and Wisconsin). Thirteen (52%) cases were female. The cases had a median age of 54 years (range, 17 to 93 years), and illness onset dates ranged from June 27 through August 12.

Of the 11 Minnesota cases, 6 (55%) were female. The cases had a median age of 39 years (range, 25 to 93 years), and illness onset dates ranged from June 27 through July 6. All 11 cases reported diarrhea, 9 (82%) reported cramps, 8 (73%) reported fever, 6 (55%) reported vomiting, and 2 (18%) reported bloody stools. Five (45%) Minnesota cases were hospitalized.

Upon initial interview, all 11 Minnesota cases reported eating at one or more restaurants in the week prior to illness onset; 10 (91%) reported eating at multiple restaurants or at the same restaurant multiples times. However, none of the cases had any restaurants in common. Cases reported eating a wide variety of foods. Nine (82%) cases reported consuming iceberg lettuce, eight (73%) tomatoes, eight (73%) onions, eight (73%) strawberries, six (55%) pre-packaged salad, and six (55%) carrots.

In the Minnesota case-case comparison study, 29 non-Muenchen *Salmonella* and *E. coli* O157:H7 cases with illness onsets from June 1 through July 15, 2011 were used as a comparison group. Consumption of iceberg lettuce (8 of 9 *S*. Muenchen cases vs. 10 of 28 comparison cases; odds ratio [OR], 14.4; 95% confidence interval [CI], 1.6 to 132.3; $p = 0.008$) and consumption of cabbage (5 of 9 *S*. Muenchen cases vs. 4 of 29 comparison cases; OR, 7.8; 95% CI, 1.4 to 42.1; $p = 0.02$) were associated with illness.

Nationally, three additional cases in other states were interviewed using an expanded food consumption questionnaire. Two had attended separate conferences in the week prior to illness onset, and all of the meals were consumed as part of a menu plan; however, those menus were not obtained.

MDA initiated traceback investigations of the iceberg lettuce consumed at restaurants by eight Minnesota cases. Six different distributors were identified from point of service records, but it was not clear from the invoices what types of lettuce were received (e.g., iceberg vs. other, shredded vs. whole head). Further analysis of upstream distribution was not pursued.

This was a multi-state foodborne outbreak of *S.* Muenchen infections. Eleven cases of *S.* Muenchen related to this outbreak were identified in Minnesota. In Minnesota, cases were most likely associated with consuming a produce item such as iceberg lettuce or cabbage. The tight distribution of case illness onsets, which suggests a food vehicle with a short shelf life, supported this conclusion. The national investigation was limited in that only 14 of 24 cases (including the 11 cases in Minnesota) were interviewed with a detailed food consumption questionnaire. In addition, the state government shutdown in Minnesota in July made the investigation more difficult to conduct completely and in a timely manner within Minnesota.

(30)
Campylobacter jejuni Infections Associated with Raw Milk Served at a Farm

June-July Benton County

Routine surveillance interviews of two cases of *Campylobacter jejuni* infection conducted by the Minnesota Department of Health (MDH) in late July 2011 revealed that both cases had consumed raw milk at a farm near Sauk Rapids in the week prior to illness onset.

All *Campylobacter* cases reported to MDH are interviewed about food consumption and other exposures as part of foodborne disease surveillance in Minnesota. Epidemiologists reviewed the information gathered during the interviews of *C. jejuni* cases to identify potential cases associated with raw milk obtained at the Sauk Rapids farm.

Two cases were identified. Repeat interviews with both cases confirmed that they had consumed raw milk from the same private farm in Sauk Rapids, Minnesota in the week prior to illness onset. Reported consumption dates for the two cases were approximately June 27 and July 6-8, respectively. One case reported being a visiting relative of the farmer, while the other case was a friend. While both cases were present on the dairy farm, neither reported contact with the cows.

Both cases were males, aged 10 and 13 years. Both cases reported diarrhea and vomiting. One (50%) case reported cramps, one (50%) reported fever, and one (50%) reported bloody stools. Incubation periods could not be calculated because one of the cases consumed raw milk on multiple days and the other case was unsure of the specific consumption date. Cases had illness durations of 5 and 6 days, respectively. Both cases had a stool specimen test positive for *Campylobacter jejuni*; both isolates were indistinguishable by pulsed-field gel electrophoresis.

This was an outbreak of campylobacteriosis associated with raw milk consumption at a private farm. Raw milk is a well-established vehicle of campylobacteriosis.

(31)
Campylobacter coli Infections Associated with Raw Milk Served at a Farm

July Todd County

Routine surveillance interviews of two cases of *Campylobacter coli* infection conducted by the Minnesota Department of Health (MDH) in late July 2011 revealed that both cases had consumed raw milk at a farm near Grey Eagle, Minnesota in the week prior to illness onset.

All *Campylobacter* cases reported to MDH are interviewed about food consumption and other exposures as part of foodborne disease surveillance in Minnesota. Epidemiologists reviewed the information gathered during the interviews of *C. coli* cases to identify potential cases associated with raw milk obtained at the Grey Eagle farm.

Three cases were identified. Repeat interviews with the cases confirmed that they had consumed raw milk from the same private farm near Grey Eagle in the week prior to illness onset while visiting an extended relative. Reported consumption dates for the cases were July 6 and 7. While the cases were

present on the dairy farm, none of them reported contact with the cattle. Two additional family members visited the farm that did not become sick; these individuals did not report drinking raw milk; however, they did report direct contact with the cattle.

All cases were adults. All three cases reported diarrhea, one (33%) reported vomiting, one (33%) reported cramps, and one (33%) reported fever. The two cases with known exposure dates both reported incubation periods of 2 days. Cases had illness durations of 9 and 10 days, respectively for the two cases who had recovered at the time of interview. Two (67%) cases were hospitalized, for 3 and 4 days, respectively. All three cases had a stool specimen test positive for *Campylobacter coli*; all isolates were indistinguishable by pulsed-field gel electrophoresis. Additionally, all isolates were resistant to nalidixic acid.

This was an outbreak of campylobacteriosis associated with raw milk consumption at a private farm. Raw milk is a well-established vehicle of campylobacteriosis.

(32)

E. coli O157:H7 Infections Associated with a Bridal Shower Potluck

July Carver County

On August 3, 2011, the Minnesota Department of Health (MDH) Public Health Laboratory (PHL) identified a cluster of two *E. coli* O157:H7 isolates with indistinguishable two enzyme pulsed-field gel electrophoresis (PFGE) patterns. The pattern designation, MN974ECB47, was new to the Minnesota database.

During her interview on August 3, one of the cases (illness onset on July 27) reported attending a bridal shower potluck held at a church in Waconia, Minnesota on July 24 and knowing of other attendees who were ill, including another person who tested positive for *E. coli* O157:H7. An investigation was initiated promptly.

The other case (age, 3 years) had illness onset on July 26; this case did not attend the bridal shower but did attend an in-home daycare in Waconia. The case's sister (age, 11 years), who also tested positive for *E. coli* O157:H7 and had illness onset on July 21, was also a daycare attendee. On follow-up with the daycare provider, she reported that she and other children at the daycare had also been ill with diarrhea. An investigation was initiated at the daycare.

The 11 year-old sibling had visited a goat farm in Watertown, Minnesota on July 17 for a picnic potluck. The farm owner reported that no other picnic attendees had become ill, but was unwilling to provide a contact list for guests. An environmental investigation was initiated at the goat farm.

A contact list was obtained from the bridal shower potluck organizer, and attendees were called by MDH staff and interviewed with a standard questionnaire. Lists of food served and their preparers were obtained from the organizer and attendees.

A case was defined as a bridal shower attendee who subsequently developed diarrhea (≥3 stools in a 24-hour period) of ≥3 days duration or who had a stool sample test positive for *E. coli* O157:H7.

Thirty-three bridal shower attendees were interviewed; six (18%) met the case definition. One attendee reported illness that did not meet the case definition (vomiting and two loose stools in a 24-hour period) and was excluded from further analyses. Twenty-six controls were used in analyses.

The median incubation period for cases was 4.7 days (range, 2.2 days to 7.1 days). The median duration of illness was 7.8 days (range, 4.7 days to 10.8 days).

Three of the cases tested positive for *E. coli* O157:H7 at a clinical laboratory and were identified through routine disease surveillance. Isolates from these cases were indistinguishable by PFGE, with Minnesota pattern designation MN242ECB341 (the pattern name had been changed since the initial PHL report). All six cases had diarrhea and abdominal cramps, four (67%) had bloody stools, one (17%) had vomiting, and one (17%) had fever. One case was hospitalized for 6 days, and none developed hemolytic uremic syndrome.

Foods for the bridal shower were prepared and brought by guests and included ham and chicken salad sandwiches, buns, chicken pasta salad, fresh fruit, fresh veggies and dip, pickles and olives, potato chips and dip, and dessert bars.

In a univariate analysis, consuming chicken pasta salad (5 of 6 cases vs. 7 of 26 controls; odds ratio [OR], 13.6; 95% confidence interval [CI], 1.3 to 137.5; p = 0.02), carrots (5 of 6 cases vs. 6 of 24 controls; OR, 15.0; 95% CI, 1.4 to 155.3; p = 0.02), "crazy bars" (4 of 6 cases vs. 4 of 24 controls; OR, 10.0; 95% CI, 1.3 to 74.5; p = 0.03), watermelon (6 of 6 cases vs. 10 of 24 controls; OR, undefined; p = 0.02), and strawberries (6 of 6 cases vs. 11 of 24 controls; OR, undefined; p = 0.02) were all significantly associated with illness. A composite variable of any fresh fruit consumption was not statistically significant.

In a multivariate analysis including all of these variables, none were independently associated with illness.

The strawberries and watermelon (along with other fresh fruit) were purchased from a local grocery store and prepared (washed in cold water and cut) by a shower attendee who lived in the same household as family members who had attended the picnic at the goat farm in Watertown. The family members did not report illness in the week following the goat farm picnic, but a pattern closely related to the shower outbreak strain (MDH pattern designation MN242ECB47; indistinguishable from the main outbreak pattern by first enzyme, and one band different by second enzyme) was isolated from a goat and an environmental sample collected from the goat farm on September 1.

The source of the person-to-person outbreak at the in-home daycare in Waconia that ultimately involved three cases with pattern MN242ECB47 and one case with an unrelated pattern (MN1229ECB347) was also likely related to the goat farm – the sibling case who had attended the goat farm picnic was the first person ill in that outbreak.

This was a foodborne outbreak of *E. coli* O157:H7 infections associated with a bridal shower potluck. Based on the epidemiologic and environmental health investigation evidence, the most plausible vehicle was fruit prepared by an attendee. The ultimate source of the outbreak likely was a local goat farm where a very closely related strain of *E. coli* O157:H7 was found and where household members of the fruit-preparer had attended a potluck 8 days prior to the bridal shower. Contamination of the household

environment or direct contact from a household member with an unidentified infection were possible mechanisms of contamination of the fruit.

The goat farm was also the likely source of a local person-to-person outbreak at a Waconia daycare that occurred during this same time period and that was caused by a PFGE subtype of *E. coli* O157:H7 that matched *E. coli* O157:H7 isolates found on the goat farm.

(33)

Enterotoxigenic *E. coli* O6:NM Infections Associated with Minnesota Correctional Facilities

July-August Multiple counties

On August 1, 2011, the Medical Director for the Minnesota Department of Corrections (DOC) called the Minnesota Department of Health (MDH) foodborne illness hotline to report an increase in gastroenteritis cases at two correctional facilities; approximately 18 of 1,600 inmates at Minnesota Correctional Facility (MCF) – Stillwater had developed gastroenteritis since July 24, and five inmates at MCF – Lino Lakes had developed similar symptoms in the week prior to the report. DOC operates 11 facilities in Minnesota, all of which share the same food distributor in Wisconsin. Kitchens at each facility are staffed both by inmates and food vendor staff. MDH Environmental Health and the Washington County Department of Public Health and Environment (WCPHE) were notified, and an investigation was initiated.

DOC staff monitored all MCFs for gastroenteritis cases during the investigation; illnesses were subsequently identified at MCF – Faribault. MCF – Moose Lake reported two cases of gastroenteritis among inmates; however, since no additional cases were reported form MCF – Moose Lake during the outbreak, the investigation focused on the other three facilities.

A case was defined as an MCF inmate who developed gastrointestinal symptoms (diarrhea, vomiting, or abdominal cramps) from July 23 through August 26, 2011. Symptoms were recorded by health services staff at the correctional facilities and provided to MDH. Cases who worked with food were excluded from food service for 72 hours after symptoms had resolved. Scheduled transfers of ill inmates to other facilities were deferred until the inmate had recovered.

Incarcerated inmates were unable to be interviewed, so exposure histories were not obtained from inmates. Stool samples were collected from ill inmates by DOC health services and submitted to the MDH Public Health Laboratory (PHL) for bacterial and viral testing.

Environmental health specialists from MDH and Washington County visited several of the facility kitchens to evaluate food handling procedures and procure records. DOC staff provided the commissary menu, recipes, and records of inmate purchases of packaged food items from the canteen service for the time periods of interest.

The Minnesota Department of Agriculture (MDA) obtained invoices for food items received at the three facilities during the time period of interest. Receipt dates for specific food items, particularly produce and spices, were compared between facilities based on the timing of illness onsets at the facility and the commissary menu for the time periods of interest. Canteen purchases were compared between inmates who became ill and those who did not.

Sample trays ("Dead Man Trays") of food items served at the commissary during the time periods of interest were tested for enterotoxigenic *E. coli* (ETEC) at the MDA laboratory.

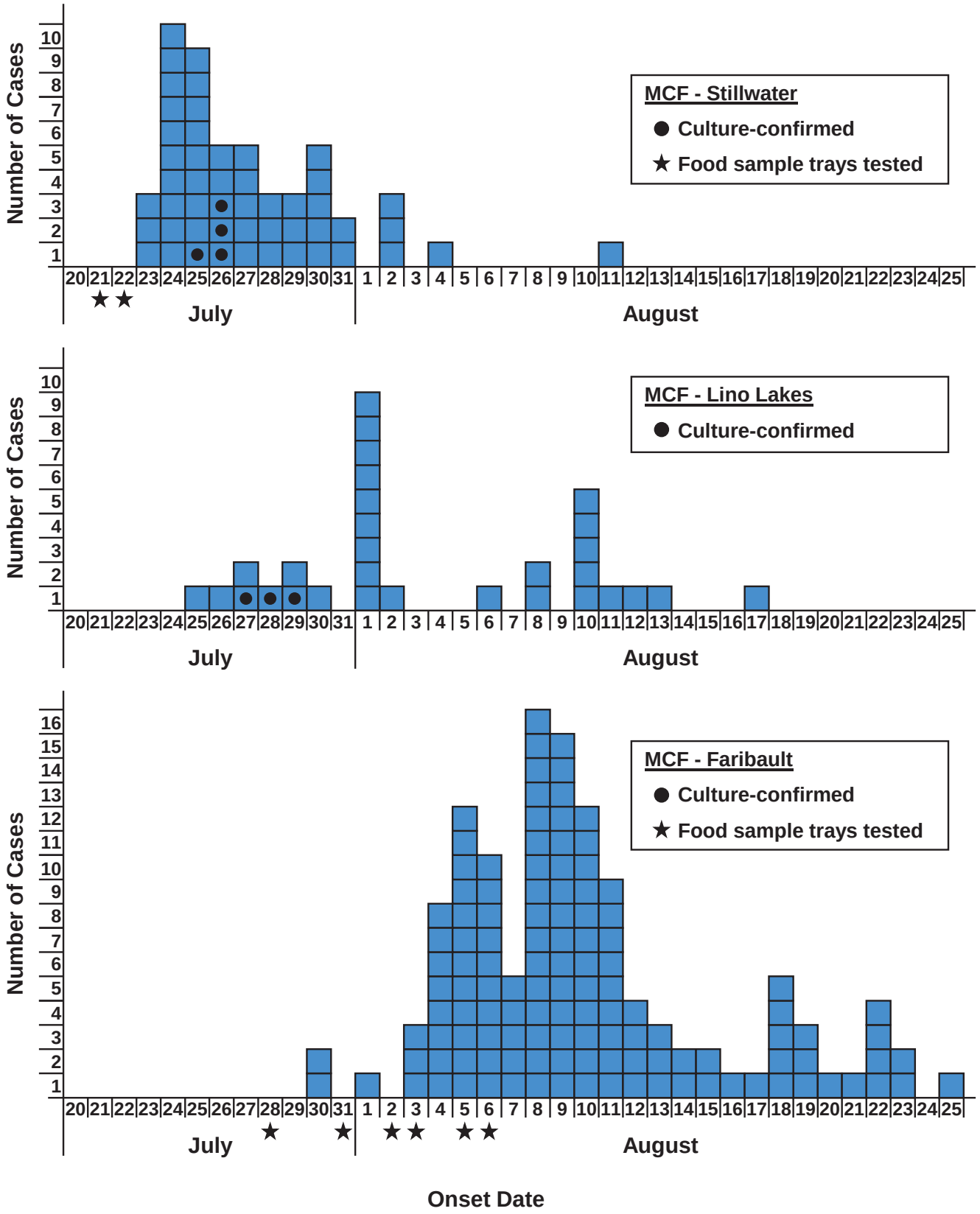
A total of 209 cases were identified in inmates from the three correctional facilities: 54 cases among MCF – Stillwater's 1,600 inmates (attack rate 3.4%) with illness onset dates from July 23 to August 11, and a peak of 10 new cases on July 24 (see epidemic curve); 30 cases among MCF – Lino Lakes' 1,400 inmates (attack rate 2.1%) with illness onset dates from July 25 to August 17, and a peak of 9 new cases on August 1; and, 125 cases among MCF – Faribault's 2,000 inmates (attack rate 6.3%) with illness onsets from July 30 to August 25, and a peak of 16 new cases on August 8. Cases were identified in multiple living units at each facility. Some inmate illnesses may have been the result of person-to-person secondary transmission; however, because the outbreak vehicle was not identified, primary transmission could not be ruled out and all cases were classified as primary cases. Inmates who reported gastrointestinal illness were confined to their cells until they were symptom-free or had been on antibiotic treatment for 24 hours; therefore, the potential for underreporting of illness was high.

All 209 cases were male. Open-ended symptom histories were available for Stillwater and Faribault cases (n=179). Of these, 163 (91%) reported diarrhea, 66 (37%) reported abdominal cramps, 8 (4%) reported vomiting, 4 (2%) reported fever, and 1 (1%) reported bloody stools. The median duration of illness for 160 cases was 7 days (range, 1 to 19 days). No cases were hospitalized.

Stool samples from 17 inmates were tested at the MDH PHL (5 from Stillwater, 5 from Lino Lakes, and 7 from Faribault); enterotoxigenic *E. coli* (ETEC) O6:NM was found in samples from 4 Stillwater inmates and 3 Lino Lakes inmates. The positive samples came from inmates with illness onset dates from July 25 through July 29. Six of the ETEC isolates had indistinguishable pulsed-field gel electrophoresis (PFGE) patterns (Minnesota pattern designation ETEC3EB3; Centers for Disease Control and Prevention [CDC] pattern designation EVEX01.0005/EVEA26.0002). The seventh isolate (from a Stillwater inmate) was two bands different by first enzyme (Minnesota pattern ETEC4EB3; CDC pattern EVEX01.0007/EVEA26.0002). The main outbreak PFGE pattern was indistinguishable from an ETEC outbreak that occurred in May 2011 at a New York City wedding; several potential common ingredients were identified, but no direct link was found. Several inmates who submitted stool samples had been taking antibiotics, which may have affected the lab results; two specimens from MCF – Faribault had no growth on enteric media and could not be tested further. All other specimens were negative for Shiga toxin-producing *E. coli*, *Shigella*, *Salmonella*, and *Campylobacter*. The Stillwater and Lino Lakes specimens were also tested for norovirus and were negative. Expanded *E. coli* virulence marker PCR testing was conducted; 4 of 15 (27%) specimens representing all three facilities tested positive for diffusely adherent *E. coli* (DAEC), including two that were also positive for ETEC. One DAEC-positive specimen, from a Lino Lakes inmate, was also positive for enteroaggregative *E. coli* (EAEC); this sample was negative for ETEC.

All 11 MCFs use the same commissary menu, and food items used to fulfill this menu are ordered and received from the same distributor. The food service director at each facility orders food independently for his/her facility based on the menu guidelines and need. Most facilities receive two food deliveries per week, and a single delivery truck may visit multiple facilities. For example, MCF – Oak Park Heights receives food from the same delivery truck on the same day as MCF – Stillwater (though the facilities may have ordered different foods for delivery on this truck); no illnesses were identified at MCF – Oak Park Heights. The facilities use a standard menu and an alternate, ovo-lacto vegetarian menu. Inmates may also order pre-packaged foods from the canteen service, which is operated by MINNCOR.

Enterotoxigenic *E. coli* O26:NM Cases in Three Minnesota Correctional Facilities by Illness Onset Date



No food items were implicated based on a comparison of dates for produce and spice items received by all three facilities during the time period of interest. Examination of pre-packaged food purchases among ill and non-ill inmates was limited by uncertain illness statuses and lack of consumption history; again, no food items were implicated.

MCFs routinely freeze and store a representative tray of food from each meal served at the facility; some of these frozen "Dead Man Trays" were available for the periods of interest at two of the correctional facilities involved in the outbreak. Seven Dead Man Trays from MCF – Faribault were collected from the facility on August 19. The trays represented a meal served at the commissary on July 28, July 31, August 2, August 3, August 5 (two meals), and August 6. Produce items from the trays, which included cantaloupe, lettuce, apples, nectarines, tomato, plum, orange, carrot, celery, and frozen spinach, were sampled and tested for ETEC at the MDA laboratory; no ETEC was found.

Most Dead Man Trays from the time period of interest had been discarded at MCF – Stillwater during a freezer cleaning. Two trays (representing a July 21 and a July 22 meal from an inmate with a tomato allergy) were picked up. Produce items on these trays included frozen veggie blend, Normandy blend, lettuce, carrot sticks, celery sticks, and frozen carrots. All food products on the Stillwater trays were tested; no ETEC was found.

Trays were not available from MCF – Lino Lakes for the time period of interest.

This was an outbreak of ETEC infections at three Minnesota correctional facilities. Twenty-seven percent of inmate stool samples also tested positive for DAEC, and one for EAEC; the significance of these results is unknown. Inability to obtain food histories from incarcerated inmates created a challenge in identifying the outbreak vehicle. The source of the outbreak was not determined, but the likely vehicle was a food item received from a common distributor and served at the three facility cafeterias at slightly different times. Studies show that only about 25% of ETEC cases diagnosed in the United States are among non-travelers, and past outbreaks have been associated with imported produce. Therefore, an imported spice or produce item is the most plausible vehicle for the outbreak. DOC staff worked with the facility kitchens to enhance produce-washing procedures to lower the risk of future outbreaks.

(34)
Clostridium perfringens Intoxications Associated with a Restaurant

August — Hennepin County

On August 3, 2011, the Hennepin County Human Services and Public Health Department (HSPHD) environmental health and epidemiology units received a complaint of gastrointestinal illness among several meeting attendees who had eaten a box lunch catered by a restaurant during a workplace meeting on August 2. HSPHD notified the Minnesota Department of Health (MDH) on August 3, and an investigation was initiated.

A list of meeting attendees was provided to HSPHD. HSPHD epidemiologists interviewed attendees about food consumption and illness history. Epidemiology staff also called the representatives for three large catering groups who also placed orders on August 2. A message was left with the group representative to distribute the HSPHD epidemiology phone number for others to call in if they had experienced illness. A case was defined as a restaurant patron who subsequently developed vomiting and/or diarrhea (≥3 loose stools in a 24-hour period) after eating a meal catered by the restaurant. Stool

samples collected from consenting complainant group members were submitted to the MDH Public Health Laboratory for bacterial, viral, and toxin testing.

HSPHD sanitarians visited the restaurant on August 4 to evaluate food preparation and handling procedures.

Twelve patrons were interviewed by HSPHD epidemiologists, all of whom attended the workplace meeting. Five (42%) individuals met the case definition. Two additional persons reported illness that did not meet the case definition and were excluded from further analysis. All cases reported cramps and diarrhea, one (20%) reported bloody stools, and none reported vomiting or fever. The median incubation was 10 hours (range, 6.5 to 11 hours). The median duration of illness was 12 hours (range, 10 to 16 hours) for four of the cases; one case was still experiencing symptoms at the time of interview. Stool specimens collected from two cases tested positive for *Clostridium perfringens* enterotoxin A and also were culture-positive for *C. perfringens* with indistinguishable pulsed-field gel electrophoresis patterns.

All of the cases consumed some type of wrap sandwich prepared by the restaurant. Three (60%) ate a chipotle chicken wrap, one (20%) ate a chicken Caesar wrap, and one (20%) ate a spicy Sante Fe wrap. Other foods consumed included packaged baby carrots, packaged kettle chips, chocolate chip cookies, and chocolate mints. Meeting attendees brought their own beverages. Five controls were interviewed and also reported eating various chicken wrap sandwiches and the side items included in the box lunches. No food item was significantly associated with illness.

HSPHD sanitarians noted several violations when conducting an inspection of the restaurant. Violations included bare-hand contact, and improper cooking, holding, and cooling of chicken. Education was provided to improve these processes, and environmental health staff continued to work with the restaurant to remedy these issues and improve the flow of food.

This was a foodborne outbreak of *Clostridium perfringens* intoxications associated with eating food from a restaurant. The vehicle of transmission was not confirmed, but chicken used in all of the wrap sandwiches was the most plausible source. 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 chicken.

(35)

Salmonella Typhimurium Infections Associated with Seedless Watermelon

August — Multiple counties/Multiple states

On August 8, 2011, two family members with laboratory-confirmed *Salmonella* Typhimurium pulsed-field gel electrophoresis (PFGE) pattern TM76 (Centers for Disease Control and Prevention [CDC] *Xba*I designation JPXX01.0324) infections were interviewed by Minnesota Department of Health (MDH) staff as part of routine surveillance. The cases reported becoming ill after a family barbeque held on August 6 and that additional family members had also become ill after the event. An investigation was initiated immediately.

From August 12 to September 6, additional *S.* Typhimurium cases with matching PFGE patterns were identified through routine surveillance that were not associated with the family barbeque. A 60-day review of the PulseNet database showed 22 additional states with 141 matching isolates.

All *S.* Typhimurium in Minnesota cases are routinely interviewed about potential exposures, including foods consumed at home and at restaurants, as part of routine surveillance. Interviews of *S.* Typhimurium cases that are indistinguishable by PFGE are compared to identify potential common exposures. Information gathered during routine interviews is reviewed by an MDH epidemiologist.

