

MINNESOTA DEPARTMENT OF HEALTH 2009 GASTROENTERITIS OUTBREAK SUMMARY

Foodborne Outbreaks
Waterborne Outbreaks
Outbreaks with Other Routes of Transmission
Foodborne Illness Complaints
Foodborne Disease Outbreak Investigation Guidelines



Compiled by:

Minnesota Department of Health
Infectious Disease Epidemiology, Prevention and Control Division
Acute Disease Investigation and Control Section
Foodborne, Vectorborne, and Zoonotic Diseases Unit

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

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

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**MINNESOTA DEPARTMENT OF HEALTH
2009 GASTROENTERITIS OUTBREAK SUMMARY**

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Definitions

Confirmed Foodborne Outbreaks

A confirmed foodborne disease outbreak is defined as an incident in which two or more persons experience a similar illness after ingestion of a common food or meal and epidemiologic evaluation implicates the meal or food as the source of illness (note: for botulism, marine toxins, and chemical exposures, even a single case is classified as an outbreak). Confirmed outbreaks may or may not be laboratory-confirmed.

Confirmed outbreaks may be classified as:

1. Laboratory-Confirmed Agent: Outbreaks in which laboratory evidence of a specific etiologic agent is obtained.
2. Epidemiologically Defined Agent: Outbreaks in which the clinical and epidemiologic evidence defines a likely agent, but laboratory confirmation is not obtained.
3. Outbreak of Undetermined Etiology: Outbreaks in which laboratory confirmation is not obtained and clinical and epidemiologic evidence cannot define a likely agent.

Probable Foodborne Outbreaks

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

Confirmed and Probable Waterborne Outbreaks

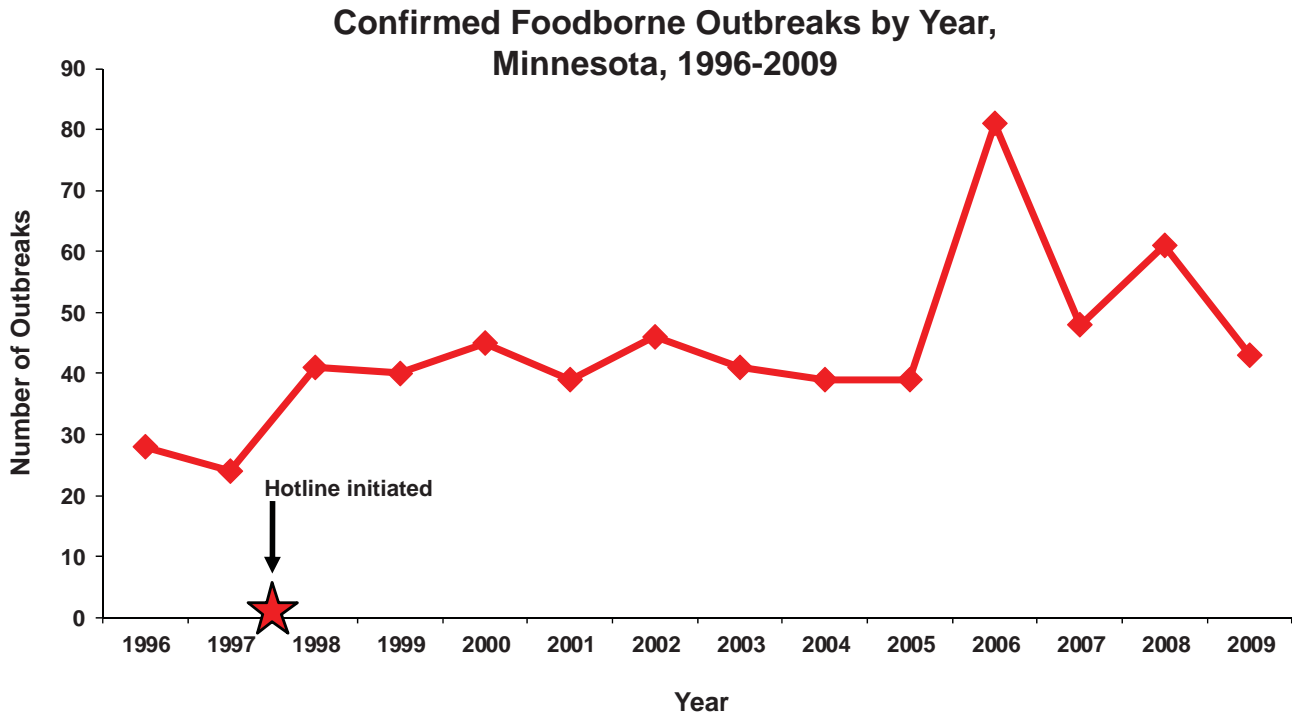
These are similar to foodborne outbreaks, except epidemiologic evaluation implicates water as the source of illness. Waterborne outbreaks may be associated with drinking water or with recreational water.

Outbreaks with Other or Unknown Routes of Transmission

These outbreaks are defined as two or more cases of illness related by time and place in which an epidemiologic evaluation suggests either person-to-person transmission occurred, or a vehicle other than food or water (e.g., animal contact) is identified. This category also includes outbreaks for which the route of transmission could not be determined.

Summary

In 2009, the Minnesota Department of Health (MDH) Acute Disease Investigation and Control Section identified a total of 131 outbreaks of gastroenteritis involving at least 3,438 cases of illness. The 131 outbreaks were classified as follows: 43 confirmed foodborne outbreaks, 15 probable foodborne outbreaks, 1 confirmed waterborne outbreak, and 72 outbreaks with other or unknown routes of transmission (see page 1 for definitions). The median annual number of confirmed foodborne outbreaks from 1996-2008 was 40 (range, 24 to 81). The median number of cases identified per confirmed foodborne outbreak in 2009 was 10 (range, 1 to 167).



In 2009, 28 (65%) of the 43 confirmed foodborne outbreaks were initially reported to MDH or local public health agencies via complaint calls from the public. Fourteen (33%) outbreaks were identified through routine laboratory-based surveillance of reportable bacterial pathogens, and one (2%) was identified through a report from a physician.

Of the 43 confirmed foodborne outbreaks, 24 (53%) were either laboratory-confirmed (n=21) or epidemiologically defined (n=3) outbreaks of norovirus gastroenteritis. There were nine (21%) confirmed foodborne outbreaks caused by *E. coli* O157:H7, five (12%) by *Salmonella*, and one (2%) each by *Campylobacter jejuni*, *Clostridium perfringens*, and ciguatera toxin. The remaining two (5%) confirmed foodborne outbreaks were classified as suspected bacterial intoxications (caused by *Clostridium perfringens* or *Bacillus cereus*).

The predominance of norovirus as a cause of foodborne disease outbreaks in 2009 continues a pattern that has been observed for over two decades in Minnesota. During 1981-2009, 435 (53%) of 819 confirmed outbreaks of foodborne disease were due to norovirus, while 172 (21%) confirmed

foodborne outbreaks were caused 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 nine confirmed foodborne outbreaks caused by *E. coli* O157:H7 in 2009; this is the highest number of foodborne *E. coli* O157:H7 outbreaks identified in Minnesota in a single year. There were four *E. coli* O157:H7 outbreaks involving commercially distributed products, including ground beef (two outbreaks), pre-packaged salad, and cookie dough. Of the other five foodborne *E. coli* O157:H7 outbreaks, two were associated with single food service establishments. Of the other three, one was associated with potato salad likely contaminated by an ill food preparer and served at a private party, one was associated with a catered meal, and one was associated with custom slaughtered beef and subsequent person-to-person transmission in a daycare.

There were five confirmed foodborne outbreaks caused by *Salmonella* in 2009. There were four salmonellosis outbreaks involving commercially distributed products, including sprouts (two outbreaks), melon, and Italian style meats. The fifth outbreak of salmonellosis was associated with turkey gravy served at a banquet; cross-contamination from bearded dragons kept in the gravy preparer's home was the likely source.

There was one confirmed foodborne outbreak of campylobacteriosis identified in 2009. It was associated with lettuce served in a restaurant and was likely due to cross-contamination from chicken.

Three of the confirmed foodborne outbreaks identified in Minnesota in 2009 were due to laboratory-confirmed or suspected bacterial intoxications caused by pathogens such as *Clostridium perfringens* and *Bacillus cereus*. These outbreaks often lack laboratory confirmation, as the resulting illnesses typically are of short duration. A recurring theme in outbreaks of bacterial intoxications is improper time and temperature control of potentially hazardous food items such as meats, rice, and sauces, which allows for the proliferation of organisms that produce these enterotoxins.

There was one waterborne gastroenteritis outbreak identified in 2009, a cryptosporidiosis outbreak associated with an aquatic center swimming pool.

There were 72 outbreaks with other or unknown routes of transmission in 2009. 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. Three of these outbreaks were due to animal contact: *Cryptosporidium* infections associated with contact with calves at a zoo, *E. coli* O157:H7 infections associated with contact with animals at a petting zoo, and *Salmonella* Typhimurium infections associated with contact with African dwarf frogs.

Confirmed Foodborne Outbreaks

(1)

Norovirus Gastroenteritis Associated with a Restaurant

January

St. Louis County

On January 8, 2008, the Minnesota Department of Health (MDH) foodborne illness hotline received a complaint of gastrointestinal illness among a group of snowmobilers who had dined together on January 2 at a restaurant in Duluth, Minnesota. Lunch at this restaurant was the only common food exposure among the snowmobilers. Epidemiologists and environmental health specialists from MDH initiated an investigation.

MDH sanitarians visited the restaurant on January 9 and interviewed restaurant staff about illness history and food preparation duties. They also obtained a menu and credit card receipts to identify customers who ate at the restaurant on January 2. The snowmobilers and patrons contacted using credit card receipts were interviewed by MDH staff about food consumption at the restaurant and illness history. A case was defined as any person who ate at the restaurant and subsequently developed vomiting or diarrhea (≥ 3 loose stools in a 24-hour period). Stool samples were requested from selected cases and food workers for bacterial and viral pathogen testing at the MDH Public Health Laboratory (PHL).

Twenty-two patrons were interviewed, including 8 members of the snowmobiler complainant group and 14 patrons identified from credit card receipts. Six cases were identified, and all six cases were part of the snowmobiler complainant group. Of the six cases, five (83%) had diarrhea, five (83%) had vomiting, and four (67%) had fever. None sought health care. The median incubation period was 65 hours (range, 59 to 79 hours). The median duration of illness was 37 hours (range, 24 to 48 hours).

Consuming hamburgers with various toppings was the only food item associated with illness (6 of 6 cases vs. 5 of 16 controls; odds ratio, undefined; $p = 0.012$). All the snowmobilers reported consuming hamburgers with various toppings, and dined between 3:00 p.m. and 5:00 p.m. None of the other 14 diners interviewed ate during this time period; all ate either before 1:30 p.m. or after 5:00 p.m. Besides the snowmobilers, 3 of the other 14 diners consumed hamburgers, while the rest consumed a variety of other menu items.

Two cases submitted stool specimens to MDH PHL and one was positive for norovirus genogroup I.

MDH sanitarians identified no specific violations during their inspection. However, multiple employees reported recent illness. A cook reported having a child that was ill on January 2, becoming ill himself on January 4, and having another child become ill on January 6, all with similar gastrointestinal symptoms. This cook prepared all meals for the restaurant on January 2 from 2:00 p.m. to 8:00 p.m. One other food worker reported illness with onset on January 6. None of the ill food workers or cases submitted a stool sample for testing at MDH.

This was an outbreak of norovirus gastroenteritis associated with eating at a restaurant. Consuming hamburgers was associated with illness. The most likely source of contamination was a cook who had an ill child at home on the implicated meal date.

(2)
Norovirus Gastroenteritis Associated with a Casino

January

Renville County

On January 12, 2009, the Minnesota Department of Health (MDH) foodborne illness hotline received a complaint of gastrointestinal illness from an individual who had attended the expo held during January 7-9 at the casino in Morton, Minnesota. The complainant reported that he knew of other individuals who had attended the expo who also had become ill with similar symptoms. A call to the event organizer confirmed that there were other individuals who had reported being ill. Sanitarians from Indian Health Services were notified, and an investigation was initiated.

A list of expo attendees was obtained from the event organizer. Epidemiologists from MDH interviewed expo attendees to obtain information on food/beverage consumption and illness history. A case was defined as an expo attendee who subsequently developed vomiting and/or diarrhea (≥ 3 loose stools in a 24-hour period). Stool specimens were obtained from four attendees and submitted to MDH for bacterial and viral testing.

Illness histories and exposure information were obtained from 84 expo attendees. Sixteen (19%) cases were identified. Eight people reported illness but did not meet the case definition, and thus were excluded from further analysis.

Fourteen (88%) cases reported diarrhea, 12 (75%) reported cramps, 9 (56%) reported vomiting, and 4 (25%) reported fever. The median duration of illness was 35 hours (range, 18 to 79 hours). Two of the stool samples tested positive for norovirus genogroup II. The stool samples submitted by the other two attendees were negative for norovirus, *Campylobacter*, *Salmonella*, *Shigella*, and *E. coli* O157.

The expo was a 3-day event consisting of seven different plated and buffet meals, as well as snacks and beverages, all served at the casino. No specific meal or food item was statistically associated with illness; the majority of attendees attended all of the meals and reported eating all of the available foods. However, given the cases' onset of symptoms, the meal served for lunch on Thursday, January 8 was the most plausible source of illness (median incubation period, 33.5 hours; range, 17.5 to 97.5 hours). Thursday's lunch was a plated meal of pork chops, potatoes, seasonal vegetables, house salad, dinner rolls, and apple crisp.

The casino was contacted by Indian Health Services and MDH about the illnesses on January 13. However, the casino did not wish to participate in the investigation. Therefore, MDH was unable to conduct an environmental health assessment of the casino or food worker interviews.

During the investigation, the MDH foodborne illness hotline received two additional complaints of illness from individuals who had attended different conferences at the casino during the same week as the expo. Four of six individuals interviewed had symptoms consistent with norovirus.

This was a foodborne outbreak of norovirus gastroenteritis associated with a casino. A specific food vehicle was not implicated. The meal served for lunch on Thursday, January 8 was the most plausible source of illness. An environmental health assessment of the casino could not be performed due to a lack of cooperation by the casino. However, the additional complaints of illness received by attendees of

other events held at the casino the same week provided additional evidence that the contamination was likely introduced by an employee of the casino rather than an expo attendee.

(3)

Norovirus Gastroenteritis Associated with a Restaurant

January

Hennepin County

On January 16, 2009, the Minnesota Department of Health Foodborne Illness Hotline received three independent complaints of gastrointestinal illness from four persons. The first two complaints mentioned eating at Restaurant A in Minnetonka in the 4 days prior to illness onset. In addition, the second complaint, consisting of two co-workers, and the third complaint also mentioned eating at Restaurant B in Wayzata. An outbreak investigation was initiated on January 22.

All complainants were contacted and interviewed using a standard questionnaire. A case was defined as a person with vomiting or diarrhea (≥ 3 loose stools in a 24-hour period) following a meal at Restaurant A or Restaurant B mentioned in the complaints. A City of Minnetonka (CM) sanitarian visited both restaurants to assess food-handling practices, employee hygiene, and employee illness. Stool samples were collected from ill patrons and restaurant employees and submitted to the MDH Public Health Laboratory (PHL) for viral testing.

All four members of the independent complaints were interviewed, and all met the case definition. Illness onsets occurred on January 14 and January 15. All cases reported vomiting, diarrhea, and cramps, and two reported fever. The first complainant ate at Restaurant A on January 13, and the second complainants (two co-workers) ate there on January 14. The median incubation period for the three complainants who dined at Restaurant A was 14.5 hours (range, 14.5 to 32.5 hours). The two co-workers also consumed food from Restaurant B on January 13, and the third complainant consumed food there on January 14. The median incubation period for the three complainants who dined at Restaurant B, including the two that also dined at Restaurant A was 39 hours (range, 29.5 to 39 hours).

A sanitarian from CM conducted inspections and employee interviews at Restaurant A on January 22 and 23. Sixteen employees were interviewed, and no current or recent gastrointestinal illness was identified. The inspections concluded that hand sinks were equipped and accessible. Handwashing and glove usage was a common practice at Restaurant A, although these practices could be improved.

The same sanitarian conducted inspections and employee interviews at Restaurant B on January 26 and 27. Twenty employees were interviewed, and five reported recent gastrointestinal illness. Illness onsets began on January 9, and three workers reported working while ill. On inspection, the sanitarian noted that none of the hand sinks had paper towels, coffee cups were found in one hand sink, and nail brushes and soap dispensers were soiled. The handle of the ice scoop was in the ice. In addition, pink mold was identified in the ice machine and the ice bin, and the pop spigots, milk dispensers, soft serve spigots and a container of spoons were all soiled. The management did keep an illness log, but did not exclude the employees who reported having the “flu” of which four mentioned having vomiting or diarrhea.

The first complainant who ate at Restaurant A, one of the second complainants who ate at both Restaurant A and B, and two food workers from Restaurant B submitted stool samples to MDH PHL for laboratory testing. All were positive for norovirus. The first complainant who ate at Restaurant B

and one of the Restaurant B food workers had specimens that were positive for norovirus genogroup I. However, nucleic acid sequencing indicated that the norovirus samples differed. The second complainant who ate at Restaurant A and B and the second ill Restaurant B food worker had specimens that were positive for norovirus genogroup II. Nucleic acid sequencing indicated that the norovirus sequences matched by region D but differed by one base pair at a region C.

This was a foodborne outbreak of norovirus gastroenteritis associated with a restaurant in Wayzata. A specific food vehicle was not identified but likely was one or more ready-to-eat food items. The source of the contamination was an ill food worker.

(4)

Norovirus Gastroenteritis Associated with a Restaurant

January

Polk County

On January 23, 2009, the Minnesota Department of Health (MDH) foodborne illness hotline received a complaint of gastrointestinal illness among individuals who ate at a restaurant in Crookston, Minnesota on January 17. The group had come together from various cities in Minnesota and North Dakota for an annual meeting. According to the original complainant, multiple attendees became ill with vomiting and diarrhea following the meeting. The meeting was held in one of the banquet rooms at the restaurant, but foods consumed by attendees were only ordered off the menu. These individuals had no other recent events or meals in common; the majority had come into town strictly for the meeting and left after it had concluded. The MDH Fergus Falls environmental health office was notified, and an outbreak investigation was initiated.

Staff from MDH interviewed meeting attendees to obtain information on food/beverage consumption and illness history. A case was defined as a meeting attendee who subsequently developed vomiting and/or diarrhea (≥ 3 loose stools in a 24-hour period). Stool specimens were obtained from consenting cases and submitted to the MDH Public Health Laboratory (PHL) for bacterial and viral testing.

A sanitarian from MDH visited the restaurant to evaluate food preparation and handling procedures. Contact information for other parties that had dined at the establishment the same day was also collected from the restaurant. MDH staff interviewed the restaurant employees regarding recent illness history and job duties. Food workers reporting recent gastrointestinal illness were also asked to submit stool specimens to MDH PHL for bacterial and viral testing.

Illness histories and exposure information were obtained from 11 of the individuals who attended this event, and seven (64%) met the case definition. Of these, all reported diarrhea, six (86%) cramps, five (71%) vomiting, and five (71%) fever. None of the cases reported bloody diarrhea. The median incubation period from the dinner meal was 49 hours (range, 40 to 57 hours). The median duration of illness for the two cases who had recovered at the time of interview was 67 hours (range, 50 to 85 hours). Stool samples were collected from two of the cases. Both of the samples tested positive for norovirus genogroup II.

Meeting attendees could have consumed food during the lunch hour, during the dinner hour, or both while at the restaurant. Lunch meals would have been ordered from the menu and served to the attendees in the banquet room where the meeting was being held. Six (86%) of the seven cases and two (50%) of

the four controls reported consuming foods from the restaurant for lunch. No foods from the restaurant were provided specifically for the meeting. Dinner meals were once again ordered from the menu, but the meal was consumed by meeting attendees in the main dining hall with other patrons. Seven (100%) cases and one (25%) control reported having dinner at the restaurant ($p = 0.02$). When analyzing menu items, cases were significantly more likely to have consumed any type of salad during the dinner meal than controls (7 of 7 vs. 1 of 4; odds ratio, undefined; $p = 0.02$). This included both items from the self-serve salad bar that was available to all restaurant patrons (5 of 7 cases) and dinner salads plated and served by restaurant staff (2 cases). No other food was statistically associated with illness.

Contact information for another large party that dined at the establishment on the same day was provided to MDH staff. Initial follow-up with the main contact for this party revealed that no one had become ill following the meal at the restaurant. However, upon further inquiry, it was determined that at least one individual in the party had become ill with vomiting and diarrhea starting 29 hours after the meal at the restaurant. This individual's illness was being attributed to another restaurant that he had patronized the day of illness onset, which is why the main contact initially denied illness within her party. The ill individual reported consuming salad from the salad bar among other things at the restaurant. The MDH phone number was obtained by the main contact to distribute to other individuals in the party if further illness was identified; however, no calls were received.

No employee illness was identified during initial contact with the restaurant by the MDH sanitarian on January 23, and no improper food handling practices were observed. Further follow-up with the restaurant revealed that there had been some recent gastrointestinal illness among employees. Employee phone lists were obtained at that time to determine the extent of illness.

Of the 22 employees who were interviewed, three (14%) reported experiencing gastrointestinal symptoms since January 1. One of these employees submitted a stool specimen to the MDH PHL; this specimen tested positive for norovirus genogroup II. Nucleic acid sequencing was conducted on the sample, and the sequence was identical to that identified in the patron samples. Two of the ill employees worked on the implicated meal date, including the employee who tested positive for norovirus. The sanitarian and MDH staff discussed with restaurant staff the importance of handwashing for the prevention of norovirus infection. Additionally, the restaurant was informed that any employee with vomiting and/or diarrhea must be excluded from working for 72 hours after the resolution of symptoms.

This was a foodborne outbreak of norovirus gastroenteritis associated with a restaurant in Crookston, Minnesota. Consumption of salad from the restaurant was statistically associated with illness. The likely source of contamination was one or more infected food workers who had contact with one or more salad ingredients.

(5)

Norovirus Gastroenteritis Associated with a Restaurant

January

Ramsey County

On January 29, 2009, the Minnesota Department of Health (MDH) foodborne illness hotline received a complaint of gastrointestinal illness among multiple individuals who had attended a managers meeting from Tuesday, January 27 to Wednesday, January 28. The complainant reported that the common meal suspected as the source of illness was boxed lunches that had been catered by Restaurant A in St. Paul

on January 27. City of St. Paul Environmental Health was notified, and an outbreak investigation was initiated.

A list of employees was obtained from the original complainant, and staff from MDH interviewed these patrons to obtain information on food/beverage consumption and illness history. A case was defined as a Company A employee who developed vomiting and/or diarrhea (≥ 3 loose stools in a 24-hour period) following the shared meals on January 27 and/or 28. Stool specimens were obtained from two consenting cases and submitted to the MDH Public Health Laboratory (PHL) for bacterial and viral testing.

A sanitarian from City of St. Paul Environmental Health visited Restaurant A to evaluate food preparation and handling procedures, and to begin employee interviews. MDH staff also assisted in interviewing restaurant employees regarding recent illness history and job duties. Contact information for other catered events from the meal date in question was obtained from the restaurant.

Illness histories and exposure information were obtained from 33 meeting attendees. Of these, 21 (64%) met the case definition. Of the cases, all reported diarrhea, 18 (86%) vomiting, 16 (76%) cramps, and 12 (57%) fever. None of the cases reported bloody diarrhea. The median incubation period from the restaurant meal was 43 hours (range, 19 to 55 hours). Only one case had recovered at the time of interview; duration of illness for this individual was 24 hours.

Other foods served during the 2-day meeting included bagels and cream cheese on Tuesday morning, snack foods on Tuesday afternoon, and pizza for lunch on Wednesday. The bagels and cream cheese had come from Restaurant B in Minneapolis. Minneapolis Environmental Health contacted this establishment, and was notified that they had not had any recent employee illness or patron complaints. Of 21 cases, only 14 (67%) reported consuming these breakfast items on Tuesday morning. The snacks available in the afternoon included popcorn and honey roasted and dry peanuts. The snack foods had all been purchased at a grocery store in St. Paul. Of the 21 cases, only seven (33%) reported consuming one of these snack foods, including five who had peanuts and five who had popcorn. The only other shared meal was lunch on Wednesday, January 28. At the time of this meal, however, four cases had already experienced onset of illness. This lunch included four types of pizza from Restaurant C, apples, and cookies. Of the 21 cases, 13 (62%) had pizza, 10 (48%) cookies, and 4 (19%) apples. Also, additional well employees that were not present at the Tuesday meeting ate the lunch on Wednesday.

The boxed lunch meal from Restaurant A on Tuesday, January 27 was the only meal that all cases reported consuming. This included one temporary employee who did not attend the meeting but consumed a left over boxed lunch from the event; this employee became sick with vomiting and diarrhea 30.5 hours after the meal. The food provided by Restaurant A was boxed prior to arriving at the meeting. Food was delivered by the restaurant around 11:30 a.m. Each boxed lunch contained a sandwich (turkey, roast beef, tuna, or veggie), a bag of plain chips, a pickle, and a chocolate chip cookie. No further handling of the food by food workers occurred after the food was delivered to the meeting.

Only one additional party had received catered food from Restaurant A on the same day as the complainants. This party had ordered one 15-piece and one 30-piece platter that included five different sandwich options. This order was picked up at the restaurant around 10:30 a.m. on January 27. The individual listed as the contact for the order was the only person available for interview. The sandwiches had been purchased for an open house real estate event that was open to the public; it was unknown

who would have consumed these items and therefore no list of attendees was available. However, both the individual who had placed the order and her spouse consumed the sandwiches and became ill with diarrhea approximately 8 and 12 hours later, respectively. According to this individual, the duration of diarrhea was approximately 24 hours. Two stool collection kits were sent to these individuals, but neither was returned.

Both stool samples submitted by individuals in the original complainant's group tested positive for norovirus genogroup II. Nucleic acid sequencing was conducted on the samples, and the sequence was identical in both patron samples. No other bacterial or viral pathogen was identified.

When analyzing foods served during the meal from Restaurant A, only consumption of the chocolate chip cookie was statistically associated with illness (19 of 21 vs. 6 of 11; odds ratio, 7.9; 95% confidence interval, 1.2 to 51.8; $p = 0.03$). No other item or ingredient was associated with illness.

Initial contact with the restaurant by City of St. Paul Environmental Health staff revealed that there were no reports of employee illness during this time period. No improper food handling practices were observed by the sanitarian. However, employees are not required to wear gloves while handling ready-to-eat food items. The sanitarian discussed with restaurant staff the importance of handwashing for the prevention of norovirus. The food code requires that employees "Use spatulas, tongs, deli tissue, other utensils or dispensing equipment to limit hand contact with food or ice (MN 4626.0225)." The restaurant management insists that they have an effective handwashing program, and therefore they do not need to wear gloves during food preparation or sandwich assembly. No other utensils are used. City of Saint Paul Environmental Health is working to resolve this ongoing point of contention. Additionally, the restaurant was informed that any employee with vomiting and/or diarrhea must be excluded from working for 72 hours after the resolution of symptoms.

Of the 19 employees, 10 were interviewed by City of St Paul Environmental Health or MDH staff; no employees reported recently experiencing gastrointestinal symptoms or having an ill household member.

This was a foodborne outbreak of norovirus gastroenteritis associated with food catered from Restaurant A. Food from this restaurant was the only meal that all cases had consumed prior to becoming sick, and additional illness was observed in an independent party that had received catered food on the same day. Incubation periods from this meal were characteristic of norovirus. The ultimate source of the outbreak was not determined. However, the most plausible source was an infected food worker who had contact with one or more ready-to-eat food items.

(6)

Suspected Norovirus Gastroenteritis Associated with a Restaurant

January

Dakota County

On January 30, 2009, the Minnesota Department of Health (MDH) foodborne illness hotline received a complaint of illness from a group of four patrons who had a buffet brunch at a restaurant in Inver Grove Heights on January 25. Two members of the party became ill with vomiting and diarrhea after the meal. The two ill patrons had no other meals or exposures in common. They had eaten a variety of food items including French toast, waffles, two types of salad, a variety of fruits, eggs, bacon, and sausage. The

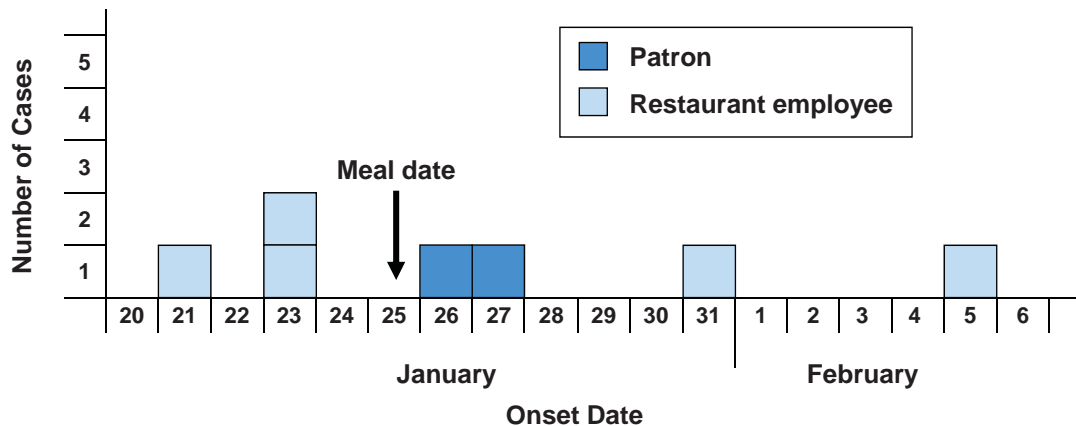
MDH Environmental Health Services (EHS) was contacted and an investigation was initiated on January 30.

A sanitarian from MDH EHS went to the restaurant on January 30 to conduct an environmental investigation and inquire about recent illness among food workers. Employee interviews were conducted by MDH staff beginning on February 2. Contact information for other restaurant patrons was not obtained. A case was defined as a restaurant patron who developed vomiting and/or diarrhea (≥ 3 loose stools in a 24-hour period) within 60 hours of the meal. Stool specimens were requested from cases and food workers who reported recent gastrointestinal illness. An employee sign-in policy was implemented at the restaurant on February 4 after it appeared that transmission was likely ongoing among restaurant employees.

The two ill patrons from the complainant group met the case definition. Both reported diarrhea and vomiting, one reported cramps, and neither reported fever or bloody diarrhea. The incubation periods were 29 and 38 hours, respectively. One of the cases had a duration of illness of 24 hours and the other had not recovered at the time of interview.

During the initial visit to the restaurant, the manager mentioned to the health inspector that he was aware of illness in one employee who had become ill with vomiting at the restaurant on January 23, and then returned to work on January 25. Employee interviews identified four other employees with symptoms of vomiting and/or diarrhea that began between January 21 and February 5 (see epidemic curve). Two additional employees reported mild gastrointestinal symptoms that did not meet the standard case definition.

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



All three restaurant employees with onset dates prior to the implicated meal date had either worked in the restaurant while they were ill or returned to work on the same day they recovered.

Statistical analysis of food items could not be conducted. No stool specimens were submitted by either patrons or foodworkers; however, symptoms and incubation periods were consistent with norovirus gastroenteritis.

This was a foodborne outbreak of suspected norovirus gastroenteritis associated with a restaurant in

Inver Grover Heights. A specific food vehicle was not implicated. However, there was evidence of extensive transmission among restaurant employees, and one employee specifically worked on the implicated meal date immediately following reported recovery from symptoms. Transmission to patrons could have happened from ready-to-eat food items on the buffet or drink garnishes; however this could not be confirmed without additional patron interviews.

(7)

Norovirus Gastroenteritis Associated with a Restaurant

February

Polk County

On February 12, 2009, the Minnesota Department of Health (MDH) foodborne illness hotline received a call from an individual who had dined at a restaurant in Winger, Minnesota on February 8 with 11 other individuals from several other households. The caller reported that she and several other diners had experienced symptoms of gastrointestinal illness after their meal. Sanitarians from MDH Environmental Health Services were notified, and an investigation was initiated.

A list of patrons from February 7 and 8 was obtained from the restaurant. Epidemiologists from MDH interviewed restaurant patrons to obtain information on food/beverage consumption and illness history. A case was defined as a restaurant patron who subsequently developed vomiting and/or diarrhea (≥ 3 loose stools in a 24-hour period). A stool specimen was obtained from one patron and submitted to MDH for bacterial and viral testing.

A sanitarian from MDH Environmental Health Services 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 30 restaurant patrons. Twenty-two (73%) cases were identified. Twenty-one (96%) cases reported diarrhea, 20 (95%) of 21 reported vomiting, 17 (77%) reported cramps, and 6 (29%) of 21 reported fever. The median incubation period was 32 hours (range, 26 to 51 hours). The median duration of illness was 47.5 hours (range, 12 to 71.5 hours) for the eight cases who had recovered at the time of interview. The stool sample tested positive for norovirus genogroup II.

The restaurant offers a variety of plated foods, as well as an extensive salad bar. Consumption of spiral macaroni salad (12 of 19 cases vs. 0 of 7 controls; odds ratio [OR], undefined; $p = 0.006$), olives (10 of 16 cases vs. 0 of 6 controls; OR, undefined; $p = 0.02$), and mushrooms (8 of 15 cases vs. 0 of 6 controls; OR, undefined; $p = 0.05$) were significantly associated with illness; all of these foods were served on the salad bar.

Illness histories and job duty information were obtained from seven employees; four employees reported recently having a gastrointestinal illness. Employees reporting illness performed a number of different job duties at the restaurant, including food preparation.

This was a foodborne outbreak of norovirus gastroenteritis associated with a restaurant. Spiral macaroni salad, olives, and mushrooms from the salad bar were implicated as the vehicles of transmission.

Several ill employees were identified, and one or more of these ill employees likely were responsible for contaminating the food items.

(8)

Norovirus Gastroenteritis Associated with a Wedding Reception

February

Ramsey County

On February 24, 2009, the Minnesota Department of Health (MDH) foodborne illness hotline received a complaint of gastrointestinal illness following a wedding reception held at a hotel in St. Paul on February 21. The original complainant knew of several illnesses among the estimated 100 attendees, with ill individuals reporting symptoms of diarrhea and vomiting that began approximately 30 hours after the event. The reception meal was composed of a self-serve taco bar, with a vegetarian pasta option available upon request. Wedding reception attendees also were provided with appetizers immediately preceding the dinner, including cheese, crackers, salami, spinach dip, bread, vegetables, dip, and fruit. The City of St. Paul Environmental Health was notified, and an investigation was initiated.

A list of attendees with contact information was obtained from the original complainant and the bride and groom, and the hotel provided contact information for the wedding guests who had purchased rooms at the hotel. Staff from MDH interviewed these individuals to obtain information on food/beverage consumption and illness history. A case was defined as a wedding reception attendee who subsequently developed vomiting and/or diarrhea (≥ 3 loose stools in a 24-hour period). Stool specimens were obtained from consenting cases and submitted to the MDH Public Health Laboratory (PHL) for bacterial and viral testing.

A sanitarian from the City of St. Paul contacted the hotel to evaluate food preparation and handling practices, and to begin employee interviews. MDH staff also interviewed the hotel restaurant staff regarding recent illness history and job duties. Food workers reporting recent gastrointestinal illness were also asked to submit stool specimens to MDH PHL for bacterial and viral testing.

Illness histories and exposure information were obtained from 29 wedding reception attendees. Of these, 16 (55%) met the case definition. Among the cases, all reported diarrhea, 15 (94%) cramps, 10 (63%) vomiting, and 7 (50%) of 14 reported fever. None of the cases reported bloody diarrhea, being hospitalized, or visiting a medical provider during their illness. The median incubation period was 31 hours (range, 24 to 51.5 hours). The median duration of illness was 24 hours (range, 7.5 to 81 hours) for the three people who had recovered at the time of interview.

Five wedding reception attendees submitted stool samples to the MDH PHL; of these, four tested positive for norovirus genogroup II.

Consumption of appetizers prior to the reception meal was significantly associated with illness (16 of 16 cases vs. 9 of 13 controls; odds ratio [OR], undefined; $p = 0.03$). Specifically, cases were more likely to have eaten vegetables than controls (13 of 16 cases vs. 4 of 13 controls; OR, 9.8; $p = 0.007$). Of the three vegetables available, carrots and broccoli were each significantly associated with illness (12 of 16 cases vs. 3 of 12 controls; OR, 9.0; $p = 0.01$; and 7 of 15 cases vs. 1 of 13 controls; OR, 10.5; $p = 0.04$,

respectively). No other food items served either with the appetizers or during the reception meal was significantly associated with illness.

Interview revealed that two guests had been ill with gastrointestinal symptoms prior to the reception meal. These two individuals were from the same household, and had onset dates of February 19 and February 21. The individual with the February 21 onset date reported that she had vomited in her hotel room immediately prior to attending the reception meal. She consumed food both from the appetizers and the main meal, but only served herself items from the taco bar. The other ill household member was responsible for serving them both appetizers. A stool sample was submitted from the guest with the February 21 onset date; no viral or bacterial pathogen was isolated from her sample.

The appetizers were prepared and plated by the kitchen staff at the hotel, and brought to the serving location by either the kitchen or wait staff. These items were then self-served by the wedding guests. The reception meal was a self-service taco bar buffet, which included chicken and beef along with a variety of toppings. Two cases at the reception had requested the vegetarian pasta option and would not have had any food from the taco bar buffet. Leftover items from the taco bar reception meal were consumed by some of the hotel staff, but this was not the case for the appetizers.

