

MINNESOTA DEPARTMENT OF HEALTH 2005 GASTROENTERITIS OUTBREAK SUMMARY

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



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**Minnesota Department of Health
2005 Gastroenteritis Outbreak Summary**

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**MINNESOTA DEPARTMENT OF HEALTH
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DEFINITIONS:

CONFIRMED FOODBORNE OUTBREAKS

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

Confirmed outbreaks may be classified as:

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

PROBABLE FOODBORNE OUTBREAKS

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

CONFIRMED AND PROBABLE WATERBORNE OUTBREAKS

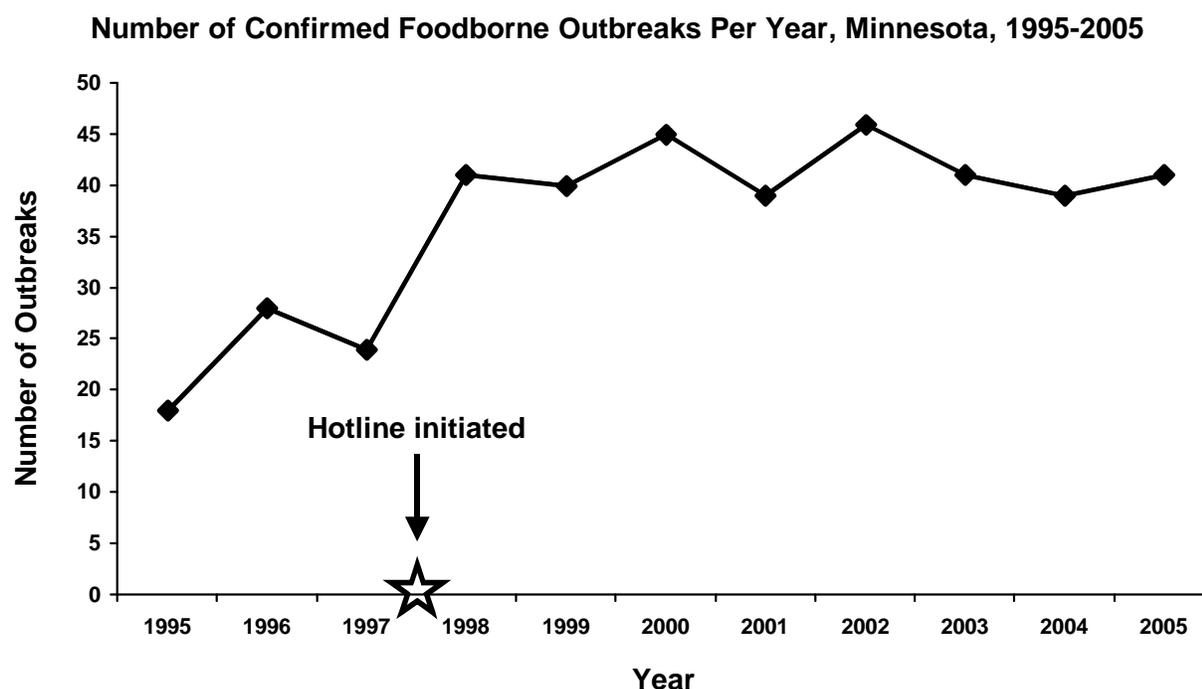
Similar to foodborne outbreaks, except epidemiologic analysis implicates water as the source of illness. Waterborne outbreaks may be associated with drinking water or with recreational water.

CONFIRMED AND PROBABLE NON-FOODBORNE, NON-WATERBORNE OUTBREAKS

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

Summary

In 2005, the Minnesota Department of Health (MDH) Acute Disease Investigation and Control Section identified a total of 97 outbreaks of gastroenteritis involving at least 1,762 cases of illness. The 97 outbreaks were classified as follows (see page 1 for definitions): 41 confirmed foodborne outbreaks, 13 probable foodborne outbreaks, four confirmed waterborne outbreaks, and 39 non-foodborne, non-waterborne outbreaks. During the past 10 years, the median number of confirmed foodborne outbreaks identified per year was 40 (range, 24 to 46). During the past 5 years, the median number of confirmed foodborne outbreaks identified per year was 41 (range, 39 to 46). The median number of cases of illness identified per confirmed foodborne outbreak in 2005 was 10 (range, two to 39).



One factor that may have contributed to the rising number of identified outbreaks over time is enhanced surveillance for outbreaks. In 1998, the toll-free MDH foodborne illness hotline (1-877-FOOD-ILL) was implemented. In 2005, 35 (85%) of the 41 confirmed foodborne outbreaks were initially reported to MDH or local public health agencies via phone calls from the public; the remaining six outbreaks were identified through active laboratory-based surveillance for bacterial pathogens.

Of the 41 confirmed foodborne outbreaks, 28 (68%) were either laboratory-confirmed (n=26) or epidemiologically defined (n=2) outbreaks of norovirus gastroenteritis. There were five (12%) confirmed foodborne outbreaks caused by *Salmonella*, one (2%) caused by *E. coli* O157:H7, one (2%) caused by scombroid toxin, and one (2%) caused by escolar toxin. The remaining five confirmed foodborne outbreaks (12%) were classified as bacterial intoxications (caused by *Clostridium perfringens*, *Staphylococcus aureus*, or *Bacillus cereus*).

The importance of norovirus as a cause of foodborne disease outbreaks in 2005 continues a pattern that has been observed for over two decades in Minnesota. During 1981-2005, 291 (50%) of 586 confirmed outbreaks of foodborne disease were due to norovirus, while 118 (20%) confirmed foodborne outbreaks were caused by infectious bacterial pathogens such as *Salmonella* and *E. coli* O157. Therefore, over this 25-year period the combined number of foodborne outbreaks due to infectious bacterial agents was less than half the number of foodborne outbreaks due to norovirus.

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

There were five confirmed foodborne outbreaks caused by *Salmonella* in 2005. Two of the outbreaks were associated with commercially distributed, frozen, stuffed, microwaveable chicken entrees. One salmonellosis outbreak was associated with cake batter ice cream sold at a national retail ice cream chain and involved cases in multiple states. One salmonellosis outbreak was linked to pork or cilantro sold at grocery stores. One salmonellosis outbreak was associated with a restaurant. The causes of restaurant outbreaks of salmonellosis are often complex and can involve consumption of undercooked foods of animal origin, infected foodhandlers, cross-contamination between raw and ready-to-eat foods, environmental contamination, and inadequate cooking, hot holding, cooling, and reheating of multiple food items.

MDH identified one foodborne outbreak caused by *E. coli* O157:H7 in 2005. This outbreak was associated with prepackaged, prewashed lettuce salad that was distributed to multiple states.

Five of the confirmed foodborne outbreaks identified in Minnesota in 2005 were bacterial intoxications caused by pathogens such as *Clostridium perfringens*, *Bacillus cereus*, and *Staphylococcus aureus*. These outbreaks often lack laboratory confirmation, as the resulting illnesses typically are of short duration. A recurring theme in outbreaks of bacterial intoxications is improper time and temperature control of potentially hazardous food items such as meats, rice, and sauces.

There were four waterborne gastroenteritis outbreaks identified by MDH in 2005. All involved recreational water; three were associated with lake beaches and one with an indoor swimming pool. The three outbreaks associated with lake beaches had a known etiology (*E. coli* O157:H7, *Shigella sonnei*, and norovirus, respectively).

There were 39 non-foodborne, non-waterborne outbreaks of gastroenteritis identified in 2005. The majority of outbreaks in this category were associated with person-to-person transmission of enteric pathogens, predominantly norovirus, in nursing homes, schools, daycares, and other facilities. For reasons that are unclear, most norovirus outbreaks in nursing homes occur during the winter months.

CONFIRMED FOODBORNE OUTBREAKS

(1)

Norovirus Gastroenteritis Associated with Sandwiches

January

Hennepin County

On January 6, 2005, the Minnesota Department of Health (MDH) foodborne disease hotline received a report of gastrointestinal illness among more than 20 people who worked together as maintenance employees. Due to an extended work shift on January 1, the employer had provided approximately 90 employees with both lunch and dinner. The lunch meal was purchased from a restaurant in Minneapolis, and the dinner meal was from another restaurant in Minneapolis. Hennepin County Public Health Protection (HCPHP) and the Minneapolis Division of Environmental Health (MDEH) were notified, and an investigation was initiated.

On January 7, MDEH sanitarians inspected both restaurants, focusing on food preparation practices and employee health and hygiene. A complete list of food items served on January 1 was obtained from both restaurants.

HCPHP epidemiologists interviewed the employees to obtain information about food/beverage consumption and illness history. A case was defined as a person who ate at least one meal provided by the employer on January 1 and subsequently became ill with vomiting or diarrhea (≥ 3 loose stools in a 24-hour period). Five stool specimens were collected from the employees and submitted to MDH for bacterial and viral testing.

Of the approximately 90 employees who worked on January 1, 62 (69%) were reached for interview. Among those interviewed, 20 (32%) met the case definition. The median age of cases was 42 years (range, 30 to 62 years), and all were men. Of the 20 cases, 17 (85%) had diarrhea, 13 (65%) had cramps, 12 (60%) had vomiting, and seven (35%) reported fever. The median incubation, calculated from the time at which the individual ate lunch, was 38 hours (range, 10 to 96 hours). The median duration of illness was 13 hours (range, 2 to 85 hours).

All five specimens were negative for *Campylobacter*, *E. coli* O157:H7, *Salmonella*, *Shigella*, and *Yersinia*. Four of five stool specimens tested positive for norovirus. All four viral sequences were identical.

The lunch meal purchased from a restaurant was a boxed lunch. The lunch included a hoagie sandwich with choice of one type of meat (ham, roast beef or turkey) all made with the same bread and toppings (mozzarella cheese, garlic butter, lettuce, onion and tomato). The boxed lunch also included one of two salads (potato salad or cole slaw), a pickle and a cookie. The dinner meal purchased from another restaurant included spaghetti with a choice of one of two sauces (meatball or sausage), a lettuce salad and breadsticks.

Eating a roast beef sandwich from the restaurant was significantly associated with illness (15 of 20 cases vs. 7 of 42 controls; odds ratio, 13.7; 95% confidence interval, 3.4 to 52.9; $p < 0.001$).

On inspection of the restaurant, MDEH sanitarians were informed by the owner that some employees, including him and family members who had assisted with preparing the boxed lunch order, had been recently ill with vomiting and diarrhea. Eight employees were interviewed. Of the eight, four (50%) had experienced diarrhea and/or vomiting with onset from December 28 through January 1. The person responsible for the majority of sandwich preparation for the boxed lunch order was not a regular employee. This temporary employee became ill with diarrhea on December 29 and recovered on December 31. No other complaints were received by the restaurant. The establishment was instructed on appropriate hand hygiene, maintaining an employee illness log, and ensuring the prescribed exclusion period for ill employees.

On inspection of the restaurant that prepared the dinner, MDEH sanitarians found overall good sanitary conditions and observed proper hand washing by employees. No ill employees were reported and no temperature violations found. No other complaints were received by the restaurant.

This was an outbreak of norovirus gastroenteritis associated with eating roast beef sandwiches from a restaurant. The source of contamination was a temporary employee who prepared most of these sandwiches; this employee had a recent history of gastroenteritis and was likely still shedding the virus at the time of food preparation. Other employees, including the restaurant owner, also reported a recent history of gastrointestinal illness.

(2)

***Salmonella* Heidelberg Infections Associated with Chicken Broccoli & Cheese**

January-March

Multiple Counties

From January through March, 2005, the Minnesota Department of Health (MDH) Public Health Laboratory identified four isolates of *Salmonella* Heidelberg that were indistinguishable by pulsed-field gel electrophoresis (PFGE); the subtype was designated SH60. The four cases resided in Hennepin, Itasca, Ramsey, and Scott Counties. Routine interviews of the cases revealed that they had all eaten several frozen, microwavable products during the week before illness onset, including stuffed chicken products. Specifically, three of the four cases had eaten the same brand (“Brand A”) Chicken Broccoli and Cheese. An investigation was initiated.

All *Salmonella* cases reported to MDH are routinely interviewed about food consumption and other exposures as part of enteric disease surveillance in Minnesota. Epidemiologists reviewed the information gathered during the interviews of *S. Heidelberg* SH60 cases. Cases were contacted again and asked specific questions about frozen, microwavable products consumed.

A case-control study was conducted to evaluate the association of illness with stuffed chicken products. Only the cases from March were included. Controls were recruited from sequential digit phone number lists based on the case phone number.

The Minnesota Department of Agriculture (MDA) Dairy, Food, and Meat Inspection Division conducted a traceback of the Chicken Broccoli and Cheese. MDH staff found intact product at a Brand A store for testing. The MDA Microbiology Laboratory cultured the products for

Salmonella, and all isolates were sent to the MDH Public Health Laboratory for PFGE subtyping.

In the case-control study, both March cases reported eating Brand A Chicken Broccoli and Cheese prior to illness. None of the six controls reported eating the product (odds ratio, undefined; $p = 0.04$).

The implicated product is a raw chicken product coated with a pre-browned breading that gives the appearance that it is fully cooked. The product is microwavable, though it is not pre-cooked, and the instructions were misread or not followed by at least two of the cases.

The fourth case had stuffed chicken products in his freezer that were purchased at the same time as product he consumed. He reported the production codes for Brand A Chicken Broccoli and Cheese (P-1358, 4365) and Chicken a la Kiev (P-1358, 5003), and staff from MDH were able to track down seven Chicken Broccoli and Cheese packages with the same production code at a local Brand A store. The seven products were tested, and three were positive for *S. Heidelberg* SH60. *S. Ohio* was also isolated from one of the packages; however, no human cases of *S. Ohio* were identified.

One of the cases was never reached for an additional interview but had initially reported consuming “Brand B” Chicken Kiev purchased at a Brand A store. Traceback investigations with the United States Department of Agriculture Food Safety and Inspection Service (USDA-FSIS) found that this brand was produced at the same processing plant that produced the Brand A product.

The cluster of Minnesota cases was posted on PulseNet, and five isolates with indistinguishable PFGE subtypes were identified in Michigan. One of the cases with a matching isolate may have consumed Chicken Cordon Bleu from another grocery chain during the week prior to illness from another grocery chain.

On April 21, MDH issued a joint press release with MDA notifying consumers about the link between *Salmonella* cases and Chicken Broccoli and Cheese purchased at Brand A stores. USDA-FSIS also did a press release that day. Brand A stores voluntarily pulled the product from the shelf until the packaging could be clarified to alert consumers that this is a raw product.

This was an outbreak of *S. Heidelberg* infections caused by frozen, microwavable Chicken Broccoli and Cheese sold by a chain of grocery stores and processed at the same plant. Four cases in Minnesota were identified. PFGE subtyping in conjunction with timely interviews of cases was critical in identifying this outbreak. The labels for the Brand A product were modified and the cooking instructions verified for this product. USDA-FSIS is re-evaluating the labeling requirements for this type of product.

(3)
Norovirus Gastroenteritis Associated with Salad Dressing

January

Mille Lacs County

On February 2, 2005, the Minnesota Department of Health (MDH) Acute Disease Investigation and Control Section received a complaint of illnesses among extended family members who ate at a restaurant in Princeton. The complainant stated that four people from a group nine extended family members from two separate households had symptoms of gastrointestinal illness after eating at the restaurant on January 29. The complainants had no other recent common exposures. An investigation was immediately initiated.

MDH staff interviewed all nine persons from the family group about food consumption and illness history. A case was defined as a person with vomiting or diarrhea (≥ 3 loose stools in a 24-hour period) after dining at the restaurant. Two cases submitted stool samples to MDH for bacterial and viral testing. An MDH sanitarian made a site visit to the restaurant on February 7. MDH staff also interviewed 17 of the 19 food workers employed at the restaurant.

Five of the nine (56%) complainants interviewed met the case definition. All five cases had diarrhea, four had cramps, four experienced vomiting, and two reported fever. The median incubation period was 35 hours (range, 16 to 90 hours). The median duration of illness was 43 hours (range, 15 to 96 hours). One family member from this party became ill two days after other complainants, and had been in close contact with one of the ill complainants since the restaurant meal. This family member and the complainant with whom he had been in close contact both submitted stool samples to MDH. The sample from the family member who became ill later than the other complainants was positive for norovirus, likely due to secondary transmission.

Based on open-ended food histories, eight of nine members of the complainant group ate salad. Other than the secondary case, 4 of 4 cases had house dressing on their salad, compared to 0 of 5 controls (odds ratio, undefined; 95% confidence interval, undefined; $p = 0.008$).

Upon inspection of the restaurant, the MDH sanitarian found that the restaurant had received no additional complaints. Food workers had opportunity for bare hand contact with ready-to-eat food items, and were not wearing gloves for salad preparation.

The restaurant did not have an employee illness log. Food worker interviews revealed that one employee had been ill with symptoms of diarrhea and vomiting on January 17, and another food worker had diarrhea starting on February 3. No stool samples were obtained from ill employees.

This was an outbreak of norovirus gastroenteritis associated with eating at a restaurant. Salad with house dressing was suspected as the vehicle. The source of the viral contamination was likely infected food workers, but this was not confirmed.

(4)
Norovirus Gastroenteritis Associated with Salad

February

Hennepin County

On Thursday, February 10, 2005, the City of Bloomington Environmental Health (CBEH) was notified by the Minnesota Department of Health (MDH) of a report of gastrointestinal illness among three persons who had eaten salad from a restaurant in Bloomington on February 5. The patrons were from two households. They had met at the restaurant for takeout dinner on February 5 and reported no other common exposures during the prior week.

On February 10, MDH epidemiology staff interviewed the patrons about illness history and food consumption using a standard questionnaire. CBEH staff was unable to obtain additional patron names or contact information. A case was defined as a person who had eaten at the restaurant with subsequent onset of vomiting or diarrhea (≥ 3 loose stools in a 24-hour period). Two stool specimen kits were delivered to the patrons for bacterial and viral pathogen testing at the MDH Public Health Laboratory (PHL).

On February 10 and 11, CBEH staff conducted an environmental health investigation at the restaurant focusing on employee health, food preparation practices, and equipment. Employees were interviewed about illness history and work duties using a standard questionnaire.

All three patrons interviewed met the case definition. Two (67%) cases were male. All three cases were ≥ 50 years of age. The median incubation period was 33 hours (range, 28 to 46 hours). The median duration of illness was 52 hours (range, 22 to ongoing at time of interview). All three cases reported diarrhea, vomiting and cramps. None of the cases reported fever or bloody stools. One case was hospitalized due to the illness.

The MDH PHL received one specimen for testing. The specimen tested positive for norovirus and negative for *Salmonella*, *Shigella*, *Campylobacter*, *E. coli* O157:H7, and *Yersinia*.

Four (57%) of seven food employees were interviewed and all denied gastrointestinal illness in themselves or in household members during the week prior to February 5. CBEH staff noticed non-compliance in employee personal hygiene during the environmental health investigation and scheduled additional employee training.

This was an outbreak of norovirus gastroenteritis. Persons from separate households became ill after consuming salads from a restaurant on February 5. The source of contamination was not identified. However, not all food workers were interviewed, and infected food workers and contaminated ready-to-eat foods such as salads are established sources of contamination and vehicles of transmission.

(5)

***Clostridium perfringens* Intoxications Associated with Prime Rib**

February

Otter Tail County

On February 11, 2005, the Minnesota Department of Health (MDH) foodborne illness hotline received a report (Complaint A) concerning illness among a group of three persons that dined at a restaurant in Fergus Falls on February 10. On February 14, the foodborne illness hotline received an independent report (Complaint B) concerning illness among a group of five persons that dined at the restaurant on February 11.

Epidemiologists from MDH obtained a list of patrons that had dined at the restaurant recently and conducted phone interviews to obtain information on consumption of foods/beverages and illness history. A case was defined as a person who developed vomiting or diarrhea (≥ 3 loose stools in a 24-hour period) after dining at the restaurant. Stool samples were collected from two individuals (one from Complaint A and one from Complaint B) and submitted to MDH for bacterial and viral testing. A sanitarian from MDH visited the restaurant to evaluate food preparation and handling procedures and to interview staff regarding recent illness.

Twenty-five individuals (including members of Complaints A and B, and additional patrons) were interviewed; five (20%) met the case definition. One patron reported gastrointestinal symptoms that did not meet the case definition; this patron was excluded from the analysis. All five cases had diarrhea, three (60%) had cramps, one (20%) had vomiting, and no cases reported a fever. The median incubation was 11 hours (range, 2 to 12 hours). The median duration of illness was 14 hours (range, 1 to 34 hours). A stool sample from one case tested positive for norovirus and a stool sample from another case tested negative for norovirus but positive for *Clostridium perfringens* enterotoxin (Type A).

Eating the prime rib was significantly associated with illness (4 of 5 cases vs. 4 of 19 controls; odds ratio [OR], 15.0; 95% confidence interval [CI], 1.3 to 174.4; $p = 0.03$). No other food or beverage items were significantly associated with illness. The case that tested positive for norovirus had an 11-hour incubation period; thus it may be theorized that the source of illness may not have come from the restaurant. When removing this case from the analysis the association between prime rib and illness became even stronger (4 of 4 cases vs. 4 of 19 controls; logit OR, 31.0; logit 95% CI, 1.4 to 691.3; $p = 0.008$).

During a routine full inspection of the establishment that was conducted on January 27, the sanitarian from MDH noted that the prime rib was at a temperature that was unacceptable for long-term holding. During a visit on February 14, the sanitarian also noted that the prime rib was being held for an extended time and then would be either sliced up for sandwiches or reheated for another meal. This practice was considered unacceptable by the sanitarian, and the restaurant was instructed to discontinue this practice.

This was an outbreak of *Clostridium perfringens* intoxications associated with the prime rib at a restaurant. Amplification of *C. perfringens* was likely facilitated by extended holding cooked

prime rib and use of this product for subsequent meals. MDH has instructed the restaurant on the proper cooking/holding practices for this food item.

(6)

Norovirus Gastroenteritis Associated with a Potluck

February

Hennepin County

On February 18, 2005, the City of Bloomington Environmental Health (CBEH) received a report of gastrointestinal illness among a group of persons who had attended a potluck at a church on February 13. Approximately 100 persons attended. Food items consumed at the potluck event included potato salad, pasta salad, macaroni salad, baked beans, hot dogs, brats, and desserts. All but the hot dogs and bratwursts were prepared in attendees' homes prior to the event. The CBEH notified the Minnesota Department of Health (MDH) on February 18 and initiated an outbreak investigation.

On February 18, CBEH staff obtained lists of attendees' names, phone numbers, and food items from a representative of the group. Attendees were interviewed about illness history, food preparation, and food consumption using a standard questionnaire. A case was defined as a person who had attended the potluck event and subsequently developed vomiting or diarrhea (≥ 3 loose stools in a 24-hour period). Four stool specimen collection kits were delivered to attendees for bacterial and viral pathogen testing at the MDH Public Health Laboratory (PHL).

Seventeen (30%) of 56 attendees interviewed met the case definition. Five attendees reported mild gastrointestinal illness symptoms but did not experience vomiting or diarrhea and were therefore removed from further analysis. Nine (53%) cases were male. Two cases (12%) were 5 to 19 years of age, and 15 (88%) were 20 to 49 years of age.

The median incubation period was 33 hours (range, 6 to 72 hours). The median duration of illness was 29 hours (range, 1 to 58 hours). Fourteen of 17 (82%) cases reported diarrhea, 11 of 15 (73%) reported cramps, 12 of 17 (71%) reported vomiting, six of 17 (35%) reported fever, and none reported bloody stools. No cases were hospitalized.

One of four stool specimen kits was received at the MDH PHL, and it tested positive for norovirus. The specimen tested negative for *Salmonella*, *Shigella*, *Campylobacter*, *E. coli* O157:H7 and *Yersinia*.

By univariate analysis, multiple food items were associated with illness, including macaroni salad (15 of 16 cases vs. 4 of 33 controls; odds ratio [OR], 108.7; 95% confidence interval [CI], 11.1 to 1,061.4; $p < 0.001$), pasta salad (14 of 17 cases vs. 3 of 34 controls; OR, 48.2; 95% CI, 8.6 to 269.4; $p < 0.001$), baked beans (12 of 17 cases vs. 6 of 33 controls; OR, 10.8; 95% CI, 2.7 to 42.4; $p < 0.001$), and brats (11 of 17 cases vs. 11 of 34 controls; OR, 3.8; 95% CI, 1.1 to 13.1; $p = 0.029$).

By unconditional multivariate logistic regression, only macaroni salad was associated with illness (adjusted OR, 34.4; 95% CI, 2.4 to 498; $p = 0.009$).

The macaroni salad was prepared on February 12 and 13 by a person who reported onset of gastrointestinal illness on February 8 and in other household members from February 8 to 10.

This was an outbreak of norovirus gastroenteritis associated with a potluck. Macaroni salad was implicated as the vehicle of transmission. An infected food handler was the source of contamination.

(7)

Norovirus Gastroenteritis Associated with a Salad Bar

February

Pine County

On February 28, 2005, the Minnesota Department of Health (MDH) foodborne illness hotline received a report (Complaint A) concerning illness among a group of four persons that dined at a restaurant in Hinckley on February 26. On March 1, the foodborne illness hotline received an independent report (Complaint B) concerning illness among a group of three persons that dined at the restaurant on February 27. On March 3, the foodborne illness hotline received a third independent report (Complaint C) concerning illness among a group of seven that dined at the restaurant on February 24. On March 4, the foodborne illness hotline received a fourth independent report (Complaint D) concerning illness among a group of six that dined at the restaurant on February 24. On March 7, the foodborne illness hotline received a fifth independent report (Complaint E) concerning illness among two individuals who dined at the restaurant on March 2. The MDH Environmental Health (EH) Services was notified on March 1 and an investigation was initiated.

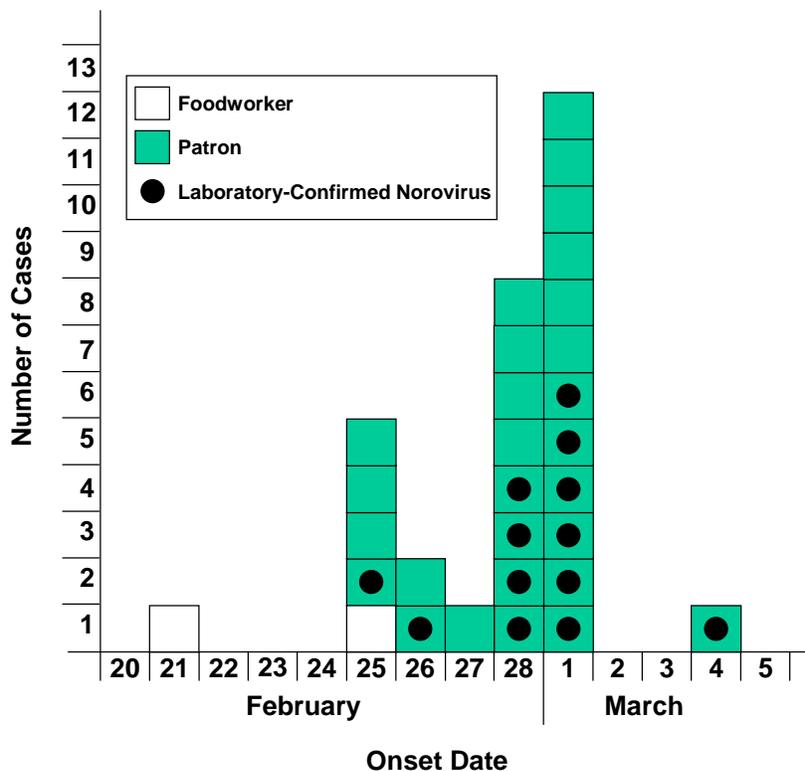
Epidemiologists from MDH obtained a list of patrons that had dined at the restaurant from February 24 to March 2 and conducted phone interviews to obtain information on consumption of foods/beverages and illness history. An open-ended question was asked regarding any foods consumed from the salad bar. A case was defined as a person who developed vomiting or diarrhea (≥ 3 loose stools in a 24-hour period) after dining at the restaurant. Stool samples were collected from 13 individuals (three from Complaint A, one from Complaint B, two from Complaint C, one from Complaint E, and six from the additional patrons that were interviewed) and submitted to MDH for bacterial and viral testing. A sanitarian from MDH EH visited the restaurant to evaluate food preparation and handling procedures and to interview staff regarding recent illness.

Sixty-four patrons (including members from all five complaints and additional patrons) were interviewed; 28 (44%) met the case definition. Three patrons reported gastrointestinal symptoms that did not meet the case definition; these patrons were excluded from the analysis. Twenty-three cases (82%) had diarrhea, 22 (79%) had vomiting, 19 (68%) had cramps, and 12 of 22 (55%) had fever. The median incubation period was 34.5 hours (range, 2 to 59 hours). The median duration of illness was 55 hours (range, 8 to 172 hours). Stool samples from 13 patrons were positive for norovirus. Nucleic acid sequencing was conducted on positive norovirus samples from five cases (from three different meal dates); all five sequences were identical.

Eating from the restaurant’s salad bar was significantly associated with illness (26 of 28 cases vs. 16 of 33 controls; odds ratio [OR], 13.8; 95% confidence interval [CI], 2.8 to 67.9; $p < 0.001$). Specific food items served on the salad bar were associated with illness, including pasta salad (15 of 17 cases vs. 3 of 21 controls; OR, 45.0; 95% CI, 6.6 to 305.7; $p < 0.001$), lettuce (19 of 21 cases vs. 9 of 26 controls; OR, 17.9; 95% CI, 3.4 to 94.9; $p < 0.001$), soup (18 of 21 cases vs. 11 of 31 controls; OR, 10.9; 95% CI, 2.6 to 45.4; $p < 0.001$), any hot dish (10 of 15 cases vs. 7 of 25 controls; OR, 5.1; 95% CI, 1.3 to 20.5; $p = 0.02$), and bread pudding (13 of 28 cases vs. 5 of 32 controls; OR, 4.7; 95% CI, 1.4 to 15.7; $p = 0.01$). Of note, many patrons either ordered the salad bar or chose an entrée from the menu; consuming an entrée item from the menu demonstrated a protective effect with regard to illness (10 of 28 cases vs. 21 of 33 controls; OR, 0.32; 95% CI, 0.11 to 0.91; $p = 0.04$).

When using cases with a 24 to 48-hour incubation period, the association between illness and the previously mentioned food items became stronger. When using this restricted incubation period, consuming bread from the salad bar became significantly associated with illness (16 of 18 cases vs. 11 of 27 controls; OR, 11.6; 95% CI, 2.2 to 61.1; $p = 0.002$); prior to this restriction the association between bread and illness approached statistical significance (22 of 27 cases vs. 18 of 31 controls; OR, 3.2; 95% CI, 0.95 to 10.6; $p = 0.09$). A meaningful regression analysis could not be performed as a result of having missing data from the open-ended questions on the questionnaire.

Gastroenteritis Cases Associated with a Restaurant, by Illness Onset Date



Two food workers reported recent gastrointestinal illness (see epidemic curve). One food worker reported an onset of vomiting on February 21; this food worker worked February 24 and February 25 and was involved in cooking, pantry help, and washing dishes. Another food worker reported an onset of vomiting and diarrhea on February 25; this food worker reported working February 25 through March 1 and was involved in baking and placing foods on the salad bar. Furthermore, this food worker reported a household member with an onset of vomiting on February 22.

Three additional food workers reported illness in the household; one reported a household member with an onset of diarrhea on February 16, another reported a household member with an onset of vomiting and diarrhea on February 16, and another reported a household member with an onset of vomiting and diarrhea on February 18. The MDH sanitarian also noted that food workers performed a variety of roles while working at the restaurant; for example, dishwashers helped prepare and place food items on the salad bar.

This was an outbreak of norovirus gastroenteritis associated with a restaurant. Multiple food items were identified as vehicles for illness. Transmission likely occurred through contamination of ready-to-eat food items by an ill employee.