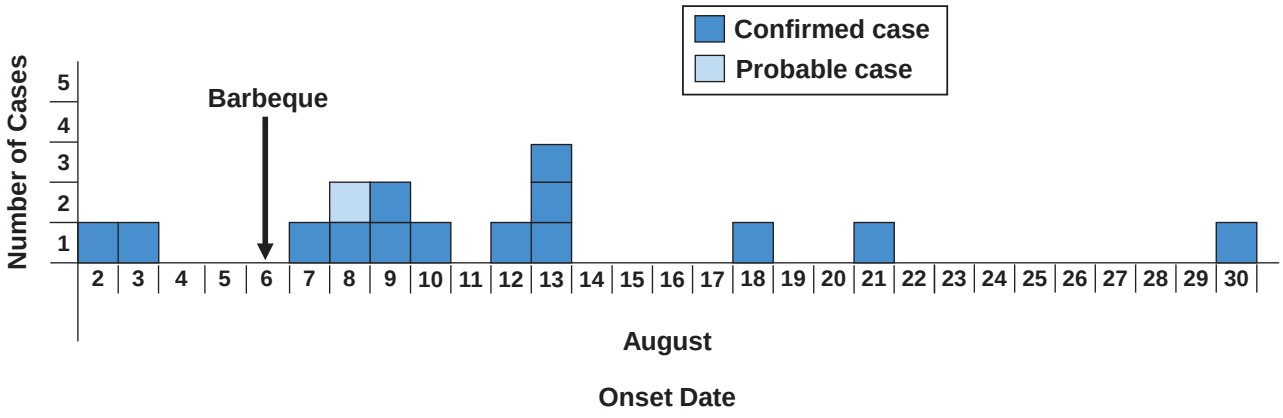
The initial case provided a list of names and phone numbers for additional barbeque attendees and foods served at the event. Subsequent cases that matched by PFGE and denied attending the barbeque were specifically asked about the types of food served at the barbeque.

A confirmed case was defined as an individual from whom *S.* Typhimurium TM76 was isolated since August 1, 2011. A probable case was defined as an individual who developed fever and diarrhea (≥ 3 loose stools in a 24-hour period) after eating at the barbeque. The Minnesota Department of Agriculture (MDA) conducted a traceback investigation of the epidemiologically implicated product.

Minnesota cases

Fifteen barbeque attendees were interviewed; five confirmed cases and one probable case were identified from this event. One attendee reported illness not meeting the case definition and was excluded from further analysis. Ten additional confirmed cases were identified through routine surveillance. One case was classified as a secondary case to an ill household member and was excluded from the exposure analysis. Case illness onsets ranged from August 2 to August 30 (see epidemic curve). Among the 16 cases (confirmed and probable), all 16 reported diarrhea, 15 (94%) reported fever and cramping, 11 (69%) reported bloody diarrhea, and 6 (38%) reported vomiting. The median incubation period for the five barbeque-associated cases for whom an incubation period could be calculated was 58 hours (range, 32.5 to 97 hours).The median duration of illness for the six cases that had recovered by the time of interview was 10 days (range, 9 to 15 days). Two cases were hospitalized, for 6 and 10 days, respectively.

Salmonella Typhimurium TM76 Cases by Illness Onset Date



Among the barbeque attendees, no food items were associated with illness. It was later discovered that two watermelons, one seedless and one with seeds, were served at the event. Due to the time that had elapsed before this information became available, individuals were not contacted again and asked specifically if the watermelon they consumed was seedless. Therefore, the association between consuming seedless watermelon and becoming ill could not be evaluated.

Among the nine primary cases not associated with the barbeque, eight (89%) reported consuming watermelon during the week prior to their illness onset, and seven (78%) reported consuming seedless watermelon. No other food item that was also served at the barbeque was reported by more than 50% of the sporadic cases.

The 2007 FoodNet Population Survey was used to estimate the background exposure rate to watermelon in the general population. These data indicated that watermelon consumption in Minnesota is highly seasonal, ranging from 7% of respondents in January to 56% of respondents in July. Of note, participants in the population survey were not asked about seedless watermelon consumption, so we were unable to evaluate that specific exposure. Using a binomial probability model based on the observed 89% exposure among Minnesota cases and estimated maximum 56% background rate of exposure in the general population, a significant association between consumption of watermelon and illness ($p = 0.04$) was identified.

Multiple locus variable-number tandem repeats analysis (MLVA) was performed on 28 clinical isolates from Minnesota (15) and Indiana (13). Ten different MLVA patterns were identified. Nine Minnesota isolates, including all five confirmed cases associated with the barbeque, and one Indiana isolate matched formed the largest MLVA cluster. This pattern had only been seen once before in the national database.

Cases in other states

From July 12 through September 14, 143 isolates with PFGE pattern JPXX01.0324 were observed in 23 states including: AL (25), AR (5), CA (2), GA (13), IA (1), IL (2), IN (7), KY (4), MD (1), MI (6), MN (13), MO (5), MS (12), NC (7), NY (1), OH (5), OR (2), PA (4), SC (9), SD (2), TN (3), WI (6), and WV(1). Three of six (50%) Alabama cases that were interviewed reported consuming seedless watermelon. Indiana reported that their questionnaire did not ask about watermelon consumption. Wisconsin reported that approximately 50% of their cases also reported consuming seedless watermelon. CDC reported that this was a fairly common PFGE pattern, particularly in southern states, and that there had been a seasonal increase in this pattern in August for the past 3 years. However, the pattern was presently not above baseline. A supplemental questionnaire developed by Minnesota was provided to CDC, which forwarded it to the other states.

Traceback investigation

Eight of nine Minnesota cases that reported consuming watermelon purchased it from either a Grocery Chain A (3 locations) or Grocery Chain B (2 locations). The Minnesota Department of Agriculture (MDA) conducted a traceback of the seedless watermelon purchased at these locations. Seedless watermelon purchased at Grocery Chain A traced to Distributor A in Vincennes, Indiana. Seedless watermelon purchased at Grocery Chain B traced to Distributor B, also located in Vincennes, Indiana. However, records at the two distributors did not indicate a common supplier between the two. Additionally, the ninth case consumed seedless watermelon purchased from a different grocery chain. The case was able to provide half of the watermelon that was reportedly consumed prior to the case's

illness onset, and this watermelon had a sticker on it that indicated it was produced in Oaktown, Indiana. The remaining seedless watermelon from the case's home was tested by the MDA for *Salmonella* and was negative.

This was an outbreak of *S*. Typhimurium TM76 infections identified through routine disease surveillance. The likely vehicle was seedless watermelon. While the traceback was not able to implicate a specific producer, the tracebacks did converge on a production area around Vincennes, Indiana. Among the family barbeque attendees, although no food vehicle was epidemiologically implicated, the revelation that two watermelons from different sources were served at the meal suggests that exposure misclassification may have contributed to the inability to implicate a vehicle in this sub-cluster.

(36)
Salmonella Enteritidis Infections Associated with Commercially Distributed Organic Eggs

August-October Multiple counties

On September 2, 2011, the Minnesota Department of Health (MDH) Public Health Laboratory (PHL) notified MDH epidemiology staff of three *Salmonella* Enteritidis isolates with indistinguishable pulsed-field gel electrophoresis (PFGE) patterns that were identified through routine surveillance; the subtype was designated SE1B173. This subtype had not previously been identified in Minnesota. Attempts were made to interview all individuals with a standard questionnaire. Over the next month, two additional indistinguishable isolates were identified by the MDH PHL. On interviews, cases reported organic egg consumption under multiple brand names. An investigation was initiated on October 7.

A confirmed case was defined as a person who had a *S*. Enteritidis isolate that matched the outbreak PFGE pattern (SE1B173), with a specimen collected from August 1, 2011 to October 31, 2011. A probable case was defined as a person who had *S*. Enteritidis isolated from their stool from August 1, 2011 to October 31, 2011 and reported consuming the implicated product. Cases were interviewed with a broad-based questionnaire and re-interviewed several times about various specific food items.

A case-control study was initiated on October 7 to evaluate food items frequently reported by cases. Three controls for each case were recruited using phone lists generated using reverse-directory of addresses in the vicinity of the case's home. Controls were restricted to individuals who reported no diarrhea or vomiting since August 1 and were age-matched to cases using the categories 5-18, 19-39, 40-59, and ≥60 years.

On October 7, the Minnesota Department of Agriculture (MDA) was notified of the *S*. Enteritidis cases. MDA conducted a traceback investigation of the implicated product.

Epidemiologic investigation

Eight cases were identified, including seven confirmed cases and one probable case. Illness onset dates ranged from August 12 to October 20. Six (75%) cases were female, and the median age was 25.5 years (range, 5 to 70 years). Of the eight cases, all eight reported diarrhea and fever, six (86%) of seven reported cramps, four (50%) reported bloody diarrhea, and four (50%) reported vomiting. The six cases who had recovered at the time of interview had a median illness duration of 10 days (range, 7 to 13 days). Three (38%) cases were hospitalized, for 3 days each.

A total of 6 cases and 18 controls were enrolled in the case-control study. Consuming organic eggs from Farm X was statistically associated with illness (5 of 6 cases vs. 1 of 15 controls; odds ratio, 75.0; 95% confidence interval, 3.9 to 1,434.1; $p < 0.001$). No other brand of eggs was statistically associated with illness.

Traceback investigation

Traceback revealed that Farm X was a common supplier for six cases who supplied purchase location information.

On October 14, MDA inspectors visited the farm to review records and sample the barn and processing/candling areas. Two samples, both taken from the egg belt, tested positive for *S*. Enteritidis on October 19; both samples ultimately were identified as the outbreak strain by PFGE.

Record review showed that in addition to eggs produced at the Owatonna farm, eggs produced at multiple farms were packed at the Owatonna farm and sold under the Farm X brand name. On October 19, Farm X issued a voluntary recall of all eggs packed at the Owatonna farm. Eggs included in the recall were packaged under three different brand names. Eggs were packaged both in bulk and various size cartons. Eggs affected by the recall were distributed to restaurants, grocery stores, food wholesalers and foodservice companies in Minnesota, Wisconsin and Michigan. On October 19, MDH and MDA issued a joint press release notifying the public about the outbreak and subsequent recall.

This was an outbreak of *S*. Enteritidis SE1B173 infections associated with commercially distributed organic eggs. The outbreak strain was found on the egg belt at the implicated farm. Following the product recall, the Owatonna farm was depopulated, cleaned, and tested negative for *S*. Enteritidis before producing eggs again.

(37)
Vibrio spp. Infections Associated with a Restaurant

August — Hennepin County

On August 26, 2011, the Minnesota Department of Health (MDH) notified the Hennepin County Human Services and Public Health Department (HSPHD) epidemiology unit and the Minneapolis Division of Environmental Health (MDEH) of a *Vibrio parahaemolyticus* case identified through routine MDH surveillance. All *V. parahaemolyticus* cases reported to MDH are interviewed about food consumption and other potential exposures as part of enteric disease surveillance in Minnesota. The case reported eating raw oysters at a restaurant on August 19. An investigation was initiated on August 26.

On September 1, MDH notified the HSPHD epidemiology unit and MDEH that the manager of the restaurant received a complaint of gastrointestinal illness in two persons who were part of a group of six people who ate at the restaurant on August 20. A stool specimen from one of the complainants tested positive for *Vibrio* spp. and had been forwarded to MDH for confirmation. The case was later found to have *Vibrio fluvialis*. The case indicated eating raw oysters at the restaurant on August 20. The investigation was expanded.

MDH interviewed both *Vibrio* cases and their dining companions about symptoms and exposures. The restaurant provided credit card receipts and reservation lists from people who ate at the restaurant on

August 19 and 20. HSPHD epidemiologists interviewed the restaurant patrons about food consumption and illness history.

A case was defined as a restaurant patron who had *Vibrio* spp. isolated from a stool culture or who developed vomiting and/or diarrhea (≥3 loose stools in a 24-hour period) within 4 days after eating at the restaurant.

On August 26, MDEH sanitarians visited the restaurant to gather records and tags of oysters sold. On September 1, MDEH sanitarians and a representative of the U.S. Food and Drug Administration (FDA) visited the restaurant to conduct a full inspection and gather additional information pertinent to a traceback of the oysters consumed by the second case.

A total of 18 patrons were interviewed, and 4 met the case definition. All cases reported diarrhea, three (75%) reported cramps, two (50%) reported vomiting, two (50%) reported fever, and one (25%) reported bloody stools. One case tested positive for *V. parahaemolyticus* and one tested positive for *V. fluvialis*; both were hospitalized. The median incubation period was 19 hours (range, 6 to 40 hours). The duration of illness was 11 hours and 9 days for two cases, while the other two cases (both of the culture-confirmed cases) were still experiencing symptoms at the time of interview, 8 and 10 days after onset, respectively. Two of the cases ate at the restaurant on August 19 (the *V. parahaemolyticus* case and a case identified from credit card receipts), and two cases ate at the restaurant on August 20 (the *V. fluvialis* case and a dining companion).

All four cases reported eating raw oysters. Cases reported eating a variety of raw oysters: one case (the *V. parahaemolyticus* case) reported eating Blue Point oysters; two other cases (the *V. fluvialis* and the dining companion case) ate Blue Point oysters, Mexican-style oysters, and several different varieties of oysters sold as 2-per-serving; the case identified from credit card receipts only had Buckley Bay oysters. Twelve controls were interviewed. Six (50%) controls reported eating oysters, but most of these controls did not remember the specific types of oysters eaten or ate dishes like the Chef's Dozen that included a variety of oysters. No food item or single oyster type or dish was found to be statistically associated with illness.

Copies of invoices and all tags from oysters served on August 19 and 20 were obtained. The restaurant maintained records on the types of oysters served each day; however, there were no records of specific oysters ordered by each patron.

The menus were printed each day listing the types of oysters available that day. Oysters served on those days were Blue Point (Delaware Bay, NJ), Conway Royal (Prince Edward Island, Canada), Malapeques (Prince Edward Island, Canada), Baynes Sound (Baynes Sound, BC, Canada, farm raised), Buckley Bay (Vancouver, BC, Canada, farm raised), Gooseberry Point (Baynes Sound, BC, Canada, farm raised), and Pacific Kiss (Vancouver, BC, Canada, farm raised). Invoices also showed the restaurant had Totten Inlet (WA, farm raised), and Tree Island (Vancouver, BC, Canada, farm raised) oysters. Mexican Oysters and Japanese oysters were mixes of oysters from west coast harvest areas served with different toppings because of their bowl-like shape. The specific oysters included in those dishes varied based on the oysters available at the time. The Chef's Dozen varied and may have included west coast or east coast varieties. The Blue Point oysters were the same oysters whether served 2-per-serving or whether by the dozen.

Oyster handling at the restaurant was evaluated, and no deficiencies were noted. Oysters were received fresh from the distributor, held in the fish walk-in cooler, and held at an oyster bar cooler before serving. Cooler temperatures and oyster temperatures were checked, and they were below the required 41° F. Oysters were shucked to order. All oyster tags were maintained in a shell stock box according to the month received.

The FDA collected records and tags, including harvest zone for each of the types of oysters eaten by the cases. However, since the epidemiological investigation was unable to implicate a single type of oyster, the harvest zone of contaminated oysters was not identified. FDA officials did not share additional information with MDH regarding commonalities with harvest zones in concurrent *Vibrio* investigations in other states.

The *Vibrio* isolates from the two confirmed cases, as well as *V. parahaemolyticus* and *V. fluvialis* isolates from a non-restaurant associated case reported in Minnesota earlier in the summer were sent to the Centers for Disease Control and Prevention for pulsed-field gel electrophoresis (PFGE). PFGE for *Vibrio* is considered experimental. No PFGE matches were found among the isolates or with other domestically acquired cases in 2011.

This was a foodborne outbreak of vibriosis associated with eating raw oysters at a restaurant in Minneapolis. It is unclear if the cases were caused by oysters from the same source contaminated with both organisms or if contaminated oysters from different harvest areas served at the restaurant in the 2-day period resulted in the different *Vibrio* infections.

(38)
Suspected Bacterial Intoxications Associated with a Wedding Reception

August Washington County

On August 29, 2011, the Minnesota Department of Health (MDH) foodborne illness hotline received an illness complaint associated with a wedding reception held at a restaurant in Stillwater, Minnesota on August 26. The complainant reported learning of numerous reception attendees becoming ill with gastrointestinal symptoms within 24 hours of the wedding. Washington County Public Health & Environment (WCPHE) was notified, and an investigation was initiated on August 30.

WCPHE sanitarians visited the restaurant on August 30 to evaluate food preparation practices, interview and assess employee hygiene and food handling practices, and review employee work schedules and illness logs. The initial complainant was re-interviewed by WCPHE staff, following which the bride was contacted to better describe wedding event activities and associated food and beverage menus, catering and bakery services, guest invitation list and contact information, and recent personal health history. A case was defined as a wedding reception attendee who developed vomiting or diarrhea (≥3 loose stools in a 24-hour period) after eating or drinking at the reception.

Illness histories and exposure information were obtained from 68 (39%) of the 175 wedding guests. Twelve (18%) individuals met the case definition. Of the 12 cases, 11 (92%) reported diarrhea, 6 (50%) reported cramps, 3 (25%) reported vomiting, and 3 (25%) reported low grade fever. The median incubation period was 7 hours (range, 3.5 to 14 hours). The median duration of illness was 35 hours

(range, 27 to 53 hours). Due to delayed receipt of the wedding guest list and contact information, cases were unwilling to provide stool samples for analysis.

All wedding guests were served the same plated meals, which included Caesar salad and dinner roll, grilled chicken breast with pesto cream sauce, garlic mashed potatoes, green beans and carrots, and a catered wedding cake. No food or beverages items were statistically associated with illness.

At the conclusion of the wedding reception, employees who had worked the event were allowed to consume any of the remaining food items. A total of 212 plated meals for the reception were ordered and 37 servings were leftover.

Illness history and food worker duties were obtained from the 20 individuals employed by the event site. All employees had worked on August 26. No ill food workers or associated household members were identified. In addition, the wedding cake catering service was contacted, and no ill individuals were identified. No stool specimens were collected from food workers.

During an August 30 and 31 environmental health investigation, the walk-in and reach-in refrigeration units and corresponding stored food products were found to be out of appropriate temperature range. Various food items stored in these cooling units were at unacceptable temperatures and were discarded (shredded pork, 59° F; diced chicken, 52° F; salads and salad dressing, 50-52° F). Orders were written for repair or replacement of refrigeration units.

Based on a review of food preparation practices with the restaurant's head chef and general manager, the grilled chicken breasts served at the August 26 wedding reception were prepared as follows: chicken was seared on flat top grill on August 26 at 0600 hours and placed on sheet trays on a speed rack and placed in the walk-in cooler. At 1800 hours the seared chicken breasts were placed in 2-inch hotel pans with white wine and chicken stock and cooked in the oven to 180° F. Chicken was plated from the oven.

This was a foodborne outbreak associated with a wedding reception held at a restaurant. Illnesses were most compatible with a bacterial intoxication; however, the etiology of the outbreak could not be confirmed. The outbreak most likely resulted from improper and prolonged cold holding at an inadequate temperature due to malfunctioning refrigeration equipment, creating a favorable environment for proliferation and survival of bacteria.

(39)
Norovirus Gastroenteritis Associated with a High School Football Game

September — Anoka County

On September 5, 2011, the Minnesota Department of Health (MDH) on-call epidemiologist received a call from a physician reporting vomiting and diarrhea among several members of High School A football team. The physician also reported that several members of the team they had played on September 1, High School B, were also ill with similar symptoms. Epidemiologists from the Foodborne, Vectorborne, and Zoonotic Diseases Unit were notified, and an investigation was initiated.

A list of all players was obtained from High School A, and a list of players who had reported being ill was obtained from High School B.

Staff from MDH interviewed players to obtain information on food/beverage consumption and illness history. A case was defined as a football player who developed vomiting and/or diarrhea (≥3 loose stools in a 24-hour period) after playing in or attending the September 1 football game. Stool samples collected from consenting players were submitted to the MDH Public Health Laboratory for bacterial and viral testing.

MDH staff interviewed 60 players, including 48 from High School A and 12 from High School B. Twenty-nine (48%) players met the case definition, including 17 from High School A and 12 from High School B. Three additional players that reported mild illness and one secondary case with a reported incubation period of 5 days were excluded from further analysis.

Twenty-five (86%) cases reported diarrhea, 21 (72%) reported vomiting, 13 (46%) of 28 reported fever, and 11 (38%) reported cramps. The median incubation period was 31 hours (range, 7 to 54 hours). The median duration of illness was 53.5 hours (range, 21 to 91 hours) for the 24 cases with known recovery date times. Three player stool samples were received; two samples were from High School B players and one sample was from a High School A player. All three samples tested positive for norovirus GII. Nucleic acid sequencing was conducted on the samples; however, two of the samples could not be sequenced due to the fact that they were weak positives.

Having ice in an individual team water bottle was significantly associated with illness (18 of 19 cases vs. 4 of 12 controls; odds ratio, 36.0; 95% confidence interval, 2.8 to 1059; $p < 0.001$). Ice was provided by High School A for both teams. The school's ice machine was broken, so ice was purchased in 20 pound bags from a nearby gas station and initially stored in the broken ice machine. It is unknown exactly how the individual water bottles were filled; however, it was confirmed that individuals getting the ice out of the ice machine used their bare hands.

This was a foodborne outbreak of norovirus gastroenteritis associated with a high school football game. Ice provided to both teams was implicated as the vehicle of transmission. The source of contamination was not identified but most likely was one or more unidentified ill individuals who handled the ice.

(40)
Norovirus Gastroenteritis Associated with a Wedding Reception at a Restaurant

September Dakota County

On September 14, 2011, the Minnesota Department of Health's (MDH) foodborne illness hotline received a report that 70% of 230 guests developed gastrointestinal illness after attending a wedding held at and catered by a restaurant in Lakeville on September 10. The plated dinner consisted of chicken, penne pasta with white sauce, lettuce salad, and steamed vegetables. Flatbread appetizers (chicken, vegetable, and shrimp options) were passed prior to the dinner. An outbreak investigation was initiated.

A partial list of wedding guests was provided by the mother of the groom, and MDH staff conducted telephone interviews with guests using a standard questionnaire. Guests were asked about attendance and food consumption at the wedding reception, a groom's dinner that took place the night prior, and a

snack session held after the reception. A case was defined as a person who attended a wedding event and subsequently became ill with vomiting and/or diarrhea (≥3 loose stools in a 24-hour period).

Stool samples were collected from consenting guests and submitted to the MDH Public Health Laboratory for bacterial and viral testing.

MDH environmental health specialists visited the restaurant on September 14 to perform an environmental assessment, conduct employee interviews, and view the employee illness log. Employees were interviewed regarding recent illness history, work history, and duties at the restaurant.

Sixty-four wedding guests were interviewed, including the complainant family. Thirty-five (55%) guests met the case definition. In addition, seven guests reported illness but did not meet the case definition. Of the 35 cases, 32 (91%) had diarrhea, 23 (66%) had cramping, 16 of 32 (50%) had fever, 14 (41%) had vomiting, and 1 (3%) had bloody stools. The median incubation period was 38 hours (range, 12 to 61 hours). For the 18 cases who had recovered at the time of interview, the median duration of illness was 41 hours (range, 9 to 98 hours). One case visited an emergency department and was hospitalized.

Stool samples were collected from five wedding guests from four households. All five stool samples tested positive for norovirus GI.

By univariate analysis, eating chicken from the plated dinner (35 of 35 cases vs. 18 of 23 controls; odds ratio [OR], undefined; 95% confidence interval [CI], 2.1 to undefined; $p = 0.01$), and drinking ice water (24 of 34 cases vs. 9 of 23 controls; OR, 3.7; 95% CI, 1.2 to 11.6; $p = 0.04$) at the reception were significantly associated with illness. Neither variable was significantly associated with illness by multivariate analysis using logistic regression.

Nineteen restaurant employees were interviewed; none reported gastrointestinal illness in the several weeks prior to the wedding. One employee reported having a child with diarrhea onset 5 days prior to the wedding reception. This employee reported using bare hands to garnish plates with parsley for the reception.

Environmental health specialists evaluating the restaurant noted that a cook did not wash his or her hands prior to beginning to prepare food; no other violations were noted. Restaurant employees reported that to prepare ice water for banquets, glasses are loaded face-up into glass racks and then filled with ice and water. Glasses are then removed from the racks and placed on tables.

Credit card receipts were not available for patrons of the restaurant on September 10. The restaurant provided contact information for the hosts of another wedding that took place at the restaurant on the same night. The bride and groom were contacted and no illnesses were reported from guests of the second wedding.

This was an outbreak of norovirus gastroenteritis associated with the wedding reception held at a restaurant in Lakeville, Minnesota. Both chicken and ice water were statistically associated with illness. Employee hand contact with meal items, including parsley garnish and water glasses, is a plausible source of illness. However, the ultimate source of contamination was not identified.

(41)
Suspected Bacterial Intoxications Associated with a Restaurant

September Ramsey County

On September 12, 2011, the Minnesota Department of Health (MDH) foodborne illness hotline received a complaint of gastrointestinal illness from an individual who ate dinner at a restaurant in St. Paul on September 10. On September 14, MDH received a second illness complaint from two individuals who also dined at the restaurant on September 10. City of St. Paul sanitarians were notified and an investigation was initiated.

City of St. Paul sanitarians visited the restaurant on September 14 to evaluate food preparation and handling procedures and collect credit card receipts for additional patrons. MDH staff interviewed patrons identified from credit card receipts about food consumption and illness history. A case was defined as a restaurant patron who developed vomiting or diarrhea (≥3 loose stools in a 24-hour period) after eating at the restaurant. Due to delayed notification of the outbreak, stool samples were not collected.

Fifteen restaurant patrons were interviewed; three (20%) met the case definition. The median incubation period for the cases was 4 hours (range, 3 to 4.5 hours). The median duration of illness was 7 hours (range, 6 to 8 hours). All three cases reported diarrhea and vomiting, one (33%) reported cramps and fever, and none reported bloody stools.

While no food items were statistically associated with illness, all three cases reported consuming spring rolls. The three cases reported dining at the restaurant at the same time, whereas the non-ill controls who reported consuming spring rolls dined at the restaurant several hours later. City of St. Paul sanitarians conducted a food preparation review of the spring rolls, and no violations were identified.

This was a foodborne illness outbreak associated with a restaurant in St. Paul. The etiology was not determined, but the illnesses were consistent with a bacterial intoxication caused by either *Staphylococus aureus* or the emetic form of *Bacillus cereus*. While spring rolls were suspected, a specific vehicle could not be confirmed.

(42)
Norovirus Gastroenteritis Associated with a Restaurant

September Chisago County

On September 23, 2011, the Minnesota Department of Health (MDH) foodborne illness hotline received a complaint of gastrointestinal illness in four of four individuals from separate households who had eaten supper at a restaurant in Chisago City on September 19. The individuals all had different main menu items, but all had eaten a salad from the salad bar. An investigation was initiated.

On September 26, the foodborne illness hotline received a second complaint about the restaurant; six of nine individuals from three households became ill after eating there on September 18.

MDH staff conducted telephone interviews with callers to the foodborne illness complaint hotline and their meal companions regarding illness history and food items eaten at the restaurant. Credit card

receipts were not available from the restaurant for September 18-19. An additional patron group was asked by one of the initial complainants to call MDH.

A case was defined as a person who ate at the restaurant and subsequently became ill with vomiting or diarrhea (≥3 loose stools in a 24-hour period). Stool samples were collected from consenting cases and restaurant employees and submitted to the MDH Public Health Laboratory (PHL) for bacterial and viral testing.