Initial contact with the hotel by the City of St. Paul Environmental Health staff revealed that there were no reports of employee illness during this time period. The hotel had not received any other patron complaints during this time period. Interviews were conducted with all of the kitchen and wait staff; one employee reported gastrointestinal illness. However, this employee's onset date was similar to the ill wedding reception attendees (February 22). The specimen submitted by this food worker tested positive for norovirus genogroup II. Nucleic acid sequencing was conducted on the sample, and the sequence was identical to that identified in the wedding guests' samples. This employee worked on the night of the implicated wedding reception; her job duties included serving and bussing dishes. The employee reported consuming only chips and bread that evening. The sanitarian and MDH staff discussed with the restaurant staff the importance of handwashing for the prevention of norovirus transmission. Additionally, the restaurant was informed that any employee with vomiting and/or diarrhea must be excluded from working for 72 hours after the resolution of symptoms.

This was a foodborne outbreak of norovirus gastroenteritis associated with a wedding reception held at a hotel in St. Paul. Appetizers, specifically carrots and broccoli, were identified as vehicles. The ultimate source of the outbreak was not determined. However, the most plausible source was an infected guest, but this was not confirmed. Alternatively, the source could have been an unidentified ill or recently ill employee.

(9)

Norovirus Gastroenteritis Associated with a Restaurant

February

St. Louis County

On February 24, 2009, the Minnesota Department of Health (MDH) foodborne illness hotline received two independent complaints of gastrointestinal illness, from a party of four and a party of two, who developed illness following a meal at a restaurant in Duluth on February 19. An investigation was initiated on February 24.

All complainants were contacted and interviewed using a standard questionnaire. A case was defined as a person with vomiting or diarrhea (≥ 3 loose stools in a 24-hour period) following a meal at the restaurant. A MDH sanitarian visited the restaurant to assess food handling practices, employee hygiene, and employee illness. Credit card receipts from February 18-21 were collected. Stool samples were collected from ill patrons and restaurant employees and submitted to the MDH Public Health Laboratory (PHL) for bacterial and viral testing.

Five of the six members of the two complaint groups were interviewed. All five met the case definition. Illness onsets were February 20 and February 21. Four (80%) cases reported diarrhea, four (80%) reported cramps, two (40%) reported vomiting, and two (40%) reported fever. The median incubation period was 40 hours (range, 20 to 46 hours). Six additional patrons were contacted through credit card receipts; all had consumed a meal at the restaurant on February 19. Of these, one became ill with gastrointestinal symptoms on February 23, but reported having an ill child at home with illness onset of February 18.

Cases reported eating fajitas with chicken, vegetables, or shrimp, guacamole, lettuce, sour cream, soda, and chips and salsa. No specific food item was statistically associated with illness.

Forty-seven employees were interviewed. Of these, two employees reported illness and two additional employees reported having ill family members or roommates at home. Illness for the ill employees, family members, and roommates ranged from February 15 to 22. One of the ill employees was the server for one of the initial complainant groups; this server called in sick on February 20. The servers routinely add ice to drinks and put together the chips and salsa. There is an ice scoop for the ice. However, the servers place a paper sheet in the chip basket and then scoop out the chips out of a common chip container, leaving the potential for bare-hand contact.

Three cases, all from the initial complainant group of four, and one ill employee submitted stool samples to MDH for laboratory testing. The case samples were positive for norovirus genogroup II.

This was an outbreak of norovirus gastroenteritis associated with a restaurant in Duluth. The specific food vehicle was not determined but ill employees were identified. Transmission likely occurred through contamination of ready-to-eat food items by an ill employee.

(10)

Norovirus Gastroenteritis Associated with a Restaurant

February

Washington County

On February 23, 2009, the Minnesota Department of Health (MDH) foodborne illness hotline received a complaint of gastrointestinal illness from a person who had eaten at a restaurant in Stillwater on February 19. Washington County Public Health and Environment (WCPHE) was notified. A second complaint about the restaurant was received by WCPHE on February 24, also about a meal on February 19, and an outbreak investigation was initiated. Near the end of the investigation, a third complaint about the restaurant was received by MDH on March 12, regarding a meal on March 8.

WCPHE interviewed the members of the three complainant groups 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). A stool specimen from one of the original complainants was submitted to MDH for bacterial and viral testing.

On February 24, WCPHE conducted an inspection of the restaurant focusing on employee hygiene, food handling, and equipment sanitation. WCPHE staff interviewed 14 employees that worked the dates in question using a standard questionnaire about recent illness history and job duties.

Illness histories and exposure information were obtained from six patrons who dined at the restaurant on February 19. All six cases reported diarrhea and vomiting, five (83%) reported cramps, and three (50%) reported fever. The median incubation period was 37 hours (range, 32 to 65 hours). The median duration of illness was 34 hours (range, 34 to 72 hours; two were still ill when interviewed). The stool sample tested positive for norovirus genogroup II.

Ten of the 11 individuals from the March 8 complainant group were interviewed. Three of the 10 patrons were ill. All three cases reported diarrhea and vomiting. The median incubation period for this group was 37 hours (range, 32 to 65 hours). The median duration of illness was 35 hours (range, 34 to 72 hours).

All cases reported eating a variety of items from the barbeque stir fry and buffet. Statistical analysis was not conducted because a decision was made not to interview more patrons due to the amount of resources needed for the multiple issues within the restaurant.

The environmental health investigation revealed multiple critical violations or non-compliant risk factors: employee illness logs were not being maintained; one kitchen handwash sink was blocked and inaccessible; employees were not washing hands when required or following the proper handwashing procedures; a towel dispenser was not working in the barbeque area; dishwashing machine sanitizer concentration was 0 ppm chlorine; unapproved beverage containers were being used in the work area; an employee was observed eating in the kitchen at a work table; noodles were cooling in large quantities; raw shrimp was located above sauces in one cooler; raw shell eggs were at 71° F on the counter; tofu was at 51° F and noodles were 46° F in the barbeque area cold holding buffet unit; one walk-in cooler was maintaining foods only at 44° F; coleslaw in the salad bar was at 45° F; and soy sauce chicken was at 100° F and egg foo young was at 126° F in the hot buffet units. Written orders were issued to correct these items immediately. The raw shell eggs, tofu, soy sauce chicken and egg foo young were discarded.

Employee health requirements and proper handwashing and disposable glove use were discussed with the management. Employee training in proper handwashing, disposable glove use, personal practices such as eating and beverage consumption in the work areas, and cross-contamination prevention was required. Management was required to check-in, discuss employee health rules, and re-train employees as they arrived to work. Follow-up inspections were conducted by WCPHE throughout the week.

Following receipt of the March 12 complaint, an additional inspection was conducted. During both environmental health field investigations (February 24 and March 12) restaurant employees were interviewed.

A total of 14 employees were interviewed; no one reported illness or illness within their households. During the employee interviews, investigators discussed and emphasized that restaurant employees can not be working while ill with vomiting and/or diarrhea and proper hand washing must be followed.

This was a foodborne outbreak of norovirus gastroenteritis associated with a restaurant. A specific food vehicle or source of contamination was not identified. During the field investigation multiple critical food handling, storage, and preparation violations were recognized. Several of these food preparation violations could have been contributing factors to foodborne illness. No ill food workers, or ill household members of the food workers, were identified during repeated interviews and follow-up inspections with the restaurant.

Buffet style food service is the primary food presentation venue for this restaurant. Buffet food service utensils were changed out twice a day. The restaurant patronage and buffet food service volume is considerable. During times of increased norovirus prevalence, as was the situation for this investigation, it is difficult to rule out norovirus seeding of buffet line food items and food service utensils by patrons.

(11)

Campylobacter jejuni Infections Associated with a Restaurant

February

Dakota County

On February 25, 2009, the Minnesota Department of Health Public Health Laboratory (MDH-PHL) identified six isolates of *Campylobacter jejuni* from residents of Dakota County. Routine interviews of the cases on February 26 revealed that they had all eaten at the same restaurant in Apple Valley in the week prior to illness onset. The MDH Environmental Health Services Section was notified, and an outbreak investigation was initiated on February 26.

All *Campylobacter* 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 *C. jejuni* cases to identify other potential cases associated with eating at the restaurant.

Cases were defined as persons who had *C. jejuni* isolated from stool or who had diarrhea (≥ 3 loose stools in a 24-hour period) and fever or diarrhea lasting >48 hours and who reported eating at the restaurant in Apple Valley in the week prior to onset of symptoms.

On February 27, MDH sanitarians conducted an inspection of the restaurant and interviewed employees. A list of contact information for people who had placed catering orders in February was obtained from the restaurant. Credit card receipts were requested from the restaurant; however, these were never made available to MDH. MDH staff interviewed restaurant patrons obtained from the catering order list and meal companions of cases to obtain information on food/beverage consumption and illness history. An ingredient specific case-control study was conducted. Cases were defined as above. Controls were meal companions of cases and restaurant patrons from the catering order list who did not experience any gastrointestinal symptoms since their meal at the restaurant.

Illness histories and exposure information were obtained from 46 patrons. Eleven (24%) cases were identified. Two people reported illness but did not meet the case definition and thus were excluded from further analysis.

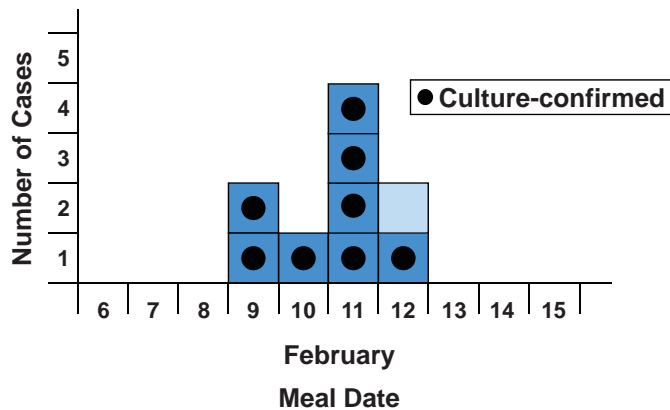
Of the 11 cases, all 11 reported diarrhea, 10 (91%) reported cramps, 10 (91%) reported fever, 7 (64%) reported blood in their stools, and 5 (46%) reported vomiting. Seven (64%) cases were female. The median age of cases was 37 years (range, 21 to 60 years). The median incubation period was 3.75 days (range, 1 to 5.5 days). The median duration of illness was 9 days (range, 5 to 12 days) for the four cases who had recovered at the time of interview. Two (18%) of the patients were hospitalized as a result of their illness, for 2 and 5 days, respectively; one of the cases experienced sequela consistent with Guillain-Barre Syndrome. Ten cases had a stool specimen test positive for *Campylobacter jejuni*; all nine isolates received by the MDH-PHL were indistinguishable by pulsed-field gel electrophoresis (PFGE).

Cases with known meal dates reported eating at the restaurant from February 9 to February 12 (see epidemic curve). Cases reported eating a variety of burritos, including chicken, beef, pork and vegetarian. Consumption of lettuce (11 of 11 cases vs. 23 of 32 controls; odds ratio, undefined; $p = 0.002$) was the only variable significantly associated with illness. Consumption of chicken was not associated with illness (7 of 11 cases vs. 19 of 33 controls).

A food flow of chicken preparation conducted by MDH sanitarians on February 27 found that raw chicken is received from the purveyor and stored in a walk-in cooler before being transported by hand or on a cart to the back prep table. Raw chicken is removed half a case at a time and placed in a large metal mixing bowl. Chicken is then mixed with seasoning for a marinade and mixed using gloved hands. Raw chicken is then transferred to 6-inch full pans, covered, marked with the date, and placed in the walk-in cooler on a lower rack to marinate for 24 hours before cooking. After marinating, raw chicken is removed from the walk-in cooler and placed on the lower shelf of an undercounter cooler on the cook line. The pan is placed on a cart and chicken is transferred to the char grill for cooking. When the cook determines the chicken is done, cooked chicken is placed in a covered pan on the front prep table; the temperature of chicken is only taken according to predetermined times on a temperature log. Cooked chicken is then cut into pieces on a cutting board on the front prep table before being transferred to a hot table to be held until it is needed for service.

An environmental health assessment of the restaurant on February 27 revealed several deficiencies and possible routes of cross-contamination. There was no designation between cutting boards used for chicken coming off of the grill and ready-to-eat foods. Also, ready-to-eat salsas, guacamole, and lettuce were prepared using the same metal mixing bowls as were used for raw chicken. Chicken coming off the charcoal broiler was temped between 144° F and 163° F. Other deficiencies noted during the environmental health assessment included using the same prep table for preparing raw food (including

Outbreak of *Campylobacteriosis* Associated with a Restaurant by Meal Date*



* One case did not remember their meal date

raw chicken) and then ready-to-eat food items (e.g., lettuce) without sanitizing between tasks, and failing to immerse food contact equipment in sanitizer solution for the appropriate length of time. An MDH sanitarian visited the restaurant on March 30 to review lettuce preparation procedures. Possible routes of cross-contamination observed included: cutting the lettuce on the same table as chicken; using the same 6-inch pans for lettuce as for raw chicken; and storing dirty dishes on the drain board and in the prep sink where lettuce is washed. Dirty dishes on the drain board and in the prep sink included dishes that had held chicken.

An MDH sanitarian visited the restaurant again on April 3 to review food preparation procedures after an additional *Campylobacter jejuni* case reported through routine surveillance reported eating at the restaurant in Apple Valley in the week prior to illness onset. At this time five major areas of concern were identified and several recommendations were issued. Recommendations included: install a produce-only prep sink, in which case all produce preparation could then be removed from the front line; review proper wash/rinse/sanitize procedures with all staff; either consider rags used under cutting boards contaminated after a single use or check into other anti-slippage methods for cutting boards; and dedicate bowls and pans for certain items.

This was a foodborne outbreak of *Campylobacter jejuni* infections associated with a restaurant in Apple Valley. Lettuce was implicated as the vehicle of transmission. The lettuce was most likely cross-contaminated by raw or undercooked chicken. As a result of the outbreak the restaurant installed a prep table exclusively for raw meat preparation and a produce-only prep sink.

(12)

Salmonella Saintpaul Infections Associated with Raw Alfalfa Sprouts

February-April

Multiple counties/Multiple states

On February 26, 2009, the Nebraska Department of Health and Human Services notified public health officials in other states of an investigation into an outbreak of salmonellosis associated with consumption of raw alfalfa sprouts. This notification followed a case-control study conducted in Nebraska and

Iowa in response to a recent increase in *Salmonella* Saintpaul infections of a specific pulsed-field gel electrophoresis (PFGE) subtype. The subtype was designated by the Centers for Disease Control and Prevention (CDC) as JN6X01.0072. The Minnesota pattern designation for this subtype was STP55. In this study, the only food item that was significantly associated with illness in a multivariate analysis was alfalfa sprouts (MMWR vol. 58, no. 18:500-3).

At the time of this notification, there was one Minnesota resident with confirmed *S. Saintpaul* STP55 infection. This case was travelling in Nebraska during his exposure time period. A case outbreak interview form was completed for this case, and the Nebraska Department of Health and Human Services was notified.

From April 6 through April 24, the Minnesota Department of Health (MDH) Public Health Laboratory (PHL) received four clinical *S. Saintpaul* STP55 isolates through routine surveillance. Routine interviews of the cases conducted by MDH revealed that three cases may have had consumed sprouts in the week prior to illness onset. The Minnesota Department of Agriculture (MDA) was notified and an investigation was initiated.

All *Salmonella* cases reported to MDH are routinely interviewed about exposures and food consumption at home and at restaurants as part of foodborne disease surveillance in Minnesota. Epidemiologists reviewed the information gathered during the interviews of *S. Saintpaul* cases to identify other potential cases associated with this outbreak. *S. Saintpaul* cases were asked specifically about consumption of sprouts as well as about dining at facilities that commonly serve this item.

Confirmed cases were defined as persons from whom *S. Saintpaul* STP55 was isolated and who had illness onset after February 1, 2009. Invoices for sprout products consumed by cases were collected by MDA. Environmental and food samples from identified suppliers/growers were also collected by MDA staff and submitted to the MDA laboratory for testing.

Overall, there were five culture-confirmed *S. Saintpaul* STP55 cases identified in Minnesota in the outbreak. Of the five, one (20%) was hospitalized. The specimen source was stool for four (80%) and urine for one (20%). The median age was 30 years (range, 21 to 34 years), and three (60%) were male. Onset dates ranged from February 27 to April 14, 2008. The median duration of illness was 10 days (range, 7 to 14 days) for the three cases who had recovered at the time of interview.

Of the five total cases, four (80%) could be associated with consumption of alfalfa sprouts, include the initial case who had traveled to Nebraska during the exposure time period. The three cases identified following the recall all reported eating, or possibly eating, sprouts purchased from local grocery stores. One of these three cases had strictly consumed prepackaged sprouts, whereas the other two had prepackaged sprout mixes that also contained radishes. The sprout mixes reported by two cases were purchased from the same grocery store chain.

Invoices collected by MDA from the three grocery stores were reviewed to determine the origin of the products. These records revealed that the sprouts had all come from the same grower in Minnesota. Contact with the grower revealed that the sprouts supplied to these establishments had all come from the same seed lot number as seeds used in the implicated sprouting facility in Nebraska. The lot number, which began with "032", was also the source of sprouts for *S. Saintpaul* cases with indistinguishable PFGE patterns in other states.

Alfalfa sprouts and environmental samples were collected from the grower in Minnesota by MDA during their inspection of the facility for the outbreak investigation. Because of the inherent delay in the investigation process, the product collected from the grower was not the same product that would have been consumed by cases. No product from seed lots beginning with “032” was leftover for testing. No pathogens were identified in the sprouts or environmental samples collected from this grower.

On May 1, 2009, FDA announced that the sprouting facility in Nebraska was removing all alfalfa sprouts from seed lot numbers that began with “032” from the market. The outbreak strain of *S. Saintpaul* was identified in irrigation water from a sprout grower in Wisconsin that had grown seed from a lot that began with “032”. Enhanced testing of implicated product that occurred nationwide as a result of this investigation identified other PFGE subtypes of *S. Saintpaul* as well as other *Salmonella* serotypes in alfalfa sprouts. There was one additional case in Minnesota that was found to have a PFGE pattern of *S. Typhimurium* that was indistinguishable from a strain identified in sprouts collected from a restaurant in Nebraska in February. However, this case did not report consumption of any sprouts. As of May 7, 2009, there were 228 cases of *S. Saintpaul* with the outbreak strain PFGE patterns identified in 13 states nationwide (MMWR vol. 58, no. 18:500-3).

Five *S. Saintpaul* STP55 cases occurred in Minnesota as part of a large nationwide outbreak associated with raw alfalfa sprouts. The alfalfa sprouts were traced back to seed from a single distributor in Kentucky by the Minnesota Department of Agriculture, and were determined to have originated from seeds with a lot code beginning with “032”. Cases with indistinguishable PFGE patterns from other states had also reported consuming sprouts grown from the same seed lots. The outbreak strain of *S. Saintpaul* as well as additional PFGE patterns and serotypes of *Salmonella* were eventually identified in alfalfa sprouts and sprout production facilities around the country.

(13)

***Salmonella* Carrau Infections Associated with Melon**

February-March

Multiple counties/Multiple states

On April 6, 2009, the Minnesota Department of Health (MDH) Public Health Laboratory (PHL) identified a clinical *Salmonella* Carrau isolate that was indistinguishable by pulsed-field gel electrophoresis (PFGE) (Minnesota pattern designation CAR1) from clinical isolates in other states and Canada. At the time the Minnesota case was identified, the Centers for Disease Control and Prevention (CDC) had been working with 17 states in the investigation of 30 matching isolates. The multi-state investigation had started in March and was on-going. An investigation of the Minnesota case was initiated in collaboration with the multi-state investigation.

In Minnesota, cases were identified through routine laboratory surveillance and were defined as Minnesota residents with culture-confirmed *S. Carrau* with PFGE subtype CAR1.

Phone interviews regarding illness history and potential exposures were conducted for all cases. Questionnaires developed by CDC were used in addition to the Minnesota routine surveillance form.

CDC coordinated a multi-state case-control study. Only cases with specimen collection dates from February 1 to March 26 were included. Three controls per case were enrolled. Controls were recruited

using phone lists generated using a reverse-directory of addresses in the vicinity of the cases' home. Controls were matched to cases by age group (less than 3 years, 3 to 10 years, 11 to 18 years, 19 to 39 years, 40 to 65 years, more than 65 years). Cases and controls were interviewed using a standard questionnaire.

The Minnesota Department of Agriculture (MDA) conducted traceback investigations of food items of interest, to determine the source of those food items and to identify common sources of foods consumed by the Minnesota cases and cases in other states.

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

Two cases with *S. Carrau* CAR1 isolates were identified in Minnesota. Dates of illness onset were March 26 and April 10. One (50%) case was female. The ages of the cases were 3 and 56 years. Both cases had diarrhea, blood in the stool and cramps, and one (50%) case had fever. One case had an illness duration of 5 days; the other case was still recovering at the time of the interview, 14 days after onset of diarrhea. Neither case was hospitalized.

Nationally, 52 cases with *S. Carrau* isolates that matched the outbreak PFGE subtype were reported from 18 states: Arizona, California, Colorado, Illinois, Massachusetts, Maine, Minnesota, Missouri, New Hampshire, New Jersey, New Mexico, New York, Oregon, Pennsylvania, Tennessee, Texas, Virginia, and Wisconsin. Illness onsets ranged from February to April. The median age of cases was 21 years (range, 11 months to 93 years), and 83% were female. Four (8%) cases were hospitalized, and one died. Twenty-eight additional *S. Carrau* cases of the outbreak PFGE pattern were reported in Canada.

The multi-state case-control study was initiated on April 9 and included questions on more than 40 food items, including fruits, produce, meats, and other food items. At the time the study was conducted, only one case had been identified in Minnesota. That case and three controls from Minnesota were included in the multi-state study. Thirty cases and 75 controls were included in the multi-state case-control study. In a matched analysis, eating cantaloupe (18 of 30 cases vs. 15 of 75 controls; matched odds ratio [mOR], 9.7; 95% confidence interval [CI], 3.5 to 29.3), honeydew (17 of 30 cases vs. 10 of 75 controls; mOR 9.6; 95% CI, 3.5 to 28.6), or watermelon (11 of 30 cases vs. 5 of 75 controls; mOR, 9.3; 95% CI, 2.7 to 38.4) were associated with illness. None of the three types of melon were independently associated with illness on a multivariate analysis.

Both of the Minnesota cases reported consumption of melon in the week prior to their illness onset. One case had mixed fruit that contained cantaloupe and honeydew melon purchased at a local grocery store, as well as a half a cantaloupe purchased at the same store. The other case had a mixed fruit cup that contained cantaloupe and honeydew melon purchased at a convenience store. The MDA traced back all the melon eaten by both cases. A common distributor of cantaloupe from Honduras was identified in both traceback investigations. Additionally, that same distributor was identified in the traceback of one case from Wisconsin. However, traceback of other cases in Wisconsin did not identify the same distributor. This information was shared with the CDC and FDA; however, it was not considered sufficiently strong evidence to pursue this finding.

This was an international outbreak of *S. Carrau* infections associated with consumption of melon. The information from the traceback investigation suggest that cantaloupe from Honduras was likely the

vehicle for the Minnesota cases; however, consumption of honeydew melon could not be ruled out.

(14)

Norovirus Gastroenteritis Associated with a Restaurant

April

Hennepin County

On April 14, 2009, the Minnesota Department of Health (MDH) foodborne illness hotline received complaints of illness from two households who had eaten at a restaurant in Eden Prairie, Minnesota on April 9. MDH notified Hennepin County Public Health Protection (HCPHP) staff of each of these complaints, and an investigation was initiated.

On April 14 and 15, 2009, HCPHP environmentalists conducted an inspection of the restaurant, focusing on food preparation practices and employee health and hygiene. Restaurant employees on duty were interviewed onsite regarding their job duties and illness history. An employee contact list and a work schedule were provided by the restaurant so that additional employees could be interviewed via telephone. Names of patrons from April 9 were obtained from the restaurant. HCPHP epidemiologists called patrons to ascertain illness history and food consumption at the restaurant.

A case was defined as a person who had vomiting and/or diarrhea (≥ 3 loose stools in a 24-hour period) with an incubation up to 60 hours after eating at the restaurant on April 9. Stool specimens from four patrons were submitted to the MDH Public Health Laboratory for bacterial and viral testing.

Thirty-four patrons were interviewed who had eaten at the restaurant on April 9. Ten (29%) patrons met the case definition. Of the 10 cases, all had diarrhea, 9 (90%) had vomiting and cramps, and 4 (40%) reported fever. The median incubation for cases was 32 hours (range, 6.5 to 39.5 hours). The median duration of illness was 63.5 hours (range, 12 to 98 hours).

Stool specimens from the four patrons tested negative for *Campylobacter*, *E. coli* O157, *Salmonella*, *Shigella*, and *Yersinia*. Two stool specimens tested positive for norovirus; nucleic acid sequence for the viral samples were identical.

Statistical analysis was not done on any food items. Seven of the patrons had eaten lunch and three ate in the evening. Six patrons had a variety of sandwiches; three had salads, several of the patrons shared appetizers with others in their group.

Of the 44 restaurant employees who worked on April 9, 41 (93%) were interviewed. Three of the employees reported having had gastrointestinal illness. Two of the employees had onset of illness on April 8 and April 9 and worked while have symptoms on April 9. The third employee had had illness the last week of March but had family members with illness at the beginning of April. Unfortunately none of the employees submitted a stool specimen for analysis. No violations were found on the April 16 visit.

This was an outbreak of norovirus gastroenteritis associated with a restaurant. The most likely source of the outbreak was an employee(s) who worked while having symptoms. Many of the food items consumed by the ill patrons were cold salad items, sandwiches and appetizers which could have been contaminated by the ill food workers.

(15)

Norovirus Gastroenteritis Associated with a Restaurant

April

Ramsey County

On April 27, 2009, the Minnesota Department of Health (MDH) foodborne illness hotline received a complaint of gastrointestinal illness among patrons who held a meeting with food catered by a restaurant in St. Paul, Minnesota on April 24. City of St. Paul environmental health officers were notified and an investigation was initiated immediately. On April 30, an additional complaint was received from a party of two who also ate at the restaurant on April 24. These complainants were not attendees of the catered meeting that started the investigation.

MDH staff interviewed complainants and their meal companions about food consumption and illness history. A case was defined as any person who ate at the restaurant and subsequently developed vomiting and/or diarrhea (≥ 3 loose stools in a 24-hour period). Four stool kits were sent to complainants. Returned kits were tested for bacterial and viral pathogens at the MDH Public Health Laboratory.

St. Paul environmentalists conducted an environmental health assessment at the restaurant. The manager of the establishment was asked about employee illness since April 1, staff at the restaurant were interviewed, and food preparation practices were observed and discussed.

Twenty-two patrons were reached for interview, and 17 (77%) met the case definition. Fourteen (83%) cases reported diarrhea, 12 (70%) reported cramps, 11 (64%) reported vomiting, and 9 (53%) reported fever. No cases reported bloody stools. The median incubation period was 38 hours (range, 20 to 68 hours). The median duration of illness was 18.5 hours (range, 2 to 59 hours). Four patrons submitted stool samples; all tested positive for norovirus (genotype I.4) with matching nucleic acid sequences (C10, D25).

Patrons ate a variety of sandwiches, all with similar toppings (e.g., lettuce, tomato, deli meats). No single food item was statistically associated with illness.

None of the employees at the restaurant reported illness in the month prior to patron illness; however the manager reported illness onset on April 26 and had done food preparation on April 24. All staff were educated on the importance of handwashing and the proper use of tongs or gloves when possible. Staff were not wearing gloves to handle ready-to-eat foods, were wearing multiple rings on their hands, and were observed not washing their hands prior to food prep work. Management and staff were also educated on the importance of excluding ill food workers and the possibility of transmission of illness from food workers to patrons. The restaurant did not have an employee illness log.

This was an outbreak of norovirus gastroenteritis associated with a restaurant in St. Paul. The vehicle and source of contamination were not identified, though observation at the restaurant suggested that food workers were the most likely source of contamination.

(16)

Norovirus Gastroenteritis Associated with a Restaurant

April

Dakota County

On April 9, 2009, the Minnesota Department of Health (MDH) foodborne illness hotline received a complaint of gastrointestinal illness among co-workers who all ate sandwiches delivered by a restaurant in Apple Valley on April 7. According to the complainant, about half of the 30 people who ate sandwiches later became ill with diarrhea and vomiting. Both turkey and ham sandwiches with lettuce, tomato, and mayonnaise were delivered by the restaurant. No other common food items were available during the meal. A second independent complaint of illness was received on April 9 from two patrons who had also eaten at the restaurant on April 7 and had no other recent meals in common; both ate vegetarian subs and later became ill with vomiting (one also developed diarrhea). MDH Environmental Health Services (EHS) was contacted and an outbreak investigation was initiated in April 9. On April 10, a third independent complaint of illness was received from a patron who had eaten a turkey sub from the restaurant on April 7 and later developed vomiting and diarrhea.

A list of contact information for co-workers from the first complainant group was provided to MDH. In addition, a list of customers who had sandwiches delivered on April 6 was obtained from the restaurant. Staff from MDH contacted individuals from the first complainant group as well as a random selection of delivery customers from April 6 to obtain information about food and beverage consumption and illness history. A case was defined as a patron of the restaurant who developed vomiting and/or diarrhea (≥ 3 loose stools in a 24-hour period) within 60 hours of eating food from the restaurant. Stool specimens were obtained from consenting cases and submitted to the MDH Public Health Laboratory (PHL) for bacterial and viral testing.

A sanitarian from MDH EHS visited the restaurant to evaluate food preparation and handling procedures and to conduct employee interviews. Food workers who reported recent gastrointestinal symptoms were also asked to submit stool specimens to the MDH PHL for bacterial and viral testing.

Illness histories and exposure information were obtained from 27 restaurant patrons and 15 (56%) met the case definition. Ten of the cases were associated with the first complainant group, three cases were associated with the second and third complainant groups, and two cases were associated with the list of delivery customers. Two people reported mild gastrointestinal symptoms that did not meet the case definition and were excluded from further analysis. Thirteen cases ate food from the restaurant on April 7, one ate food from the restaurant on April 6, and one ate food from the restaurant on both days. Among the cases, 14 (93%) reported diarrhea, 13 (87%) reported cramps, 11 (73%) reported vomiting, and 6 (67%) of 9 reported fever. The median incubation period was 30 hours (range, 16 to 34 hours). The incubation period could not be assessed for the patron case who ate at the restaurant on both April 6 and April 7. Duration of illness information was only available for three cases; the duration of illness for each of those three cases was 41, 48, and 48 hours, respectively. Four stool samples were collected from cases; all were positive for norovirus genogroup II.

Ten controls were recruited; six were from the original complainant group, and four were from the delivery list. Meaningful ingredient-specific analysis could not be performed because all the cases and controls from the first complainant group ate one of two sandwich types with the same toppings.

The restaurant inspection conducted by MDH EHS on April 9 indicated there were temperature violations on the sandwich preparation table, the restaurant was not sanitizing cutting boards every 4 hours, and an employee illness log was not being maintained.

Illness histories and job duty information were obtained from all 18 restaurant employees. Three employees reported recent symptoms of gastrointestinal illness. Employee 1 reported onset of vomiting at work in the evening on April 7. Employee 1 did not work on April 8 or April 9. Employee 2 reported onset of diarrhea and vomiting at work in the evening on April 8 (and was excluded from work until 72 hours after recovery). Employee 3 reported onset of vomiting in the morning on April 10 and was also excluded for 72 hours after recovery. Only Employee 3 reported work duties that included regularly preparing ingredients and sandwiches, although Employees 1 and 2 reported occasionally helping to prepare or wrap sandwiches. Employee 2 submitted a stool specimen which was positive for norovirus genogroup II. Nucleic acid sequencing performed on the specimens from the four positive patrons and one positive employee indicated that the sequences were all identical.

This was a foodborne outbreak of norovirus gastroenteritis associated with a restaurant in Apple Valley. A specific sandwich ingredient was not implicated; however, transmission likely occurred through one or more of the ready-to-eat sandwich toppings. Several ill employees were identified, including one from whom the outbreak strain of norovirus was recovered. These illnesses suggest norovirus transmission among the food workers, who were likely the ultimate source of contamination. Although none of the ill employees reported an onset date prior to the meal date of the cases, one employee reported an onset date on April 7 (the same day that most of the identified cases ate food from the restaurant). Earlier transmission could have been due to unidentified illness in another food worker.

(17)

***Salmonella* Cubana Infections Associated with Raw Sprouts**

April-August

Multiple counties/Multiple countries

On August 9, 2009, the Canadian Food Inspection Agency issued an alert warning the public to avoid consuming Brand X raw onion sprouts and onion/alfalfa sprout mixes due to potential *Salmonella* contamination. The advisory coincided with a voluntary recall of the product, which reportedly had only been distributed in Canada. Cases in Canada had onsets from April to August 2009. Staff at the Minnesota Department of Health (MDH) was made aware of this recall and the associated serotype and pulsed-field gel electrophoresis (PFGE) subtype on August 20. The serotype identified both in sprouts and Canadian residents was Cubana, and the subtype was designated by the Centers for Disease Control and Prevention (CDC) as JDGX01.0072. The Minnesota pattern designation for this subtype was CUB4. *Salmonella* Cubana had only been seen in 11 cases in Minnesota since 1995, and this was a novel PFGE subtype. At the time that MDH became aware of this investigation, there were two Minnesota residents since the beginning of 2009 who had confirmed *S. Cubana* CUB4 infection. The onset dates for the two cases were April 27 and August 12, respectively. Routine interviews of the cases conducted by MDH revealed that both cases had consumed sprouts in the week prior to illness onset. The Minnesota Department of Agriculture (MDA) was notified and an investigation was initiated.

All *Salmonella* cases reported to MDH are routinely interviewed about exposures and food consumption at home and at restaurants as part of foodborne disease surveillance in Minnesota. All *Salmonella* cases, including *S. Cubana* cases, are specifically asked about consumption of sprouts, including information about variety, brand, and purchase location.

Confirmed cases were defined as persons from whom *S. Cubana* CUB4 was isolated and who had illness onset after January 1, 2009. Invoices for sprout products consumed by cases were collected by MDA.

Environmental and food samples from identified suppliers/growers were also collected by MDA staff and submitted to the MDA laboratory for testing.

Overall, the two aforementioned cases were the only culture-confirmed *S. Cubana* CUB4 cases identified in Minnesota in the outbreak. Neither case was hospitalized. The specimen source was stool for one and urine for the other, but both cases reported experiencing diarrhea. Both cases were female, and their ages were 44 and 62 years, respectively.

The two cases reported eating the same brand of sprouts purchased from different grocery store chains in different cities. The case with the earlier onset report consuming alfalfa, onion, and garlic sprouts, and the case with the later onset reported consuming alfalfa, radish, onion, and broccoli sprouts.

Invoices collected by MDA from the two grocery stores were reviewed to determine the origin of the products. These records revealed that the sprouts had come from the same grower in Minnesota. Contact with the grower revealed this establishment had received onion seeds from the same lot that the implicated sprouting facilities in Canada received. This Canadian product had yielded PFGE patterns of *S. Cubana* that were indistinguishable from *S. Cubana* isolates from the two Minnesota cases and the 14 cases in Canada.

Various sprouts, seeds, and environmental samples were collected from the Minnesota grower by MDA and the United States Food and Drug Administration during their inspection of the facility for the outbreak investigation. Because of the inherent delay in the investigation process, no product from the aforementioned lot was left over for testing. No pathogens were identified in the sprouts, seeds, or environmental samples collected from this grower.

Seeds used in the production of the implicated sprouts in Canada were traced back to a distributor in Tennessee. The Minnesota grower which supplied the sprouts purchased by the Minnesota cases had received the recalled lot of onion seeds from this distributor as well.

Two *S. Cubana* CUB4 cases occurred in Minnesota as part of a larger outbreak associated with raw sprouts. The outbreak strain of *S. Cubana* was initially identified in onion and onion/alfalfa sprout mixes in Canada.

(18)

***Escherichia coli* O157:H7 Infections Associated with Pre-packaged Salad**

April

Multiple counties/Multiple states

On May 6, 2009, the Minnesota Department of Health was contacted by an epidemiologist in the Wisconsin Division of Public Health (WDPH) about a clinical *Escherichia coli* O157:H7 isolate from a Minnesota resident that was indistinguishable by pulsed-field gel electrophoresis (PFGE) (2-enzyme Minnesota pattern designation MN664ECB230, a rare pattern) from a cluster of five clinical case isolates being investigated in Wisconsin. An investigation of the Minnesota case was initiated.

In Minnesota, a case was defined as a Minnesota resident with culture-confirmed *E. coli* O157:H7 with PFGE subtype MN664ECB230. The case isolate were submitted to the Centers for Disease Control and Prevention (CDC) for subtyping using multiple-locus variable-number tandem repeat analysis (MLVA).

The case was interviewed by phone regarding illness history and potential exposures. Questionnaires developed by WDPH were used in addition to the Minnesota routine surveillance form.

A multi-state case-control study was conducted. Two controls per case were enrolled. Controls were recruited using phone lists generated using a reverse-directory of addresses in the vicinity of the cases' home. Controls were matched to cases by age group (within 2 years if the case was <10 years of age, within 5 years if the case was >10 to <25 years of age, and within 10 years if the case was ≥25 years of age). Cases and controls were interviewed using a standard questionnaire.