(8)

Norovirus Gastroenteritis Associated with Lettuce

February

Olmsted County

On March 7, 2005, Olmsted County Public Health Services (OCPHS) received a phone call from a medical clinic (Group A) reporting that most of their staff members had experienced vomiting and/or diarrhea over the weekend; some were still ill at the time of the report. They attributed their illness to a lunch they had eaten on March 3; the lunch was prepared by a restaurant in Rochester and delivered to their site by a third party. Also on March 7, a voice mail message left over the weekend reported gastroenteritis among attendees of a March 3 meeting at another medical facility (Group B) where the restaurant had also catered lunch. Based on this information, an outbreak investigation was initiated by OCPHS.

A team from OCPHS visited the establishment on March 7. In addition to sit-down dining, the restaurant also caters and has a nearby retail outlet. Restaurant management informed the team that the restaurant had catered four events on March 3 (Groups A, B, C, and D). Menus and the names of contact persons for the events were provided. OCPHS also requested and obtained the contact name and menu for an event catered on March 4 (Group E), copies of orders taken to customers' homes by an independent delivery service, and credit card receipts for March 3 through March 6. OCPHS staff called the contacts listed on the catering sheets and requested lists of attendees and then prepared an interview form with the associated menu for each event. Attendees were called and interviewed using standard interview forms.

An assessment of food preparation and staff hygiene was made using the principles of Hazard Analysis Critical Control Points and Active Managerial Control (AMC). Because the initial epidemiological information indicated norovirus as the likely etiology, special attention was paid

to bare-hand contact with ready-to-eat foods and handwashing procedures. Employees were interviewed using a standard food service employee questionnaire.

A case was defined as a person who ate food prepared by the restaurant and subsequently experienced vomiting and/or diarrhea (≥ 3 loose stools in a 24-hour period). Stool samples were requested from symptomatic patrons and food workers.

A total of 81 interviews were completed. Thirty persons (37%) met the case definition; two additional ill persons who ate only leftover food at home were excluded from the analysis. Twenty-nine of the 30 cases ate meals on March 3; one case ate catered food on March 4. The median incubation period was 31 hours (range, 21 to 83 hours). The median duration of illness was 44 hours (range, 15 to 68 hours). Of the 30 cases, 28 (93%) had vomiting, 28 (93%) had diarrhea, 25 (83%) had abdominal cramps, and 14 (47%) reported a fever. No cases reported bloody stools.

Thirteen of 14 food workers were interviewed, as were eight other employees (housekeepers and servers). One server reported experiencing diarrhea beginning on March 5, but this person did not prepare or handle food consumed by ill patrons and appeared to be a probable victim. A food worker, whose husband is a cook at the restaurant, reported that her family members experienced diarrhea the weekend of March 5. This worker, who did not get sick, and reportedly did not routinely prepare food, was asked to prepare salad on the morning of March 3. Two other workers, a cook and server (who were also husband and wife), reported that they experienced vomiting the morning of March 7. In addition, the managers reported two other ill employees but were not sure of their symptoms. These employees were interviewed, but neither of them experienced vomiting or diarrhea; one reported body aches and the other reported a headache. One of these employees submitted a stool sample.

Six stool samples were obtained and sent to the Minnesota Department of Health Public Health Laboratory for analysis: two samples from Group A, one sample each from groups B, C and E, and one sample from a restaurant employee who was reported to be ill by restaurant management. The sample from the employee tested negative, and the five samples from patrons all tested positive for norovirus. Three of the five norovirus-positive samples were sequenced (one each from Groups A, B, and E) and all three had identical sequences (NLV187).

Eating any type of salad was statistically associated with illness (odds ratio [OR], 19.7; $p < 0.001$ for persons eating on Thursday, and OR, 17.2; $p < 0.001$ for persons eating on Thursday or Friday). All salads contained romaine lettuce and no other common ingredient. A food flow describing the preparation of romaine lettuce was used to identify points where contamination could be introduced. Bare-hand contact with ready-to-eat foods, including romaine lettuce, was reported and observed. Obstructed handwashing sinks were also observed, and the catering and salad stations did not have conveniently located handwashing sinks.

Managers were instructed to screen all employees for symptoms of vomiting and diarrhea and exclude any ill employees until they were symptom-free for 3 days. Each employee was also given the same message when they were initially interviewed by OCPHS. OCPHS visited the restaurant on three separate occasions following the investigation to assure that all employees

received adequate training. The importance of handwashing was stressed, especially before preparation of foods that will not be cooked, such as fresh fruits and vegetables. Handwashing demonstrations and skill verification using “Glitter Bug” lotion were conducted for all employees, including food preparation and wait staff. OCPHS also reviewed preliminary outbreak findings with the management, including disease symptoms and statistical findings. The food flow diagram for romaine lettuce was discussed and used to identify critical control points and emphasize training opportunities for staff.

This was an outbreak of norovirus gastroenteritis associated with a restaurant. This outbreak was likely due to a food worker who contaminated the romaine lettuce that was used in various salad items at the catered events and served in the restaurant to patrons. The substitute worker who prepped the romaine lettuce may have been asymptomatic, brought the virus into the establishment from an ill household member, or was ill but did not report the illness. Although 22 restaurant patrons who ate meals prepared on March 4 and 5 were interviewed, only one person reported illness, so it appears the outbreak was confined to foods prepared on March 3.

(9)

Norovirus Gastroenteritis Associated with a Catered Lunch

March

Benton County

On March 15, 2005, the Minnesota Department of Health (MDH) received a report concerning teachers at a school in Sauk Rapids, Minnesota who became ill after eating a catered lunch on March 10. The meal was catered by a restaurant in Rice, Minnesota.

Epidemiologists from MDH conducted phone surveys of the teachers to obtain information on consumption of foods/beverages and illness history. A case was defined as an individual who consumed food items from the catered meal and subsequently became ill with vomiting or diarrhea (≥ 3 loose stools in 24-hour period). A sanitarian from MDH visited the restaurant to evaluate food preparation and handling procedures and to interview staff regarding recent illness. Stool samples were collected from six teachers and submitted to MDH for bacterial and viral testing.

Of the 20 teachers interviewed, 13 (65%) met the case definition. One other teacher reported gastrointestinal symptoms that did not meet the case definition; this teacher was excluded from the analysis. All 13 cases had diarrhea, 11 (85%) had cramps, seven (54%) had vomiting, and three (23%) had fever. The median incubation period was 38 hours (range, 18 to 53 hours). Ten teachers reported having leftover food items on March 11, which could influence the incubation periods. The median duration of illness was 61 hours (range, 34 to 98 hours). Stool samples from six teachers were positive for norovirus. Nucleic acid sequencing was conducted on positive norovirus samples from two cases; both sequences were identical.

No single food item was significantly associated with illness. Consuming lettuce from either the sandwich wraps or from the lettuce salad approached statistical significance (9 of 13 cases vs. 1 of 6 controls; odds ratio, 11.3; 95% confidence interval, 0.97 to 130.2; $p = 0.06$).

Twenty food workers were interviewed regarding recent illness. One food worker reported three household members with gastrointestinal symptoms prior to the catered lunch; one household member had an onset during the beginning of March, and two additional household members had an onset of vomiting on March 10. This food worker indicated that he helped prepare the catered meal for the teachers on March 10 and was not home when the two children became ill. A second food worker reported an onset of vomiting and diarrhea on March 1 and did not recover until March 7. This food worker did return to work on March 10 and was involved with pizza prep, deliveries, and dishwashing.

The restaurant also prepared a meal for another event on March 10; however, many of the food items were not the same as those served for the teachers. The restaurant stated that no illnesses had been reported from the second catered event. MDH repeatedly tried to reach a contact person for this second event and inquire about illnesses, but these attempts were unsuccessful.

This was an outbreak of norovirus gastroenteritis associated with a catered meal from a restaurant. Lettuce was identified as a potential vehicle. The source of contamination likely was a recently ill food worker or a food worker with ill family members.

(10)

***Clostridium perfringens* Intoxications Associated with Refried Beans**

March

Anoka County

On March 28, 2005, the Minnesota Department of Health (MDH) Acute Disease Investigation and Control Section received an email complaint of illness from two individuals who ate together at a restaurant in Anoka on March 26. These individuals reported that they had no other common exposures. An Anoka County Community Health and Environmental Services (ACCHES) environmental health specialist was notified and an investigation was initiated immediately.

MDH staff interviewed 61 restaurant patrons, including the original complainants and additional patrons who ate at the restaurant on March 26 whose names were obtained from a list of patrons provided by the restaurant. Patrons were asked about food consumption and illness history. A case was defined as a person with vomiting or diarrhea (≥ 3 loose stools in a 24-hour period) after eating food from the restaurant. Two cases submitted stool samples to MDH for bacterial and viral testing. The ACCHES environmental health specialist went to the restaurant on March 29 to conduct environmental assessments.

Ten of the 61 (16%) persons interviewed met the case definition. All cases had diarrhea, five (50%) cases had cramps, and one (10%) had vomiting. The median incubation period was 12 hours (range, 1.5 to 64.5 hours). The median duration of illness was 26 hours (range, 8.5 to 59 hours). The stool samples obtained from two of the complainants were both positive for *Clostridium perfringens* enterotoxin. Molecular subtyping with pulsed-field gel electrophoresis (PFGE) showed that the subtypes of *C. perfringens* isolates cultured from the stool samples of the two cases were indistinguishable (PFGE subtype PERF12).

By univariate analysis, consumption of refried beans (9 of 10 cases vs. 23 of 47 controls; odds ratio, 9.4; 95% confidence interval, 1.03 to 217.5; $p = 0.03$) was associated with illness.

During the environmental assessment of the restaurant on March 29, the ACCHEs environmental health specialist found that beans out for reheating on the cook line were at 49.7 to 51.4° F. Full pans of beans were being held in the steam table at 193° F. The beans were boiled for 3 hours during cooking, then onions, spices, and peppers (sautéed separately) were blended into the beans. Beans were stored in 2-inch pans in the walk-in cooler. The refried beans could have been prepared at least 24 hours before they were reheated and served; therefore, there was potential for temperature abuse of the refried beans from the time of preparation until the time of reheating, which in turn could have allowed bacteria to proliferate.

This was an outbreak of foodborne intoxications caused by *C. perfringens*. Refried beans were statistically associated with illness. In the preparation of the refried beans, there was potential for temperature abuse, with subsequent proliferation of bacteria.

(11) Norovirus Gastroenteritis Associated with a Restaurant

March

Hennepin County

On March 31, 2005, the Minnesota Department of Health (MDH) notified the City of Bloomington Environmental Health (CBEH) of a complaint from an individual representing a party of people who had become ill after attending an Easter Sunday brunch served at a restaurant in Bloomington on March 27. No other complaints were received by the restaurant or CBEH. Approximately 700 patrons were served a brunch-buffet style meal, which included various breakfast items, side dishes, soups and salads, entrees, carving and chef attended stations, and desserts. CBEH initiated an outbreak investigation immediately.

On April 1, CBEH obtained copies of the menu, reservation list, and kitchen staff schedule from restaurant management. Complainant and other groups randomly selected from the reservation list were interviewed about illness history and food consumption using a standard questionnaire. A case was defined as a person who attended the brunch with subsequent onset of vomiting and/or diarrhea (≥ 3 loose stools in a 24-hour period).

Also on April 1, CBEH initiated an environmental health investigation at the restaurant, which focused on employee health, food preparation and handling, and equipment. CBEH interviewed restaurant employees about food handling activities and illness history using a standard questionnaire. Five stool kits were delivered by MDH to patrons for bacterial and viral testing at the MDH Public Health Laboratory.

Eighteen (39%) of forty-six patron interviewed met the case definition. Four patrons experienced mild symptoms, but did not meet the definition and were removed from further analysis. Thirteen (72%) of 18 cases were female and five (28%) were male. No cases were <1 year old, one (5%) was <4 years old, two (11%) were 5 to 19 years old, 10 (56%) were 20 to 49 years old, and five (28%) were >50 years old.

The median incubation period was 31.0 hours (range, 5 to 73.5 hours). The median duration of illness was 19 hours (range, 4.5 to 79 hours). Twelve (67%) cases reported vomiting, 16 (89%) reported diarrhea, 10 (56%) reported cramps, and six (33%) reported fever. No cases reported bloody stools or were hospitalized. Four of five stool specimens submitted tested positive for norovirus. Sequencing was conducted on norovirus nucleic acid from two specimens, and the sequences were identical. All specimens tested negative for *Salmonella*, *Shigella*, *Campylobacter*, and *E. coli* O157:H7.

Consumption of one food item, Wisconsin home fries, was associated with illness by univariate analysis (7 of 17 cases vs. 1 of 23 controls; odds ratio, 15.4; 95% confidence interval, 1.7 to 142.5; $p = 0.006$).

Nine restaurant employees were interviewed and none reported illness. The environmental health investigation revealed no apparent critical violations, or non-compliant risk factors.

This was an outbreak of norovirus gastroenteritis associated with a restaurant. Wisconsin home fries were associated with illness but accounted for a small proportion of cases. Other vehicles and the source of contamination were not determined.

(12)

Norovirus Gastroenteritis Associated with a Restaurant

March

Olmsted County

On April 1, 2005, Olmsted County Public Health Services (OCPHS) received a call from one of their nursing directors reporting that four of six staff members became ill after eating together at a restaurant in Rochester on March 30. The nursing director felt that no other exposures could have accounted for their similar symptoms and onsets, and an investigation was initiated.

The complainants were interviewed to assess their symptoms and food consumption histories. The Environmental Health Manager, a nurse manager, two sanitarians, and a Spanish-language interpreter visited the restaurant on April 1 to interview employees and conduct a food-handling review. Credit card receipts were obtained from the restaurant for people who ate at the restaurant from March 28 through March 31. A case was defined as a person who ate at the restaurant and subsequently became ill with vomiting and/or diarrhea (≥ 3 loose stools in a 24-hour period). Stool specimens were obtained from ill patrons and employees.

Forty-six patrons were interviewed, and 15 (33%) met the case definition. Three cases (20%) ate at the restaurant on March 29, 11 (73%) ate lunch on March 30, and one (7%) ate dinner at the restaurant on March 30. All cases experienced diarrhea, 12 (80%) had cramping, 10 (67%) had vomiting, and one (7%) reported fever. The median incubation period was 33 hours (range, 10 to 44 hours). Most of the cases were still symptomatic at the time of their interview; therefore, the median duration could not be determined.

A wide variety of foods were eaten by the cases, and no specific food was statistically associated with illness.

Twenty-four restaurant employees were interviewed. Two of them admitted they were ill with gastrointestinal symptoms beginning March 30. Both ate at the restaurant on March 29. One of them worked on March 29, and the other worked on March 30. Neither ill restaurant employee was involved in the direct preparation of food; one was a host, the other was a server.

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

An environmental assessment of the restaurant was conducted on April 1. Several critical items related to hand hygiene were noted, including infrequent handwashing, bare-hand contact with ready-to-eat foods, a blocked hand sink, and inadequate soap and paper towels at hand sinks. During the time of the outbreak, two key kitchen staff members were absent from the facility; their absence may have contributed to the breakdown in the systems and policies normally in place.

This was an outbreak of norovirus gastroenteritis associated with a restaurant. The presence of ill restaurant employees in the facility and the lapses in hand hygiene indicated contamination by restaurant employees as the likely cause of the outbreak. Corrective actions were taken at the restaurant, including handwashing education and the proper use of gloves, the discarding of all ready-to-eat food items including ice, chips, meat and taco fixings, exclusion of ill employees, and implementation of better surveillance for employee illness.

(13)

Norovirus Gastroenteritis Associated with a Restaurant

April

Hennepin County

On April 27, 2005, the Minnesota Department of Health (MDH) foodborne illness hotline received a report of illness from a party of 17 people, several of whom became ill after eating at a fast food restaurant in Champlin on April 24. This group also participated in a basketball tournament at a local high school on April 23-24. Hennepin County Public Health Protection (HCPHP) – Epidemiology (Epi) and Environmental Health (EH) were notified about the report and an investigation was initiated. The City of Brooklyn Park Environmental Services (BPES) was also notified because the basketball tournament was held at a school with a food concession service licensed by BPES.

On April 27, HCPHP-EH contacted the manager of the restaurant to inquire about any foodborne illness complaints and employee illness reports. HCPHP-Epi contacted the initial complainant to obtain a list and phone numbers of other team families to interview them about symptoms of illness and foods consumed. A case was defined as a person who had eaten at the restaurant and subsequently became ill with vomiting or diarrhea (≥ 3 loose stools in a 24-hour period). The tournament coordinator was contacted to obtain the names and phone numbers of other coaches

to determine if other teams were experiencing symptoms. One person submitted a stool for bacterial and viral testing.

BPES contacted the school about the concession stand and asked about types of food served, number of staff involved in food handling, and their food-handling practices.

Of the 14 persons interviewed, four (28%) met the case definition. All reported vomiting and two (50%) reported diarrhea. The median incubation period (based on the meal time at the restaurant) for vomiting was 38 hours (range, 32.5 to 44 hours), with vomiting lasting from 5 to 16.5 hours. The median incubation period for diarrhea was 35 hours (range, 32.5 to 37 hours) with diarrhea lasting from 7 and 16.5 hours. Norovirus was identified in the one stool specimen submitted for testing. Secondary transmission was reported in a family member of the person with confirmed norovirus.

According to the restaurant manager, the complainants had informed the restaurant of their illness; however, the restaurant did not report these illnesses to HCPHP-EH as required by the Minnesota Food Code. The manager also stated that none of the employees reported any gastrointestinal illness during the week prior to April 24.

HCPHP interviewed thirteen restaurant employees; one reported diarrheal illness on April 26. This person indicated that he had worked the cash register on April 24 when the party would have eaten at the restaurant. He also stated that there were several teams from the tournament that had been at the restaurant over the weekend and noted that there were no obvious situations of illness, such as vomiting, in the dining area.

During the observation of food-handling practices over the busy lunch period, numerous critical violations, particularly involving bare-hand contact with ready-to-eat foods (which is now prohibited under Hennepin County Food Protection Ordinance 3), were noted. The faucets for the hand sinks were operated by an electronic eye to avoid contact with handle controls; however, they all needed adjustment as the stream of water cut off too quickly, and the temperature never reached the minimum of 110° F.

Additional poor hygienic practices were noted, including wet wiping cloths on counters being used by employees to wipe hands in lieu of handwashing, and touching garbage cans and then continuing foodhandling activities without handwashing. All food temperatures were appropriate.

BPES reported that all the foods at the basketball tournament concession stand were purchased pre-packaged. During the interviews with the patrons, nine reported not purchasing anything from the concession stand. Of the five that did purchase items, two had bottled beverages only. The other three purchased popcorn, pretzels, donuts, and bottled drinks. With this information, no additional investigation of the concession stand was warranted.

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

confirmed. Critical violations at the restaurant were addressed and corrected during the course of the inspection. HCPHP-EH reviewed the code requirement for managers to report any customer illness reports to the health department, and to keep employee illness logs. HCPHP-EH will continue to monitor compliance with the “no bare-hand contact on ready-to-eat foods” rule at the restaurant.

(14)

Norovirus Gastroenteritis Associated with a Restaurant

May

Hennepin County

On May 10, 2005, the Minnesota Department of Health (MDH) foodborne illness hotline received a report (Complaint A) regarding an individual who dined at a fast food restaurant in Minnetonka on May 5 and subsequently become ill. On May 11, the foodborne illness hotline received an independent report (Complaint B) concerning illness among a group of three persons that dined at the same restaurant on May 4. Hennepin County Public Health Protection (HCPHP) and the City of Minnetonka Health Division were subsequently notified and an investigation was initiated.

An HCPHP epidemiologist conducted interviews with individuals from both complaints to obtain information on consumption of foods/beverages and illness history. A case was defined as a person who ate at the restaurant during May 4-5 and subsequently became ill with vomiting or diarrhea (≥ 3 loose stools in a 24-hour period). HCPHP attempted to obtain a list of patrons from the restaurant; however, the restaurant's patrons rarely pay by credit card or check. On May 11, a City of Minnetonka sanitarian inspected the restaurant, focusing on food preparation practices and employee health and hygiene. Two stool specimens were collected from patrons and submitted to MDH for bacterial and viral testing.

Four patrons were interviewed; two (50%) patrons met the case definition, one from Complaint A and one from Complaint B. Both cases reported diarrhea and cramps, one reported vomiting, and one reported fever. The incubation periods for these two cases were 24.5 and 27 hours, and the durations of illness were 48 and 87 hours, respectively. Both stool specimens tested positive for norovirus. Nucleic acid sequences of the two viruses were identical.

No food item was significantly associated with illness. One case ate a chicken fillet sandwich, fries, and a soda with ice. The other case ate a southwestern chicken wrap. Both chicken items include pre-washed leaf lettuce and were prepared by the same food handler.

Ten employees of the restaurant were interviewed. One employee reported an upset stomach, with low appetite and slight nausea on April 30 or 31 in the early evening; this employee reported no symptoms at the time of the interview. This employee did not work on May 4, but did work on May 5. Employees were observed washing hands and using gloves and utensils during food preparation. Sanitizing solutions were present and at proper ranges. The restaurant did not receive any other customer complaints.

This was an outbreak of norovirus gastroenteritis associated with a restaurant. The vehicle of transmission was not identified. The source of the outbreak may have been ill food workers, with transmission occurring through contamination of ready-to-eat food items.

(15)

Scombroid Poisoning Associated with Mahi Mahi

May

Hennepin County

On May 9, 2005, an urgent care physician contacted the Minnesota Department of Health (MDH) foodborne illness hotline to report a case of apparent scombroid poisoning. Scombroid poisoning is caused by consumption of certain species of fish that have decomposed because of improper temperature controls. Spoilage bacteria lead to a buildup of histamine in the fish tissue. Ingestion of the fish causes acute histamine intoxication. The case had eaten mahi mahi for lunch at his workplace cafeteria in Minnetonka. MDH initiated an investigation in collaboration with Hennepin County Community Public Health Protection, the City of Minnetonka Environmental Health Division, and the Food and Drug Administration (FDA).

MDH staff interviewed the reported case about food consumption and illness history. A City of Minnetonka sanitarian went to the restaurant on May 10 to review foodhandling practices, focusing on temperature control processes for the mahi mahi. A frozen sample of mahi mahi left over from the lunch and other fillets from the implicated lot were submitted to an FDA laboratory for histamine analysis. An FDA inspector assessed the chain of suppliers that provided the mahi mahi to the cafeteria.

Two cases of scombroid poisoning were identified. The first case (the case reported to MDH on May 9 by a physician) had onset of headache, flushing, dizziness, and rapid heartbeat approximately 15 minutes after eating the mahi mahi. The case sought medical attention and was treated with diphenhydramine, an antihistamine.

A second case notified cafeteria management of his symptoms, and the cafeteria referred his information to the health department. The second case was in the cafeteria line at the same time as the first case. The second case went back to his desk to eat mahi mahi that was cut from the same fillet as the first case's piece. Approximately 20 minutes after eating, the second case developed a severe headache, flushing, and dizziness. The second case did not seek medical attention and recovered after approximately 18 hours.

The Minnetonka sanitarian gathered information from the management at the cafeteria. The cafeteria had received the implicated mahi mahi frozen on May 6 from their supplier, a seafood distributor located in Minnesota. The mahi mahi was then placed in a walk-in cooler for thawing. At the time of the sanitarian's visit, the walk-in was at a proper temperature of 38° F. On the morning of May 9, the mahi mahi was prepped by heating it in a steamer to an internal temperature of 120° F. The steamed fish were then placed in a hot holding box (at the time of sanitarian's visit, the temperature inside the hot holding box was 150° F). As patrons came through the cafeteria line, the mahi mahi was taken out of the hot holding box and cut and served. An estimated 64 orders were served on May 9. At least two of the cafeteria's food workers ate the mahi mahi, and neither of them reported symptoms.

An inspector from the FDA Minneapolis district office visited the Minnesota seafood distributor that had supplied the cafeteria with the implicated frozen mahi mahi. The inspector examined the distributor's seafood HACCP records and observed the distributor's seafood handling practices. No problems were found. The mahi mahi was labeled "Product of Singapore" and had reached the local seafood distributor via distributors in Illinois and California. The mahi mahi was received and maintained in a frozen state by the distributor. Samples from the same lot that went to the cafeteria were taken and submitted to FDA for histamine testing. The mahi mahi sample leftover from the cafeteria had a histamine level of 63 ppm. In addition, three fillets of the same lot collected from the distributor had histamine levels of 153 ppm, 266 ppm, and 428 ppm, respectively. FDA considers any reading over 50 ppm to be an elevated level.

This was an outbreak of two cases of scombroid poisoning associated with mahi mahi fish served in a workplace cafeteria. Mahi mahi is a known histamine-producing species and has been associated with past outbreaks of scombroid poisoning. In this outbreak, the implicated mahi mahi had a high level of histamine. Mahi mahi from the same lot as the fish received by the workplace cafeteria also had an elevated level of histamine. As there were no temperature control problems identified at the distributor, it is most likely that the temperature abuse that led to the elevated histamine levels occurred further back in the distribution chain. It is possible that the mahi mahi were not promptly frozen at sea immediately after they were caught.

(16)

Suspected Norovirus Gastroenteritis Infections Associated with a Prom

May

Carver County

On May 17, 2005, the school nurse from a high school in Hennepin County called the Minnesota Department of Health (MDH) foodborne illness hotline to report an increase in the number of students absent from school or reporting to the nurse's office with symptoms of gastrointestinal illness. The nurse's initial assessment was that the majority of ill students had attended the prom, which was held at a country club in Carver County on Saturday, May 14. Sanitarians from the City of Bloomington Building and Environmental Health Services (BBEHS) and the MDH were notified of the illnesses on May 17, and an investigation was begun to determine the cause and extent of the outbreak.

Sanitarians from BBEHS contacted and/or visited the high school to discuss employee illness on May 17 and 18, hygiene, and prevention measures; MDH sanitarians conducted an environmental assessment at the country club on May 17.

MDH obtained a list of students who attended the prom, as well as a complete school roster and attendance/absentee lists for the week after the prom. The lists were divided into three priority lists: students who attended the prom and subsequently missed school due to illness, students who attended the prom with unknown illness status, and a random sample of all students in the high school regardless of illness status or prom attendance.

A case was defined as any person who attended the high school and/or the prom and developed vomiting or diarrhea (≥ 3 loose stools in a 24-hour period) before May 17. Ten stool collection kits were distributed by the school nurse to students who were sent home ill.

Interviews were completed for 104 students and one faculty member; 30 people (29%) met the case definition. An additional 17 symptomatic people were excluded from the analysis either because their incubation periods were >48 hours from the prom, indicating that they likely were secondary cases, or because their symptoms were not severe enough to meet the case definition. Twenty-seven cases (90%) reported vomiting, 24 cases (80%) reported cramps, 18 cases (60%) reported diarrhea, and 12 cases (40%) reported fever (although none of these measured their temperature). The median incubation period based on the prom meal was 38 hours (range, 4 to 46 hours). The median duration of illness was 24 hours (range, 4 to 82 hours). Six cases contacted or visited their health care provider; none were admitted to the hospital.

Attendance at prom was statistically associated with illness, (29 of 30 cases vs. 36 of 57 controls; odds ratio [OR], 16.9; 95% confidence interval [CI], 2.3 to 723.2; $p = 0.001$). An analysis of the attendance/absentee list from the school indicated that at least 125 of the 350 students (36%) who attended prom missed school or were sent home ill from school in the days following prom.

Analysis of foods on the buffet indicated two items statistically associated with illness: chicken (27 of 29 cases vs. 25 of 36 controls; OR, 5.9; 95% CI, 1.1 to 58.9; $p = 0.02$) and pineapple (20 of 28 cases vs. 14 of 36 controls; OR, 3.9; 95% CI, 1.2 to 13.1; $p = 0.009$).

No stool kits were returned to MDH for bacterial or viral testing.

MDH learned through interviews with the high school students that at least two prom attendees were ill with gastrointestinal symptoms during the prom event. An analysis of the seating chart and order in which tables were released to the buffet suggested that at least one ill prom attendee went through the buffet line early in the course of serving, possibly contaminating foods and/or utensils on the buffet. In addition, two people who were ill at prom attended after-prom events in which food was served. It is unclear if those events may have led to further contamination and spread of illness.

Subsequent analysis of attendance/absentee lists from school indicated considerable secondary transmission among students who did not attend prom.

MDH sanitarians interviewed nine of 11 food workers at the country club where the prom was held; none reported being ill with gastroenteritis, or having ill family members. Two of seven wait staff were interviewed; none reported illness. All country club employees are provided a meal when they work, including grounds crew, pro shop staff, kitchen and wait staff, and managers; no employees reported illness. The country club did not receive any reports of illness from other groups or persons who dined at the facility. MDH contacted another high school from which students dined at the country club on May 13. No increase in illness was noted at this school.

The prom menu included bread/butter, beef tenderloin in mushroom sauce, chicken breast in Dijon tarragon cream sauce, mashed potatoes, green beans, Caesar salad, pasta salad, pineapple,

cantaloupe, strawberries, grapes, dessert bars, cookies, lemonade, iced tea, water, and coffee. The buffet consisted of eight chafing dishes with two Sterno warmers under each chafing dish. There were no mechanical refrigeration or sneeze guards on the serving line. The food items were set out on the buffet line at approximately 6:40 p.m. Students began serving themselves at approximately 7:00 p.m., and all food items were removed from they line by 8:30 p.m.

Two country club employees who were wearing gloves cut the fruit for the buffet. The strawberries and grapes were washed prior to cutting; the pineapple and cantaloupe were not washed prior to cutting. The fruit was arranged on tiered plates; each plate held only one type of fruit. The Caesar salad dressing contained cottonseed oil, unpasteurized egg yolks, red wine vinegar, anchovies, garlic cloves, salt and pepper. The lettuce was cut at the facility and mixed by hand (using gloves) with the dressing.

Water and lemonade were served in Cambo containers with spigots. The Cambros were cleaned and sanitized when they were emptied and then refilled. Drinking glasses were prefilled with ice and a lemon wedge. A bartender cut the lemons; the lemons were not washed, and no gloves were worn while cutting the lemons.

BBEHS sanitarians contacted the high school by phone on May 17 and made an on-site visit on May 18. There were no reports of illness among food workers in the school cafeteria. Self-service items such as the salad bar were modified so that students could no longer serve themselves. Recommendations were made to the school regarding increased cleaning and sanitizing of bathrooms and other common areas. MDH recommended that students in home economics classes be reminded of good handwashing techniques, and that they should not prepare food for others if they had been recently ill.

This was an outbreak of gastrointestinal illness associated with attending a high school prom held at a country club. Although no agent could be identified due to a lack of stool specimen submission, the symptoms were characteristic of norovirus infection. Illness was associated with the consumption of chicken and pineapple served buffet style at the prom. The most likely source of contamination was ill prom attendees. Additionally, there was considerable secondary person-to-person transmission at the high school as evidenced by the numbers of students who continued to call in sick throughout the week following prom.

(17)

Norovirus Gastroenteritis Associated with a Family Party

May

Chisago County

On May 16, 2005, the Minnesota Department of Health (MDH) received a report of gastrointestinal illness among persons who had attended a private gathering at a Forest Lake residence on May 14. A second report of illness among attendees of the same gathering was received by MDH on May 17. Approximately 23 adults and one child attended the event.

Lists of guests that attended the gathering and food items served were obtained. Epidemiologists from MDH interviewed attendees about illness history and food consumption at the gathering. A

case was defined as a person who attended the gathering and subsequently became ill with vomiting or diarrhea (≥ 3 loose stools in a 24-hour period). One stool specimen was submitted for testing.