MDH environmental health specialists visited the restaurant on September 26 to perform an environmental assessment and interview employees regarding recent gastrointestinal illness history and work duties at the restaurant.

Interviews were conducted with 14 patrons from three groups representing eight households. Nine cases were identified; all had eaten at the restaurant on September 18 (n=5) or September 19 (n=4). An additional patron reported mild symptoms that did not meet the case definition and was excluded from further analyses. Of the nine cases, all had diarrhea, eight (89%) had cramping, six (67%) had vomiting, three of six (50%) had fever, and none had bloody stools. The median incubation period was 36 hours (range, 9.5 to 55.5 hours). For the three cases who had recovered at the time of interview, the median duration of illness was 53 hours (range, 51 to 116 hours). One of the cases visited an emergency department and another saw a healthcare provider; none were hospitalized.

Eating a salad from the salad bar was significantly associated with illness (9 of 9 cases vs. 0 of 4 controls; odds ratio, undefined; $p = 0.001$). No other menu items were significantly associated with illness.

All 11 restaurant employees were interviewed. None of the employees reported being ill in the time preceding the complainant meal dates. However, a chef had diarrhea on September 16 and September 20 according to another employee and the staff illness log. The employee was seen by a healthcare provider and diagnosed with diverticulitis. Additionally, two employees reported caring for an ill child who had vomiting onset on September 20. Another chef cared for a family member who became ill with diarrhea, vomiting, and cramping on September 14.

Stool samples were obtained from six patrons from six households; five stool samples tested positive for norovirus GII.4 New Orleans. Four of the positive specimens (representing both meal dates) had identical viral nucleic acid sequences; the fifth positive specimen had a sequence that differed from the others by one base pair. Stool samples collected from the restaurant's three chefs on September 28 were negative for norovirus, *Salmonella*, *Shigella*, *Campylobacter*, and Shiga toxin-producing *E. coli*.

The environmental assessment at the restaurant noted that salad bar items are prepared in the evening and morning, primarily by the restaurant's chefs. Other employees help prepare salad bar items throughout the day as needed. The produce for the salad bar is washed, but the employees do not generally wear gloves during the preparation process.

EH specialists discussed with restaurant management cleaning of non-food contact surfaces, practicing good hand hygiene, and limiting bare-hand contact with ready-to-eat foods. An employee illness screening form was used for the weekend starting on September 23.

This was an outbreak of norovirus gastroenteritis associated with a Chisago City restaurant. Salad from the restaurant's salad bar was identified as the vehicle. Bare-hand contact with salad bar items by ill employees or employees with illness in their households was the likely source of contamination.

(43)
E. coli O157:H7 Infections Associated with Romaine Lettuce

October — Multiple counties/Multiple states

On November 8, 2011, the Minnesota Department of Health (MDH) Public Health Laboratory (PHL) identified several recent *E. coli* O157:H7 isolates with a two enzyme pulsed-field gel electrophoresis (PFGE) pattern (Minnesota designation MN179ECB13) indistinguishable from isolates that were part of a national cluster investigation (Centers for Disease Control and Prevention [CDC] pattern designation EXHX01.0047/EXHA26.0015, cluster ID 1110MOEXH-2) centered in Missouri; several salad bar items from a Missouri grocery store chain (Chain A) had been tested as part of the national investigation. MN179ECB13 is a common *E. coli* O157:H7 PFGE pattern; multiple locus variable-number tandem repeats analysis (MLVA) was used to further subtype isolates. One of the Minnesota isolates matched the Missouri/national outbreak MLVA pattern (Minnesota designation MEC89), and Minnesota joined the national investigation.

Nationally, a case was defined as a person from whom *E. coli* O157:H7 with PFGE pattern combination EXHX01.0047/EXHA26.0015 and the outbreak MLVA pattern was isolated on or after October 7, 2011.

Minnesota cases were interviewed with a standard broad-based exposure questionnaire regarding illness history and food exposures. Nationally, case exposures were compared to 2006-2007 FoodNet population survey baseline exposure data, and a case-control study was conducted.

The Minnesota Department of Agriculture (MDA) obtained food invoices from the university dining hall where one of the Minnesota cases was exposed, and performed a traceback investigation to determine the source of romaine lettuce served at the dining hall. Traceback information was provided to CDC and the United States Food and Drug Administration (FDA). FDA and Missouri health and agriculture authorities also conducted a traceback investigation of romaine lettuce served at implicated Missouri Chain A grocery store salad bars.

Fifty-eight cases from nine states were identified in this outbreak: Missouri (38 cases), Illinois (9), Arkansas (2), Indiana (2), Kansas (2), Minnesota (2), Arizona (1), Kentucky (1), and Nebraska (1). Illness onsets ranged from October 9 to November 7. Thirty-three (67%) of 49 cases were hospitalized, and three (5%) developed hemolytic uremic syndrome (HUS). The median age of cases was 28 years (range, 1 to 94 years), and 59% were female.

Two Minnesota cases met the case definition: a 28 year-old male from St. Paul with onset on October 28; and, an 18 year-old female from Minneapolis with onset on October 24. One case was hospitalized for 5 days and neither developed HUS. The 24 year-old case denied eating romaine lettuce in the week prior to his illness onset. The 18 year-old case reported consumption of romaine lettuce as part of salads she prepared from a university dining hall salad bar on multiple occasions in the week prior to her illness onset.

Nationally, 22 (81%) of 27 cases interviewed with a national hypothesis-generating questionnaire reported consumption of romaine lettuce; this was statistically significant compared to the proportion (47%) of FoodNet population survey respondents who reported consumption of romaine lettuce ($p < 0.001$). Supplemental interviews conducted with cases (mostly in Missouri, or who had travelled to Missouri) specifically implicated romaine lettuce served at multiple locations of Chain A salad bars. In a national case-control study of 22 ill and 82 well persons that included controls who had shopped at a Chain A grocery store in Missouri, consumption of romaine lettuce, shopping at Chain A, and consumption of food from a Chain A salad bar were all significantly associated with illness. Romaine served at all Chain A salad bars was sourced from a single lettuce processing facility via a single distributor. Chain A had voluntarily removed suspected items, including romaine, from its salad bars on October 26 as a precaution during the investigation.

The Minnesota university dining hall received pre-packaged, pre-chopped romaine from Distributor A (Minnesota); the lettuce was not processed further before served on the salad bar. An MDA traceback investigation of chopped romaine served on the university salad bar during the case's likely meal dates identified five California growers of interest. FDA traceback from several Chain A locations and a university campus in Missouri identified two California growers of interest. The MDA and FDA tracebacks identified one common grower, a farm in California. A single lot of romaine lettuce harvested from this California farm was used to supply grocery Chain A in Missouri and the Minnesota university dining hall. This lot also went to the Missouri university's distributor, but could not be connected to the university due to lack of adequate records.

In Minnesota, whole romaine heads from the implicated farm were shipped by Shipper A in California to Processor A in Minnesota. Chopped romaine from Processor A was shipped to Distributor A, which then distributed the romaine to the Minnesota university dining hall. In Missouri, whole romaine heads from Shipper A were shipped through a different processor and distributor.

Production of romaine at the implicated farm had stopped at the time of the FDA investigation, and the source of contamination was not identified.

This was a multi-state foodborne outbreak of *E. coli* O157:H7 infections associated with consumption of California-grown chopped romaine lettuce served at salad bars. Minnesota had two cases included in the national outbreak, one of whom reported consuming chopped romaine from a university dining hall salad bar. Traceback of the Minnesota case's romaine exposure was a key component of national traceback efforts that led to identification of a single implicated farm and lot of romaine. The ultimate source and mechanism of contamination of the lettuce at the farm were not identified.

Reference

1. http://www.cdc.gov/ecoli/2011/ecoliO157/romainelettuce/032312/index.html, Accessed November 24, 2014.

(44)

Shiga toxin-producing *E. coli* O111:NM and *Cryptosporidium parvum* Infections Associated with Unpasteurized Apple Cider at an Apple Orchard

October Washington County

On October 28, 2011, the Minnesota Department of Health (MDH) Public Health Laboratory (PHL) identified two cases of non-O157 Shiga toxin-producing *E. coli* (STEC) with indistinguishable pulsed-field gel electrophoresis (PFGE) patterns (MDH two-enzyme pattern designation ECM425SB400). Illness onset dates were October 11 and October 14.

On initial interview, one case had reported visiting an apple orchard where animals were present, and the other case had reported consuming apples and unpasteurized apple cider at an apple orchard. It was not apparent from the initial interviews if the cases had visited the same apple orchard. An investigation was initiated on October 28.

MDH staff conduct real-time standard interviews with all *Cryptosporidium* and STEC cases identified though routine surveillance. Cases are asked about illness history and exposures prior to illness onset. Completed interviews are reviewed by MDH epidemiologists. Callers to MDH's foodborne illness complaint hotline are also interviewed regarding their illness and exposure histories.

Cases were defined as individuals who either had a stool sample positive for *E. coli* O111:NM with the outbreak PFGE pattern or *Cryptosporidium*, or who became ill with diarrhea (≥3 loose stools in a 24-hour period) of at least 3 days duration, after a visit to the apple orchard in October. A secondary case was defined as an individual who met these criteria, lived in the same household as a primary case, and became ill more than 14 days after visiting the orchard.

Cases and their companions who visited the orchard were interviewed with a supplemental questionnaire targeting food, animal, and environmental exposures at the orchard. Contact information for other orchard patrons was not available.

Stool samples were collected from consenting ill patrons and were tested for bacterial and parasitic pathogens at the MDH PHL.

Environmental health (EH) specialists from Washington County Public Health and Environment visited the orchard on October 31 to conduct a kitchen inspection and evaluate potential exposures at the orchard. On November 4, MDH and Washington County staff visited the orchard to obtain stool samples from animals at the on-site petting zoo and environmental samples from the petting zoo area and from inside the apple processing barn. A copy of the *Compendium of Measures to Prevent Disease Associated with Animals in Public Settings, 2009* was provided to the orchard owners.

Animal and environmental samples were tested for STEC, *Salmonella* and *Campylobacter*. Animal samples were also tested for *Yersinia* and *Cryptosporidium*.

Case characteristics

Four cases of *E. coli* O111:NM (*stx1* only) infection with the outbreak subtype were identified through routine surveillance, with dates of illness onset from October 11 to October 15. All had visited the apple

orchard on October 8 (n=2, 50%) or October 9 (n=2, 50%). The median incubation period was 4 days (range, 3 to 6 days). Three (75%) cases were female. The median age of cases was 16 years (range, 6 to 47 years). All four cases reported diarrhea and stomach cramps, two (50%) had blood in their stool, two (50%) had vomiting, and one (25%) had fever. The two cases who had recovered at the time of interview had symptom durations of 4 days and 36 days. None of the cases were hospitalized and none developed HUS.

Three *Cryptosporidum* cases were identified through routine surveillance, with illness onset dates of October 15 (n=2) or October 16 (n=1). Two of the cases had also placed a call to the foodborne illness hotline on October 26 and mentioned visiting the apple orchard on October 9 during their interview. The third case was an individual who matched the outbreak *C. parvum* subtype but who had not mentioned the orchard on initial interview. Upon subsequent interview, the case reported visiting the apple orchard on October 8 or October 9. Two of the *Cryptosporidium* cases were positive for *C. parvum* with subtype BGP16 (IIaA17G2R2); the third case's specimen was not received at the MDH PHL and thus could not be further characterized. The incubation period for the three cases was 6 or 7 days. Two (66%) of the cases were female. The median age of cases was 39 years (range, 31 to 39 years). All three cases reported diarrhea and stomach cramps. One (33%) case had bloody stools and one (33%) had fever. The median duration of illness was 11 days (range, 10 to 12 days). None of the cases were hospitalized.

An ill family member of a laboratory-confirmed STEC case submitted a stool sample to the MDH PHL that tested positive for the outbreak strain of *E. coli* O111:NM and also for *C. parvum* with subtype BGP16a (IIaA17G2R2), one base pair different from the main outbreak strain. The case had visited the orchard on October 9 and had onset of illness on October 17. The case reported diarrhea, vomiting, cramps, and fever. The case's duration of illness was 13 days.

A total of 26 orchard patrons representing 6 independent groups were interviewed. In addition to the eight laboratory-confirmed cases, six additional patrons were identified who met the case definition. Of these six cases, four (67%) were female. The median incubation period was 6 days (range, 2 to 10 days). All of the cases had diarrhea, none had bloody stools, three (50%) had vomiting, and four of four (100%) had stomach cramps. The median duration of illness was 10 days (range, 7 to 12 days).

A secondary case was identified in an ill family member of an STEC case who had onset of illness 16 days after visiting the orchard. Another family member of an STEC case developed symptoms within an hour of visiting the orchard, and another patron reported mild symptoms that did not meet the case definition. All three were excluded from further analyses.

Exposure analysis

All 14 cases were combined for data analysis. By univariate analysis, drinking a sample of unpasteurized apple cider during a pressing demonstration was significantly associated with illness (14 of 14 cases vs. 5 of 9 controls; odds ratio [OR], undefined; $p = 0.01$), and having contact with the petting zoo animals was inversely associated with illness (8 of 14 cases vs. 9 of 9 controls; OR, 0; 95% confidence interval, 0 to 0.8; $p = 0.048$). Neither variable was significantly associated with illness in a multivariate model including both apple cider exposure and animal contact, but small sample size hindered the analysis.

Animal evaluation

The petting zoo at the apple orchard comprised 18 animals: 10 goats, 4 llamas (including 1 cria), 2 sheep, a donkey, and a calf. An MDH veterinarian and other staff from MDH and Washington County

collected fecal samples (digital rectal sample or freshly fallen droppings) from 14 of the 18 petting zoo animals. Samples were not obtained from a goat, a sheep, and two of the llamas. The calf was housed in a separate pen that shared three common fences with the main enclosure. During specimen collection on November 4, the calf had nasal discharge and visible evidence of recent scours. All other animals intermingled in the main pen. Orchard visitors were not allowed to enter the animal enclosure but were able to feed and contact all animals through fences.

STEC was found in 10 of 14 (71%) animal samples. Four animal samples were positive for *stx1* by PCR; isolates from three of the goats were identified as *E. coli* Ound:Hund (n=2) and Ound:H6 (n=1); an isolate was not found from the fourth goat sample. *E. coli* O111:NM subtype ECM425SB415 isolated from the calf sample matched the outbreak pattern found in all five of the human *E. coli* O111:NM isolates by digest with *Xba*I and was one band different by *Bln*I.

Three animal samples were positive for *stx2* by PCR; *E. coli* Ound:H45 was isolated from two goat samples and Ound:H11 was isolated from a llama sample.

A goat and a llama both tested positive for *stx1* and *stx2*. *E. coli* Orough:NM was isolated from the goat sample; an isolate was not found from the llama sample.

Cryptosporidium of the outbreak subtype (BGP16) was identified in the sample collected from one of the petting farm sheep. The specimen could not be identified to the species level (although subtyping indicated it was likely *C. parvum*). *Cryptosporidium* was also found in the donkey sample by microscopy using acid fast stain. The sample was negative by PCR and thus could not be further characterized.

Yersinia enterocolitica was identified in a sample collected from a llama, and *Aeromonas caviae* was identified in a goat sample. Two goats and a donkey tested negative for all pathogens.

Environmental evaluation

Environmental samples from material collected from the ground in the calf pen and the ground in the main animal enclosure were both positive for Shiga toxin genes by PCR (*stx1* in calf pen, *stx2* in main pen); however, STEC isolates were not found for either sample. A sample of feed from inside the calf pen was also positive for *stx1* (no isolate found).

A barn building adjacent to the petting farm enclosure is used for processing and storing apples, storing equipment, and pressing cider. Unpasteurized cider from a wooden press was served to the public only as samples during cider pressing demonstrations that took place multiple times per day on October 8, 9, 15, 16, 22, and 23. Samples of cider were served in small disposable paper cups. Orchard staff used tree-picked washed and graded apples for the cider pressing. The same staff were also charged with care of the petting zoo animals, but reported that they did not care for animals on days when they pressed cider. Staff who pressed and served cider during the demonstrations denied recent illness.

Twelve environmental SpongeSicle™ samples were collected inside the apple processing barn from: the wooden apple press used during demonstrations to serve cider to orchard visitors; an employee hand sink; cloth apple picking baskets used by employees; wooden grading crates; the belt of the apple

processing machine; and, the handles of the machines used by the public to dispense food for petting zoo animals. All of these samples were negative for STEC, *Salmonella*, and *Campylobacter*.

Running water is not available at the orchard for visitors to wash hands. Alcohol-based hand sanitizer is available near the petting zoo area, but two patrons reported that the sanitizers were empty for a period of time on October 8. During the November 4 visit, sanitizer dispensers were cracked and visibly dirty. Small signs on the sanitizer stations encouraged guests to use sanitizer after visiting the animals, but no other public health signage was present.

On November 4, the petting zoo animals were removed from the orchard at the request of Washington County EH specialists to mitigate exposure to the animals by patrons during the orchard's last few open days of the season. On December 15, Washington County staff instructed orchard owners to discontinue serving cider from a wooden cider press, and recommended installation of handwashing stations and signage near the petting zoo animals, and separation of duties between animal and food-handling employees.

This was an outbreak of STEC and *Cryptosporidium* infections associated with drinking unpasteurized apple cider at an apple orchard where petting zoo animals were present. Animals in the petting zoo tested positive for the outbreak strain of *Cryptosporidium*, a strain of STEC closely related to the outbreak strain, and other potential human pathogens. The exact mechanism for contamination of the cider was not identified. However, the petting zoo animals were the ultimate source of the pathogens that caused the outbreak, and the most plausible scenario is that workers who cared for the animals served as mechanical vectors for the pathogens from the animals to the cider pressing equipment. Recommendations were provided to the orchard owners to help prevent future illnesses.

(45)
E. coli O157:H7 Infections Associated with Pre-Packaged Romaine Lettuce

October-November — Multiple counties/Multiple states

During November 7-21, four *E. coli* O157:H7 cases having isolates with pulsed-field gel electrophoresis (PFGE) pattern WA1ECB281 (Centers for Disease Control and Prevention [CDC] *Xba*I designation EXHX01.0074 and *Bln* designation EXHA26.0621) were interviewed by Minnesota Department of Health (MDH) staff as part of routine surveillance. A 60-day review of the PulseNet database showed seven additional states with nine matching isolates. A multi-state investigation was initiated.

All *E. coli* O157:H7 cases in Minnesota are routinely interviewed about potential exposures, including foods consumed at home and at restaurants, as part of routine surveillance. Interviews of *E. coli* O157:H7 cases with isolates that are indistinguishable by PFGE are compared to identify potential common exposures. Information gathered during routine interviews is reviewed by an MDH epidemiologist.

A confirmed case was defined as an individual from whom *E. coli* O157:H7 WA1ECB281 was isolated since November 1, 2011. Shopper card information was collected from cases when available to assist the epidemiologic investigation. The Minnesota Department of Agriculture (MDA) conducted traceback investigations of food products of interest.

Minnesota cases

Four confirmed cases in Minnesota were identified through routine surveillance. Case illness onsets ranged from October 30 to November 11. Among the four cases, all four reported diarrhea, cramping, and bloody stools, two (50%) reported fever, and two reported (50%) vomiting. The median duration of illness for the three cases who had recovered by the time of interview was 10 days (range, 7 to 12 days). One case was hospitalized for 3 days.

All four Minnesota cases reported consuming Brand A pre-packaged salad during the week prior to their illness onset. The cases reported different varieties of Brand A pre-packaged salad including Leafy Green Romaine (n=2), Caesar Lite Kit (n=1), and 5-Lettuce Mix (n=1). Romaine lettuce was the only common ingredient in the three reported varieties. No other specific food item was reported by more than 50% of the cases.

Multi-state investigation

From November 1 through December 1, 26 isolates with PFGE pattern EXHX01.0074 were observed in 14 states: Alabama (1), California (1), Florida (2), Iowa (1), Illinois (3), Massachusetts (1), Michigan (1), Minnesota (4), Missouri (2), Ohio (1), Texas (2), Utah (1), Washington (1), and Wisconsin (5).

At the time the multi-state investigation was initiated, there were 10 isolates in 6 states primarily in the upper Midwest: Iowa (n=1), Illinois (n=1), Massachusetts (n=1), Michigan (n=1), Minnesota (n=3), and Wisconsin (n=3). Routine surveillance interviews with these initial cases in Illinois, Michigan, Minnesota, and Wisconsin revealed that all eight cases reported consuming Brand A pre-packaged salad; multiple varieties were reported. Romaine lettuce was the only ingredient common to the Brand A pre-packaged lettuce varieties reported by the cases. A high proportion of the initial cases (70%) also reported consuming ground beef. However, further follow-up with cases and traceback activities in Wisconsin determined that the ground beef reported by the cases was from different sources.

Overall, 23 of 26 cases were interviewed nationally. Fifteen (65%) cases reported consuming pre-packaged lettuce prior to illness onset, and 11 (48%) reported consuming Brand A pre-packaged lettuce. Several cases occurred in states that would likely fall outside of Brand A's expected product distribution area. However, the investigation revealed that Brand A Franklin Park, Illinois facility also sold bulk lettuce to institutional facilities and to several restaurant chains, including Burger King, McDonald's, and Subway.

Traceback investigation

A traceback investigation was conducted by MDA in conjunction with the Illinois Department of Agriculture, Wisconsin Department of Agriculture, and United States Food and Drug Administration (FDA). Shopper card information was available for four Wisconsin cases and one Illinois case, but not for the four Minnesota cases. The traceback indicated that the Brand A pre-packaged salad varieties reported by the Minnesota cases who reported Caesar Lite Kit and Leafy Green Romaine, and the four Wisconsin cases and one Illinois case with shopper card information, was produced at the Brand A Franklin Park, Illinois facility. Romaine lettuce from nine lots and five growers were found to be in common across the four traceback legs. Additional information collected by FDA from the Brand A Franklin Park, Illinois facility indicated that two lots of romaine lettuce from two growers in the Salinas Valley, California could have provided the implicated romaine lettuce.

FDA conducted environmental assessments at both farms and presented the results of these assessments on a March 13, 2012 conference call with the states and CDC. At Farm A, the field were the romaine lettuce was grown was irrigated by water that was pumped into open reservoirs approximately 20 feet from a cattle ranch. Well water, water from the reservoir, and soil were tested by FDA and were negative for *E. coli* O157:H7. Cattle at the neighboring ranch were not tested. At Farm B, coyote tracks and manure were found on the field, and there was a cattle ranch at the northwest corner of Farm B. However, the ranch and the field were separated by a large distance. During the conference call, the states requested and FDA agreed to provide a written summary of the assessment findings. However, this had not been provided at the time this report was written.

This was a multi-state outbreak of *E. coli* O157:H7 infections associated with romaine lettuce. Although multiple varieties of Brand A pre-packaged lettuce were consumed by cases, all the varieties contained romaine lettuce. A traceback investigation indicated that either of two possible lots of romaine lettuce from two growers in the Salinas Valley could have been responsible for the outbreak. An environmental assessment at Farm A indicated that romaine lettuce was irrigated with water from an open reservoir next to a cattle ranch, suggesting a possible source of the contamination. However, this was not confirmed.

(46)
Norovirus Gastroenteritis Associated with a Soccer Banquet at a Country Club

November Dakota County

On November 9, 2011, a country club in Eagan, Minnesota, contacted their local Minnesota Department of Health (MDH) sanitarian to report a complaint of gastrointestinal illness in a patron. The complainant had attended a banquet for a high school girls' soccer team at the facility on Sunday, November 6. Approximately 50 people attended the banquet. One of the event organizers was contacted by MDH and reported multiple illnesses in banquet attendees. MDH sanitarians were notified and an investigation was initiated.

MDH obtained a list of banquet attendees and interviewed them about food consumption and illness history. A case was defined as a person who attended the banquet and subsequently developed vomiting and/or diarrhea (≥3 loose stools in a 24-hour period). Stool specimens were submitted to the MDH Public Health Laboratory for bacterial and viral testing.

On November 15, MDH sanitarians visited the country club to evaluate food preparation and handling procedures and to interview food workers about illness history and work duties.

Thirty-seven banquet attendees were interviewed, and eight (22%) met the case definition. Of the eight cases, six (75%) reported vomiting, five (63%) reported cramps, four (50%) reported diarrhea, three (38%) reported fever, and none reported bloody stools. The median incubation period from the banquet meal was 33.5 hours (range, 11 to 46.5 hours). The median illness duration was 74 hours (range, 8 to 114 hours). No cases visited a medical provider or were hospitalized.

Food items served at the banquet included Caesar salad, mixed fresh fruit (strawberries, pineapple, cantaloupe, honeydew, grapes, watermelon), antipasto platter (olives, artichoke, zucchini), lasagna, penne pasta, fettuccine pasta, Italian meatballs, marinara sauce, alfredo sauce, bread sticks, butter, lemonade, coffee, iced tea, soda, water, and ice cream cake. All food items served at the banquet were

prepared by the country club, except the ice cream cakes, which were purchased from restaurant and supplied by the parent organizers. The cakes were cut and served by the banquet servers. All of the foods were self-serve on a buffet line.

By univariate analysis, consuming fresh fruit was significantly associated with illness (7 of 7 cases vs. 21 of 29 controls; odds ratio [OR], undefined; 95% confidence interval, undefined; p = 0.03). No other foods were associated with illness.

Illness histories and job duty information were obtained from the country club food workers and banquet servers who helped with the event. No employees reported having had gastrointestinal illness previous to or on the implicated meal date. Two banquet servers became ill after the event (one with vomiting, one with both vomiting and diarrhea) with illness onset on November 9. One of the servers reported that she had family members who were ill with diarrhea 2 weeks prior to the event, but was unable to recall specific dates or times. The two servers helped bring food items to the buffet line, served ice cream cake to the tables, and cleared away dirty dishes. Leftovers from the soccer banquet were served as employee meals for the 2 days following the event. One of the ill servers recalled eating leftover antipasto platter, lasagna, penne pasta, alfredo sauce, and breadsticks. The other server who became ill could not recall eating any leftovers from the soccer banquet.

Stool specimens from the two ill banquet servers were submitted to MDH. One of the specimens tested positive for norovirus GII, and the other specimen tested negative for norovirus. Both specimens tested negative for *Campylobacter*, *Salmonella*, Shiga toxin-producing *E. coli*, *Shigella*, and *Yersinia*. The second specimen was collected approximately three weeks after illness onset, and the delay in collection could explain the negative norovirus test results.

There were no reports of vomiting at the event. Of the 37 banquet attendees interviewed, no one reported being ill during or prior to the event. One of the cases who became ill after the event had a shorter incubation period (11 hours) than the other cases (range, 31 to 47 hours). It is plausible that the person with the shorter incubation period may have contaminated food and/or utensils on the buffet line during the incubation stage of illness. However, this could not be confirmed.

MDH sanitarians stressed the importance of proper handling of food and beverages, use of gloves when handling ready-to-eat foods, good handwashing, thorough cleaning and disinfection, and exclusion of ill food handlers to the employees of the country club.

This was a foodborne outbreak of norovirus gastroenteritis associated with eating at a soccer banquet dinner. Fresh-cut fruit was identified as a vehicle of illness. Foods and serving utensils may have been contaminated by a banquet attendee who was in the incubation stage of illness. However, this was not confirmed.