The Minnesota Department of Agriculture (MDA) conducted a traceback investigation of food items of interest, to determine the source of those food items. Information collected from the case interview and tracebacks was shared with the CDC and the U.S. Food and Drug Administration (FDA).

One case with *E. coli* O157:H7 MN664ECB230 isolate was identified in Minnesota. The isolate's MLVA pattern matched the main outbreak MLVA pattern. The case was a 16-year old female with illness onset on April 26. The case had diarrhea, blood in the stool, and cramps. The case has an illness duration of 3 days and was not hospitalized.

Nationally, a total of 15 cases with isolates that matched the outbreak PFGE subtype were identified. In addition to the Minnesota case, nine cases were reported from Wisconsin, three from Illinois, and two from Missouri. Illness onsets ranged from April 24 to May 6. The median age of cases was 21 years (range, 9 to 53 years), and 80% were female. Nine (60%) cases were hospitalized, two developed hemolytic uremic syndrome, and none died.

The multi-state case-control study included questions on meats, leafy greens, and specific brands and varieties of pre-packaged salads. Twelve cases and 23 controls were included in the study. In an unmatched univariate analysis, eating Brand X pre-packaged salad (8 of 11 cases vs. 4 of 17 controls; odds ratio [OR] 11.3; 95% confidence interval [CI], 2.03 to 63.1; $p = 0.002$), and eating any pre-packaged lettuce or leafy greens (8 of 11 cases vs. 8 of 22 controls; OR, 4.75; 95% CI, 0.82 to 27.2; $p = 0.05$) were associated with illness. In a matched analysis, eating Brand X of pre-packaged salad (matched OR, 12.0; 95% CI, 1.30 to 110.3) was the only food associated with illness.

The Minnesota cases reported consumption of lettuce at a restaurant and at a school cafeteria. The MDA traced back all the lettuce eaten by the case. However, Brand X was not among the brands of lettuce in the exposures reported by the case. The traceback investigation did not identify a common lettuce source with cases in Wisconsin. Identification of the initial source of contaminated lettuce was not possible from traceback investigations of lettuce conducted in other states.

This was a multi-state outbreak of *E. coli* O157:H7 MN664ECB230 infections. Illness was statistically associated with consumption of Brand X pre-packaged salad. One case associated with this outbreak was identified in Minnesota. Although the case did not specifically report eating Brand X of prepackaged lettuce, the case did report eating lettuce at multiple venues.

(19)

Norovirus Gastroenteritis Associated with a Private Birthday Party

On May 21, 2009, the Minnesota Department of Health (MDH) foodborne illness hotline received a complaint regarding illness following a birthday party held at a private home in Lexington, Minnesota on May 17. The complainant was calling regarding frozen hamburger patties purchased at a warehouse store in Fridley and served at the gathering. The complainant denied personal illness but reported that the majority of 15 attendees were ill with vomiting and diarrhea. Other foods served at this event included hot dogs, buns, potato salad, baked beans, ketchup, mustard, pickles, tomatoes, onions, relish, chips, dip, cake, and ice cream. All foods were supplied by private parties, with the potato salad and cake reported as the only homemade items.

A list of party attendees and contact information was received from the original complainant, and MDH staff interviewed attendees regarding food/beverage consumption and illness history. A case was defined as an individual who consumed food served at the birthday party and subsequently developed vomiting and/or diarrhea (≥ 3 loose stools in a 24-hour period). Stool specimens were obtained from two consenting cases and submitted to the MDH Public Health Laboratory (PHL) for bacterial and viral testing.

Of 15 cases interviewed, 11 (79%) met the case definition. One individual reported illness but did not meet the case definition, and thus was excluded from further analysis. Among the cases, 7 (64%) reported diarrhea, 7 (64%) vomiting, 4 of 7 (57%) abdominal cramps, and 2 of 10 (20%) fever. The median incubation period was 34.5 hours (range, 18 to 61.5 hours). The median illness duration was 19 hours (range, 12 to 22 hours) for the 3 cases who had recovered at the time of interview. Only one of the two stool specimens returned was suitable for testing. This specimen tested positive for norovirus genogroup II. No other bacterial or viral pathogen was identified.

Consumption of potato salad was the only item significantly associated with illness (10 of 10 exposed vs. 1 of 4 not exposed; relative risk, 4.0; $p = 0.01$). This item was prepared by the original complainant, who did not report illness in her or in her household members prior to this event. However, upon notifying the positive attendee of the testing results, she informed us that she had heard another guest had been ill in the week before this party. However, this information was not corroborated through interviews conducted by MDH.

This was a foodborne outbreak of norovirus gastroenteritis associated with a private birthday party. Potato salad was significantly associated with illness, but the source of contamination was not identified. However, the potato salad was likely contaminated by a guest who was infected prior to this event, either during preparation or serving.

(20)

***E. coli* O157:H7 Infections Associated with Cookie Dough**

May

Multiple counties/Multiple states

On May 18, 2009, the Minnesota Department of Health (MDH) Public Health Laboratory (PHL) identified two *Escherichia coli* O157:H7 isolates indistinguishable by pulsed-field gel electrophoresis (PFGE) with two enzymes (Minnesota pattern designation MN41ECB10). There were 15 recent isolates in 12 other states that matched by PFGE; however, the PFGE pattern is common. An investigation of

the Minnesota cases was initiated. On May 22, the Centers for Disease Control and Prevention (CDC) notified the states that the number of matching isolates had increased to 23 matches in 15 states. A multi-state investigation was initiated.

In Minnesota, cases were identified through routine laboratory surveillance and were defined as Minnesota residents with laboratory-confirmed *E. coli* O157 infection with PFGE subtype MN41ECB10. Case isolates were submitted to the CDC for subtyping using multiple-locus variable-number tandem repeat analysis (MLVA).

Phone interviews regarding illness history and potential exposures were conducted for all cases. Questionnaires developed by CDC were used in addition to the Minnesota routine surveillance form. CDC conducted open-ended hypothesis generating interviews of cases in other states.

MDH conducted a case-control study that included three cases and three age-matched controls. Controls were identified from historically reported cases of enteric infections other than *E. coli* O157 in the same county as the case. That study was stopped when CDC coordinated a multi-state case-control study. In the multi-state study, one control per case was enrolled. Controls were also identified from historically reported cases of enteric infections other than *E. coli* O157 who lived in the same county as the case, and who did not report a recent history of international travel. Controls were matched to cases by age group. Cases and controls were interviewed using a standard questionnaire.

The Minnesota Department of Agriculture (MDA) collected one open product sample from a case-household and seven unopened product samples from grocery stores and tested them for Shiga toxin-producing *E. coli*.

The United States Food and Drug Administration (FDA) conducted an investigation of the plant that produced the implicated product and conducted testing of product held at the plant. Warnings to the public about not eating the implicated product were released by the FDA, CDC, and MDH/MDA on June 19.

Seven cases with *E. coli* O157 MN41ECB10 isolates were identified in Minnesota. Six (86%) of the isolates had identical MLVA patterns that matched the main outbreak MLVA pattern, and one (14%) was closely related, differing at only one of seven alleles. Dates of illness onset ranged from May 3 to June 29, 2009. Five (71%) cases were female. The median age of cases was 10 years (range, 2 to 19 years). All seven cases reported diarrhea, six (86%) had blood in their stool, two (29%) had fever, and two (29%) had vomiting. The median duration of illness was 5 days (range, 3 to 16 days). One (14%) case was hospitalized for 7 days, none developed hemolytic uremic syndrome (HUS) and none died. The seven cases lived in six separate households (two were siblings). The two siblings in the same household had onset of illness 11 days apart; 4 days prior to the onset of the first ill sibling they both had played in a kiddie pool with a case who had onset of illness 12 days earlier. Therefore, one or both siblings may have been secondary cases.

According to the CDC, a total of 77 cases with isolates that matched the outbreak strain by PFGE were reported from 30 states: Arizona, California, Colorado, Connecticut, Delaware, Georgia, Iowa, Illinois, Kentucky, Massachusetts, Maryland, Maine, Minnesota, Missouri, Montana, North Carolina, New Hampshire, New Jersey, Nevada, New York, Ohio, Oklahoma, Oregon, Pennsylvania, South Carolina, Texas, Utah, Virginia, Washington, and Wisconsin. At least 51 were tested using MLVA and matched or were closely related (had no more than one different allele) to the main outbreak MLVA pattern. Cases

with isolates that were different by MLVA (had more than one different allele) were not considered part of the outbreak. Illness onset ranged from March 16 to July 8. The median age of cases was 15 years (range, 2 to 65 years), and 71% were female. Thirty-five of 67 (55%) cases were hospitalized, 10 of 57 (18%) developed HUS, and none died.

Interviews of the Minnesota cases using the routine interview form did not identify any common exposures. Early in the investigation, cases were also interviewed with a CDC questionnaire about foods and exposures previously associated with *E. coli* O157 infections, such as ground beef, unpasteurized milk, and lettuce. Although ground beef was suspected early in the investigation, it was quickly ruled out as a potential vehicle. These early interviews did not yield any strong hypotheses. The demographic characteristics of the cases, in particular the high proportion of females and young age, lead to re-interview of the Minnesota cases with more detailed questions about unpasteurized juices (including smoothies or blended drinks), candy, and fresh fruit. On June 16, CDC staff started conducting open-ended interviews of a subset of cases. By the next day, CDC staff reported that a high proportion of cases in one state mentioned eating raw Brand A cookie dough; five of five cases interviewed mentioned eating raw cookie dough, and four specifically reported eating Brand A raw cookie dough. Among the Minnesota cases, one case had mentioned eating that product without being specifically asked on the initial interview. The Minnesota cases were called back on June 17, and all three who were reached that day reported eating Brand A raw cookie dough. No other food was consumed by all of the cases. That same day, a Minnesota specific case-control study was conducted. None of the three controls ate raw cookie dough.

The multi-state case-control study was initiated on June 18 and included questions on more than 20 food items. By June 19, eating raw cookie dough was statistically associated with illness. By the time the study was completed, 33 of 36 cases vs. four of 37 controls reported eating raw cookie dough (matched odds ratio, 42.8; 95% confidence interval, 7.6 to undefined; $p < 0.001$). No other exposure was statically associated with illness. Ninety-three percent of the cases who reported eating cookie dough reported eating Brand A.

On June 19, Brand A recalled all refrigerated cookie dough products (47 flavors, 3.6 million packages). MDH and MDA issued a joint press release the same day. CDC and FDA also issued press releases.

During the re-interview process, the household with two sibling cases reported having an open container of Brand A Chocolate Chip cookie dough from which at least one of the cases had eaten. The MDA tested it and recovered non-O157 Shiga toxin-producing *E. coli*. The isolate was forwarded to MDH which identified it as *E. coli* O8:H19. It was forwarded to CDC, where it was identified as *E. coli* O124:H-. Based on the production date, that container of cookie dough was produced on February 17, 2009. MDA also tested seven unopened containers from retail establishments, and all tested negative for Shiga toxin-producing *E. coli*. The FDA tested samples at the plant, and one sample from an unopened product produced on February 10, 2009 tested positive for O157, but the PFGE and MLVA subtypes were different from the outbreak subtypes. The New York City Department of Health and Mental Hygiene also reported recovering a non-O157 Shiga toxin-producing *E. coli* from an open container of cookie dough from a case's home. The production date for that cookie dough was not available. The plant investigation did not identify any sources of contamination. The flour supplier was also inspected, but no deficiencies were found and all samples tested negative for *E. coli*.

This was an outbreak of *E. coli* O157:H7 infections associated with consumption of raw Brand A cookie dough. Although O157 of the outbreak subtype was not recovered from the product, O157 of a different

subtype and a non-O157 Shiga toxin-producing *E. coli* were recovered, indicating that the product was indeed contaminated. The source of contamination of the product was never identified.

(21)

***E. coli* O157:H7 Infections Associated with a Graduation Party**

June

Mower County

On June 11, 2009, the Minnesota Department of Health (MDH) Public Health Laboratory (PHL) identified an *Escherichia coli* O157:H7 clinical isolate with the pulsed-field gel electrophoresis (PFGE) Minnesota pattern designation WA1ECB20; the isolate was from a resident of Rose Creek, Minnesota. On the same day, several reports regarding cases of *E. coli* O157:H7 in the Rose Creek and Rochester area were received by MDH from health care providers. Two clinical isolates from the reported cases were pending confirmation at the MDH Public Health Laboratory. Additionally, a case with a clinical isolate of *E. coli* O157:H7 WA1ECB20 had been identified on June 2; that person was also a resident of Rose Creek. An investigation was initiated.

Cases were identified through routine laboratory surveillance and were defined as Minnesota residents with laboratory-confirmed *E. coli* O157:H7 infection with PFGE subtype WA1ECB20 after May 28, 2009. Case isolates were submitted to the Centers for Disease Control and Prevention for subtyping using multiple-locus variable-number tandem repeat analysis (MLVA).

Phone interviews regarding illness history and potential exposures were conducted for all cases.

Four cases with *E. coli* O157:H7 WA1ECB20 isolates were identified. All of the isolates had identical MLVA patterns. Dates of illness onset ranged from June 1 to June 4. The median age of cases was 27 years (range, 1 to 31 years). All four cases reported diarrhea and blood in their stool, two (50%) had vomiting, and one (25%) had fever. Only one person had recovered at the time of the interview, and that person reported an illness duration of 9 days. None of the cases were hospitalized, and none developed hemolytic uremic syndrome.

One of the cases reported hosting a graduation party on May 28 at a private residence in Rose Creek. The other three cases reported attending the same graduation party. According to the cases, foods served at the graduation party included bratwursts, hot dogs, turkey sandwiches, cheese and mushroom soup, potato salad, pasta salad, fruit salad, and cookies. Approximately 200 guests attended the party. The case that hosted the party declined providing names and contact information of people who attended; therefore, it was not possible to interview additional party attendees.

The earlier clinical *E. coli* O157:H7 isolate of the outbreak PFGE subtype that had been identified was from a person who had an onset of illness on May 23 and reported an illness recovery date of May 30. The person had already been interviewed when this investigation started. On re-interview, the person reported being related to the host of the May 28 graduation party, preparing the potato salad served at the party, and attending the event. The person reported a 3-day duration of diarrhea and an illness recovery date of May 30; therefore, the person was still not fully recovered at the time of food preparation for the event or attendance at the event.

This was an outbreak of *E. coli* O157:H7 infections associated with a graduation party. The source of the outbreak was a person with an *E. coli* O157:H7 infection of the same PFGE subtype who prepared the potato salad for the party and who was not fully recovered at the time of food preparation. The vehicle was most likely the potato salad, but an analytical study of foods eaten by event attendees was not possible.

(22)

***Escherichia coli* O157:H7 Infections Associated with Beef Products**

May

Hennepin County/Multiple states

On June 24, 2009, the Minnesota Department of Health Public Health Laboratory identified an *Escherichia coli* O157:H7 isolate of Minnesota pulsed-field gel electrophoresis (PFGE) 2-enzyme pattern designation MN272ECB20 that matched cases in other states. At the time the Minnesota case was identified, the Centers for Disease Control and Prevention (CDC) had been working with several states on an investigation of the cases. Additionally, the Food Safety and Inspection Service (FSIS) of the United States Department of Agriculture had isolated *E. coli* O157:H7 of the same PFGE pattern from beef samples from Processor A in Colorado. FSIS's findings lead to a recall of 41,280 pounds of beef products on June 24. An investigation of the Minnesota case was initiated in collaboration with the multi-state and FSIS investigations.

In Minnesota, a case was defined as a Minnesota resident with laboratory-confirmed *E. coli* O157:H7 with PFGE subtype MN272ECB20. The case isolate was submitted to the CDC for subtyping using multiple-locus variable-number tandem repeat analysis (MLVA).

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. The Minnesota Department of Agriculture (MDA) conducted a traceback investigation of food items of interest to determine the source of those food items, and to identify whether foods eaten by the case were affected by the recall. Information collected from the case interview and tracebacks was shared with the CDC and FSIS. CDC coordinated a multi-state investigation of cases. FSIS conducted the plant investigation and initiated recalls.

One case with *E. coli* O157:H7 MN272ECB20 isolate was identified in Minnesota. The isolate's MLVA pattern matched the main outbreak MLVA pattern. The case was a 14-year old male with illness onset on May 28. The case had diarrhea, blood in the stool and cramps, without fever or vomiting. The case's duration of illness was 5 days, and the case was not hospitalized.

Nationally, 23 cases with isolates that matched the outbreak PFGE were reported from 9 states: California, Maine, Michigan, Minnesota, New Hampshire, New Jersey, New Mexico, New York, and Wisconsin. Illness onsets ranged from April 2 to June 13. The median age of cases was 19 years (range, 2 to 74 years), and 64% were male. Among the cases for whom hospitalization status was known, 12 (70%) were hospitalized, two developed hemolytic uremic syndrome and none died.

The Minnesota case reported consumption of ground beef as pre-formed hamburger patties purchased from the meat counter at a grocery store in Bloomington, Minnesota in the week prior to his illness onset. MDA contacted the grocery store. The store used Processor A trimmings that were later recalled in ground

beef sold at the meat counter, but they did not make or sell fresh pre-formed hamburger patties at the meat counter. The store stopped using the products when they were recalled. This information was shared with the CDC and FSIS.

After the initial June 24 recall, Processor A expanded the recall to include approximately 380,000 pounds of assorted beef primal products on June 28. Although the recall included intact cuts of beef typically used for steaks and roasts, FSIS reported that the products had been further processed into ground beef at other companies.

This was a multi-state outbreak of *E. coli* O157:H7 infections associated with consumption of beef products produced by Processor A, leading to a beef product recall. One case associated with this outbreak was identified in Minnesota. The Minnesota case reported eating hamburgers purchased at the meat counter a local grocery store. Although the store reported not using the recalled product for hamburgers, they did use it for ground beef. The most likely explanation is that case misremembered the exact product purchased at the store. Based on PFGE, MLVA, and the fact that the case purchased ground beef products from a store that used the recalled beef during the outbreak time period, the case was considered part of the outbreak.

(23)

***E. coli* O157:H7 Infections Associated with Consumption of Steaks at Restaurants**

June

Hennepin County

On June 23, 2009, the Minnesota Department of Health (MDH) Public Health Laboratory (PHL) identified two *Escherichia coli* O157:H7 isolates that had indistinguishable pulsed-field gel electrophoresis (PFGE) patterns. The subtype, designated MN1108, had never been seen before in Minnesota. The cases were interviewed by MDH staff about illness history and potential exposures. Illness onsets for the two cases were 1 day apart, and both were residents of Hennepin County. During the interview, both cases reported consuming dishes containing steak at a sit down restaurant in the 7 days prior to illness onset. These were the only beef exposures reported by the cases. One case reported Restaurant A as the restaurant where steak exposure occurred, whereas the other case reported that their steak exposure occurred at Restaurant B. However, it was discovered that these establishments were owned by the same company. An investigation was initiated.

Cases were identified through routine laboratory surveillance, and were defined as Minnesota residents with laboratory-confirmed *E. coli* O157 infection of the outbreak PFGE subtype and an illness onset date since June 1, 2009. Phone interviews regarding illness history and potential exposures were conducted for all cases. Additional case finding was attempted by contacting individuals who patronized one of the restaurants, Restaurant B, and had ordered the same steak menu item on the same meal date as the case (June 9, 2009). Patron credit card receipt information was not available from Restaurant A.

Invoices for the steak that would have been used in the dishes reported by the cases were collected from the restaurant by environmental health staff in the respective jurisdictions, and were forwarded to the Minnesota Department of Agriculture (MDA). MDA, in conjunction with the United States Department of Agriculture (USDA), performed a traceback to determine the source of the steaks. An inspector for the City of Bloomington also visited Restaurant B to speak with restaurant staff about food preparation

and handling procedures.

According to the national PulseNet database, there was one additional *E. coli* O157 isolate, in Colorado, with an indistinguishable PFGE pattern. An epidemiologist in this state was contacted to ascertain case exposures.

No additional *E. coli* O157 cases with an isolate of subtype MN1108 were identified in Minnesota or nationwide during this investigation. One of the Minnesota cases was a 29 year-old female, and the other was 63 year-old male. Illness onset dates for the two cases were June 13 and June 14, respectively. Both cases developed bloody diarrhea, one (50%) had fever, and one (50%) vomiting. One of the cases was hospitalized for four days; neither developed hemolytic uremic syndrome. Neither case had recovered at the time of interview, so illness duration information was not available.

The case with onset of illness on June 13 reported eating at Restaurant B in Bloomington, Minnesota on June 9. Foods consumed during this meal included an appetizer with grilled beef tenderloin, fried shrimp, and Ahi tuna. The second case, with an onset date of June 14, reporting eating at Restaurant A in Minnetonka, Minnesota during the week prior to illness (exact meal date unknown). Foods consumed at this restaurant included a steak sandwich with onions and fries.

Restaurant B provided MDH with a list of four customers with available credit card receipt information who had purchased the same steak appetizer as the case on June 9. None of these individuals could be reached for interview after several attempts.

According to an epidemiologist in Colorado, their case did not report consuming any steak products in the week prior to illness but did have ground beef at two restaurants. Onset of illness for the Colorado case was approximately May 26, 2009.

An inspector with the City of Bloomington was informed by the head chef at Restaurant B that the beef used in the appetizer consumed by the case was a six ounce portion from the end of a loin cut. The beef is cut and trimmed in the restaurant before being grilled and served. The standard of the restaurant is to cook the meat to medium-rare unless otherwise requested by the patron. The cooked meat is then thinly shaved, seasoned, and placed on bread. The restaurant had sold six of the appetizer item on June 9.

Invoices were collected from both of the restaurants for the beef products used in the dishes consumed by the cases, and according to these records the same product was used in both establishments. The product was beef tenderloin and came in a case from the Distributor A labeled "Boneless Beef Butt Tender". It was a fresh kyrovac-packaged product shipped in a 10-pound container. The label also stated that Distributor A (located in Minneapolis, Minnesota) received the source product from Producer A in Arkansas City, Kansas. According to USDA, Processor A did not tenderize any of their tenderloin products, so this product would not have been needle or blade tenderized. The order date that most likely corresponded to product that would have been served during the one known meal date for the case that patronized Restaurant B was June 9. Invoices showed that Restaurant A restaurant had also ordered product on this date. No leftover product was available for testing.

MDA discovered that one of the restaurants patronized by the Colorado case received frozen premade hamburger patties from Producer B (Rochester, Minnesota). Producer B, in turn, received beef trim from Producer A, as well as another establishment.

Two cases of *E. coli* O157:H7 infection in Minnesota were associated with the consumption of beef tenderloin steak consumed at two sit-down restaurants owned by the same parent company and located in the Twin Cities metropolitan area. Steaks were implicated through routine surveillance interviews and the use of product invoice information. A PFGE-matching *E. coli* O157:H7 case in Colorado consumed ground beef that could have been made from beef trim supplied by the same beef processor that supplied the source product for the tenderloin steak consumed by the Minnesota cases. However, the USDA investigation did not reveal a definitive link between the Minnesota and Colorado cases.

(24)

***E. coli* O157:H7 Infections Associated with a Catered Event**

June

Mower County

On July 2, 2009, Austin Medical Center (AMC) notified the Minnesota Department of Health (MDH) of an unusually high number of persons with diarrhea presenting to the emergency room, that about half of those persons also had bloody diarrhea, and that many reported working at the same company (Company A) and attending a company lunch on June 25. Several of those persons submitted specimens for testing, but results were pending. MDH Environmental Health (EH), the Minnesota Department of Agriculture (MDA) and the company for which the patients worked were notified, and an investigation was initiated.

A list of names and phone numbers of the AMC emergency room patients who presented with diarrhea was obtained. Interviews about illness history and potential exposures were conducted, and laboratory results were obtained.

Lists of company employees and foods served at the June 25 company lunch were obtained. Interviews were conducted about illness history, attendance at the lunch, food consumption at the lunch, and foods purchased and eaten from a local grocery store that catered the lunch. Stool samples collected from ill company employees were submitted to the MDH Public Health Laboratory for bacterial testing.

Lists of names of people who attended an unrelated event on June 24 catered by the grocery store and foods served were obtained, and interviews were conducted about food consumption at the event and illness history.

A case was defined as a Company A employee who subsequently developed diarrhea (≥ 3 loose stools in a 24-hour period) from June 25 to July 1, or who had a laboratory-confirmed infection with *E. coli* O157:H7 of the outbreak PFGE subtype (MN179ECB21) identified as part of the investigation or through routine laboratory surveillance. Case-isolates were submitted to the Centers for Disease Control and Prevention for subtyping using multiple-locus variable-number tandem repeat analysis (MLVA). Cases with O157 isolates that did not match the outbreak MLVA pattern were excluded. Laboratory-confirmed cases were interviewed about illness history and potential exposures.

MDA conducted an investigation of food handling practices at the grocery store. Grocery store workers were interviewed about illness history and work duties, with particular attention paid to duties relating to the catered lunch.

MDA collected and reviewed invoices for beef products used in the catering area and meat section of the grocery store and reviewed store grinding records.

Grocery store purchase receipts from a case that did not attend the June 25 lunch and did not work at Company A were obtained and cross-referenced with foods served at the luncheon and with beef products used in the catering area of the grocery store.

Overall, 182 people were interviewed as part of the investigation. Sixteen cases were identified. Of those, seven were confirmed cases with *E. coli* O157 MN179ECB21 isolates that also matched by MLVA. Of all the cases, only one confirmed case did not have any known connection to Company A. Specimen collection dates for the confirmed cases ranged from June 30 to July 10, 2009. The median age of cases was 38 years (range, 21 to 62 years). Illness onset dates ranged from June 26 to June 30, 2009. All 16 cases reported diarrhea, 10 (63%) had blood in their stool, seven (44%) had fever, and five (31%) had vomiting. Three (19%) of the patients were hospitalized. One case was still hospitalized at the time of the interview. The durations of hospitalization for the other two cases were 4 and 6 days, respectively. None of the cases developed hemolytic uremic syndrome and none died.

Among the 145 Company A employees who were interviewed, 12 were excluded from further analyses due to mild illness, illness that was consistent with norovirus (i.e., vomiting and non-bloody diarrhea with onset after a household member with similar symptoms), or illness onset more than a week after the lunch. The June 25 lunch was served at two locations within Company A, North and South. Foods served included turkey burgers, turkey bratwurst, buns, ketchup, mustard, sliced pickles, relish, red onions, sauerkraut, American cheese, salsa, spring salad (pasta salad), chips, cookies, and canned soda. Among 133 Company A employees included in the analysis, attending the June 25 lunch was significantly associated with illness (15 of 16 cases vs. 69 of 117 controls; odds ratio [OR], 10.3; 95% confidence interval [CI], 1.8 to 226; $p = 0.007$). Among those who attended the lunch, eating at the North location was significantly associated with illness (15 of 15 cases vs. 52 of 69 controls; OR, undefined; 95% CI, 1.3 to undefined; $p = 0.03$). No other exposure or specific food item was associated with illness. The median incubation period from the June 25 lunch was 3 days (range, 2 to 5 days).

Except for the turkey burgers and bratwursts, the foods served at the June 25 lunch were catered by the grocery store. The turkey burgers and bratwursts were precooked and frozen, provided by the company, grilled at the North location by the grocery store catering staff, and transported to the South location several times during the lunch. The sliced red onions, sliced American cheese, spring salad, and all other foods served were pre-packaged. The spring salad was plated at the grocery store prior to the lunch, but the rest of the foods were opened and placed in disposable plastic containers or aluminum trays at Company A. No additional handling or preparation was done at the store or at the lunch. Food was carried from the grocery store to Company A in plastic “luggers” or large plastic tubs. None of the grocery store employees involved in plating the foods or serving the lunch reported a recent illness or illness among their family members. On initial interview, one employee reported making meatloaf before plating the spring salad for the event; however, that employee recanted that account on later interviews and reported not being sure when the meatloaf was made.

MDA inspectors noticed that the plastic “luggers”, food contact surfaces and cutting boards were worn and no longer cleanable. There were sanitation problems at the store, particularly with washing of utensils

and racks. Also, employees were not knowledgeable about proper handwashing technique. Sanitary citations and orders to discard and replace “luggers” and cutting boards were issued.

One confirmed case did not work at Company A, did not attend the lunch, and had no known contact with anyone who attended the lunch. The case reported shopping at the grocery store and provided invoices for foods eaten prior to onset of illness. The case did not report eating any of the foods served at the lunch but did have a history of ground beef and ground beef patty consumption, both made with 85% lean ground chuck. MDA reviewed the case’s receipts, store invoices, and store grinding logs, looking for possible commonalities between ground beef eaten by the case and ground beef used to make the meatloaf in the catering area. The 85% lean ground chuck used for the meatloaf and sold as ground beef and ground beef patties during the time window of interest both originated from the same plant, establishment number 245C.

The confirmed case with no link to the Company A lunch also reported attending a separate event catered by the grocery store on June 24. Forty-three additional event attendees were interviewed, and none developed gastrointestinal illness after attending the event. Foods served at the event included ball tip steaks, baked potato, baked beans, bread and condiments. MDA looked for commonalities between the foods served between the two events, and with the ground beef at the store, and no common foods or ingredients were found. Based on the lack of ill persons or common food items with the other event, it was determined that this event was not part of the outbreak.

This was an outbreak of *E. coli* O157:H7 infections associated with attending a company lunch catered by a grocery store. An additional *E. coli* O157:H7 case that matched by PFGE and MLVA that shopped at the same the grocery store that catered the event occurred during the same time period. That case consumed grocery store ground beef in the week prior to illness onset. The ground beef eaten by the case came from the same source as ground beef used to make meatloaf at the grocery store. Food handling practices at the store suggest the possibility of cross-contamination from ground beef used to make meatloaf to ready-to-eat foods in the grocery store preparation area for the lunch. However, the specific food vehicle and the source of contamination was not confirmed.

(25)

***Clostridium perfringens* Intoxications Associated with a Graduation Party**

June

Anoka County

On June 30, 2009, the Minnesota Department of Health (MDH) foodborne illness hotline received an illness complaint associated with a graduation party that was held in Coon Rapids on June 27. The parent of the graduate reported at least 12 illnesses among 120 event attendees. A caterer prepared roast beef, a vegetarian pizza, pickle roll-ups, Italian pasta salad, broccoli salad, cheese tray, vegetable tray, and fruit tray that were served at the party. The family purchased a cake, rolls, chips, and ham and prepared a chicken pasta salad and Asian salad that were also served at the party. Anoka County Environmental Health Services (ACEHS) was contacted, and an investigation was initiated.

A parent of the graduate provided MDH with a list of graduation party attendees. Epidemiologists from MDH interviewed graduation attendees to obtain information on food/beverage consumption and illness history. A case was defined as a graduation party attendee who developed diarrhea (≥ 3 loose stools in

a 24-hour period) following the event. Stool samples collected from two ill graduation party attendees were submitted to the MDH Public Health Laboratory for bacterial, viral, and toxin testing.

ACEHS sanitarians contacted the caterer to assess food preparation procedures.

Illness histories and exposure information were obtained from 34 graduation party attendees. Eighteen (53%) individuals met the case definition; four additional individuals reported gastrointestinal illness symptoms but did not meet the case definition.

All cases reported diarrhea, 15 (83%) reported cramps, and one (6%) reported fever. The median incubation period was 11 hours (range, 4 to 17 hours). The median duration of illness was 17 hours (range, 7 to 72 hours) for the 12 cases who had recovered at the time of interview. Both stool samples were positive for *Clostridium perfringens* enterotoxin A.

In the univariate analysis, consumption of roast beef (18 of 18 cases vs. 0 of 12 controls; odds ratio [OR], undefined; $p < 0.001$), pineapple (7 of 18 cases vs. 0 of 12 controls; OR, undefined; $p = 0.02$), chips (10 of 17 cases vs. 1 of 10 controls; OR, 12.9; 95% confidence interval [CI], 1.1 to 345.2; $p = 0.02$), and rolls (14 of 18 cases vs. 4 of 12 controls; OR, 7.0; 95% CI 1.1 to 53.7; $p = 0.02$) were significantly associated with illness. Multivariate analysis could not be performed because of zero cell-counts for some variables.

The caterer was found to be unlicensed. A sanitarian from ACEHS spoke with the caterer to discuss food preparation procedures. The caterer had prepared 45 pounds of roast beef at her home and transported it to the graduation party.

This was an outbreak of *Clostridium perfringens* intoxications associated with foods served at a graduation party. Roast beef was implicated as the outbreak vehicle based on being the food item most strongly associated with illness, could explain all 18 cases, and represents the most plausible source of *Clostridium perfringens* intoxications due to the reported food preparation practices by the caterer. 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 roast beef.

(26)

Norovirus Gastroenteritis Associated with a Birthday Party

July

Todd County

On July 10, 2009, the Minnesota Department of Health (MDH) foodborne illness hotline received an illness complaint associated with a birthday party that was held in Long Prairie on July 8. The complainant reported six illnesses among 12 party attendees. Food items included sloppy joes, fresh fruit, and sundried tomato turkey deli meat purchased at a grocery store in Alexandria. The Minnesota Department of Agriculture (MDA) was notified and an investigation was initiated on July 10.

On July 14, MDA inspected the grocery store to assess employee illness and food preparation practices. The complainant provided MDH with a list of birthday party attendees, who were then interviewed by MDH staff. A case was defined as a birthday party attendee with vomiting or diarrhea (≥ 3 loose stools

in a 24-hour period) following the event. Stool samples collected from two ill birthday party attendees were submitted to the MDH PHL for bacterial and viral testing.

Interviews were completed for 11 attendees. Six (55%) individuals met the case definition. No attendee reported gastrointestinal illness in their household during the week prior to the birthday party.

The median incubation period for the six cases was 38 hours (range, 35 to 44 hours). The median duration of illness was 42 hours (range, 7 to 77 hours). All cases reported diarrhea and cramps, four (67%) reported fever, one (17%) reported vomiting, and none reported bloody diarrhea. Both stool samples submitted by ill birthday party attendees tested positive for norovirus. Sequencing was conducted on norovirus nucleic acid from the two specimens and the sequences were identical.

The univariate analysis demonstrated that only consumption of sundried tomato turkey deli meat was significantly associated with illness (6 [86%] of 7 exposed vs. 0 of 4 unexposed; risk ratio, undefined; 95% confidence interval, undefined; $p = 0.015$).

MDA's inspection of the grocery store identified no food safety violations. No employee gastrointestinal illnesses were noted in the employee illness log, but only two of an unknown number of employees were interviewed.

This was a foodborne outbreak of norovirus gastroenteritis associated with food served at a birthday party. Sundried tomato turkey deli meat was significantly associated with illness. No ill food workers were identified during inspection of the grocer by MDA staff, but only two employees were interviewed. The ultimate source of the outbreak was not determined. However, the most plausible source was an unidentified infected food worker or birthday party attendee who had contact with the sundried tomato turkey deli meat.

(27)

Norovirus Gastroenteritis Associated with a Restaurant

July

Wright County

On July 13, 2009, the Minnesota Department of Health (MDH) investigated a complaint of gastrointestinal illness among a group of 6 people who traveled together and ate at two restaurants, Restaurant A in Annandale and the Restaurant B in Pequot Lakes. Epidemiologists and environmental health specialists from MDH initiated an investigation at both restaurants.

The outbreak was investigated by interviewing food workers at both restaurants, and interviewing diners for menu items eaten and illness. A case was defined as a group member who subsequently developed diarrhea (≥ 3 loose stools in a 24-hour period) or vomiting.

MDH sanitarians inspected the Restaurant A kitchen on July 15 and interviewed restaurant staff on food preparation duties and illness. MDH epidemiology staff obtained a menu and credit card receipts from customers who ate at Restaurant A on July 9–10. Diners were contacted and interviewed to determine if they had gastrointestinal illness following their meal and to identify what food items they had eaten. A case was defined as a Restaurant A patron who subsequently developed diarrhea or vomiting. Stool

samples were requested from persons meeting the case definition and if obtained, tested for bacterial and viral causes of gastrointestinal illness at the MDH Public Health Laboratory.

Five (83%) of the six people met the case definition: five (100%) had diarrhea, three (60%) had vomiting, and two (40%) had fever. Cases all ate salads at Restaurant A on July 10 (median incubation period, 36 hours; range, 31 to 41 hours). The cases shared a vegetable pizza at the Old Milwaukee Saloon on July 11 (median incubation period, 12 hours; range, 8 to 17 hours). The median duration of illness, calculated for three cases who had recovered by the time of the interview, was 33 hours (range, 30 to 35 hours). Stool specimens collected from all 5 cases tested positive for norovirus genogroup I. Although credit card receipts were obtained from both restaurants, none of the other diners could be contacted.

One Restaurant A employee had made salads on July 10 and became ill (symptoms of diarrhea, vomiting, and fever; onset July 9; duration 24 hours). Observation by the MDH sanitarian on salad-making procedures identified salad preparation with bare hands. This employee also reported an ill family member with similar symptoms during July 3–7. The ill Restaurant A employee did not submit a stool sample for testing at MDH.

An employee of Restaurant B reported illness on July 11 with symptoms of vomiting, cramps, and nausea and duration of ~24 hours. They reported no ill family members. On July 10 this employee's duties were dish washing and pizza preparation. The employee from Restaurant B did submit a stool sample for testing at MDH, received on July 30, which tested negative for norovirus.