Twenty-two people were interviewed. Four people were excluded from analysis: three people had a mild illness that did not meet the case definition; and one person was ill the day of the gathering and did not attend the event. Of the remaining 18 persons, eight (44%) met the case definition. Seven (88%) cases reported diarrhea, six (75%) reported vomiting, six (75%) reported cramps, and five (63%) reported fever. The median incubation was 39 hours (range, 34 to 51 hours). The median duration of illness was 50 hours (range, 49 to 51 hours).

The stool specimen submitted for testing was positive for norovirus and was negative for *Salmonella*, *E. coli* O157:H7, *Campylobacter*, *Shigella* and *Yersinia*.

Food items served included grilled hamburgers, bratwursts, buns, taco salad, commercially prepared cake, baked beans, chips, ketchup, mustard and chip dip, and beverages. Eating ketchup (7 of 8 cases vs. 1 of 10 controls; odds ratio [OR], 63.0; 95% confidence interval [CI], 3.2 to 1,551.8; $p = 0.003$), eating any meat (7 of 8 cases vs. 2 of 10 controls; OR, 28.0; 95% CI, 2.0 to 702.7; $p = 0.02$), eating any bun (7 of 8 cases vs. 2 of 10 controls; OR, 28.0; 95% CI, 2.0 to 702.7; $p = 0.02$), and eating cheese (5 of 8 cases vs. 1 of 10 controls; OR, 15.0; 95% CI, 1.2 to 391.3; $p = 0.04$) were associated with illness.

None of the persons who prepared food reported gastrointestinal illness at the time of food preparation or at the event. However, a child that was ill with diarrhea and vomiting with onset May 11 and multiple household members of the child attended the gathering. In addition, one of the child's household members was not able to attend the gathering because of gastrointestinal illness with onset on the day of the gathering. The non-ill members of the same household assisted in preparing food at the event. Other party attendees that handled the child also helped prepare food.

This was an outbreak of norovirus infections associated with a private gathering. Meats, buns, and ketchup were associated with illness. The most likely source of contamination was an ill child who was handled by attendees who then prepared or served food.

(18)

Norovirus Gastroenteritis Associated with a Restaurant

May

Hennepin County

On May 17, 2005, the Minnesota Department of Health (MDH) foodborne illness hotline received a complaint of gastrointestinal illness in two of three individuals after eating at a restaurant in St. Louis Park on May 14. On May 18, the MDH foodborne illness hotline received a complaint from two additional people who became ill after dining at the same restaurant on May 15. Hennepin County Public Health Protection (HCPHP) and St. Louis Park Environmental Health (SLPEH) were notified of the complaints on May 19, and an investigation was initiated.

On May 27, the MDH foodborne illness hotline received an additional complaint of gastrointestinal illness in one individual after eating at the same restaurant on May 17.

A sanitarian from SLPEH visited the restaurant to assess food preparation procedures. Interviews were conducted with employees of the restaurant to determine recent illness history, work schedules, and normal work duties. Patrons were interviewed about their food consumption and illness histories. Stool specimens were collected from three patrons and one employee; these samples were submitted to MDH for bacterial and viral testing. A case was defined as a person who ate at the restaurant and subsequently developed vomiting or diarrhea (≥ 3 loose stools in a 24-hour period).

Upon inspection of the restaurant, a SLPEH sanitarian found that the restaurant had received one additional complaint of illness from a patron who dined at the restaurant on May 13. Six complainants met the case definition. Five (83%) reported vomiting, five (83%) reported diarrhea, and zero reported fever. The median incubation period was 30 hours (range, 27 to 38 hours). For the five cases who had recovered at the time of the interview, the median duration of symptoms was 20 hours (range, 7.5 to 120 hours). Food histories of cases were not analyzed because all of the entrees served at the restaurant contained the same basic ingredients.

Of the 12 restaurant employees who were interviewed, two (17%) reported illness with vomiting on May 15 and 16. One of the ill employees was the restaurant's general manager and the other was a cook who also worked on the preparation line serving people. Incubation periods could not be calculated because the employees eat at the facility on a regular basis.

Norovirus was identified in all four of the stool specimens. All three nucleic acid sequences that were available (two from patrons and the one from the employee) were identical.

This was an outbreak of norovirus gastroenteritis associated with a restaurant. Transmission likely occurred through contamination of food items by an infected food worker. A specific food vehicle could not be identified.

(19)

Suspected Bacterial Intoxications Associated with a Taco Meal

May

Hennepin County

On May 26, 2005, the City of Minneapolis Division of Environmental Health (MDEH) received a report that nine employees of a company and one employee of the company's cafeteria had become ill with vomiting and diarrhea approximately 1 hour after eating lunch at the workplace cafeteria on May 25. The lunch consisted of tacos, Spanish rice and refried beans. Hennepin County Public Health Protection (HCPHP) and the Minnesota Department of Health (MDH) were contacted by MDEH and an investigation was initiated.

On May 27 HCPHP interviewed company employees and other persons that had reported eating at the workplace cafeteria on May 25. On May 27 the MDEH inspectors conducted an inspection of the cafeteria. The inspection included a focus on the taco meat from receiving to serving, as

well as food flow analyses of the Spanish rice and refried beans. Cafeteria employees were interviewed about food consumption and illness history.

A case was defined as a person who had eaten at the cafeteria and subsequently became ill with vomiting or diarrhea (≥ 3 loose stools in a 24-hour period). Stool specimens were collected from cases for bacterial viral and toxin testing.

Nineteen company employees were interviewed. Two persons reported mild gastrointestinal symptoms (one or two episodes of diarrhea), and were excluded from further analysis. Seven of the remaining 17 (41%) met the case definition. Five (71%) persons had vomiting, two (29%) had diarrhea, two (29%) had cramps, one (14%) had fever, and one (14%) had bloody stools. The median incubation was 2.4 hours (range, 2 to 3.5 hours). The median duration of illness was 17 hours (range, 2 to 21 hours); however, several persons had not recovered at the time of the interview.

Among the non-ill, four had eaten at the cafeteria on May 25 but did not eat the taco meal, three did not eat at the cafeteria on May 25, and three had not eaten there that week.

Eating at the cafeteria on May 25 was significantly associated with illness (7 of 7 cases vs. 4 of 10 controls; odds ratio [OR], undefined; 95% confidence interval [CI], undefined; $p = 0.03$). Among those who ate at the cafeteria on May 25, eating the taco meal was associated with illness (7 of 7 cases vs. 0 of 4 controls; OR, undefined; 95% CI, undefined; $p = 0.003$).

Of the 12 cafeteria employees interviewed, three had illness onsets the afternoon of May 25. Two reported vomiting and one had diarrhea. None of the ill cafeteria employees helped prepare or serve the taco ingredients. One employee ate there on May 25 but did not eat the tacos. Information about food consumption could not be obtained for the other two ill food service employees.

The MDEH food flow analysis did not identify any problems in the preparation of the taco meat, Spanish rice and the refried beans. No problems were identified in the review of the employee illness log, cooler temperature log and final cooking and holding temperatures, and inspection of the facility.

Three stool specimens were tested for *Salmonella*, *Shigella*, *Campylobacter*, *E. coli* O157, *Yersinia* and norovirus. Two of the specimens were also tested for *Staphylococcus aureus*, *Bacillus cereus*, and *Clostridium perfringens* toxins. All three specimens tested negative for *Shigella*, *Campylobacter*, *E. coli* O157, *Yersinia* and norovirus. Two specimens also tested negative for *Salmonella*. Of those two, one was positive for *Bacillus cereus* diarrheal toxin. The third specimen tested positive for *Staphylococcus aureus* enterotoxin A and for *Salmonella* Oranienburg.

This outbreak was an outbreak of bacterial intoxications associated with eating a taco meal at a workplace cafeteria on May 25. The specific outbreak etiology was not identified despite receiving stool specimens for testing. The distribution of incubations and symptoms most closely resembles

illness due to *Staphylococcus aureus* enterotoxin, but this was not confirmed with multiple positive tests on stool specimens.

It is extremely unlikely that the suspected meal was the source of the case's *Salmonella* infection (reported onset of symptoms 3.5 hours after the meal; *Salmonella* usually has a longer incubation). The average duration of shedding of *Salmonella* in the stool after recovery of symptoms is 1 month, so it is possible that the case was sick weeks ago and was still shedding. If this were an outbreak of salmonellosis, at least one of the other cases presumably would have tested positive for *Salmonella*.

(20)

***Salmonella* Typhimurium Infections Associated with Ice Cream from a National Chain**

June

Hennepin County/Multiple States

On June 29, 2005, the Minnesota Department of Health identified a cluster of four *Salmonella* Typhimurium isolates with a pulsed-field gel electrophoresis (PFGE) subtype (TM681) that was new to the PulseNet national database. The cases all reported eating cake batter flavor ice cream from two separate stores in the same retail chain (Chain A). Chain A creates various ice cream flavors at each store and combines these flavors with various mix-in ingredients on a cold stone to fill a customer's order.

The PulseNet national database was queried to identify potential cases in other states. A case was defined as infection with an *S. Typhimurium* isolate that matched the outbreak PFGE pattern, and illness onset since May 2005. All cases were interviewed with a standard questionnaire. State and federal officials conducted a traceback of ice cream ingredients. Samples of ice cream, cake mix, and spray-dried egg whites were cultured for *Salmonella* at various laboratories.

Twenty-six cases were identified in nine states (MN, 5; OR, 5; WA, 5; VA, 3; OH, 2; CA, FL, IL, MA, MI, PA, 1 each); 25 reported eating cake batter ice cream from Chain A. The median age of cases was 14 years (range, 2 to 32 years). The median incubation was 4 days (range, 1 to 7 days). Illness onset dates ranged from May 21 to July 4; five cases were hospitalized. The Minnesota residents all lived in Hennepin County, and three different Chain A stores in Hennepin County were implicated.

Chain A voluntarily recalled cake batter ice cream on July 1. This flavor's ingredients included a pasteurized liquid sweet cream base and yellow cake mix. The sweet cream base was used in numerous other ice cream flavors, but the cake mix was used only in cake batter ice cream. The cake mix comprised spray-dried egg whites, flour, and several low-risk components. Tracebacks in Minnesota, Oregon, and Virginia implicated a single lot of cake mix produced on April 14, 2005. Forty-eight percent of this cake mix lot was shipped to nine of the states with confirmed cases. The rest of this cake mix lot was shipped to 20 other states. No manufacturing anomalies were identified for this lot. Cake mix and ice cream samples tested by the United States Food and Drug Administration (FDA) and individual states were negative; however, two cake mix samples from the implicated lot were positive for *S. Typhimurium* of the outbreak PFGE subtype at the University of Georgia Center for Food Safety.

The implicated cake mix lot contained two lots of spray-dried egg whites. The United States Department of Agriculture (USDA) regulates spray-dried eggs. They located two 50-pound boxes of one of the egg white lots of interest to test. Samples from one of these boxes tested negative at USDA; the other box was not tested. No other egg white samples were available for testing. Quality control samples of both egg white lots tested by the producer were negative. Spray-dried egg whites are heat-treated for 7 days at 130° F (54° C). USDA requires testing of each spray-dried egg white lot by the producer. Testing must include at least three 100g samples/lot, and a lot may comprise 10,000 pounds (a day's production). USDA historical data on in-plant testing of spray-dried egg whites indicates that there was one positive *Salmonella* result from 1,130 (0.1%) egg white samples from 1995-2003.

Flour was also an ingredient in the cake mix. Flour is regulated by FDA, and approximately 1% of flour samples may be contaminated with *Salmonella*. Specific lots of flour used in the implicated cake mix lot were not determined, and no flour testing was attempted.

An FDA bulletin was issued to food retailers warning them that cake mixes and flour are not considered "ready to eat" and should be heat processed before consumption.

The vehicle for this outbreak was ice cream made with contaminated cake mix. Products such as cake mixes and flour that are intended to be baked should not be used in ready-to-eat foods without prior heat processing. Several outbreaks in the past have documented low-level *Salmonella* contamination of high fat-content foods, such as ice cream, cheese, or chocolate. The difficulty in recovering *Salmonella* from the Chain A ice cream and cake mix and the relatively long incubation period for cases in this outbreak suggest low-level contamination of the cake mix. While the ultimate source of contamination was not confirmed, a review of the efficacy of spray-drying egg whites as a kill step for *Salmonella* would be prudent. Continued monitoring and education of the retail food industry are needed. Routine and rapid subtyping of bacterial isolates, coupled with a vigorous epidemiological response, were critical to identifying and abating this multi-state outbreak.

(21)

Norovirus Gastroenteritis Associated with a Restaurant

June

Hennepin County

On June 13, 2005, the Minnesota Department of Health (MDH) Acute Disease Investigation and Control Section received complaints of gastrointestinal illness from two independent parties who ate at a fast food restaurant in Eden Prairie. Three individuals from the two parties became ill after dining on June 7, 8, and 9. A Hennepin County Public Health Protection (HCPHP) epidemiologist was notified, and an investigation was promptly initiated.

Environmentalists from HCPHP made a site visit to the restaurant to evaluate food preparation and storage procedures and to interview all restaurant employees. Employees were asked about illness and work duties during June 5-9. HCPHP epidemiologists also requested a list of patrons who dined at the restaurant.

A case was defined as a person with vomiting or diarrhea (≥ 3 loose stools in a 24-hour period) after dining at the restaurant. Two cases (among the original complainants) submitted stool samples to MDH for bacterial and viral testing. The son of one of the complainants did not eat at the restaurant but became ill after the complainants. This person also submitted a stool sample to MDH for bacterial and viral testing.

All three patron cases had diarrhea, cramps, nausea, and vomiting. One case ate at the restaurant on June 8 and 9, resulting in possible incubation periods of 36 or 12 hours. The other two cases ate at the restaurant on June 7, with incubation periods of 28 and 29 hours. Two of the cases had recovered from their illness at the time of interview, and both were ill for 4 days. Two patron cases (one from each complainant group) submitted stool samples to MDH; both were positive for norovirus. The two viral sequences were identical. The son of one of the cases also submitted a stool that was positive for norovirus; he did not eat at the restaurant and was considered a secondary case.

The three complainants had all eaten burritos, but no single common food item could be determined. All of the specific ingredients of each burrito were not identified. The restaurant did not provide a list of patrons, and thus no food vehicle could be implicated as a cause of illness.

Upon inspection of the restaurant, HCPHP environmentalists found that the restaurant had received no additional complaints. All food workers were interviewed, and none reported illness during June 5-9. The restaurant did not have an employee illness log. Good handwashing practices and proper glove use was observed among all employees.

This was an outbreak of norovirus gastroenteritis associated with eating at a restaurant. The vehicle for illness and ultimate source of the viral contamination at the restaurant were not determined.

(22)

***Salmonella* Manhattan Infections Associated with Pork or Cilantro**

June-September

Multiple Counties

From June through September 2005, the Minnesota Department of Health (MDH) Public Health Laboratory received and identified six clinical isolates of *Salmonella* Manhattan. Five of the 2005 *S.* Manhattan isolates were indistinguishable by pulsed-field gel electrophoresis (PFGE); the subtype was designated HAT5. The isolate from the case with the earliest onset was two bands different by PFGE; the subtype was designated HAT4. *S.* Manhattan is a very rare serotype in Minnesota, with one case reported in 2001 and none in 2002-2004.

The first three cases occurred in June. Two cases were Hispanic/Latino, and one was Asian. The June cases did not know each other or have events or restaurants in common. The three additional cases occurred in August and September, and all three were Caucasian. Two of those cases attended the same wake where sandwiches from a Vietnamese restaurant located in St. Paul (Ramsey County) were served.

All *Salmonella* cases reported to MDH are routinely interviewed about symptoms and potential exposures as part of enteric disease surveillance in Minnesota. A case-control study was conducted to evaluate the association of illness with specific food products. All *S. Manhattan* cases identified in surveillance were contacted for interviews about food consumption and other exposures. Cases that completed the interviews were included in the study. *Salmonella* cases of serotypes other than Manhattan identified in the same time frame (nearest specimen collection date) that did not travel were used as controls. Three controls were included per case.

Lists of guests that attended the wake and food items served were obtained. Epidemiologists from MDH interviewed attendees about illness history and food consumption at the gathering. A case was defined as a person who attended the gathering and subsequently became ill with diarrhea and fever or who has a culture-confirmed *S. Manhattan* infection. Diarrhea was defined as three or more loose stools in a 24-hour period.

An environmental health evaluation of the restaurant that prepared the foods for the wake was conducted by the City of St. Paul Office of License, Inspections and Environmental Protection. A list of sandwich ingredients and a detailed description of the preparation of the sandwiches served at the wake were obtained. Restaurant employees were interviewed about gastrointestinal illness.

Five of the six cases of *S. Manhattan* identified in surveillance were reached and interviewed. Five of the six cases were male, with a median age of 42 years (range, 2 months to 65 years). Among the interviewed cases, dates of illness onset ranged from June 12 to September 17. All five cases reported having diarrhea, four (80%) had fever, three (60%) had vomiting, and two (40%) had bloody stools. The median duration of illness was 7 days (range, 5 to 14 days). Four (67%) of the cases were hospitalized for their illness.

Five cases and 15 controls were included in the case-control study. Eating cilantro (4 of 5 cases vs. 1 of 12 controls; odds ratio [OR], 44.0; lower limit of 95% confidence interval [CI], 1.5 to 7,593; $p < 0.01$), and pork (5 of 5 cases vs. 0 of 11 controls; OR, undefined; 95% CI, 1.9; $p = 0.03$) were statistically associated with illness. No other exposures were statistically associated with illness.

Thirty-four wake attendees were interviewed about illness and food consumption. The only two individuals that met the case definition were the *S. Manhattan* cases identified in surveillance. One additional wake attendee reported mild gastrointestinal symptoms (fever, one episode of diarrhea, loss of appetite) 8 days after the wake, and one attendee reported diarrhea, no fever, but was not able to provide a date of onset of symptoms. The two cases denied having any contact before or after the wake.

The only foods served at the wake were pork sandwiches from a Vietnamese restaurant, tortilla chips and canned soda. An investigation of the restaurant revealed that the sandwiches contained pork, fresh cilantro, chicken pate (chicken liver, chicken fat, bread crumbs, shallots, garlic, chives, and mushroom soy sauce, baked and blended), homemade mayonnaise (reportedly made with pasteurized eggs), carrots and daikon marinated in vinegar and sugar, jalapeño and cucumbers. No problems were identified at the restaurant. None of the restaurant employees

reported a history of recent gastrointestinal illness. No complaints about the restaurant were received by the restaurant, city of St. Paul, or MDH. The sandwiches were picked up at the restaurant on the day of the wake. They were held at room temperature for 6 hours before they were served.

The other three *S. Manhattan* cases were re-interviewed and they did not eat at the restaurant that made the sandwiches for the wake. The counties in which these three cases lived were Anoka, Dakota, and Hennepin, respectively.

This was an outbreak of *S. Manhattan* infections detected through routine surveillance associated with consumption of cilantro or pork. Due to the small number of cases, it was not possible to identify which of the two food items was the vehicle for infection, or the source of contamination. The sandwiches served at the wake contained both pork and cilantro. Temperature abuse of the sandwiches likely contributed to two of the illnesses.

(23)

Norovirus Gastroenteritis Associated with a Wedding Reception

June

Blue Earth County

On June 14, 2005, the Minnesota Department of Health (MDH) foodborne illness hotline received a report concerning illness among individuals who attended a wedding reception on June 11 in Mankato. The father of the bride reported that several of the food items were purchased from a local grocery store (Store A) and then served at his home.

Epidemiologists from MDH conducted phone surveys of the attendees to obtain information on consumption of foods/beverages and illness history. A case was defined as an individual who attended the wedding reception and subsequently became ill with vomiting or diarrhea (≥ 3 loose stools in 24-hour period). A representative from the Minnesota Department of Agriculture visited the grocery store to evaluate food preparation and handling procedures and to interview staff regarding recent illness. Stool samples were collected from three attendees and submitted to MDH for bacterial and viral testing.

Of the 33 attendees interviewed, 23 (70%) met the case definition. Twenty-two (96%) of the cases had cramps, 19 (83%) had diarrhea, 19 (83%) had vomiting, and 13 (57%) had fever. The median incubation period was 29 hours (range, 11 to 108 hours). The median duration of illness was 37 hours (range, 12 to 66 hours). A case with onset on June 16 (incubation of 108 hours) likely represented a secondary infection; thus, this attendee was reclassified as a control when examining food items. Stool samples from three attendees were positive for norovirus. Nucleic acid sequencing was conducted on positive norovirus samples from two cases; both sequences were identical.

Eating a deli sandwich was significantly associated with illness (22 of 22 cases vs. 3 of 11 controls; logit odds ratio [OR], 109.3; logit 95% confidence interval [CI], 5.1 to 2,346; $p < 0.001$). Specific food ingredients were also significantly associated with illness, including buns for the sandwiches (22 of 22 cases vs. 3 of 11 controls; OR, 109.3; logit 95% CI, 5.1 to 2,346;

p < 0.001), deli roast beef (14 of 22 cases vs. 0 of 11 controls; logit OR, 39.2; logit 95% CI, 2.0 to 753.6; p < 0.001), mayonnaise (8 of 22 cases vs. 0 of 11 controls; logit OR, 13.5; logit 95% CI, 0.7 to 259; p = 0.03), and deli ham (13 of 22 cases vs. 2 of 11 controls; OR, 6.5; 95% CI, 1.1 to 37.5; p = 0.03).

Inspection of Store A found that all sliced meats and cold salads were at appropriate temperatures. None of the employees reported any recent gastrointestinal illness. No complaints of illness had been reported to the store.

Of note, the bride anecdotally reported that two cousins had been ill with the “flu” prior to the wedding reception; however, we were unable to obtain contact information on this family and ascertain the exact onset date. Each attendee prepared their own sandwich by selecting the bun, deli meat, cheese, and any condiment.

This was an outbreak of norovirus gastroenteritis associated with consumption of deli sandwiches at a wedding reception. The source of contamination of the sandwiches was not identified, but could have been attendees that were ill at the time of the reception.

(24)

Norovirus Gastroenteritis Associated with an Anniversary Party

June

Anoka County

On June 23, 2005, the Minnesota Department of Health (MDH) foodborne illness hotline received a complaint from a guest who had become ill with gastrointestinal symptoms after attending a wedding anniversary celebration at a private home in Ham Lake on June 18. The complainant knew of at least 14 other guests who had also experienced gastrointestinal symptoms subsequent to the celebration, which was catered by a grocery store in Roseville. The MDH also was subsequently forwarded a complaint from the same party by the caterer of the event. The catered food was delivered in a catering truck to the home, and then set up in the backyard in a buffet fashion. A cake was also brought to the event by a party attendee. The event was held between 11 a.m. and 3 p.m. Foods served included broccoli salad, deli wraps, pasta salad, shrimp, antipasto, and a fruit platter. There were approximately 35 guests at the party. There were no other events associated with the party.

Epidemiologists from MDH obtained a list of individuals who attended the party from the organizers of the event and conducted phone interviews with guests to obtain information on illness history and consumption and preparation of foods/beverages. A case was defined as a guest who attended the party and subsequently became ill with vomiting and/or diarrhea (≥ 3 loose stools in 24-hour period). Public health officials from the Ramsey County Health Department inspected the facility that prepared foods for the party and interviewed staff at the facility to ascertain work-related duties and recent illness history. Stool samples were collected from five guests and submitted to MDH for bacterial and viral testing.

Of the 20 guests who were interviewed, eight (40%) met the case definition. In addition, one guest reported gastrointestinal illness 2 days before the wedding reception and was excluded

from analyses. Three individuals reported mild gastrointestinal symptoms that did not meet the case definition; these individuals were excluded from analyses. Six (75%) cases had diarrhea, four (50%) had vomiting, 5 (63%) had cramps, and 1 (13%) reported a fever. The median incubation period was 39 hours (range, 32 to 56 hours). The median duration of illness was 42 hours (range, 4 to 87 hours). All five samples from 5 guests were positive for norovirus. Nucleic acid sequencing was conducted on positive norovirus samples from two of the cases; the sequences were identical.

Two items served at the anniversary celebration were significantly associated with illness including consumption of the broccoli salad (8 of 8 cases vs. 4 of 8 controls; logit odds ratio [OR], 17.0; logit 95% confidence interval [CI], 0.74 to 391.7; $p = 0.025$), and consumption of cake (7 of 8 cases vs. 2 of 8 controls; OR, 21.0; 95% CI, 1.50 to 293; $p = 0.04$).

Investigation by officials from the Ramsey County Health Department found no major problems with the catering establishment. The caterer had supplied food for over 100 events on June 18, and there were no other complaints. Employees of the caterer were interviewed and no recent illness was reported among food workers employed by the caterer. The guest who brought the cake was not identified.

This was an outbreak of norovirus gastroenteritis among guests of wedding anniversary celebration. Broccoli salad and cake were identified as possible vehicles for illness. The source of contamination was not identified. However, contamination of foods in the buffet line through direct contact by an ill guest was a plausible transmission route as one previously ill guest was identified.

(25)

Norovirus Gastroenteritis Associated with a Restaurant

June

Winona County

On June 27, 2005, the Minnesota Department of Health foodborne illness hotline received reports of illness from a group of five people who dined at a restaurant in Winona on June 24. The complainants had nothing else in common besides their meal at the restaurant. Sanitarians from Winona County Environmental Services Department (WCESD) were notified and an investigation was initiated.

The five complainants were interviewed to assess their symptoms and food consumption histories. WCESD sanitarians visited the restaurant on June 27 and 28 to interview employees and conduct a food-handling review. Credit card receipts were obtained from the restaurant for people who ate at the restaurant on June 24. A case was defined as a person who ate at the restaurant on June 24 and became ill with vomiting and/or diarrhea (≥ 3 loose stools in a 24-hour period) during the following 2 days. Stool specimens were obtained from ill patrons and employees.

Forty patrons (including the original five complainants) were interviewed. Twelve (30%) met the case definition; an additional four people experienced illness not meeting the case definition and

were excluded from the analysis. All cases experienced diarrhea, eight (67%) had vomiting, five (42%) had cramping, and four (33%) reported fever. The median incubation period was 34.5 hours (range, 23 to 58 hours). Six people were still experiencing symptoms at the time they were interviewed; for the six people who had recovered, they did so within 8.5 hours to 39 hours. Three cases called or visited their medical provider but were not admitted to a hospital.

Nine stool samples were collected, including samples from three restaurant employees. Six samples tested positive for norovirus, including two from food workers. Further laboratory analysis was conducted on three of the specimens (two patrons and one employee); all three had identical nucleic acid sequences.

Consumption of spinach dip was statistically associated with illness (5 of 12 cases vs. 0 of 24 controls; odds ratio, undefined; 95% confidence interval lower limit, 2.4; $p = 0.002$).

Forty-eight food workers were interviewed. Four food workers admitted to having gastrointestinal symptoms in the weeks before June 24. Several employees stated that “the flu” had been going around work in the past couple of weeks. As not all food workers were interviewed, it is possible that there were other ill employees during this time period.

An environmental assessment of the restaurant was conducted on June 27. Several critical items were noted, including inadequate employee illness logs, poor reporting of illness by employees, and several cold-holding temperature violations. During the assessment, the sanitarian from WCESD observed an employee washing a head of lettuce in a handsink. The employee stated that it was the procedure she was trained to follow. The head of lettuce was discarded; it is unclear if other produce items were washed in a similar manner in the days leading up to the outbreak.

This was an outbreak of norovirus gastroenteritis associated with a restaurant. Although spinach dip was statistically associated with illness, only five of the cases ate it. The presence of ill food workers in the establishment points to contamination by the employees as the likely cause of the outbreak. Corrective actions were taken at the restaurant, including handwashing education, implementing better surveillance of ill employees, logging ill employees, and education regarding the proper methods of washing foods and maintaining handsinks for handwashing only.

(26)

Suspected Bacterial Intoxications Associated with a Restaurant

July

Hennepin County

On July 25, 2005, the Minnesota Department of Health (MDH) foodborne illness hotline received a call from an individual who attended a conference in Minneapolis and subsequently developed a gastrointestinal illness. The complainant stated that at least two other colleagues became ill at the close of their meeting on July 20. Conference attendees arrived in Minneapolis on the evening of July 19 and shared a meal at a restaurant in St. Louis Park. The conference attendees had then stayed at a hotel in Minneapolis, and on the day of the conference attended a continental breakfast and a banquet lunch at the hotel. Hennepin County Public Health Protection (HCPHP), the Minneapolis Division of Environmental Health (MDEH) and the City of St. Louis Park Environmental Health (SLP) were notified, and an investigation was initiated.

On July 26 MDH requested a list of event participants from the conference organizer, and HCPHP began calling participants to obtain information on consumption of foods/beverages and illness history. A case was defined as a person who attended the conference on July 20 and subsequently became ill with vomiting and/or diarrhea (≥ 3 stools in 24-hour period). Three stool specimens were obtained for testing.

On July 26 and July 28, SLP sanitarians inspected the restaurant in St. Louis Park where the complainants had eaten on July 19. On July 28, MDEH sanitarians inspected the food facility of the hotel in Minneapolis where the complainants had stayed. Both inspections focused on food preparation practices and employee health and hygiene. A list of additional restaurant patrons was requested and obtained from the restaurant. MDH staff attempted to reach patrons that dined at the restaurant between the dates of July 19 and July 22.

Of the 17 conference attendees, 14 (82%) were interviewed. Of these, two (14%) met the case definition of vomiting and/or diarrhea (≥ 3 loose stools in 24-hour period). Two other conference attendees (14%), while not meeting the case-definition, also experienced gastrointestinal illness symptoms and incubation periods consistent with the other ill attendees and were therefore included in analysis. All four cases reported diarrhea (100%) and three reported cramping (75%). One (25%) reported vomiting and fever. None of the cases detected blood in their stool. The median incubation calculated from the mealtime at the restaurant was 22 hours (range, 21.5 to 36.5 hours). The median duration of illness was 34.5 hours (range, 5 to 91 hours). Stool specimens were obtained from two people that ate at the restaurant and one tested positive for *Bacillus cereus* and *B. cereus* enterotoxin.

Among those that ate at the restaurant, no single food item was significantly associated with illness. Consuming tzatziki sauce at the restaurant approached statistical significance (3 of 4 cases vs. 1 of 8 controls; odds ratio, 21.0; 95% confidence interval, 0.96 to 458; $p = 0.053$). Interviews with patrons who also dined at the restaurant on July 19 or 22 did not yield additional cases; however, three did report consuming tzatziki sauce.

Four of five employees who had worked at the restaurant on July 19 were interviewed. None of the restaurant employees reported gastrointestinal illness in the week prior to the meal in question.

The SLP environmental health specialist's visits revealed significant temperature violations in the cooling and storing of the vegetarian moussaka and pasta noodles. In addition, the cold server rail, holding various items including the tzatziki sauce, was found not to be functioning properly to maintain a temperature of 41°F or less. Corrective action was taken immediately, and a follow-up visit was made by the SLP sanitarian on July 29 to ensure proper temperatures were in effect. The restaurant did not report any other customer complaints.

The MDEH inspection of the hotel in Minneapolis found no temperature, food handling or hygiene violations. Four employees were interviewed. A dishwasher reported two episodes of diarrhea on July 16; however, this employee did not have any food handling responsibilities. The hotel food facility did not receive any other customer complaints.

This was an outbreak of foodborne intoxications associated with a restaurant. The clinical characteristics of the illnesses were compatible with the diarrheagenic form of *B. cereus*, but the isolation of this organism from only one case is not sufficient to confirm *B. cereus* as the source of this outbreak. The epidemiological findings suggest that illness was associated with consumption of the tzatziki sauce. Generally, bacterial intoxication outbreaks are caused by time-temperature abuse of food items such as meat, rice, or sauces. This conclusion is consistent with environmental health findings of temperature abuse in the cold rail holding of the tzatziki sauce.