(47)
Norovirus Gastroenteritis Associated with a Restaurant

November Goodhue County

On November 18, 2011, the Minnesota Department of Health (MDH) foodborne illness hotline received a complaint of gastrointestinal illness among a group of three patrons from two different households

who ate at a restaurant in Dennison on November 12. All three became ill with vomiting and/or diarrhea 31 to 32 hours after eating at the restaurant. Persons from the two households had no other recent meals in common. An investigation was initiated.

MDH Environmental Health (EH) specialists visited the restaurant on November 18 to evaluate food preparation and handling procedures and to inquire about employee illness, including the employee illness log. Lists of employees and their work schedules were obtained.

MDH epidemiology staff interviewed restaurant employees about recent history of gastrointestinal illness and foods consumed at the restaurant.

The restaurant owners were asked to screen employees for gastrointestinal illness when they presented to work during the investigation. Additional interventions to prevent further transmission were also implemented.

MDH EH specialists and MDH epidemiologists made several requests to the restaurant for credit card receipts for patrons who ate at the restaurant on November 12. A letter including pertinent statutes that compelled release of this information was sent by an MDH epidemiologist to the restaurant owner on November 23. MDH staff began interviewing restaurant patrons about food consumption and illness history on November 29, when the credit card receipts were provided by the restaurant.

A case was defined as a person who ate at the restaurant and subsequently developed vomiting and/or diarrhea (≥3 loose stools in a 24-hour period). Stool samples collected from consenting restaurant patrons were submitted to the MDH Public Health Laboratory for bacterial and viral testing.

Twenty-four restaurant patrons were interviewed: three from the initial complaint and 21 from credit card receipts. Seven (29%) patrons met the case definition. All seven cases reported diarrhea, five (71%) reported abdominal cramps, four (57%) reported vomiting, one (14%) reported fever, and none reported bloody stools. Two (29%) cases visited a medical provider. The median incubation period was 32 hours (range, 10 to 37 hours). The median duration of illness was 71 hours (range, 50 to 78 hours).

MDH collected stool specimens from two cases (both from one household of the original complaint) who ate at the restaurant on November 12. One of the two stool specimens tested positive for norovirus GII.

By univariate analysis, eating chicken wings (3 of 7 cases vs. 0 of 17 controls; odds ratio [OR], undefined; 95% confidence interval [CI] lower limit, 1.7; $p = 0.02$); the mahi mahi dinner entrée (3 of 7 cases vs. 0 of 17 controls; OR, undefined; 95% CI lower limit, 1.7; $p = 0.02$); mashed potatoes (4 of 7 cases vs. 1 of 17 controls; OR, 21.3; 95% CI, 1.7 to 554; $p = 0.01$); any entrée from the Dinner menu (4 of 7 cases vs. 2 of 17 controls; OR, 10.0; 95% CI, 1.1 to 96.9; $p = 0.04$); and, a combined variable that included either an entrée from the Dinner menu or from the Saturday Specials menu (7 of 7 cases vs. 4 of 17 controls; OR, undefined; 95% CI lower limit, 3.9; $p = 0.001$) were significantly associated with illness. Eating an appetizer (6 of 7 cases vs. 6 of 17 controls; OR, 11.0; 95% CI, 1.1 to 275; $p = 0.07$) approached significance. In an analysis stratified by whether or not a subject ate an item from the Dinner or Saturday Specials menu, eating appetizers, chicken wings, mashed potatoes, or the mahi mahi dinner entrée were no longer associated with illness. A meaningful multivariate analysis was not possible.

All entrees in the Dinner and Saturday Specials menus were served with French fries or small baked potatoes, a dinner roll, and a choice of soup, salad, or coleslaw.

During the environmental health assessment, employee handwashing techniques were observed and deemed to be appropriate; the handwashing station was accessible and properly supplied. Although gloves were available, they were not required or consistently used to minimize bare-hand contact with ready-to-eat foods. There was an employee illness log available, but it was not being maintained. Illness histories and job duty information were obtained from all 11 employees. No employees reported having had gastrointestinal illness previous to or on the implicated meal date.

MDH sanitarians stressed the importance of proper handling of food and beverages, use of gloves or utensils when handling ready-to-eat foods, good handwashing, and exclusion of ill food handlers to the employees of the restaurant.

This was an outbreak of norovirus gastroenteritis associated with a restaurant in Dennison, Minnesota. A specific food vehicle was not identified, but eating an entrée from the Dinner or Saturday Specials menus was statistically associated with illness. Since none of the restaurant employees reported being ill, the initial source of the outbreak was not identified. However, bare-hand contact with ready-to-eat foods could have played a role in contamination of food.

(48)
Norovirus Gastroenteritis Associated with a Restaurant

November Hennepin County

On November 21, 2011, the Minnesota Department of Health (MDH) foodborne illness hotline received a report from Caterer X regarding three complaints of illness following a wedding catered by Caterer X and held at Restaurant A on November 19. The three complainants had also attended a rehearsal dinner held at Restaurant B on November 18. Both restaurants are located in Minneapolis. MDH notified the Hennepin County Human Services and Public Health Department (HSPHD) epidemiology unit and the Minneapolis Division of Environmental Health (MDEH), and an investigation was initiated.

HSPHD epidemiologists interviewed the original complainants and other members of their dining groups about food consumption and illness history. Four additional complaints were made to Caterer X on November 22. A case was defined as a wedding guest who subsequently developed vomiting and/or diarrhea (≥3 loose stools in a 24-hour period) after eating at one of the facilities. Stool samples collected from consenting complainant group members were submitted to the MDH Public Health Laboratory for bacterial and viral testing.

MDEH sanitarians visited the restaurant on November 21 and 22 to evaluate food preparation and handling procedures and to interview food workers about illness history and work duties Caterer X was also contacted regarding any recent employee illness and reports of patron illness.

Thirteen wedding guests were interviewed, and eight met the case definition. All cases reported diarrhea, six (75%) reported vomiting, six (75%) reported cramps, three (38%) reported fever, and none reported bloody stools. The median incubation from the wedding reception meal from Caterer X was 15.5 hours (range, 6.5 to 24 hours). The median incubation from the rehearsal dinner at Restaurant B was 39 hours

(range, 30 to 47.5 hours). The median duration of illness was 29 hours (range, 21 to 51 hours) for the five who had recovered at the time of interview. One stool specimen was submitted and tested positive for norovirus GII.

Based on the incubation periods and reported symptoms, the rehearsal dinner meal at Restaurant B was the more likely source of the illnesses and was the focus of this investigation.

Cases reported eating a variety of foods at the rehearsal dinner including several appetizers, Caesar salad, a choice of three entrees, and coconut cake. All eight cases reported consuming sushi rolls and six cases reported consuming Caesar salad. Only five controls were interviewed; this precluded a conclusive statistical analysis of specific food exposures.

Seventy-seven employees were interviewed and screened for recent illness. Four employees reported recent gastrointestinal illness and were excluded from food handling for 72 hours past their last symptom. None reported being symptomatic at the time of the rehearsal dinner. Two employees had illness onset on November 20; the other two had illness on November 21.

MDEH sanitarians noted overall compliance with food code requirements for food preparation; however, the facility was unable to produce an employee illness log. The facility already had a glove policy for ready-to-eat items. The sanitarians further stressed the importance of proper handling of food and beverages, good handwashing, thorough disinfection, and exclusion of ill employees. The restaurant implemented screening of employees for illness at the beginning of each shift. The restaurant received no additional complaints from patrons.

This was a foodborne outbreak of norovirus gastroenteritis associated with eating at a restaurant. The vehicle of transmission and source of contamination were not identified. However, multiple ill employees were identified, suggesting illness transmission among workers at the restaurant. It is likely that food items were contaminated by an ill or recently ill food worker who did not identify their symptoms or the correct onset date of their symptoms during interview.

(49)
Suspected Norovirus Gastroenteritis Associated with a Restaurant

December Anoka County

On December 1, 2011, the Minnesota Department of Health (MDH) foodborne illness hotline received a complaint of gastrointestinal illness among a party of 10 individuals who had eaten at a restaurant in Ramsey, Minnesota on November 20. The complainant reported eight ill individuals from four different households. The complainant knew of an additional party of four individuals who had eaten at the restaurant on the same date; she did not know if they had become ill but gave the patron the MDH hotline number. Anoka County Environmental Services was notified on December 1, and an investigation was initiated.

MDH interviewed the original complainants, and Anoka County obtained credit card receipts from the establishment for additional patron contact information. A case was defined as a person who ate at the

restaurant on November 20 and subsequently developed vomiting and/or diarrhea (≥3 loose stools in a 24-hour period).

On December 2, Anoka County sanitarians visited the restaurant to evaluate food preparation and handling procedures and to ask about employee illness histories. On December 4, MDH staff began interviewing employees, as well as patrons identified from the credit card receipts. On December 5, Anoka County sanitarians continued interviewing food workers about illness history and work duties.

Fourteen patrons were interviewed, and six (43%) met the case definition (all from original complaint). Two patrons (also from the original complaint) reported illness that did not meet the case definition and were excluded from analyses. The median incubation period for the cases was 36 hours (range, 23 to 62 hours). The median duration of illness was 54 hours (range, 38.5 to 65 hours). All six cases reported diarrhea, five (83%) reported vomiting, four (67%) reported cramps, two (33%) reported fever, and none reported bloody stools. No cases visited a medical provider or were hospitalized.

The patrons reported eating a variety of different menu items. In an ingredient-specific univariate analysis, consuming both shredded cheese (6 of 6 cases vs. 2 of 6 controls; odds ratio [OR], undefined; 95% confidence interval [CI], undefined; $p = 0.03$) and chopped lettuce (6 of 6 cases vs. 2 of 6 controls; OR, undefined; 95% CI, undefined; $p = 0.03$) were significantly associated with illness. No other foods were associated with illness.

MDH was able to interview one additional patron from the credit card receipts (the receipts only had signatures, making it difficult to determine the name of the patron or to obtain contact information). The patron reported gastrointestinal illness in all four members of the dining party, but only two individuals met the case definition. The patron reported a meal date of November 27 and illness onset the same day; however, the credit card receipt was for November 20. Therefore, it appears that the patron had difficulty recalling both the meal date and the date of illness onset.

Illness histories and job duty information were obtained from 26 restaurant employees. No employees reported having had gastrointestinal illness previous to or on the implicated meal date; however, the restaurant reported one employee with gastrointestinal illness during November 7-9. One employee became ill after the implicated meal date, with illness (vomiting) onset on November 23, and one employee reported ill family members with illness onset on November 25.

The Anoka County sanitarian stressed the importance of proper handling of food and beverages, use of gloves or utensils when handling ready-to-eat foods, good handwashing, and exclusion of ill food handlers to the employees.

This was a foodborne outbreak associated with eating at a restaurant in Ramsey, Minnesota. The etiologic agent was not identified, but the distribution of incubation periods and symptoms were characteristic of norovirus gastroenteritis. Shredded cheese and lettuce were statistically associated with illness. The most likely source of contamination was an infected food worker, but this was not confirmed.

(50)
Suspected *Clostridium perfringens* Intoxications Associated with a Restaurant

December — Otter Tail County

On December 5, 2011, the Minnesota Department of Health (MDH) foodborne illness hotline received a complaint of gastrointestinal illness among a group of five extended family members who ate at a restaurant in Fergus Falls on December 3. The group reported no other recent meals in common. An investigation was initiated immediately.

MDH Environmental Health Services sanitarians visited the restaurant on December 5 to evaluate food preparation and handling procedures and collect credit card receipts for additional patrons who had dined there on December 3. MDH staff interviewed patrons identified from credit card receipts about food consumption and illness history. A case was defined as a restaurant patron who developed vomiting or diarrhea (≥3 loose stools in a 24-hour period) after eating at the restaurant. Stool samples collected from consenting restaurant patrons were submitted to the MDH Public Health Laboratory for bacterial and viral testing.

Thirteen restaurant patrons were interviewed; 10 (77%) met the case definition. The median incubation period for the cases was 11 hours (range, 6 to 15 hours). The median duration of illness was 24 hours (range, 5 to 35 hours). All 10 cases reported diarrhea and vomiting, 8 (80%) reported cramps, and none reported vomiting, fever, or bloody stools. A stool specimen submitted by one ill patron tested positive for *Clostridium perfringens* enterotoxin Type A.

Due to the limited number of non-ill controls, no food items were significantly associated with illness. However, Mexican rice was the only food item that was consumed by the majority of cases, and consumption of Mexican rice yielded a very high odds ratio in the analysis (8 of 9 cases vs. 1 of 3 controls; odds ratio, 16.0; 95% confidence interval, 0.3 to 1,057; $p = 0.12$).

MDH EHS sanitarians conducted an environmental assessment on December 5. Mexican rice was found to be held in a plastic tub in a low temperature oven at 104° F 5 hours after it was prepared. The rice was discarded and employees were educated on safe hot holding procedures.

This was a foodborne outbreak of suspected *Clostridium perfringens* intoxications associated with a restaurant in Fergus Falls. Time-temperature abused Mexican rice was the likely vehicle.

(51)
Norovirus Gastroenteritis Associated with an Event Center

December — St. Louis County

On December 6, 2011, the Minnesota Department of Health (MDH) foodborne illness hotline received an illness complaint associated with a wedding reception that was held at an event center in Duluth on December 3. The complainant reported approximately 75 illnesses among 260 reception attendees. MDH Environmental Health Services (EHS) was notified and an investigation was initiated.

On December 6, MDH sanitarians in the Northeast District Office received a call from management at the event center reporting that they had been receiving illness complaints from patrons both that morning and the previous day and that they had been collecting information from the complainants. Management was instructed to fax all complaints to MDH, as required by the Minnesota Food Code.

On December 6, the MDH foodborne illness hotline received an illness complaint from two individuals who had attended a holiday party at the event center on December 3.

A partial list of wedding guests was obtained from the bride and groom. Contact information for the 105 holiday party guests was obtained from the party organizer. A menu with food and beverages served at the wedding reception and holiday party was provided by the ballroom.

Staff from MDH interviewed wedding and holiday party guests to obtain information on food/beverage consumption and illness history. A case was defined as an event center guest who developed vomiting and/or diarrhea (≥3 loose stools in a 24-hour period) after attending an event at the ballroom. Stool samples collected from consenting guests and employees were submitted to the MDH Public Health Laboratory for bacterial and viral testing.

MDH sanitarians visited the ballroom to evaluate food preparation and handling procedures and to interview staff regarding recent illness and job duties.

MDH staff interviewed 98 ballroom guests, including 71 wedding guests and 27 holiday party guests. Sixty-two (63%) guests met the case definition, including 50 wedding guests and 12 holiday party guests. Ten additional guests reported illness that did not meet the case definition and were excluded from further analysis.

Fifty-three (87%) of 61 cases reported diarrhea, 48 (79%) of 61 reported cramps, 40 (65%) of 62 reported vomiting, and 33 (60%) of 55 reported fever. The median incubation period was 33 hours (range, 3 to 68 hours). The median duration of illness was 48 hours (range, 10 to 78 hours) for the 17 cases with known recovery date times. Two patron stool samples were received; one from a wedding guest and one from a holiday party guest. Both samples tested positive for norovirus GII. Nucleic acid sequencing was conducted on the samples, and the resulting sequences were identical.

Food for both events featured butler-passed hors d'oeuvres and a buffet dinner. The two events had different menus, but food for both was prepared in the same kitchen. No individual food items served at the events were found to be significantly associated with illness.

At the start of the investigation sanitarians and management established a screening protocol for employee illness. All employees with vomiting and/or diarrhea were excluded from work until 72 hours after the resolution of symptoms. Illness histories and job duty information were obtained from 41 employees. Eight employees reported recently having a gastrointestinal illness, with illness onset dates ranging from November 25 to December 11. One employee reported working December 3 while actively having vomiting and diarrhea. An additional employee reported working December 3 with abdominal cramps; however, his reported onset of diarrhea and vomiting was not until December 5. Employees reporting illness performed a variety of job duties at the ballroom, including food preparation. Five employees tested positive for norovirus GII. Nucleic acid sequencing was conducted on two of the

positive food worker samples, including the food worker who worked while ill on December 3, and the resulting sequences were identical to each other and to the sequence identified in patron samples.

During the December 6 on-site investigation, all food that had been previously prepared was discarded due to the fact that ill employees were involved in the preparation. All surfaces throughout the establishment were sanitized.

This was a foodborne outbreak of norovirus gastroenteritis associated with an event center in Duluth. The same norovirus sequence was identified in samples submitted from ballroom guests from separate events and from ballroom employees. The source of contamination was one or more infected food workers who had contact with ready-to-eat food items.

(52)
Gastroenteritis Associated with an Event at a Hotel

December Ramsey County

On December 7, 2011, a hotel in Saint Paul received a complaint of gastrointestinal illness among a group of patrons that ate at the holiday lunch held at the restaurant on December 4. The complaint was forwarded to the City of Saint Paul Environmental Health, which forwarded the complaint to the Minnesota Department of Health (MDH). An investigation was initiated.

City of Saint Paul Environmental Health sanitarians visited the restaurant on December 9 to evaluate food preparation and handling procedures, interview food workers, and collect a reservation list of additional event attendees. MDH staff interviewed event attendees about food consumption and illness history. A case was defined as a holiday lunch attendee who developed vomiting or diarrhea (≥3 loose stools in a 24-hour period) after eating at the event. Stool samples collected from consenting attendees were submitted to the MDH Public Health Laboratory for bacterial and viral testing.

Twenty-three event attendees were interviewed and 12 (52%) met the case definition. Three additional patrons reported illness that did not met the case definition and were excluded from analysis. The median incubation period for the cases was 13 hours (range, 2.5 to 39 hours). The median duration of illness was 2 days (range, 12 hours to 8 days). All 12 cases reported diarrhea, 9 (75%) reported cramps, 4 (33%) reported fever, and none reported vomiting or bloody stools. Stool samples submitted by six ill patrons tested negative for *Salmonella*, *Shigella*, *Campylobacter*, *Yersinia*, Shiga toxin-producing *E. coli*, enterotoxigenic *E. coli*, norovirus, sapovirus, rotavirus, adenovirus, and astrovirus. Additional testing indicated that all six specimens were negative for enteropathogenic *E. coli*, enteroinvasive *E. coli*, and diffusely adherent *E. coli*. Three of six stool specimens were positive for enteroaggregative *E. coli.* Two of the three enteroaggregative *E. coli* isolates from unrelated cases (i.e., they did not attend the event together) had indistinguishable PFGE patterns.

By univariate analysis, consuming the Black Forest ham and Liptauer chive cheese wrap was significantly associated with illness (12 of 12 cases vs. 11 of 18 controls; odds ratio [OR], undefined; 95% confidence interval [CI], undefined; p = 0.02). Consuming the turkey and orange tarragon butter finger square (12 of 12 cases vs. 13 of 18 controls; OR, undefined; 95% CI, undefined; p = 0.07), whipped butter (7 of 12 cases vs. 4 of 18 controls; OR, 4.9; 95% CI, 0.8 to 32.7; p = 0.06), or black

currant tea (10 of 12 cases vs. 7 of 18 controls; OR, 7.9; 95% CI, 1.1 to 88.2; p = 0.06) approached statistical significance.

City of Saint Paul Environmental Health sanitarians interviewed 12 hotel employees, and one reported recent gastrointestinal illness. The employee reported becoming ill on November 30 with diarrhea and cramping and recovered on December 1. The employee worked on December 4 but reported job duties of taking out the trash and cleaning and did not prepare food.

This was a foodborne outbreak of gastroenteritis associated with a holiday lunch held at a hotel in Saint Paul. Extensive testing ruled out numerous common as well as more uncommon pathogens. Three stool specimens were positive for enteroaggregative *E. coli*, and two isolates were indistinguishable by PFGE. This suggests that enteroaggregative *E. coli* was an etiologic agent in this outbreak. However, many of the case incubation periods were shorter than the 20-48 hour incubations previously reported for enteroaggregative *E. coli*. Black Forest ham and Liptauer chive cheese wrap was identified as the vehicle. Enteroaggregative *E. coli* is thought to be a human-only pathogen suggesting that a food item in the Black Forest ham and Liptauer chive cheese wrap was contaminated by an infected food worker either at the restaurant, or from a human source prior to the restaurant. However, the original source of the contamination was not identified.

(53)
Norovirus Gastroenteritis Associated with a Restaurant

December Hennepin County

On December 16, 2011, Hennepin County Human Services and Public Health Department (HSPHD) epidemiology unit (Epi) received a foodborne illness complaint about a restaurant in Plymouth from the Minnesota Department of Health (MDH). The complainants had eaten at the restaurant on December 6. HSPHD-Epi notified HSPHD-environmental health unit (EH) about the complaint. An outbreak investigation was initiated on December 16.

After the investigation was initiated, HSPHD-EH learned that the restaurant had received four additional illness complaints from patrons who had dined there on December 6; these complaints had not been forwarded on to HSPHD-EH. Another illness complaint was received by the restaurant on December 20 from a person who had eaten there on December 16. This complaint was forwarded to HSPHD-Epi on December 20.

On December 16, HSPHD-EH spoke with a restaurant manager and requested names from the reservation lists for December 6. HSPHD-Epi interviewed restaurant patrons identified from the complaints and the reservation lists to obtain information on food/beverage consumption and illness history. 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). The reservation lists received did not include any lunch patrons, only those who had eaten there late in the afternoon or evening of December 6. The only lunch patrons from December 6 who were interviewed were part of the complainant groups. No stools specimens were requested from persons who had eaten on December 6 because of the time period between illness and interviews. A stool specimen was collected from the complainant who had

eaten at the restaurant on December 16 and tested for viral and bacterial pathogens at the MDH Public Health Laboratory.

On December 16, HSPHD-EH conducted an inspection of the facility and interviewed the food workers regarding illness history and job duties.

Illness histories and exposure information were obtained from 20 patrons who had eaten on December 6. Six (30%) cases were identified from this meal date. Five cases (83%) reported diarrhea, vomiting, and/or abdominal cramps, and one (17%) reported fever. The median incubation period was 33 hours (range, 27 to 36 hours). The median duration of illness was 77 hours (range, 56 to 114 hours) for the five cases who had recovered from their symptoms at the time of the interview.

One case was identified who dined at the restaurant on December 16. This case had a 20-hour incubation and reported vomiting, diarrhea, cramps, and fever. The person was still having symptoms when interviewed 96 hours after illness onset. This person submitted a stool specimen that tested positive for norovirus GII.

Cases all reported eating a variety of salads, but no food items were statistically significant in the univariate analysis.

Illnesses histories and job duty information were obtained from 38 restaurant employees. Seven employees reported having had a recent gastrointestinal illness. Six had vomiting and/or diarrhea with illness onset dates ranging from December 7 to December 9. Of the six, three were servers, one was a bartender, and two were kitchen staff. The seventh person (kitchen staff) reported cramps only on December 11. Two of the kitchen workers reported that family members had been ill with vomiting and/or diarrhea in the week prior to their symptoms; one of these workers prepared salads. Four of the ill employees reported eating salads or lettuce on December 6.

During the inspection of the restaurant, several critical violations were noted including bare-hand contact with ready-to-eat foods (breadsticks), and the fact that management had received four customer complaints but had not notified the health department.

Immediate action was taken by management to correct critical violations. Tongs were provided for handling breadsticks, and the phone number to report illness to the health department was added to customer complaint form that the restaurant uses. Additional spot-check inspections were conducted on December 19 and December 21 to meet with management, verify continued compliance, and answer questions.

This was a foodborne outbreak of gastroenteritis associated with a restaurant. Transmission on December 6 was solidly documented. Although the etiology of illnesses associated with the restaurant on December 6 was not confirmed, the distribution of symptoms and incubations were characteristic of norovirus gastroenteritis. In addition, a stool specimen from a case who dined at the restaurant on December 16 did test positive for norovirus. A specific food vehicle was not confirmed, but salads were eaten by all of the cases. The likely source of contamination was an infected food worker.

(54)
Norovirus Gastroenteritis Associated with a Holiday Party at a Restaurant

December Hennepin County

On December 15, 2011, the Minnesota Department of Health (MDH) foodborne illness hotline received a complaint of gastrointestinal illness from the director of a clinic that held their holiday party at a restaurant in Bloomington on December 12. The City of Bloomington Environmental Health (CBEH) Program was contacted and an investigation was initiated immediately.

CBEH sanitarians visited the restaurant on December 15 to evaluate food preparation and handling procedures, interview food workers, and collect credit card receipts for additional patrons from December 11 to 13. The clinic provided a list of holiday party attendees. CBEH staff interviewed holiday party attendees and other restaurant patrons about food consumption and illness history. A case was defined as a holiday party attendee or other restaurant patron who developed vomiting or diarrhea (≥3 loose stools in a 24-hour period) after eating at the restaurant. Stool samples collected from consenting holiday party attendees were submitted to the MDH Public Health Laboratory for bacterial and viral testing.

Thirty-four holiday party attendees were interviewed, and 15 (44%) met the case definition. Five additional holiday party attendees reported illness that did not met the case definition and were excluded from analysis; three of these individuals reported illness onsets prior to the event. The median incubation period for the cases was 31.5 hours (range, 10 to 54.5 hours). The median duration of illness was 24 hours (range, 5 to 68 hours). All 15 cases reported diarrhea, 11 (73%) vomiting, 10 (67%) cramps, 7 (47%) fever, and none bloody stools. A stool specimen submitted by one ill holiday party attendee tested positive for norovirus GII. CBEH staff contacted five additional groups who ate at the restaurant from December 11 to 13 and none reported illness.

No food items were significantly associated with illness. Foods at the holiday party were served buffet style and included a vegetable tray, olive and cheese tray, shrimp cocktail, baked brie, beef pinwheel, pot stickers, meatballs, buffalo chicken dip, Thai tidbits, Caesar salad, garlic toast, cookies, bars, and chocolate-dipped desserts.

CBEH sanitarians interviewed 12 restaurant employees, and none reported recent vomiting or diarrhea. However, two employees reported fever and abdominal pain during the week prior to the event. CBEH sanitarians also received complaints from patrons that the restaurant lacked hot water in their restrooms. The restaurant reported that their hot water heater had been broken and that the restaurant was without hot water on December 12.

This was a foodborne outbreak of norovirus gastroenteritis associated with a holiday party held at a restaurant in Bloomington. No vehicle was identified, and the source of the contamination was not confirmed. However, holiday party attendees with illness onsets prior to the event were identified which coupled with the lack of adequate handwashing facilities at the restaurant and buffet-style food service at the event suggests that an ill event attendee may have served as the source of contamination.

(55)
Norovirus Gastroenteritis Associated with a Restaurant

December Dakota County

On December 19, 2011, the Minnesota Department of Health (MDH) foodborne illness hotline received a complaint of gastrointestinal illness among a group of 11 patrons who ate dinner at a restaurant in Burnsville, Minnesota on December 14. Seven members of the group reportedly became ill with diarrhea and vomiting 7.5 to 31 hours after eating at the restaurant. The complainants did not have any other common exposures. An investigation was initiated. Subsequently, MDH became aware of additional complaint that had been received by the restaurant.