This outbreak of gastroenteritis was most likely associated with salad contaminated at Restaurant A by an ill employee. Although no stool samples were collected, the symptoms, duration, incubation period after the meal at Restaurant A, and person-to-person transmission in their household are consistent with norovirus. It is plausible that the employee prepared salads with contaminated hands and the salads consumed by the group were the vehicle.

(28)

***Salmonella* Montevideo Infections Associated with Italian-style Meats/Black and Red Pepper**

July 2009-April 2010

Multiple counties/Multiple states

On November 30, 2009, the Centers for Disease Control and Prevention (CDC) notified public health officials of a nationwide *Salmonella* Montevideo cluster. At this time, there were 106 cases of *S. Montevideo* infection with a specific pulsed-field gel electrophoresis (PFGE) subtype and specimen collection dates ranging from June 14 to November 10, 2009. The subtype was designated by the Centers for Disease Control and Prevention (CDC) as JN6X01.0072. The Minnesota pattern designation for this subtype was SMON19. At the time of this notification, there were four Minnesota residents with confirmed *S. Montevideo* SMON19 infection. Local cluster investigations of these cases had not revealed any common exposure believed to be the source of illness, but all available information was forwarded on to CDC.

On December 3, the first multi-state conference call was held to discuss suspicious exposures among cases interviewed thus far. During this call, CDC reported that historically this subtype of *S. Montevideo* had been isolated from various food products including pistachios, fish food, dog food, and crimped

oats. Case exposures discussed on the call included salsa, a Mexican-grocery store, and Grocery Chain A. By December 15, spicy food items such as barbecue sauce, spices/meat seasoning, and pork carnitas were being frequently reported by cases infected with the outbreak strain. On January 6, 2010, three open-ended interviews conducted by CDC revealed that all cases had consumed items from prepackaged spicy Italian meat variety packs. Further reports of this exposure were shared on a January 11 multi-state conference call. On January 13, public health officials from Washington state reported that a large proportion of their cases shopped at Warehouse Grocery Chain A, and review of shopper card information from this establishment revealed that five of seven had purchased Brand X Italian meats gourmet variety pack. A national case-control study was launched on January 17.

All *Salmonella* cases reported to MDH are routinely interviewed about exposures and food consumption at home and at restaurants as part of foodborne disease surveillance in Minnesota. Epidemiologists reviewed the information gathered during the interviews of *S. Montevideo* cases to identify potential cases associated with this outbreak. *S. Montevideo* cases were asked specifically about consumption of Italian meats as well as about shopping at facilities that commonly sold this item. Warehouse Grocery Chain A identification numbers were collected from consenting cases and forwarded to the Minnesota Department of Agriculture (MDA) to obtain or verify brand and purchase date information. As the investigation proceeded, cases infected with additional serotypes and subtypes of *Salmonella* were investigated as being possibly associated with the outbreak due to identification of other *Salmonella* strains in implicated products. Confirmed cases were defined as persons from whom *S. Montevideo* SMON19 was isolated and who had illness onset after July 1, 2009.

Confirmed cases with specimen collection dates of January 1, 2010 or later were eligible for enrollment in the case-control study. One control per case was recruited and was selected based on geographical proximity to the case determined through reverse digit dialing. All controls had to be 18 years of age or older to be eligible regardless of the cases age and were excluded if they had diarrhea (≥ 3 loose stools in a 24-hour period) at any point during the month prior to interview.

Overall, there were seven culture-confirmed *S. Montevideo* SMON19 cases identified in Minnesota during the outbreak. The median age was 16 years (range, 2 months to 61 years), and six (86%) were female. Onset dates ranged from July 6, 2009 to March 13, 2010. Of the seven cases, all reported experiencing diarrhea, six (86%) fever, two (29%) vomiting, and one (14%) bloody stools. The median duration of illness was 13 days (range, 6 to 14 days) for the six cases who had recovered at the time of interview. None of the cases were hospitalized. The specimen source was stool for all cases.

Of the seven total Minnesota cases, only one (14%) could be associated with consumption of Brand X Italian-style meats. This case reported consuming the Brand X mozzarella panino which included capocollo, prosciutto, and hot salami wrapped around three mozzarella cheese logs. This item had been purchased at Warehouse Grocery Chain A; the customer identification number for the individual who purchased this item was collected and forwarded to MDA. Customer records verified that this product had in fact been purchased and indicated a purchase date of January 12, 2010. The case reported consuming the product on January 16 and becoming ill on January 21.

On January 20, 2010, it was reported on a multi-state conference call that *Salmonella* had been isolated from an unopened package of a Brand X Italian-style meat variety pack. It was also reported during this call that 10 of 14 cases nationwide who shopped at Warehouse Grocery Chain A had purchased a Brand X Italian-style meat product at the establishment based on shopper card records. Purchase dates for the

products ranged from July 2 to December 20, 2009. On January 21, preliminary case-control study results showed an association between consumption of salami and illness. Also on this day it was reported that cultures from an open container of black pepper taken from a Brand X plant during the outbreak investigation had yielded *Salmonella*.

Based on findings from this investigation, a product recall was issued on January 23, 2010. Subsequent sampling and testing of product from case households, retail establishments, and at the production plants resulted in identification of the outbreak subtype of *S. Montevideo* in Brand X sliced salami variety packs, Salame Panino products, black pepper, and crushed red pepper. Black and red pepper were applied to Brand X Italian-style meat products after the final kill step. *Salmonella* was also identified in pepper samples collected further upstream in the distribution process, with positive samples occurring at the two spice companies that supplied Brand X: Spice Company A and B. These findings led to an expansion of the recall to include additional Brand X meat products as well as black and red pepper.

During the course of the investigation, an additional strain of *Salmonella* was identified in Brand X products collected both from patients' households and retail settings. The organism identified was *S. Senftenberg* of the Minnesota PFGE subtype pattern SFT16 (CDC designation of JMPX01.0004). There was one culture-confirmed *S. Senftenberg* SFT16 case identified in Minnesota during the outbreak. This case was a 57 year-old man with an illness onset date of January 11, 2010. The case was hospitalized for an illness that did not include diarrhea or other gastrointestinal symptoms; instead, the case had experienced a fever with associated chills and confusion for 8 days. *S. Senftenberg* was isolated from a urine specimen that was collected on January 12, 2010. Interviews with friends and family of the case revealed that he had consumed items from a Brand X salami variety pack on December 24, 2009. This was confirmed through Warehouse Grocery Chain A records which indicated that item had been purchased on December 21, 2009. Nationwide, six *S. Senftenberg* cases of this subtype were identified during the outbreak. Only five of the six were interviewed; two of these (including the Minnesota case) reported consuming Brand X products. However, CDC did not include *S. Senftenberg* cases in the outbreak case definition.

As of April 28, 2010, there were 272 individuals nationwide with specimen collection dates since July 1, 2010 found to be infected with the outbreak subtype of *S. Montevideo*.

Seven *S. Montevideo* SMON19 cases occurred in Minnesota during a large nationwide outbreak associated with Italian-style meats. However, only one case in Minnesota could be definitely linked to the product. Case interviews, shopper card information, and product testing assisted in the identification of these products as the source of illness. The outbreak subtype of *S. Montevideo*, as well as *S. Senftenberg*, were eventually identified in Italian-style meat products as well as black and red pepper used as a coating for these products. Identification of the outbreak strain in pepper samples collected further upstream in the distribution process suggested that pepper was the ultimate source of contamination. This could explain why the majority of the Minnesota outbreak cases did not report consuming Italian-style meat products prior to becoming ill.

(29)

***E. coli* O157:H7 Infections Associated with Custom Slaughter Beef, with Subsequent Person-to-Person Transmission in a Daycare**

August

Douglas County

On November 29, 2008, an *E. coli* O157:H7 case was identified by the Minnesota Department of Health (MDH) through routine surveillance. A standard interview was administered by telephone to the case's parents. Illness onset was November 21. This case had several exposures to cattle at her grandparent's farm and consumed custom slaughter beef cooked both at home and at her grandparent's home during the 7 days prior to illness onset. The case became ill while visiting their grandparent's farm and remained there for the duration of her illness. This was a sporadic case of *E. coli* O157:H7 infection with no epidemiologic link to other *E. coli* O157:H7 cases reported to MDH through July 2009. Of note, the case's mother operated an in-home daycare attended by children ages 1 to 8. There was no illness reported among other daycare attendees at the time the November case was investigated.

On August 18, 2009, an *E. coli* O157:H7 case with a PFGE pattern indistinguishable from the November 2008 cases was identified by the MDH through routine surveillance. The case became ill on August 12, 2009 and later developed hemolytic uremic syndrome (HUS). The case attended daycare at the home of the November 2008 case. Further investigation was initiated.

The mother of the November 2008 case, who also was the daycare provider for the August 2009 case, was contacted to determine if any other children at daycare had been ill. The daycare provider was asked about foods served at the daycare and whether or not the custom slaughter beef that had been mentioned in her child's interview had been served to daycare attendees.

A letter to parents describing the situation and including information on *E. coli* O157:H7 infections was sent with stool kits to the daycare provider's home. The daycare provider was instructed to send a kit and a letter home with each parent. Each parent was then interviewed regarding illness and exposure history of their child. If a child reported having diarrhea within the past 2 weeks they were excluded from daycare until their stool tested negative for *E. coli* O157:H7. Those children whose stools tested positive were excluded from daycare until they had two consecutive negative stool cultures taken at least 24 hours apart.

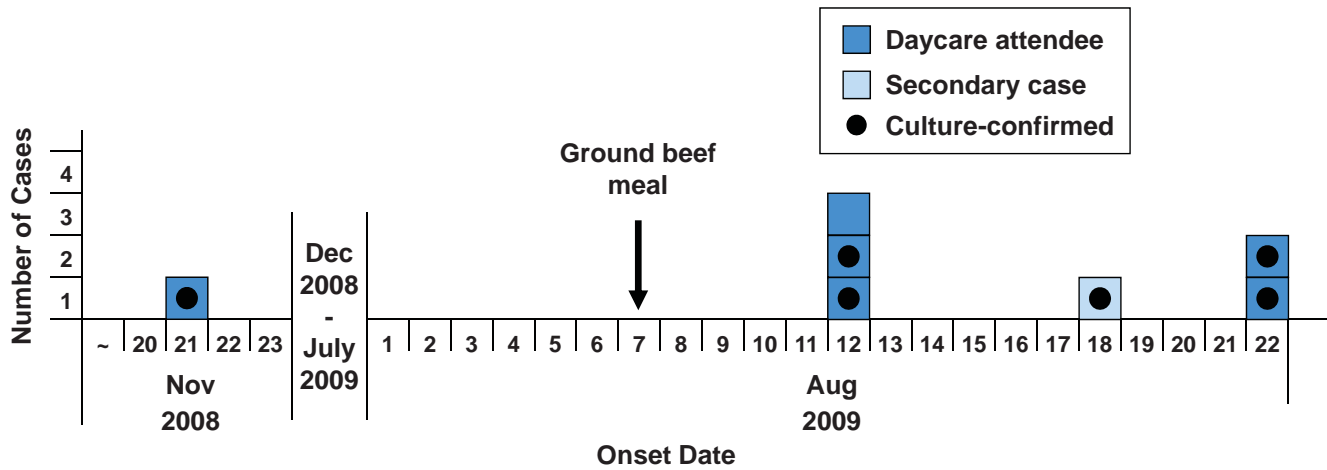
A daycare case was defined as a daycare attendee who 1) developed diarrhea (≥ 3 loose stools within 24 hours) within 7 days after attending the daycare; or 2) had a stool sample test positive for *E. coli* O157:H7. A secondary case was defined as a person who was a household member of a daycare case and who had a stool sample test positive for *E. coli* O157:H7.

The Minnesota Department of Agriculture tested six, 2-pound samples of custom slaughter beef from the daycare provider for *E. coli* O157:H7. Three of these samples were from ground beef that had been processed during the fall of 2008, and three samples were from ground beef processed in the spring of 2009.

Fifteen children attended the daycare. Stool samples were tested for all 15 daycare attendees and one family member who reported symptoms consistent with *E. coli* O157:H7. Of the 16 stool kits received, 7 (44%) tested positive for *E. coli* O157:H7. A total of 18 daycare attendees, family members, and staff

were interviewed, and 7 met the case definition. Six cases were daycare attendees and 1 case was a secondary case. Six (86%) cases had stomach cramps, five (71%) had diarrhea, two (29%) cases reported vomiting, one (14%) case reported bloody diarrhea, and none of the cases reported fever. One case developed HUS and there were no deaths. Dates of illness onset ranged from August 12 to 22 (See epidemic curve).

***E. coli* O157:H7 Cases Associated with a Daycare, by Illness Onset Date**



* The illness onset date of August 22 represents an approximate onset date. One case-patient was culture-confirmed but asymptomatic.

The daycare provider reported serving custom slaughter beef in meals prepared for children at the daycare. The beef was used in lasagna served on August 7; this was the only time ground beef had been served in the week prior to the earliest illness onset dates in August. All three samples of ground beef from the fall 2008 batch tested positive for *E. coli* O157:H7 and all of the samples from the spring 2009 batch were negative for *E. coli* O157:H7. The positive ground beef isolates were indistinguishable from the November 2008 and August 2009 case isolates by PFGE (subtype designation SD23ECB221).

This was an outbreak of *E. coli* O157:H7 infections associated with eating contaminated ground beef at a daycare, with subsequent person-to-person transmission at the daycare. The eight month gap between cases is surprising. The November 2008 case may have become ill by consuming the same batch of contaminated ground beef that was served at the daycare, or the case may have been exposed to *E. coli* O157:H7 on her grandparent’s farm.

(30)

Norovirus Gastroenteritis Associated with a Restaurant

August

Hennepin County

On August 28, 2009, the Minnesota Department of Health (MDH) foodborne illness hotline received a complaint of gastrointestinal illness from an individual who ate at a restaurant in Bloomington, Minnesota on August 26. That same day, the hotline received an independent complaint from a food worker at the restaurant in Bloomington who was calling to complain about another establishment. This food worker had worked on the day the other complainant reported patronizing the establishment

(August 26), and both had onset of illness on August 27. These two individuals had no other events or meals in common. The City of Bloomington environmental health office was notified, and an outbreak investigation was initiated.

Staff from MDH interviewed meal companions of the first complainant to obtain information on food/beverage consumption and illness history. A case was defined as a restaurant patron or employee who developed vomiting and/or diarrhea (≥ 3 loose stools in a 24-hour period). Stool specimens were obtained from consenting cases and submitted to the MDH Public Health Laboratory (PHL) for bacterial and viral testing.

A sanitarian from the City of Bloomington visited the restaurant to evaluate food preparation and handling procedures, and interviewed restaurant employees regarding recent illness history and job duties. Food workers reporting recent gastrointestinal illness were asked to submit stool specimens to MDH PHL for bacterial and viral testing.

Illness histories and exposure information were obtained from the two of the four individuals in the first complainant's party, and both met the case definition. According to these individuals, the other two meal companions did not develop illness. Both cases reported diarrhea, one (50%) cramps, one (50%) vomiting, and one (50%) fever. Neither case had recovered at the time of interview. Foods consumed by the cases included a chicken sandwich with fries and a BLT sandwich with fruit, respectively.

The median incubation period from the restaurant meal was 39.25 hours (range, 32 to 46.5 hours). Neither case had recovered at the time of interview. A stool sample was collected from one of the cases; the sample tested positive for norovirus genogroup II.

No additional employee illness was identified during initial contact with the restaurant by the City of Bloomington sanitarian, and no improper food handling practices were observed. The restaurant also had not received any additional complaints. The sanitarian discussed with restaurant staff the importance of handwashing for the prevention of norovirus infection. Additionally, the restaurant was informed that any employee with vomiting and/or diarrhea must be excluded from working for 72 hours after the resolution of symptoms. Employee phone lists were obtained, and 24 (27%) of the 88 employees were interviewed. None of the employees (aside from the second complainant) reported experiencing gastrointestinal symptoms recently.

The restaurant food worker who called the MDH hotline reported having vomiting and diarrhea, and had not recovered at the time of interview. He reported eating at the restaurant on August 26, as well as on most other days that he worked. He reported working at least August 25, 26, and 27 that week. This food worker submitted a stool specimen to the MDH PHL; this specimen tested positive for norovirus genogroup II. Nucleic acid sequencing was conducted on the sample, and the sequence was identical to that identified in the patron sample.

This was a foodborne outbreak of norovirus gastroenteritis associated with a restaurant in Bloomington. The likely source of contamination was one or more unidentified infected food workers who had contact with ready-to-eat food items.

(31)

Ciguatera Intoxications Associated with a Restaurant

August

Hennepin County

On August 20, 2009, Hennepin County Public Health Protection - Epidemiology (HCPHP) and the Minneapolis Division of Environmental Health (MDEH) were notified by the Minnesota Department of Health (MDH) of a report of ciguatera-like illness following meals at a restaurant in Minneapolis. Three patrons out of a party of 11 reported having symptoms consistent with ciguatera poisoning after eating the barracuda dinner. An investigation was initiated.

Restaurant management provided credit card receipts and reservation lists from August 10-12. Credit card receipts did not include the card holder's name, but did include the food items purchased. This information was used in conjunction with the reservation lists in an attempt to identify patrons who may have consumed the barracuda meal. These patrons were interviewed by HCPHP epidemiologists about food consumption and illness history using a standard questionnaire. A case was defined as a person who ate a meal at the restaurant and subsequently became ill with ciguatera-like symptoms within 24 hours of the meal.

Eleven parties were contacted from the reservation list; however, only one party included a patron that ate the barracuda. In total, five patrons who ate the barracuda were identified, and three (60%) met the case definition. All three cases reported diarrhea and tingling of the hands and feet, two (67%) reported headache, one (33%) reported decreased sensitivity of hands and feet, one (33%) reported itching of the hands and feet, one (33%) reported muscle weakness, and one (33%) reported body aches. The median incubation period was 10 hours (range, 5 to 21 hours). The duration of symptoms was greater than 7 days for all cases. One case received medical treatment at an emergency department and was clinically diagnosed with ciguatera poisoning. No additional cases were identified through credit card receipts.

MDEH contacted the restaurant to gather information about the implicated meal. The barracuda was a temporary menu item served for only 3 days as a "special". The barracuda special was served 43 times during this time period. In addition, it was also eaten by some members of staff who did not report any subsequent illness. No problems were identified in the transport, handling, or preparation of the barracuda. The restaurant did not receive any additional reports of illness.

This was an outbreak of ciguatera intoxications associated with a restaurant. The source of the outbreak was barracuda that was served as a special menu item. It is well known that toxin levels can vary considerably within the same cut of fish, and also from fish to fish, thus explaining why patrons were not uniformly affected.

(32)

***E. coli* O157:H7 Infections Associated with Beef Products from a Common Producer**

August

Multiple counties/Multiple states

On August 21, 2009, the Minnesota Department of Health (MDH) Public Health Laboratory (PHL) identified two clinical isolates of *E. coli* O157:H7 that were indistinguishable by pulsed-field gel electrophoresis (PFGE); the subtype was designated MN1122ECB87. This PFGE pattern had not

previously been observed in Minnesota. A third clinical isolate of *E. coli* O157:H7 MN1122ECB87 was identified on August 25. On August 26, the MDH PHL was notified that the Washington State Department of Health had also identified a clinical isolate of *E. coli* O157:H7 MN1122ECB87. Routine surveillance interviews of the three Minnesota resident cases on August 24 and August 25 revealed they had all eaten at a Restaurant Chain A location in the 7 days prior to illness onset. One of the cases had eaten at the Chain A restaurant in Blaine, one had eaten at the Chain A restaurant in Burnsville, and the third had likely eaten at the Blaine Chain A restaurant (but possibly a different location). An investigation was initiated on August 26.

On August 27, the Washington State Department of Health informed MDH that the Washington resident had also eaten at the Chain A restaurant in Blaine during the 7 days prior to illness onset. That same day, Anoka County Community Health and Environmental Services (ACCHES) conducted an environmental assessment of the restaurant in Blaine, interviewed food workers, and requested product invoices. MDH Environmental Health Services (EHS) also conducted an environmental assessment, interviewed food workers, and requested product invoices at the Burnsville Chain A restaurant on August 27. Records of faxed and online customer orders and credit card receipts were requested from the Restaurant Chain A corporate office.

A patron case was defined as a person who had *E. coli* O157:H7 subtype MN1122ECB87 isolated from their stool in August. In addition to the routine surveillance interview form, cases were interviewed with an ingredient-specific food history form based on the Chain A restaurant menu. Well-meal companions of the cases, along with additional patrons contacted through the faxed and online order records, were also interviewed with the ingredient-specific food history form.

Food exposure and illness histories for cases who did not reside in Minnesota were obtained by contacting the appropriate state or local health department.

The Minnesota Department of Agriculture and the USDA Food Safety and Inspection Service (FSIS) were provided with epidemiological data and conducted traceback investigations of beef products used in the Chain A restaurants and other food service locations named by the cases.

Six cases were identified; three cases were Minnesota residents, one was a Washington state resident who was traveling in Minnesota in the 7 days prior to illness onset, one was a California resident with no history of travel outside of California in the 7 days prior to illness, and one was a Colorado resident with no history of travel outside of Colorado. (The Washington state and California residents were contacted and interviewed directly by MDH after requesting permission from the appropriate state or local health department.)

Of the Minnesota resident cases, one was an adult male, one was an adult female, and the third case was a male under 18 years of age. All three Minnesota resident cases reported diarrhea, two (66%) of three reported bloody diarrhea, one (33%) of three reported vomiting, and none reported fever. One of the three cases was hospitalized for 4 days. The four cases who were in Minnesota in the 7 days prior to illness onset (the three Minnesota residents and one Washington state resident) reported eating at one of two Chain A restaurants during that time period (although one of the cases could not be completely

sure of the restaurant location). The four cases reported eating a variety of food items at the restaurant, including barbacoa tacos, a barbacoa burrito bowl, a carnitas (pork) burrito, and a chicken burrito (Table 1).

Table 1. Information for *E. coli* O157:H7 cases exposed in Minnesota

Case number	Age (yrs.)	Onset date	Restaurant chain A meal date	Restaurant chain A location	Foods consumed	Ground beef exposures in 7 days prior to illness onset
1	17	8/11/2009	8/8/2009	Burnsville	Carnitas (pork) burrito with lettuce, peppers, onions, rice, and salsa	No ground beef exposure
2	>18	8/13/2009	8/10/2009	Blaine	Chicken burrito with rice, lettuce, and salsa	Burgers at two other restaurants
3	22	8/15/2009	Unknown	Blaine (possibly)	Barbacoa (shredded beef) tacos with lettuce and salsa	Ground beef purchased from a grocery store
4	58	8/16/2009	8/15/2009	Blaine	Barbacoa burrito bowl with rice and salsa	No ground beef exposure

The California case did not report eating at Restaurant Chain A in the 7 days prior to illness onset, but did report eating steak products prepared at two local establishments. The Colorado case patient also did not report eating at Restaurant Chain A, but reported eating ground beef from five different restaurants in the week prior to illness onset.

Eighty-two additional Restaurant Chain A patrons (including both case meal companions and those contacted through order records) were interviewed. Eight of these patrons reported experiencing diarrhea (≥ 3 stools in a 24-hour period) after a meal at Restaurant Chain A in August; however, none of those patrons reported bloody diarrhea or diarrhea durations greater than 2 days (both of which are characteristic of *E. coli* O157:H7 infection). Three patrons reported milder gastrointestinal symptoms, and the 71 remaining patrons interviewed reported no symptoms of gastrointestinal illness following a meal at Restaurant Chain A in August.

No food items were statistically significantly associated with illness by ingredient-specific analysis that included the 4 case-patients who ate at Restaurant Chain A and the 71 non-ill patron controls.

One employee at the Burnsville restaurant reported non-bloody diarrhea sometime in August lasting 2 days, and one employee at Blaine restaurant reported 6-7 days of non-bloody diarrhea at the beginning of August. The environmental assessment of the stores found some potential for cross contamination of vegetables during the preparation and handling of raw meats. The pork (carnitas) and shredded beef (barbacoa) arrived at the restaurant pre-cooked; however, the steak and chicken came in raw and

were marinated and cooked on site. After discussions with MDH Environmental Health regarding the potential for cross contamination in its restaurants, the corporate restaurant office instituted some policy changes. These changes included separate color-coded cutting boards for meat and vegetables, and dedicated meat-marinating bowls that would not be used for vegetable preparation.

The Minnesota Department of Agriculture and the Foodborne Disease Investigations Branch (FDIB) of FSIS traced back the source of raw beef used at the Restaurant Chain A locations in Minnesota; they received beef from one processor that sourced product from three different slaughter establishments (Establishments A, B, and C). According to FDIB, Establishment A was also the direct source of ground beef used by one of the restaurants where the Colorado case reported eating ground beef. Establishment A also supplied the beef to a restaurant named by the California case. FSIS conducted a food safety assessment at Establishment A, which was issued non-conformance reports and took actions to correct deficiencies.

This was an outbreak of *E. coli* O157:H7 infections likely associated with beef products that originated from a common slaughter facility and were distributed to different food establishments in multiple states. The illnesses among Restaurant Chain A patrons in Minnesota most likely were due to cross-contamination from raw steak to ready-to-eat vegetables during preparation. The two cases exposed in other states consumed ground beef and steak that could have originated from the same beef slaughter establishment that supplied steak to the implicated Restaurant Chain A locations in Minnesota.

(33)

Suspected Foodborne Bacterial Intoxications Associated with a Restaurant

September

Ramsey County

On September 8, 2009, the Minnesota Department of Health (MDH) foodborne illness hotline received complaints of gastrointestinal illness among four of five individuals who had dined together at a restaurant on September 5. This was the only recent meal the four individuals from two separate households had in common. Sanitarians from St. Paul Environmental Health were notified, 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 or diarrhea (≥ 3 loose stools in a 24-hour period) after dining at the restaurant.

Sanitarians from St. Paul Environmental Health visited the restaurant to discuss food preparation procedures. The restaurant refused to provide credit card receipts or reservation lists, so additional patrons could not be assessed for recent illness or food consumption history. One stool specimen was submitted to the MDH Public Health Laboratory for bacterial and viral testing; due to the time that had elapsed since the meal date, it was not tested for bacterial intoxication agents.

Illness histories and exposure information were obtained from five meal attendees. Three (60%) cases were identified. One person reported illness that did not meet the case definition and thus was excluded from further analysis.

All three cases reported diarrhea and cramps. No one reported vomiting or fever. The median incubation period was 10 hours (range, 8.5 to 12 hours). The median duration of illness was 15 hours (range, 8 to 19.5 hours). The stool specimen was negative for norovirus, *Salmonella*, *Shigella*, *Campylobacter*, and *E. coli* O157.

All three cases reported eating turkey, mashed potatoes with gravy, dressing, cranberry sauce, and popcorn. The lack of sufficient non-ill controls prohibited a meaningful statistical analysis of specific food exposures.

This was a foodborne outbreak associated with a restaurant. Illnesses were characteristic of a bacterial intoxication caused by either *Clostridium perfringens* or the diarrheal form of *Bacillus cereus*; however, due to the time that had elapsed before the outbreak was reported, the etiology of the outbreak could not be confirmed. The restaurant's failure to cooperate with the investigation meant we were unable to conduct additional case finding, and therefore we could not identify the food vehicle responsible for the outbreak.

(34)

Norovirus Gastroenteritis Associated with a Restaurant

October

Hennepin County

On October 9, 2009, the Minnesota Department of Health (MDH) foodborne illness hotline received a call reporting gastrointestinal illness in 15 employees of a neurology clinic. All had called in sick to work on October 9 with reports of vomiting and diarrhea. The clinic had provided party sub sandwiches, potato salad, coleslaw, and cookies to clinic employees in the Minneapolis, Fridley, and Brooklyn Center offices and boxed lunches to the clinic employees in the Plymouth, Burnsville, and Edina offices on October 7. All meals were provided by a caterer located in Hopkins, Minnesota. The caterer did not prepare any of the food but had received all prepared items from a restaurant in Saint Louis Park, Minnesota. Sanitarians from MDH Environmental Health Services and the St. Louis Park Health Department were notified, and an investigation was initiated.

Clinic employees were interviewed by phone about food consumption and illness history. A case was defined as a person with vomiting or diarrhea (≥ 3 loose stools in a 24-hour period) after eating food from the meal provided by the caterer on October 7. Controls included well employees who also consumed the meal on October 7. Stool specimens were obtained from consenting cases and submitted to the MDH Public Health Laboratory (PHL) for bacterial and viral testing.

Sanitarians from St. Louis Park Health Department visited the restaurant to evaluate food preparation and handling procedures and to conduct employee interviews. Food workers who reported recent gastrointestinal symptoms were also asked to submit stool specimens to the MDH PHL for bacterial and viral testing.

Illness histories and exposure information were obtained from 55 clinic employees. Twenty-seven (49%) cases were identified. Five additional employees reported mild illness but did not meet the case definition and were excluded from further analysis. Twenty-five (93%) cases reported vomiting, 20 (77%) of 26 reported cramps, 20 (74%) reported diarrhea, and 5 (21%) of 24 reported fever. The median incubation period was 44 hours (range, 18 to 63 hours). The median duration of illness was 40 hours

(range, 6 to 106.5 hours) for the 13 cases who had recovered at the time of interview. Four stool kits were sent to cases, and all tested positive for norovirus genogroup II.

Sixteen cases worked in the Minneapolis office, four in the Fridley office, four in Brooklyn Center clinic, and three in the Plymouth clinic. Because 24 of the 27 cases worked at clinic locations that received the party sub sandwiches instead of the boxed lunches and no controls were enrolled from the boxed lunch clinics, only the employees who worked in the Minneapolis, Fridley, and Brooklyn Center clinics were included in the case-control study. Eating party sub sandwiches on October 7 was statistically associated with illness; (24 of 24 cases vs. 17 of 22 controls; odds ratio undefined; $p = 0.01$). No other specific food items were significant in the analysis.

St. Louis Park sanitarians visited the restaurant and interviewed food workers on October 9. Forty-three food workers were interviewed, and four reported recent gastrointestinal illness. One food worker had been sick with vomiting and diarrhea on October 4 and had sought medical care; however, this food worker returned back to work on October 5 and prepared all of the food for the catered clinic event the next day, including both the party sub sandwiches and the boxed lunches. The remaining three food workers reported illness onsets on October 7; two developed illness at work. Two food workers with onsets on October 7 submitted stool kits and both tested positive for norovirus genogroup II. Nucleic acid sequencing was conducted on the two food worker samples and two case samples; the nucleic acid sequences were identical.

Food workers had good handwashing practices while observed and wore gloves when handling ready-to-eat foods. Due to the large number of ill employee found at the restaurant, all ready-to-eat foods at the restaurant that had been prepared during the 72 hours leading up to the sanitarians visit were discarded. All ice was discarded from bulk ice machines and from ice bins. Food preparation surfaces and equipment were cleaned and sanitized using a strong concentration of bleach.

This was an outbreak of norovirus gastroenteritis associated with eating a catered food prepared by a restaurant. Illness was statistically associated with consuming party sub sandwiches. A recently ill employee prepared all of the food that was delivered to the six clinics and was the source of contamination.

(35)

Norovirus Gastroenteritis Associated with a Restaurant

November

Cottonwood County

On November 9, 2009, the Minnesota Department of Health (MDH) followed up on a complaint of gastrointestinal illness received by Brown-Nicollet Environmental Health (BNEH) from an individual who ate at a restaurant in Windom, Minnesota on November 6. The complainant reported that five of five meal companions from two separate households became ill with vomiting and diarrhea approximately 36 hours after eating at the restaurant. Food items consumed were identical and included a burger (cheese, tomato, lettuce, red onion, mayonnaise, ketchup, mustard, and dill pickles) with fries and a beverage. Individuals from the separate households reported that they had no other recent events or meals in common. An outbreak investigation was initiated in collaboration with BNEH.

Staff from MDH interviewed meal companions of the complainant to obtain information on food/ beverage consumption and illness history. A case was defined as an individual who developed vomiting and/or diarrhea (≥ 3 loose stools in a 24-hour period) after consuming foods from Restaurant A in Windom. Stool specimens were obtained from consenting cases and submitted to the MDH Public Health Laboratory (PHL) for bacterial and viral testing.

A sanitarian from BNEH visited the restaurant to evaluate food preparation and handling procedures. The employee schedule, illness log, and contact information were collected by the sanitarian. MDH staff interviewed restaurant employees regarding recent illness history and job duties. Food workers reporting recent gastrointestinal illness were asked to submit stool specimens to MDH PHL for bacterial and viral testing. The sanitarian also attempted to collect patron credit card receipt information, but was informed by the restaurant that this information was not available.

Illness histories and exposure information were obtained from all five of the individuals in the complainant's party, and all met the case definition. All cases reported diarrhea, vomiting, and cramps. None reported fever or bloody stools. The median incubation period from the restaurant meal was 28 hours (range, 27 to 29 hours). The median duration of illness was 33 hours (range, 32 to 34 hours) for the two cases who had recovered at the time of the interview. Stool samples were collected from all of the cases; all samples tested positive for norovirus genogroup II.

Interviews were conducted for 15 employees; three (20%) reported experiencing recent gastrointestinal illness. These employees had all been working on the complainant's meal date. However, all three reported onset dates consistent with or following that of the original complainants. Two of the ill food workers submitted stool specimens to the MDH PHL; both specimens tested positive for norovirus genogroup II. Nucleic acid sequencing was conducted on the samples, and the sequence was identical to that identified in the patrons' samples.

No additional complaints were received by the restaurant, and no improper food preparation or handling practices were observed. The sanitarian discussed with restaurant staff the importance of handwashing for the prevention of norovirus infection, and indicated that reporting of employee illness is an area that required further education. Additionally, the restaurant was informed that any employee with vomiting and/or diarrhea must be excluded from working for 72 hours after the resolution of symptoms.

This was a foodborne outbreak of norovirus gastroenteritis associated with a restaurant in Windom, Minnesota. The likely source of contamination was one or more unidentified infected food workers who had contact with ready-to-eat food items, as the three ill employees interviewed did not report being ill prior to or on the complainants' meal date.

(36)

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

November

Multiple counties/Multiple states

On December 2, 2009, the Minnesota Department of Health (MDH) Public Health Laboratory (PHL) identified an *Escherichia coli* O157:H7 isolate with the two-enzyme pulsed-field gel electrophoresis (PFGE) pattern designation MN23ECB20 (PulseNet designation EXHX01.0248/EXHA26.0569), and requested that the Centers for Disease Control and Prevention (CDC) PulseNet team check for isolates

in other states that were indistinguishable by PFGE. The next day, PulseNet identified 13 matching isolates in 11 states: California, Colorado, Florida, Iowa, Michigan, Minnesota, Nevada, Oklahoma, South Dakota, Tennessee and Utah. The Minnesota case was interviewed by MDH staff on December 6 about illness history and potential exposures. During the interview the case reported eating at numerous restaurants and consuming a pink hamburger at a friend's house in the 7 days prior to illness onset. On December 7 and 8, epidemiologists from several states shared information about their cases. The Minnesota Department of Agriculture (MDA) was notified of the cluster. On December 8, CDC initiated a multi-state investigation. By December 10, seven of eight cases reported eating ground beef. Information on consumption of steaks was available for seven cases. Of those, five cases in different states reported eating steaks at family-style restaurants, including four at Chain A and one at Chain B. One additional case ate at Chain A but the foods consumed were unknown. Of the five cases who reported eating steaks at family-style restaurants, four reported eating their steak rare. The first multi-state conference call was held on December 11.

Cases were identified through routine laboratory surveillance and in Minnesota were defined as Minnesota residents with a laboratory-confirmed *E. coli* O157 infection with an isolate of the outbreak PFGE subtype, MN23ECB20. Phone interviews regarding illness history and potential exposures were conducted for all cases. A questionnaire developed by CDC was used in addition to the Minnesota routine surveillance form.

Invoices for ground beef and steak consumed by cases were collected by MDA and City of Saint Cloud environmental health staff. MDA, in conjunction with the United States Department of Agriculture Food Safety and Inspection Service (USDA FSIS), conducted traceback investigations to determine the source of the ground beef and steak, and to identify common sources of beef consumed by the Minnesota cases and cases in other states.

Information collected from case interviews and tracebacks was shared with the CDC, USDA FSIS, and other states. Case-isolates were submitted to the CDC for subtyping using multiple-locus variable-number tandem repeat analysis (MLVA).

Minnesota Epidemiologic Investigation: Five cases with *E. coli* O157 MN23ECB20 isolates were identified in Anoka (one case), Stearns (one case) and Benton (three cases) Counties; specimen collection dates from November 24, 2009 to January 15, 2010. Dates of illness onset ranged from November 23, 2009 to January 14, 2010. All five cases were male. The median age of cases was 54 years (range, 20 to 80 years). All five cases reported diarrhea and had blood in their stool, one of four (25%) had fever, and one of four (25%) had vomiting. Only two cases had recovered at the time of the investigation; the duration of illness for those two cases was 4 and 9 days, respectively. Four of the five (80%) of the patients were hospitalized. The median duration of hospitalization was 10 days (range, 2 to 19 days). No cases developed hemolytic uremic syndrome, but one (20%) case died. Three of the cases lived in two unrelated residential facilities. One of these cases was considered a secondary case and therefore was excluded from further analysis.

The four primary case isolates matched each other, and isolates submitted to the CDC from other states, by MLVA.

Among the four primary cases, all had a history of ground beef consumption in the 7 days before their date of illness onset. One of the four (25%) also ate a steak at a family-style restaurant.