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Suspected Bacterial Intoxications Associated with a Catered Lunch

July

Dakota County

On July 28, 2005, a nurse from a medical clinic in Farmington contacted the Minnesota Department of Health (MDH) Acute Disease Investigation and Control Section foodborne illness hotline. The nurse stated that the evening before, approximately 40 clinic employees had eaten food delivered from a restaurant in Apple Valley. The food served included various chicken dishes, beef lo mein, vegetable stir fry, eggrolls, white rice, and fried rice. No other foods were served at the meal, and beverages came from a variety of sources including workplace vending machines, store-bought liters of soda, and beverage cans that employees brought to work. The initial report was that some employees had called in sick the morning after the meal, and other employees who did come to work reported illness as well. An outbreak investigation was initiated in collaboration with the MDH Environmental Health Services Section.

The clinic provided MDH epidemiologists with a roster of clinic employees and phone numbers. Clinic employees were interviewed by phone about food consumption, other shared exposures, and illness history using a standard form. A case was defined as a person with vomiting or diarrhea (≥ 3 loose stools in a 24-hour period) after eating the restaurant meal on July 27. Three ill clinic employees submitted stools to MDH for testing.

MDH sanitarians went to the restaurant on July 28 to evaluate foodhandling practices and collect more information on the suspect meal. MDH sanitarians took samples of fried rice from the restaurant and submitted them to the laboratory at the Minnesota Department of Agriculture.

All 36 of the clinic employees listed on the roster were interviewed. Of these, 32 had been present at the meeting where the restaurant food was served. The four employees who were not present at the meeting were not ill.

Of the 32 clinic employees that attended the meeting where the restaurant meal was served, 22 (69%) reported no symptoms. The remaining 10 (31%) clinic employees reported gastrointestinal symptoms of varying degrees of severity. None of the 10 symptomatic persons had vomiting, fever, or bloody stools. Three met the standard outbreak case definition of at least three loose stools in a 24-hour period. Their incubation periods were 2.25, 4.50, and 7.50 hours. The other seven persons reported one or two episodes of loose stools, nausea, and/or cramps. The median incubation period from the restaurant meal (counting all 10 symptomatic persons) was 8 hours (range, 2 to 27 hours). As most of the ill persons were still symptomatic at the time of interview, duration of illness could not be calculated.

Data were analyzed two ways: comparing the three persons who met the standard case definition to the 22 well persons, and comparing all 10 symptomatic persons to the 22 well persons. There did not appear to be any other common exposure (such as anyone who was ill prior to the restaurant meal, or other food or beverage items shared among employees at the clinic) that may have explained the illnesses.

In the first analysis, 3 of 3 cases ate the sweet and sour sauce compared to 6 of 20 controls (odds ratio [OR], undefined; 95% confidence interval [CI] lower limit, 1.03; $p = 0.05$) (some persons could not recall whether or not they ate a certain food item, so the denominators may be less than the total number interviewed). Three of three cases ate the Peking chicken, compared to 10 of 22 controls (OR, undefined; 95% CI lower limit, 0.57; $p = 0.12$).

In the second analysis, 5 of 9 symptomatic persons ate the sweet and sour sauce compared to 6 of 20 controls (OR, 2.92; 95% CI, 0.53 to 15.91; $p = 0.18$). Eight of 10 symptomatic persons ate the Peking chicken, compared to 10 of 22 controls (OR, 4.80; 95% CI, 0.83 to 37.8; $p = 0.07$).

The stool samples collected from three ill clinic employees tested negative for norovirus by RT-PCR and were negative for *Campylobacter*, *E. coli* O157:H7, *Salmonella*, *Shigella*, *Staphylococcus aureus*, and *Bacillus cereus* by culture methods. A *Clostridium perfringens* enterotoxin EIA test could not be performed on the stools due to miscommunication with the laboratory.

The MDH sanitarians reviewed the foodhandling procedures used for the preparation of the clinic meal. No problems were identified. The restaurant was holding hot items at the proper temperatures and using proper cooling techniques. The sanitarians reviewed temperature logs from July 27 and no problems were identified. Most of the food served at the restaurant was cooked at the restaurant chain's central commissary; no reports of illness from other restaurants in the chain were received.

A clinic employee told MDH that the delivery person was late to the clinic and mentioned the lateness was due to problems with a “steaming table” at the restaurant. Restaurant management denied having any problems with a steam table or other equipment. However, restaurant management did tell MDH sanitarians that the food for the clinic group was still being prepared when the delivery person arrived to take the food from the restaurant. Therefore, the food was not stored in a hot box, as is food that is usually sent out for delivery. But as the food was being heated shortly before it left the restaurant, being out of temperature control during the drive to the clinic may not have been a problem.

The receipt for the clinic’s order was time-stamped 4:16 p.m., but the restaurant said that the delivery left the store at 4:45 p.m. The restaurant and the clinic were approximately 10 miles apart. The clinic reported receiving the delivery at approximately 5:15 p.m., and the employees ate the food soon after it was delivered.

The restaurant catered another large order that day; an MDH epidemiologist contacted that group and they reported no illnesses. However, this order went out about 5 hours prior to the clinic’s order.

The leftover fried rice tested by the MDA laboratory was negative for coagulase-positive *Staphylococcus*, staph enterotoxin, *Bacillus cereus*, and *Clostridium perfringens*. The restaurant chain ran their own parallel tests on the fried rice and those tests were also negative.

This was an outbreak of gastrointestinal illnesses associated with a catered workplace meal. A specific etiology and vehicle for the outbreak were not confirmed. The epidemiologic and clinical characteristics of the illnesses, including relatively short incubation periods and mild symptoms, were characteristic of bacterial intoxications such as those caused by *Bacillus cereus* and *Clostridium perfringens*. Laboratory tests on ill persons’ stools were negative for all pathogens for which they were tested (however, specimens were not tested for *C. perfringens* enterotoxin). Consumption of the sweet and sour sauce and the Peking chicken had a weak statistical association with the illnesses. Generally, bacterial intoxication outbreaks are caused by time-temperature abuse of food items such as meat, rice, or sauces. However, no specific incidents of time-temperature abuse, either at the restaurant or the workplace, could be documented for this outbreak.

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Norovirus Gastroenteritis Associated with a Restaurant

July

St. Louis County

On August 1, 2005, the Minnesota Department of Health (MDH) received a report from a Duluth hospital infection control practitioner of two unrelated persons who presented to the emergency room on July 31 with gastrointestinal illness symptoms after attending a wedding reception. The ICP also mentioned hearing about a third case of gastrointestinal illness presenting at a neighboring hospital emergency room. MDH interviews of the two reported cases revealed that they had attended unrelated events; however, both had eaten at a restaurant in Duluth independently of each other on July 29. One of the cases was a resident of Isanti County who

traveled to Duluth and attended a groom's dinner at the restaurant. The other case was a resident of Hennepin County who traveled to Duluth for a wedding, and ate lunch at the restaurant with five other people. MDH notified the Environmental Health division of the St. Louis County Health and Human Services Department (SLCHHS), an investigation was initiated and the restaurant was contacted on August 1.

Epidemiologists from MDH obtained illness histories, lists of events attended including dates and locations, and foods and beverages consumed for the two cases initially reported.

For one group (Group 1) a list of names and phone numbers of people who attended events associated with the wedding was obtained, including attendees of the groom's dinner and/or wedding reception. Lists of foods and beverages served at all the events were compiled as well as information about foods eaten at restaurants and private homes.

Epidemiologists from MDH also obtained names and phone numbers of people in the party of six who ate at the restaurant (Group 2), as well as information about the events, restaurants and consumption of foods and beverages by persons in that group during their visit to Duluth, from July 29 through the date of the earliest illness onset (July 31).

Analyses of events and exposures of persons in Groups 1 and 2 were conducted in order to assess if the restaurant was the source of their illness or if the exposure occurred in association with another restaurant or event.

At MDH's request, restaurant management provided names of patrons who paid by credit card after eating at the restaurant on July 29 and 30 (Group 3). Restaurant patrons were contacted and interviewed in order to assess if persons not associated with Groups 1 and 2 also became ill.

Environmental health specialists from SLCHHS conducted an environmental health assessment of the restaurant. Records of employee illness calls were reviewed, and names and phone numbers of restaurant employees were obtained. MDH epidemiologists and SLCHHS environmental health specialists interviewed employees about recent history of gastrointestinal illness and work duties. SLCHHS environmental health specialists implemented and monitored employee food safety training.

A case was defined as a person in any of the interviewed groups who reported vomiting and/or diarrhea (≥ 3 loose stools in a 24-hour period). A restaurant-associated case was defined as a person who ate at the restaurant and subsequently became ill with vomiting and/or diarrhea, or who had a laboratory-confirmed norovirus infection.

Further statistical analysis was conducted in order to evaluate whether specific foods consumed at the restaurant were associated with illness.

Stool samples collected from guests in each group and restaurant employees with a history of gastrointestinal illness were submitted to MDH for bacterial and viral testing.

Seventy-six persons were interviewed about food consumption and illness history, including 48 restaurant patrons and wedding attendees from Group 1, four patrons from Group 2, and 24 restaurant patrons identified using the credit card receipt list (Group 3).

Eighteen persons (24%) met the case definition. Seven persons had a history of mild gastrointestinal illness that did not meet the case definition; they were excluded from further analysis. Of the 18 cases, nine were associated with Group 1, three with Group 2, and six with Group 3. Among the Group 3 cases, five of the six dined together.

Statistical analysis of persons in Groups 1 and 2 with onsets of illness before August 2 found that eating at the restaurant was associated with illness (8 of 9 cases vs. 15 of 34 controls; odds ratio [OR], 10; 95% confidence interval [CI], 1.3 to 237; $p = 0.02$). Eating at other restaurants or events was not associated with illness.

Of the 18 cases, three did not eat at the restaurant so their illnesses were considered unrelated to this outbreak. The three unrelated cases were excluded from further analysis. Among the 15 restaurant-associated cases from Groups 1-3, 13 (87%) reported diarrhea, 11 (73%) had vomiting, nine (60%) had a fever, eight (53%) had cramps, and none reported bloody stools. Three cases (20%) visited a hospital emergency room for their illness, but none was hospitalized. The median incubation was 35 hours (range, 31 to 55 hours). The median duration of illness was 39 hours (range, 15 to 128 hours). Four stool specimens were collected from persons in the three different groups. All four tested negative for *Campylobacter*, *E. coli* O157, *Salmonella*, *Shigella*, and *Yersinia*, and all were positive for norovirus. Norovirus from two specimens collected from persons in different groups was sequenced, and the sequences were identical.

Fourteen cases patronized the restaurant on July 29, and one from Group 3 ate there on July 30. The cases ate a variety of foods, including sandwiches, salads, appetizers, seafood, pork, beef entrées, soup and bread. They also consumed a variety of beverages. Drinking iced tea was significantly associated with illness (4 of 14 cases vs. 0 of 32 controls; OR, undefined; 95% CI lower limit, 2.4; $p = 0.006$). No other foods or drink were statistically associated with illness.

Review of restaurant records of ill worker calls found that two employees were absent from work due to illness in the week prior to the outbreak. Interviews of 70 restaurant employees found that 14 (20%) employees reported a history of gastrointestinal symptoms with onset dates ranging from July 4 to August 4. Among the restaurant employees with a history of illness, three reported mild gastrointestinal symptoms (only one or two episodes of diarrhea and no vomiting). Among the 14 employees with any history of gastrointestinal symptoms, five (two who were mildly ill, and three who met the case definition) reported onset of illness on or before July 29. At least three of the five worked while ill. A cook presented to work on July 29 after experiencing vomiting and diarrhea throughout the night. After working for one hour, the cook was sent home because of feeling ill and vomiting while at work. Later that day, a server developed mild diarrhea while at work, but continued to work despite the onset of symptoms. Two stool specimens were collected from restaurant employees. Both tested negative for *Campylobacter*, *E. coli* O157, *Salmonella*, *Shigella*, and *Yersinia*, and both were positive for norovirus. The norovirus from one specimen was sequenced, and it was identical to the viral sequence identified from the patrons' specimens.

To prevent further transmission to patrons, kitchen and bathroom surfaces at the restaurant were thoroughly cleaned. During the investigation, the restaurant management monitored employee health much more closely, inquiring about presence of symptoms when employees presented to work. As a result of the investigation, the restaurant re-trained all workers on hand hygiene, food safety, and regarding not working while ill.

This was an outbreak of norovirus gastroenteritis associated with a restaurant. Cases were identified among persons that were part of different parties, and from persons whose names were obtained from credit card receipts. Transmission to patrons occurred primarily on July 29, but one case with a meal date of July 30 was identified. Although consumption of iced tea was statistically implicated as a vehicle, only four of the cases consumed it. A cook worked for 1 hour on July 29 while experiencing gastrointestinal symptoms, and possibly other ill or recently ill employees likely contaminated multiple foods that acted as vehicles for infection of patrons. Restaurant employees with gastrointestinal illness symptoms earlier in the month could have served as the initial source of contamination. Matching sequences of norovirus isolated from specimens of a restaurant employee and patrons in different groups is additional evidence implicating the restaurant as the source of the patron's infections.

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***Salmonella* Enteritidis Infections Associated with Frozen Chicken Entrees**

August 2005-July 2006

Multiple Counties/Multiple States

In 1998 and 2005, two outbreaks of salmonellosis associated with eating frozen, pre-browned, single-serving, microwavable stuffed chicken products were identified in Minnesota. Thirty-three cases of *Salmonella* Typhimurium infection associated with consumption of Brand A Chicken Kiev were identified in the 1998 outbreak [see summary #2, above]. Four cases of *S. Heidelberg* infection associated with consumption of Brand B Chicken Broccoli and Cheese were identified in the 2005 outbreak. The investigations of these two outbreaks lead to minor label changes of the two specific brands of stuffed chicken products.

Another outbreak of salmonellosis associated with these types of products was identified and investigated in Minnesota in 2005. From August 2005 through February 2006, the Minnesota Department of Health (MDH) Public Health Laboratory identified 13 human-case isolates of *Salmonella* Enteritidis that were indistinguishable by pulsed-field gel electrophoresis (PFGE); the subtype was designated SE43. Routine interviews of the cases revealed that they many of the cases reported eating frozen, pre-browned, single-serving, microwavable stuffed chicken products during the week before illness onset. An investigation was initiated.

All *Salmonella* cases reported to MDH are routinely interviewed about food consumption and other exposures as part of enteric disease surveillance in Minnesota. A case-control study was conducted to evaluate the association of illness with stuffed chicken products. All *S. Enteritidis* SE43 identified in surveillance that were interviewed from August, 2005 through February 2006 were included as cases. *Salmonella* cases of serotypes other than Enteritidis identified in the same time frame were used as controls. Three controls were included per case.

The Minnesota Department of Agriculture (MDA), the Centers for Disease Control and Prevention, the United States Department of Agriculture (USDA) Food Safety and Inspection Service (FSIS), and other states were notified of the *S. Enteritidis* outbreak on March 8, 2006.

The MDA Dairy and Food Division collected products for testing that *S. Enteritidis* cases had purchased at the same time as the products consumed in the week before their illness. Intact products from the same stores or chains where the cases shopped were also collected for testing. The MDA Microbiology Laboratory cultured the products for *Salmonella*, and all isolates were sent to the MDH Public Health Laboratory for PFGE subtyping.

Eleven cases and 33 controls were included in the case-control study. Eating stuffed chicken products was statistically associated with illness (9 of 11 cases vs. 0 of 32 controls; odds ratio, undefined; 95% confidence interval, undefined; $p < 0.001$). No other exposure was statistically associated with illness.

Twenty-seven *S. Enteritidis* cases with isolates of the outbreak subtype ($n=26$) or one band different ($n=1$) from the outbreak subtype that reported eating stuffed chicken products in the week prior to illness were identified. The counties in which these cases resided were: Aitkin (1), Anoka (1), Becker (1), Cass (1), Clay (1), Dakota (1), Douglas (1), Freeborn (2), Hennepin (3), Hubbard (1), Lyon (1), McLeod (1), Meeker (1), Mille Lacs (1), Ramsey (1), Redwood (1), Rice (2), Scott (1), St. Louis (3), Stearns (1), and Washington (1). Dates of illness onset ranged from August 21, 2005 through July 27, 2006. The median age of the cases was 31 years (range, 5 to 85 years). All 27 cases had diarrhea, 22 of 25 (88%) had cramps, 21 of 25 (84%) had fever, 17 of 26 (65%) had nausea, 11 of 26 (42%) had vomiting, and 11 of 27 (41%) had bloody stools. The median duration of illness was 7 days (range, 3 to 22 days). Six cases were hospitalized for their infection. Several cases reported eating the stuffed chicken products multiple times during the week prior to onset, and the majority of the cases did not recall the precise meal date and time. Among the three cases for whom a precise meal date and time was known, the median incubation was 4 days (range, 40.5 hours to 7 days).

Unlike the two previous outbreaks, cases reported eating different varieties (Kiev, Cordon Bleu, and Shrimp and Crab) of product representing several different brands and manufacturers. Eight different brands produced by three different manufacturers were reportedly consumed by cases. Products produced by "Plant A" were reported by at least 11 cases, "Plant B" by at least five cases, and "Plant C" by at least one case.

S. Enteritidis was isolated from stuffed chicken products from three cases' households. All three were Brand A (from Plant A) products, with production codes which represent production dates of November 3 and 4, 2005, and February 16, 2006. No other brands were available for testing from cases' households.

Cooking methods were ascertained for all 27 cases; of these, 70% cooked the products in the microwave, and one case cooked the product in a toaster oven. None of the cases took the internal temperature after cooking.

Fourteen additional *S. Enteritidis* cases associated with these products were identified in nine other states (CA, CO, IA, IL, MD, ND, OK, PA, and TN).

Responding to the isolation of *S. Enteritidis* of the outbreak subtype, Brand A issued a recall on March 10, 2006. Only Chicken Broccoli and Cheese and Shrimp and Crab sold under specific labels with specific production codes were recalled. In addition to the recall, on March 2006, USDA FSIS sent a letter to all processing plants that make these or similar products to those recalled, instructing them to re-evaluate the adequacy of the package labels to ensure that the consumer is aware that these products are “uncooked”. Also in response to the outbreak, the National Advisory Committee for the Microbiological Criteria for Foods (NACMCF) issued new guidelines for labeling this type of product; these guidelines included: advising consumers that microwaving raw poultry from a frozen state is not advisable unless the manufacture instructions ensures that they achieve the recommended (165°F) endpoint temperature; the principal display panel of the label should have a warning declaration explicitly stating that the product contains raw poultry; and reminding consumers to fully cook the product when the product is raw, but gives the appearance of being fully cooked. The processing plants were required to submit the new labels for USDA approval within 8 months.

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

This was the third outbreak of *Salmonella* infections in Minnesota associated with eating frozen, pre-browned, single-serving, microwavable stuffed chicken products. Even though these products are raw, the products’ cooked appearance, and the label’s microwave instructions, has lead to consumers undercooking the products. Most cases cooked the products in the microwave without thawing it first (as per instructions on the labels). Despite instruction on the label to take an internal temperature to assure that these products were cooked thoroughly, none of the cases took the internal temperature. Under the new label requirements, consumers will more easily identify the product as raw. The producers were required to verify that the cooking instructions (time and temperature) on the label are sufficient to reach the appropriate internal temperature. However, microwave cooking instructions will still be allowed on the new labels. In order to prevent future outbreaks, we recommend that microwave instructions should be removed entirely from the label, that these products are fully cooked prior to sale, or that these products are irradiated prior to sale.

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Norovirus Gastroenteritis Associated with a Wedding Reception

August

Wright County

On September 1, 2005, the Minnesota Department of Health (MDH) foodborne illness hotline received a complaint of gastrointestinal illness associated with a wedding reception held at a facility in Monticello on August 27. The event was catered by a facility in Anoka (Anoka County) and was served in a pre-plated fashion. The food served included ham, green beans, au gratin potatoes, rolls, and butter. The wedding party brought in some other items themselves, including two wedding cakes, a root-beer keg, a beer keg, and punch. The complainant reported that approximately 30 of 175 guests that attended the wedding reception had subsequently become ill with vomiting and diarrhea. Anoka County Community Health and Environmental Services (ACCHES) was notified and an investigation was initiated.

Epidemiologists from MDH obtained a list of individuals who attended the wedding reception dinner from the families of the bride and groom and conducted phone interviews with guests to obtain information on illness history, consumption of foods/beverages, and specific event attendance. Open-ended questions were asked regarding attendance at other wedding associated events. A case was defined as a guest who attended the wedding reception and subsequently became ill with vomiting and/or diarrhea (≥ 3 loose stools in a 24-hour period). Public health officials from ACCHES contacted the catering facility and interviewed staff at the facility to ascertain work-related duties and recent illness history. At this time they learned the kitchen in which the food was prepared was actually located in New Brighton (Ramsey County). A stool sample was collected from one of the guests and submitted to MDH for bacterial and viral testing.

Of the 97 guests who were interviewed, 31 (32%) met the case definition. Six individuals reported mild gastrointestinal symptoms that did not meet the case definition; these individuals were excluded from the analyses. Ten guests that had onset more than 72 hours after the reception were classified as secondary cases were also excluded from analyses.

Sixteen cases (76%) had diarrhea, 17 (81%) had vomiting, 13 (65%) had cramps, one (5%) had blood in their stool, and four (22%) had fever. The median incubation period was 40 hours (range, 2 to 73 hours). The median duration of illness was 55 hours (range, 13 to 102.5 hours). The stool sample from the patron was positive for norovirus.

Drinking root beer from a self-serve keg was significantly associated with illness (18 of 21 cases vs. 25 of 53 controls; odds ratio, 6.7; 95% confidence interval 1.63 to 38.9; $p = 0.002$). While punch was not significantly associated with illness, some guests reported dipping their glasses into a punch bowl while others drank punch from glasses that had been poured prior to the event. It was impossible to evaluate these two exposures separately, as many guests had both served themselves and had consumed pre-poured punch. Other guests were unable to recall whether or not they served themselves punch or had consumed punch from the pre-poured glasses. None of the guests that were reached for interview reported gastrointestinal illness prior to the wedding

reception; however there were a large number of guests that were not reached and their illness histories were not ascertained.

There were several other wedding associated events reported by guests including a groom's dinner and a gift opening; these events were not statistically associated with illness.

Investigation by officials from Anoka County found no major problems with the catering establishment. No recent illness was reported among food workers employed by the caterer, and the caterer had not received any other complaints.

This was an outbreak of norovirus gastroenteritis among guests of wedding reception. Transmission occurred at the reception dinner on August 27. The root beer keg was implicated as the vehicle of transmission, and the source of the viral contamination was probably infected guests. Contamination of the punch or other food items through direct contact by ill guests also may have contributed to the outbreak. Secondary person-to-person transmission was also an important transmission route in the days after the wedding.

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***E. coli* O157:H7 Infections Associated with Prepackaged, Prewashed Lettuce Salad**

September

Multiple Counties/Multiple States

On September 27, 2005, the Minnesota Department of Health (MDH) Public Health Laboratory identified three isolates of *E. coli* O157:H7 (O157) with indistinguishable pulsed-field gel electrophoresis (PFGE) subtype patterns. This PFGE subtype (designated PulseNet pattern EXHX01.0238) had not previously been identified in Minnesota, and was uncommon in the United States, comprising only 0.35% of all isolates subtyped by *Xba*I in the national *E. coli* O157:H7 PulseNet database. The three O157 isolates were from three patients, and had been submitted to MDH from clinical laboratories through routine statewide laboratory-based surveillance. During routine interviews with a detailed questionnaire of the case-patients by MDH staff, there were no obvious commonalities; however, the case-patients did all report eating prepackaged lettuce salad during the week prior to illness onset. An investigation was initiated.

On September 28, a case-control study was initiated. For the purposes of this case-control study, a case was defined as a person with a diarrheal illness (≥ 3 loose stools in a 24-hour period), from whom *E. coli* O157:H7 of the outbreak PFGE subtype was isolated, and with illness onset after September 7, 2005. All O157 isolates were subtyped by PFGE with restriction enzyme *Xba*I, utilizing previously described methods. Selected O157 isolates were also subtyped with a second restriction enzyme, *Bln*I. MDH attempted to enroll three controls per case through sequential digit dialing anchored on the case's telephone prefix. Controls were matched to cases by age category, and reported no diarrhea or vomiting during the preceding 2 weeks. Relevant age categories were 2 to <6 years, 6 to <12 years, 12 to <18 years, 18 to <40 years, 40 to <60 years, and 60 years or older. Following a routine Tennessee consent, all controls were interviewed with a standard, detailed questionnaire about food consumption and other potential exposures occurring in the 7 days prior to the case's onset of illness. Because initial case interviews suggested a common exposure to prepackaged lettuce salad, the interview included specific

questions about brands and varieties of prepackaged salad, production codes and best-if-used-by (BIUB) dates, and purchase date(s) and location.

Subsequent case-finding continued after the case-control study was completed. Confirmed cases were defined as having evidence of O157 infection by stool culture, or by serologic testing for hemolytic uremic syndrome (HUS) patients. Stool isolates of O157 had to be the primary O157 outbreak PFGE pattern (PulseNet *Xba*1 pattern EXHX01.0238), or differ by a single band (PulseNet *Xba*1 pattern EXHX01.2415). The Centers for Disease Control and Prevention's Immunology Laboratory performed serologic testing for antibodies to the O157 LPS antigen. Confirmed cases had to have reported exposure to a specific lettuce salad product implicated during the case-control study during the 7 days prior to illness onset. Exposure was defined as having consumed the implicated lettuce salad, or having shared a common meal where the implicated product was served. Probable cases were defined as persons who had a diarrheal illness following consumption of the implicated product, and who were epidemiologically-linked (e.g., household members or sharing a common meal) to a culture-confirmed case.

The Minnesota Department of Agriculture (MDA) Dairy and Food Inspection Division, United States Food and Drug Administration (FDA), and the California Department of Health Services (CDHS) jointly conducted traceback investigations of the epidemiologically implicated product. MDH collected leftover product from case-households for testing at the MDA Laboratory. The MDA Laboratory submitted all O157 isolates from product to the MDH Public Health Laboratory for PFGE subtyping.

The case-control study was conducted during September 28-30, 2005. Ten cases and 26 matched controls were enrolled. Consumption of any lettuce during the week prior to illness onset was reported by 9 of 10 cases vs. 17 of 26 controls; this association was not statistically significant (matched odds ratio [MOR], 3.5; 95% confidence interval [CI], 0.5 to 25.0; $p = 0.17$). However, consumption of prepackaged lettuce salad was reported by fewer controls, yielding a statistically significant association (9 of 10 cases versus 10 of 26 controls; MOR, 8.4; 95% CI, 1.2 to 59.6; $p = 0.01$). Consumption of Brand A brand prepackaged lettuce salad was even more strongly associated with illness (9 of 10 cases versus 5 of 23 controls; MOR, 10.1; 95% CI, 1.5 to 67.3; $p = 0.002$). During the case-control study, cases reported consuming Brand A prepackaged lettuce salad purchased from Chain A grocery stores; no controls reported consumption of Brand A prepackaged lettuce salad purchased from Chain A (MOR, undefined; $p < 0.001$). No other foods or other potential exposures asked about on the questionnaire were associated with illness.

Three cases (two confirmed, one probable) from separate households reported consuming the implicated lettuce product served at a college class potluck dinner (in Ramsey County) on September 13, 2005. Food items served at this dinner included chicken, cheese, salsa, sour cream, tortillas, and lettuce. A class registry list was obtained from the college, and attendees were interviewed about food items consumed at the class potluck and subsequent gastrointestinal illness. Eleven of 12 students who attended the class potluck were interviewed. No foods served at the potluck dinner were statistically associated with illness. However, 3 of the 6 individuals who ate lettuce developed gastrointestinal illness versus 0 of 5 that did not eat lettuce (relative risk, undefined; Fisher exact 2-tailed p -value = 0.18). The median incubation period from the potluck for the ill attendees was 3 days (range, 3 to 6 days). Two of the three ill attendees

submitted a stool culture that yielded O157 with the outbreak PFGE pattern (EXHX01.0238). Leftover prepackaged lettuce (Brand A Classic Romaine) was subsequently recovered from the household of a class attendee who had purchased the product for the potluck, and who had taken the remainder of the lettuce home after class. This lettuce was submitted to the MDA Laboratory for culture and yielded O157 with the outbreak PFGE pattern (EXHX01.0238).

Three varieties of the implicated Brand A pre-packaged lettuce salad were reported by cases in the case-control study – Classic Romaine, Greener Selection, and American Blend. Bags of leftover salad recovered from 10 case-households all had a best-if-used-by (BIUB) date of 09/23/05, and production codes beginning with “B250”.

On the afternoon of September 30, 2005, MDH terminated its case-control study and issued a press release/health alert notifying consumers and health officials of the association between *E. coli* O157:H7 infection and Brand A prepackaged lettuce salad. Consumers were instructed to dispose of bags of Brand A salad varieties Classic Romaine, American Blend, and Greener Selection that had a BIUB date of 09/23/05 and a production code beginning with B250. On that same day, MDH submitted a notice of the outbreak on the Epidemic Information Exchange (Epi-X) and notified the Centers for Disease Control and Prevention (CDC), FDA, and CDHS. CDHS and FDA contacted Brand A about the Minnesota findings on September 30, 2005. As a result of the investigation, FDA subsequently issued a nationwide health alert on October 2, 2005 to warn consumers, and Brand A voluntarily recalled 245,000 bags of prepackaged lettuce salad. On October 12, 2005, MDH submitted an updated posting to Epi-X as additional cases were identified in Minnesota, Oregon, and Wisconsin.

Thirty-four confirmed (n=26) and probable (n=8) cases in three states were ultimately identified in this outbreak. Cases represented individuals from 23 separate households.

Three of the confirmed cases in this outbreak resided in states other than Minnesota; through PulseNet, one confirmed case was identified in Oregon and two in Wisconsin. Twenty-three case-isolates were PulseNet pattern EXHX01.0238. Secondary *Bln1* enzyme digestion was performed on six of these case-isolates (MN-3, OR-1, WI-2); all were indistinguishable by *Bln1* (PulseNet *Bln1* pattern EXHA26.1040). Two case-isolates differed by a single band from the primary outbreak PFGE subtype by *Xba1* digestion, and were designated PulseNet pattern EXHX01.2415. Serologic testing performed by CDC’s Immunology Laboratory was positive in a case-patient who was hospitalized for HUS following consumption of the implicated Brand A salad product. This case-patient was the sibling of a culture-confirmed case-patient.

Probable cases (n=8) all had a diarrheal illness following consumption of the implicated product, and were household members of a culture-confirmed case. Probable cases did not submit a stool culture during illness (n=6) or received antimicrobials prior to submitting a stool culture, which tested negative (n=2). Seven probable cases were Minnesota residents and one was a Wisconsin resident.

Among all confirmed and probable case-patients (n=34), the median age was 41 years (range, 3-84 years). Twenty-one (62%) were female. All case-patients reported diarrhea; the median duration of diarrhea was 5 days (range, 3-97 days). Bloody diarrhea was reported by 76% of case-patients. Abdominal cramping was reported by 94% of case-patients, and 20% reported

low-grade fever ($\leq 101^{\circ}$ F). Thirteen case-patients (38%) were hospitalized; the median duration of hospitalization was 5 days (range, 2-34 days). Hemolytic uremic syndrome was diagnosed in two patients. No deaths occurred.

Most reported illness occurred among Minnesota residents (30 of 34 confirmed and probable cases). Cases resided in multiple counties in Minnesota: Hennepin (10 cases), Ramsey (7 cases), Martin (6 cases), Anoka (3 cases), Chisago (1 case), Dakota (1 case), Isanti (1 case), and Washington (1 case).

Thirty-two of 34 (94%) cases reported consumption of Brand A prepackaged lettuce salad during the week prior to illness onset. Two (8%) confirmed cases (aged 3 and 84 years, respectively) did not consume the implicated product, but shared a meal with family members who consumed the implicated product.