MDH epidemiologists interviewed patrons from three complainant groups about food consumption and illness history. A case was defined as a person who ate at the restaurant and subsequently developed vomiting and/or diarrhea (≥3 loose stools in a 24-hour period). Stool samples collected from consenting restaurant patrons were submitted to the MDH Public Health Laboratory for bacterial and viral testing.

MDH Environmental Health (EH) specialists contacted the restaurant on December 19 and asked the manager to start screening workers and exclude workers who reported vomiting or diarrhea. List of complaints received by the restaurant were obtained. EH specialists visited the restaurant on December 20 to evaluate food preparation and handling procedures. Restaurant employees were interviewed about recent history of gastrointestinal illness and foods consumed at the restaurant. Employee work schedules and illness log were obtained. Restaurant management staff were asked to continue to screen employees for gastrointestinal illness when they presented to work during the investigation. Additional interventions to prevent further transmission were implemented.

Restaurant reservation lists and credit card receipts were not obtained, because the restaurant claimed to not have them.

The restaurant received four independent complaints of illness in people who ate at the restaurant on December 14 or 15. Contact information was not available for one complaint, one complaint was the group that called the foodborne illness hotline, and two new complaints were identified. Sixteen restaurant patrons who were part of the complaint groups were interviewed. Fourteen (88%) persons met the case definition. The 14 cases ate at the restaurant on December 14 for dinner (n=9) and December 15 for lunch (n=5). All 14 cases reported vomiting, 12 (86%) reported diarrhea, 8 (57%) reported cramps, 5 (36%) reported fever, and 1 (7%) reported bloody stool. The median incubation period was 28 hours (range, 7.5 to 38 hours). For the seven cases who had recovered by the time of interview, the median duration of illness was 88 hours (range, 38 to 101 hours). Four of the cases called a health care provider and one visited the emergency room; none were hospitalized.

Cases reported eating bruschetta, stuffed mushrooms, the trio platter, apple gorgonzola salad, mixed greens salad, lasagna, ravioli, spaghetti marinara, chicken marsala, garlic mashed potatoes, dolce platter, chocolate cake, cheesecake, and apple. A meaningful statistical analysis was not possible because only two non-ill controls were interviewed.

Foods consumed by a high proportion of cases included salad (14 of 14 cases vs. 2 of 2 controls), chopped antipasto salad (10 of 14 cases vs. 1 of 2 controls), appetizers (13 of 14 cases vs. 2 of 2

controls), baked pasta (12 of 14 cases vs. 1 of 2 controls), pasta (12 of 14 cases vs. 2 of 2 controls), and drinking water (10 of 12 cases vs. 2 of 2 controls).

Sixty-one food workers were interviewed. Four reported a recent history of acute gastrointestinal illness, with onsets of December 13, 14, 17, or 18. Of the four ill employees, three (75%) reported nausea, two (50%) reported diarrhea, two (50%) reported vomiting (50%), and one (25%) reported fever. Illness durations ranged from 1 to 7 days. Three food workers reported working while ill. Among the ill restaurant employees, one employee who worked on salad and pizza prep experienced vomiting and diarrhea while at work on December 14, reported it to the manager, and continued to work because a replacement could not be found. Another employee reported feeling ill while at work to their manager on December 17 and also continued to work. Although restaurant management was aware of illness among employees, they did not report it to MDH. The EH specialists noted that the employee illness log did not have any entries of employee illness in the previous month. Additionally, although the restaurant received complaints of illness from patrons, they did not report the complaints to MDH.

Ill employees were excluded from work until 72 hours after their recovery. Restaurant management was asked to screen employees for illness each shift for 10 days after the start of the investigation.

As a result of the investigation, the restaurant voluntarily closed for cleaning during lunch on December 20. Restaurant staff cleaned and sanitized equipment and food contact surfaces; they also threw away ready-to-eat (RTE) food items. Food preparation was not occurring during the EH evaluation; however, the EH specialists observed handwashing techniques and glove use of restaurant employees, and deemed them to be appropriate. Holding temperatures for food items were also deemed appropriate. EH specialists stressed the importance of proper handling of food and beverages, use of gloves or utensils when handling RTE foods, good handwashing, and exclusion of ill food workers.

MDH tested stool specimens from four ill patrons, including at least one from each complaint group, and two restaurant employees. All six samples tested positive for norovirus; five were GII.1 of the same sequence and one from a patron was GII.7. One sample from a patron also tested positive for adenovirus.

This was an outbreak of norovirus gastroenteritis associated with a restaurant in Burnsville. Several ill restaurant employees, including three who worked while ill, were source the likely of the outbreak. No single food item could be implicated as the vehicle of transmission.

(56)
Norovirus Gastroenteritis Associated with a Restaurant

December Olmsted County

On January 2, 2012, Olmsted County Public Health Services (OCPHS) received a complaint of gastrointestinal illness from a husband and wife who had dined at a restaurant in Rochester, Minnesota on December 27, 2011. On January 3, OCPHS and the Minnesota Department of Health (MDH) foodborne illness hotline both received independent complaints from restaurant patrons. An outbreak investigation was immediately initiated.

OCPHS Environmental Health (EH) specialists visited the restaurant on January 3 to assess food preparation and handling procedures, interview employees, and obtain credit card receipts for additional patron contact information.

Patrons identified from credit card receipts and foodborne illness complaints were interviewed by OCPHS staff to obtain information on food/beverage consumption and illness history.

A case was defined as a restaurant patron who developed vomiting and/or diarrhea (≥3 stools in a 24-hour period) after eating at the restaurant. A secondary case was defined as an individual who developed these symptoms at least 24 hours after a household member's illness onset. Stool samples from consenting patrons and food workers were submitted to the MDH Public Health Laboratory (PHL) for bacterial and viral testing.

Fifty-four patrons were interviewed; 17 (31%) met the case definition. One secondary case was identified with illness onset on January 3 and was excluded from further analyses. Case meal dates were December 27 (n=7), 28 (n=2), 29 (n=7), and 31 (n=1), and illness onset dates ranged from December 28 through January 2. The median incubation period was 35.5 hours (range, 29 to 48.5 hours), and the median duration of illness was 58 hours (range, 6 to 116 hours). All 17 cases reported vomiting, 16 (94%) diarrhea, 15 (88%) abdominal cramps, seven (41%) fever, and one (6%) bloody stool. None of the cases saw a healthcare provider. Two patron stool samples were received at the MDH PHL from independent complainants who ate at the restaurant on December 28 and 29; both tested positive for norovirus GII.4 New Orleans with identical region D nucleic acid sequences.

In a univariate analysis, consuming a pita entrée side salad (6 of 16 cases vs. 1 of 36 controls; odds ratio [OR], 21.0; 95% confidence interval [CI], 2.3 to 195.4; $p = 0.002$), a gyros/pita/fries lunch special (8 of 16 cases vs. 5 of 35 controls; OR, 6.0; 95% CI, 1.5 to 23.4; $p = 0.01$), or a pita entrée rice side (5 of 16 cases vs. 2 of 36 controls; OR, 7.7; 95% CI, 1.3 to 45.6; $p = 0.02$) were significantly associated with illness. Most, but not all, salads contained romaine lettuce; when interviewed about side salads, cases and controls were not asked to specify the salad type. A composite variable including any salad and any romaine lettuce-containing item, which included most pitas and the gyros/pita/fries lunch special, explained a greater proportion of cases than controls (16 of 17 cases vs. 24 of 36 controls; OR, 8.0; 95% CI, 0.9 to 67.7; $p = 0.04$). Consuming tzatziki (0 of 16 cases vs. 13 of 36 controls; OR, 0; 95% CI, undefined; $p = 0.01$) was inversely associated with illness. A multivariate analysis was not attempted due to overlap in menu items and ingredients, and the lack of specificity during patron interviews.

Three (23%) of 13 restaurant employees interviewed reported recent vomiting or diarrhea. Two submitted stool specimens that tested positive for norovirus GII.4 New Orleans; one had onset of illness late in the evening on December 28, and the other had onset on December 31. The region D nucleic acid sequence for the first positive employee stool specimen was identical to the two patron sequences. Region D could not be sequenced for the second positive employee stool specimen. The third ill employee also had onset on December 28; a stool sample from this employee tested positive for norovirus GII.3. One employee had reported his/her illness to the restaurant management, but was told to report to work anyway because the restaurant was short-staffed; the employee returned home 30 minutes after arriving at the restaurant.

OCPHS EH specialists instructed restaurant management to implement norovirus interventions during their visit to the restaurant on January 3. Interventions included mandatory glove use for handling ready-

to-eat (RTE) foods, review of employee illness and handwashing policies with all staff, daily screening of staff for vomiting and diarrhea, exclusion of ill employees, cleaning and sanitizing of the facility, and discarding all prepared or opened RTE foods. The restaurant voluntarily closed in the afternoon on January 3 to accomplish these interventions and reopened after additional EH assessment on January 4.

EH specialists noted that employee training about appropriate handwashing after entering the kitchen from the restaurant's only uni-sex toilet room may have been inadequate, or that handwashing was not properly stressed to employees by management.

On January 5, EH specialists reviewed the food flow for romaine lettuce served at the restaurant. Gloves were used by food workers when chopping a case of whole heads of romaine; however, bare hands were then used to agitate the chopped lettuce in a water rinse bath, which was not changed between cases of lettuce. Recommendations were made to discontinue use of bare hands to wash lettuce, change out rinse water after each case of romaine, and clean and sanitize all food contact surfaces after each case is processed.

This was a foodborne outbreak of norovirus gastroenteritis associated with a restaurant. Environmental and statistical evidence indicated that romaine lettuce was the most likely vehicle of transmission. The source of contamination was not identified. However, bare-hand contact issues were identified during the lettuce washing process, and it is likely that an ill or recently ill food worker, or a food worker with an ill household member, contaminated the romaine lettuce during preparation or serving.

(57)
Suspected Norovirus Gastroenteritis Associated with a Fitness Center Camp

December Hennepin County

On December 30, 2011, the Minnesota Department of Health (MDH) foodborne illness hotline received a report from a fitness center camp near Loretto, Minnesota regarding several complaints of illness following a 2-day youth camping event held on December 28 and 29. MDH notified the Hennepin County Human Services and Public Health Department (HSPHD) epidemiology and environmental health units, and an investigation was initiated.

HSPHD epidemiologists interviewed youth campers, camp counselors, camp staff, and members of a church group who were also at the camp. Information was gathered regarding food consumption and illness history. A case was defined as a person who attended the camp and subsequently developed vomiting and/or diarrhea (≥3 loose stools in a 24-hour period).

HSPHD sanitarians interviewed food workers and other camp employees about illness history and work duties on December 30. A sanitarian also visited the camp kitchen on January 4 to provide instructions on precautions to be put into place prior to preparing meals for additional camp attendees.

Thirty-one individuals were interviewed, and 18 (58%) met the case definition. Seventeen cases (94%) reported vomiting, 11 (61%) reported diarrhea, 8 (44%) reported nausea, 7 (39%) reported cramps, 6 (33%) reported fever, and none reported bloody stools. The median incubation from the lunch meal served on December 28 was 32 hours (range, 22 to 46 hours). The median duration of illness was 12.5

hours (range, 1 to 26 hours) for the 14 cases who had recovered at the time of interview. No stool specimens were submitted for testing.

Cases reported eating a variety of foods while at camp including chicken patty on a bun, fries, spaghetti, salad bar items, hot and cold breakfast foods, roast beef, mashed potatoes, cookies, cider, and hot chocolate. The youth campers and camp counselors ate each meal family-style, with foods being passed around the table. Church group attendees served themselves from a buffet line. The self-serve salad bar station was available to everyone.

No individual food items were statistically associated with illness. However, getting reliable food histories from youth campers proved difficult, so an analysis was done including only the camp counselors and the church group. In this analysis, the December 28 lunch meal was significantly associated with illness (8 of 8 cases vs. 2 of 5 controls; odds ratio [OR], undefined; 95% confidence interval [CI], undefined; Fisher's exact two-tailed $p = 0.04$). When the analysis was expanded to include youth campers, the December 28 lunch meal approached significance (18 of 18 cases vs. 6 of 9 controls; OR, undefined; 95% CI, undefined; Fisher's exact two-tailed $p = 0.05$).

Six camp employees were interviewed. Three employees reported recent gastrointestinal illness and were excluded from food handling for 72 hours after their last symptom resolved. None reported being symptomatic at the time of the camp; however a cook reported having diarrhea on December 26 and 27. This cook prepared meals on December 28, but did not prepare foods for the salad bar. A dishwasher reported vomiting on December 27 and returned to work on December 29. A second dishwasher became ill with diarrhea and vomiting on December 29. The second dishwasher worked December 27-29 and reported eating meals prepared at the camp.

HSPHD sanitarians noted overall compliance with food code requirements; however, the kitchen was closed at the time of visit and therefore no food preparation was observed. The sanitarians further stressed the importance of proper handling of food and beverages, good handwashing, thorough disinfection, and exclusion of ill employees upon reopening of the kitchen.

This was a foodborne outbreak of suspected norovirus gastroenteritis associated with eating at a fitness center camp. The vehicle of transmission and source of contamination were not identified. However, multiple ill employees were identified, suggesting illness transmission among workers at the camp. It is likely that food items were contaminated by an ill or recently ill food worker.

Probable Foodborne Outbreaks

(1)
Gastroenteritis Associated with a Restaurant

January Pope County

On January 5, 2011, the Minnesota Department of Health (MDH) foodborne illness hotline received a complaint of gastrointestinal illness among two individuals from different households who had dined together at a restaurant in Glenwood on January 3. The complainants did not report any other common meals or events. MDH notified Douglas and Pope Counties Public Health Department (DPCPHD), and an investigation was initiated.

On January 5, DPCPHD sanitarians inspected the restaurant, interviewed food workers about illness history and work duties, and collected credit card receipts for patrons who had dined at the restaurant from January 2 to January 4. MDH interviewed patrons regarding food consumption and illness history. A case was defined as a restaurant patron who subsequently developed vomiting and/or diarrhea (≥3 loose stools in a 24-hour period).

Thirty-five restaurant patrons were interviewed and four (11%) met the case definition. One additional patron reported gastrointestinal illness prior to their meal date and was excluded from analysis. All four cases reported diarrhea, three (75%) reported vomiting, two (50%) reported cramps, and no cases reported bloody stools or fever. All four cases ate at the restaurant on January 3. The median incubation period was 16 hours (range, 6.5 to 33 hours). Illness duration information was unavailable as all four cases were still ill at the time of interview. No stool specimens were submitted.

The cases reported consuming chicken Caesar wrap, tomato soup, bourbon-marinated sirloin, mashed potatoes, and dieter's salad. The 30 controls reported eating a wide variety of food items. No food item was significantly associated with illness.

DPCPHD sanitarians interviewed all 28 restaurant employees. Two employees reported recent gastrointestinal illness. A server reported developing vomiting of 9 hour duration on December 27. A second server reported developing vomiting of 29 hour duration on December 29; this server reported working on January 3. Stool specimen kits were provided to both ill employees but were not returned. All employees with vomiting and/or diarrhea were excluded from work until 72 hours after the resolution of symptoms. During the investigation, sanitarians and restaurant management established a screening protocol for employee illness. The restaurant was ordered to implement an employee illness log and prevent bare-hand contact with ready-to-eat foods. The sanitarian also discussed the importance of handwashing for the prevention of norovirus transmission.

This was a probable foodborne outbreak of gastroenteritis associated with eating at a restaurant. The most likely etiology was norovirus, but this was not confirmed. There was gastrointestinal illness among food workers prior to the outbreak, and contamination of ready-to-eat foods by restaurant employees is the most plausible explanation for the patron illnesses. However, this was not confirmed.

(2)
Gastroenteritis Associated with a Restaurant

April Hennepin County

On April 1, 2011, the Minnesota Department of Health (MDH) foodborne illness hotline received a complaint of gastrointestinal illness among a group of four individuals who ate at a restaurant in Minneapolis, Minnesota on March 29. A second complaint was received by MDH on April 4, 2011 regarding a family of four who had eaten from the lunch buffet on April 2. Hennepin County Human Services and Public Health Department (HSPHD) epidemiology unit and Minneapolis Environmental Health (MEH) staff were notified, and an investigation was initiated.

The complainants provided MDH staff with names and contact numbers for their meal companions, who were then interviewed about illness history and food consumption at the restaurant. A case was defined as person who developed vomiting and/or diarrhea (≥3 loose stools in a 24-hour period) after eating at the restaurant. Stool specimen kits were sent to three patrons for submission to MDH for bacterial and viral testing.

MEH sanitarians inspected the restaurant and interviewed all food service employees responsible for preparing items served to the complaint groups. The restaurant did not have credit card receipts for other patrons who had meals prepared at the restaurant on March 29 or April 2.

Eight patrons were interviewed, and six (75%) met the case definition. One additional patron reported gastrointestinal symptoms that did not meet the case definition and was excluded from analysis.

The two complaint groups reported different symptoms and incubation periods. Among the March complaint group, both cases reported diarrhea and cramps but no fever, vomiting, or bloody stools. The incubation periods were 25.5 hours and 27.5 hours. Illness duration information was not available as both cases were still ill at the time of interview. Both cases submitted stool specimens which were negative for norovirus and bacterial pathogens. Individuals from this group reported consuming schwarma gyros, yellow rice, and a chicken dinner ordered from the menu.

Among the April 4 complaint group, all four reported vomiting, three (75%) reported cramps, one (25%) reported diarrhea, and none reported fever or bloody stools. The median incubation period was 10 hours (range, 6 to 10 hours). The illness durations for two patrons who had recovered at the time of interview were 1 and 7 hours. No stool specimens were submitted from this group. Individuals from this group reported consuming lamb ribs, lamb steak, chicken wings, and falafel from the lunch buffet.

The sanitarian interviewed restaurant staff about preparation methods for the foods served at these meals and about any recent gastrointestinal illness. Nine employees were responsible for the food preparation; none of the employees reported illness during the prior 2 weeks. No improper food handling practices were observed by the sanitarian. Because one group had short incubation periods, hot (n=5) and cold (n=4) food items were selected to obtain temperatures. All fell within acceptable ranges for the type of item.

This was a probable foodborne outbreak associated with a restaurant in Minneapolis. Neither an etiology nor a vehicle of transmission was identified. The distribution of symptoms and incubation periods

differed between the two complaint groups. Possible explanations include two separate contamination events, or a source of illness other than the restaurant for at least one of the groups.

(3)
Salmonella Newport Infections Associated with a Birthday Party

June Beltrami County

On June 22, 2011, two patients with laboratory-confirmed infections with *Salmonella* Newport pulsed-field gel electrophoresis (PFGE) pattern NEW17 were identified as part of routine surveillance. The cases were interviewed on July 1 and 7, and both reported becoming ill after attending a birthday party held on June 5 and that additional attendees had also become ill after the event. An investigation was initiated immediately.

All *Salmonella* cases in Minnesota are routinely interviewed about potential exposures, including foods consumed at home and outside the home, as part of routine surveillance. Interviews of *Salmonella* cases with isolates that are indistinguishable by PFGE are compared to identify potential common exposures. Information gathered during routine interviews is reviewed by an MDH epidemiologist.

The initial case provided a list of names and phone numbers for additional birthday party attendees and foods served at the event.

A confirmed case was defined as an individual from whom *S*. Newport NEW17 was isolated since June 1, 2011. A probable case was defined as an individual who developed fever and diarrhea (≥3 loose stools in a 24-hour period) after eating at the birthday party.

Five birthday party attendees were interviewed; two confirmed cases and one probable case were identified. Case illness onsets were June 6 or June 7. Three additional party attendees who were reported to have illness were lost to follow up. Among the three confirmed and probable cases, all reported bloody diarrhea and cramps, two (67%) reported fever, and one (33%) reported vomiting. The median incubation period for the three birthday parties was 33 hours (range, 18 to 36 hours).The median duration of illness was 7 days (range, 7 to 28 days). One case was hospitalized for 7 days.

The small number of cases and controls precluded a meaningful case-control study of birthday party attendees, and no food items were associated with illness. The meal consisted of fried and grilled chicken, coleslaw, and potato salad purchased from a restaurant, salami, sliced cheddar cheese, crackers, ice cream, birthday cake, and cupcakes. Some of the food, specifically the chicken, cheese and crackers, was also served at a church group gathering the following evening (June 6). All of the interviewed party attendees also attended this event. No additional cases were reported or found through routine surveillance.

This was a foodborne outbreak of *S*. Newport NEW17 infections associated with a birthday party and identified through routine disease surveillance. The food vehicle was not identified because sufficient subjects could not be reached to conduct a full investigation.

(4)
Suspected Norovirus Gastroenteritis Associated with a Restaurant

August Hennepin County

On August 4, 2011, the Minnesota Department of Health (MDH) foodborne illness hotline received a complaint from a staff member of a week-long day camp run by the City of St. Louis Park. The complainant reported that at least 5 of the 25 staff and campers had become ill with vomiting and/or diarrhea since the camp started on August 1. Activities at the camp included bowling and lunch at a restaurant on August 1, approximately 30 hours prior to individuals reportedly becoming ill. St. Louis Park Environmental Health (SLPEH) was notified and an investigation was initiated.

A list of staff and campers was obtained from the camp administrator. The administrator also provided a schedule of activities for camp that week and foods/beverages consumed. Epidemiologists from MDH interviewed campers and staff about food/beverage consumption and illness history. A case was defined as a summer camp staff member or camper who developed vomiting and/or diarrhea (≥3 loose stools in a 24-hour period) after the start of the camp.

A list of restaurant patrons from August 1 was obtained from the restaurant. A sanitarian from SLPEH 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 13 camp staff and campers. Six (46%) cases were identified. All six cases reported vomiting, four (67%) reported diarrhea, three (50%) reported cramps, and two (40%) of five reported fever. The median incubation period from the lunch meal at the restaurant was 37 hours (range, 29 to 53 hours). The median duration of illness was 25 hours (range, 10 to 38 hours) for the five cases who had recovered at the time of interview.

Due to the limited menu, a meaningful statistical analysis could not be performed. Foods consumed by the patrons included pizza and soda. All other foods consumed at the camp that day were pre-packaged and individual-sized.

Illness histories and exposure information were obtained from 13 additional restaurant patrons; one patron reported illness, however, their onset was 4 hours after their meal.

At the start of the investigation sanitarians and management established a screening protocol for employee illness. Illness histories and job duty information were obtained from all employees who worked on August 1; no employees reported any recent gastrointestinal illness.

This was a probable foodborne illness outbreak associated with a restaurant. The etiologic agent was not confirmed; however, the symptoms and incubation periods were characteristic of norovirus gastroenteritis. The vehicle of transmission and source of contamination were not identified. While no one reported being previously ill, it is possible that an unidentified infected camp staff member or camper contaminated the food or infected others during other camp activities.

(5)
E. coli O157:H7 Infections Associated with a Wedding

September Hennepin County

On September 16 and September 23, 2011, two cases of *E. coli* O157:H7 infection were interviewed as part of routine disease surveillance by Minnesota Department of Health (MDH) staff, before pulsed-field gel electrophoresis (PFGE) information was available. Both mentioned attending a wedding in Minneapolis on September 10 where rice and beef that were prepared in a private home were served. The second case mentioned knowing of another individual who had attended the same wedding and had been hospitalized for vomiting and diarrhea. An investigation was initiated.

Re-interview of one of the cases confirmed that both cases had attended the same wedding. Case isolates were indistinguishable by PFGE with Minnesota two-enzyme pattern designation MN1252ECB13.

E. coli O157:H7 is a reportable pathogen in Minnesota, and all cases are routinely contacted by MDH staff and asked to complete a telephone interview detailing the case's illness and exposure histories. A case was defined as an individual with a stool sample positive for the outbreak strain of *E. coli* O157:H7 after attending the September 10 wedding. Food samples were tested for *E. coli* O157:H7 at the Minnesota Department of Agriculture (MDA) laboratory.

The two original cases were the only cases identified. Illness onsets were September 13 and September 14, yielding incubation periods of 3 and 4 days, respectively. One of the cases had recovered at the time of interview; the duration of illness was 7 days. One case was a 12 year-old male and the other a 6 year-old female; both were Hispanic. Both cases had diarrhea, bloody stools, and cramps; one had vomiting and one had fever. One case was hospitalized for 5 days; neither developed hemolytic uremic syndrome.

The wedding was held in the rental room of a Minneapolis restaurant. The only food items served at the event were beef, rice, hot sauce, and cake. The cake was purchased at an unknown Mexican bakery and the other items were prepared by relatives in private homes. The beef served at the event was purchased by the groom or a relative as a whole cow slaughtered at one of the live animal markets in South St. Paul. The beef was cut into large bone-in pieces and boiled in water on a stove. Frozen cooked beef from the same cow was picked up from a case's home on September 28 and tested negative for *E. coli* O157:H7 at the MDA laboratory. Attempts to contact the groom for additional information about wedding attendees and foods served were unsuccessful. The two cases did not appear to know one another or have other exposures in common.

A third case with PFGE pattern MN1252ECB13 was identified in routine disease surveillance. This case was a Hispanic child from Minneapolis with illness onset on October 3; however, the case did not attend the wedding and denied any exposure to a live animal market and therefore was not included in the outbreak.

This was a probable foodborne outbreak of *E. coli* O157:H7 infections associated with a wedding at which privately prepared foods were served. Beef from a cow purchased at a live animal market was the most likely vehicle, but this was not confirmed.

(6)
Norovirus Gastroenteritis Associated with a Wedding Reception

October Grant County

On October 18, 2011, the Minnesota Department of Health (MDH) foodborne illness hotline received a complaint of gastrointestinal illness in people who attended a wedding in Ashby, Minnesota on October 15. The wedding reception took place at the American Legion in Ashby. Approximately 200 persons attended the wedding reception. The MDH Fergus Falls district office was notified on October 18, and an investigation was initiated.

MDH obtained a list of wedding attendees and interviewed them about food consumption and illness history. A case was defined as a person who attended the wedding and subsequently developed vomiting and/or diarrhea (≥3 loose stools in a 24-hour period). Stool specimens were submitted to the MDH Public Health Laboratory for bacterial and viral testing.

On October 18, an MDH sanitarian contacted the American Legion regarding the wedding and found that the kitchen had been rented out by the wedding party; no food was prepared by the American Legion staff. A list of the food items served at the wedding reception was obtained from the bride.

Forty-five wedding attendees were interviewed, and 18 (40%) met the case definition. Of the 18 cases, 14 (78%) reported diarrhea, 14 (78%) reported vomiting, 13 (72%) reported cramps, 7 (39%) reported fever, and none reported bloody stools. The median incubation period from the time of the reception was 37 hours (range, 28 to 59 hours). The median illness duration was 52 hours (range, 22.5 to 63 hours). One case visited a medical provider; no cases went to the emergency room or were hospitalized.

Two stool specimens from attendees were submitted to MDH, and both tested positive for norovirus GII. All specimens tested negative for *Campylobacter*, *Salmonella*, Shiga toxin-producing *E. coli*, *Shigella*, and *Yersinia*.

Food items served at the reception came from multiple sources. Coleslaw, mashed potatoes, gravy, corn, buns, barbeque sauce, and punch were purchased and prepared by a family member. Pork loin from a grocery store in Alexandria, Minnesota was prepared at a meat market in Evansville, Minnesota. The wedding cake was purchased from a local bakery. Beverages were also available for purchase at the American Legion Bar. All of the foods were self-serve on a buffet line. No food item was significantly associated with illness.