Multi-State Epidemiologic Investigation: According to the CDC, 25 cases in 17 states (California, Colorado, Florida, Hawaii, Iowa, Indiana, Kentucky, Michigan, Minnesota, Nebraska, Nevada, Ohio, Oklahoma, South Dakota, Tennessee, Utah, and Washington) with onsets from October 3 to January 31, 2010 were identified; 12 were hospitalized, 1 developed HUS, and 1 died. The median age of patients was 30 years (range, 14 to 87 years). Of the 22 cases interviewed, 14 (64%) reported eating steak at a family-style restaurant; nine (41%) ate at a Chain A restaurant. Of the 14 who ate steak, 9 (64%) ate a 7-oz. sirloin, 1 (7%) reported eating sirloin tips, and 4 (29%) could not recall the cut of steak. All patients who ate steak ate them rare, medium-rare, or medium. Among the eight cases who did not report eating steak, seven (88%) ate ground beef. Traceback investigation of the steaks eaten by cases at Chain A determined that the steaks were mechanically-tenderized and came from a single processor in Oklahoma, Processor A.

On December 24, 2009, the processor issued a voluntary recall of 248,000 pounds of beef products, including mechanically-tenderized steak and other products distributed to restaurants, including Chain A.

Traceback Investigation of the Minnesota Case Exposures: Only one of the four primary Minnesota cases reported eating steak at a restaurant in the 7 days prior to illness onset. An environmental health specialist from the City of St. Cloud obtained invoices from this restaurant and forwarded them to MDA for review. It was determined that the steak eaten by the case did not come from Processor A and that the restaurant had not received any beef products included in the recall. Furthermore, there were no other cases or complaints of illness associated with the restaurant.

One case did not have any information about the source of ground beef that he ate at a friend's home. MDA traced back all ground beef consumed by the other three primary cases. All three cases ate ground beef purchased at different retailers or points of service, including two grocery stores and a day program. The two grocery stores did not grind or package any ground beef; they purchased pre-packaged ground beef (80% lean 3-lb. chubs, and 80% lean 1-lb. packages, respectively) from Distributor A in St. Michael, Minnesota. The day program obtained pre-packaged ground beef from a distributor, Distributor B in Cloquet, Minnesota. This distributor did not do any grinding, processing, or packaging of the ground beef; they purchased the pre-packaged ground beef (80% lean packages) from Distributor A in St. Michael, Minnesota. Distributor A did not grind, process, or package the ground beef consumed by any of the three cases. The ground beef eaten by each of the cases was traced back to three different Producer B plants in Illinois, Kansas, and Texas. All three Producer B plants are slaughter facilities, but all three added lean finely texturized beef product from Producer C in South Dakota. In communication with USDA FSIS, it was noted that one of the suppliers of trim for Producer C was Producer D (location unknown). Producer D was also a supplier of beef products to Processor A prior to the recall. FSIS was unable to document overlap in dates of products sold by Producer D to Producer C and the dates of product sold by Producer C to the different Producer B plants. USDA FSIS concluded that due to the lack of documented date overlaps, they were not able to conclusively implicate Producer D as the ultimate source of ground beef eaten by the Minnesota cases.

In addition to the Minnesota cases, three cases in Hawaii, Indiana, and Florida consumed beef products traced back to a Colorado plant supplied by the same Producer D plant that supplied Processor A. As of the writing of this report, details of this portion of the investigation have not been made available to the Minnesota investigators.

This was a multi-state outbreak of *E. coli* O157:H7 infections associated with consumption of ground beef and mechanically tenderized steaks. Cases in multiple states occurred during the same time period, and case-isolates were indistinguishable both by PFGE (two enzymes) and MLVA. This strongly suggests a common source outbreak. The most likely scenario is that contaminated beef products from a common source were further processed into steaks and ground beef and both types of products caused illness. The investigation identified a potential common denominator in a company that supplied beef products to multiple plants that in turn supplied steaks or ground beef consumed by cases. However, the traceback investigation was not considered sufficiently strong to conclusively implicate that company.

(37)

Norovirus Gastroenteritis Associated with a Restaurant

November

Dakota County

On November 17, 2009, the Minnesota Department of Health (MDH) foodborne illness hotline received a complaint of gastrointestinal illness among two patrons from separate households who had eaten at a restaurant in Eagan, Minnesota on November 15. Sanitarians from MDH Environmental Health Services were notified, and an investigation was initiated.

A list of patrons from November 14 and 15 was obtained from the restaurant. Epidemiologists from MDH interviewed restaurant patrons to obtain information on food/beverage consumption and illness history. A case was defined as a restaurant patron who subsequently developed vomiting and/or diarrhea (≥ 3 loose stools in a 24-hour period). Stool specimens from both individuals from the original complainant group were submitted to the MDH Public Health Laboratory for bacterial and viral testing.

A sanitarian from MDH Environmental Health Services 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 36 restaurant patrons. Four (11%) cases were identified. All four cases reported diarrhea, three (75%) reported vomiting, one (25%) reported cramps, and one (25%) reported fever. The median incubation period was 35 hours (range, 32 to 38 hours) for the two cases with known onset times. Both stool samples tested positive for norovirus genogroup II. Nucleic acid sequencing was conducted on the samples, and the sequences were identical. No other bacterial or viral pathogen was identified.

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

Illness histories and job duty information were obtained from 79 employees; seven employees reported either being recently ill with gastrointestinal illness (n=4) or having a sick child at home (n=3). Onset dates ranged from November 13 to November 18. Employees reporting illness performed a number of different job duties at the restaurant, including food preparation. An MDH sanitarian observed employees having bare-hand contact with whole loaves of bread that were cut for serving. Additionally, employees observed preparing salads were observed only wearing a glove on one hand.

This was a foodborne outbreak of norovirus gastroenteritis associated with a restaurant. A specific food vehicle was not identified. Several ill employees were identified, and one or more of these ill employees likely were responsible for contaminating the food items.

(38)

Suspected Norovirus Gastroenteritis Associated with a Country Club

November

Ramsey County

On December 4, 2009, the Minnesota Department of Health (MDH) foodborne illness hotline received a call from the general manager of a country club regarding a complaint they had received about a banquet that had been held at their establishment on November 24. The organizer of the event had contacted the club on December 2 to report that approximately 36 of 110 people who attended the buffet dinner had reported becoming ill with vomiting or diarrhea. Sanitarians from St. Paul Environmental Health were notified, and an investigation was initiated.

A list of banquet attendees was obtained from the event organizer. Epidemiologists from MDH e-mailed a questionnaire on food/beverage consumption and illness history to all event attendees. Respondents could either fill out the questionnaire and return it to MDH by fax or they could complete the interview by telephone. A case was defined as a banquet attendee who subsequently developed vomiting and/or diarrhea (≥ 3 loose stools in a 24-hour period).

A sanitarian from St. Paul Environmental Health visited the club to evaluate food preparation and handling procedures and to interview staff regarding recent illness and job duties.

Illness histories and exposure information were obtained from 61 banquet attendees. Twenty-nine (48%) cases were identified. Four people reported illness but did not meet the case definition, and thus were excluded from further analysis.

Twenty-six (93%) cases reported vomiting, 24 (86%) reported diarrhea, 21 (81%) of 26 reported cramps, and 17 (63%) of 27 reported fever. The median incubation period was 29 hours (range, 7 to 53 hours). The median duration of illness was 47 hours (range, 19 to 130 hours).

Consumption of fruit (25 of 27 cases vs. 18 of 26 controls; odds ratio, 5.6; 95% confidence interval, 0.90 to 44.0; $p = 0.04$) was borderline statistically significant. No other food items approached statistical significance.

St. Paul Environmental Health and MDH obtained illness histories and job duty information from 13 employees; four employees reported being recently ill with gastrointestinal symptoms. However, two of the employees who denied illness when interviewed by MDH were previously identified as having had vomiting and diarrhea on a list compiled by club management prior to reporting the complaint to MDH. One additional employee was named on this list as having vomiting and diarrhea; however, when staff from MDH tried to contact him he hung up on them and would not return future calls. No stool specimens were submitted by either patrons or food workers.

This was a foodborne outbreak of suspected norovirus gastroenteritis associated with a banquet served at a country club. The etiologic agent was not identified. However, the symptoms and incubation

periods were characteristic of norovirus gastroenteritis. Fruit was implicated as the likely vehicle of transmission; the available evidence indicates that one or more ill or recently ill employees were the ultimate source of contamination of the food item.

(39)

***Salmonella* subspecies IV Infections Associated with a Potluck**

November

Blue Earth County

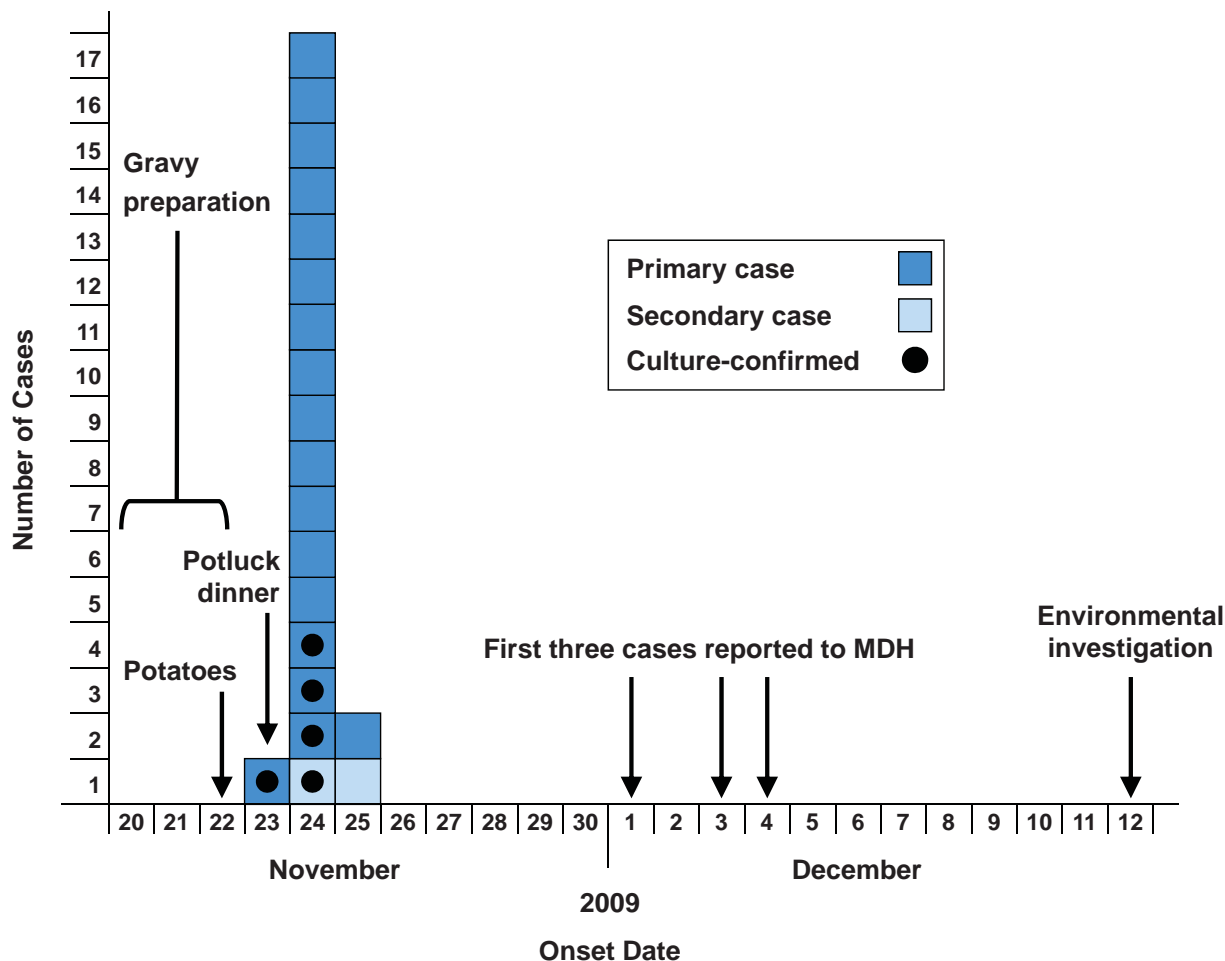
From December 1 to December 4, 2009, three case isolates of *Salmonella enterica* subspecies IV 6,7:z4,z24:- with indistinguishable pulsed-field gel electrophoresis patterns were received at the Minnesota Department of Health (MDH) Public Health Laboratory (PHL). During routine surveillance interviews conducted by MDH staff, all three cases reported attending the same potluck dinner prior to their illness onset; the potluck dinner was held on November 23 in Madison Lake, Minnesota. Cases of *Salmonella* IV have previously been associated with reptiles. An investigation was initiated.

A list of potluck attendees was obtained from the event organizer. Potluck attendees were interviewed about illness history, foods they prepared for and consumed at the event, and pet ownership. A case was defined as a potluck attendee who developed fever and diarrhea (≥ 3 loose stools in 24 hours) or from whom *Salmonella* IV matching the outbreak strain was isolated. Stool samples were collected from selected ill potluck attendees.

Nineteen days after the event, environmental samples were collected from a food preparer's house where two pet bearded dragons were kept. Samples were collected from the kitchen, living area and bathroom of the house, inside the dragons' terrarium, and the environment surrounding the dragons' terrarium by using sponge swabs. Cloacal swabs of the bearded dragons and feces from the dragons' terrarium were also collected. Environmental and animal samples were cultured for *Salmonella* at the MDH PHL. Frozen leftover turkey from the potluck meal was tested for *Salmonella* at the Minnesota Department of Agriculture (MDA) laboratory.

Sixty-six of 73 potluck attendees were interviewed and 19 cases were identified (overall attack rate, 29%) (see epidemic curve). Two of the 19 cases were classified as secondary cases. Eighteen potluck attendees (27%) reported gastrointestinal symptoms that did not meet the case definition, and 29 (44%) reported no illness. The median age of the cases was 27 years (range, 7 to 42 years). The median incubation period for the 12 cases for whom incubation periods could be calculated was 19 hours (range, 3 to 26 hours). Eighteen cases (95%) reported diarrhea and headaches, 16 (84%) fever, 10 (53%) muscle aches, 3 (16%) vomiting and 2 (11%) reported bloody diarrhea. The median duration of illness was 5 days (range, 1 to 11 days). Five (26%) cases reported visiting a healthcare provider because of their illness. No cases were hospitalized. *Salmonella* IV with the outbreak PFGE subtype was isolated from five potluck attendees. Two patients submitted serial stool samples, and one demonstrated shedding of *Salmonella* IV in stool after recovery (37 days after illness onset).

Salmonella subspecies IV Cases Associated with a Potluck, by Illness Onset Date



Consuming gravy was the only food item associated with illness (16 of 32 exposed ill vs. 1 of 12 unexposed ill, relative risk, 6.0; $p = 0.02$). The gravy had been prepared in a private home, and this home was the only one in which reptiles were kept. The reptiles were two bearded dragons kept together in a terrarium in the living room of the home. The gravy preparer, who owned the two bearded dragons, reported no history of illness in the household, and no stool samples were collected to identify asymptomatic shedding among household residents. The bearded dragons' owner did not attend the potluck dinner but did prepare items for the event in the home. During the 3 days before the event; foods prepared included turkey, potatoes, gravy, and two salads. The gravy had been prepared over the course of 3 days (see epidemic curve), and three turkeys had been prepared for the potluck dinner and other events. Each turkey had been baked, carved and frozen, with turkey drippings collected and added as a component of the gravy; the gravy was heated, but never boiled, and subsequently refrigerated. The gravy was then rewarmed at the potluck dinner. The gravy preparer also supplied ingredients and assisted in preparation of mashed potatoes at another potluck attendee's home the day before the event (see epidemic curve). Four residents of the household in which the gravy preparer assisted in the potato preparation reported gastrointestinal illness; two of these residents met the case definition and were culture-confirmed. One person had experienced illness onset 3 hours after eating at the potluck dinner (24 hours after potato preparation). The other person in the household had experienced illness onset the following day; this person did not attend the potluck event but had consumed mashed potatoes that had

been prepared. Leftover, frozen turkey from the event tested negative for *Salmonella* species. No other potluck items remained for testing.

Salmonella was identified in numerous environmental and animal samples collected from the home. Both the outbreak PFGE subtype of *Salmonella* IV and *Salmonella* subspecies I, serotype Labadi were identified from the contents of the vacuum-cleaner bag. *S. Labadi* was also cultured from a cloacal swab of one of the bearded dragons, as well as from the environmental samples: on the glass inside and outside the reptiles' terrarium; bearded dragon feces; sand, water, plants and rocks inside the terrarium; an oil painting above the terrarium; a stairway banister railing near the terrarium; the knob of the bathroom door; the bathroom sink drain; and the kitchen sink drain.

The gravy preparer reported that the bearded dragons had not been taken out of their terrarium during preparation of the potluck food, and that an adolescent in the household was primarily responsible for providing food and water to the dragons and cleaning the terrarium. The adolescent was instructed to clean the terrarium by using the nearby bathroom; however, the gravy preparer reported that the adolescent might have cleaned the reptiles' dishes and refilled the dragons' water dish in the kitchen sink during the 3 days of meal preparation. The gravy preparer recalled having received education regarding cleaning and disinfecting terrarium items and other precautions (e.g., not keeping the reptiles in children's bedrooms or in the kitchen, or letting the reptiles roam free in the house). The gravy preparer reported having vacuumed once during the 19 days between the potluck event and collection of environmental samples.

This was a foodborne outbreak of *Salmonella enterica* subspecies IV infections associated with gravy served at a potluck. The gravy was prepared in a private home that kept two bearded dragons. The bearded dragons were likely the original source of the contamination. Reptiles pose a community threat when food for public consumption is prepared in households with reptiles. Education is needed on *Salmonella* risk from reptiles in terms of environmental contamination of food preparation surfaces. A description of the outbreak was published in *Zoonoses and Public Health* (2011; vol. 58:560-566).

(40)

Norovirus Gastroenteritis Associated with a Resort

December, 2009-January, 2010

Otter Tail County

On December 22, 2009, the Minnesota Department of Health (MDH) foodborne illness hotline received a call from a party of 15 families who stayed at Resort A in Ottertail, Minnesota, on December 18, 19, and 20. An investigation was immediately initiated. Subsequent complaints about the resort were received both by the resort and by MDH from people who had stayed at the resort during the weekends of December 11, December 25, January (2010) 1, and January 8.

MDH environmentalists received a list of complainants who contacted Resort A, and MDH staff compiled a list of complainants who had called the foodborne illness hotline. MDH staff interviewed all complainants about food consumption, water park use, and illness history. A case was defined as a person who stayed at Resort A and subsequently developed vomiting and/or diarrhea (≥ 3 loose stools in a 24-hour period). Primary cases were defined as the first case in a household; multiple cases in a household were classified as primary if they had the same onset date. Stool kits were sent to several ill patrons.

MDH environmentalists conducted an environmental health assessment at Resort A. The manager was asked about employee illness during December. Staff was interviewed, and food preparation practices were observed and discussed. The water park at Resort A was also inspected.

Two hundred fifty-nine patrons of Resort A were interviewed, and 120 (46%) met the case definition. Illness onset dates ranged from December 13 through January 14. Of the 120 cases, many were possible secondary cases within families. Seventy-four primary cases (62% of the total ill) and 46 secondary cases were identified. Of the 74 primary cases, 62 (84%) had vomiting, 51 (69%) had diarrhea, 44 (59%) had cramps, 11 (15%) had fever, and one (1%) case had bloody stools. The median incubation period could not be determined because no specific food items, meals, or water exposures were associated with illness. The median duration of illness among primary cases was 15.5 hours (range, 3 to 76 hours). Ten ill patrons submitted stool samples and nine tested positive for norovirus. Nucleic acid sequencing was performed on samples from patrons who stayed December 11, December 18, January 1, and January 8; the sequences were identical. No samples were obtained from ill patrons from the weekend of December 25 since these complaints came in after the investigation was concluding and interventions were being implemented.

Twenty-five patrons reported mild illness symptoms that did not meet the case definition. Some of these reported symptoms included headaches and nausea from strong chlorine smells in the pool area.

An analysis was initially conducted including all patrons (primary and secondary cases included) who stayed the weekend of December 18, since they were the first to report illness. Staying at Resort A on Friday night (19 of 33 cases vs. 9 of 19 controls; odds ratio [OR], 2.87; 95% confidence interval [CI], 0.99 to 8.39; Fisher 2-tailed $p = 0.05$), eating at Resort restaurant A (11 of 17 cases vs. 0 of 28 controls; OR, undefined; 95% CI lower limit, 4.49; Fisher 2-tailed $p < 0.001$), consuming food from the taco bar at Resort restaurant A (14 of 28 cases vs. 0 of 28 controls; OR, undefined; 95% CI lower limit, 6.97; Fisher 2-tailed $p < 0.001$), and Saturday breakfast at Resort restaurant B (11 of 33 cases vs. 0 of 28 controls; OR, undefined; 95% CI lower limit, 3.56; Fisher 2-tailed $p = 0.002$) were statistically associated with illness. An analysis including only primary cases showed eating at Resort restaurant A (4 of 14 cases vs. 0 of 28 controls; OR, undefined; 95% CI lower limit, 2.08; Fisher 2-tailed $p = 0.009$), consuming food from the taco bar at Resort restaurant A (5 of 14 cases vs. 0 of 28 controls; OR, undefined; 95% CI lower limit, 3.05; Fisher 2-tailed $p = 0.002$), and Saturday breakfast at Resort restaurant B (5 of 16 cases vs. 0 of 28 controls; OR, undefined; 95% CI lower limit, 2.58; Fisher 2-tailed $p = 0.004$) were statistically associated with illness. Subsequent illnesses could have been associated with contact with already ill patrons (either in the water park or restaurants), contact with ill family members, or contact with contaminated environmental surfaces; therefore further data analysis was not attempted.

After guests were interviewed, reports of illness among patrons who stayed the previous weekend (December 11) were received; therefore, the December 18 weekend illnesses likely represented an ongoing problem.

Interviews of resort staff identified 22 employees with symptoms of vomiting and/or diarrhea. One additional employee became ill after interview and was excluded from work. Known exact onsets ranged

from December 12 through January 6. One employee had illness sometime in early December, but didn't recall an exact date.

Twelve of the ill employees were food service staff, four worked in the waterpark, and the rest were other hotel staff. MDH environmentalists discussed the importance of handwashing and general food safety practices with staff as well as the importance of excluding ill employees and reporting employee illness and customer illness to MDH.

MDH environmentalists recommended the following to Resort A staff:

- 1) Implement a screening program to ask each employee at the start of each shift (regardless of job duties) whether they or anyone in their household had been ill with vomiting and/or diarrhea in the last 72 hours and implement appropriate restrictions/exclusions.
- 2) Educate housekeeping staff about how to keep themselves safe while cleaning rooms (e.g., wearing personal protective equipment like gloves, handwashing); to pay particular attention to high touch areas like phones, remote controls, and ice buckets (which were reportedly used as vomit receptacles by some patrons); to clean bathrooms last in order to avoid contaminating other parts of the room; and to avoid cross-contamination between rooms by using disposable cloths.
- 3) Stop vacuuming the carpets (to the extent possible) and use steam cleaners instead to avoid aerosolization of viral particles.
- 4) Launder all bed linens at the highest possible temperature.
- 5) Call a chemical supplier and obtain cleaning products that are effective against norovirus.
- 6) Close and superchlorinate the pools.
- 7) Call the health department immediately with any additional complaints and refer callers to MDH.

Multiple issues were identified with the pool areas at Resort A. A hot tub, kiddie pool, and lazy river with a water slide were all available to guests. All pool areas were superchlorinated multiple times; however, pH and chlorine imbalances were continually identified. On January 4, an MDH environmentalist talked with the pool manager. Employees in the pool area did not know there was a problem with norovirus and had not been screened for illness. The kiddie pool and hot tub were drained and superchlorinated, and the pool areas closed down. The pool log from January 2 showed a free chlorine level of 1.85 and combined chlorine of 2.26 in the kiddie pool. The water park pool pH was between 8 and 8.2. Continual problems with the balance of pH and chlorine levels in the pools indicated that the facility would probably need to incorporate the use of UV light as a sanitation measure.

Routine cleaning and sanitation at the facility had to be repeated continually since ill guests were identified on an ongoing basis. When illnesses were reported from the weekend of January 1 also, Resort A voluntarily closed on January 6 for 72 hours to undergo more comprehensive cleaning. Resort A did a press release on January 6 to explain their voluntary shut down and describe norovirus infections to the community.

While the resort was closed, staff re-cleaned carpets, pool toys and surfaces, used disposable cleaning cloths in rooms, and continued to screen employees. Records were then being kept on dates and times of employee screens for illness, and employees were excluded for 72 hours after recovery from illness.

This was an outbreak of norovirus gastroenteritis associated with Resort A in Ottertail, Minnesota. Foodborne transmission was documented, but other sources of exposure such as contaminated pool

areas and contaminated guest rooms also likely contributed to the outbreak. Employee illness, pool chlorination issues, and illness in guests while at the resort likely all played parts in the ongoing transmission of norovirus at the facility.

(41)

Norovirus Gastroenteritis Associated with a Groom's Dinner

December

Crow Wing County

On January 4, 2010, the Minnesota Department of Health (MDH) foodborne illness hotline received an illness complaint associated with a wedding reception that was held at an entertainment center in Brainerd on January 1. The complainant reported approximately 22 illnesses among 150 reception attendees. They also reported that a groom's dinner was held on December 31 at a private residence and that individuals at the home where the groom's dinner was held were ill with gastrointestinal symptoms the previous week. MDH Environmental Health Services (EHS) was notified and an investigation was initiated on January 4.

The complainant provided MDH with a list of groom's dinner and wedding reception attendees, who were then interviewed by MDH staff about event attendance, food consumption, and illness history. A case was defined as a wedding event attendee with vomiting or diarrhea (≥ 3 loose stools in a 24-hour period) following the event. Stool samples collected from four ill wedding event attendees were submitted to the MDH Public Health Laboratory for bacterial and viral testing.

Interviews were completed for 56 wedding event attendees. Twenty-seven (48%) individuals met the case definition. Two individuals reported illness that did not meet the case definition and were excluded from further analysis.

The median incubation period for the cases was 32.5 hours (range, 23 to 96 hours). The median duration of illness was 24 hours (range, 5 to 94 hours). Twenty-three cases (85%) reported diarrhea, 19 (17%) reported vomiting, 19 (70%) reported cramps, 10 (40%) reported fever, and none reported bloody stools. Three stool samples submitted by ill groom's dinner attendees tested positive for norovirus genogroup II.

The univariate analysis demonstrated that attending the groom's dinner was significantly associated with illness (19 [95%] of 20 exposed vs. 8 of 34 unexposed; risk ratio, 61.8; 95% confidence interval, 6.53 to 1470; $p < 0.001$). Only one groom's dinner attendee did not report illness, preventing a meaningful statistical analysis of foods consumed at the groom's dinner. Neither attending the wedding reception nor consuming any food item served at the wedding reception was statistically associated with illness.

This was a foodborne outbreak of norovirus gastroenteritis associated with a groom's dinner. A specific food vehicle from the groom's dinner was not identified because of the lack of non-ill groom's dinner attendees. The source of contamination was likely one or more ill individuals in the household in which the groom's dinner was held.

Suspected Norovirus Gastroenteritis Associated with a Restaurant

December

Washington County

On January 5, 2010, the Minnesota Department of Health (MDH) foodborne illness hotline received an illness complaint associated with a restaurant in Cottage Grove. The complainant reported that 3 of 10 meal companions from multiple households developed gastroenteritis after eating at the restaurant on December 23. Washington County Public Health & Environment (WCPHE) was notified, and an investigation was initiated on January 5.

On January 7, 2010, the MDH foodborne illness hotline received a second illness complaint associated with the same restaurant. The second complainant reported that 3 of 4 meal companions from the same household developed gastroenteritis after eating at the restaurant on December 21.

WCPHE sanitarians visited the restaurant on January 6 to evaluate food preparation and handling procedures and to interview food workers. The complainants and their meal companions were interviewed by MDH staff 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.

Illness histories and exposure information were obtained from the 14 individuals in the two complainant groups; 6 individuals met the case definition. The median incubation period for the cases was 17.5 hours (range, 5 to 47 hours). The median duration of illness was 42 hours (range, 1 hour to 5 days). All six cases reported vomiting, five (83%) reported cramps, three (50%) reported diarrhea, one (17%) reported fever, and none reported bloody stools. Due to delayed notification of the outbreak no stool samples were collected.

Cases reported eating a variety of foods including honey BBQ boneless wings, steaks, mashed potatoes, chicken tenders, and cheeseburgers. No food items were statistically associated with illness.

Upon inspection, WCPHE sanitarians identified four additional patron illness complaints received by the restaurant from December 23 to 29. The restaurant failed to collect contact information for the complainants and did not notify WCPHE as required by the Minnesota foodcode. This contributed to delayed outbreak identification and prevented MDH from contacting the additional complainants. Three of the four additional complainants reported becoming ill with vomiting and diarrhea after eating at the restaurant.

The employee illness log revealed a total of five unspecified employee illnesses from December 19 to 30. WCPHE sanitarians and MDH staff interviewed 27 employees and identified two employees with recent gastrointestinal illness. A server reported developing diarrhea on December 24, and a cook reported developing vomiting on December 29.

This was a foodborne outbreak of gastroenteritis associated with a restaurant. Although the etiology was not confirmed, the symptoms, incubation periods, and illness durations were characteristic of norovirus. No specific food vehicle was identified. However, two ill employees were identified, suggesting that the source of contamination was likely an ill food worker. Management and employees were educated

on the importance of handwashing, the need to exclude employees for at least 72 hours after the last diarrhea or vomiting episode, and the need to immediately report patron illness complaints to WCPHE.

(43)

Suspected Foodborne Bacterial Intoxications Associated with a Correctional Facility

December

Chisago County

On December 29, 2009, the Minnesota Department of Health (MDH) foodborne illness hotline received a report of gastrointestinal illness among offenders at a unit of a correctional facility. Minnesota Department of Corrections (MDC) staff reported that 24 of 325 individuals in the unit became ill with vomiting and diarrhea on December 25 and 26. No additional illnesses were identified among inmates after December 26. MDH Environmental Health Services (EHS) was notified, and an investigation was initiated.

MDC provided MDH epidemiologists with a line list documenting offender onset date, recovery date, and symptoms and provided a menu of meals served at the facility during the week before the illnesses occurred. Inmates were not able to be interviewed directly. A case was defined as a correctional facility inmate who was reported to have developed vomiting and/or diarrhea on or after December 25. An EHS sanitarian conducted an environmental assessment of the prison kitchen on December 30.

Illness histories were documented for 228 inmates; 167 (73%) met the case definition. Three inmates had illness onsets before December 25 and were excluded from further analysis. One hundred and sixty-four cases (98%) reportedly had diarrhea, 51 (31%) had vomiting, and 4 (2%) had fever. Case onsets ranged from 4:00 p.m. on December 25 through 4:00 p.m. on December 26. The median duration of illness was 24 hours (range, 2 to 127 hours) for the 157 cases with documented illness duration.

A specific food vehicle could not be assessed with an analytic study due to the inability to interview inmates regarding exposures. However, MDC staff indicated that no illnesses in inmates outside of the unit were observed and the only food item served to the unit and not to the general facility population was the pulled chicken served on December 25. The median incubation period calculated from the pulled chicken dinner on December 25 was 15 hours (range, 5 to 68 hours) for the 148 cases with documented onset times.

The environmental assessment identified various critical temperature control problems. Critical time and temperature measurements were not taken consistently in accordance to the prison's HACCP plan. At the time of inspection, prison kitchen staff reported that the pulled chicken was prepared on December 24 and stored in large plastic containers stacked on top of each other in the walk in cooler; this likely prevented the chicken from being cooled in an appropriate time frame. Additionally, no cooking, cooling, or reheating temperatures were taken for the pulled chicken. Employees of the prison kitchen were trained to ensure that all staff follow correct handling procedures for food preparation, service, and cooling.

This was an outbreak of suspected bacterial intoxications associated with a correctional facility. The etiology was not confirmed, but the distribution of incubations and symptoms were characteristic of *Clostridium perfringens*. The suspected vehicle, pulled chicken, is also consistent with a *C. perfringens*

etiology. Potential for temperature abuse in the preparation of the pulled chicken was observed and measures were taken to correct temperature control in the future.

Probable Foodborne Outbreaks

(1)

Suspected Norovirus Gastroenteritis Probably Associated with a Restaurant

January

Hennepin County

On January 14, 2009, the Minnesota Department of Health (MDH) foodborne illness hotline received a complaint of gastrointestinal illness from a patron who had eaten lunch at a restaurant in Crystal on January 11. This patron had dined with extended family members who lived in different households, and these family members were also reporting similar gastrointestinal symptoms. MDH notified the Hennepin County Public Health Department (HCPHD) epidemiology and environmental health units and an investigation was initiated.

HCPHD epidemiology staff interviewed the other patrons in the dining party identified by the original complaint. 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 on January 11.

On January 15, HCPHD sanitarians inspected the restaurant and began interviewing employees about illness history and work duties. The environmental health assessment of the restaurant focused on employee illness, flow of food, food preparation, and food storage procedures.

The complainant group consisted of 12 extended family members from three separate households; however, two of the family members were infants who did not eat or drink any items at the restaurant. The three households reported no other common exposures, no recent shared meals, and had not recently eaten at other common restaurants.

Of the 10 family members who ate at the restaurant, eight met the case definition. Five (62%) of the cases were male. The median case age was 31 years (range, 2 to 53 years). All eight cases reported diarrhea, seven (87%) vomiting, five (62%) fever, and one (12%) cramping. The median incubation was 36.5 hours (range, 2.5 to 37.5 hours). The ill patron with a 2.5 hour incubation reported feeling “a little off” while at the restaurant, but did not experience any gastrointestinal symptoms during this meal. The symptoms and incubation periods of the other cases suggested norovirus gastroenteritis, which has a 24-48 hour incubation period; therefore, the case with the 2.5 hours incubation would have been exposed somewhere other than the restaurant. This case did spend a few hours at the restaurant with her extended family members, but could not recall any other contact when she was having symptoms. Neither a 7 month-old infant nor an 8 year-old child in this case’s house reported gastrointestinal symptoms. The median duration of illness was 16 hours (range, 2 to 26 hours) for the five cases that had recovered at the time of interview. None of the cases agreed to submit a stool sample to the MDH laboratory for bacterial and viral testing.

A wide variety of foods from the buffet were consumed by the dining group. All eight cases consumed salads and vegetables from the salad bar, while the two non-ill family members did not eat any items from the salad bar. Food item recall was complicated by the wide array of options. Common foods mentioned during interview included chicken, baked fish, ham, roast beef, pizza, popcorn shrimp,

mashed potatoes, cornbread, baked goods, and soft-serve ice cream. Beverages included coffee, tea, milk, soda, and ice water.

Thirty one (69%) of the restaurant's 45 employees were interviewed. HCPHD epidemiology and environmental health staff attempted to contact all restaurant employees; however, two refused interview, five had disconnected or incorrect telephone information, and seven employees did not return several messages left by HCPHD. None of the employees interviewed reported any recent gastrointestinal illness. HCPHD sanitarians noted overall compliance with food code requirements for food preparation. The sanitarians further stressed the importance of proper handling of food and beverages, use of gloves when handling ready-to-eat foods, good handwashing, thorough disinfection, and exclusion of ill employees. The restaurant received no additional complaints and no reports of employee illness.

This was a probable foodborne outbreak of gastroenteritis among a group who dined at a restaurant. The etiologic agent was not identified, but the distribution of incubation periods and symptoms were characteristic of norovirus gastroenteritis. The vehicle of transmission and source of contamination were not identified. A ready-to-serve item on the buffet may have been contaminated by a food worker or patron. However, person-to-person transmission from the family member with the early onset is also a plausible mechanism for this outbreak.

(2)

Norovirus Gastroenteritis Probably Associated with a Private Party

February

Olmsted County

On February 3, 2009, Olmsted County Public Health Service (OCPHS) received a complaint of illness among people who attended at private event at the complainant's home on January 31. Six of 16 attendees reported illness following the event. Food that was served at the gathering had been purchased from two restaurants in Rochester. Guests had also prepared food items that were served at the gathering. An investigation was initiated on February 5.

A complete list of attendees was obtained from the complainant along with a list of foods that were available for consumption at the party. All attendees were interviewed using a standard questionnaire. OCPHS staff conducted environmental assessments of both restaurants, and interviewed food workers at both restaurants about illness and work histories. Credit card receipts from patrons who ate at Restaurant A on January 31 were requested. Patrons were interviewed by phone about food consumption and illness history using a standard questionnaire.

Stool specimens were requested from several attendees of the private gathering for testing at the Minnesota Department of Health (MDH) Public Health Laboratory. A case was defined as an attendee of the private gathering who experienced vomiting and/or diarrhea (≥ 3 loose stools in a 24-hour period) following the event.

Five of the event attendees met the case definition. Three of the attendees did not consume food at the event and did not experience any illness. All cases reported diarrhea, cramps, and nausea; two (40%) reported vomiting, and none reported fever. None of the cases was hospitalized. The median incubation period was 31 hours (range, 29.5 to 35.5 hours) and the median duration of illness was 51 hours (range,

11 to 77 hours). One stool specimen was submitted to the MDH Public Health Laboratory and was positive for norovirus by PCR. None of the food items was significantly associated with illness.