Classic Romaine salad was the most commonly implicated variety of Brand A salad, reported by 28 (82%) case-patients. Seven case-patients reported consumption of one of four additional Brand A salad varieties (American Blend [2], Classic Caesar [2], European Blend [1], and Greener Selection [2]). Some individuals consumed more than one salad variety. All Brand A salad varieties contained romaine lettuce, which was the only common ingredient in all varieties. Onsets of illness for cases ranged from September 14 to September 30, 2005. The median incubation was 2 days (range, 1 to 7 days). Cases consumed the implicated salad an average of 1.8 occasions during the 7 days prior to illness onset (range, 1 to 5 occasions).

The common production codes obtained from recovered case-household bags of leftover lettuce salad indicated that the product had originated from a single Brand A processing plant in Soledad, California, with a production date of September 7, 2005. The implicated lettuce reportedly could have been harvested from any one of seven fields in the Salinas Valley of California. The ultimate source of contaminated lettuce was not identified.

The California Food Emergency Response Team (CALFERT, a collaborative team of investigators from CDHS and FDA) visited the Brand A processing facility to obtain distribution records on September 30, 2005, and began an investigation at the processing facility on October 1, 2005. No employee illnesses were reported by management for the dates in question. CALFERT reviewed the processing lines where the implicated products could have been produced. During the investigation, CALFERT collected in-line, finished product, environmental, and food samples (shredded carrots, chopped romaine lettuce and chopped red cabbage); the samples were sent to FDA for laboratory analysis. The investigation team later determined that approximately 245,000 bags of Brand A salad of three of the initially implicated varieties (Classic Romaine, American Blend and Greener Selection) with the B250 production code were distributed to 34 states in September. By October 4, 2005, CALFERT had begun an investigation of the agricultural fields that supplied produce to the Brand A facility during the time of production of the implicated prepackaged salad.

Grocery stores belong to seven unrelated grocery chains in three states were identified as places where the product had been purchased, involving multiple distributors. FDA conducted an environmental investigation at one Minnesota distributor and at one of the grocery stores (Chain A), also collecting invoices to verify information.

Eleven bags of Brand A salad recovered from case-households were submitted to the MDA Laboratory for culture during the initial week of the outbreak investigation. Product testing by the MDA Laboratory isolated *E. coli* O157:H7 from two opened bags of Brand A Classic Romaine salad obtained from separate households and associated with three culture-confirmed cases and one probable case. One of the positive bags of lettuce was from the Northwestern College outbreak. Of note, the student who brought the lettuce to the class potluck, and from whom the leftover lettuce was recovered, did not consume the implicated lettuce and was never ill (i.e., this student was not one of the two culture-confirmed cases or the probable case associated with the college outbreak).

Isolation of O157 occurred within 60 hours of receipt of the two positive bags of lettuce. The O157 isolate from the lettuce consumed at the college class potluck was confirmed as the primary outbreak pattern by *Xba*1 and *Bln*1 PFGE subtyping (PulseNet patterns EXHX01.0238 and EXHA26.1040, respectively). The second positive lettuce sample, submitted by a confirmed case with stool-isolate pattern EXHX01.2415, yielded isolates with both the primary outbreak PFGE pattern (EXHX01.0238) and a third PFGE pattern (PulseNet *Xba*1 pattern EXHX01.0634). PFGE pattern EXHX01.0634 differed by a single band from patterns EXHX01.0238 and EXHX01.2415. No cases of human illness were associated with PFGE pattern EXHX01.0634. All samples collected at the Brand A facility were negative for *E. coli* O157:H7.

This was a multistate outbreak of O157 infections associated with prepackaged lettuce salad manufactured by Brand A. This product is advertised as “prewashed, ready-to-eat”. Thirty-four cases were identified among residents of three states.

Epidemiologic implication of Brand A lettuce as the outbreak vehicle occurred within 3 days of initial recognition of the O157 isolate PFGE cluster, resulting in FDA issuing a nationwide health alert and the manufacturer voluntarily recalling 245,000 bags of lettuce salad. A rapid epidemiologic response and testing by the MDA Laboratory enabled the successful isolation of the outbreak strain of O157 from two submitted bags of Brand A Classic Romaine salad recovered from different case-households. This is the first time in which the outbreak strain of O157 has been isolated from lettuce during a public health investigation.

Since 1995, 18 lettuce-associated O157 outbreaks have occurred in the United States. Based in part on this investigation, the FDA issued a “Letter to California Firms that Grow, Pack, Process, or Ship Fresh and Fresh-cut Lettuce”. The letter stated FDA’s serious concern with the continuing outbreaks of foodborne illness associated with consumption of fresh and fresh-cut lettuce and other leafy greens, and outlined FDA’s planned actions and actions expected of the industry to improve the safety of their products.

***Salmonella* Enteritidis Infections Associated with a Restaurant**

September

Dodge County

In September 2005, review of routine surveillance interviews of *Salmonella* Enteritidis pulsed-field gel electrophoresis (PFGE) subtype SE1B103 cases reported to the Minnesota Department of Health (MDH) revealed that three cases had patronized the same restaurant in Kasson. An investigation was initiated on September 21.

All *S. Enteritidis* cases are routinely interviewed about exposures and food consumption at home and at restaurants as part of surveillance. Interviews of *S. Enteritidis* cases that are indistinguishable by PFGE are compared to identify potential common exposures. Information gathered during routine interviews was reviewed by an MDH epidemiologist. A case was defined as a Minnesota resident from whom *S. Enteritidis* SE1B103 was isolated since September 1, 2005 and who reported eating at the restaurant prior to symptom onset.

MDH environmental health specialists conducted environmental assessments of the restaurant on September 21 and during the following weeks. MDH environmental health specialists interviewed restaurant employees about gastrointestinal illness in the previous month. All restaurant employees were asked to submit two stool specimens for *Salmonella* testing. Environmental samples of food and non-food contact surfaces were collected September 22 and tested for *Salmonella*.

Three patron-cases were identified from routine surveillance. None of the restaurant employees reported any gastrointestinal symptoms and none tested positive for *Salmonella*.

All three patron-cases had diarrhea, fever, and bloody stools, two (67%) had vomiting, and two (67%) reported cramps. Two of the patron-cases' meal dates were September 9; the third case could not recall the exact date but reported consuming a meal at the establishment during August 28 to September 3. The median incubation period for patrons was 45 hours (range, 25 to 65 hours). None of the cases had recovered at the time of interview date, which ranged from 10 days to 14 days after illness onset. One case (33%) was hospitalized for 7 days.

Cases had eaten a variety of foods from the restaurant buffet. One case ate sweet and sour pork, beef, broccoli, wontons, rice, and noodles. Another case ate noodles, wontons, sweet and sour chicken and General Tsao's chicken. The third case ate wontons, noodles, tapioca, fish, egg rolls, and mushrooms.

The initial environmental assessment found multiple temperature violations. Eggs were left out at room temperature and were not refrigerated. When cracking eggs, shells were tossed into the egg flat which was placed on a surface above the food preparation counters. The preparation cooler has not functioning well, and the temperature of chicken was 50 degrees F. Chicken was also being thawed improperly in containers of water, and noodles were not cooled properly and were left for an indefinite amount of time at room temperature. There was no Certified Food Manager associated with the establishment.

Eleven environmental samples were collected on September 22 but none of them tested positive for *Salmonella*.

As a result of the environmental assessment findings, the refrigerator was repaired, proper cooling techniques were discussed, eggs were no longer kept at room temperature, and the need for a Certified Food Manager was emphasized. The restaurant was also thoroughly cleaned. The environmental health specialist discussed with the manager/owner the risks associated with keeping cracked eggshells above food preparation areas.

This was an outbreak of *S. Enteritidis* SE1B103 infections associated with eating at a restaurant. The outbreak was identified through routine surveillance at MDH. Documented transmission to patrons of the restaurant occurred over at least a 1 week period. A specific vehicle was not identified. Multiple temperature violations were noted specifically in chicken and egg storage. Shell eggs and chicken are often the source of *S. Enteritidis* and temperature abuse may have caused the organism to proliferate. Several deficiencies in food holding and preparation were identified, such as inadequate refrigeration and potential for cross-contamination. These deficiencies likely contributed to the survival and proliferation of *Salmonella* in foods and cross-contamination in the kitchen.

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Norovirus Gastroenteritis Associated with a Circus

September

Hennepin County

On October 1, 2005, a Hennepin County Public Health Department (HCPHD) epidemiologist received a foodborne illness complaint call from a Minneapolis Environmental Health (MEH) inspector. Twenty full-time employees with a visiting circus had become ill with gastrointestinal symptoms at approximately the same time, causing the cancellation of the Saturday shows. An investigation began that day.

Epidemiologists from HCPHD obtained a list of circus employees and interviewed them using a standard open-ended 3-day food history questionnaire. Subsequently, a more detailed, objective questionnaire about foods eaten on September 29 was administered to circus employees. Ninety-three employees were interviewed with the original open-ended questionnaire, and 62 were interviewed with the questionnaire about foods eaten on September 29. A case was defined as a circus employee with onset of vomiting and/or diarrhea (≥ 3 loose stools in 24 hours) since September 27, 2005. Stool kits were offered to employees with ongoing diarrhea.

Environmentalists from MEH inspected the circus kitchen and interviewed food service employees about job duties, illness since September 24 and food consumption at the circus cafeteria since September 28. Stool cultures were collected and tested for bacterial and viral pathogens at the Minnesota Department of Health Public Health Laboratory.

Thirty-nine of the 93 (42%) interviewed circus employees met the case definition. All reported cramping, 30 (77%) reported vomiting, 28 (72%) reported diarrhea, and 21 (54%) reported fever but did not measure the temperature. A probable exposure date was postulated to be September

29 after an epidemiologic curve suggested a point source mode of transmission with a peak on October 1 (22 ill). Incubation periods ranged from 20 to 61 hours (median, 39 hours), based on lunchtime on September 29. Durations of illness ranged from 5 to 110 hours (median, 24 hours). Twenty-six (67%) cases were male. Ages of cases ranged from 19 to 52 years (median, 30 years).

A variety of foods were served for lunch and dinner on September 29 using a self-service buffet set-up. By logistic regression, “Make your own sandwich” for lunch was significantly associated with illness (29 of 37 cases vs. 8 of 18 controls; odds ratio [OR], 4.53; 95% confidence interval [CI], 1.15 to 18.5; $p = 0.01$), as was using the salad bar (31 of 36 cases vs. 11 of 20 controls; OR, 5.1; 95% CI, 1.19 to 22.8; $p = 0.01$).

During inspection of the establishment (an onsite circus kitchen that did not prepare food for the general public), inspectors issued orders to correct issues in kitchen processes, food temperatures, sanitation, hand washing and ill employee exclusion.

After excluding ill employees, discarding potentially contaminated foods, disinfecting surfaces vigorously and discontinuing self-service of food, the outbreak stopped.

It was also noted that several temporary employees from a food service company (with a majority of staff working in concessions and a few in the circus kitchen) became ill with gastrointestinal symptoms. Therefore, concessions were only allowed to sell pre-packaged foods and employees had to wear gloves. No reports of ill spectators were ever reported.

Stool samples from two of four circus employees were positive for norovirus.

This was an outbreak of norovirus gastroenteritis among circus employees associated with self-service buffet style food at the circus. Food, utensils, or both may have been contaminated and served as vehicles in this outbreak. A specific source of contamination (i.e., food worker vs. buffet patron) was not identified.

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Gastroenteritis Associated with Escolar

October

Ramsey County

On November 7, 2005, the City of St. Paul License, Inspections and Environmental Protection (LIEP) program notified the Minnesota Department of Health (MDH) of an illness complaint from a hotel in St. Paul. On November 3, the hotel received an event evaluation stating that event attendees had become ill after attending an all-day event held at the hotel on October 27. Also, the hotel received an independent complaint letter on November 4 describing illnesses stemming from a meal eaten on October 26.

MDH and LIEP obtained a list of the attendees for the October 27 event. The complainants (including the patrons who wrote the letter) were interviewed to assess their symptoms and food consumption histories. LIEP sanitarians contacted the restaurant by phone to discuss employee health and food handling issues. A case was defined as a person who ate at the hotel during

October 26-27 and subsequently became ill with diarrhea (≥ 3 loose stools in a 24-hour period) or loose stools plus one other symptom (e.g., headache, itching/tingling sensation).

Nineteen of 20 event attendees were interviewed in addition to the four complainants mentioned in the letter. Five (22%) persons met the case definition. All cases reported diarrhea, three (60%) reported cramping, and one (20%) had a headache. One of the cases also experienced a tingling/itching sensation of the mouth. The median incubation period was 2.5 hours (range, 0.25 to 7 hours); the median duration was 15 hours (range, 4.5 to 20.5 hours). None of the cases contacted their medical provider. No stool or food specimens were obtained.

All five cases consumed escolar vs. 0 of 14 controls (odds ratio, undefined; $p < 0.001$). No other food items were statistically associated with illness. MDH contacted the Minnesota Department of Agriculture and the Minneapolis office of the Food and Drug Administration (FDA) to inform them of the illnesses.

Escolar contains a natural toxin called gempylotoxin (a strong purgative oil that can cause severe diarrhea). FDA's website (<http://vm.cfsan.fda.gov/~dms/hret-a1.html>) recommends that escolar "should not be marketed for interstate commerce". The chef at the hotel was contacted to discuss scombroid fish poisoning (which likely was the cause of the tingling/itching sensation experienced by one of the cases) and the potential side effects of eating escolar. The chef stated that approximately 20 servings of the fish were served on October 26-27. Attempts were made to identify other patrons who had consumed escolar on those dates; however, individuals could not be identified from the restaurant's records.

This was an outbreak of gastroenteritis associated with the consumption of escolar fish. Escolar has caused multiple similar outbreaks of diarrheal illness, as well as being associated with outbreaks of scombroid fish poisoning. MDH recommended that the hotel discontinue serving escolar due to the inherent risks associated with consumption of the fish.

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Norovirus Gastroenteritis Associated with a Party

November

McLeod County

On November 23, 2005, the Minnesota Department of Health (MDH) received a complaint of gastrointestinal illness among attendees of a private party in McLeod County on November 19. The event included foods purchased from a grocery store as well as food made by the hosts and other party attendees.

On November 23, MDH received a list of food items served at the party and a list of attendees from the party host. MDH staff began interviewing party attendees regarding illness history and food/beverage consumption using a standard questionnaire.

A case was defined as a person who had attended the party on November 19 and who had subsequently experienced vomiting or diarrhea (≥ 3 loose stools in a 24-hour period). Two attendees submitted stool samples to MDH for bacterial and viral testing.

Twenty-eight party attendees were interviewed, and 11 (39%) met the case definition. Ten (91%) cases had diarrhea, seven (64%) had vomiting, five (45%) had cramps, and five (45%) reported fever. The median incubation period was 38 hours (range, 19 to 45 hours). The median duration of illness was 46 hours (range, 11 to 168 hours). Two cases submitted stool samples to MDH; both were positive for norovirus. Only one of the samples provided enough product for viral nucleic acid sequencing.

Univariate analysis indicated that eating ham (10 of 11 cases vs. 7 of 14 controls; odds ratio, 10.0; 95% confidence interval, 1.1 to 247.6; $p = 0.04$) was significantly associated with illness. It was unknown which party guests brought or prepared specific foods at the event. All foods were served buffet style, beginning with mashed potatoes, meats, and gravy. All foods had individual serving tongs and forks. Not all party attendees could be reached for interview, and some party attendees reported additional foods (including stuffing and rolls) that weren't asked about for all attendees.

This was an outbreak of norovirus gastroenteritis associated with ham served at a party at a private home. One non-ill party attendee had an infant (not present at the party) with ongoing diarrhea. Since not all party attendees could be interviewed, it is also possible that someone was ill prior to other cases and was shedding virus at the time of the party. Tongs or forks in the buffet could have become contaminated by party attendees. The ultimate source and mode of contamination were not determined.

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Norovirus Gastroenteritis Associated with a Restaurant

December

Hennepin County

On December 5, 2005, the Minnesota Department of Health (MDH) foodborne illness hotline received a complaint of illness among a party of three who had eaten together at a restaurant in Golden Valley on December 2. A second, independent complaint was received by Hennepin County Public Health Protection (HCPHP) on the same day from a party of four who had eaten at the restaurant on December 3. MDH and HCPHP staff subsequently notified each other of the complaints, and an investigation was initiated. An additional three complaints were received over the next three days by MDH and HCPHP.

On December 5, a HCPHP sanitarian inspected the restaurant, focusing on food preparation practices and employee health and hygiene. Employees currently on duty were interviewed on-site regarding their job duties and illness history. An employee contact list and schedule were provided by the restaurant so that additional employees could be interviewed via telephone. Names from credit card records were also provided by the restaurant so additional patrons could be contacted. The sanitarian visited the restaurant again on December 6, 7, and 8 to make recommendations, monitor compliance and interview additional employees.

Epidemiologists from HCPHP interviewed additional employees via telephone and made attempts to reach patrons. MDH staff made additional attempts to reach patrons.

A case was defined as a person who ate at the restaurant between November 29 and December 3 and who either subsequently became ill with vomiting or diarrhea (≥ 3 loose stools in a 24-hour period) or had milder gastrointestinal symptoms and a laboratory confirmed norovirus infection. Stool specimens from four patrons were submitted to the MDH laboratory for bacterial and viral testing.

A total of 20 patrons who had eaten at the restaurant were interviewed. Sixteen (80%) patrons met the case definition. One person reported milder symptoms but did not meet the case definition. Of the 16 cases, 15 (94%) had diarrhea, 12 (75%) had vomiting, eight (50%) had cramps, and three (19%) reported fever. The median incubation was 23.5 hours (range, 8 to 57 hours). The median duration of illness was 39 hours (range, 8 to 72 hours). The median age of cases was 30 years (range, 1 to 54 years) and 10 cases (63%) were male.

Stool specimens from four patrons tested positive for norovirus. Nucleic acid sequencing was conducted on positive norovirus samples from two positive cases from separate complaint groups; the sequences were identical in both samples.

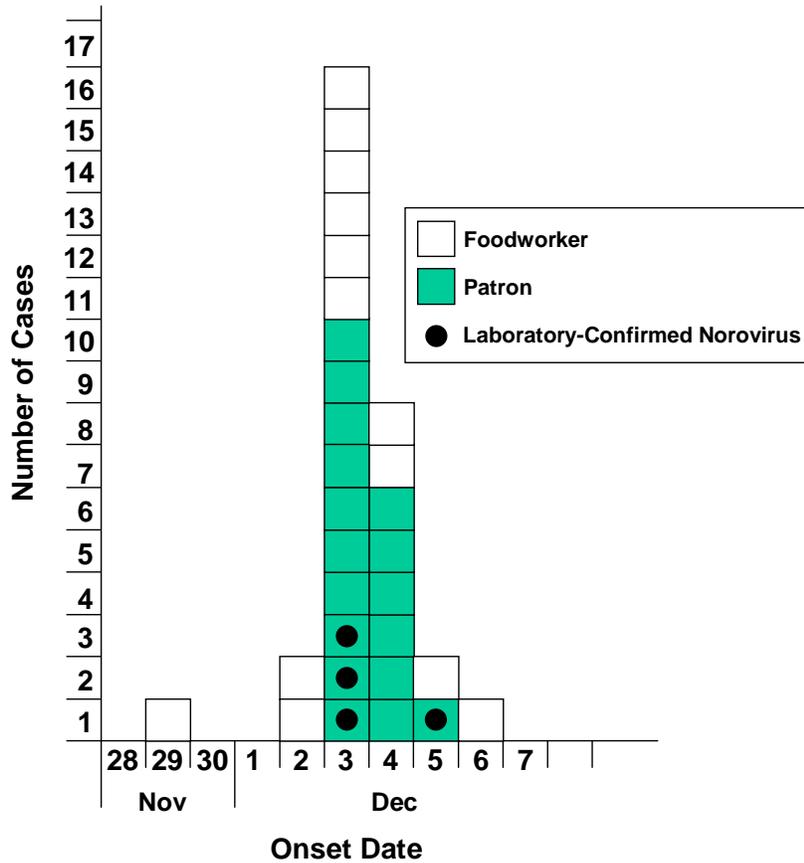
Not enough controls were recruited to allow for statistical analysis of food items consumed. The majority of cases (63%) ate burgers or sandwiches that contained uncooked food products, such as lettuce, tomato and other cold toppings. However, not all cases ate these items. Other food items consumed by cases included a salad, a pasta bowl, two steak and shrimp entrees, a riblet and one order of chicken strips. Of the three patrons who did not report any symptoms, two ate salads and one ate a burger.

Thirty of 43 (70%) restaurant employees who had worked the week of November 27 were interviewed. Of the 30 interviewed, thirteen (43%) reported recent gastrointestinal symptoms, including one employee who reported just one episode of diarrhea and no other symptoms on November 29 (see epidemic curve). At least three of the thirteen ill employees worked while they were ill and performed duties which included serving food and handling glassware and plates.

Upon inspection, the HCPHP sanitarian noted overall compliance with food code requirements. Equipment and food contact surfaces were properly cleaned and sanitized.

Staff did an excellent job of washing their hands when observed. Servers were observed washing their hands with much greater frequency than usually observed in restaurants. However, one of the two cooks working was touching ready-to-eat food barehanded. The worker on the grill had a glove on the hand holding the spatula, but he was touching the bun, the lettuce and tomato added to the bun, and the pickles put on the plate with a bare hand. The servers were grabbing unwrapped straws and placing them in drinks. One worker was observed using a glass to scoop ice for a soda that he then carried out of the kitchen to drink. Otherwise, servers used utensils to add any toppings and garnishes to plates and drinks. Workers also drink from open cups in the pick-up area. There are special cone-shaped cups for their use (which cannot be set down when in use due to their shape).

Gastroenteritis Cases Associated with a Restaurant, by Illness Onset Date



This was an outbreak of norovirus gastroenteritis associated with a restaurant. Although a specific food vehicle was not identified, the source of the outbreak was ill food workers with transmission occurring through bare-hand contact of ready-to-eat food items. The establishment has been instructed on the importance of limiting bare-hand contact of food items, and excluding ill food workers from work and hand washing.

**(37)
Norovirus Gastroenteritis Associated with a Restaurant**

December

Ramsey County

On December 12, 2005, the Minnesota Department of Health (MDH) foodborne illness hotline received a complaint about a restaurant in White Bear Lake. The complainant stated that two couples from two different households had eaten dinner together at the restaurant on the evening of December 6. All four reportedly became ill with gastroenteritis. MDH initiated an outbreak investigation in collaboration with Ramsey County Environmental Health.

MDH epidemiologists interviewed the four diners by phone about food consumption, other shared exposures, and illness history using a standard form. A case was defined as a person with onset of gastrointestinal symptoms after eating at the restaurant on December 6. Three of the four

diners submitted stool samples to the MDH Public Health Laboratory for bacterial and viral testing.

A Ramsey County sanitarian went to the restaurant on December 12 to evaluate foodhandling practices and collect more information on the suspect meal. The restaurant manager provided a list of all the foodhandlers who had worked at the restaurant on December 6, and MDH epidemiologists interviewed these foodhandlers by phone about recent illnesses and job duties.

All four of the diners met the case definition. Three cases (75%) had loose stools, two (50%) had cramps, one (25%) had vomiting, and no cases had fever or bloody stools. No cases sought medical attention or were hospitalized. The two couples denied any other recent common exposures. The incubation periods from the restaurant meal for the four cases were 31.5, 33, 34, and 37 hours, respectively. The durations of illness were 2, 3.5, 4, and 4 days, respectively.

All four cases reported eating the “Tuesday special” at the restaurant, which were beef tacos. They drank a variety of beverages. Statistical analysis could not be done, as there were no non-ill controls.

The stool samples collected from three cases (two cases in the same household and one case in a different household) tested positive for norovirus by RT-PCR at the MDH Public Health Laboratory. Viruses from one case from each household were sequenced. The genetic sequences were identical, indicating a common source of infection.

The sanitarian from Ramsey County spoke with the restaurant manager, who denied receiving any additional patron complaints. The sanitarian examined how the beef tacos had been prepared. The foodhandlers had bare-hand contact with shredded lettuce and cheese while preparing the tacos.

All nine restaurant employees who worked on December 6 were interviewed by phone. One server was ill with vomiting but the onset date was December 8, 2 days after the cases’ meal date. No other workers reported recent gastrointestinal symptoms in themselves or in their households.

This was an outbreak of norovirus gastroenteritis associated with a restaurant meal. The four cases had all consumed beef tacos and beverages at the restaurant, but due to the lack of controls, the specific vehicle could not be confirmed. The most likely source of contamination was bare-hand contact by infected foodhandlers. However, interviews with the foodhandlers who worked on December 6 did not identify any foodhandlers who were ill during the relevant time period. Therefore, the source of the norovirus within the restaurant could not be determined.

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Norovirus Gastroenteritis Associated with a Restaurant

December

Hennepin County

On December 12, 2005, the Minnesota Department of Health (MDH) foodborne illness hotline received a report (Complaint A) concerning gastrointestinal illness among a group of four

persons that dined at a restaurant in Eden Prairie on December 9. Hennepin County Public Health Department (HCPHD) was subsequently notified. On December 23, HCPHD was notified of complaints from three independent groups (Complaint B, Complaint C, and Complaint D; total of both groups was approximately 70 patrons) that recently dined on December 17, 19, and 21 at the restaurant.

Epidemiologists from MDH conducted phone interviews among members associated with Complaint A. Epidemiologists from HCPHD obtained a list of 20 names among members associated with Complaint B, Complaint C, and Complaint D and conducted phone surveys to obtain information on consumption of foods/beverages and illness history. A case was defined as a person who developed vomiting or diarrhea (≥ 3 loose stools in a 24-hour period) or who was laboratory-confirmed with norovirus after dining at restaurant.

A sanitarian from HCPHD visited the restaurant to evaluate food preparation and handling procedures and to interview staff regarding recent illness and job duties. Stool samples were collected from two patrons (Complaint A) and from three restaurant employees and submitted to MDH for bacterial and viral testing.

Seventeen patrons (including four from Complaint A and 13 from Complaints B and C) were interviewed; all 17 met the case definition. Sixteen cases (94%) had cramps, 15 (88%) had diarrhea, 12 (70%) had vomiting, and eight of 14 (57%) had fever. The median incubation period was 33 hours (range, 14 to 73 hours). The median duration of illness was 46 hours (range, 20 to 66 hours).

A meaningful case-control study to evaluate potential food vehicles could not be performed due to lack of non-ill controls; however, house salads served family style were common to all cases.

A sanitarian from HCPHD interviewed 32 restaurant employees (of approximately 70 current employees) regarding recent gastrointestinal illness. One employee reported recent illness; however, this person no longer worked at the restaurant and was unable to recall the onset date of symptoms.

On December 23, the restaurant's corporate staff submitted a list of 13 ill employees with onset of gastrointestinal symptoms from December 11 to December 23; among these ill employees, some had previously denied illness to HCPHD environmentalists. Eleven employees (85%) had diarrhea, nine (69%) had vomiting, and three (23%) had nausea. Stool samples from two patrons and one employee tested positive for norovirus. Sequencing was successful for one sample out of the three positive.

On December 23, MDH and HCPHD recommended that the restaurant be temporarily closed. On December 26, the restaurant was allowed to open contingent on recommendations/restrictions put forth by HCPHD, including closely monitoring employee illness log, excluding ill employees at the door, educating employees on hand hygiene, cleaning, and disinfecting against norovirus, submitting a list of excluded employees to HCPHD for interviewing, and offering stool kits to ill employees.

Three employees were interviewed after the restaurant was allowed to open. All three employees had vomiting, two (67%) had diarrhea, two (67%) had cramps, and one (33%) had fever. One employee had an onset on December 29, the second employee had an onset on January 1, 2006, and the third employee had an onset on January 3. There were no further complaints of illness from patrons.

This was a norovirus gastroenteritis outbreak associated with the restaurant. Although the vehicle and transmission route was not determined from the investigation, transmission likely occurred through contamination of ready-to-eat food items by ill employees.

(39)

Norovirus Gastroenteritis Associated with a Restaurant

December

Hennepin County

On December 23, 2005, the Minnesota Department of Health (MDH) foodborne illness hotline received a complaint of illness among a party of 10 people who had eaten at a restaurant in Maple Grove on December 17. A prior complaint had been received by the MDH foodborne illness hotline on December 20. This caller reported one person ill out of a party of two who had eaten at the restaurant on December 17. The caller was calling regarding another restaurant but the restaurant in Maple Grove was mentioned in the 4-day food history. MDH notified Hennepin County Public Health Protection (HCPHP) staff of each of these complaints, and an investigation was initiated.

On December 23, a HCPHP sanitarian inspected the restaurant, focusing on food preparation practices and employee health and hygiene. Restaurant employees on duty were interviewed on-site regarding their job duties and illness history. An employee contact list and a schedule were provided by the restaurant so that additional employees could be interviewed via telephone.

Names from reservation lists for December 19-21 were also provided by the restaurant so additional patrons could be contacted. HCPHP epidemiologists interviewed patrons and additional employees via telephone.

A case was defined as a person who had vomiting and/or diarrhea (≥ 3 loose stools in a 24-hour period) since December 17 for restaurant patrons and any gastrointestinal illness in the month of December for restaurant employees. Stool specimens from two patrons were submitted to the MDH Public Health Laboratory for bacterial and viral testing.

Fifteen patrons who had eaten at the restaurant on December 17 were interviewed. Eleven (73%) patrons met the case definition. One person for each of five groups that ate at the restaurant on December 19 was contacted. According to the five group contacts, only one of 27 persons reported symptoms 10 hours after eating at the facility, but the illness did not meet the case definition. For December 20 only one party was reached, and the contact person was not ill and was not aware of illness in the other person in their party.

Seventy-one (86%) of 83 restaurant employees were interviewed. Sixteen employees (23%) met the case definition.

Of the 27 cases (11 patrons and 16 employees), 24 (89%) had diarrhea, 21 (78%) had vomiting, 13 (48%) had cramps, and nine (33%) reported fever. The median incubation for patron-cases was 33 hours (range, 8 to 46 hours). Duration of illness was available for 12 cases. The median duration of illness was 32 hours (range, 6 to 46 hours). Among patron-cases, onset dates ranged from December 17 through the 19. Among restaurant employees, onset dates ranged from December 12 through December 20, with five employees reporting onsets prior to the patron's meal dates.

Stool specimens from the two patrons tested negative for *Campylobacter*, *E. coli* O157, *Salmonella*, *Shigella*, and *Yersinia*, but both were positive for norovirus.

Due to the limited number of patron interviews, meaningful statistical analysis to identify a specific food vehicle was not feasible. Patron-cases ate a variety of food items such as bruschetta, calamari, stuffed mushrooms, chicken Florentine soup, salads, chicken, lobster, pastas and desserts.

HCPHP sanitarians interviewed restaurant employees, and distributed five stool specimen kits, but none of the ill employees submitted specimens for testing. Recommendations to restrict or exclude employees who exhibited gastrointestinal symptoms from direct contact with food for at least 72 hours after symptoms resolved and to perform a thorough cleaning and sanitation with a concentrated chlorine (bleach) solution of the kitchen were communicated to management.

During the investigation, it was discovered that at least one of the restaurant's assistant managers was aware of the initial complaint 2 days prior to MDH's notification. The general manager was informed of the State Rules governing the immediate notification of suspected foodborne illnesses (a copy of the specific section of the State Food Code was supplied to him).

This was an outbreak of norovirus gastroenteritis associated with a restaurant. Although a specific vehicle was not identified, the source of the outbreak was likely ill food workers, since several ill food workers were identified with illness onsets just prior to the meal date of patron-cases. The establishment was instructed on the importance of limiting bare-hand contact of food items, excluding ill food workers from work and immediately reporting any patron complaints of illness to the health department.