There was a rehearsal dinner held at a church on the evening of October 14 and a gift opening held on October 16 (location unknown). Leftovers from the reception were served at the gift opening. Attending the rehearsal dinner or the gift opening was not statistically associated with illness, and multiple ill individuals did not attend either event.

A child was reportedly ill prior to the wedding reception and vomited at the church before the wedding ceremony. It is unknown where in the church the vomiting incident occurred. Both of the people who prepared food for the wedding reception were reported by others to have become ill the evening of the wedding. The two food preparers could not be reached for interview; however the Minnesota Department of Agriculture (MDA) spoke with the person who prepared the meat for the reception and

verified that he became ill after the wedding reception dance (exact time unknown). It is unknown exactly when the other food preparer became ill.

An inspector from MDA visited the meat market to review food safety practices and found records showing that the product had reached proper cooking temperatures. The inspector discussed the retail requirements that the establishment would need to meet in order to cater and told the establishment to discontinue catering activities until retail requirements are met.

This was a probable foodborne outbreak of norovirus gastroenteritis associated with eating at a wedding reception dinner. Because 40% of interviewed attendees were ill, there likely was contamination of one or more food items. No specific food vehicle was identified. Foods were most likely contaminated by a food preparer that was ill or in the incubation stage of illness. However, this was not confirmed, and person-to-person transmission could not be ruled out as the cause of the outbreak.

(7)
Norovirus Gastroenteritis Associated with a Restaurant

October Waseca County

On October 31, 2011, the Minnesota Department of Health (MDH) foodborne illness hotline received a complaint of gastrointestinal illness among two individuals from separate households after eating take-out food from a restaurant in Waseca, Minnesota on October 28. Additionally, a child of one of the individuals had developed stomach cramps without vomiting or diarrhea. Both ill individuals had eaten broasted chicken, mashed potatoes, gravy, and coleslaw; the child had eaten the same meal except coleslaw. Environmental Health (EH) specialists from Waseca County Public Health Services were notified and an investigation was initiated.

Waseca County EH specialists visited the restaurant on November 1 (the restaurant was closed on October 31) to evaluate food preparation and handling procedures. The restaurant was reluctant to provide patron contact information; a letter describing MDH's statutory authority and the purpose of the public health investigation was e-mailed to the restaurant owner. Patron names from credit card and check transactions from October 28 were provided by the restaurant.

MDH interviewed patrons to obtain information on food/beverage consumption and illness history. Restaurant employees were interviewed about food preparation and handling duties and illness history by MDH and Waseca County EH specialist.

A case was defined as a patron who developed vomiting and/or diarrhea (≥3 loose stools in a 24-hour period) after eating at the restaurant. Stool samples were submitted by consenting cases to the MDH Public Health Laboratory (PHL) for bacterial and viral testing.

A total of 38 patron interviews were completed. Only the two (5%) individuals from the original complaint met the case definition. Five patrons reported mild illness that did not meet the case definition, and two reported diarrhea with a biologically implausible incubation period (2.5 hours). The small number of cases precluded a meaningful statistical analysis. Most (n=24) of the non-ill patrons

consumed pizza. In addition to the two cases, two non-ill patrons consumed the broasted chicken. Only the two cases reported consuming coleslaw and mashed potatoes.

The incubation period for both cases was 17 hours. Both reported diarrhea and abdominal cramps, one reported vomiting, one reported fever, and neither reported bloody stools. Neither case visited a healthcare provider. One case had recovered at the time of interview; her illness duration was 43 hours. Both cases submitted a stool sample collected 4 days after illness onset to the MDH PHL for testing; one was positive for norovirus GI.6A.

Fifteen (94%) of the restaurant's 16 employees were interviewed by MDH or Waseca County EH specialists. A manager/supervisor who worked during October 26-28 reported that a household member had been ill with vomiting on October 24 or 25 for 24 hours or less. The employee had performed a variety of food preparation duties including: preparing chicken, cheese, and salad; shredding cabbage; making coleslaw; and managing the pizza and sandwich stations. The employee did not report any symptoms and refused to submit a stool sample. No other food worker illness was reported.

This was an outbreak of norovirus gastroenteritis probably associated with a restaurant. The outbreak vehicle was not identified. An asymptomatic employee who prepared various menu items and reported a household member with recent gastrointestinal illness was a plausible source of contamination.

Confirmed Waterborne Outbreaks

(1)
Pontiac Fever Associated with a Recreation Center Spa Pool

March Anoka County

On March 9, 2011, the Minnesota Department of Health (MDH) received a complaint from an individual who had attended a handball tournament at recreation center in Columbia Heights on March 4 and 5. The complainant reported that approximately 30 of 44 players had become ill with fever, chills, malaise, and headache following the tournament, primarily with an onset date of March 6. Discussions with the complainant revealed that several of the players had used a spa pool in the men's locker room. Sanitarians from Anoka County Community Health and Environmental Services (ACCHES) were contacted, and an outbreak investigation was initiated.

A list of handball tournament players was obtained from the organizer. Contact information for additional users of the facility was obtained from team organizers and facility personnel. Epidemiologists from MDH interviewed players and spectators to obtain information on exposures and illness history. A case was defined as a recreation center user who subsequently developed fever and/or chills.

Sanitarians from ACCHES and environmental health staff and an epidemiologist from MDH visited Central Courts to interview staff and assess the facilities.

Of 73 individuals interviewed, 48 (66%) met the case definition. Two individuals reported illness but did not meet the case definition, and thus were excluded from further analysis. Forty-four (92%) cases were male. The median age of cases was 60 years (range, 29 to 82 years) for the 47 cases who reported their age. Forty-five (98%) of 46 reported fatigue, 45 (94%) reported chills, 44 (94%) of 47 reported headache, 43 (93%) of 46 reported muscle aches, 43 (91%) of 47 reported fever, 29 (62%) of 47 reported cough, 21 (44%) reported dizziness, 20 (43%) of 47 reported chest tightness, and 12 (26%) of 47 reported sore throat. The median incubation period from the first exposure to the recreation club was 44.5 hours (range, 15 to 73.5 hours). The median duration of illness was 60.5 hours (range, 21.5 to 91 hours) for the 16 cases who had recovered at the time of interview. Nine (19%) cases visited a medical provider for their symptoms; one case was hospitalized overnight. Six patients had a specimen collected for a *Legionella* urinary antigen test; all six specimens were negative.

Being in the men's locker room the evening of March 4 was significantly associated with illness (43 of 48 cases vs. 0 of 23 controls; odds ratio, undefined; $p < 0.001$). The five cases who were not in the men's locker room on March 4 had later onsets of illness than the rest of the cases, perhaps indicating a later exposure or a smaller dose.

ACCHES visited the facility and confirmed that there was an unlicensed spa pool in operation in the men's locker room. The operator stated that the spa pool had been losing 3 to 6 inches of water a day for unknown reasons and was being filled with water from a hose attached to a sink in the locker room mechanical room. There was no history of the spa pool being recently chlorinated or otherwise disinfected. Cracks and corrosion were observed on the spa pool surfaces. The locker room facilities

were observed to be in general disrepair. The spa pool was drained and removed from operation. The owner of the recreation center voluntarily closed the recreation center on March 11.

This was an outbreak associated with a recreation center spa pool. The symptoms, incubation period, and high attack rate are consistent with Pontiac Fever, a milder illness caused by the *Legionella* bacteria. The improper maintenance and lack of disinfection of the spa pool likely led to the proliferation of the bacteria. Ventilation problems may have allowed aerosols to spread outside of the men's locker room.

(2)
Cryptosporidiosis among a High School Swim Team

August-September Hennepin County

A routine surveillance interview of a laboratory-confirmed *Cryptosporidium* case conducted by the Minnesota Department of Health (MDH) on September 14, 2011, revealed that the case had swam at a community center pool in St. Louis Park multiple times in the 2 weeks prior to illness onset as part of her high school swim team. The parent of the case also reported that multiple other girls on the swim team were ill with similar symptoms. An MDH epidemiologist contacted the coach of the swim team, who confirmed that several girls had recently been ill. Sanitarians from the City of St. Louis Park were contacted on September 15, and an outbreak investigation was initiated.

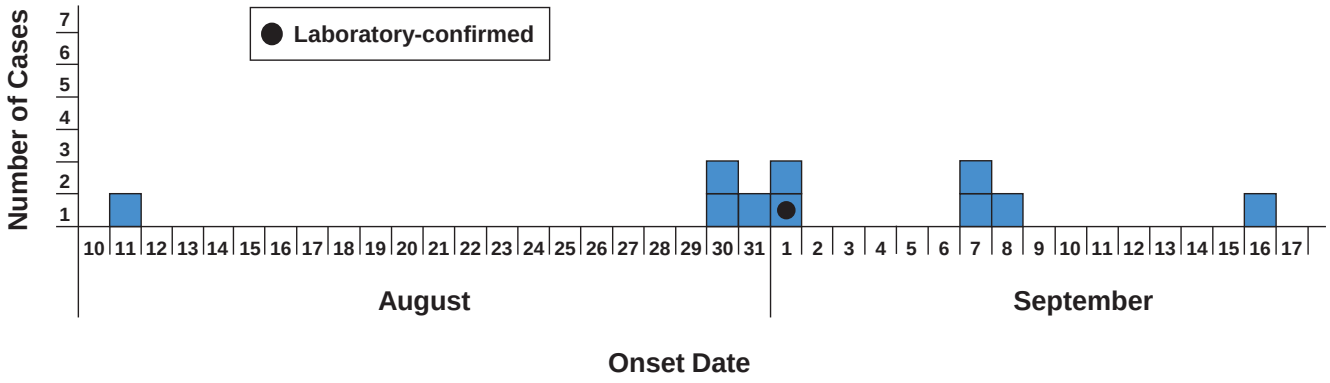
Information about pool usage and contact information for swim team members was provided to MDH by the swim team coaching staff. MDH staff interviewed swim team members about their illness and exposure histories. Cases of cryptosporidiosis that were identified through routine surveillance were interviewed to determine if they had exposure to any pools the swim team might have used. Additionally, an MDH epidemiologist contacted the swim team coaches or athletic directors of schools the team competed against while swimmers were ill to alert them to the symptoms of cryptosporidiosis.

A case was defined as a swim team member who subsequently developed either a laboratory-confirmed *Cryptosporidium* infection or diarrhea (≥3 loose stools in a 24-hour period) or vomiting lasting 3 or more days, with illness onset since August 2011.

Illness histories and exposure information were obtained from 31 swim team members. Eleven (35%) cases were identified, including two with stool specimens that tested positive for *Cryptosporidium*. Three swim team members reported illness but did not meet the case definition, and thus were excluded from further analysis. Two positive specimens were received by the MDH Public Health Laboratory, and *Cryptosporidium hominis* subtype HGP25 was identified in both.

Of the 11 cases, all reported diarrhea, 8 (73%) reported cramps, 5 (45%) reported fever, 3 (30%) of 10 reported weight loss, and 3 (27%) reported vomiting. Illness onset dates ranged from August 11 to September 16 (see epidemic curve). The median incubation period could not be determined because cases swam at the pool more than once in the 2 weeks prior to illness onset. The median duration of illness was 6 days (range, 3 to 15 days) for the nine cases who had recovered by the time of interview. No cases required hospitalization for their illness.

Cryptosporidiosis Cases among a High School Swim Team, by Illness Onset Date*



*Onset date unknown for one laboratory-confirmed case

Interviews with coaches and swim team members revealed that the team had used the community center pool, and a local junior high school pool for practices and home meets. Use of a particular pool was not statistically associated with illness. Swimmers reported swimming while actively ill and/or after being ill.

The community center pool was already closed for the season at the time the investigation was initiated. On September 16, the community center and the junior high school pools were voluntarily closed in order to be superchlorinated at 20 ppm for 12.75 hours, the necessary chlorine level and time needed to inactivate *Cryptosporidium*. Upon inspection and review of pool logs, both pools were found to be operating properly and had been within state regulatory limits for pH and disinfection levels for the previous month. However, *Cryptosporidium* can survive and be transmitted even in properly operated pools.

The community center pool was reopened on September 19, and the junior high pool reopened on September 20. Signs with healthy swimming messages were posted at both pools and anyone with symptoms of gastrointestinal illness was told not to enter the pools until 2 weeks following the resolution of symptoms.

This was a waterborne outbreak of cryptosporidiosis among a high school swim team. Although the original source of contamination was not confirmed, an infectious pool user most likely introduced the parasite into the pool. Swim team members continuing to swim while ill or recently ill likely led to additional team members becoming ill.

Animal Contact Outbreaks

(1)
Salmonella Altona Infections Associated with Contact with Baby Chicks

April — Dakota County/Multiple states

On May 2, 2011, the Minnesota Department of Health Public Health Laboratory identified a *Salmonella* Altona isolate of Centers for Disease Control and Prevention (CDC) pulsed-field gel electrophoresis (PFGE) subtype designation LXNX01.0009 that matched cases in other states. At the time the Minnesota case was identified, the CDC had been working with several states on an investigation of the cluster. An investigation of the Minnesota case was initiated in collaboration with the multi-state investigation.

In Minnesota, a case was defined as a Minnesota resident with culture-confirmed *Salmonella* Altona with PFGE subtype LXNX01.0009.

The case was interviewed by phone regarding illness history and potential exposures. Questionnaires developed by CDC were used in addition to the Minnesota routine surveillance form. CDC coordinated a multi-state investigation of the cases.

One case with *Salmonella* Altona LXNX01.0009 isolate was identified in Minnesota. The case was a 59-year old male with illness onset on April 25. The case reported diarrhea, vomiting, and fever without cramps or bloody diarrhea. He was hospitalized for 7 days.

Nationally, 45 cases with isolates that matched the outbreak PFGE subtype were reported from 15 states: Georgia, Indiana, Kentucky, Maryland, Michigan, Minnesota, North Carolina, New York, Ohio, Pennsylvania, Tennessee, Virginia, Vermont, Wisconsin, and West Virginia. Illness onsets ranged from February 25 to May 27, 2011. The median age of cases was 46 years (range, ≤1 to 86 years), and 53% were female. Among the cases for whom hospitalization status was known, 12 (31%) were hospitalized. None of the cases died.

The Minnesota case reported purchasing two baby chicks and feed from Company A in Inver Grove Heights at the beginning of March. The case reported that the baby chicks were kept in the kitchen and that the chicks died approximately 1 week after they were purchased.

Nationally, 31 of 39 (79%) cases with available information reported exposure to chicks and ducklings, and 24 of 26 (92%) of cases reported buying the chicks and ducklings from a Company A store. In discussions with Company A, CDC learned that all the retail locations where cases purchased poultry had received poultry from a single hatchery in Ohio. Environmental specimens collected from a case's household in Ohio, and three environmental samples collected from chick and duckling displays at two locations of Company A in North Carolina, were positive for the outbreak strain of *S*. Altona.

During this investigation, a cluster of *Salmonella* Johannesburg infections including 24 cases from 14 states was also found to be associated with baby chicks purchased from Company A stores and originating from the hatchery in Ohio.

This was a multi-state outbreak of *Salmonella* Altona infections associated with contact with baby chicks from a single mail order hatchery and sold at Company A locations. Cases with a second serotype, *Salmonella* Johannesburg, were also found to be associated with baby chicks sold at the same national retail chain and originating from the same Ohio hatchery. One case of *Salmonella* Altona associated with this outbreak was identified in Minnesota. The Minnesota case reported purchasing baby chicks from a Company A store in Minnesota.

(2)

Campylobacter jejuni Infections Associated with Masonry Work on a Dairy Farm

July Stearns County

Routine surveillance interviews of two *Campylobacter jejuni* cases conducted by the Minnesota Department of Health (MDH) in late July and early August 2011 revealed that both cases had performed masonry work at the same dairy farm in Farming Township, Minnesota.

All *Campylobacter* cases reported to MDH are interviewed about occupational exposures as part of foodborne disease surveillance in Minnesota. Epidemiologists reviewed the information gathered during the interviews of the *C. jejuni* cases to identify other potential cases associated with the dairy farm.

Cases were defined as persons who had *C. jejuni* isolated from stool or who had diarrhea (≥3 loose stools in a 24-hour period) lasting 3 or more days and who reported working at the Farming Township dairy farm in the week prior to onset of symptoms.

Only the two original cases were identified. Both cases reported diarrhea and fever. Neither case reported cramps, vomiting, or blood in their stools. The incubation period could not be calculated, as cases were exposed on more than one occasion. The median duration of illness was 11.5 days (range, 9 to 14 days). Both cases had a stool specimen test positive for *Campylobacter jejuni*; both isolates were indistinguishable by pulsed-field gel electrophoresis (PFGE).

Cases did not report any common exposures other than working together performing masonry work at the dairy farm. Neither case reported any direct contact with the animals, but reported dairy cattle being present.

This was an outbreak of *Campylobacter jejuni* infections associated with performing masonry work at a dairy farm. Cattle and their environment are well-established vehicles of campylobacteriosis, and likely were the source of this outbreak.

(3)

Escherichia coli O157:H7 Infections Associated with a County Fair

August Freeborn County

On August 18, 2011, the Minnesota Department of Health (MDH) Public Health Laboratory (PHL) identified two clinical *E. coli* O157:H7 isolates that were indistinguishable by pulsed-field gel electrophoresis (PFGE) by second enzyme *Bln*I, and one band different on first enzyme *Xba*I (MDH two-enzyme pattern designation MN66ECB348 and MN31ECB348). Illness onset dates were August

8 and August 10. Routine surveillance interviews revealed that both cases had attended the Freeborn County Fair prior to illness onset. An investigation was started immediately.

All *E. coli* O157:H7 cases in Minnesota are routinely interviewed about potential exposures, including animal contact and foods consumed at home and at restaurants, as part of routine surveillance. Interviews of *E. coli* O157:H7 cases with isolates that are indistinguishable or very similar by PFGE are compared to identify potential common exposures. Information gathered during routine interviews is reviewed by an MDH epidemiologist.

An MDH epidemiologist and veterinarian visited the Freeborn County Fairgrounds on August 24 to talk to staff about the fair and collect animal and environmental samples. These samples were tested for Shiga toxin-producing *E.coli* (STEC).

Only the two original cases were identified; both were one-year-old males. Both cases had bloody diarrhea. One case had cramps and vomiting. The other case had a fever. Duration of illness for one case was 6 days, while the other case had not recovered at the time of interview. The incubation period was 6 days for one case; the other case attended the fair on August 3 and August 5, resulting in an incubation period of 3 or 5 days. Both cases had exposure to the petting zoo and the 4-H animal barns. One case remained in the stroller while in the petting zoo and had no direct contact with any animals there. The other case had direct contact with goats, sheep, kittens, and baby chicks while in the petting zoo. The one case had direct contact with a goat while in the 4-H animal barn while the other case had direct contact with a sheep in the animal barn. Both reported washing hands after visiting the barns.

The Freeborn County Fair was held from August 2-7 at the Freeborn County Fairgrounds. The 4-H barn was a large pole shed that temporarily housed sheep and goats that were exhibited during the fair. Handwashing signs were posted and alcohol dispensers were located at some of the exits; however, neither was readily visible. Handwashing stations were posted outside the front doors, but were not plumbed and relied on foot pumps to supply the water. The petting zoo was in a separate building that was dedicated to the petting zoo only. It consisted of a mixture of permanent and temporary pens, and animals were provided by volunteers. Handwashing stations were located outside the front doors but were not plumbed.

Both buildings had been roughly cleaned at the time of the site visit on August 24. A total of 20 environmental samples were taken from multiple locations in the 4-H barn and petting zoo building. One sample was positive for *E. coli* O157:H7 but the isolate was >6 bands different from the outbreak strain by PFGE. Messages were left for the four volunteers who brought animals to the petting zoo. Only one responded, and fecal samples from four sheep that were displayed were tested for STEC. Multiple STECs were detected in two sheep including three *E. coli* O157:H7 isolates but all isolates were >6 bands different from the outbreak strain by PFGE.

The fair manager and the petting zoo superintendent were provided a copy of the *Compendium of Measures to Prevent Diseases Associated with Animals in Public Settings, 2011* and educational signs. Detailed recommendations to prevent zoonotic disease transmission at the fair were discussed.

This was an outbreak of *E. coli* O157:H7 infections associated with the Freeborn County Fair. Both cases had multiple interactions with sheep and goats, which are known carriers of *E. coli* O157:H7. While the outbreak strain was not detected in any of the environmental or animal samples, multiple

strains of STEC were detected, indicating the opportunity for exposure. All attendees to fairs where animal contact is possible should be educated about the risk of acquiring illness from animals, and measures to prevent such illnesses. Fair boards should ensure that adequate handwashing facilities are easily accessible and visible.

(4)
Multi-State Outbreaks of Salmonellosis Associated with Exposure to Small Turtles

August Hennepin County/Multiple states

On October 25, 2011, the Minnesota Department of Health (MDH) Public Health Laboratory (PHL) identified a *Salmonella* Sandiego isolate with a pulsed-field gel electrophoresis (PFGE) pattern (Minnesota designation SDG26) indistinguishable from a cluster of three cases (Centers for Disease Control and Prevention [CDC] cluster ID 1110MDJLX-1, pattern designation JLXX01.0053) posted by Maryland, all of whom had reported exposure to live turtles. The Minnesota case had reported exposure to two mud turtles during her initial interview; communication was established with Maryland to share information about turtle purchase locations and feed.

On March 30, 2012, the CDC posted a web investigation announcement regarding three multi-state outbreaks of human *Salmonella* infections linked to small turtles. MDH contacted CDC to determine if the outbreak involved pattern JLXX01.0053 and provide information about the Minnesota case's turtle exposure. CDC expanded the case definition (from collection dates beginning September 1, 2011) to include the Minnesota case and several other cases. The cluster code had been changed to 1201PAJLX-1. Minnesota joined the national outbreak investigation.

In 1975, Title 21 of the Code of Federal Regulations banned the sale and distribution of turtles with a carapace less than 4 inches in the United States under the Public Health Service Act; the ban was intended to help prevent turtle-associated salmonellosis, especially among young children.

Nationally, a case was defined as a person from whom *Salmonella* with a serotype/PFGE combination associated with one of eight turtle-associated outbreaks was isolated from May 2011 to September 2013.

The Minnesota case was interviewed with a standard broad-based exposure questionnaire and additional detailed questions about reptile exposures. Information on turtle purchase location, feed, and other details were provided to CDC.

Serotypes among the eight national outbreaks included *S.* Sandiego, *S.* Newport, *S.* Pomona, and *S.* Poona; some outbreaks involved multiple serotypes and/or PFGE patterns.

A total of 473 cases were identified nationally from 41 states, the District of Columbia, and Puerto Rico. Estimated onset dates ranged from May 23, 2011 to September 9, 2013. Twenty-nine percent of cases were hospitalized and no deaths were reported. The median age of cases was 4 years (range, <1 to 94 years); 70% were 10 years or younger, and 31% were 1 year or younger. Fifty-five percent were female, and 85 (44%) reported Hispanic ethnicity.

Of 272 cases interviewed, 187 (69%) reported contact with turtles in the week prior to illness onset, and 124 of 141 (88%) reported a turtle with a carapace less than 4 inches. Red-eared slider turtles were reported by 55 of 70 (80%) cases; others had contact with yellow-bellied sliders and mud turtles.

Among 116 cases who reported the place where they obtained the turtle, 36 (31%) purchased them from street vendors, 21 (18%) from pet stores, 14 (12%) from flea markets, and 19 (16%) received them as gifts. Others obtained the turtles from discount stores, souvenir/gift shops, and online.

Public health and agriculture departments in other states and the United States Food and Drug Administration (FDA) traced back turtles implicated in the outbreaks to identify retail establishments, turtle brokers, and turtle farms that supplied the turtles. The ultimate source for many of the turtles was not found. However, traceback of turtles purchased from Florida souvenir shops identified two source turtle farms in Louisiana. Cease and desist orders were issued in March 2013 for both source farms. *Salmonella* matching an outbreak strain was recovered in multiple states from case and retail turtles and turtle habitats, and from a pond at one of the Louisianna farms. CDC-developed educational materials promoting safe handling of turtles were distributed and published online.

Minnesota had one case with an isolate serotype (Sandiego) and PFGE pattern (SDG26/ JLXX01.0053) included in the national turtle-associated outbreaks. The Minnesota case was an 8 year-old female from Minneapolis with illness onset on August 4, 2011. She was not hospitalized. The case handled her two green-colored mud turtles about twice a week prior to her illness onset. The turtles were purchased in June 2011 at a pet store (likely in Richfield, Minnesota). The case's guardian reported that the turtles were about 3 inches long at the time of purchase. The turtles were fed two commercial pet foods (brown-gray floating pellets and floating multi-colored flakes) purchased from a retail store. They did not have a receipt or know the exact date when turtles were purchased. The turtles had been given to a relative by the time of interview, and the case stopped returning phone calls from MDH, so environmental testing was not possible.

These were a collection of eight multi-state outbreaks of salmonellosis that occurred from May 2011 to September 2013 and were associated with exposure to small, live turtles. Most cases reported turtles with a carapace shorter than 4 inches, the sale and distribution of which are illegal in the United States. One Minnesota case of *S.* Sandiego infection from August 2011 was included in the outbreaks; the Minnesota case purchased her turtles at a pet store, but the ultimate source of the Minnesota case's turtles was not identified. The source of some national cases' turtles was two Louisiana turtle farms; distribution of turtles from these farms was stopped. The ultimate source for many of the turtles could not be identified due to challenges in traceback of illegal turtle sales by transient vendors.

Reference

1. http://www.cdc.gov/salmonella/small-turtles-03-12/index.html, Accessed [November 4, 2014]

(5)

Salmonella 4,[5],12:i:- Infections Associated with Feeder Rodents

August 2011-February 2012 St. Louis County/Multiple states

On November 8, 2011, a cluster of *Salmonella* 4,[5],12:i:- cases with isolates with indistinguishable pulsed-field gel electrophoresis (PFGE) patterns was posted on the national PulseNet web board. One

case with a PFGE pattern indistinguishable from the outbreak strain had been previously reported in Minnesota. The PFGE subtype was designated TM933 (Centers for Disease Control and Prevention [CDC] *Xba*I pattern designation: JPXX01.1071). Discussions between MDH epidemiologists and other state and local epidemiologists revealed that reptile exposure had been reported by several cases for which interviews had been completed. CDC was contacted, and an investigation was initiated. This outbreak strain also was implicated in a 2009 outbreak in the United Kingdom and a 2010 outbreak in the United States, both linked to frozen feeder rodents (i.e., rodents used to feed reptiles) from a single U.S. supplier, resulting in recalls.

Cases were identified through routine laboratory surveillance, and were defined as individuals who had culture-confirmed infection with *S*. 4,[5],12:i:- TM933 since August 29, 2011. Interviews about illness history and potential exposures, including animal contact, were conducted. Feeder rodent specimens were collected from several pet stores and tested for *Salmonella*. Traceback was attempted of sources of feeder rodents to which cases had exposure.