All nine employees at Restaurant A who prepared food on January 31 were interviewed; none reported recent or current symptoms of gastrointestinal illness. The manager of the restaurant did not report receiving any customer complaints. None of the 41 Restaurant A patrons who were interviewed by phone reported gastrointestinal illness following their meal at the restaurant. In addition, none of the Restaurant B employees who prepared the food for the private gathering on January 31 reported recent or current gastrointestinal symptoms.

This was a probable foodborne outbreak of norovirus associated with a private gathering in Rochester, Minnesota. Food was purchased or prepared at various locations. The vehicle of transmission could not be determined, and another route of transmission (such as person-to-person) could not be ruled out.

(3)
Norovirus Gastroenteritis Probably Associated with a Restaurant

February

Hennepin County

On February 12, 2009 a restaurant in Minneapolis received a complaint of illness from a patron group that had dined at the restaurant on February 6. A second complaint was received by the restaurant on February 16 from a patron group that dined at the restaurant on February 13. The restaurant notified the Minneapolis Division of Environmental Health (MDEH) of the complaints on February 18. MDEH subsequently notified the Minnesota Department of Health (MDH) and Hennepin County Human Services and Public Health Department (HSPHD) epidemiology, and an investigation was initiated on February 18.

HSPHD epidemiology staff interviewed patrons in the two dining parties identified by the original complainants. 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. Reservation lists for February 13 were obtained from the restaurant, and one representative from each party was contacted to assess illness among other groups. Those persons were asked to contact the members of their parties and ask them to call HSPHD.

On February 18, MDEH sanitarians inspected the restaurant and on February 20 began interviewing employees about illness history and work duties. The environmental health assessment of the restaurant focused on employee illness, flow of food, food preparation, and food storage procedures.

Twenty-five persons were interviewed (three persons from the two complaint groups, and 22 representatives from parties on the reservation lists). Four met the case definition (three from complaints, and one from the reservation list). Three (75%) had diarrhea, three (75%) had vomiting, two (50%) had fever, and two (50%) had cramps. The median illness incubation was 34 hours (range, 8 to 36 hours). The median illness duration was 8 hrs (range, 1 to 48 hours). A stool sample from one ill complainant was submitted to the MDH Public Health Laboratory tested positive for norovirus genogroup II and negative for *Campylobacter*, Shiga toxin-producing *E. coli*, *Salmonella*, *Shigella* and *Yersinia*. The cases

that were part of the complaint groups reported additional ill persons in their parties, but those persons were not reachable for interview. No additional persons from the reservation lists contacted HSPDH.

The cases ate a variety of foods, most of which were shared with members of their dining parties: pescado ahumado (smoked swordfish with a citrus dressing), chips and salsa, nachos, chicken wings shrimp curry, plantain chicken, empanadas, Chinese barbeque ribs, queso fundido and chips, Cuban pork, and fried ice cream. Beverages included ice water, margaritas, a mojito, and a coconut smoothie.

All 76 of the restaurant's employees who worked on February 13 were interviewed. None of the employees interviewed reported any gastrointestinal illness previous to or on the implicated meal dates. One employee reported 13 hours of stomach cramps on February 16 but did not report any other gastrointestinal symptoms. Another employee reported 16 hours of vomiting and diarrhea beginning on February 20, but this employee had an ill child in the home with gastrointestinal symptoms previous to hers. MDEH sanitarians noted overall compliance with food code requirements for food preparation. The sanitarians further stressed the importance of proper handling of food and beverages, use of gloves when handling ready-to-eat foods, good handwashing, thorough disinfection, and exclusion of ill employees. The restaurant received no additional complaints and no reports of employee illness.

This was a probable foodborne outbreak of norovirus gastroenteritis among patrons who ate at a restaurant. The vehicle of transmission and source of contamination were not identified.

(4)

Suspected Norovirus Gastroenteritis Probably Associated with a Restaurant

March

Ramsey County

On March 19, 2009, the Minnesota Department of Health (MDH) foodborne illness hotline received a complaint of gastrointestinal illness in two individuals from separate households who ate lunch together at a restaurant in St. Paul on March 14. This meal was the only recent event the two individuals had in common. Upon following up with the restaurant manager, the sanitarian from St. Paul Environmental Health learned of illness among at least one employee at the restaurant on the complainants' meal date. An outbreak investigation was initiated on March 20.

MDH epidemiology staff interviewed the two ill patrons from the original complaint. A list of credit card receipts from patrons who ate at the restaurant on March 14 was requested from the restaurant; however, the receipts did not have patron names on them, so additional patron follow-up could not be performed. A case was defined as a restaurant patron who subsequently developed vomiting and/or diarrhea (≥ 3 loose stools in a 24-hour period).

On March 20, a St. Paul Environmental Health sanitarian inspected the restaurant and began interviewing employees about illness history and work duties.

Two cases (the original complainants) were identified. One case reported diarrhea, vomiting, and fever. The other case reported diarrhea and cramps. The two cases reported incubation periods of 36 and 40 hours, with illness durations of 55 and 51 hours, respectively. No stool specimens were obtained for bacterial or viral testing. Both cases reported eating the steak salad, corn bread, and water with lemon.

Twenty-two employees were interviewed; one employee reported recent gastrointestinal illness. The sanitarian further stressed the importance of proper handling of food and beverages, use of gloves when handling ready-to-eat foods, good handwashing, thorough disinfection, and exclusion of ill employees. The restaurant received no additional complaints and no reports of employee illness.

This was a probable foodborne outbreak of gastroenteritis associated with consuming a meal from a restaurant. The etiologic agent was not identified, but the incubation period and symptoms were characteristic of norovirus gastroenteritis.

(5)

***Staphylococcus aureus* Intoxications Probably Associated with a Restaurant**

April

Hennepin County

On April 6, 2009, the Minnesota Department of Health (MDH) foodborne illness hotline received a complaint of gastrointestinal illness in three individuals from two different households who had eaten dinner together at a restaurant in New Hope, Minnesota on April 5. Hennepin County epidemiology and environmental health staff were notified and an investigation was initiated.

Two Hennepin County environmental health specialists went to the restaurant on April 7 to conduct an environmental assessment, including checking food temperatures and cooling procedures.

MDH staff interviewed the original complainants about food consumption and illness history. A case was defined as a restaurant patron with vomiting or diarrhea (≥ 3 loose stools in a 24-hour period). Two stool samples were obtained. No other patron names or credit card receipts were available at the restaurant.

All three interviewed persons met the case definition. All cases had vomiting; two (67%) had diarrhea and two (67%) had cramps. The median incubation period was 6 hours (range, 5 to 6 hours). Only one case had recovered at the time of interview, and had an illness duration of 8 hours.

Two cases submitted stool samples to the Minnesota Department of Health. One sample was positive for *Staphylococcus aureus* enterotoxins A and B. The other sample was negative for all pathogens; however it was submitted a week after illness onset, whereas the first sample had been submitted immediately after onset.

Cases had all eaten cheese and broccoli soup and the turkey dinner with potatoes, stuffing, gravy, green beans, cranberry sauce, and a dinner roll. Since no well controls could be interviewed statistical analysis was not possible.

During inspection, Hennepin County environmentalists observed violations regarding improper food temperatures, cooling methods, and bare-hand contact of ready-to-eat foods. Employees were not familiar with wearing gloves, and cross contamination between raw and ready-to-eat foods was observed. Temperatures for foods prepared at the time of inspection were correct; however, restaurant management could not demonstrate knowledge of proper cooling and bare-hand contact requirements. Staff food safety certifications were out of date. They were asked to attend a refresher course on April 13. Extensive education of management on proper cooling procedures and use of a temperature

data logger were covered by environmentalists. The environmentalist reinforced appropriate cooking practices and temperature controls with chefs at the restaurant. Soup was found to be cooling in an ice bath at the appropriate temperature, but all ice had melted; when an environmentalist looked at it and took the temperature, only then did restaurant staff replenish the ice and refrigerate the soup appropriately.

The restaurant had also had a turkey dinner the night prior to the meal eaten by cases. The staff at the restaurant said they did not save leftovers from that turkey dinner to serve the next day. They did not have a log of how food was cooled for the meal in question. After extensive education, environmentalists left a temperature data logger for management staff at the restaurant. They demonstrated use of this tool on April 11 and had cooled turkey appropriately and logged the information. No further follow up was necessary at this point.

This was a probable outbreak of foodborne bacterial intoxications at a restaurant. The etiology was identified in one sample as *Staphylococcus aureus*; the distribution of signs, incubations, and illness durations were consistent with this finding. Because of the inability to contact additional exposed patrons, the vehicle could not be identified. However, multiple violations were found at the restaurant with regard to temperature control, supporting the occurrence of an outbreak of foodborne bacterial intoxications.

(6)

Norovirus Gastroenteritis Probably Associated with a Restaurant

April

Anoka County

On April 3, 2009, the Minnesota Department of Health (MDH) foodborne illness hotline received a report of suspected foodborne illness resulting from a meal at a restaurant in Coon Rapids, Minnesota. The complainant stated that five of seven individuals from three separate households became ill after eating at this restaurant on April 1. Foods consumed by ill meal companions included a rib tip appetizer, pork sandwiches and other dishes, shrimp, green beans, black beans, corn on the cob, corn muffins, fries, and ice cream sundaes. The complainant reported that some the individuals that attended this meal had additional events in common, but the restaurant meal was the only meal that all ill individuals attended. Anoka County Environmental Health staff were notified, and an investigation was initiated.

The complainant provided MDH staff with names and contact numbers for all of the individuals who dined together on April 1. Persons in the party were interviewed about food consumption over the 2-day period and illness history. A case was defined as a person who developed vomiting and/or diarrhea (≥ 3 loose stools in a 24-hour period) following a meal at the restaurant.

A sanitarian from the Anoka County inspected the restaurant and collected employee contact information and credit card receipts for patrons who dined at the restaurant from March 31 to April 4, 2009. Credit card receipt patrons were interviewed by MDH staff about foods consumed and any illness following the meal. Persons meeting the case definition were asked to submit stool samples to the MDH Public Health Laboratory (PHL) for bacterial, viral, and toxin testing. Restaurant employees were interviewed by MDH and Anoka County staff regarding their work duties and any recent gastrointestinal illness.

Of the seven individuals who were part of the original complainant's party, four (57%) met the case definition. One additional individual, however, reported being ill with diarrhea the morning prior to the meal at the restaurant. Since this individual was symptomatic before the meal and therefore did not meet the case definition, the individual was not included in additional analyses. All four cases reported diarrhea, two (50%) vomiting, two (50%) fever, and two (50%) cramps. None of the cases had bloody stools. The median incubation period from the shared meal was 36 hours (range, 27 to 39 hours). The median duration of illness was 26 hours (range, 17 to 35.5 hours) for the two cases who had recovered at the time of interview. Stool samples were submitted from two of the cases, and both tested positive for norovirus genogroup II.

Interviews were conducted for 38 additional restaurant patrons identified through credit card receipts, including three who dined on March 31, 21 on April 1, nine on April 2, and five on April 3. Of these, seven (18%) from four separate households met the case definition. Of the seven cases, six (86%) reported diarrhea, five (71%) cramps, two (29%) vomiting, and one (14%) fever. Incubation periods were varied for these cases. Four reported onset of illness 3.5-4.5 hours after the meal. The other two with known onset dates had incubation periods of 51.5 and 76 hours. The median duration of illness for the four cases who had recovered at the time of contact was 50.5 hours (range, 18 to 36.5 hours). Specimen collection kits were returned from two credit card receipt cases; both were negative for bacterial and viral pathogens.

The sanitarian and MDH staff interviewed 36 of the 47 restaurant staff with available contact information; none reported recent gastrointestinal illness. The restaurant also denied receiving any other complaints during this time period. No improper food handling or preparation practices were observed, and the restaurant was informed that any employee with vomiting and/or diarrhea must be excluded from working for 72 hours after the resolution of symptoms

This was an outbreak of norovirus gastroenteritis that was possibly associated with a meal at a restaurant. The source and vehicle of infection were not identified. Additional illnesses were identified in credit card receipt patrons who dined at the establishment during the same time period, but an etiology could not be confirmed in any of these cases. The symptom profile of the credit card receipt cases was also not consistent with that of the cases in the original complainant's party. Furthermore, no ill restaurant employees were identified. One individual who dined with the original complainant did report experiencing gastrointestinal illness the morning prior to the shared meal. Therefore, person-to-person transmission could not be ruled out as a cause of the outbreak.

(7)

Suspected Bacterial Intoxications Probably Associated with a Restaurant

April

Olmsted County

On April 13, 2009, Olmsted County Public Health Services (OCPHS) received a complaint that 5 of 12 extended family members from four separate households had become ill with cramps and diarrhea approximately 12 hours after eating an Easter lunch at a restaurant in Rochester on April 12. The complainant reported that the families had no other recent meals in common. The Minnesota Department of Health (MDH) was notified, and an investigation was initiated.

The complainant provided OCPHS with a list of family members who had attended the April 12 meal. A list of restaurant patrons was compiled from credit card receipts provided by the restaurant. Staff from OCPHS interviewed restaurant patrons to obtain information on food/beverage consumption and illness history. A case was defined as a restaurant patron who subsequently developed diarrhea (≥ 3 loose stools in a 24-hour period) or vomiting. Stool specimens were requested from cases who reported recent gastrointestinal illness.

Three OCPHS Environmental Health Specialists visited the restaurant on the afternoon of April 13 to conduct an assessment of food preparation and handling procedures and to interview staff regarding recent illness and job duties.

Illness histories and exposure information were obtained from 30 restaurant patrons. Ten (33%) cases were identified. Eight (80%) cases reported diarrhea, five (50%) reported cramps, two (20%) reported vomiting, and one (10%) reported fever. The median incubation period was 7 hours (range, 3 to 24 hours). The median duration of illness was 21 hours (range, 3 to 29 hours). No stool specimens were returned by ill patrons.

OCPHS EH staff visited the restaurant on April 13. The manager/chef stated that public turnout exceeded expectations (and reservations) for the April 12 Easter lunch; consequently, the restaurant was understaffed. The facility was run with minimal kitchen staff (only the manager/chef) and minimal support staff.

The manager/chef was the sole food preparer for the Easter lunch. He reported that he had worked most of the previous evening and early morning to prepare all the foods offered on the buffet. Based upon his description of the food prepared for the buffet, the only potential cooling issue identified was with the pasta preparation. Pasta was cooked on Saturday and cooled in running water and ice before being placed in the cooler. The pasta salads were served cold. The linguini was oven baked and served hot. No individual food item was statistically associated with illness.

The manager/chef stated that foods to be served cold were prepared on Saturday and then refrigerated overnight. Foods that required cooking prior to service were prepared on Saturday, refrigerated overnight, and batch cooked as needed on Sunday. He stated that Sunday demand was high, which resulted in food residence time on the buffet line to be less than 90 minutes.

The restaurant did not have commercial cold-holding buffet equipment, so cold dishes were offered on ice. Upon inspection, refrigeration equipment temperatures were all less than 41° F. Chafing dishes and commercial hot-holding equipment were used for hot holding.

This was a probable foodborne outbreak of suspected bacterial intoxications associated with a restaurant. The etiology was not confirmed. However, the distribution of incubations and symptoms were compatible with intoxications caused by *Clostridium perfringens* or *Bacillus cereus*. The buffet was a special event for the restaurant and the foods served, preparation practices, and guest load for the event were not typical for the restaurant.

(8)

Gastroenteritis Probably Associated with a Catered Meal

May

Ramsey County

On May 5, 2009, the Minnesota Department of Health (MDH) foodborne illness hotline received a complaint of gastrointestinal illness from an individual who had attended a convention on May 2 at a church in St. Paul. According to the complainant, around half of the approximately 40 attendees had become ill after the convention. The original complainant provided breakfast items for this event, but the lunch meal had been catered by a private caterer. As the location of the catering facility was unknown, sanitarians from MDH Environmental Health Services were notified and an investigation was initiated.

A list of attendees was obtained from the original complainant. Staff from MDH interviewed attendees to obtain information on food/beverage consumption and illness history. A case was defined as an individual who developed vomiting and/or diarrhea (≥ 3 loose stools in a 24-hour period) following the consumption of foods served at this event. Stool specimen collection kits were sent to consenting cases.

A call to the caterer revealed that she had prepared the food for the convention at an unlicensed kitchen in the basement of her home in Maplewood. Sanitarians from the city of Maplewood visited the home where the food had been prepared to discuss food preparation procedures with the caterer.

Illness histories and exposure information were obtained from nine attendees, and five (56%) cases were identified. One individual reported illness but did not meet the case definition, and thus was excluded from further analysis.

All cases reported diarrhea and cramps, and two (40%) reported vomiting. None reported fever or bloody diarrhea. The median incubation period from the catered lunch was 15 hours (range, 10 to 16 hours). Only two cases had recovered at the time of interview; the median duration of illness was 34.5 hours (range, 15 to 54 hours). No stool samples were returned to the MDH Public Health Laboratory for testing.

No food item was significantly associated with illness. All cases reported consuming foods provided by the caterer, while four (80%) reported having breakfast items. The only items that all cases reported eating were fried chicken (vs. 3 of 3 controls) and roast beef (vs. 2 of 3 controls).

According to the caterer, two 15 pound roasts and 60 pieces of chicken were prepared for this event. The roasts were seasoned and put whole into the oven around 1:00 a.m. on May 2 and cooked for approximately 2 hours. They were allowed to cool at room temperature for 3 to 4 hours before slicing, and then the meat was placed in the refrigerator until transport. The chicken pieces were deep fried starting around 6:30 a.m. and were completed after 2 to 3 hours. The chicken pieces sat at room temperature until transport. All foods were transported in aluminum pans, and arrived at the church around 10:00 a.m. After arriving at the event, the caterer put all the food into steam tables to reheat. Food was served around 11:00 a.m. in a buffet style. Neither the caterer nor her spouse, who assisted in the preparation of the food items for this event, reported experiencing recent gastrointestinal illness. The caterer's spouse also reported consuming the food served at this event, but his exact food history was

not obtained. Along with the improper time-temperature practices, the sanitarian also identified cross-contamination issues, use of domestic equipment, and lack of a certified food manager.

This was a probable foodborne outbreak of gastroenteritis associated with a convention held at a church. The combination of symptoms, incubation periods, and illness durations was not characteristic of known foodborne pathogens. Since no stool specimens were obtained, the etiology of the outbreak could not be identified. Only a minority of convention attendees could be interviewed, and the vehicle was not identified. Improper cooling procedures and improper hot- and cold-holding temperatures were documented, but their role in the outbreak was not confirmed.

(9)

Norovirus Gastroenteritis Probably Associated with a Restaurant

August

Ramsey County

On August 10, 2009, the Minnesota Department of Health (MDH) foodborne illness hotline received a report of suspected foodborne illness resulting from a meal at a restaurant in St. Paul, Minnesota. The complainant stated that two of two individuals from separate households became ill shortly after eating food at this restaurant on August 7. Foods consumed by both patrons during this meal included the spring rolls and chicken skewers appetizers. Both dishes came with dipping sauces on the side. Following the meal, the two meal companions also shared popcorn with butter at a local movie theater. Besides these two establishments, the complainant denied any other recent common exposures or events. City of St. Paul Environmental Health staff were notified, and an investigation was initiated.

Both individuals were interviewed about food consumption and illness history. A case was defined as a person who developed vomiting and/or diarrhea (≥ 3 loose stools in a 24-hour period) following the meal at the restaurant. Cases were asked to submit stool samples to the MDH Public Health Laboratory (PHL) for bacterial, viral, and toxin testing. A sanitarian from the City of St. Paul inspected the restaurant to review food preparation and storage procedures.

Both individuals met the case definition, and reported vomiting, diarrhea, and cramps. Neither of the cases had fever or bloody stools. The median incubation period from the meal at the restaurant was 11.5 hours (range, 8 to 15 hours), and the median duration of illness was 20.5 hours (range, 12 to 29 hours). A stool sample was submitted from one of the cases, and tested positive for norovirus genogroup II. This case had both the shorter incubation period and duration of illness of the two.

The sanitarian questioned restaurant staff about preparation methods for the foods served at this meal. Multiple violations were identified during the inspection, including a cooler being held at higher temperature than required and improper procedures for cooling and thawing of prepared foods. The cooler had an ambient temperature of 50° F, and all of the food inside was also found to be at the same temperature. Sauces, pork roast, and egg rolls were being cooled at room temperature for an hour or more before being stored in the cooler. Three tubs full of bagged, frozen, raw chickens were also thawing at room temperature. Food falling under these violations was discarded by the sanitarian during the inspection.

According to the employee illness log and interviews with management staff, there were no employees with current or recent gastrointestinal illness. The restaurant also did not receive any other complaints during the time period of the investigation.

Two dining companions reported a similar illness after eating at the restaurant, and one tested positive for norovirus. However, the reported incubations calculated from the meal at the restaurant were shorter than what is characteristic of norovirus (particularly the 8 hour incubation). Also, there was no evidence of illness among food workers at the restaurant. Therefore, the restaurant could not be confirmed as the source of the complainants' illnesses.

(10)

Suspected Norovirus Gastroenteritis Probably Associated with a Private Party

September

Wright County

On September 29, 2009, the Minnesota Department of Health (MDH) foodborne illness hotline received a complaint regarding illness following a confirmation party in a Montrose, Minnesota home on September 26, 2009. The complainant was calling regarding meat and cheese trays purchased at a warehouse grocery in Maple Grove and served at the gathering. The complainant reported that the majority of 15 attendees from seven different households were ill with vomiting and diarrhea following this event. Other food items served at the event included homemade chicken wings, cheese balls, pin wheels, taco dip, and dessert bars, and store bought buns, crackers, cake, pasta salad, and pickles. Mustard and mayonnaise were also provided with the meat and cheese trays. Hennepin County Environmental Health was notified, and an investigation was initiated.

A list of attendees and contact information was received from the original complainant, and MDH staff interviewed attendees regarding food/beverage consumption and illness history. A case was defined as an individual who developed vomiting and/or diarrhea (≥ 3 loose stools in a 24-hour period) after consuming food served at the confirmation party. Consenting cases were sent stool specimen collections kits to be submitted to the MDH Public Health Laboratory (PHL) for bacterial and viral testing.

Hennepin County contacted the establishment and the distributor/supplier of this product to inquire about food preparation practices and recent employee illness. Contact information for additional patrons who purchased the same meat and cheese tray at the Maple Grove warehouse grocery store during the same time period was also collected from the establishment.

Of 14 attendees interviewed, eight (57%) met the case definition. Among the cases, all reported diarrhea and cramps, six of eight (75%) vomiting, and four of seven (57%) fever. The median incubation period was 50.5 hours (range, 30 to 61.5 hours). The median illness duration was 52.25 hours (range, 40.5 to 64 hours) for the two cases who had recovered at the time of interview. Stool specimen collection kits were sent to two cases; none of the kits were returned to MDH PHL.

The meat and cheese plate contained ham, roast beef, turkey, pepper jack cheese, cheddar cheese, Colby cheese, and Swiss cheese. Spreads such as mayonnaise and mustard were also included in the tray. The only food item significantly associated with illness of all those available at the party was mustard (3 of 4 cases vs. 0 of 5 controls; odds ratio, undefined; $p = 0.05$). However, data on this food item was only available for 9 (64%) of 14 attendees. MDH staff attempted to re-contact the original complainant to

complete a more detailed food history on four attendees after a full list of foods served at the event had been obtained, but were unsuccessful.

Hennepin County's inspection revealed that the meat and cheese trays are not made on site at grocery store and are not opened at the establishment for any reason. Because of this, employee illness was not assessed in detail at this level. The tray was made at a facility in Wisconsin. MDH staff were able to interview three additional parties that had purchased the same product from the Maple Grove grocery store location; none of the contacts reported illness among the individuals who had consumed this product.

This was a probable foodborne outbreak of gastroenteritis associated with a private confirmation party. Clinical and epidemiologic features were compatible with norovirus as an etiology. Consumption of mustard was found to be significantly associated with illness, but the value of this association may be limited as data on this variable were not collected for all attendees. Illness was not reported in other groups who had purchased the same product from the grocery store in Maple Grove. Therefore, a specific food vehicle and source were not confirmed for this outbreak.

(11)

Norovirus Gastroenteritis Probably Associated with a Restaurant

October

Ramsey County

On October 16, 2009, the Minnesota Department of Health (MDH) foodborne illness hotline received a report of suspected foodborne illness resulting from a meal at a restaurant (Restaurant A) in St. Paul, Minnesota. The complainant stated that two co-workers became ill 15.5 and 27 hours, respectively, after eating at this restaurant on October 14. Foods consumed by ill meal companions included a salad and a bacon turkey wrap, respectively. Furthermore, the complainant also reported running into a former co-worker in line at the restaurant. Contact with this individual following the meal revealed that the former co-worker also experienced gastrointestinal symptoms after consuming foods from the restaurant. However, the complainant reported that the two current co-workers had also shared a meal the day prior (October 13) at another restaurant (Restaurant B) in St. Paul, which would have been 39.5 and 51 hours prior to their onsets, respectively. Foods consumed at this establishment included stir fried chicken and vegetables and fried rice. City of St. Paul Environmental Health staff was notified, and an investigation was initiated. Based on the symptom profile, incubation periods, and type of foods consumed (raw/ready-to-eat vs. cooked), the investigation focused primarily on the first restaurant.

The complainant provided MDH staff with names and contact information for the individuals who dined at the Restaurant A on October 14. Individuals were interviewed about food consumption at the common restaurants and illness history. A case was defined as a person who developed vomiting and/or diarrhea (≥ 3 loose stools in a 24-hour period) after consuming food at Restaurant A. Consenting individuals were sent stool specimen collections kits to be submitted to the MDH Public Health Laboratory (PHL) for bacterial and viral testing.

A sanitarian from the City of St. Paul inspected both the restaurants, and collected credit card receipts for patrons who dined at Restaurant A on October 14. Managers at both establishments were interviewed by City of St. Paul staff about any recent gastrointestinal illness in restaurant employees.

Of the three individuals who dined at Restaurant A on October 14, two (67%) met the case definition. The other individual reported experiencing mild gastrointestinal illness and was not included in additional analyses. Both cases reported diarrhea and cramps, one (50%) vomiting, and one (50%) fever. None of the cases had bloody stools. The median incubation period from the shared meal at Restaurant A was 21.25 hours (range, 15.5 to 27 hours), and was 45.25 hours (range, 39.5 to 51 hours) from the meal at Restaurant B. The duration of illness was 30.5 hours for the one case who had recovered at the time of interview. Stool samples were submitted from both of the cases as well as from the individual who experienced mild illness but did not meet the case definition; one tested positive for norovirus genogroup II. No other bacterial or viral pathogen was identified in any of the samples.

Interviews could not be conducted for additional patrons identified through credit card receipts as there was no identifying information listed on the documents provided by the restaurant to MDH. There were no additional complainants received by the MDH foodborne illness hotline or by the restaurant during the time period of this investigation.

The sanitarian interviewed management and checked employee illness logs at both restaurants; neither reported or had documented recent gastrointestinal illness. There were only three employees responsible for food preparation at Restaurant A, and only four at Restaurant B. No improper food handling or preparation practices were observed. The restaurants were informed that any employee with vomiting and/or diarrhea must be excluded from working for 72 hours after the resolution of symptoms

This was a probable outbreak of gastroenteritis that was possibly associated with a meal at a restaurant. Norovirus was identified in one case sample, but not in the other two samples collected. The source and vehicle of infection were not identified. Additional illnesses could not be identified through credit card receipts, and no other complaints about the establishment were received during the investigation. Furthermore, no ill restaurant employees were identified. The two co-workers had an additional meal and possibly other common exposures at the work place. Therefore, other routes (person-to-person) of transmission and sources of illness could not be ruled out as a cause of the outbreak.

(12)

Norovirus Gastroenteritis Probably Associated with a Wedding Rehearsal Dinner

November

Olmsted County

On November 23, 2009, Olmsted County Public Health Services (OCPHS) received a complaint that 7 of 30 people who had attended a rehearsal dinner at a restaurant on the evening of November 20 had become ill with vomiting and diarrhea. The Minnesota Department of Health (MDH) was contacted, and an investigation was immediately initiated.

OCPHS sanitarians visited the restaurant on November 23 to evaluate food preparation and handling procedures, interview food workers, and collect credit card receipts for additional patrons. The complainant provided a list of rehearsal dinner attendees. OCPHS staff interviewed rehearsal dinner attendees and patrons identified from credit card receipts about food consumption and illness history. A case was defined as a rehearsal dinner attendee who developed vomiting or diarrhea (≥ 3 loose stools in a 24-hour period) after eating at the restaurant. Stool samples collected from consenting rehearsal dinner attendees were submitted to the MDH Public Health Laboratory for bacterial and viral testing.

Twenty-six rehearsal dinner attendees were interviewed and nine (35%) met the case definition. Two patrons reported illness prior to the rehearsal dinner and were excluded from analysis. Only one patron identified from credit card receipts was interviewed. The median incubation period for the cases was 36 hours (range, 5 to 51 hours). The median duration of illness was 17 hours for the five cases who had recovered by the time they were interviewed. Seven cases (78%) reported nausea and vomiting, five (56%) diarrhea, four (44%) cramps, two (22%) fever, and none bloody stools. Stool samples submitted by two ill rehearsal dinner attendees tested positive for norovirus.

No food items were associated with illness. OCPHS sanitarians interviewed all seven restaurant employees who either worked on November 20 or prepared food for that day. None reported recent gastrointestinal illness. Sanitarians indicated that employees lacked adequate handwashing practices. Additionally, sanitarians observed bare-hand contact with ready-to-eat foods by food workers, and conditions and practices that could contribute to cross contamination. Specifically, these included the accumulated food debris on food contact surfaces and the use of vinegar and water as the sanitizer that is used during hours of operation.

The restaurant was instructed to: 1) review handwashing with all staff and develop a system of monitoring to verify that appropriate employee handwashing is occurring; 2) review illness policy with all staff including the importance of reporting symptoms of vomiting and diarrhea; 3) exclude any employees reporting vomiting and diarrhea from work until symptoms have been resolved for 72 hours; 4) clean and sanitize all food-contact surfaces, including ice bins; and 5) discard left-over food from November 20.

This was an outbreak of norovirus gastroenteritis associated with a rehearsal dinner held at a restaurant. The vehicle was not identified. No ill food workers were identified. The presence of ill family members among the rehearsal dinner attendees prior to the meal indicates that ill attendees could have been the source of the outbreak.

(13)

Norovirus Gastroenteritis Probably Associated with a Restaurant

December

Anoka County

On December 7, 2009, the Minnesota Department of Health (MDH) followed up on a complaint of gastrointestinal illness received by Anoka County Community Health and Environmental Services from an individual who ate at a restaurant in Coon Rapids, Minnesota on December 5. The complainant reported that multiple individuals from six separate households became ill with vomiting and diarrhea approximately 24 to 30 hours after attending a party held at the restaurant. Food items consumed included pizza (cheese, pepperoni, and sausage) and soda with ice provided by the establishment, as well as chocolate cake prepared at the home of one of the attendees. Individuals from the separate households reported that they had no other recent events or meals in common, but a few attended the same elementary school and/or daycare. An outbreak investigation was initiated in collaboration with Anoka County.

The complainant provided MDH staff with names and contact information for the individuals who attended the party at the restaurant on December 5. Individuals were interviewed about food consumption, daycare/school attendance, and illness history. A case was defined as a person who

developed vomiting and/or diarrhea (≥ 3 loose stools in a 24-hour period) after patronizing the restaurant. Consenting individuals were sent stool specimen collections kits to be submitted to the MDH Public Health Laboratory for bacterial and viral testing.

A sanitarian from Anoka County inspected the restaurant and collected contact information for patrons who visited the establishment during the same time period. The sanitarian also interviewed staff about any recent gastrointestinal illness and work duties at the restaurant.

Of the 10 party attendees who could be reached for interview, five (50%) met the case definition. All cases reported diarrhea, four (80%) vomiting, two (40%) cramps, and one (20%) fever. None of the cases had bloody stools. The median incubation period from the meal at the restaurant was 42 hours (range, 37.5 to 44 hours). The duration of illness was 22 hours for the one case who had recovered at the time of interview. Stool samples were submitted from two of the attendees; both tested positive for norovirus genogroup II. No other bacterial or viral pathogen was identified in either sample.

No food item served at the party was found to be statistically associated with illness. Of the attendees interviewed, 3 of 5 cases and 1 of 5 controls (odds ratio, 6.0; $p = 0.5$) reported attending the same elementary school.

The restaurant did not have credit card receipt information, but was able to provide MDH with a short list of frequent patrons as well as bowling league information for a 3-day time period (December 4-6). Telephone numbers could not be located for any of the names on the frequent patron list. However, MDH staff were able to interview nine individuals who visited the establishment on the night of December 4 and 15 individuals on December 6 as part of bowling leagues. No individuals who were part of leagues that patronized the restaurant on the same night as the complainants (December 5) could be interviewed. Of the nine interviewed from December 4, 3 (33%) met the above case definition but reported a wide variety of incubation periods from their meals at the restaurant (6.5, 33, and 108.5 hours, respectively). Similarly, the two (13%) of 15 interviewed from December 6 that met the case definition reported 12 and 76.5 hour incubations, respectively. The only symptoms reported by these additional patrons were diarrhea (5 of 5) and cramps (2 of 5, 40%). There were no additional complainants received by the MDH foodborne illness hotline or by the restaurant during the time period of this investigation.

The sanitarian interviewed all employees involved in food service at the establishment; none reported or had documented recent gastrointestinal illness. However, an employee identified through bowling league information reported experiencing vomiting and diarrhea that began on December 6. This employee only works Saturdays and had worked on the day the complainants ate there (December 5); she only consumed French fries and a soda with ice during the shift. The employee who prepared this food reported not experiencing illness. No improper food handling or preparation practices were observed. The restaurant was informed that any employee with vomiting and/or diarrhea must be excluded from working for 72 hours after the resolution of symptoms.

This was a probable foodborne outbreak of norovirus gastroenteritis. The source and vehicle of infection were not identified. Additional illnesses potentially associated with the restaurant were identified through bowling league information, but incubation periods were not consistent within or between the parties. However, additional patrons who ate at the establishment on the same day as the complainants could not be interviewed. No other complaints about the establishment were received during the investigation. Furthermore, no ill restaurant employees involved in food service were identified. One employee

identified through other means did report experiencing vomiting and diarrhea that began on the same day as the individuals in the complainant's group. This employee only worked at the establishment one day a week, with the most recent shift being the same day as the complainants. Conversely, a few members of the original complainant's party could have had other common exposures at school or daycare. Therefore, other routes of transmission (e.g., person-to-person) and sources of illness other than the restaurant could not be ruled out as a cause of the outbreak.

(14)

***Salmonella* Enteritidis SE11B6 Infections Probably Associated with Consumption of Cheese**

December 2009-February 2010

Multiple counties/Multiple states

On January 27, 2010, the Minnesota Department of Health (MDH) completed interviews for two *Salmonella* Enteritidis cases with isolates that the MDH Public Health Laboratory (PHL) determined had indistinguishable pulsed-field gel electrophoresis (PFGE) patterns. The pattern was designated subtype SE11B6 (Centers for Disease Control and Prevention [CDC] *XbaI/Bln* pattern designation JEGX01.0002/JEGA26.0010). The cases were interviewed by MDH staff about illness history and potential exposures using an extensive, standard questionnaire. Historically, the vast majority of Minnesota residents with this pattern report travel to a foreign country (especially Latin America) or the western United States. However, these two cases did not report traveling in the 7 days prior to illness onset. Both cases did report consuming a specific brand of cheese (Brand X) in the 7 days prior to illness onset. On February 11, a third *S. Enteritidis* case with an isolate of subtype SE11B6 was interviewed. This case also denied traveling internationally during the exposure time period but did report consuming Brand X cheese in the week prior to onset. The three cases had onsets dates of December 18, 2009, January 16, 2010, and January 24, 2010, respectively, and all lived in the seven county Minneapolis-St. Paul metropolitan area. Two reported purchasing the cheese at the same warehouse grocery store (Chain A) and the third from another grocery (B). An investigation was initiated.

Cases were identified through routine laboratory surveillance. Cases were defined as individuals with laboratory-confirmed *S. Enteritidis* infection with the outbreak PFGE subtype and an illness onset date since September 1, 2009. Cases who met these criteria but had reported traveling internationally in the 7 days prior to illness onset or having contact with an individual who was ill prior to the case's onset were excluded from analyses. The cluster was reported on the PulseNet national web board on February 12, 2010 to ascertain potential cases in other states. The two-enzyme (*XbaI* and *Bln*) PFGE subtype was included in the case definition for residents of Minnesota while only a one-enzyme (*XbaI*) PFGE subtype was used to identify potential cases in other states. Phone interviews regarding illness history and potential exposures were conducted for all cases using an interview form developed specifically for this investigation. Multiple-locus variable-number tandem repeat analysis (MLVA) testing was also performed at CDC later in the investigation in an attempt to further discriminate isolates from potential cases.

A multi-state case-control study was initiated on February 14, 2010. Controls were selected based on age and geographic proximity to the cases. Controls were eligible for enrollment if they lived on a street adjacent to the case (determined using reverse phone directory on White Pages.com), were in the same age group as the case (using the intervals 2 to 9, 10 to 19, 20 to 39, 40 to 59, and 60+ years), and had

not experienced gastrointestinal illness during the time period in question. Controls' exposures were assessed for the 7 days prior to the case's onset date. Three controls per case were enrolled.