(40)

Norovirus Gastroenteritis Associated with a Restaurant

December

Olmsted County

On December 19, 2005, Olmsted County Public Health Services (OCPHS) received a complaint of gastrointestinal illness in a person that ate at a restaurant in Rochester on December 15. Only one person in a party of eight became ill after eating at the restaurant. However, on December 20, OCPHS received two additional complaints of illness in persons who ate at the same

restaurant on December 17. The Minnesota Department of Health (MDH) was notified, and investigation was initiated.

Environmental Health (EH) staff from OCPHS visited the restaurant. A list of patrons who had eaten at the restaurant on December 17 was compiled from credit card receipts. These patrons were contacted and interviewed about food consumption and illness history. Restaurant employees were interviewed about illness history, work duties, and food consumption. An assessment of food preparation and staff hygiene was made using the principles of Hazard Analysis Critical Control Points and Active Managerial Control.

A case was defined as a person with vomiting or diarrhea (≥ 3 loose stools in a 24-hour period) after eating at the restaurant on December 17. Stool specimens from patrons and employees were sent to the MDH Public Health Laboratory for bacterial and viral testing.

Of the 28 patrons interviewed, five (18%) met the case definition. All five cases reported diarrhea and vomiting, four (80%) reported nausea, three (60%) reported fever, and two (40%) had abdominal pain. The median incubation period was 40 hours (range, 31 to 50 hours). Only two cases had recovered at the time of their interview, with durations of illness of 19 and 29 hours. Cases reported eating a variety of foods, including dinner salad, artichoke and spinach dip, quesadillas. No specific food items were implicated in the statistical analysis.

Forty-three (59%) of the 73 employees listed on the payroll were interviewed. Three (7%) reported a recent history of vomiting and/or diarrhea. One employee was ill on December 3, another on December 14, and the last one on December 17. The employee who was ill on December 3 came to work that day but left after 10 minutes. The other two employees reported not working while ill.

One patron and two employees submitted stool samples for testing. All three stools were negative for *Campylobacter*, *E. coli* O157, *Salmonella*, *Shigella* and *Yersinia*. Two of the three specimens tested positive for norovirus. Only one of the viruses could be amplified for sequencing, so nucleic acid sequences could not be compared.

Bare-hand contact with ready-to-eat foods was observed in the salad preparation area. Gloves were not routinely used, and wait staff were making salad orders with bare hands with no observable handwashing step. At the time of OCPHS visit, EH staff directed the manager to require glove use at the salad prep area. It was also required that the shift manager discard all open ready-to-eat foods in the restaurant including ice, and to wash, rinse and sanitize all food contact surfaces. Other recommendations and control measures included: exclusion of employees who are ill with vomiting or diarrhea until symptoms have been resolved for 72 hours; implementation of a no-bare-hand-contact policy for ready-to-eat foods (including requiring handwashing before putting on gloves); monitoring for appropriate glove use and minimization of hand contact with foods these foods; and, training and review of handwashing with employees.

This was an outbreak of norovirus gastroenteritis associated with eating at the restaurant.

A specific food vehicle was not identified. Ill or recently ill food workers were likely the source of contamination. Likely transmission of norovirus among food workers was identified. Bare-hand contact with salad ingredients or other ready-to-eat foods likely contributed to transmission.

(41)

Suspected Norovirus Gastroenteritis Associated with a Restaurant

December

Hennepin County

On January 3, 2006, the Minnesota Department of Health (MDH) foodborne illness hotline received a complaint about a restaurant in Minneapolis. The complainant stated that two couples from two different households had eaten dinner together at the restaurant on the evening of December 20. Three of the four subsequently became ill with gastrointestinal symptoms. They reported no other common meals. At the restaurant, they had shared several types of sushi. MDH initiated an outbreak investigation in collaboration with an epidemiologist from Hennepin County Public Health Protection (HCPHP) and a sanitarian from the Minneapolis Division of Environmental Health (MDEH).

MDH staff interviewed the complainants about symptoms and food history. A case was defined as a person with vomiting or diarrhea (≥ 3 loose stools in a 24-hour period) after the meal at the restaurant. A stool sample was collected from one case and submitted to the MDH Public Health Laboratory for bacterial and viral testing. A sanitarian from MDEH went to the restaurant on January 4 to interview food workers and evaluate foodhandling practices.

Three of the four persons interviewed met the case definition. Two had diarrhea, two had vomiting, two had a fever, and one had cramps. No one reported bloody stools. The incubation periods from the meal at the restaurant were 29, 36, and 38 hours, respectively. The illness durations reported were 2 days, 2 days, and 12 days, respectively. None of the ill persons reported seeking medical attention. The stool sample submitted by one case to MDH was negative for enteric bacteria and for norovirus; however, this sample was collected over 10 days after the case began experiencing symptoms.

Fourteen of the 25 restaurant employees were interviewed by MDEH. One of them reported vomiting on December 18, which was 2 days before the complainants' meal date. The restaurant employee attributed the vomiting to excessive drinking. The restaurant did not have an employee illness log and was advised to keep such a log in the future.

This was a foodborne outbreak associated with a restaurant. The symptoms and incubation periods were consistent with norovirus gastroenteritis. The source of the outbreak at the restaurant was not determined. Ill food workers were a possible source of viral contamination, but not all of the restaurant's food workers were interviewed.

PROBABLE FOODBORNE OUTBREAKS

(1)

Suspected Bacterial Intoxications Probably Associated with a Restaurant

January

Hennepin County

On January 11, 2005 the Minneapolis Division of Environmental Health (MDEH) received a report of illness among a group of four persons that dined at a restaurant in Minneapolis on January 10. The Hennepin County Human Services and Public Health Department (HSPHD) and the Minnesota Department of Health (MDH) were subsequently notified.

Epidemiologists from HSPHD conducted phone interviews of group members to assess illness history and foods/beverages that were consumed at the restaurant. A case was defined as an individual who dined at the restaurant on January 10 and subsequently became ill with vomiting and/or diarrhea (≥ 3 loose stools in a 24-hour period).

A MDEH sanitarian visited the restaurant to evaluate food preparation procedures, employee health, and environmental conditions. Stool kits were delivered to two patrons; however, none were returned for testing.

Three of the four patrons were interviewed; all three met the case definition. All three cases reported diarrhea and abdominal cramps; none reported vomiting. The median incubation period was 8 hours (range, 8 to 8.5 hours). The duration of illness for all cases was less than 24 hours.

Since there were no controls, no single food item was significantly associated with illness; however, there were common foods that were shared among the group, including bread, butter, and lobster tails. The group had not been together for at least a week prior.

A MDEH sanitarian inspected the restaurant on January 11, 2005. No other complaints had been received. One hundred seventy-two people had dined at this establishment the evening of January 10 and seven lobster tails were sold. No employees had reported illness.

Since lobster tails were a common food item among the group, the preparation process for the lobster tail was discussed in detail. The tails are received frozen from the restaurant's distributor. The lobster tails are generally thawed in a cooler over night or in a sink under running water and then stored in a walk-in cooler. The lobsters are cut and shelled and then steamed to approximately 170° F. Next they are browned on a broiler, buttered and seasoned, and then plated with parsley and lemon. Hot butter, in individual dishes, also is served with the lobster. Generally the waiter cuts up the lobster, although the patrons may have done this themselves.

A critical temperature violation was identified with regard to the lobsters. Three lobsters are put on display carts at approximately 5:30 p.m. and used during the night for display to the tables. These lobsters sit on the carts at room temperature until approximately 8:30 p.m. These display lobsters are the first to be served the following evening.

This was a probable outbreak of foodborne bacterial intoxications among patrons of a Minneapolis restaurant. The etiologic agent was not identified, but the incubation and clinical signs and symptoms were characteristic of *Clostridium perfringens*. The vehicle was not identified; however, illness may have been associated with consumption of lobster tails. This group of four dined early in the evening and may have been served lobster tails that were used for display the prior evening; this could not be confirmed.

MDEH required that the practice of serving lobsters that were displayed the night before be changed immediately. The restaurant will keep lobsters on ice on the carts, and the display lobsters will be cooked as orders come in.

(2)

Gastroenteritis Probably Associated with a Restaurant

February

Hennepin County

On February 25, 2005, City of Bloomington Environmental Health (CBEH) received a foodborne illness complaint regarding a group of people that dined together at a restaurant in Bloomington on February 11. The complaint stated that two out of the seven people in the group had experienced gastrointestinal symptoms after eating at the restaurant. The members of the party had shared sea bass and appetizer platters that included crab dip, bread, marinated steak, and prawns. CBEH initiated an outbreak investigation.

CBEH staff interviewed attendees about food consumption and illness history using a standard questionnaire. A case was defined as any person who ate at the restaurant on February 11 and subsequently developed vomiting and/or diarrhea (≥ 3 loose stools in a 24-hour period). One stool specimen was collected and submitted to the Minnesota Department of Health (MDH) Public Health laboratory for testing. CBEH staff conducted an environmental health investigation at the restaurant to determine if there were any foodhandling problems

The two ill persons from the complaint were interviewed, and both met the case definition. One case (case #1) had onset of diarrhea, cramps, and a slight fever approximately 3.5 days after the meal. The duration of illness was 10 days. The other case (case #2) had onset of the same symptoms approximately 2 days after the meal, and reported an illness duration of 6 days. Neither case reported bloody stools. Neither case sought medical attention. Both cases reported no other common meals other than at the restaurant.

The stool sample collected from case #1 was tested at MDH and was negative for norovirus, parasites, and enteric bacteria. A DNA sweep of the bacterial stool culture plate was positive for Shiga toxin 1 by polymerase chain reaction. Further testing by MDH and the Centers for Disease Control and Prevention identified an isolate of Shiga toxin-producing *E. coli* O117:H7.

No non-ill people could be interviewed, so no food items could be statistically associated with illness. CBEH staff did not note any foodhandling problems at the restaurant. The restaurant did not use non-intact/injected steak products that have been found in the past to be a source of *E. coli* O157.

This was a probable foodborne outbreak of gastroenteritis, likely caused by Shiga toxin-producing *E. coli*, associated with a restaurant. Due to the small number of persons interviewed and the fact that the positive laboratory finding was limited to one case, the link between the restaurant and the illnesses could not be confirmed. However, the symptoms, incubations, and durations of both the laboratory-confirmed case and the other case were compatible with a Shiga toxin-producing *E. coli*.

(3)

Suspected Bacterial Intoxications Probably Associated with a Brunch Buffet

March

Rice County

On Monday, March 28, 2005, a food service manager at a college in Northfield received a foodborne illness complaint and notified a sanitarian from the Minnesota Department of Health (MDH) Mankato District Office Southeastern District office. A party of four persons from two separate households had contacted the college to report that three of them had developed gastrointestinal illness symptoms after eating at an Easter brunch buffet on Sunday, March 27. The sanitarian notified the MDH Acute Investigation and Control Section and an investigation was initiated.

Food service staff at the college took symptom information and a food history when the complainants called them. The complainants declined to be re-interviewed by MDH staff. A case was defined as a person with vomiting or diarrhea (≥ 3 loose stools in a 24-hour period) after the meal. No food or stool samples were collected.

Based on the information taken by the food service manager, three of the four persons in the party met the case definition. All three had diarrhea and one also had cramps. Incubation periods were 2.5, 7.5, and 8 hours. Durations of symptoms were 1, 13, and 15 hours. The party had drunk champagne at a private home before the Easter brunch. Foods served at the buffet included salads, smoked salmon, cheese, sliced fresh fruit, ham, shrimp, vegetables, potatoes, and dessert.

The food service manager estimated that 250 people had eaten at the buffet on March 27. They had not received any additional complaints from patrons. The sanitarian reviewed proper foodhandling practices specific to buffets including proper time and temperature parameters.

This was a probable foodborne outbreak of a suspected bacterial foodborne intoxication associated with a brunch buffet. The fact that the ill persons were from two separate households and denied any other common meals suggested a link to the buffet. However, due to the lack of additional cases, other sources of the reported symptoms could not be ruled out.

(4)

Norovirus Gastroenteritis Probably Associated with a Restaurant

April

Hennepin County

On Tuesday, April 12, 2005, the Minnesota Department of Health (MDH) notified the City of Bloomington Environmental Health (CBEH) of three cases of gastrointestinal illness in a group that had hosted a private gathering with pizza from a restaurant in Bloomington on March 26. The complainant reported that several additional attendees had become ill after the event. The pizzas (cheese, Hawaiian, pepperoni, sausage) purchased just before the event were cooked at the host's home. Other food items consumed at the gathering included salad, cupcakes, fruit, ice cream and refreshments. CBEH initiated an outbreak investigation.

On April 14, the host provided CBEH staff with a menu and the names and phone numbers of the attendees. CBEH staff interviewed attendees about food consumption and illness history using a standard questionnaire. A case was defined as any person who attended the private gathering and subsequently developed vomiting and/or diarrhea (≥ 3 loose stools in a 24-hour period). No stool specimens were delivered for testing at MDH given the length of time since illness recovery.

On April 12, CBEH staff conducted an environmental health investigation at the restaurant in Bloomington. CBEH staff were unable to obtain names of other persons who had purchased pizza on March 26.

Eight of 12 attendees were interviewed, and seven (87%) met the case definition. One attendee reported mild illness symptoms that did not meet the case definition. Four attendees could not be contacted despite several attempts. All seven cases reported vomiting, two (28%) reported fever, and one (14%) reported diarrhea or cramps. No cases reported bloody stools and none were hospitalized. The median incubation period was 34.5 hours (range, 25.5 to 49.5 hours). The median duration of illness was 2 hours (range, 0.5 to 36 hours).

No non-ill people could be interviewed, so no food items were significantly associated with illness. All attendees interviewed did consume pizza, as well as other foods. The manager of the restaurant denied any illness in food employees the week prior to the event. However, individual employees were not interviewed. No critical food safety violation was detected during the environmental health investigation.

This was an outbreak of gastrointestinal illness associated with a private gathering. Most of the clinical features of the outbreak were characteristic of viral gastroenteritis; however, illness durations were very short in many cases. The source of contamination and mode of transmission could not be determined.

(5)

Norovirus Gastroenteritis Probably Associated with a Restaurant

April

Anoka County

On April 6, 2005, Anoka County Community Health and Environmental Services (ACCHES) received a foodborne illness complaint about a restaurant in Columbia Heights. A party of four persons, who were relatives but lived in two separate households, reported that all of them had developed gastrointestinal symptoms after eating a takeout meal from the restaurant on April 2. The meal consisted of chicken, mashed potatoes, gravy, macaroni and cheese, coleslaw, and biscuits. The four persons denied any other common meals. ACCHES notified the Minnesota Department of Health (MDH) Acute Investigation and Control Section and an investigation was initiated.

MDH epidemiologists interviewed all four persons about food consumption and illness history. A case was defined as a person with vomiting or diarrhea (≥ 3 loose stools in a 24-hour period) after the meal. Stool kits were sent to all four cases. Three cases (from two separate households) returned stool samples to MDH for bacterial and viral testing.

All four persons met the case definition. All reported diarrhea, vomiting, and cramps. None of the four reported fever or bloody stools. The incubation periods from the restaurant meal were 17 hours, 22.5 hours, 30 hours, and 30 hours. Durations of illness were 1 to 2 days. None of the cases reported seeking medical attention. All three of the cases (representing two separate households) that submitted stools to MDH were positive for norovirus. All three cases had identical genetic sequences of norovirus.

ACCHES staff talked to the restaurant manager, who denied any recently ill employees or other complaints.

This was a probable foodborne outbreak of norovirus associated with a restaurant. The fact that the ill persons were from two separate households and denied any other common meals suggested a link to the restaurant. However, there was information suggesting that there may have been an ill child present at the time that the cases shared the meal from the restaurant. Therefore, a non-foodborne source of infection could not be conclusively ruled out.

(6)

Norovirus Gastroenteritis Probably Associated with a Restaurant

April

Hennepin County

On April 13, 2005, an individual called Hennepin County Public Health Protection (HCPHP) to report a suspect foodborne illness. The complainant stated that seven of 12 people in her party were ill, but was unwilling to give contact information for her companions. The party ate lunch on April 6 at a fast food restaurant in Eden Prairie. The complainant reported no other common exposures among the group. The Minnesota Department of Health (MDH) was subsequently notified and an investigation was initiated.

On April 13, a HCPHP sanitarian inspected the restaurant, focusing on food preparation practices and employee health and hygiene. The complainant was asked to have other party members call the HCPHP epidemiologist, so they could be interviewed about food/beverage consumption and illness history. A case was defined as a person who ate at the restaurant on April 6 and subsequently became ill with vomiting or diarrhea (≥ 3 loose stools in a 24-hour period). Two stool specimens were collected from patrons and submitted to MDH for bacterial and viral testing.

Of the 12 people reported to have eaten together at the restaurant on April 6, seven were interviewed. Among those interviewed, five (71%) met the case definition. Three of the group members had gastrointestinal illness in the household within the three weeks prior to April 6; however, specific onset dates were not obtained since these group members did not wish to be interviewed. The cases were two adult females and three children (age range, 5 to 9 years). Of the five cases, all had vomiting, four (80%) had cramps, three (60%) had diarrhea, and one (20%) had fever. The median incubation was 38 hours (range, 27 to 55 hours). The median duration of illness was 43 hours (range, 13 to 62.5 hours). Both stool specimens tested positive for norovirus. Nucleic acid sequences of the two viruses were identical. Both specimens were negative for *Campylobacter*, *E. coli* O157:H7, *Salmonella*, *Shigella*, and *Yersinia*.

Cases ate a variety of food items including chicken salad, chicken caesar salad, chicken nuggets, hamburger, fries, apple slices with caramel sauce, milk, chocolate milk, water with ice, and soda with ice.

On inspection, the employee illness log did not show any employee illnesses reported from March 31 through April 6. Eight of 10 food service employees that worked on April 6 were interviewed regarding illness history during the week of March 31 through April 6.

Inspection of the facility revealed poor hand washing practices. The hand wash sink closest to the grill area and the salad prep table did not have soap in the dispenser or a fingernail brush. The temperature of the water at the sink indicated it had not been used recently. In the grill area, bare hand contact was noted while preparing (adding cheese, lettuce, pickles, condiments to sandwiches) and wrapping sandwiches and burgers. An unopened package of cheese, tested at 70°F, was found sitting on a shelf below the prep table and was discarded at the time of inspection. Packages of grated cheese were found without date labels in the walk-in cooler. The pop machine spigots and ice chutes at the customer self-service area were found soiled with a mold/slime build-up.

This was an outbreak of norovirus gastroenteritis associated with a restaurant. Bare-hand contact of food items and inadequate hand washing were observed during the inspection. The source of the outbreak may have been ill food workers, with transmission occurring through contamination of ready-to-eat food items; however, no employees reported being ill. Furthermore, there was evidence that some group members were ill prior to dining at the restaurant and also may have

been the source of the outbreak. The establishment was instructed to stock the hand-washing sink with soap and a nailbrush and to ensure appropriate hand hygiene for food handlers.

(7)

Suspected Bacterial Intoxications Probably Associated with a Restaurant

May

Hennepin County

On May 12, 2005, the Minnesota Department of Health (MDH) foodborne illness hotline received a call reporting a suspected foodborne illness stemming from a meal at a restaurant in Minneapolis. The complainant stated that he and his companion become ill after sharing a common meal on May 11. Hennepin County Public Health Protection (HCPHP) and Minneapolis Division of Environmental Health (MDEH) were subsequently notified and an investigation was initiated.

On May 12, MDEH sanitarians inspected the restaurant, focusing on food preparation practices and employee health and hygiene. A HCPHP epidemiologist interviewed the second person in the party about food consumption and illness history using a standard questionnaire. The restaurant provided a list of five additional patrons who also dined on May 11. A case was defined as a person who ate at the restaurant on May 11 and subsequently became ill with vomiting and/or diarrhea (≥ 3 loose stools in a 24-hour period). No stool specimens were obtained for testing.

The cases were two adult males (54 and 83 years old). Both had diarrhea and cramps. One reported blood in his stool. Neither case had vomiting or fever. Incubations were 13.5 and 16 hours. One case reported a duration of illness of 32.5 hours; the other case was still experiencing symptoms at the time of the interview. Both cases ate lentil soup and baked chicken with lemon sauce. One case drank decaf coffee and the other drank water. Interviews with patrons who also dined on May 11 yielded no additional cases.

No employees reported illness in the week prior to the meal in question. The head chef and the two owners who worked the lunch shift on May 11 were interviewed. There were no reports of vomiting or loose stools among those three persons. Three additional employees who did not work the lunch shift on May 11 were also interviewed and did not report any illness. On May 11, the head chef ate the lentil soup and baked chicken with lemon sauce. Both owners also ate the lentil soup that day. None of the employees who ate the food reported subsequent illness.

Preparation and handling of foods, including the lentil soup, chicken and lemon sauce were discussed. The cooling and reheating procedures described by the chef were satisfactory to the regulatory authority. The lentil soup was prepared the same day as the meal; however, the procedures could not be confirmed by observation during the environmental health assessment visit. Past inspection records did not identify any cooling, reheating or hot holding issues. Hot holding of lentil soup and lemon sauce were confirmed to be $>170^{\circ}$ F. The kitchen inspection did not identify any critical issues that could have contributed to these reported illnesses.

Management stated that about 100 customers were served the lentil soup on May 11. The restaurant did not receive any other customer complaints.

This was a probable outbreak of gastroenteritis associated with a restaurant. There were not enough data to conduct statistical analyses on food items consumed. The symptoms and incubations were consistent with a foodborne bacterial intoxication, such as that caused by *Clostridium perfringens*.

(8)

Suspected Norovirus Gastroenteritis Probably Associated with a Restaurant

September

Dakota County

On September 6, 2005, the Minnesota Department of Health (MDH) received a complaint of eight cases of gastrointestinal illness in a group of co-workers who had eaten pizza from a restaurant in Farmington on September 2. No other foods were eaten during this meal. Each individual brought beverages for personal consumption. MDH initiated an outbreak investigation.

The original complainant provided MDH staff with meal information and the names and phone numbers of the co-workers who ate the pizza. MDH staff interviewed attendees about food consumption and illness history using a standard questionnaire. A case was defined as any person who ate the pizza and subsequently developed vomiting and/or diarrhea (≥ 3 loose stools in a 24-hour period). Stool kits were delivered to the complainants' workplace, but no samples were returned to MDH for testing.

On September 7, MDH staff conducted an environmental health investigation at the restaurant. Employees were interviewed about any illness since August 1. MDH staff were able to get credit card receipts for 15 patrons who dined at the restaurant on September 2.

In addition to the original complainant group, one additional patron of the restaurant was reached. This person was not ill. Of the complainant group, all eight were interviewed, and seven (88%) met the case definition. One co-worker reported mild illness symptoms that did not meet the case definition. Additional patrons from credit card receipts could not be contacted despite several attempts. Receipts only listed signatures of the patron without a printed name; therefore, several names could not be deciphered.

Six (86%) cases reported vomiting, five (71%) reported diarrhea, four (57%) reported cramps, and four (57%) reported fever. No cases reported bloody stools and none were hospitalized. The median incubation period was 33 hours (range, 17 to 44 hours). The median duration of illness was 40 hours (range, 26 to 54 hours). The case with the earliest onset also has irritable bowel syndrome and could not pinpoint the exact time of worsening symptoms.

Only one non-ill person was interviewed, so a meaningful case-control analysis could not be conducted. All patrons interviewed consumed pizza, but no other foods. All cases consumed the same type of pizza (pepperoni, sausage, and cheese).

The manager of the restaurant denied any illness in food employees during the week prior to the event. All employees were interviewed. Only one employee reported some ongoing diarrheal symptoms due to chemotherapy. No other employees reported illness. The restaurant did not

have an employee illness log. Employees have bare hand contact with ready-to-eat foods (such as hoagies), but no bare hand contact with pizzas (no hand contact was observed during the transfer of pizza to boxes or during cutting of pizzas). No toppings are added to pizzas after they come out of the oven.

This was a probable outbreak of norovirus gastroenteritis associated with a restaurant. The source of contamination and mode of transmission were not determined.

(9)

Norovirus Gastroenteritis Probably Associated with a School Cafeteria

September

Scott County

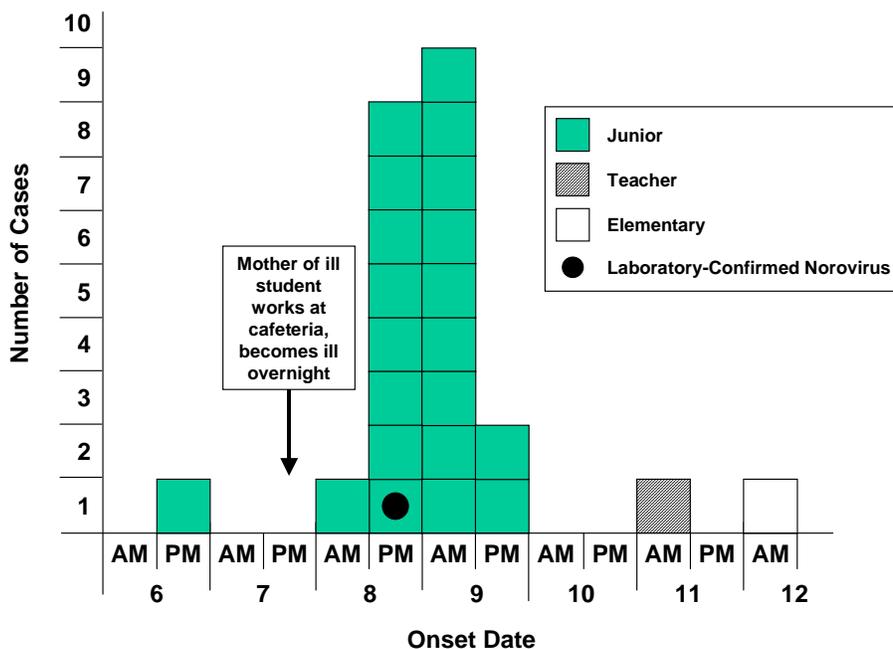
On September 9, 2005 the Minnesota Department of Health (MDH) received a report concerning an increase in absenteeism at a junior high school in Scott County. Regular absenteeism is less than five students each day; the district nurse indicated that approximately 10% of the student body (229 students) was absent on September 9, with a large proportion reporting gastrointestinal symptoms.

Epidemiologists from MDH conducted phone surveys of the students to obtain information on consumption of foods/beverages and illness history. A case was defined as an individual who became ill with vomiting or diarrhea (≥ 3 loose stools in 24-hour period) during September 6-9. A sanitarian from MDH visited the school cafeteria to evaluate food preparation and handling procedures and to interview cafeteria workers regarding recent illness. One stool sample was collected from a student and submitted to MDH for bacterial and viral testing.

Of the 73 students and one teacher interviewed, 28 (38%) met the case definition. Six other students reported gastrointestinal symptoms that did not meet the case definition; these students were excluded from the analysis. Twenty-three of 26 cases (88%) had vomiting, 18 of 27 (67%) had cramps, 11 of 28 (39%) had fever, and 10 of 26 (38%) had diarrhea. Incubation periods could not be calculated as multiple meals were served to the students. The median duration of illness was 44 hours (range, 10 to 72 hours). Twenty-four cases (86%) were among grades 7-9 at the junior high. The stool sample from the student (grade 7) was positive for norovirus.

No single food item was significantly associated with illness. The students may choose from the "hot lunch" or a number of "ala carte" items (nachos, pizza, cookies, etc.). The "ala carte" foods are mainly self-serve and generally do not have utensils. Consuming foods from the cafeteria vs. the student bringing their lunch from home was not associated with illness. Furthermore extracurricular activities such as football, tennis, and volleyball were not associated with illness. One teacher indicated candy was brought for the entire class during the week of illness; however, each candy piece was individually wrapped.

Gastroenteritis Cases at a Junior High School, by Illness Onset Date, September 2005



Nine cafeteria workers were interviewed regarding recent illness. One food worker reported an onset of vomiting on September 8. This food worker reported only working September 6 and 7; job duties include cashiering and cooking pizzas. This food worker also had an ill household member who attends the junior high school; the student reported an onset of vomiting on September 6.

Anecdotal reports indicated two establishments near the school were popular hangouts for the students; available foods included sandwiches, slushies, and desserts. Food workers from one establishment were interviewed regarding recent illness; no ill food workers were identified. No complaints regarding either facility were noted.

This was an outbreak of norovirus gastroenteritis associated with the school cafeteria at a junior high. The vehicle of transmission was not identified. Given the distribution of cases, the data suggest the source of illness may have been the ill student with onset on September 6 or the mother who worked in the school cafeteria; however, this could not be confirmed. Self-service among the students may have facilitated the outbreak.

(10)

Suspected *Clostridium perfringens* Intoxications Probably Associated with a Restaurant

September

Olmsted County

On October 6, 2005, Olmsted County Public Health Services (OCPHS) received a complaint of illness from the manager of a restaurant in Rochester; three of four patrons had become ill after eating at the restaurant on September 29. The complainant reported that they had no other recent

common exposures. OCPHS notified the Minnesota Department of Health (MDH) and an investigation was initiated.

OCPHS staff obtained illness and food consumption histories from the three ill members of the party, but were unable to obtain information directly from the other person. A patron list was not available from the restaurant due to the length of time since the suspect meal. A case was defined as a person who ate at the restaurant on September 29 and subsequently became ill with diarrhea (≥ 3 loose stools in a 24-hour period) and abdominal cramping.

On October 7, an OCPHS sanitarian conducted an assessment of the food preparation practices and interviewed food workers at the restaurant. No foods were leftover from the suspect meal date.

All three ill persons interviewed met the case definition. All had diarrhea and cramps and none had a fever, vomiting, or bloody stools. The median incubation from the meal time to the onset of diarrhea was 14 hours (range, 11 to 24 hours). The median duration was 40 hours (range, 22 to 58 hours).

All three cases ate the mushroom/Swiss burger, and two of the three cases also ate nachos supreme (including ground beef and other toppings).

An assessment was conducted on October 7 to review food flows and food preparation practices, with a special focus on the taco meat and mushroom Swiss burgers, as these were common foods eaten among the ill persons. Final temperatures in the heating of the taco meat and hamburger patties were not taken. Cooling and reheating temperatures for the taco meat used for nachos were not monitored.

The symptoms, incubation period, and duration of illnesses are consistent with *Clostridium perfringens* as the cause of this outbreak. The exact source of the outbreak was unclear. The advance preparation of large batches of taco meat used for the nachos supreme had the potential for *C. perfringens* amplification. However, not all three cases reported eating the nachos supreme. A separate cooling study conducted at a follow-up assessment identified that the cooling of the taco meat was within the parameters of the Minnesota Food Code.

(11)

Gastroenteritis Associated with Catered Workplace Events

October

Hennepin County

On October 20, 2005, the Minnesota Department of Health (MDH) foodborne illness hotline received a report concerning illness among a group of employees at a medical clinic in Minneapolis following a lunch catered on October 19 from a restaurant in Minneapolis (Restaurant A). The foods were delivered from a local catering company that purchases foods from various local restaurants. The clinic also had a lunch from the same catering company on October 17 from a different restaurant in Minneapolis (Restaurant B). Hennepin County Public

Health Department (HCPHD) and environmentalists from the City of Minneapolis were subsequently notified of the complaint.

Epidemiologists from HCPHD obtained a list of employees at the clinic and conducted phone interviews to obtain information on consumption of foods/beverages and illness history. A case was defined as a clinic employee who developed vomiting or diarrhea (≥ 3 loose stools in 24 hours) following one of the two catered meals (October 17 and 19). A stool kit was collected from one clinic employee and submitted to MDH for bacterial and viral testing.

Environmentalists from the City of Minneapolis inspected kitchens in both Restaurant A and Restaurant B, and interviewed employees about job duties, food consumption, and illness history from October 12, 2005 using a standard restaurant employee questionnaire. Food samples were collected and tested at the City of Minneapolis microbiology laboratory.