One case was identified in Minnesota. This case was an 8 year-old male with illness onset on September 25, 2011. He developed bloody diarrhea accompanied by cramps, vomiting, and fever of 103.7° F. Diarrhea was ongoing at the time of interview on October 9. Two pet snakes were kept in the case's home: a 4 to 5 year-old ball python measuring 4.5 feet in length, and a 1 year-old California Kingsnake, measuring 2.5 feet in length. The snakes were kept in separate terraria and were fed different types of rodents. Live small rats were fed to the python, and frozen "fuzzies" (10 to 13 day-old mice) were thawed and fed to the California Kingsnake. Both types of rodents were purchased from a pet store (pet store A) in Minnesota. According to the case's mother, the case was not directly involved in feeding the snakes or cleaning their housing. However, the cleaning was performed in a bathroom in the house.

On November 10, 2011, the family was re-contacted to determine whether testing could be performed on the snakes and any feeder rodents available in the home. The mother reported that the snakes were not available for testing because they had both died approximately two weeks previously after the furnace failed while the family was away. They had already disposed of the terraria and any remaining feeder rodents.

A representative of pet store A was contacted to determine the sources of feeder rodents sold at the Duluth store. Two different suppliers were reported for the time in question for frozen feeder rodents and live rats, respectively. This store location had not recently changed suppliers for any type of feeder rodents. Case information and contacts for the rodent suppliers were shared with CDC.

According to a report in *Morbidity and Mortality Weekly Report* (vol. 61;15:277), as of February 2, 2012, 46 *S.* 4,[5],12:i:- isolates of the outbreak PFGE subtype were identified in 22 states (including the one in Minnesota). The median patient age was 11 years (range, <1 to 69 years), and 52% were male. Of the 27 patients interviewed, six (22%) reported hospitalization, 20 (74%) reported reptile or amphibian exposures, and 15 (56%) reported feeder rodent exposure. For 12 patients who recalled the types of rodent contacted, five (42%) reported exposure to live rodents, four (33%) to frozen rodents, and three (25%) to both live and frozen rodents. Seven (58%) patients reported exposure to mice, two (17%) to rats, two (17%) to both mice and rats, and one (8%) was unsure. The outbreak strain was isolated from frozen mice specimens from two North Carolina pet stores where cases had purchased feeder rodents. CDC was unable to trace the contaminated feeder rodents to a definite source because of complex breeder and supplier networks and inadequate records. However, two breeders supplying pet stores from

which cases had purchased rodents had received mice from the company implicated in the 2009 and 2010 outbreaks.

This was an outbreak of *S*. 4,[5],12:i:- infections associated with exposure to feeder rodents. No definitive source of contaminated rodents was identified; however, a company implicated in 2009 and 2010 outbreaks associated with feeder rodents did supply some of the mice linked to cases in this outbreak. Rodent suppliers and pet stores involved in this outbreak were widely distributed, suggesting that the outbreak strain may be endemic in feeder rodents.

Confirmed Foodborne Outbreaks
Minnesota, 2011

Outbreak Number	Month	Setting	No. Cases	No. Laboratory-Confirmed	Vehicle	Agent	Contributing Factor	County
1	Jan	Restaurant	3	2	Unknown	Norovirus	Ill food workers	Hennepin
2	Jan	Restaurant	22	1	Unknown	Norovirus	Ill food workers	Stevens
3	Jan	Private home	6	1	Unknown	Norovirus	Likely food worker with ill household member	Mower
4	Feb	Restaurant	5	1	Unknown	Norovirus	Ill food worker	Hennepin
5	Feb-Mar	Commerical product	3	3	Papaya	*Salmonella* Agona	Contaminated product	Multiple counties/ Multiple states
6	Feb	Restaurant	15	1	Unknown	Norovirus	Unknown	Hennepin
7	Feb	Wedding reception	3	3	Pollo guisado	*Salmonella* Enteritidis	Improper cooking	Dakota
8	Feb	Event venue	16	2	Sub sandwiches	Norovirus	Ill food worker	Dakota
9	Feb	Restaurant	9	0	Unknown	Suspected norovirus	Unknown	Dakota
10	Mar	Church	53	5	Unknown	Norovirus	Unknown	Ramsey
11	Mar	Restaurant	5	5	Artichoke dip	Norovirus	Ill food worker	Dakota
12	Mar	Restaurant	3	0	Fried rice	Suspected bacterial intoxication	Time/temperature abuse	Anoka
13	Mar	Correctional institution	32	4	Scalloped potatoes and ham	*Clostridium perfringens*	Likely time/temperature abuse	Anoka
14	Mar	Private home	2	2	Wild boar	*Trichinella spiralis*	Contaminated product	Winona
15	Mar	Commerical product	2	2	Ground turkey	*Salmonella* Heidelberg	Contaminated product	Multiple counties/ Multiple states
16	Apr	Restaurant	3	0	Fried rice	Suspected bacterial intoxication	Time/temperature abuse	Hennepin
17	Apr	Camp	21	3	Ready-to-eat foods	Norovirus	Infected food workers	Beltrami
18	Apr	Hotel/ Restaurant	61	5	Fresh-cut fruit	Norovirus	Infected food worker	Hennepin

Confirmed Foodborne Outbreaks
Minnesota, 2011 (continued)

Outbreak Number	Month	Setting	No. Cases	No. Laboratory-Confirmed	Vehicle	Agent	Contributing Factor	County
19	Apr	Church	31	3	Caesar salad or potato salad	Norovirus	Likely infected worker	Dakota
20	May 2011-July 2012	Live animal market	18	18	Pork	*Salmonella* 4,[5],12:i:-	Contaminated product	Ramsey
21	May	Catered event	32	3	Mashed potatoes or peanuts	Norovirus	Food worker with ill household member	Wright
22	May	Restaurant	9	1	Unknown	Norovirus	Ill food worker	Fillmore
23	May	Restaurant	5	1	Unknown	Norovirus	Ill food worker	Hennepin
24	May	Restaurant	9	0	Unknown	Suspected norovirus	Ill food worker	Kandiyohi
25	Jun	Private home	14	0	Eggs and potato salad	*Staphylococcus aureus*	Time/temperature abuse	Olmsted
26	Jun	Restaurant chain	6	6	Cucumbers or tomatoes	*Salmonella* Newport	Contaminated product	Multiple counties/ Multiple states
27	Jun	Commerical product	1	1	Cantaloupe	*Salmonella* Uganda	Contaminated product	Rice/Multiple states
28	Jun-Jul	Restaurant	8	8	Unknown	*Salmonella* Typhimurium	Unknown	Winona
29	Jun-Jul	Commerical product	11	11	Iceberg lettuce	*Salmonella* Muenchen	Contaminated product	Multiple counties/ Multiple states
30	Jun	Dairy farm	2	2	Raw milk	*Campylobacter jejuni*	Contaminated product	Benton
31	Jul	Dairy farm	3	3	Raw milk	*Campylobacter coli*	Contaminated product	Todd
32	Jul	Private party	6	3	Multiple food items	*E. coli* O157:H7	Unknown	Carver
33	Jul-Aug	Institution	209	7	Unknown	Enterotoxigenic *E. coli* O26:NM	Unknown	Multiple counties

Confirmed Foodborne Outbreaks
Minnesota, 2011 (continued)

Outbreak Number	Month	Setting	No. Cases	No. Laboratory-Confirmed	Vehicle	Agent	Contributing Factor	County
34	Aug	Restaurant	5	2	Unknown	*Clostridium perfringens*	Time/temperature abuse	Hennepin
35	Aug	Private home	16	15	Seedless watermelon	*Salmonella* Typhimurium	Unknown	Multiple counties/ Multiple states
36	Aug-Oct	Commerical product	8	8	Organic eggs	*Salmonella* Enteritidis	Contaminated product	Multiple counties
37	Aug	Restaurant	4	2	Raw oysters	*Vibrio* spp.	Contaminated product	Hennepin
38	Aug	Restaurant	12	0	Unknown	Suspected bacterial intoxication	Time/temperature abuse	Washington
39	Sep	Stadium	29	3	Ice	Norovirus	Unknown	Anoka
40	Sep	Restaurant	35	5	Chicken and ice water	Norovirus	Likely infected food worker	Dakota
41	Sep	Restaurant	3	0	Likely spring rolls	Suspected bacterial intoxication	Unknown	Ramsey
42	Sep	Restaurant	9	5	Salad	Norovirus	Likely infected worker or food worker with ill household member	Chisago
43	Oct	Commerical product	2	2	Lettuce	*E. coli* O157:H7	Contaminated product	Multiple counties/ Multiple states
44	Oct	Apple orchard	14	8	Unpasteurized apple cider	*E. coli* O111 and *Cryptosporidium parvum*	Numerous factors	Washington
45	Oct-Nov	Commerical product	4	4	Pre-packaged lettuce	*E. coli* O157:H7	Contaminated product	Multiple counties/ Multiple states
46	Nov	Restaurant	8	0	Fresh-cut fruit	Norovirus	likely ill attendee	Dakota
47	Nov	Restaurant	7	1	Dinner entrée	Norovirus	Unknown	Goodhue
48	Nov	Restaurant	8	1	Unknown	Norovirus	Unknown	Hennepin

Confirmed Foodborne Outbreaks
Minnesota, 2011 (continued)

Outbreak Number	Month	Setting	No. Cases	No. Laboratory-Confirmed	Vehicle	Agent	Contributing Factor	County
49	Nov	Restaurant	6	0	Shredded cheese or lettuce	Suspected norovirus	Likely infected worker	Anoka
50	Dec	Restaurant	10	0	Likely Mexican rice	Suspected bacterial intoxication	Time/temperature abuse	Otter Tail
51	Dec	Event venue	62	2	Unknown	Norovirus	Infected food workers	St. Louis
52	Dec	Restaurant	12	3	Ham and cheese wrap	Enteroaggregative *E. coli*	Likely infected worker	Ramsey
53	Dec	Restaurant	7	1	Unknown	Norovirus	Likely infected worker or food worker with ill household member	Hennepin
54	Dec	Restaurant	15	1	Unknown	Norovirus	Likely ill attendee	Hennepin
55	Dec	Restaurant	14	4	Unknown	Norovirus	Infected food workers	Dakota
56	Dec	Restaurant	17	2	Unknown	Norovirus	Ill food worker	Olmsted
57	Dec	Camp	18	0	Unknown	Suspected norovirus	Ill food worker	Hennepin

Total: 57

Probable Foodborne Outbreaks
Minnesota, 2011

Outbreak Number	Month	Setting	No. Cases	No. Laboratory-Confirmed	Vehicle	Agent	Contributing Factor	County
1	Jan	Restaurant	4	0	Unknown	Suspected norovirus	Ill food workers	Pope
2	Apr	Restaurant	6	0	Unknown	Unknown	Unknown	Hennepin
3	Jun	Private home	3	2	Unknown	*Salmonella* Newport	Unknown	Beltrami
4	Aug	Restaurant	6	0	Unknown	Suspected norovirus	Likely infected attendee/ food worker	Hennepin
5	Sep	Wedding	2	2	Unknown	*E. coli* O157:H7	Unknown	Hennepin
6	Oct	Wedding	18	2	Unknown	Norovirus	Unknown	Grant
7	Oct	Restaurant	2	1	Unknown	Norovirus	Likely food worker with ill household member	Waseca

Total: 7

Confirmed Waterborne Outbreaks
Minnesota, 2011

Outbreak Number	Month	Setting	No. Cases	No. Laboratory-Confirmed	Vehicle	Agent	Contributing Factor	County
1	Mar	Recreation center	48	0	Recreational water	*Legionella* (Pontiac fever)	Improper maintenance	Anoka
2	Aug-Sep	School pool	11	2	Recreational water	*Cryptosporidium hominis*	Likely infectious swimmer	Hennepin

Total: 2

Animal Contact Outbreaks
Minnesota, 2011

Outbreak Number	Month	Setting	No. Cases	No. Laboratory-Confirmed	Vehicle	Agent	County
1	Feb	Private home	1	1	Baby chicks	*Salmonella* Altona	Dakota/Multiple states
2	Jul	Dairy farm	2	2	Cattle	*Campylobacter jejuni*	Stearns
3	Aug	County fair	2	2	Sheep and goats	*E. coli* O157:H7	Freeborn
4	Aug	Private home	1	1	Small turtles	*Salmonella* Sandiego	Hennepin/Multiple states
5	Aug 2011-Feb 2012	Private home	1	1	Feeder rodents	*Salmonella* 4,[5],12:i:-	St. Louis/Multiple states

Total: 5

Person-to-Person Gastroenteritis Outbreaks
Minnesota, 2011

Outbreak Number	Month	Setting	No. Cases	No. Laboratory-Confirmed	Vehicle	Agent	County
1	Jan	Nursing home	14	0	Person-to-person (PTP)	Suspected norovirus	Dakota
2	Jan	Nursing home	50	0	PTP	Suspected norovirus	Clay
3	Jan	Nursing home	19	0	PTP	Suspected norovirus	Hennepin
4	Jan	Nursing home	8	0	PTP	Suspected norovirus	Ramsey
5	Jan	Nursing home	20	0	PTP	Suspected norovirus	Murray
6	Jan	Nursing home	26	0	PTP	Suspected norovirus	Clay
7	Jan	Nursing home	37	0	PTP	Suspected norovirus	Hennepin
8	Jan	Nursing home	29	0	PTP	Suspected norovirus	Polk
9	Jan	Nursing home	46	0	PTP	Suspected norovirus	Kandiyohi
10	Jan	Nursing home	58	0	PTP	Suspected norovirus	Dakota
11	Jan	Rehabilitation center	51	0	PTP	Suspected norovirus	Scott
12	Jan	Nursing home	34	0	PTP	Suspected norovirus	McLeod
13	Jan	Nursing home	17	0	PTP	Suspected norovirus	Wright
14	Jan	Nursing home	35	0	PTP	Suspected norovirus	Washington
15	Jan	Nursing home	47	0	PTP	Suspected norovirus	Hennepin
16	Jan	Nursing home	23	0	PTP	Suspected norovirus	Ramsey
17	Jan	Nursing home	63	0	PTP	Suspected norovirus	Dakota
18	Jan	Nursing home	14	0	PTP	Suspected norovirus	Hennepin
19	Jan	Nursing home	120	0	PTP	Suspected norovirus	Hennepin
20	Jan	Nursing home	56	0	PTP	Suspected norovirus	Washington
21	Jan	Long term care	35	0	PTP	Suspected norovirus	Nicollet
22	Jan	Nursing home	33	0	PTP	Suspected norovirus	Beltrami
23	Jan	Assisted living	31	0	PTP	Suspected norovirus	Scott
24	Jan	School	224	0	PTP	Suspected norovirus	Dodge
25	Jan	Treatment facility	9	0	PTP	Suspected norovirus	Nicollet
26	Jan	Treatment facility	55	0	PTP	Suspected norovirus	Nicollet

Person-to-Person Gastroenteritis Outbreaks
Minnesota, 2011 (continued)

Outbreak Number	Month	Setting	No. Cases	No. Laboratory-Confirmed	Vehicle	Agent	County
27	Jan	School	30	0	PTP	Suspected norovirus	Scott
28	Feb	Assisted living	10	0	PTP	Suspected norovirus	Hennepin
29	Feb	Nursing home	27	0	PTP	Suspected norovirus	Renville
30	Feb	Assisted living	37	0	PTP	Suspected norovirus	Nicollet
31	Feb	Nursing home	12	0	PTP	Suspected norovirus	Dakota
32	Feb	Nursing home	19	1	PTP	Norovirus	Dakota
33	Feb	Nursing home	16	0	PTP	Suspected norovirus	Sherburne
34	Feb	Nursing home	11	0	PTP	Suspected norovirus	Dakota
35	Feb	Nursing home	9	0	PTP	Suspected norovirus	Ramsey
36	Feb	Nursing home	43	0	PTP	Suspected norovirus	Meeker
37	Feb	School	11	0	PTP	Suspected norovirus	Goodhue
38	Feb	Restaurant	3	0	PTP	Suspected norovirus	Hennepin
39	Mar	Assisted living	8	1	PTP	Norovirus	Dakota
40	Mar	Nursing home	23	0	PTP	Suspected norovirus	Hennepin
41	Mar	Restaurant	2	2	PTP	Norovirus	Dakota
42	Mar	Nursing home	31	0	PTP	Suspected norovirus	Benton
43	Mar	School	65	0	PTP	Suspected norovirus	Blue Earth
44	Apr	Nursing home	12	0	PTP	Suspected norovirus	Isanti
45	Apr	Nursing home	140	0	PTP	Suspected norovirus	Hennepin
46	May	Nursing home	6	0	PTP	Suspected norovirus	Jackson
47	May	Nursing home	26	0	PTP	Suspected norovirus	Hennepin
48	May	Nursing home	8	0	PTP	Suspected norovirus	Anoka
49	May	Nursing home	16	0	PTP	Suspected norovirus	Winona
50	May	Nursing home	8	0	PTP	Suspected norovirus	Stearns
51	May	Treatment facility	15	0	PTP	Suspected norovirus	Nicollet
52	Jun	Nursing home	11	0	PTP	Suspected norovirus	Hennepin

Person-to-Person Gastroenteritis Outbreaks
Minnesota, 2011 (continued)

Outbreak Number	Month	Setting	No. Cases	No. Laboratory-Confirmed	Vehicle	Agent	County
53	Jun	Daycare	2	2	PTP	*Cryptosporidium parvum*	Olmsted
54	Jul	Nursing home	16	0	PTP	Suspected norovirus	Dakota
55	Sep	Nursing home	6	0	PTP	Suspected norovirus	Winona
56	Sep	Nursing home	25	0	PTP	Suspected norovirus	Norman
57	Oct	Nursing home	68	0	PTP	Suspected norovirus	Pope
58	Oct	Nursing home	7	0	PTP	Suspected norovirus	Hennepin
59	Oct	School	60	1	PTP	Norovirus	Dakota
60	Oct	Nursing home	11	0	PTP	Suspected norovirus	Ramsey
61	Oct	Daycare	12	0	PTP	Suspected norovirus	Hennepin
62	Nov	Nursing home	19	0	PTP	Suspected norovirus	Martin
63	Nov	Nursing home	48	0	PTP	Suspected norovirus	Hennepin
64	Nov	School	61	0	PTP	Unknown	Olmsted
65	Nov	Daycare	6	0	PTP	Unknown	Brown
66	Nov	Nursing home	99	0	PTP	Suspected norovirus	Hennepin
67	Nov	Nursing home	10	0	PTP	Suspected norovirus	Ramsey
68	Nov	Nursing home	89	0	PTP	Suspected norovirus	Ramsey
69	Nov	Nursing home	39	0	PTP	Suspected norovirus	Washington
70	Nov	Nursing home	42	0	PTP	Suspected norovirus	Hennepin
71	Dec	Nursing home	65	0	PTP	Suspected norovirus	Washington
72	Dec	Nursing home	13	0	PTP	Suspected norovirus	Olmsted
73	Dec	Nursing home	7	0	PTP	Suspected norovirus	Hennepin
74	Dec	Nursing home	38	0	PTP	Suspected norovirus	Le Sueur
75	Dec	Senior independent living	20	0	PTP	Suspected norovirus	Wright
76	Dec	Restaurant	6	0	PTP	Unknown	Hennepin
77	Dec	Nursing home	74	0	PTP	Suspected norovirus	Wabasha

Person-to-Person Gastroenteritis Outbreaks
Minnesota, 2011 (continued)

Outbreak Number	Month	Setting	No. Cases	No. Laboratory-Confirmed	Vehicle	Agent	County
78	Dec	Nursing home	20	0	PTP	Suspected norovirus	Ramsey
79	Dec	Nursing home	22	0	PTP	Suspected norovirus	Chisago
80	Dec	Nursing home	13	0	PTP	Suspected norovirus	Martin
81	Dec	Nursing home	8	0	PTP	Suspected norovirus	Cass
82	Dec	Nursing home	28	0	PTP	Suspected norovirus	Hennepin
83	Dec	Skilled living	57	0	PTP	Suspected norovirus	Olmsted
84	Dec	Nursing home	15	0	PTP	Suspected norovirus	Big Stone
85	Dec	Nursing home	31	0	PTP	Suspected norovirus	Washington
86	Dec	Nursing home	31	0	PTP	Suspected norovirus	Wright
87	Dec	Nursing home	21	0	PTP	Suspected norovirus	Olmsted
88	Dec	Nursing home	8	0	PTP	Suspected norovirus	Washington
89	Dec	Nursing home	112	0	PTP	Suspected norovirus	Meeker
90	Dec	Nursing home	36	0	PTP	Suspected norovirus	Douglas
91	Dec	Nursing home	19	0	PTP	Suspected norovirus	Hennepin
92	Dec	Nursing home	18	0	PTP	Suspected norovirus	Winona
93	Dec	Nursing home	142	0	PTP	Suspected norovirus	Dakota
94	Dec	Nursing home	17	0	PTP	Suspected norovirus	Wright
95	Dec	Nursing home	5	0	PTP	Suspected norovirus	Dakota

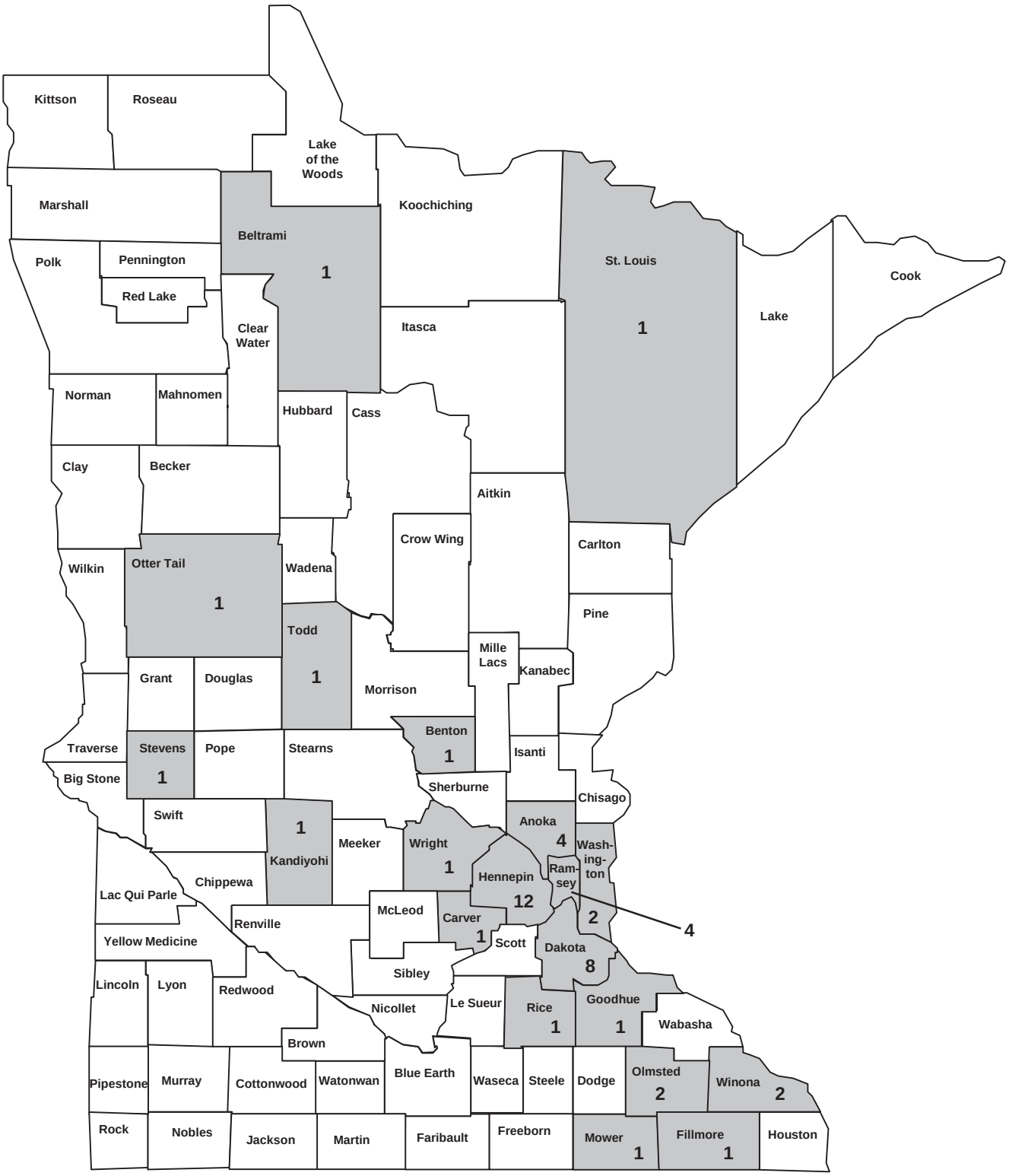
TOTAL: 95

Gastroenteritis Outbreaks with Unknown Transmission Routes
Minnesota, 2011

Outbreak Number	Month	Setting	No. Cases	No. Laboratory-Confirmed	Vehicle	Agent	County
1	Jan	Nursing home	46	0	Unknown	Suspected norovirus	Dakota
2	Mar	Nursing home	18	0	Unknown	Suspected norovirus	Wright
3	Apr	Restaurant	3	0	Unknown	Unknown	Ramsey
4	May	Treatment facility	2	2	Unknown	*Salmonella* Bareilly	Carlton
5	May	Restaurant	2	0	Unknown	Suspected bacterial intoxication	Hennepin
6	Jun	Private	4	0	Unknown	Unknown	Hennepin
7	Jul	Country club	3	3	Unknown	STEC	Washington
8	Aug	Restaurant	2	0	Unknown	Unknown	Ramsey
9	Aug	Private home	2	1	Unknown	*Yersinia enterocolitica*	Washington
10	Nov	Group home	7	1	Unknown	Norovirus	Wright
11	Dec	Restaurant	4	1	Unknown	Norovirus	Hennepin
12	Dec	Treatment facility	7	0	Unknown	Unknown	Nicollet