Warehouse grocery chain A identification numbers were collected from consenting cases and used by the Minnesota Department of Agriculture (MDA) to determine purchase dates and verify product details for Brand X cheese items. Left-over Brand X cheese product was collected if available and submitted to the MDA or other state laboratories for *Salmonella* testing. The United States Food and Drug Administration (FDA) visited the cheese production facility to conduct environmental and product testing.

One additional *S. Enteritidis* case with an isolate of the subtype SE11B6 who did not report international travel or ill contacts was identified in Minnesota during this investigation. The onset date for this fourth case was January 29, 2010. Of the four total cases, three (75%) had fever, two (50%) had bloody diarrhea, and one (25%) had vomiting. One of the cases was hospitalized for 3 days as a result of this illness. Duration of illness was 6 days for the one case who had recovered at the time of interview.

The first Minnesota case (illness onset on December 18, 2009) reported purchasing either medium or sharp cheddar Brand X cheese at a Warehouse grocery chain A in mid-October; purchase records accessed using the customer identification number indicated that the case purchased the 2-lb. X-Sharp White Cheddar on April 11, 2009, the 2.5-lb. Medium Cheddar on July 11, 2009, and the 2-lb. Medium Cheddar on January 10, 2009, September 19, 2009, and November 29, 2009 (Table 1). The second case (illness onset on January 16, 2010) reported purchasing extra sharp cheddar Brand X cheese at grocery store B sometime during January 9-16, 2010. This case did not have any documentation of the purchase (e.g., a receipt), but contact with grocery B by MDA revealed that the grocery store only receives the X-Sharp Cheddar Brand X cheese. The third case (illness onset on January 24, 2010) reported consuming Brand X white extra sharp cheddar cheese purchased from the same Warehouse grocery chain A location as the first case; records indicated purchases of the 2-lb. X-Sharp White Cheddar on May 28, 2009 and September 24, 2009 (Table 1). The fourth Minnesota case did not report consuming Brand X cheese during the week prior to illness onset.

MDH staff were able to recruit three controls for each of the four cases. In the case-control study, only consumption of Brand X cheese was statistically associated with illness (3 of 4 cases vs. 0 of 12 controls; odds ratio [OR], undefined; $p = 0.007$). Oregon was the only other state who participated in the case-control study. When including the two cases and six controls enrolled from Oregon with the Minnesota case data, consumption of Brand X cheese was still the only item significantly associated with illness (5 of 6 cases vs. 4 of 17 controls; OR, 16.3; $p = 0.02$).

One hundred and forty *S. Enteritidis* isolates with the outbreak PFGE pattern were reported from the United States during September 2009 through February 2010. Of these, 67 (48%) cases were interviewed; 43 (64%) reported traveling to a foreign country in the 7 days prior to illness onset. These cases were excluded from further analysis, along with two who reported having ill contacts and four who did not have available exposure information (e.g., couldn't recall food consumption history, refused full interview, couldn't be reached for follow-up interview). The median age for the remaining 18 cases was 42 years (range, 4 to 81 years) and 61% were female. Isolation dates for cases ranged from November 21, 2009 to February 3, 2010.

Table 1. Brand X cheese information for cases that reported this exposure

State	Age (yrs.)	Sex	Illness Onset Date	Variety	Purchase Date
MN	53	F	12/18/09	Medium cheddar (2.5 lb.)	7/11/09
				Medium cheddar (2 lb.)	9/19/09
				Medium cheddar (2 lb.)	11/29/09
				X-sharp white cheddar	4/11/09
MN	44	M	1/16/10	X-sharp cheddar	~1/9/10-1/16/10
MN	59	M	1/24/10	X-sharp white cheddar	5/28/09
				X-sharp white cheddar	9/24/09
OR	42	F	12/10/09	X-sharp white cheddar	Unknown
				Sharp cheddar	Unknown
OR	70	F	12/17/09	Medium cheddar	Unknown
				Sharp cheddar	Unknown
				Colby	Unknown
				Mozzarella	Unknown
WA	4	F	1/8/10	Sharp cheddar	09/29/09
				Sharp cheddar	10/23/09
				Sharp cheddar	12/15/09

Of the 18 cases, only six (33%) from Minnesota (n=4), Oregon (n=2), and Washington (n=1) reported consuming Brand X cheese in the 7 days prior to illness onset (Table 1). The first Oregon case reported consuming both the sharp and vintage white extra sharp cheddar varieties of Brand X cheese; this case became ill on December 10, 2009. The second Oregon case reported traveling to California from October 2009 to approximately December 12, 2009. During this trip, she also traveled to Tijuana, Mexico on approximately December 3 and reported eating fish tacos while there. This case first had onset of diarrhea on approximately December 4, 2009; symptoms included bloody diarrhea. She sought medical attention in California, was diagnosed with colitis, and symptoms resolved. A second onset of illness occurred on December 17, 2009 while the case was back in Oregon. The case reported that there was a distinct period of time between the two estimated onset dates when she was asymptomatic. The second onset of diarrhea (nonbloody this time) prompted another healthcare visit during which she submitted the sample that tested positive for the outbreak strain of *S. Enteritidis*. She reported eating Brand X cheese during the entire time from October until specimen collection. She brought four 2-lb. blocks of cheese with her to California in October (medium cheddar, sharp cheddar, Colby, and mozzarella varieties). She also ate Brand X cheese when she returned to Oregon, but this was cheese that was leftover from before October. The Washington case was a 4 year-old who ate Brand X sharp cheddar cheese from Warehouse grocery chain A on January 6, 2010, and became ill on January 8 (Table 1). According to the mother of the case, her 5 year-old brother also ate the cheese and developed similar illness that was 8 days in duration; the sibling was never tested. The Washington case household reported purchasing three 2.5-lb. blocks of Brand X sharp yellow cheddar in September, October, and December 2009; only one of these blocks was eaten before illness. The two unopened packages were the only products available for testing.

MLVA testing was performed on 62 isolates involved in the multi-state cluster; 14 distinct patterns were identified. The six cases with Brand X cheese exposure represented three different MLVA isolate

patterns; pattern differences occurred at one locus. Therefore, MLVA results did not provide evidence supporting the hypothesis that Brand X cheese consumption was associated with illness. However, the utility of this type of laboratory testing for discrimination of *S. Enteritidis* isolates during outbreak investigations has not been formally demonstrated.

Left-over extra sharp cheddar cheese that was purchased on September 24, 2009 and consumed prior to onset, as well as an intact package that was purchased after illness onset, were collected from one of the Minnesota cases. Intact/unopened product was also collected from the Washington case's household. *Salmonella* was not isolated from any of the cheese products collected. All product (three different cheese varieties) and environmental samples collected by FDA during their inspection of the Brand X plants were reportedly also negative for *Salmonella*. Also, 30 to 40 samples of retail vintage white cheddar cheese were collected and tested negative for *Salmonella* at a private laboratory in Washington.

This was a probable outbreak of *S. Enteritidis* SE11B6 infections in Minnesota associated with the consumption of Brand X brand cheese. In Minnesota, evidence of an association with Brand X brand cheese was provided by routine surveillance interviews, the use of Warehouse grocery chain A customer records accessed through identification numbers, and a case-control study. Nationwide, consumption of Brand X cheese was reported by only 33% of cases with domestically-acquired *S. Enteritidis* SE11 infection from September 2009 to February 2010. Outside of Minnesota, only three cases reported consumption of Brand X cheese, and all three were in West Coast states. Consumption of Brand X cheese has rarely been reported by Minnesota cases in the past; however, Brand X cheese is a relatively common exposure in West Coast states, presumably due to closer proximity to the plant. This PFGE pattern of *S. Enteritidis* is also endemic in poultry in West Coast states, so domestically acquired cases in those states were more difficult to evaluate with respect to this potential outbreak.

(15)

***Salmonella* Thompson Infections Probably Associated with a Family Gathering**

December

Hennepin County

On January 11, 2010, the Minnesota Department of Health (MDH) Public Health Laboratory (PHL) notified MDH epidemiology staff of two *Salmonella* Thompson isolates with indistinguishable pulsed-field gel electrophoresis (PFGE) patterns that were identified through routine surveillance. The PFGE subtype was designated TMP3. It was determined through routine interviews that the two cases attended the same family gathering at a private home on December 26, 2009, prior to becoming ill. An investigation was initiated.

Cases were identified through routine laboratory surveillance and were defined as individuals who attended the family gathering on December 26 and subsequently had culture-confirmed infection with *S. Thompson* TMP3. Staff from MDH interviewed cases to obtain information on food/beverage consumption and illness history. Cases were also asked to provide details about the gathering, including foods served and any reported illness among other attendees. Contact information for the individual who hosted the party was also collected to determine the source of the food items served at the event.

Illness histories and exposure information were obtained from two cases. One case was a 49 year-old female and the other was a 55 year-old male. Both cases lived in Hennepin County and had an illness onset date of December 27. Both reported diarrhea and fever, one (50%) cramps, and one (50%)

vomiting. Neither case reported experiencing bloody diarrhea. One of the two cases was hospitalized for 4 days as a result of this illness. The median incubation period from the meal served at the family gathering was 19 hours (range, 18 to 20 hours). The duration of illness for the one case who had recovered at the time of interview was 6 days.

The cases reported knowledge of the other's illness during their interviews, but one of the cases and the host also stated that there was illness in an additional attendee as well. This individual reportedly had onset of illness 1 day after the cases, and had been staying in the same household as one of the cases prior to and during his illness. This third ill attendee was stationed in North Carolina and contact information for him could not be obtained. There were no other illnesses among the approximately 20 attendees according to those individuals who were interviewed.

According to the cases, foods available at the family gathering included in-shell mixed nuts, beef curry, and cookies. The beef curry was a tomato-based dish that could be placed over rice and topped with items of the attendees' choice. Toppings included green peppers, shredded cheddar cheese, hard-boiled eggs, mandarin oranges, cucumbers, celery, sunflower seeds, raisins, bananas, coconut, sesame seeds, and peanuts. These items were held in individual containers, and most of them had not been cooked prior to consumption. The meal was served in a potluck style fashion; attendees brought different items that could be used as toppings for the beef curry. Foods that were consumed by both cases included the beef curry, rice, shredded cheddar cheese, and hard-boiled eggs. MDH could not obtain contact information for other attendees, except for the event host; therefore, a food-specific statistical analysis could not be performed.

While conducting this investigation, MDH staff was notified that a food isolate uploaded to the national PulseNet web board had a PFGE pattern that was indistinguishable from the two Minnesota case isolates. Contact with officials at the Centers for Disease Control and Prevention revealed that the food isolate had been collected during routine testing of hazelnuts at a tree nut processing plant in Oregon. According to the United States Food and Drug Administration, this was the only type of nut that was produced in this facility, and the hazelnuts were shelled prior to distribution. The product was reportedly not shipped to food service establishments in Minnesota. The host reported that the mixed in-shell nuts served at this event came from bulk containers at a Rainbow retail store in Plymouth, Minnesota. The nuts were purchased a week or two prior to the event on December 26, but the exact purchase date was unknown. The host still had the nuts at the time of contact, and members of her household had been eating them prior to and following the event without any further reports of illness. The host stated that the mixed nuts included walnuts, almonds, and Brazil nuts; she did not recall purchasing any hazelnuts but couldn't definitively rule it out. According to the host, other nuts available at the event as toppings for the beef curry included sesame seeds and shelled peanuts. The only other item the host purchased for the meal was the rice, and a complete list of foods available at the event could not be obtained for certain from this individual.

One of the cases denied consuming any nuts at this event. The other case reported having the peanut topping and mixed nuts, but expressed an extreme dislike for hazelnuts and therefore would not have eaten this type of nut if it was present.

This was an outbreak of *S. Thompson* infections associated with a family gathering. A specific food vehicle was not identified and the ultimate source of the outbreak was not determined. No additional cases of *S. Thompson* infection were identified through surveillance during this time period. The family

gathering was the only exposure that the two cases had in common; therefore, it is likely that illness was the result of the meal at this gathering. The vehicle likely was a food item that was contaminated prior to preparation. However, as most of the event attendees were not interviewed, contamination by an infected individual who was ill prior to or during the family gathering could not be ruled out.

Confirmed Waterborne Outbreaks

(1)

Cryptosporidiosis Associated with an Aquatic Center

June-August

Redwood County

Routine surveillance interviews of laboratory-confirmed *Cryptosporidium* cases conducted by the Minnesota Department of Health (MDH) in July and August 2009 revealed that three cases had gone swimming at an aquatic center multiple times in the 2 weeks prior to illness onset in July 2009. Sanitarians from Redwood-Renville Community Health were contacted on August 5, and an outbreak investigation was initiated.

Contact information for swimming lesson participants and aquatics staff was provided to MDH by the aquatic center. MDH staff interviewed pool users about their illness and exposure histories. Cases of cryptosporidiosis from the Redwood Falls area that were identified through routine surveillance were interviewed to determine if they had exposure to the aquatic center. A case was defined as an aquatic center user 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.

Illness histories and exposure information were obtained from 62 aquatic center patrons and 24 aquatic center staff members. Thirty-three cases were identified (30 patrons and 3 staff), including 18 with stool specimens that tested positive for *Cryptosporidium*. Twenty positive specimens were received by the MDH Public Health Laboratory, including specimens from three additional secondary cases; *Cryptosporidium hominis* subtype HGP4 was identified in all.

Of the 33 cases, all reported diarrhea, 25 (86%) of 29 reported cramps, 13 (46%) of 28 reported fever, 14 (45%) of 31 reported vomiting, and 8 (36%) of 22 reported weight loss. The median incubation period was 4 days (range, 4 to 12 days) for the seven cases who only swam at the aquatic center once in the 2 weeks prior to illness onset (see epidemic curve). The median duration of illness was 7 days (range, 3 to 19 days) for the 14 cases who had recovered by the time of interview. No cases required hospitalization for their illness.

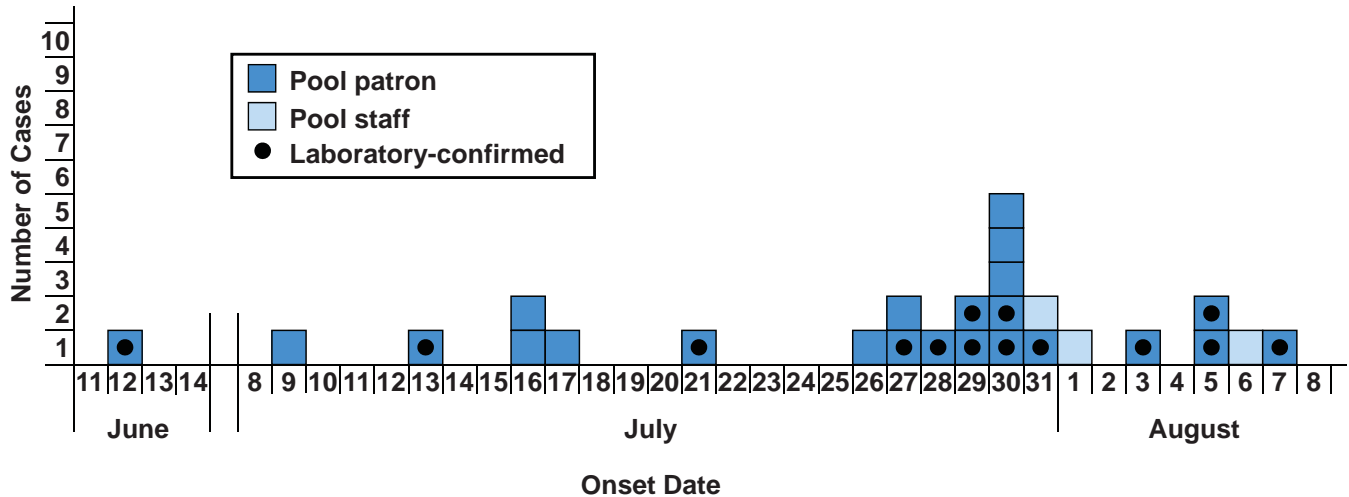
Use of any particular pool area was not statistically associated with illness.

Illness histories and exposure information were obtained from 24 aquatic center staff members; three staff members reported being recently ill with gastrointestinal illness consistent with cryptosporidiosis.

Upon inspection, the aquatic center was found to be operating properly and was within state regulatory limits for pH and chlorine levels. However, *Cryptosporidium* can survive and be transmitted even in properly operated pools. An extensive Environmental Health Outbreak Investigation Survey of the aquatic center complex was conducted by an MDH Environmental Health Services sanitarian. The survey included information on the physical description of the pool, water flow and treatment, associated physical facilities, facility management, recent developments at the facility, and a field assessment of the chemical levels. Review of the water quality reports from July and August showed multiple occasions

on which the combined chlorine residual had exceeded the state pool code of 0.5 parts per million; no corrective action was noted on the reports.

Cryptosporidiosis Cases Associated with an Aquatic Center, by Illness Onset Date



On August 5, the Redwood Falls Aquatic Center voluntarily closed in order to be superchlorinated at 20 ppm for 12.75 hours, the necessary chlorine level and time needed to inactivate *Cryptosporidium*.

All pools at the aquatic center were reopened on August 7; anyone with symptoms of gastrointestinal illness was told not to enter the pool until 2 weeks following the resolution of symptoms.

This was a waterborne outbreak of cryptosporidiosis associated with a community aquatic center. Although the original source of contamination was not confirmed, an infectious water park user most likely introduced the parasite into the pool. The high combined chlorine levels recorded indicates that the chlorine that was present in the pool was not acting as an effective disinfectant.

Outbreaks Due to Animal Contact

(1)

Cryptosporidiosis Associated with a Zoo

August

Olmsted County

On August 25, 2009, the Minnesota Department of Health (MDH) was contacted by Olmsted County Public Health Services (OCPHS) about one employee and one volunteer at a zoo in Byron, Minnesota who had been diagnosed with cryptosporidiosis. Both staff members had contact with two calves that had been on loan to the zoo from a local farm in the 2 weeks prior to their illness. An investigation was initiated on August 25.

A list of park employees and volunteers was obtained from the zoo. Staff from OCPHS interviewed zoo staff about their illness and exposure histories. Cases of cryptosporidiosis from the Olmsted County area that were identified through routine surveillance were interviewed to determine if they had exposure to the zoo. Cases were defined as persons who had a laboratory-confirmed *Cryptosporidium* infection or diarrhea (≥ 3 loose stools in a 24-hour period) or vomiting lasting 3 or more days after visiting the zoo.

A site visit was performed on August 27 by environmental health specialists from OCPHS. A local veterinarian submitted stool samples from two calves, a fisher, pigmy goat, wolf pup, pony, donkey, coyote, and goat that had been on display at the zoo to the University of Minnesota for *Cryptosporidium* testing. These samples were forwarded to the MDH Public Health Laboratory for additional testing.

Illness histories and exposure information were obtained from 29 zoo staff. Four cases were identified, including the two initial laboratory-confirmed cases. Eight zoo staff reported illness but did not meet the case definition, and thus were excluded from further analysis.

All four cases reported diarrhea and cramps, two (50%) reported fever, and one (25%) reported vomiting. Illness onset dates ranged from August 6 to August 19, 2009. The median duration of illness was 11.5 days (range, 8 to 15 days) for the two cases who had recovered at the time of interview. *Cryptosporidium parvum* subtype BGP3 was identified in the two positive specimens received by the MDH Public Health Laboratory.

Specific calf-related activities were evaluated. Zoo workers had very close contact with calves and calf pens. The only exposure statistically associated with illness was wearing gloves while having contact with calves (3 of 4 cases vs. 1 of 13 controls; odds ratio, 36.0; 95% confidence interval, 1.1 to 6,536; $p = 0.02$). It is unknown what type of gloves were worn or if cases who reported wearing gloves washed their hands immediately after taking off their gloves. Specific calf contact activities (e.g., picking up manure, feeding the calf) or hygiene practices (e.g., lack of handwashing, drying hands on clothes, etc.) were not associated with illness. However, both cases and controls reported in adequate hygiene practices after having contact with the calves.

The calves were ill with gastrointestinal disease during their display time at the zoo. One of the calves tested positive for *Cryptosporidium parvum* subtype BGP3. Stool specimens collected from the other calf and the other species of animals were all negative for *Cryptosporidium* species.

Specific recommendations made to the zoo included a renewed focus on the importance of good handwashing practices for staff, volunteers, and visitors; placing handwashing signs around the zoo to remind staff and visitors to wash their hands after visiting or working in animal areas; placing hand sanitizer stations at the zoo's exits for use by guests after visiting the animals; ensuring that proper personal protective equipment is worn by staff when caring for animals; and restricting food service within the zoo.

This was an outbreak of cryptosporidiosis associated with calf contact among workers at a zoo. Infection with *Cryptosporidium parvum* subtype BGP3 was documented in one calf and two staff members. Recommendations emphasized better handwashing and instruction, the use of hand sanitizer gels, the use of personal protective equipment for zoo staff, and the restriction of food service within the zoo.

(2)

***E. coli* O157:H7 Infections Associated with a Petting Zoo**

August-October

Scott County

On October 9, 2009, the Minnesota Department of Health (MDH) Public Health Laboratory (PHL) identified two *Escherichia coli* O157:H7 isolates that were indistinguishable by pulsed-field gel electrophoresis (PFGE) (two-enzyme pattern designation MN1130ECB255). This PFGE pattern had never previously been seen in Minnesota. MDH staff had already interviewed both cases about illness history and potential exposures in the 7 days prior to illness onset. Both cases had a history of visiting an apple orchard with a petting zoo in Jordan, Minnesota. However, additional information was needed to determine if they had visited the same facility. An investigation was initiated.

Cases were identified through routine laboratory surveillance and were defined as Minnesota residents with laboratory-confirmed infection with *E. coli* O157 PFGE subtype MN1130ECB255. Phone interviews regarding illness history and potential exposures were conducted for all cases.

MDH zoonotic diseases staff, accompanied by Minnesota Department of Agriculture (MDA) inspectors, visited the facility and collected fecal samples of all animals in the petting zoo. The samples were tested at the MDH for *E. coli* O157, other Shiga-toxin producing *E. coli*, *Campylobacter*, *Salmonella*, and *Cryptosporidium*. MDA inspected the food service part of the facility.

Three cases with *E. coli* O157 MN1130ECB255 isolates with specimen collection dates from August 28 to October 3, 2009 were identified. Dates of illness onset ranged from August 26 to October 1. Two (67%) cases were male. The median age of cases was 50 years (range, 3 to 73 years). All three cases reported diarrhea and blood in their stool, two (67%) had vomiting, and none had fever. Two (67%) of the cases developed hemolytic uremic syndrome and were hospitalized. The durations of hospitalization for the two cases were 12 days and 33 days, respectively. None died.

One case, from Washington County, attended a wedding reception at the orchard on August 22 and had onset of illness on August 26. The case did not directly contact animals in the petting zoo, but did go on a wagon ride around the orchard. The case did not consume apple pie or cider although they were served at the reception. No other reception attendees reported illness. The second case, from Dakota County, visited the petting zoo at the orchard along with a group of children on September 27 and had onset of illness on October 1. This case reported eating apple pie at the orchard. There were no other illnesses

reported in that group. The third case had onset of illness on September 29; this case lived on a farm in Scott County within 5 miles of the apple orchard but denied visiting the orchard or petting zoo. No indirect links, such as family members visiting the orchard or animals being moved between the orchard and the farm, were identified. The illness incubation period was 4 days for each of the two cases that reported visiting the orchard.

An MDH veterinarian and other staff collected 16 fecal samples, including rectal samples from a cow, eight goats, two sheep, one deer, and two llama fecal samples collected from the ground. Two environmental swabs were also collected, from a wagon and a hand sanitizer station. The two llama fecal specimens tested positive for *E. coli* O157 MN1130ECB255. Six samples collected from different animals tested positive for other Shiga-toxin producing *E. coli*: a cow and a goat sample were positive for *E. coli* O124:H19, a goat sample was positive for O undetermined:H19, a sheep and a goat sample were positive for O undetermined:NM, and a goat sample was positive for O undetermined:H28. All the samples tested negative for *Campylobacter*, *Salmonella*, and *Cryptosporidium*.

The petting zoo consisted of a large fenced-in area where all the animals were free to mingle with each other and with petting zoo visitors. There were no transition areas between animal and non-animal areas. There were no barriers to keep visitors from coming into direct contact with animals or animal manure. The ground was uncovered dirt or mud devoid of any cleanable surfaces. There were no handwashing sinks in or immediately adjacent to the petting zoo. There was one jug of hand sanitizer near the petting zoo's gate. There were no posted instructions to the public about the risk of disease transmission from animals or about washing hands after visiting the petting zoo.

Based on the layout and lack of cleanable ground cover of the petting zoo, it was not possible to clean the area and/or to isolate the infected animals to render it safe for the public. Based on MDH's recommendation, the petting zoo voluntarily closed for the season. The petting zoo operators received a copy of the National Association of State Public Health Veterinarians' Compendium of Measures to Prevent Disease Associated with Animals in Public Settings. MDH discussed the recommendations over the phone, and an opportunity to meet in person to discuss these recommendations before reopening the petting zoo was offered.

Although food did not appear to play a role in transmission to cases, multiple food handling violations were found on the MDA inspection, leading to relinquishing of the facility's food license. In December, the entire facility (orchard, food service and petting zoo) closed permanently.

This was an outbreak of *E. coli* O157:H7 infections associated with visiting the an orchard with a petting zoo. The source of *E. coli* O157:H7 were infected animals in the petting zoo. Two persons became infected from direct or indirect contact with the animals or their manure. The outbreak PFGE pattern was identified in a third person who lived 5 miles from the orchard, but no links to the orchard were identified.

(3)

***Salmonella* Typhimurium Infections Associated with Aquatic Frogs**

March-December

Winona County/Multiple states

On October 1, 2009, the Minnesota Department of Health (MDH) Public Health Laboratory (PHL) notified epidemiologists at MDH of an isolate of *Salmonella* Typhimurium that had an indistinguishable pulsed-field gel electrophoresis (PFGE) pattern to a recent posting on the national PulseNet web board. The PFGE subtype was designated TM260 (Centers for Disease Control and Prevention [CDC] *Xba*I pattern designation: JPXX01.0177). MDH epidemiologists were subsequently contacted by staff at the CDC, and an investigation was initiated.

Cases were identified through routine laboratory surveillance, and were defined as individuals who had culture-confirmed infection with *S. Typhimurium* TM260 since March 1, 2009. Interviews about illness history and potential exposures, including animal contact, in the 7 days prior to illness were conducted. Cases were re-interviewed about suspicious exposures reported by other outbreak cases as information became available.

A multi-state case-control study was initiated on December 1, 2009. Controls were selected from individuals infected with *Salmonella* strains other than the outbreak strain and were based on age and geographic proximity to the cases. Controls were eligible for enrollment if they had a specimen collection dates of July 15, 2009 or later, had not traveled internationally during their exposure period, lived in the same or an adjacent county to the case, and were in the same age group as the case (using the intervals <5, 5 to 12, 13 to 18, 19 to 59, and 60+ years). Emphasis was placed on eligible controls with the most recent collection dates and then sequentially back in time until two controls had been enrolled.

Leftover pet food was collected from the Minnesota case's household by the Minnesota Department of Agriculture (MDA) and tested for *Salmonella* at their laboratory. CDC staff contacted implicated pet stores to obtain traceback and source information for the animals.

The MDH PHL only identified the one original case isolate of *S. Typhimurium* TM260 from March to December, 2009. This case was a 54 year-old female with illness onset on August 3, 2009. She developed 7 days of bloody diarrhea that was accompanied by cramps and fever, but was not hospitalized for this illness. She had not recovered at the time of interview, so illness duration information was not available.

The Minnesota case was first interviewed about illness history and potential exposures on August 17, 2009. The only animals the case reported having contact with during this initial interview were birds and dogs. On October 16, November 9, and November 16, the case was re-contacted to inquire about suspicious exposures that had been reported by multiple cases in other states. The first two follow-up calls focused primarily on additional food items, but on the November 16 call the case was specifically asked about contact with fish, frogs, and other aquatic animals. This exposure was assessed based on findings from the multi-state investigation, which indicated that 8 of 11 (73%) cases reported exposure to an aquatic pet (goldfish or frog). At this time, the case denied having contact with frogs or similar animals prior to becoming ill. It was requested that she verify this with family members during the upcoming holiday weekend as she had frequent contact, and therefore similar exposures, with these individuals. On November 25, the case was contacted for a fifth time and reported during this

conversation that she had in fact purchased two frogs at some point during the month prior to her illness onset. She contacted the pet store where the frogs had been purchased to determine the specific name of the animals; she was informed that they were African dwarf frogs.

The animals purchased by the Minnesota case were no longer available for testing, but the case did have leftover frog food. This was collected by MDA and submitted to their laboratory for testing; the product tested negative for *Salmonella*. CDC staff contacted the pet store where the Minnesota case reportedly purchased the animals to determine where the frogs had originated. The store contact reported that all African dwarf frogs present in the store during the time period of interest would have been farm-raised in Singapore.

As of December 30, 2009, 85 *S. Typhimurium* isolates of the outbreak PFGE subtype were identified in 31 states (including the one in Minnesota). Fourteen (36%) of 39 cases with available exposure information reported contact specifically with African dwarf frogs (MMWR vol. 58, no. 51&52:1433-1436). The case-control study, which included 19 cases and 31 controls, found that exposure to frogs was the only exposure significantly associated with illness (63% of cases vs. 3% of controls; matched odds ratio, 24.4; 95% confidence interval lower limit, 4.0). No food item or other animal exposure was associated with illness.

The outbreak strain of *Salmonella* was identified in environmental samples collected from four case households in other states. Traceback investigations for these and other African dwarf frogs purchased by outbreak cases converged on a breeder in Madera, California. Sampling at this facility also resulted in the identification of the outbreak strain of *Salmonella*. All of the pet food samples collected during this investigation were negative for *Salmonella*.

This was an outbreak of *S. Typhimurium* infections associated with exposure to African dwarf frogs. Contact with reptiles is a well known risk factor for *Salmonella* infections in humans, but this is the first documented multi-state *Salmonella* outbreak associated with amphibians. A breeding facility in Madera, California was implicated as the source of the frogs.

**Confirmed Foodborne Outbreaks
Minnesota, 2009**

Outbreak Number	Month	Setting	No. Cases	No. Laboratory-Confirmed	Vehicle	Agent	Contributing Factor	County
1	Jan	Restaurant	6	1	Hamburgers	Norovirus	Likely infected food worker	St. Louis
2	Jan	Conference	16	2	Unknown	Norovirus	Unknown	Renville
3	Jan	Restaurant	4	2	Unknown	Norovirus	Infected food worker	Hennepin
4	Jan	Restaurant	7	2	Salad	Norovirus	Likely infected food worker	Polk
5	Jan	Catered meal	21	2	Unknown	Norovirus	Likely infected food worker	Ramsey
6	Jan	Restaurant	2	0	Unknown	Suspected norovirus	Likely infected food worker	Dakota
7	Feb	Restaurant	22	1	Multiple items	Norovirus	Likely infected food worker	Polk
8	Feb	Wedding reception	16	4	Multiple items	Norovirus	Likely infected guest	Ramsey
9	Feb	Restaurant	5	3	Unknown	Norovirus	Infected food worker	St. Louis
10	Feb	Restaurant	9	1	Unknown	Norovirus	Unknown	Washington
11	Feb	Restaurant	11	10	Lettuce	<i>Campylobacter jejuni</i>	Cross contamination	Dakota
12	Feb-Apr	Commercial product	5	5	Alfalfa sprouts	<i>Salmonella</i> Saintpaul	Contaminated product	Multiple counties
13	Feb-Mar	Commercial product	2	2	Melon	<i>Salmonella</i> Carrau	Contaminated product	Multiple counties
14	Apr	Restaurant	10	2	Unknown	Norovirus	Likely infected food worker	Hennepin
15	Apr	Restaurant	17	4	Unknown	Norovirus	Likely infected food worker	Ramsey
16	Apr	Restaurant	15	4	Unknown	Norovirus	Infected food worker	Dakota
17	Apr-Aug	Commercial product	2	2	Sprouts	<i>Salmonella</i> Cubana	Contaminated product	Multiple counties
18	Apr	Commercial product	1	1	Pre-packaged salad	<i>Escherichia coli</i> O157:H7	Contaminated product	Hennepin
19	May	Private event	11	1	Potato salad	Norovirus	Unknown	Anoka
20	May	Commercial product	7	7	Cookie dough	<i>Escherichia coli</i> O157:H7	Contaminated product	Multiple counties

**Confirmed Foodborne Outbreaks
Minnesota, 2009 (continued)**

Outbreak Number	Month	Setting	No. Cases	No. Laboratory-Confirmed	Vehicle	Agent	Contributing Factor	County
21	May	Graduation party	4	4	Potato salad	<i>Escherichia coli</i> O157:H7	Infected food preparer	Mower
22	May	Commercial product	1	1	Ground beef	<i>Escherichia coli</i> O157:H7	Contaminated product	Hennepin
23	Jun	Restaurant	2	2	Beef tenderloin steak	<i>Escherichia coli</i> O157:H7	Contaminated product	Hennepin
24	Jun	Catered meal	16	7	Unknown	<i>Escherichia coli</i> O157:H7	Potential cross-contamination	Mower
25	Jun	Graduation party	18	2	Roast beef	<i>Clostridium perfringens</i>	Time/temperature abuse	Anoka
26	Jul	Private event	6	2	Turkey deli meat	Norovirus	Unknown	Todd
27	Jul	Restaurant	5	5	Salad	Norovirus	Likely infected food worker	Wright
28	Jul-Apr	Commercial product	7	7	Italian-style meats/black and red pepper	<i>Salmonella</i> Montevideo	Contaminated product	Multiple counties
29	Aug	Daycare	7	7	Custom Slaughter Beef	<i>Escherichia coli</i> O157:H7	Unknown	Douglas
30	Aug	Restaurant	3	1	Unknown	Norovirus	Infected food worker	Hennepin
31	Aug	Restaurant	3	0	Barracuda	Ciguatoxin	Unknown	Hennepin
32	Aug	Restaurant	3	3	Multiple items	<i>Escherichia coli</i> O157:H7	Contaminated product resulting in cross-contamination	Multiple counties
33	Sep	Restaurant	3	0	Unknown	Suspected bacterial intoxications	Unknown	Ramsey
34	Oct	Restaurant	27	4	Sub sandwich	Norovirus	Infected food worker	Hennepin
35	Nov	Restaurant	5	5	Unknown	Norovirus	Likely infected food worker	Cottonwood

**Confirmed Foodborne Outbreaks
Minnesota, 2009 (continued)**

Outbreak Number	Month	Setting	No. Cases	No. Laboratory-Confirmed	Vehicle	Agent	Contributing Factor	County
36	Nov	Commercial product	5	5	Ground beef	<i>Escherichia coli</i> O157:H7	Contaminated product	Multiple counties
37	Nov	Restaurant	4	2	Unknown	Norovirus	Likely infected food worker	Dakota
38	Nov	Banquet	29	0	Cut fruit	Suspected norovirus	Likely infected food worker	Ramsey
39	Nov	Private event	19	5	Turkey gravy	<i>Salmonella</i> subspecies IV	Cross contamination from colonized reptiles	Blue Earth
40	Dec-Jan	Resort	120	9	Taco bar	Norovirus	Likely infected food worker	Otter Tail
41	Dec	Private event	27	3	Unknown	Norovirus	Likely infected attendee	Crow Wing
42	Dec	Restaurant	6	0	Unknown	Suspected norovirus	Likely infected food worker	Washington
43	Dec	Correctional facility	167	0	Pulled chicken	Suspected bacterial intoxications	Time/temperature abuse	Chisago

TOTAL: 43

**Confirmed Waterborne Outbreaks
Minnesota, 2009**

Outbreak Number	Month	Setting	No. Cases	No. Laboratory-Confirmed	Vehicle	Agent	Contributing Factor	County
1	Jun-Aug	Aquatic center pool	36	20	Recreational water	<i>Cryptosporidium hominis</i>	Likely infectious swimmer	Redwood

TOTAL: 1

**Outbreaks Due to Animal Contact
Minnesota, 2009**

Outbreak Number	Month	Setting	No. Cases	No. Laboratory-Confirmed	Vehicle	Agent	County
1	Aug	Zoo	4	2	Animal	<i>Cryptosporidium parvum</i>	Olmsted
2	Aug	Private home	1	1	African Dwarf Frog	<i>Salmonella</i> Typhimurium	Winona
3	Aug	Petting zoo	3	3	Animal	<i>Escherichia coli</i> O157:H7	Scott