Of the 15 clinic employees interviewed, five (33%) met the case definition. All five cases had diarrhea and cramps, one (20%) had vomiting, and one (20%) had fever. One employee reported gastrointestinal symptoms that did not meet the case definition; this employee was excluded from the analysis. All five cases ate the catered meal on October 19, whereas only one of the five cases attended the October 17 meal. No common foods items among the clinic employees were documented on October 18. The median incubation period for the lunch on October 19 was 3 hours (range, 1 to 17 hours). The median duration of illness was 11 hours (range, 9 to 21 hours); however, two cases were still ill at the time of the interview. The stool sample submitted to MDH was positive for norovirus.

Lunch on October 19 was a “make your own fajita” meal with a variety of food items, including beef, chicken, sautéed peppers, rice, beans, cheese, onions, sour cream, guacamole and tortillas. A statistical association between eating lunch on October 19 and illness could not be made since everyone interviewed ate that day. No specific food was significant associated with illness.

No food workers reported any illness since October 12. During the inspection of Restaurant A, the sanitarian reported multiple temperature violations. None of the food samples tested by the City of Minneapolis yielded any pathogenic organisms; however, the foods tested were collected days after the catered lunch on October 19.

This was an outbreak of gastrointestinal illness among a group of co-workers. The data are insufficient for a definitive conclusion on the source for this outbreak. The vehicle and transmission route was not determined from the investigation. The incubation and clinical signs were most compatible with a foodborne intoxication outbreak; however, this assessment is weakened by the laboratory-confirmation of norovirus among one case.

(12)

Gastroenteritis Probably Associated with a Restaurant

December

Hennepin County

On December 19, 2005, the Minnesota Department of Health (MDH) foodborne illness hotline received a report that three of six patrons experienced gastrointestinal illness following a dinner

together at a restaurant in Minneapolis on December 15. MDH contacted Hennepin County Public Health Protection (HCPHP) and the Minneapolis Division of Environmental Health (MDEH), and an investigation was initiated immediately.

On December 20 and 22, a MDEH sanitarian inspected the facility focusing on food preparation practices and temperature control. The sanitarian requested a list of additional patrons who had dined on December 15, and restaurant management complied by providing a reservations list. Hennepin County epidemiologists interviewed the remaining party members from the original complaint and attempted to reach additional patrons from the reservation list. Patrons were interviewed about their food consumption and illness histories using a standard questionnaire. A case was defined as a person who ate at the restaurant on December 15 and subsequently became ill with vomiting and/or diarrhea (≥ 3 loose stools in a 24-hour period). Stool samples were requested from those who had recently recovered from gastrointestinal illness.

Two of the six patrons from the original complaint met the case definition. An additional 32 patrons were reached off of the reservations list (representing parties that represented a total of 149 patrons). Three of these 32 patrons met the case definition. Of the five total cases, all reported diarrhea, four (80%) reported abdominal cramps, three (60%) reported vomiting, one (20%) reported fever, and one (20%) reported blood in the stool. The median incubation period was 4 hours (range, 3 to 8 hours). The median duration of illness was 30 hours (range, 19.5 to 59.5 hours).

Main entrees were ordered individually, while other foods (including mashed potatoes, asparagus, bacon, mushrooms, and bread) were served family-style and passed among the attendees. No food items were statistically associated with illness.

Three stool samples submitted by patrons (within 5 days of onset of illness) to the MDH laboratory were all negative for bacterial enteric pathogens, toxins, and norovirus.

The environmental inspection conducted by MDEH focused on foods that were eaten by the original complainants, including the procedure for using time as a public health control for sauces. The protocol for Hollandaise sauce, in particular, noted that the sauce was held at 120 degrees F for 5 hours and then discarded. Restaurant management was advised that the food code states that the maximum time food can be held is 4 hours before discarding. The restaurant has changed their protocol to meet food code standards. There were 375 diners served at the restaurant on December 15, and the restaurant did not receive any additional complaints.

This was a probable outbreak of foodborne bacterial intoxications. The incubation periods and reported signs and symptoms were compatible with intoxications caused by *Staphylococcus aureus* or the emetic form of *Bacillus cereus*. However, because the complaint occurred 4 days after illness onsets, stool samples could not be collected in time to detect these pathogens. The source of the outbreak was not identified.

(13)

Norovirus Gastroenteritis Probably Associated with a Restaurant

December

Blue Earth County

On December 19, 2005, a pharmaceutical representative contacted the Minnesota Department of Health (MDH) foodborne illness hotline to report gastrointestinal symptoms. The caller stated that on December 16, he and approximately 20 medical clinic employees had eaten food brought to the clinic from a restaurant in Mankato. The pharmaceutical representative and at least two clinic employees developed gastrointestinal symptoms after the meal. The food was served at a clinic meeting in box lunch form and included beef or turkey sandwiches, chips, and cookies. An outbreak investigation was initiated in collaboration with the MDH Environmental Health Services Section.

The pharmaceutical representative provided MDH with the clinic sign in sheet for the luncheon. The clinic provided MDH epidemiologists with a roster of clinic employees and phone numbers. Clinic employees were interviewed by phone about food consumption, other shared exposures, and illness history using a standard form. A case was defined as a person with vomiting or diarrhea (≥ 3 loose stools in a 24-hour period) after eating the meal on December 16. Two ill luncheon attendees submitted stools to MDH for bacterial and viral testing.

MDH sanitarians went to the restaurant on December 20 to evaluate food handling practices, interview food workers about gastrointestinal illness, and to collect more information on the suspect meal.

Twenty-one luncheon attendees were interviewed. Three (14%) met the case definition. All cases had diarrhea and vomiting, two (67%) had cramping, and one (33%) reported fever. The median incubation period was 8 hours (range, 5 to 9 hours). All of the cases were still experiencing symptoms at the time they were interviewed.

Two stool samples were collected, and both tested positive for norovirus. Nucleic acid sequencing was conducted on positive norovirus samples from the two positive cases; the sequences from both specimens were identical.

No foods were statistically associated with illness.

Thirty-seven (73%) out of 53 food workers were interviewed, including all seven of those that worked on December 16. One food worker that worked on December 16 admitted to having gastrointestinal symptoms in the week prior.

An environmental assessment of the restaurant was conducted on December 20, and no other complaints had been received. The ill employee had not reported the illness to restaurant management.

This was a probable outbreak of norovirus gastroenteritis associated with a restaurant in Mankato. The pharmaceutical representative had nothing else in common with clinic staff, and

the norovirus sequence retrieved from this sample matched a sample submitted by a clinic staff person. Although the number of cases was small and the incubation period for norovirus is generally not this short, the identical norovirus sequences suggest that this was an outbreak. A specific food vehicle was not identified. The presence of an ill food worker at the establishment supports contamination by the employee as the cause of the outbreak. The establishment has been instructed on the importance of excluding ill food workers from work and hand washing.

**CONFIRMED WATERBORNE OUTBREAKS
(RECREATIONAL WATER)**

(1)

Gastroenteritis Associated with a Swimming Pool

May

Hennepin County

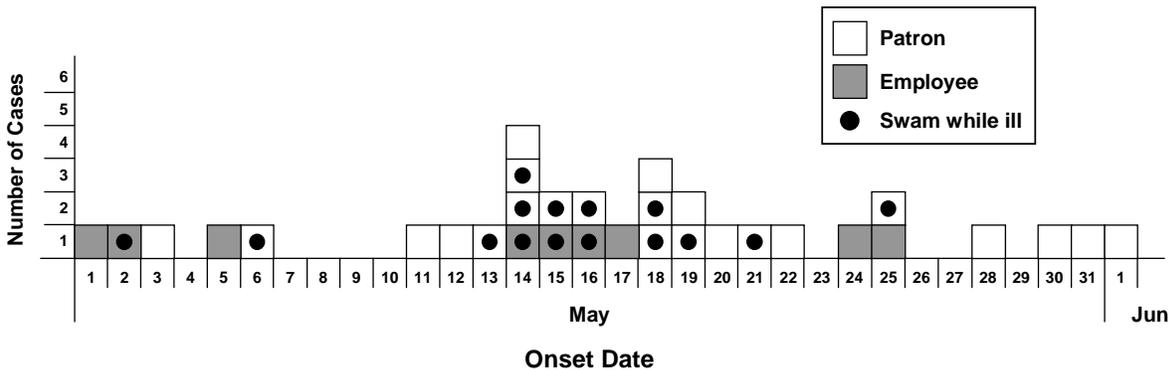
On May 24, 2005 the assistant sanitarian of the City of Edina called the Minnesota Department of Health (MDH) to report gastrointestinal illness among five pool employees of a fitness facility in Edina. The sanitarian had been told of at least one vomiting incident in the pool on May 1. Epidemiologists from MDH consulted with sanitarians from the City of Edina and initiated an investigation on May 25.

On May 25, the facility provided epidemiologists with lists of pool employees who worked at the facility during the month of May. MDH interviewed all facility employees about illness, water contact, food consumption, and other activities. Upon request from MDH, the facility provided lists of children and adults that attended swimming lessons during May. Epidemiologists from MDH interviewed patrons about swimming dates, times, and activities. A case was defined as a patron or employee with onset of vomiting or diarrhea (≥ 3 loose stools in a 24-hour period) after swimming at the facility during May. Ill persons were advised not to enter any recreational water until at least 2 weeks after they recovered.

Sanitarians from the City of Edina visited the facility multiple times between May 24 and June 3. Stool samples were collected from 10 cases and submitted to MDH for bacterial, viral, and parasitic testing.

Two hundred and twenty-three persons were interviewed, and 32 (14%), including nine employees and 23 patrons, met the case definition. Twenty-four of 32 (75%) cases had diarrhea, 13 of 27 (48%) had cramps, 15 of 32 (47%) had vomiting, and 12 of 32 (38%) reported having a fever with a median high temperature of 102° F (range, 101° F to 103° F). The median duration of illness was 2 days (range, 1 to 23 days). Onsets of illness occurred from May 1 to June 1 (see epidemic curve) and nine of 20 cases (45%) had an illness duration of ≥ 7 days. One (4%) of the cases was <1 year old, 11 (39%) were 1-4 years old, 10 (36%) were 5-19 years old, five (18%) were 20-49 years old, and one (4%) was >50 years old. The median incubation period could not be calculated due to the multiple potential exposures. None of the cases were hospitalized, but six cases saw their healthcare provider. Sixteen cases reported swimming in the pool while ill, including four employees.

Gastroenteritis Cases Associated with Swimming in a Pool, by Illness Onset Date



Several factors were statistically associated with illness in the univariate analysis, including using the hot tub (8 of 24 cases vs. 19 of 149 controls; odds ratio [OR], 2.61; 95% confidence interval [CI], 0.88 to 7.11; $p = 0.038$), swimming on May 10 (12 of 15 cases vs. 38 of 148 controls; OR, 3.39; 95% CI, 0.93 to 6.02; $p = 0.038$), and swimming on May 13 (5 of 22 cases vs. 5 of 138 controls; OR, 6.17; 95% CI, 1.31 to 29.3; $p = 0.002$). None of these variables remained independently associated with illness after being analyzed using a stepwise logistic regression model.

Ten stool specimens were collected from patrons. All ten specimens tested negative for *Campylobacter*, *Clostridium difficile*, *E. coli* O157, *Salmonella*, *Shigella*, *Yersinia*, *Cryptosporidium*, *Giardia*, norovirus, astrovirus, and adenovirus. Two out of 10 specimens tested positive for enteroaggregative *E. coli* (EaggEC) gene Eagg, and one specimen tested positive for the *E. coli* virulence gene eaeA. The two positive Eagg isolates were analyzed using pulsed-field gel electrophoresis and the patterns were not identical.

The large pool was shock treated according to CDC parasitic specifications three times between May 24 and June 3, and the two smaller pools were drained and cleaned. CDC signs were put up at the facility to remind people not to enter the pools until 2 weeks after they recovered from any gastrointestinal illness. In addition, pool employees screened those participating in swimming classes for a history of recent gastrointestinal illness before allowing them in the pool.

This was an outbreak of gastroenteritis associated with using recreational water facilities at an indoor swimming pool. The etiologic agent for the outbreak was not confirmed. Persons with diarrhea should not swim in recreational water for 2 weeks after their symptoms have stopped. Precautions taken to minimize fecal contamination of the water are the best methods to prevent waterborne outbreaks.

(2)

***E. coli* O157:H7 Infections Associated with a Swimming Beach**

June

Anoka County

On July 8, 2005 testing at the Minnesota Department of Health (MDH) indicated that *E. coli* O157:H7 isolates from four cases reported through routine surveillance were indistinguishable by pulsed-field gel electrophoresis (the subtype was designated MN409). By July 8, three of the four cases had been interviewed; all of the interviewed cases reported swimming at a beach in Anoka County during June 21-23. Anoka County Community Health & Environmental Services closed the beach on July 8.

Epidemiologists from MDH interviewed cases about exposures and illness history using a standard questionnaire. The interview also consisted of questions about swimming dates and activities, food and water consumed at the swimming beach, and attendance at a daycare or preschool. On July 8, MDH conducted an inspection of the beach and took water samples for testing.

On July 8, MDH issued a press release urging people who swam at the beach and later developed diarrheal illness to contact their health care provider. On July 8, MDH also sent out a health alert to clinics and hospitals serving the Anoka County area. The letter alerted healthcare providers to the outbreak and requested that they consider *E. coli* O157:H7 in patients who developed gastroenteritis after swimming at the beach in late June or early July.

All four cases reported swimming at the beach within 5 days prior to the onset of illness. The cases had no restaurants, food items, or other exposures in common. The cases were ages 2, 2, 3, and 13, and had onset of illness from June 22 to June 28. All four cases reported having diarrhea, three (75%) reported abdominal cramps, three (75%) reported bloody diarrhea, and three (75%) reported vomiting. The median duration of illness was 8 days (range, 2 to 10 days). Two (50%) cases were hospitalized for 2 and 3 days, respectively. None of the cases developed hemolytic uremic syndrome.

Inspection of the beach did not identify any sources of agricultural run-off contaminated by livestock. The results of water samples taken from the beach contained <4 colony-forming units of fecal coliforms per 100 ml, indicating no evidence of fecal contamination. The beach reopened on July 12.

This was an outbreak of *E. coli* O157:H7 infections among persons who swam at a beach during late June. The source of contamination was not identified. Therefore the most plausible source of contamination was a fecal accident by an infected person.

(3)

***Shigella sonnei* Infections Associated with a Swimming Beach**

July

Carver County

On July 12, 2005, a physician called the Minnesota Department of Health (MDH) to report that he had seen two siblings who were experiencing vomiting and bloody diarrhea. The physician suspected that swimming at a lake park in Carver County on July 9 was the source of their illness. On July 13, MDH received additional reports of illness from a family who had been swimming at the same beach with the two children from the original report. At that point, MDH initiated an investigation of the beach.

The complainants were interviewed to determine the source of their illness. Based on the information from the initial interviews, Carver County Parks closed the beach on the evening of July 13. Water samples were obtained from the swimming beach and the bathroom facilities on the morning of July 14. A press release and health alert were issued on July 14 to inform the public of the beach closure and to provide information to physicians regarding the nature of the illnesses. Carver County also posted the press release on their website and established a hotline to provide information to concerned citizens. A case was defined as a person who swam at the beach on July 9 and subsequently became ill with vomiting and/or diarrhea (≥ 3 loose stools in a 24-hour period) during the following 5 days.

There were 12 cases associated with the beach. All cases experienced diarrhea; 11 (92%) had cramping; 10 (83%) had a fever; six (50%) had vomiting; and three (25%) had bloody diarrhea. The median incubation period was 69.5 hours (range, 26 to 104 hours). Eight of the cases were still symptomatic at the time of their interviews; the four cases who had recovered at the time of their interview reported durations of illness ranging from 4 to 12 days (median, 6 days). Nine (75%) cases called or visited their healthcare provider; no cases were hospitalized. Cases reported swimming with their head under the water and ingesting the beach water.

Nine cases were tested for bacterial pathogens; seven cases tested positive for *Shigella sonnei*. The two cases that tested negative for *Shigella* and other bacterial pathogens collected their stool samples much later in their recovery period than the positive cases. Isolates from five of the confirmed cases were pulsed-field gel electrophoresis subtype SS361. One isolate was subtype SS360 and one was subtype SS384; these two subtypes were within 2 bands of SS361.

After the press release was issued on July 14, MDH and Carver County received numerous calls regarding the lake and the beach. The majority of calls came from residents of lakeshore homes who were concerned about other parts of the lake or had questions regarding the reopening of the beach. Several callers reported illness after swimming at other beaches on the lake; however, further questioning revealed that the reported symptoms were inconsistent with *Shigella* infections.

Water samples collected from the park on the morning of July 14 included eight samples from the beach and two samples from the handwashing sink in the men's restroom. Samples were tested for total coliforms, fecal coliforms, *E. coli* and enterococci. Samples results were

evaluated using the Environmental Protection Agency standard for *E. coli* at beaches of 235 cfu/100ml. All 10 samples were below the EPA standard. The beach was reopened on July 15 based on these water sample results.

The well serving the changing house, toilets, hand sinks, shower, and drinking fountain failed on the morning of July 9. The well was removed from service on July 9. The building housing the changing rooms, toilets, and hand sinks was closed on July 9 due to the lack of water. Three portable toilets were provided for beach-goers. The National Weather Service reported a high temperature of 92° F on July 9. Reports from Carver County Parks and case interviews indicated that the beach was heavily utilized on July 9.

This was an outbreak of *Shigella sonnei* infections associated with swimming in a lake beach. It is unclear how the beach water was initially contaminated; however, as *Shigella* is strictly a human pathogen, presumably the beach was contaminated by an ill beach-goer. The lack of changing facilities and handwashing sinks on July 9 likely contributed to the outbreak.

(4)

Norovirus Gastroenteritis Associated with a Swimming Beach

August

Ramsey County

On August 3, 2005, the Minnesota Department of Health (MDH) received reports of illness from a group of people who had been swimming at a beach in White Bear Lake on August 1. On the same day, MDH received a message from a physician reporting illness in several patients who had been swimming at the same beach. Ramsey County and the City of White Bear Lake were notified of the illnesses, and an investigation was initiated.

The complainants and reported patients were interviewed to determine potential sources of their illness. Based on the information from the initial interviews, the City of White Bear Lake closed the beach on August 4. Water samples were obtained from the swimming beach on the date of closure. A case was defined as a person who swam at the beach on August 1 and subsequently became ill with vomiting and/or diarrhea (≥ 3 loose stools in a 24-hour period). Stool specimens were obtained from ill beach-goers.

Eight cases associated with the beach were identified. These cases represented three different groups that swam at the beach on August 1. All cases experienced vomiting; four (50%) had cramping; two (25%) had diarrhea; and one (13%) had a fever. The median incubation period was 30.5 hours (range, 10.5 to 42 hours). The median duration of illness was 24.3 hours (range, 5.5 to 88 hours). One case was seen at an emergency department on August 2. Six stool specimens were tested for viral and bacterial pathogens; all six were positive for norovirus. Further laboratory analysis was conducted on three of the specimens; all three had identical nucleic acid sequences.

Five water samples were collected from the beach on August 4. Samples were tested for total coliforms, fecal coliforms, *E. coli* and enterococci. Samples results were evaluated using the Environmental Protection Agency (EPA) standard for *E. coli* at beaches of 235 cfu/100ml. All

five samples were below the EPA standard. The beach was reopened on August 5 based on these water sample results.

This was an outbreak of norovirus gastroenteritis associated with a swimming beach. It is unclear how the beach water was initially contaminated; however, as norovirus is a human pathogen, presumably the water was contaminated by an ill beachgoer.

**NON-FOODBORNE, NON-WATERBORNE OUTBREAKS:
AN OUTBREAK DUE TO ANIMAL CONTACT**

(1)

Salmonellosis Associated with Reptiles in a School

December

Washington County

From December 2005 to January 2006, four cases of *Salmonella* Typhimurium pulsed-field gel electrophoresis (PFGE) subtype TM606 were identified by the Minnesota Department of Health (MDH) Public Health Laboratory through routine surveillance. TM606 is an extremely uncommon PFGE subtype of *S. Typhimurium*. All of the cases resided in Washington County. During routine interviews, three of the cases reported attending a junior high school in Washington County, and one reported having a sibling at the school. Three cases reported observing or handling snakes in the science classroom at the school. An investigation was initiated on December 23. The MDH contacted the school and offered to do environmental and reptile sampling to culture for *Salmonella*.

All *S. Typhimurium* cases are interviewed about food consumption and other potential exposures as part of routine surveillance. Interviews of *S. Typhimurium* cases that are indistinguishable by PFGE are compared to identify potential common exposures. A case was defined as a Minnesota resident from whom *S. Typhimurium* TM606 was isolated since December 1, 2005 and had an epidemiological link to Stillwater Junior High School. PFGE subtyping was performed on human samples, environmental samples, feed mice samples, and reptile samples.

On March 6, 2006 two MDH epidemiologists collected six environmental and stool samples from the two snakes kept in the science classroom at the school. Seven frozen vacuum-packed feed mice were collected from 4 separate bags. The school principal and science teacher were interviewed about husbandry practices and management of reptiles, handwashing, and student contact with the reptiles. Measures were recommended to prevent zoonotic transmission of *Salmonella*.

The four cases described above were the only cases identified (Table 1).

Table 1. Human *S. Typhimurium* TM606 Case Demographics and Clinical Symptoms

Case No.	Age (years)	Direct Contact with Snake?	Illness Onset Date	Vomiting	Diarrhea (maximum # stools/24 hrs)	Blood in Stools	Duration of Diarrhea (days)	Fever (highest temp.)
1	13	No	12/2/05	Yes	Yes (3)	Yes	9	No
2	12	Yes	12/2/05	No	Yes (20)	No	14	Yes (104° F)
3	9	No	1/11/06	Yes	Yes (24)	Yes	7	Yes (99° F)
4	13	Yes	1/29/06	No	Yes (20)	Yes	5	Yes (unk)

The science classroom was set up with a long lab table lining the back wall of the room. On the table two snakes, a ball python and a fox snake, were housed in separate terrariums. Directly in front of the snakes' terrariums was a large island counter where classroom supplies including paper, assignments, and writing utensils were placed. Desks were centered in the room, and some of them were just a few feet from the island counter space. The classroom also had a sink which had debris accumulated in the bottom. The teacher was interviewed and did not know that snakes can carry *Salmonella*. He was also interviewed about hand-washing practices and said he did not wash his hands after cleaning the reptile cages. He reported cleaning the cages weekly and using the sink to clean the terrariums when necessary. The snakes were fed vacuum packed mice. The teacher said he rarely allowed his students to handle the snakes themselves, but he never instructed them to wash their hands after coming into contact with them.

Salmonella Typhimurium TM606 and *Salmonella* somatic group C1 were isolated from the fox snake's stool sample, and *S. enterica* subspecies Diarizonae was isolated from the ball python's stool sample. Salmonellae were also isolated from environmental samples and feed mouse samples. Specifically, two samples collected from the countertop where the snakes were stationed were positive for *S. Typhimurium* TM606 and *Salmonella* serogroup C1. *Salmonella* Typhimurium TM606 and *Salmonella* serogroup C1 were isolated from the center island counter top in front of the aquariums and from the classroom sink. Two samples taken from the freshly cleaned snake terrarium glass and the door hand of the classroom were negative for *Salmonellae*. Cultures of three of seven feed mice yielded pure growth of *S. Typhimurium* from the liver, spleen, and intestines. PFGE subtyping was performed on these isolates and yielded two PFGE patterns, one of which was indistinguishable from that of isolates from the cases, snakes, and environmental samples. In summary, one or more *Salmonella* serotypes were isolated from two snake fecal samples and six (75%) of eight environmental samples. The outbreak strain of *S. Typhimurium* was isolated from the snakes, feed mice, and the classroom environment.

This was an outbreak of *S. Typhimurium* TM606 infections among students at a junior high school. Environmental contamination of multiple classroom surfaces, including the classroom sink, with *S. Typhimurium* TM606 was documented; transmission likely occurred through direct contact with reptiles and also through contact with environmental surfaces indirectly contaminated by reptiles or feed mice.

The finding of *Salmonella* among the reptiles was expected; most reptiles (>90%) shed the organisms intermittently throughout life. Because of nearly universal carriage, it is not possible to select *Salmonella*-free reptiles as pets, nor is it possible to eliminate *Salmonella* carriage from the gastrointestinal tract of reptiles with antibiotic treatment. Therefore, reptile owners must assume that all reptiles are shedding the organisms and must constantly strive to prevent transmission of *Salmonella* to people.

We recommended cleaning of the classroom and all counter surfaces with commercially available disinfectants after appropriate cleaning of surfaces, and regularly using a 1:10 solution of bleach to disinfect the classroom sink. In addition we recommended that strict hand-washing procedures should be implemented immediately and provided posters to aid as memory cues. We encouraged the teacher to restrict the handling of the snakes and that anyone working with the snakes should wash their hands thoroughly afterwards.

**Confirmed Foodborne Outbreaks
Minnesota, 2005**

Outbreak No.	Month	Setting	No. Cases	No. Laboratory-Confirmed	Vehicle	Agent	Contributing Factor	County
1	Jan	Restaurant	20	4	Roast beef sandwiches	Norovirus	Ill food workers	Hennepin
2	Jan	Commercial product	4	4	Frozen chicken entrees	<i>Salmonella</i> Heidelberg	Contaminated raw product	Multiple Counties
3	Jan	Restaurant	5	2	House salad dressing	Norovirus	Likely ill food worker	Mille Lacs
4	Feb	Restaurant	3	1	Salads	Norovirus	Unknown	Hennepin
5	Feb	Restaurant	5	1	Prime rib	<i>Clostridium perfringens</i> enterotoxin	Time/temperature abuse	Otter Tail
6	Feb	Potluck at a church	17	1	Macaroni salad	Norovirus	Ill food preparer	Hennepin
7	Feb	Restaurant	28	13	Multiple salad bar items	Norovirus	Ill food workers	Pine
8	Mar	Restaurant	37	5	Lettuce	Norovirus	Ill food workers	Olmsted
9	Mar	Restaurant	13	6	Suspect lettuce	Norovirus	Ill food worker	Benton
10	Mar	Restaurant	10	2	Refried beans	<i>Clostridium perfringens</i> enterotoxin	Time/temperature abuse	Anoka

**Confirmed Foodborne Outbreaks
Minnesota, 2005 (continued)**

Outbreak No.	Month	Setting	No. Cases	No. Laboratory-Confirmed	Vehicle	Agent	Contributing Factor	County
11	Mar	Restaurant	18	4	Buffet	Norovirus	Unknown	Hennepin
12	Mar	Restaurant	15	3	Unknown	Norovirus	Infected food workers	Olmsted
13	Apr	Restaurant	4	1	Unknown	Norovirus	Unknown	Hennepin
14	May	Restaurant	2	2	Unknown	Norovirus	Infected food workers	Hennepin
15	May	Workplace cafeteria	2	0	Mahi mahi	Scombroid toxin	Elevated histamine levels in implicated fish	Hennepin
16	May	Prom	30	0	Pineapple and chicken	Suspected norovirus	Likely ill attendees	Carver
17	May	Party at private home	8	1	Picnic food	Norovirus	Likely ill attendee	Chisago
18	May	Restaurant	6	4	Unknown	Norovirus	Infected food workers	Hennepin
19	May	Workplace cafeteria	4	0	Taco meal	Suspected bacterial toxin	Unknown	Hennepin
20	June	Ice cream chain	5	5	Cake batter ice cream	<i>Salmonella</i> Typhimurium	Contaminated product	Hennepin/ Multiple States
21	June	Restaurant	3	2	Unknown	Norovirus	Unknown	Hennepin
22	June	Product	5	5	Suspect pork or cilantro	<i>Salmonella</i> Manhattan	Unknown	Multiple
23	June	Wedding reception	23	3	Deli sandwiches	Norovirus	Unknown	Blue Earth
24	June	Anniversary party	8	5	Broccoli salad and cake	Norovirus	Likely ill attendee	Anoka

**Confirmed Foodborne Outbreaks
Minnesota, 2005 (continued)**

Outbreak No.	Month	Setting	No. Cases	No. Laboratory-Confirmed	Vehicle	Agent	Contributing Factor	County
25	Jun	Restaurant	12	6	Multiple food items	Norovirus	Infected food workers	Winona
26	Jul	Restaurant	4	2	Tzatziki sauce	Suspected bacterial toxin	Time/temperature abuse	Hennepin
27	Jul	Restaurant	10	0	Unknown	Suspected bacterial toxin	Unknown	Dakota
28	Jul	Restaurant	18	4	Unknown	Norovirus	Infected food workers	St. Louis
29	Aug-Jul	Commercial product	27	27	Frozen chicken entrees	<i>Salmonella</i> Enteritidis	Contaminated raw product	Multiple Counties/ Multiple States
30	Aug	Wedding reception	31	1	Root beer keg	Norovirus	Likely ill attendee	Wright
31	Sept	Commercial product	30	23	Bagged lettuce salads	<i>E. coli</i> O157:H7	Contaminated raw product	Multiple Counties/ Multiple States
32	Sept	Restaurant	3	3	Buffet	<i>Salmonella</i> Enteritidis	Time/temperature abuse and cross-contamination	Dodge
33	Sept	Workplace cafeteria	39	2	Buffet	Norovirus	Unknown	Hennepin
34	Oct	Event at hotel	5	0	Escolar	Escolar toxin	Natural fish toxin	Ramsey
35	Nov	Party at private home	11	2	Ham	Norovirus	Likely ill attendee	McLeod
36	Dec	Restaurant	16	4	Unknown	Norovirus	Ill food workers	Hennepin

**Confirmed Foodborne Outbreaks
Minnesota, 2005 (continued)**

Outbreak No.	Month	Setting	No. Cases	No. Laboratory-Confirmed	Vehicle	Agent	Contributing Factor	County
37	Dec	Restaurant	4	3	Unknown	Norovirus	Unknown	Ramsey
38	Dec	Restaurant	17	3	Unknown	Norovirus	Infected food workers	Hennepin
39	Dec	Restaurant	11	2	Unknown	Norovirus	Ill food workers	Hennepin
40	Dec	Restaurant	5	2	Unknown	Norovirus	Infected food workers	Olmsted
41	Dec	Restaurant	3	0	Unknown	Suspected norovirus	Unknown	Hennepin

TOTAL: 41

**Confirmed Waterborne Outbreaks
Minnesota, 2005**

Outbreak No.	Month	Setting	No. Cases	No. Laboratory-Confirmed	Vehicle	Agent	Contributing Factor	County
1	May	Swimming pool	32	0	Recreational water	Unknown	Unknown	Hennepin
2	June	Lake beach	4	4	Recreational water	<i>E. coli</i> O157:H7	Unknown	Anoka
3	July	Lake beach	12	7	Recreational water	<i>Shigella sonnei</i>	Unknown	Carver
4	Aug	Lake beach	8	6	Recreational water	Norovirus	Unknown	Ramsey

TOTAL: 4

**Non-Foodborne, Non-Waterborne Gastroenteritis Outbreaks
Minnesota, 2005**

Outbreak No.	Month	Setting	No. Cases	No. Laboratory-Confirmed	Vehicle	Agent	County
1	Jan	Nursing home	76	1	Person-to-person	Norovirus	Wright
2	Jan	Nursing home	73	2	Person-to-person	Norovirus	Wabasha
3	Jan	Nursing home	3	3	Unknown	Norovirus	Ramsey
4	Jan	Nursing home	29	0	Person-to-person	Norovirus	St. Louis
5	Jan	Nursing home	48	0	Unknown	Suspected norovirus	McLeod
6	Jan	Nursing home	7	2	Unknown	Norovirus	Jackson
7	Jan	Nursing home	39	3	Person-to-person	Norovirus	Clearwater
8	Jan	Nursing home	10	2	Unknown	Norovirus	Clearwater
9	Jan	Assisted living	24	3	Unknown	Norovirus	Ramsey
10	Jan	Daycare	30	0	Person-to-person	Suspected norovirus	Dodge
11	Jan	Hospital	16	4	Person-to-person	Norovirus	Hennepin
12	Jan	Catered event	31	4	Person-to-person	Norovirus	Ramsey
13	Feb	Nursing home	29	0	Person-to-person	Suspected norovirus	Winona
14	Feb	Nursing home	64	2	Person-to-person	Norovirus	Mower
15	Feb	College	139	3	Person-to-person	Norovirus	Stearns