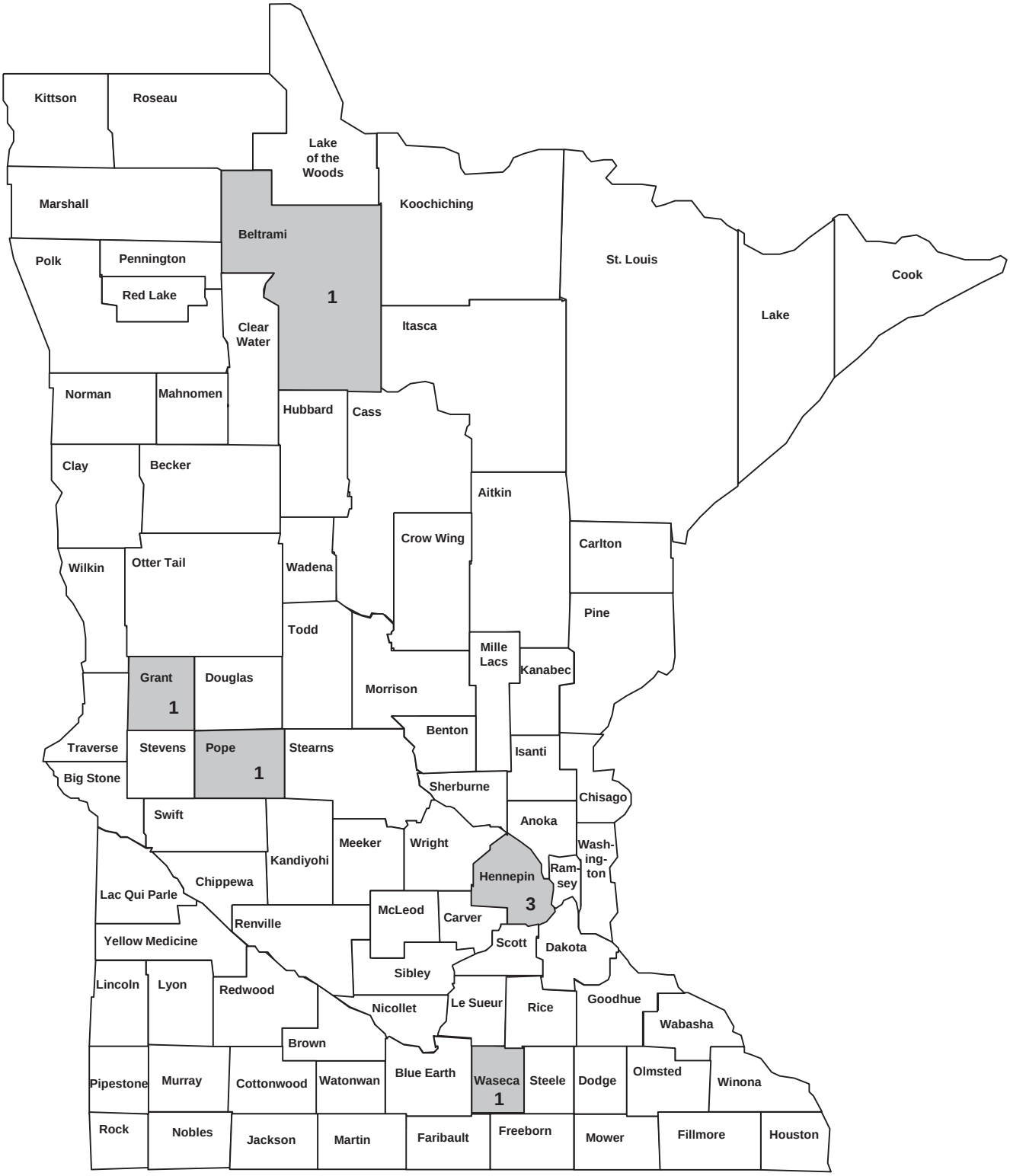
TOTAL: 12

Confirmed Foodborne Outbreaks by County, Minnesota, 2011 (n=47*)

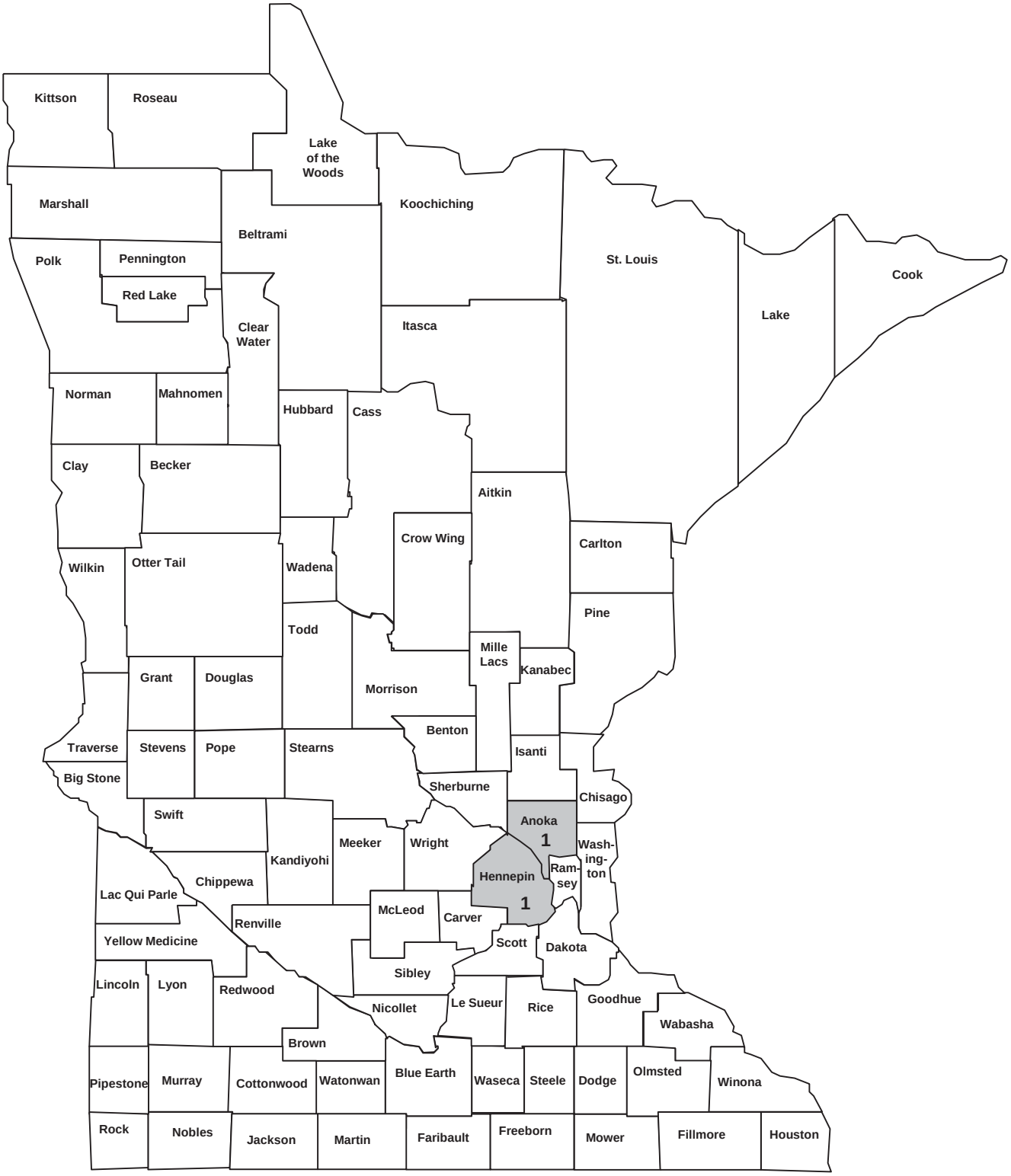


* The total number of confirmed outbreaks in 2011 was 57; however, the numbers on the map add up to 47. The remaining 10 outbreaks (#5, #15, #26, #29, #33, #35, #36, #42, #43 and #45) involved multiple counties.

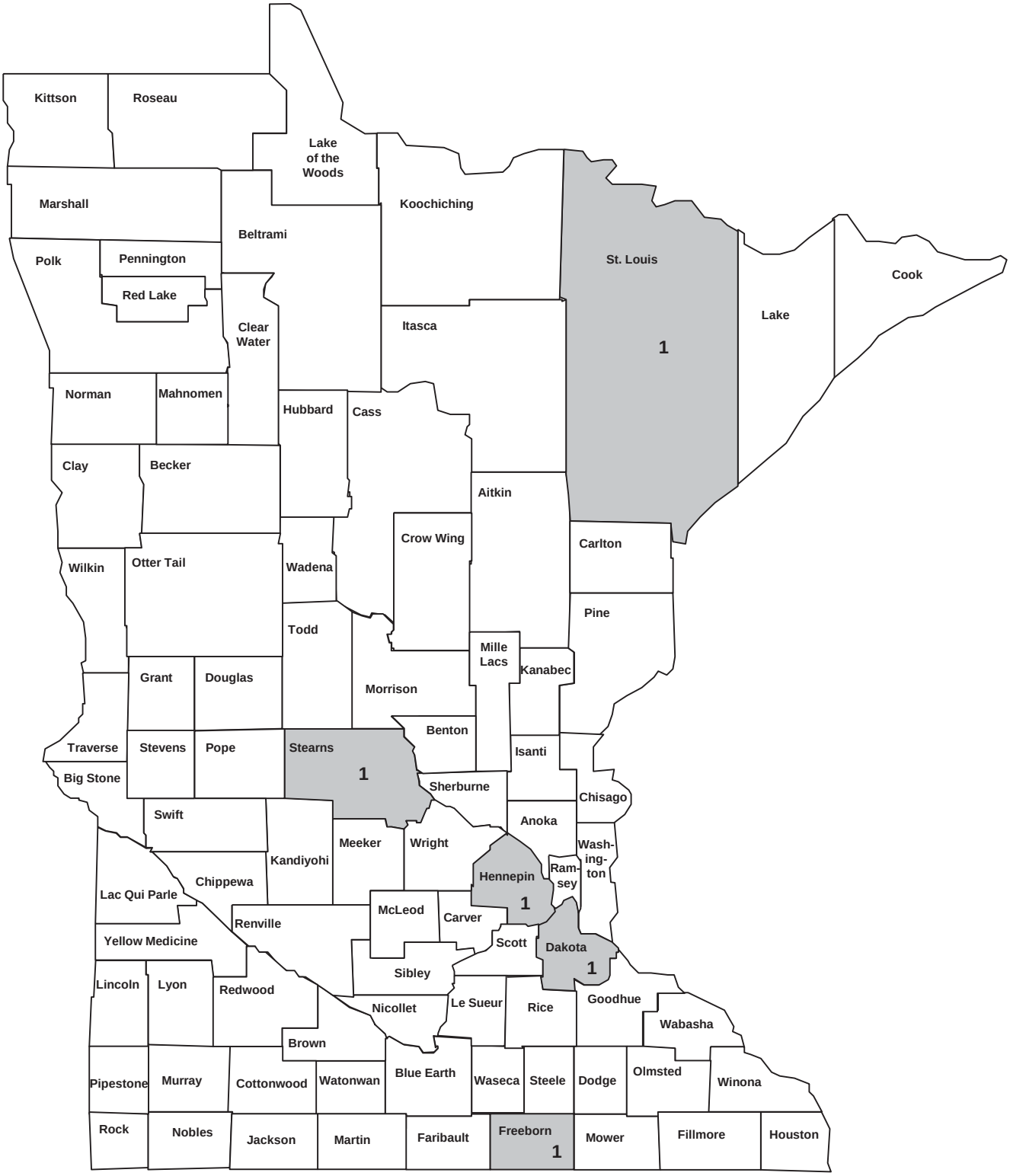
Probable Foodborne Outbreaks by County, Minnesota, 2011 (n=7)



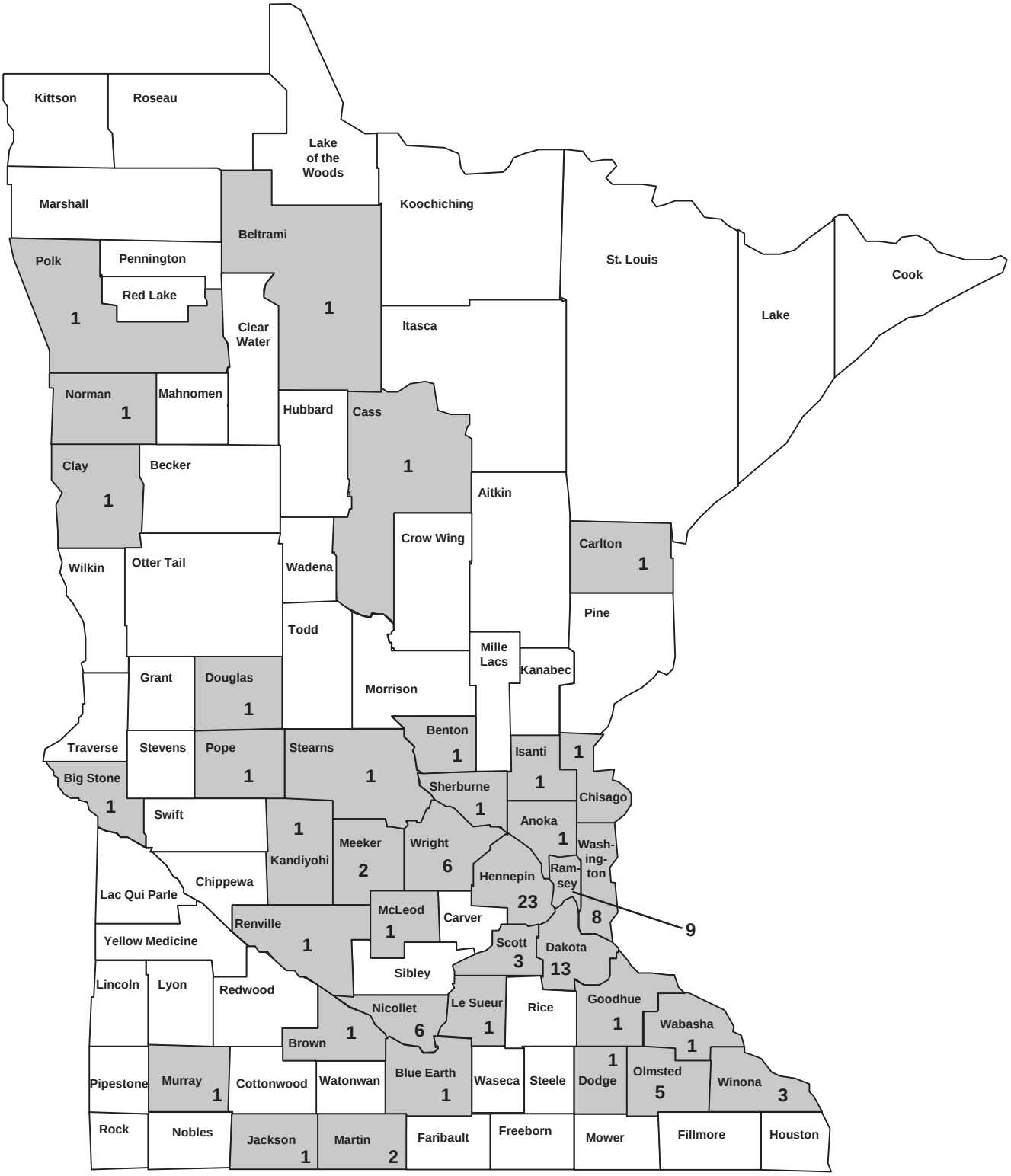
Confirmed Waterborne Outbreaks by County, Minnesota, 2011 (n=2)



Animal Contact Outbreaks by County, Minnesota, 2011 (n=5)



Outbreaks with Other or Unknown Routes of Transmission, Minnesota, 2011 (n=107)



Foodborne Illness Complaints, Minnesota, 2011

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	0	0	0
Anoka County	27	9	36
* Becker County	2	0	2
* Beltrami County	6	0	6
* Benton County	0	0	0
Big Stone County	0	0	0
Bloomington/Richfield, City of	52	33	85
* Blue Earth County	4	1	5
Brooklyn Park, City of	6	0	6
Brown County	2	0	2
* Carlton County	5	0	5
* Carver County	6	0	6
* Cass County	0	0	0
Chippewa County	1	0	1
* Chisago County	5	0	5
Clay County	0	0	0
* Clearwater County	0	0	0
* Cook County	2	0	2
Cottonwood County	0	0	0
* Crow Wing County	10	0	10
Crystal, City of	1	0	1
* Dakota County	52	0	52
* Dodge County	0	0	0
Douglas County	1	0	1
Edina, City of	17	19	36
Faribault County	0	0	0
* Fillmore County	2	0	2
* Freeborn County	0	0	0
Goodhue County	7	0	7
* Grant County	1	0	1
Hennepin County	63	10	73
Hopkins, City of	3	0	3
* Houston County	0	0	0

Foodborne Illness Complaints, Minnesota, 2011 (continued)

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
* Hubbard County	0	0	0
* Isanti County	4	0	4
* Itasca County	3	0	3
* Jackson County	0	0	0
* Kanabec County	1	0	1
Kandiyohi County	5	0	5
* Kittson County	0	0	0
* Koochiching County	1	0	1
Lac Qui Parle County	0	0	0
Lake County	3	0	3
* Lake of the Woods County	1	0	1
Le Sueur County	3	0	3
Lincoln County	0	0	0
* Lyon County	2	0	2
* Mahnomen County	0	0	0
Maplewood, City of	15	0	15
* Marshall County	0	0	0
Martin County	1	0	1
* McLeod County	4	0	4
* Meeker County	2	0	2
* Mille Lacs County	2	0	2
Minneapolis, City of	128	0	128
Minnetonka, City of	15	0	15
Moorhead, City of	1	0	1
Morrison County	2	0	2
* Mower County	3	0	3
Murray County	0	0	0
Nicollet County	4	0	4
Nobles County	2	0	2
* Norman County	0	0	0
Olmsted County	19	33	52
* Otter Tail County	2	0	2
* Pennington County	0	0	0
* Pine County	5	0	5

Foodborne Illness Complaints, Minnesota, 2011 (continued)

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
Pipestone County	0	0	0
* Polk County	0	0	0
Pope County	1	0	1
Ramsey County	33	0	33
* Red Lake County	0	0	0
Redwood County	1	0	1
Renville County	2	1	3
* Rice County	2	0	2
Rock County	0	0	0
* Roseau County	0	0	0
St. Cloud, City of	9	0	9
St. Louis County	22	1	23
St. Louis Park, City of	19	0	19
St. Paul, City of	70	0	70
* Scott County	5	0	5
* Sherburne County	7	0	7
* Sibley County	0	0	0
Stearns County	4	0	4
* Steele County	2	0	2
Swift County	0	0	0
* Stevens County	1	0	1
Todd County	0	0	0
* Traverse County	0	0	0
Wabasha County	0	0	0
Wadena County	0	0	0
Waseca County	2	0	2
Washington County	30	0	30
Watonwan County	0	0	0
Wayzata, City of	7	0	7
Wilkin County	0	0	0
Winona County	1	0	1
* Wright County	12	0	12
Yellow Medicine County	0	0	0
Bureau of Indian Affairs	8	0	8

Foodborne Illness Complaints, Minnesota, 2011 (continued)

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
FDA	3	0	3
MN Dept of Ag	48	0	48
MDH Environmental Health	0	0	0
U of M	4	0	4
USDA	0	0	0
Total	796	107	903

* MDH Environmental Health Services jurisdiction (total number of reports faxed to MDH EHS Metro or District Offices = 154)

In 2011, MDH received 725 foodborne illness complaints. Detailed information on symptoms and a food history were obtained from each call (4-day food history if a single ill person or if all people lived in the same household), and the complaint was faxed to the appropriate jurisdiction for each restaurant, deli, grocery store, or other establishment mentioned in the complaint. Of the 725 complaints received, 618 (85%) were received directly through the MDH foodborne illness hotline (1-877-FOODILL), and 107 (15%) were reported to MDH by local public health agencies (Figure 1). In 2011, 34 (60%) of the 57 confirmed foodborne outbreaks were initially reported to MDH or local public health agencies via phone calls from the public; of those, 28 (82%) were reported directly to MDH (Figure 2).

See the Minnesota Integrated Food Safety Center of Excellence website for a more detailed description of the MDH foodborne illness complaint system: http://mnfoodsafetycoe.umn.edu/foodborne-illness-complaint-system/

Figure 1. Number of Foodborne Illness Complaints per Year, Minnesota, 1999-2011

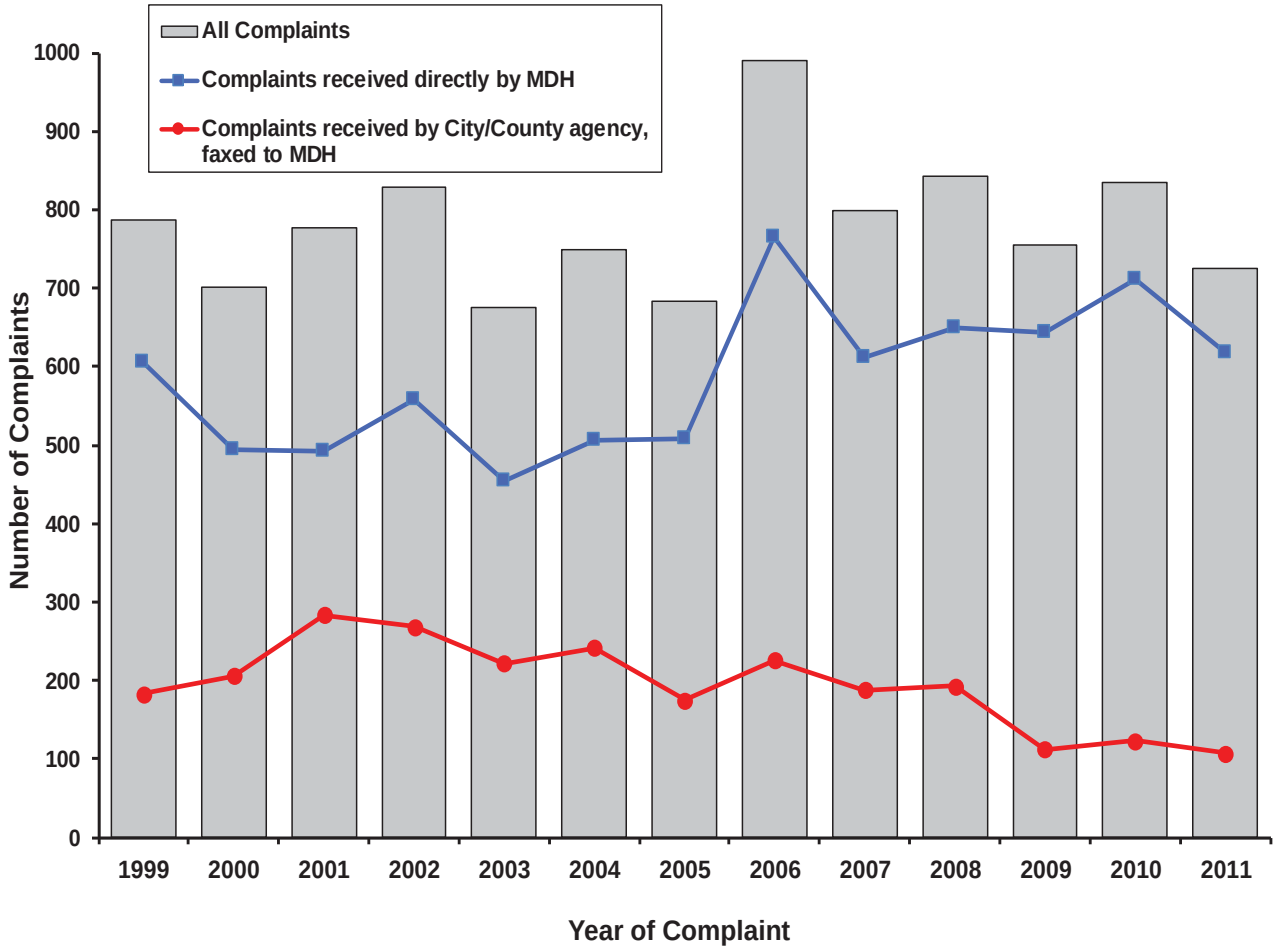
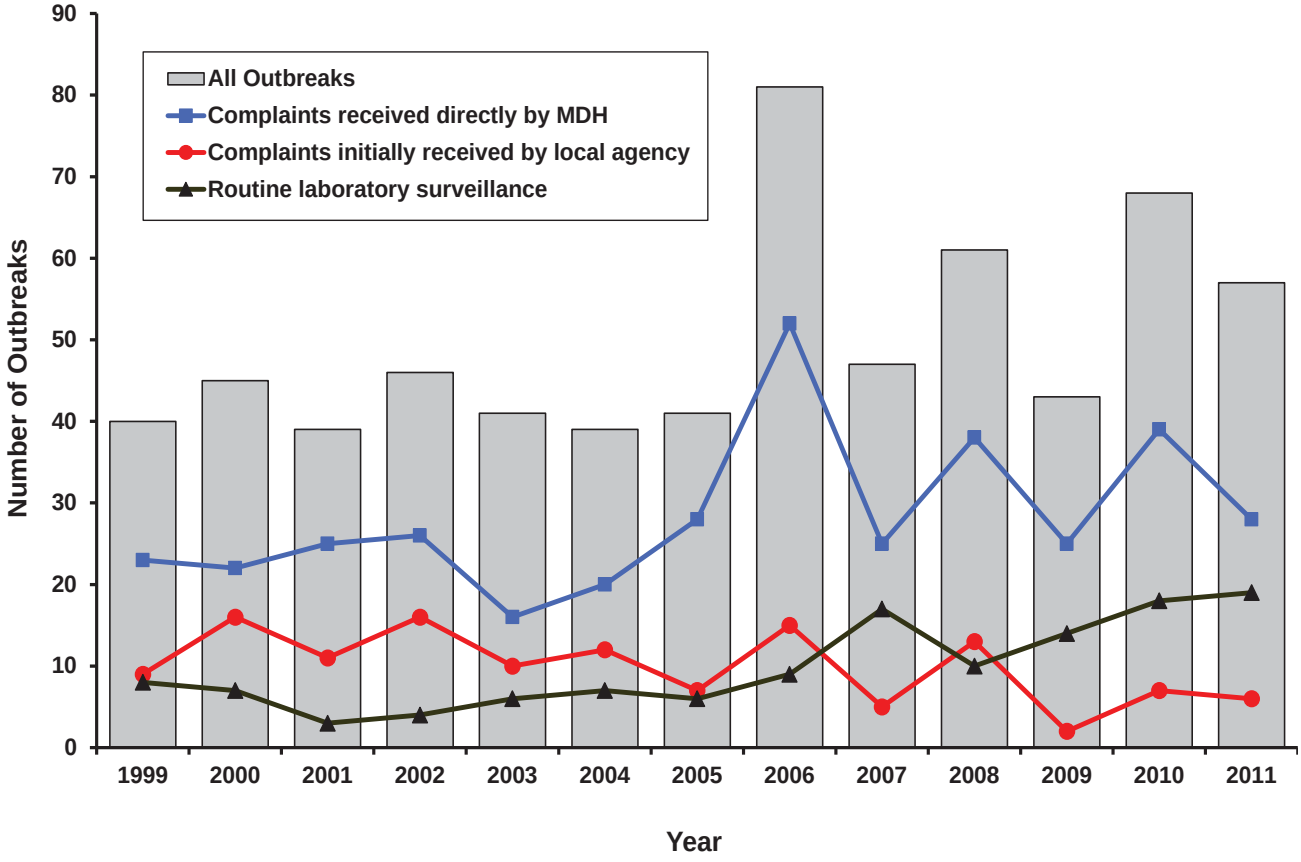


Figure 2. Confirmed Foodborne Outbreaks by Method of Initial Identification, Minnesota, 1999-2011



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 _____

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 145, "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.

(1) Provide an overview of the investigation process, including a brief description of the roles of ADIC, LPH, and PHL.

(2) 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).**

(3) 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 (PHFs), 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 CCPs by reviewing records, interviewing staff, or observing practices.

iv. Assess whether critical limits for PHFs 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 establishment's records, interviewing staff, or observation.

Note: This approach to hazard analysis is applicable in all outbreaks linked to FSEs. 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 (SSOPs):

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 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
_____	____	____/____/____
_____	____	____/____/____
_____	____	____/____/____