TOTAL: 3

**Outbreaks with Other or Unknown Routes of Transmission
Minnesota, 2009**

Outbreak Number	Month	Setting	No. Cases	No. Laboratory-Confirmed	Vehicle	Agent	County
1	Jan	Nursing home	64	0	Person-to-person (PTP)	Suspected norovirus	Hennepin
2	Jan	Nursing home	30	0	PTP	Suspected norovirus	Hennepin
3	Jan	Nursing home	8	0	PTP	Suspected norovirus	St. Louis
4	Jan	Nursing home	18	0	PTP	Suspected norovirus	Olmsted
5	Jan	Nursing home	16	0	PTP	Suspected norovirus	Anoka
6	Jan	Nursing home	24	0	PTP	Suspected norovirus	Ramsey
7	Jan	Nursing home	35	0	PTP	Suspected norovirus	Otter Tail
8	Jan	Nursing home	84	0	PTP	Suspected norovirus	Ramsey
9	Jan	Nursing home	30	0	PTP	Suspected norovirus	Hennepin
10	Jan	Assisted living	45	1	PTP	Notovirus	Dakota
11	Jan	Nursing home	32	0	PTP	Suspected norovirus	Redwood
12	Jan	Nursing home	61	0	PTP	Suspected norovirus	Rock
13	Jan	Nursing home	14	0	PTP	Suspected norovirus	Cottonwood
14	Jan	Nursing home	35	0	PTP	Suspected norovirus	Wright
15	Jan	Nursing home	12	0	PTP	Suspected norovirus	Hennepin
16	Jan	Nursing home	28	0	PTP	Suspected norovirus	Stearns
17	Jan	Nursing home	50	0	PTP	Suspected norovirus	Ramsey
18	Jan	Nursing home	10	0	PTP	Suspected norovirus	Winona
19	Jan	Nursing home	239	0	PTP	Suspected norovirus	Hennepin
20	Jan	Nursing home	16	0	PTP	Suspected norovirus	Hennepin
21	Jan	Nursing home	7	0	PTP	Suspected norovirus	Beltrami
22	Jan	Nursing home	40	0	PTP	Suspected norovirus	Otter Tail
23	Jan	Nursing home	68	0	PTP	Suspected norovirus	Sherburne

**Outbreaks with Other or Unknown Routes of Transmission
Minnesota, 2009 (continued)**

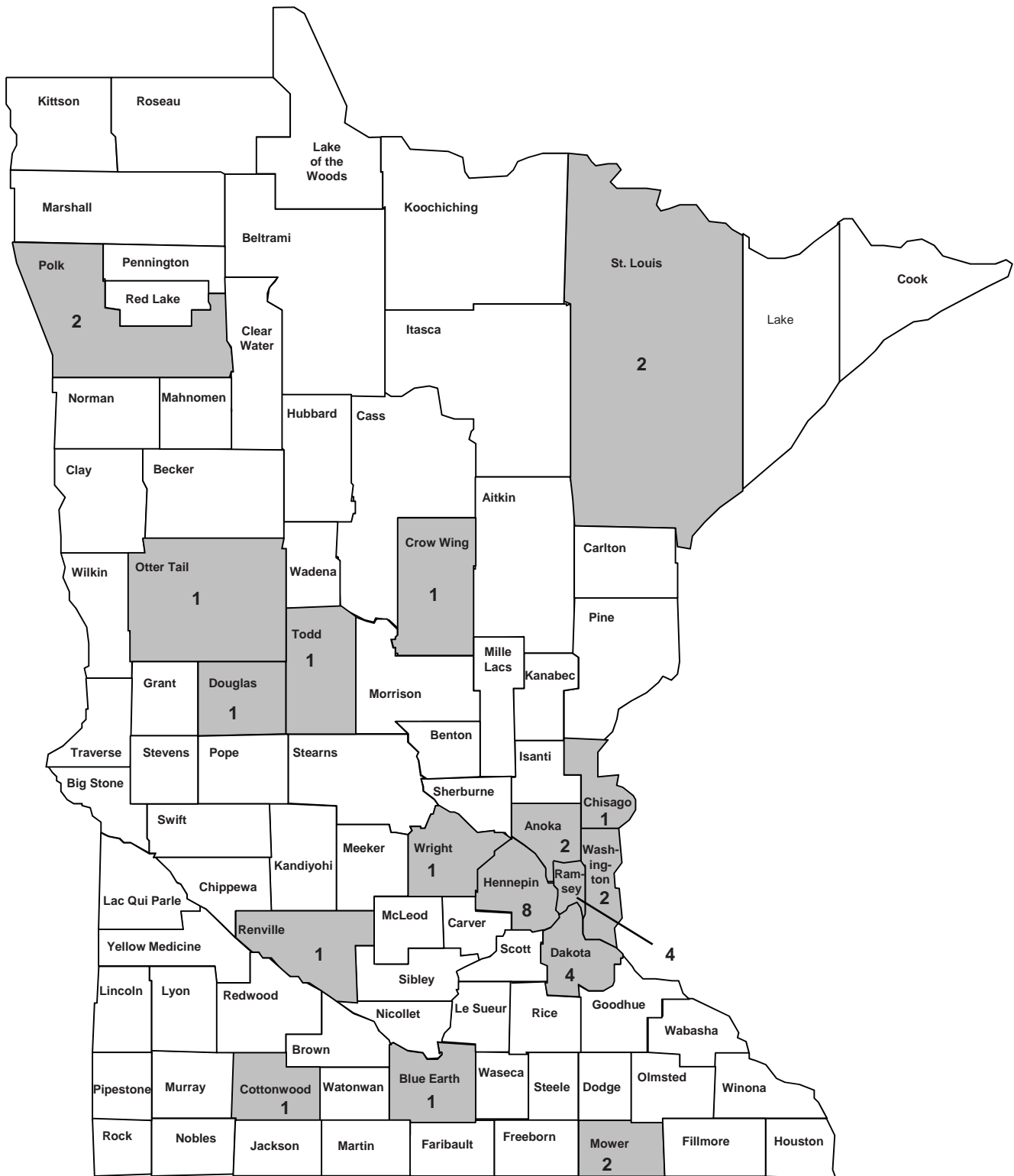
Outbreak Number	Month	Setting	No. Cases	No. Laboratory-Confirmed	Vehicle	Agent	County
24	Jan	Nursing home	22	0	PTP	Suspected norovirus	Dakota
25	Jan	Wedding party	25	2	PTP	Notovirus	Hennepin
26	Jan	Jail	50	0	PTP	Suspected norovirus	Carlton
27	Jan	Resort	19	2	PTP	Notovirus	Lake
28	Feb	Nursing home	74	0	Unknown	Suspected norovirus	Wabasha
29	Feb	Nursing home	19	0	Unknown	Suspected norovirus	LeSueur
30	Feb	Nursing home	44	0	PTP	Suspected norovirus	Hennepin
31	Feb	Nursing home	23	0	PTP	Suspected norovirus	Ramsey
32	Feb	Nursing home	77	0	PTP	Suspected norovirus	Rice
33	Feb	Nursing home	12	0	PTP	Suspected norovirus	Cass
34	Feb	Nursing home	9	0	PTP	Suspected norovirus	Hennepin
35	Feb	Nursing home	60	1	Unknown	Notovirus	Wright
36	Feb	Nursing home	39	0	PTP	Suspected norovirus	Stearns
37	Feb	Nursing home	21	0	PTP	Suspected norovirus	Anoka
38	Feb	Nursing home	5	0	PTP	Suspected norovirus	Ramsey
39	Feb	Nursing home	52	4	PTP	Notovirus	Anoka
40	Feb	Nursing home	55	0	PTP	Suspected norovirus	McLeod
41	Feb	Nursing home	32	0	PTP	Suspected norovirus	Hennepin
42	Mar	Nursing home	34	0	PTP	Suspected norovirus	Rice
43	Mar	Nursing home	17	0	PTP	Suspected norovirus	Hennepin
44	Mar	Nursing home	60	0	PTP	Suspected norovirus	Hennepin
45	Mar	Nursing home	21	0	PTP	Suspected norovirus	Otter Tail
46	Mar	Nursing home	34	1	PTP	Notovirus	Kandiyohi
47	Mar	Nursing home	17	0	PTP	Suspected norovirus	Hennepin

**Outbreaks with Other or Unknown Routes of Transmission
Minnesota, 2009 (continued)**

Outbreak Number	Month	Setting	No. Cases	No. Laboratory-Confirmed	Vehicle	Agent	County
48	Mar	Nursing home	31	0	PTP	Suspected norovirus	Otter Tail
49	Mar	Daycare	2	2	Unknown	<i>Salmonella</i> Brandenburg	Kandiyohi
50	Apr	Assisted living	14	0	PTP	Suspected norovirus	Hennepin
51	Apr	Assisted living	20	0	PTP	Suspected norovirus	St. Louis
52	Apr	Assisted living	23	0	PTP	Suspected norovirus	Lac Qui Parle
53	Apr	School	11	3	PTP	Norovirus	Olmsted
54	Apr	Retreat	4	1	PTP	Norovirus	Wright
55	Jul	Camp	50	0	Unknown	Unknown	Koochiching
56	Aug	Nursing home	19	0	PTP	Suspected norovirus	Washington
57	Aug	Daycare	7	3	PTP	Norovirus	McLeod
58	Sep	Daycare	2	2	PTP	<i>Cryptosporidium parvum</i>	Mower
59	Sep	Daycare	4	3	PTP	<i>Cryptosporidium hominis</i>	Otter Tail
60	Nov	School	120	0	Unknown	Suspected norovirus	Douglas
61	Nov	Assisted living	9	0	PTP	Suspected norovirus	Itasca
62	Nov	School	52	0	PTP	Suspected norovirus	Hennepin
63	Dec	School	43	0	PTP	Suspected norovirus	Washington
64	Dec	Nursing home	86	2	PTP	Norovirus	Crow Wing
65	Dec	Nursing home	12	0	PTP	Suspected norovirus	Dakota
66	Dec	Nursing home	25	0	PTP	Suspected norovirus	Clay
67	Dec	Nursing home	75	0	PTP	Suspected norovirus	Goodhue
68	Dec	School	152	0	PTP	Suspected norovirus	Wabasha
69	Dec	School	160	0	PTP	Suspected norovirus	Ramsey

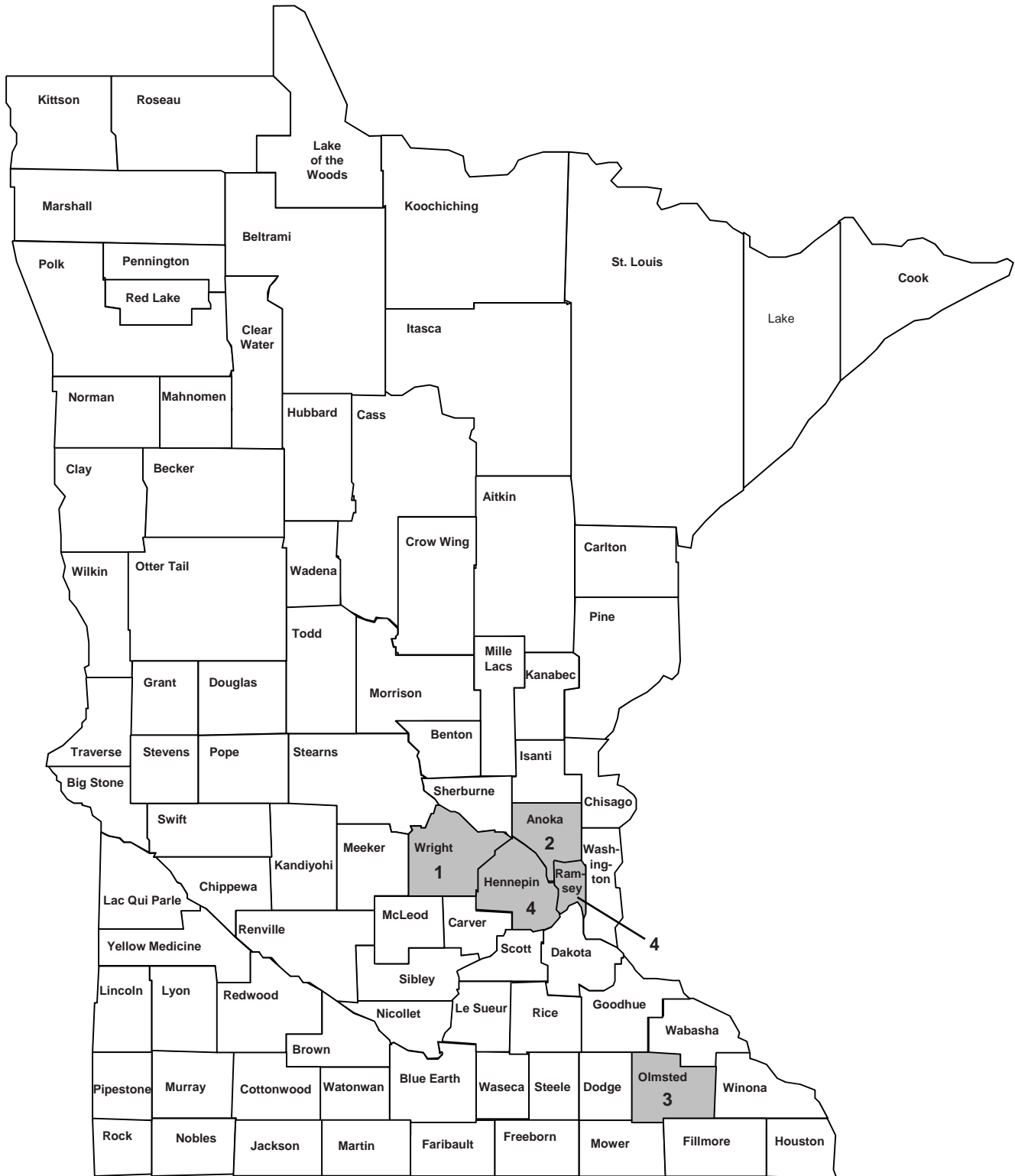
TOTAL: 69

Confirmed Foodborne Outbreaks by County, Minnesota, 2009 (n=43*)



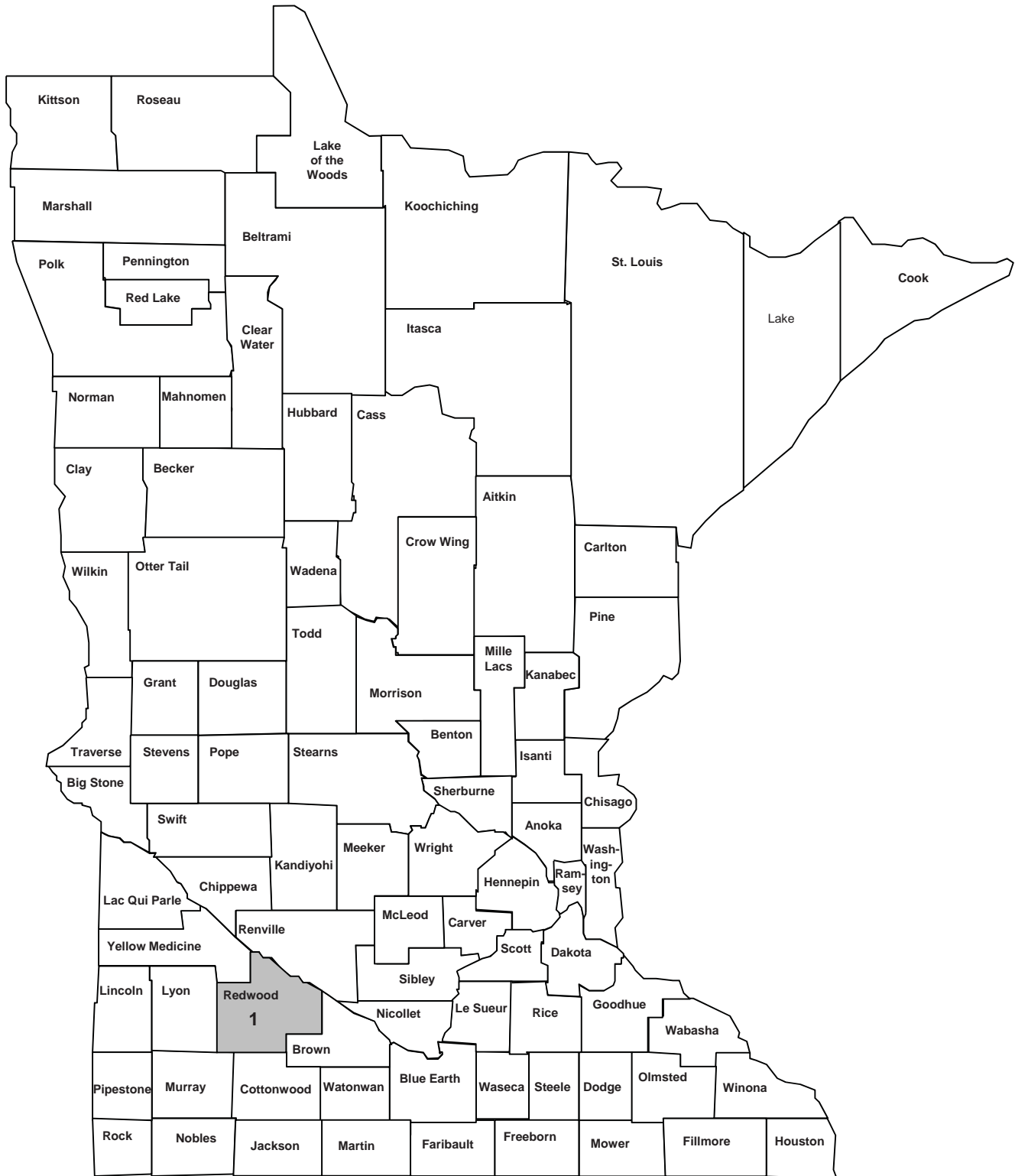
* The total number of confirmed outbreaks in 2009 was 43; however, the numbers on the map add up to 35. The remaining eight outbreaks (#12, #13, #17, #18, #20, #28, #32, and #37) involved multiple counties.

Probable Foodborne Outbreaks by County, Minnesota, 2009 (n=15*)

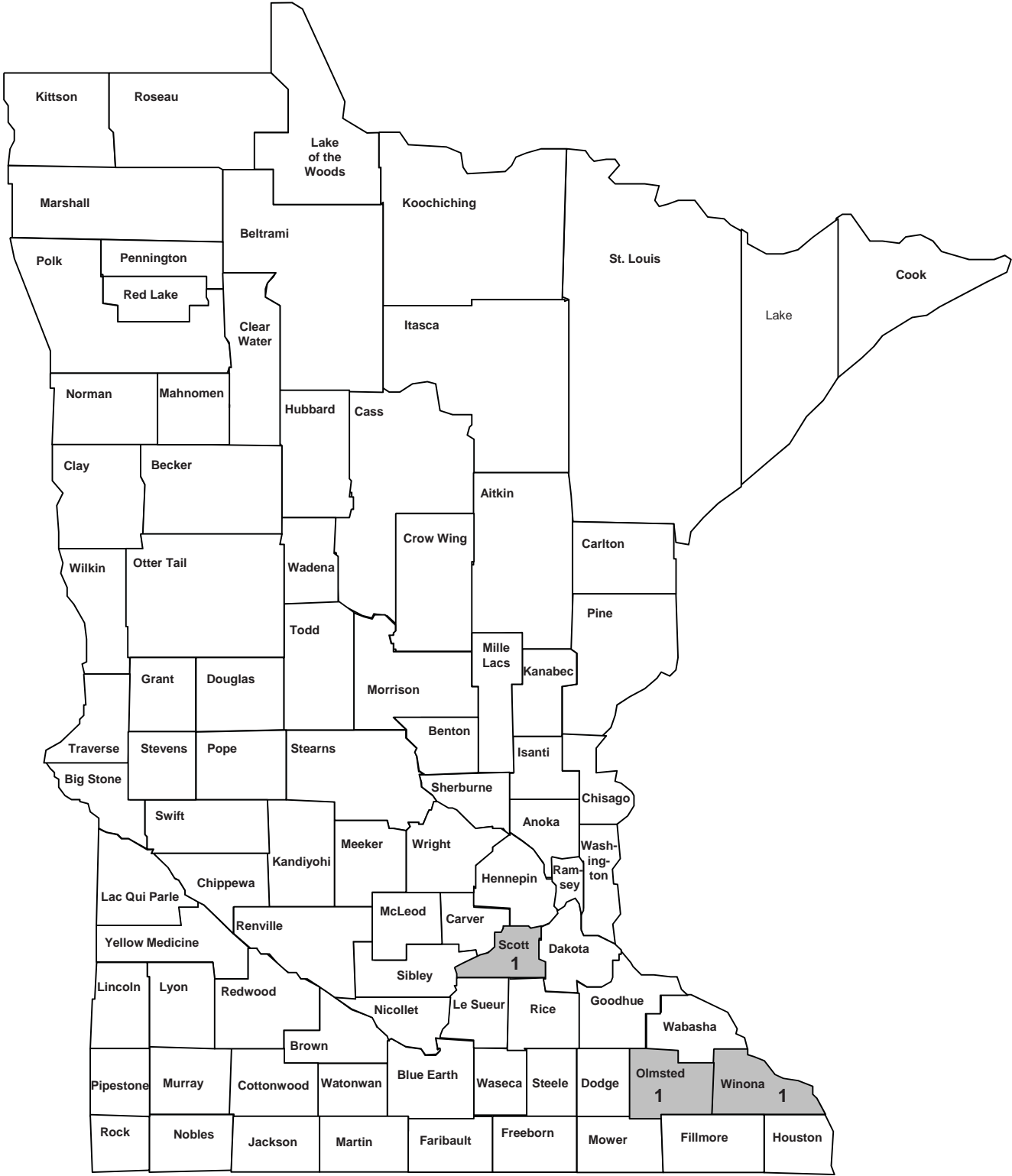


* The total number of probable outbreaks in 2009 was 15; however, the numbers on the map add up to 14. Outbreak #14 involved multiple counties.

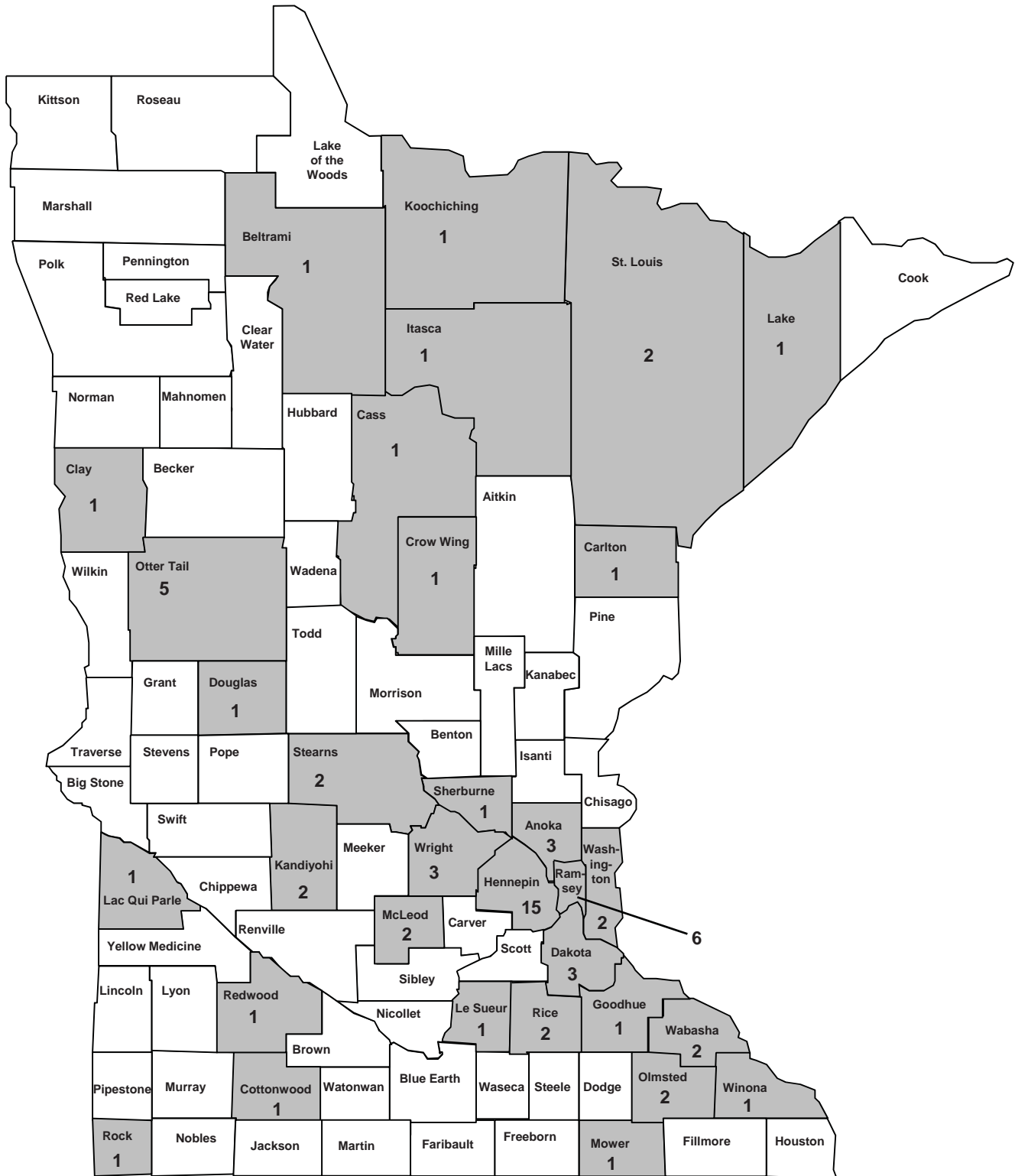
Confirmed Waterborne Outbreaks by County, Minnesota, 2009 (n=1)



Confirmed Outbreaks Due to Animal Contact by County, Minnesota, 2009 (n=3)



Outbreaks with Other or Unknown Routes of Transmission, Minnesota, 2009 (n=69)



Foodborne Illness Complaints, Minnesota, 2009

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	33	6	39
* Becker County	1	0	1
* Beltrami County	2	0	2
* Benton County	3	0	3
Big Stone County	1	0	1
Bloomington/Richfield, City of	33	38	71
* Blue Earth County	4	0	4
Brooklyn Park, City of	6	0	6
Brown County	4	0	4
* Carlton County	5	1	6
* Carver County	5	0	5
* Cass County	1	0	1
Chippewa County	1	0	1
* Chisago County	2	0	2
Clay County	0	0	0
* Clearwater County	0	0	0
* Cook County	3	0	3
Cottonwood County	2	0	2
* Crow Wing County	4	0	4
Crystal, City of	1	0	1
* Dakota County	68	0	68
* Dodge County	2	0	2
Douglas County	7	0	7
Edina, City of	20	11	31
Faribault County	0	0	0
* Fillmore County	0	0	0
* Freeborn County	1	0	1
Goodhue County	4	0	4
* Grant County	1	0	1
Hennepin County	75	12	87
Hopkins, City of	2	0	2
* Houston County	0	0	0

Foodborne Illness Complaints, Minnesota, 2009 (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	2	0	2
* Itasca County	2	0	2
* Jackson County	0	0	0
* Kanabec County	1	0	1
Kandiyohi County	1	0	1
* Kittson County	0	0	0
* Koochiching County	1	0	1
Lac Qui Parle County	0	0	0
Lake County	0	2	2
* Lake of the Woods County	1	0	1
Le Sueur County	2	1	3
Lincoln County	0	0	0
* Lyon County	2	0	2
* Mahnommen County	0	0	0
Maplewood, City of	17	0	17
* Marshall County	0	0	0
Martin County	0	0	0
* McLeod County	3	0	3
* Meeker County	0	0	0
* Mille Lacs County	1	0	1
Minneapolis, City of	122	2	124
Minnetonka, City of	10	0	10
Moorhead, City of	1	0	1
Morrison County	2	1	3
* Mower County	2	0	2
Murray County	0	0	0
Nicollet County	6	0	6
Nobles County	1	0	1
* Norman County	0	0	0
Olmsted County	10	27	37
* Otter Tail County	6	0	6
* Pennington County	1	0	1
* Pine County	4	0	4

Foodborne Illness Complaints, Minnesota, 2009 (continued)

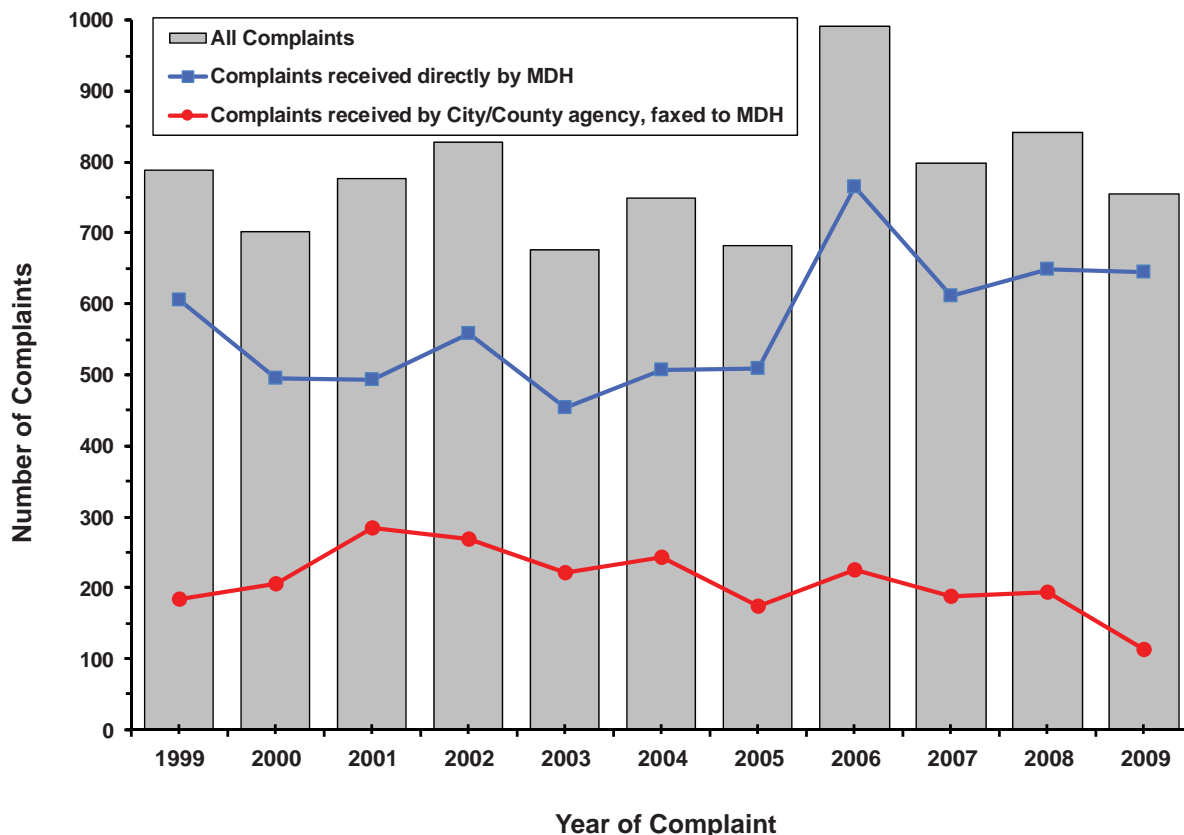
City or County	Foodborne illness complaints faxed from MDH Epi to environmental health agency	Foodborne illness complaints received by MDH Epi from environmental health agency	Total
Pipestone County	0	0	0
* Polk County	3	0	3
Pope County	0	0	0
Ramsey County	51	0	51
Red Lake County	0	0	0
Redwood – Renville Counties	1	2	3
* Rice County	9	0	9
Rock	2	0	2
* Roseau County	0	0	0
St. Cloud, City of	7	0	7
St. Louis County	33	3	36
St. Louis Park, City of	9	0	9
St. Paul, City of	82	1	83
* Scott County	9	0	9
* Sherburne County	1	0	1
* Sibley County	1	0	1
Stearns County	3	0	3
* Steele County	2	0	2
Swift County	0	0	0
* Stevens County	0	0	0
Todd County	1	0	1
* Traverse County	0	0	0
Wabasha County	2	0	2
Wadena County	1	0	1
Waseca County	0	0	0
Washington County	48	5	53
Watsonwan County	1	0	1
Wayzata, City of	5	0	5
Wilkin County	0	0	0
Winona County	0	0	0
* Wright County	10	0	10
Yellow Medicine County	0	0	0
Bureau of Indian Affairs	13	0	13
FDA	1	0	1

Foodborne Illness Complaints, Minnesota, 2009 (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
MN Dept of Agriculture	82	0	82
MDH – Compliance Monitoring	2	0	2
MDH Environmental Health	0	0	0
U of M	4	0	4
USDA	0	0	0
Total	872	112	984

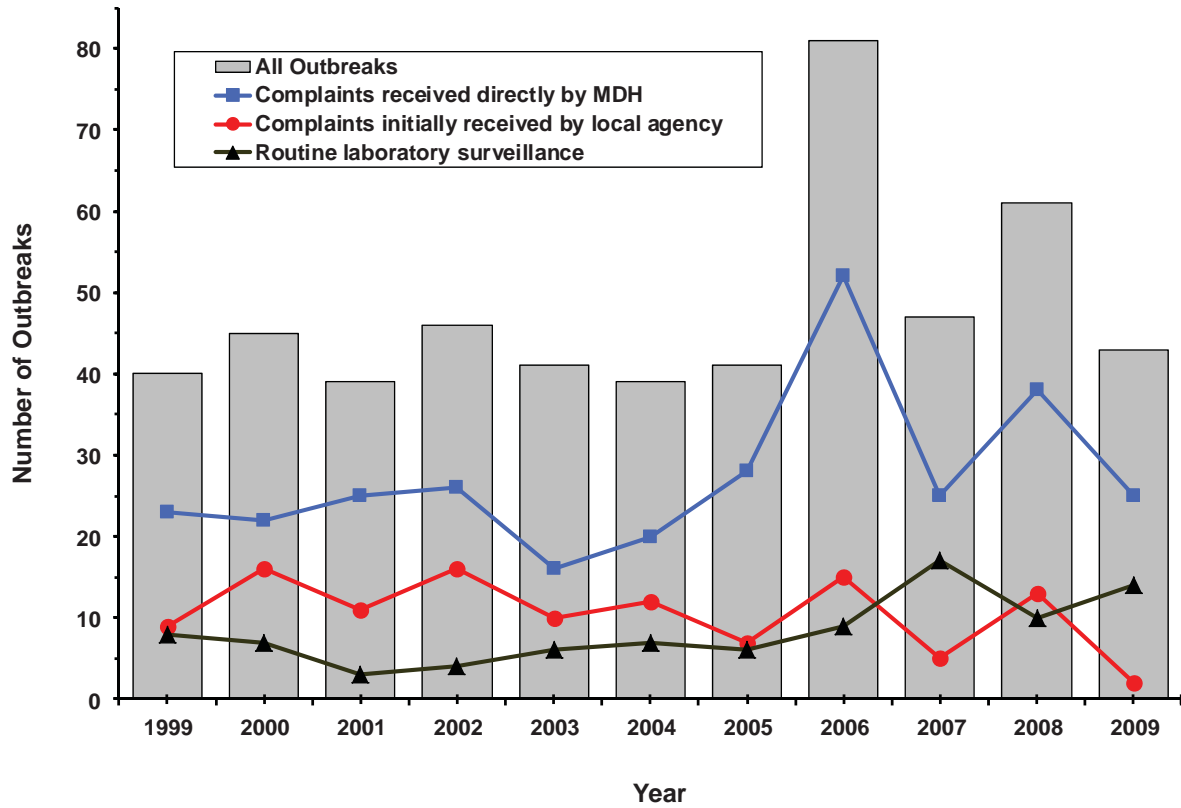
* MDH Environmental Health Services jurisdiction (total number of reports faxed to MDH EHS Metro or District Offices = 163)

Figure 1. Number of Foodborne Illness Complaints per Year, Minnesota, 1999-2009



In 2009, the MDH Acute Disease Investigation and Control Section received 756 foodborne illness complaints. Detailed information on symptoms and a 4-day food history were obtained from each call, and the complaint was faxed to the appropriate jurisdiction for each restaurant, deli, grocery store, or other establishment mentioned in the complaint. Of the 756 complaints received, 644 (83%) were received directly through the MDH foodborne illness hotline (1-877-FOODILL) and 112 (15%) were reported to MDH by local public health agencies (Figure 1). In 2009, 28 (65%) of the 43 confirmed foodborne outbreaks were initially reported to MDH or local public health agencies via phone calls from the public; of those, 25 (89%) were reported directly to MDH (Figure 2).

Figure 2. Confirmed Foodborne Outbreaks by Method of Initial Identification, Minnesota, 1999-2009



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

Tennessee Statements

The Tennessee 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**

Date: _____

Name of Outbreak
City, MN
Date

Interviewer: _____

Name: _____ Age _____ Sex: F M
Street: _____ City: _____ County: _____
State: _____ Zip code: _____ Phone (H) _____ (W) _____

Illness Onset: _____/_____/_____	Time: _____	Recovery: _____/_____/_____	Time: _____
Vomiting <input type="checkbox"/> Y <input type="checkbox"/> N	Onset: _____/_____/_____	Time: _____	Recovery: _____/_____/_____
Diarrhea <input type="checkbox"/> Y <input type="checkbox"/> N	Onset: _____/_____/_____	Time: _____	Recovery: _____/_____/_____
Number of stools per 24-hr period (max): _____		Diarrhea duration: _____ days/hours	
Bloody stools <input type="checkbox"/> Y <input type="checkbox"/> N	Cramps <input type="checkbox"/> Y <input type="checkbox"/> N	Fever <input type="checkbox"/> Y <input type="checkbox"/> N	Temperature _____ °F
First Symptom: _____	Onset Date: _____/_____/_____	Time: _____	
Other Symptoms: _____	Onset Date: _____/_____/_____	Time: _____	
Called Provider: <input type="checkbox"/> Y <input type="checkbox"/> N	Visited Provider: <input type="checkbox"/> Y <input type="checkbox"/> N	Office / ER	Date of Visit: _____/_____/_____
Provider requested stool sample: <input type="checkbox"/> Y <input type="checkbox"/> N	Stool submitted: <input type="checkbox"/> Y <input type="checkbox"/> N	Hospitalized: <input type="checkbox"/> Y <input type="checkbox"/> 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
_____	_____	_____/_____/_____
_____	_____	_____/_____/_____
_____	_____	_____/_____/_____