**Non-Foodborne, Non-Waterborne Gastroenteritis Outbreaks
Minnesota, 2005 (continued)**

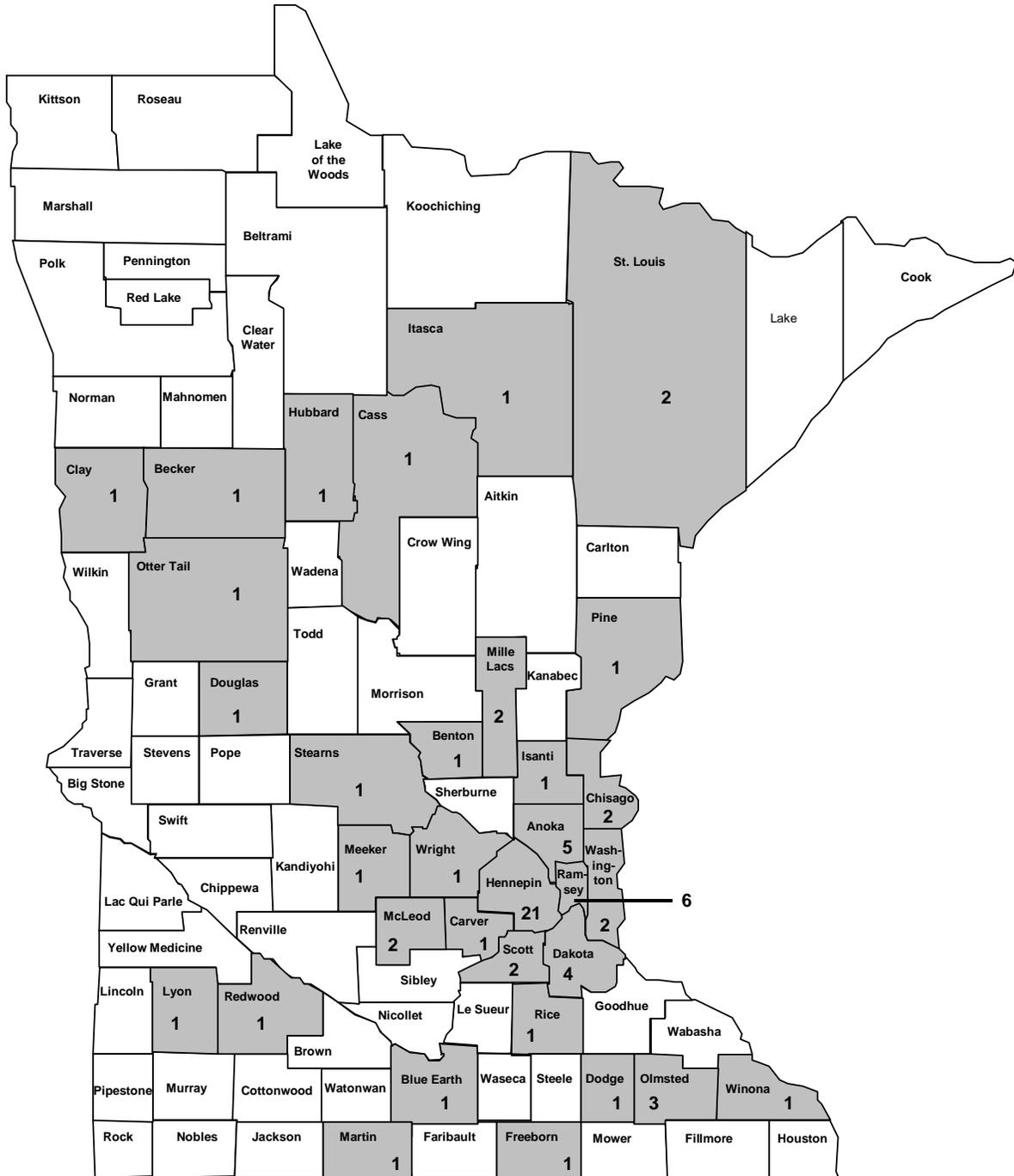
Outbreak No.	Month	Setting	No. Cases	No. Laboratory-Confirmed	Vehicle	Agent	County
16	Mar	Hospital	6	6	Person-to-person	Norovirus	Hennepin
17	Mar	Elementary school	47	2	Person-to-person	Norovirus	Hennepin
18	Mar	Elementary school	24	0	Person-to-person	Suspected norovirus	Dakota
19	Apr	Catered event	15	4	Person-to-person	Norovirus	Ramsey
20	May	Elementary school	72	2	Person-to-person	Norovirus	Clay
21	May	Nursing home	26	2	Unknown	Norovirus	Hennepin
22	May	Elementary school	50	2	Person-to-person	Norovirus	Hennepin
23	May	Elementary school	35	0	Person-to-person	Suspected norovirus	Hennepin
24	May	Daycare	3	3	Person-to-person	<i>Cryptosporidium</i>	Kandiyohi
25	May	Community	9	9	Person-to-person	<i>Shigella</i>	Waseca
26	Jun	Daycare	7	7	Person-to-person	<i>Giardia</i>	McLeod
27	Jul	Beach/Other	7	1	Unknown	<i>E. coli</i> O26:NM	Stearns
28	Aug	Daycare	12	7	Person-to-person	<i>E. coli</i> O157	Wabasha
29	Sep	Daycare	3	1	Person-to-person	<i>E. coli</i> O157	Jackson

**Non-Foodborne, Non-Waterborne Gastroenteritis Outbreaks
Minnesota, 2005 (continued)**

Outbreak No.	Month	Setting	No. Cases	No. Laboratory-Confirmed	Vehicle	Agent	County
30	Sep	Restaurant	10	0	Unknown	Unknown	Washington
31	Oct	Elementary school	26	3	Person-to-person	Norovirus	St. Louis
32	Nov	School	26	0	Unknown	Unknown	Hennepin
33	Nov	Elementary school	20	3	Person-to-person	Norovirus	Hennepin
34	Nov	Daycare	4	3	Person-to-person	<i>Cryptosporidium</i>	Big Stone
35	Nov	Elementary school	44	3	Person-to-person	Norovirus	Olmsted
36	Dec	Junior high school	4	4	Reptile contact	<i>Salmonella</i> Typhimurium	Washington
37	Dec	Catered event/Hotel/ Restaurant	12	3	Person-to-person	Norovirus	Fillmore
38	Dec	Private gathering	12	4	Person-to-person	Norovirus	Olmsted
39	Dec	Daycare	18	5	Person-to-person	Norovirus	Hennepin

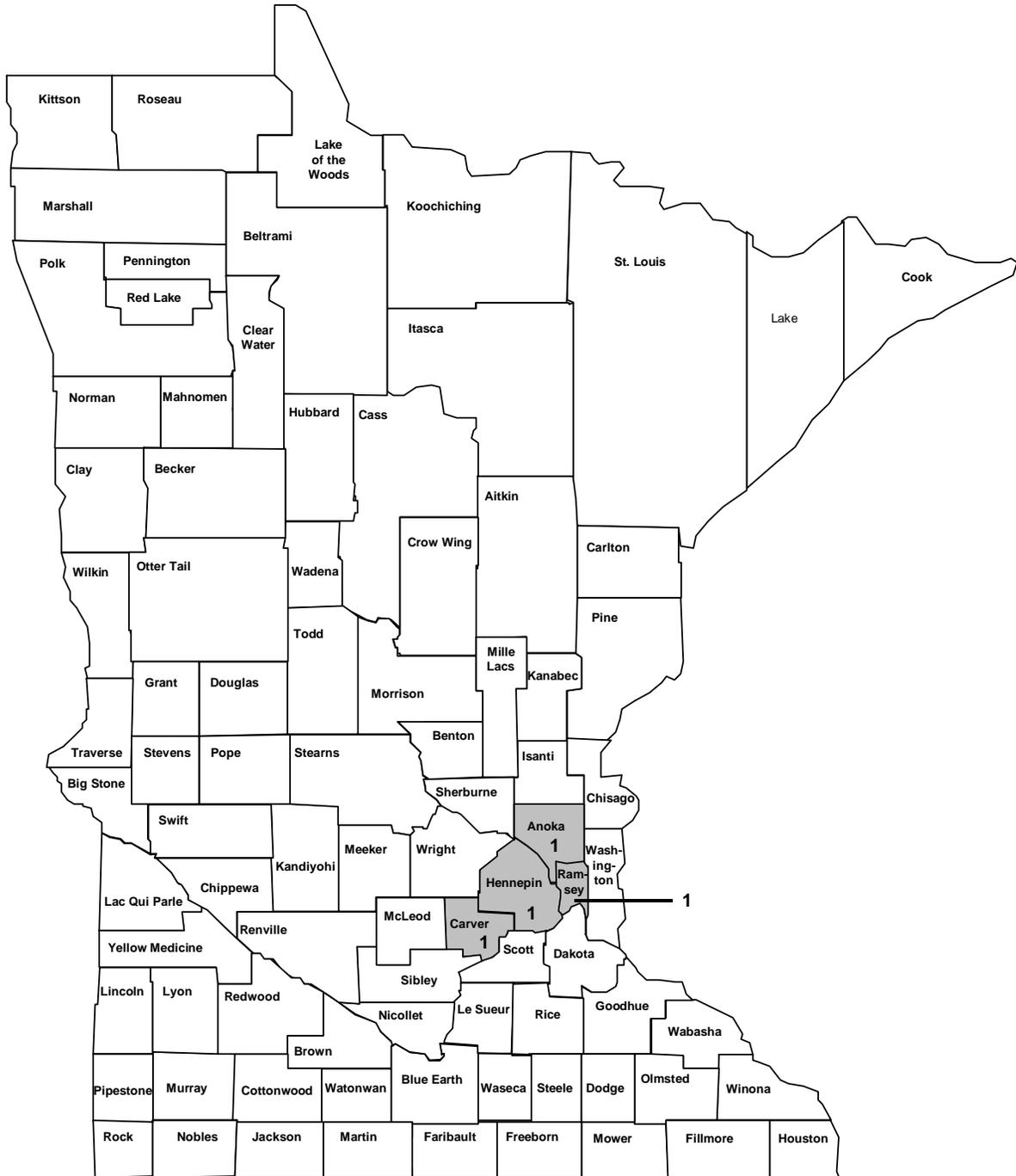
TOTAL: 39

Confirmed Foodborne Outbreaks by County, Minnesota, 2005 (n=41*)

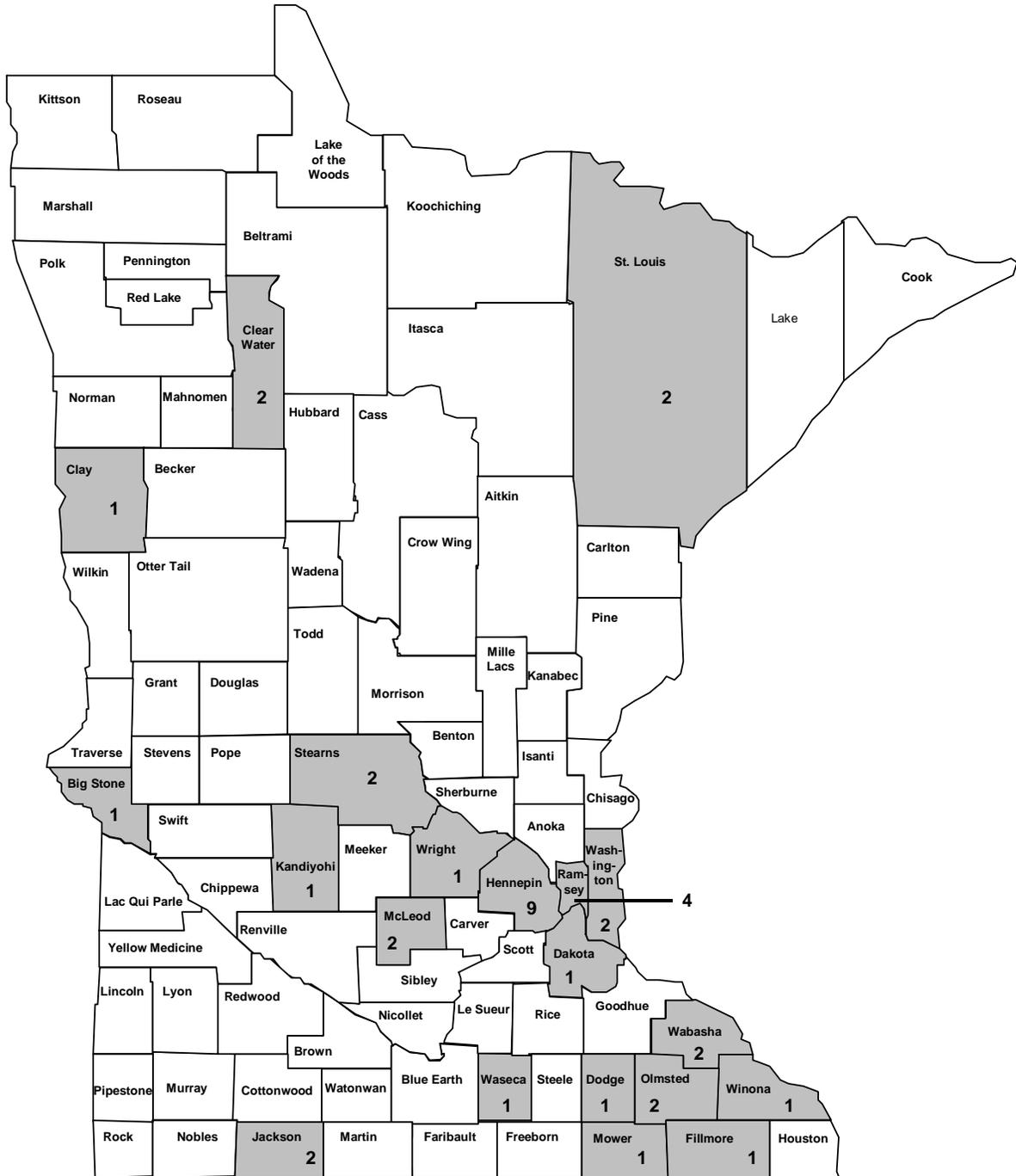


* Numbers on map add up to 73 because 36 of the 41 outbreaks involved single counties but four involved multiple counties. One outbreak involved Hennepin, Itasca, Ramsey, and Scott Counties. One outbreak involved Anoka, Dakota, Hennepin, and Ramsey Counties. One outbreak involved Anoka, Becker, Cass, Clay, Dakota, Douglas, Freeborn, Hennepin, Hubbard, Lyon, McLeod, Meeke, Mille Lacs, Ramsey, Redwood, Rice, Scott, St. Louis, Stearns, and Washington Counties. One outbreak involved Anoka, Chisago, Dakota, Hennepin, Isanti, Martin, Ramsey, and Washington Counties.

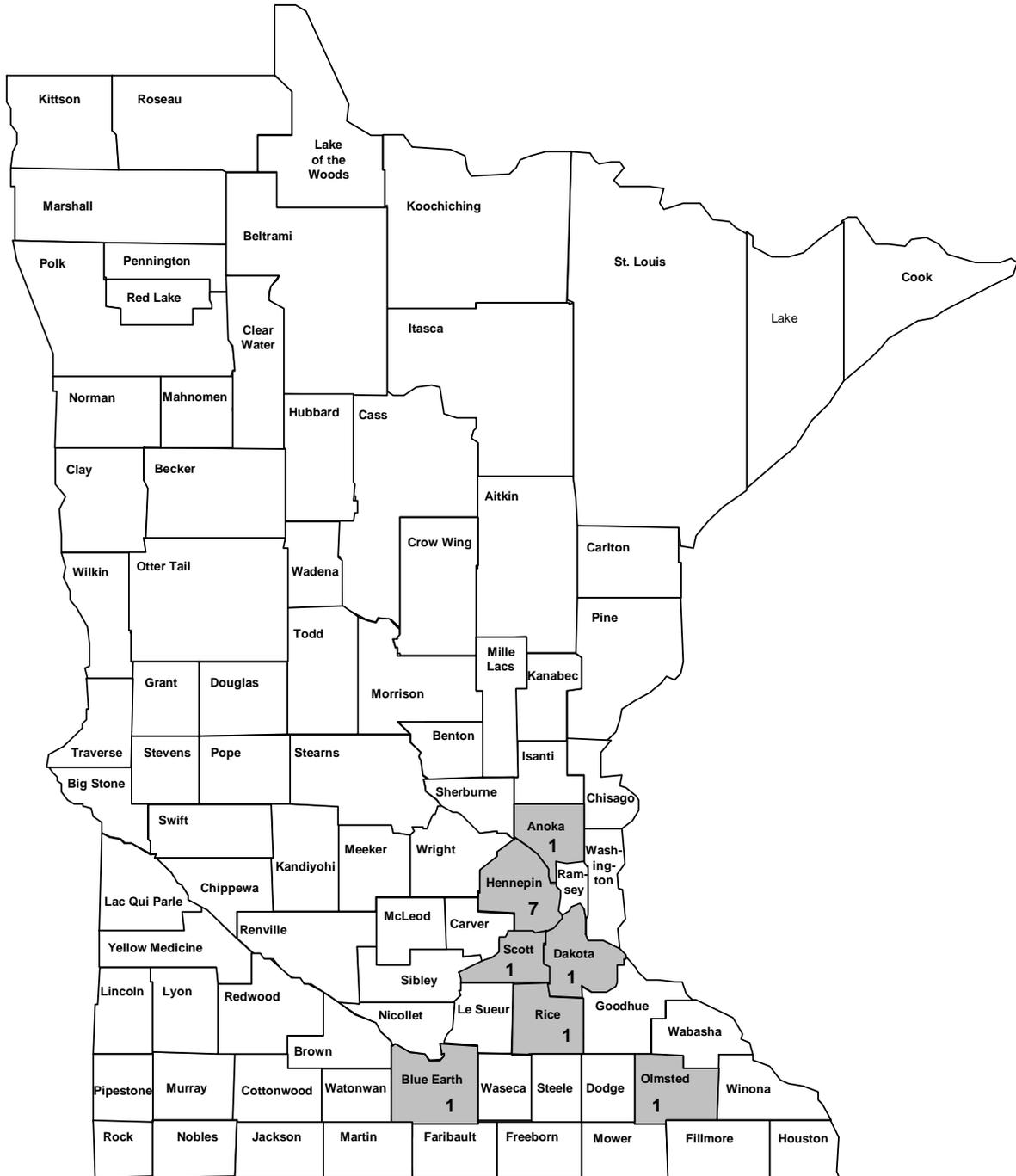
Confirmed Waterborne Outbreaks by County, Minnesota, 2005 (n=4)



Non-Foodborne, Non-Waterborne Gastroenteritis Outbreaks by County, Minnesota, 2005 (n=39)



Probable Foodborne Outbreaks by County, Minnesota, 2005 (n=13)



Foodborne Illness Complaints, Minnesota, 2005

City or County	Foodborne illness complaints faxed from MDH to local public health agency	Foodborne illness complaints received by MDH from local public health agency	Total
Aitkin County	1	0	1
Albert Lea, City of	0	0	0
Anoka County	33	4	37
* Becker County	1	0	1
* Beltrami County	1	0	1
* Benton County	0	0	0
Big Stone County	0	0	0
Bloomington, City of	26	29	55
* Blue Earth County	4	0	4
Brooklyn Park, City of	7	0	7
Brown County	1	0	1
* Carlton County	2	0	2
+ Carver County	7	0	7
Cass County	0	0	0
Chippewa County	0	0	0
+ Chisago County	4	0	4
Clay County	0	0	0
* Clearwater County	0	0	0
Cook County	1	0	1
Cottonwood County	1	0	1
* Crow Wing County	5	0	5
Crystal, City of	5	0	5
+ Dakota County	56	0	56
* Dodge County	0	0	0

City or County	Foodborne illness complaints faxed from MDH to local public health agency	Foodborne illness complaints received by MDH from local public health agency	Total
Douglas County	1	0	1
Duluth, City of	0	0	0
Edina, City of	12	4	16
Faribault County	0	0	0
* Fillmore County	2	0	2
* Freeborn County	1	0	1
Golden Valley, City of	13	0	13
Goodhue County	2	0	2
* Grant County	0	0	0
Hennepin County	66	13	79
Hopkins, City of	1	0	1
* Houston County	0	0	0
* Hubbard County	0	0	0
+ Isanti County	0	0	0
* Itasca County	1	0	1
* Jackson County	0	0	0
* Kanabec County	0	0	0
Kandiyohi County	2	0	2
* Kittson County	0	0	0
* Koochiching County	0	0	0
Lac Qui Parle County	0	0	0
Lake County	4	0	4
* Lake of the Woods County	0	0	0
Le Sueur County	1	0	1
Lincoln County	0	0	0
* Lyon County	0	0	0

City or County	Foodborne illness complaints faxed from MDH to local public health agency	Foodborne illness complaints received by MDH from local public health agency	Total
* Mahnomen County	0	0	0
Maplewood, City of	9	0	9
* Marshall County	0	0	0
Martin County	0	0	0
* McLeod County	2	0	2
* Meeker County	0	0	0
* Mille Lacs County	1	0	1
Minneapolis, City of	75	24	99
Minnetonka, City of	17	0	17
Moorhead, City of	1	0	1
Morrison County	3	3	6
* Mower County	3	0	3
Murray County	0	0	0
New Brighton, City of	2	0	2
Nicollet County	3	0	3
* Nobles County	1	0	1
* Norman County	0	0	0
Olmsted County	5	68	73
* Otter Tail County	7	0	7
* Pennington County	0	0	0
+ Pine County	6	0	6
Pipestone County	0	0	0
* Polk County	0	0	0
Pope County	0	0	0
Ramsey County	30	0	30
* Red Lake County	0	0	0

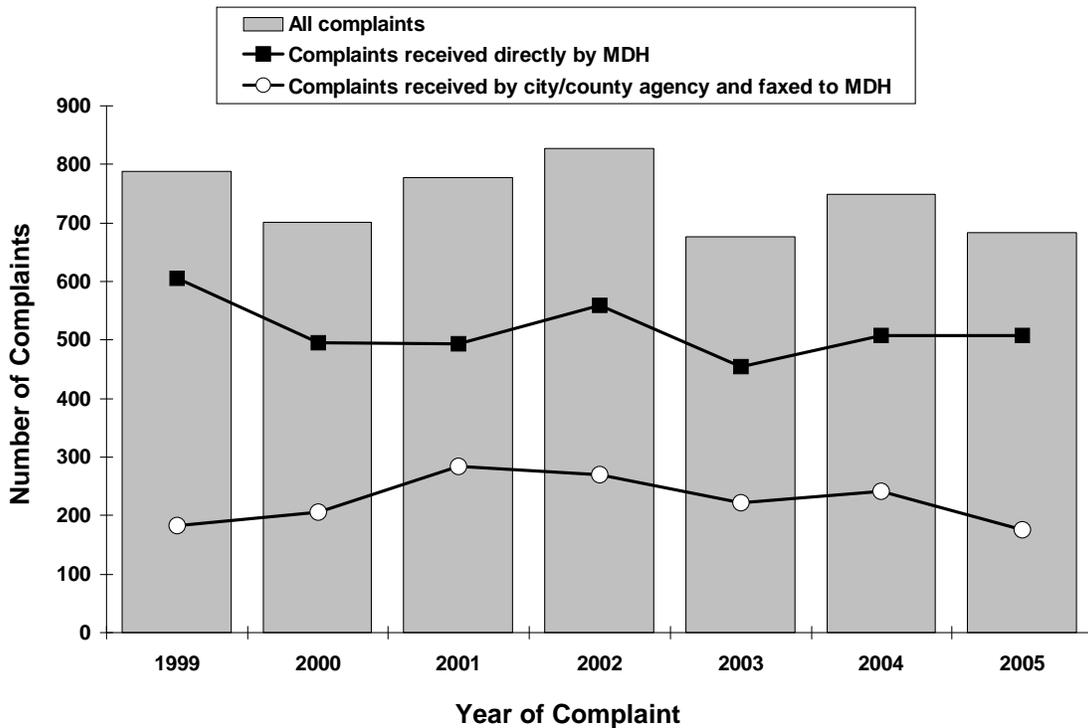
City or County	Foodborne illness complaints faxed from MDH to local public health agency	Foodborne illness complaints received by MDH from local public health agency	Total
Redwood County	2	4	6
* Renville County	1	0	1
* Rice County	5	0	5
Richfield, City of	5	0	5
Rock County	0	0	0
* Roseau County	0	0	0
St. Cloud, City of	7	0	7
St. Louis County	9	14	23
St. Louis Park, City of	21	1	22
St. Paul, City of	68	1	69
+ Scott County	7	0	7
* Sherburne County	3	0	3
* Sibley County	0	0	0
Stearns County	4	3	7
* Steele County	1	0	1
Swift County	0	1	1
* Stevens County	0	1	1
Todd County	2	0	2
* Traverse County	0	0	0
Wabasha County	0	0	0
Wadena County	1	0	1
Waseca County	0	0	0
Washington County	29	1	30
Watsonwan County	0	0	0
Wayzata, City of	3	1	4
Wilkin County	1	0	1

City or County	Foodborne illness complaints faxed from MDH to local public health agency	Foodborne illness complaints received by MDH from local public health agency	Total
Winona County	4	0	4
+ Wright County	13	0	13
Yellow Medicine County	0	0	0
Bureau of Indian Affairs	4	0	4
FDA	2	0	2
MN Dept of Ag	35	0	35
MDH Environmental Health	1	3	4
U of M	1	0	1
USDA	0	0	8
<i>Total</i>	655	175	830

* Report faxed to the MDH-District Office (total number of reports sent to MDH-District Office = 40)

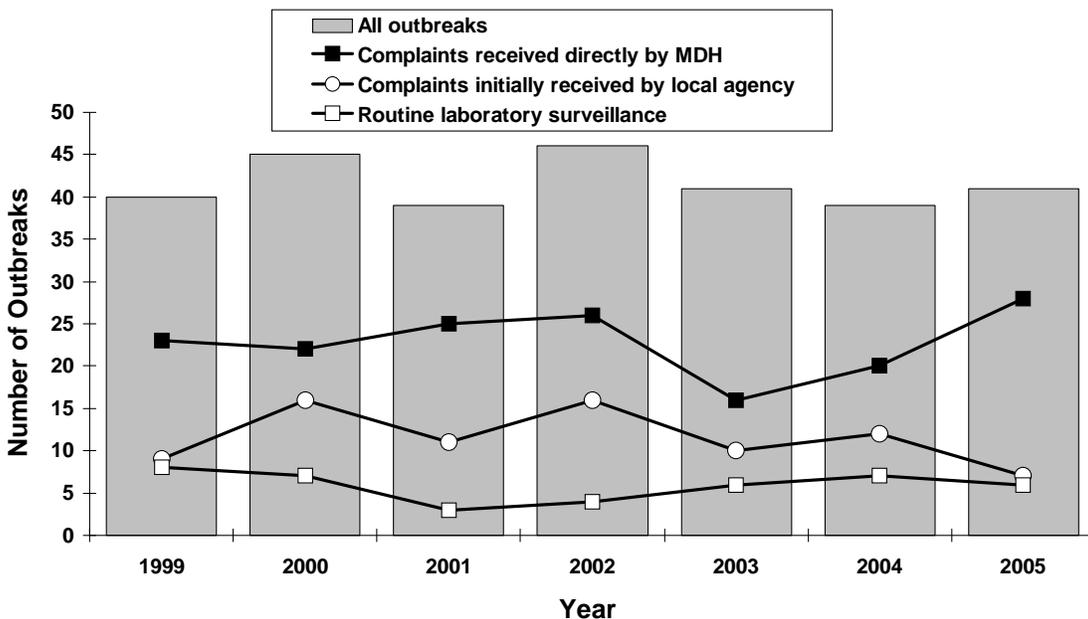
+ Report faxed to the MDH-EHS (total number of reports sent to MDH-EHS = 93)

Figure 1. Number of Foodborne Illness Complaints per Year, Minnesota, 1999-2005



In 2005, the MDH Acute Disease Investigation and Control Section received 683 foodborne illness complaints. Detailed information on symptoms and a 4-day food history were obtained from each caller (see form on next page), and the complaint was faxed to the appropriate jurisdiction for each restaurant, deli, grocery store, or other establishment mentioned in the complaint. Of the 683 complaints received, 508 (74%) were received by MDH (Figure 1). In 2005, 35 (85%) of the 41 confirmed foodborne outbreaks were reported to MDH or local public health agencies via phone calls from the public. Of those, 28 (80%) were reported directly to MDH (Figure 2).

Figure 2. Confirmed Foodborne Outbreaks by Initial Notification, Minnesota, 1999-2005



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

Stool kit delivered
Daily

Complaint date: ___/___/___ Tennessee: Reporter: _____
Agency: _____ Phone: _____ Fax: _____
First Name: _____ Last Name: _____ Age: _____ Female Male
Address _____ Zip: _____
Day phone: (_____) _____ Evening phone: (_____) _____
Occupation: _____ Daycare exposure: Yes No

Illness History:

Illness Onset Date: ___/___/___ Time: _____ Illness Recovery Date: ___/___/___ Time: _____
Vomiting Y N Onset date: ___/___/___ Time: _____ Vomiting recovery date: ___/___/___ Time: _____
Diarrhea Y N Onset date: ___/___/___ Time: _____ Diarrhea recovery date: ___/___/___ Time: _____
Number of stools per 24 hour period: _____ Cramps Y N Fever Y N temp: _____ Bloody stools Y N
Other symptoms: _____

Called healthcare provider: Y N Visited provider: Y N Please circle Office / ER Date of visit: ___/___/___
Provider requested stool sample: Y N Date stool submitted: ___/___/___ Result: _____ Hospitalized: Y N

Food History:

If only one person is ill, complete entire four day food history.

If ill persons live in the same household, complete entire four day food history.

If more than one person is ill and they live in different households, then record only the common meals.

Date of Illness Onset: ___/___/___

Meal Time Foods and Drinks Consumed and Location (including home)

Brk: _____

Lun: _____

Sup: _____

Oth: _____

One Day Prior to Illness Onset: ___/___/___

Meal Time Foods and Drinks Consumed and Location (including home)

Brk: _____

Lun: _____

Sup: _____

Oth: _____

Two Days Prior to Illness Onset: ___/___/___ Caller's name: _____

Meal Time Foods and Drinks Consumed and Location (including home)

Brk: _____

Lun: _____

Sup: _____

Oth: _____

Three Days Prior to Illness Onset of Illness: ___/___/___

Meal Time Foods and Drinks Consumed and Location (including home)

Brk: _____

Lun: _____

Sup: _____

Oth: _____

Establishment or Product Complainant Suspects (for products, include brand, size, flavor, UPC, purchase date & location)

Number of persons exposed: _____ Number ill: _____ Did complainant call the establishment: Yes No

History of others Ill:

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

Address: _____ **Phone:** _____

Illness Onset Date: ___/___/___ Time: _____ Illness Recovery Date: ___/___/___ Time: _____

Vomiting Y N Onset date: ___/___/___ Time: _____ Vomiting recovery date: ___/___/___ Time: _____

Diarrhea Y N Onset date: ___/___/___ Time: _____ Diarrhea recovery date: ___/___/___ Time: _____

Number of stools per 24 hour period: _____ Cramps Y N Fever Y N temp: _____ Bloody stools Y N

Other symptoms: _____

Foods eaten at common event:

Agencies Notified MDH-EHS MDH-District Office MN Dept of Ag FDA USDA

Local Agencies: _____

Comments _____

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

Complaint to be logged in database only

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

Results: Norovirus O157 Shig Salm Campy Yersinia Other _____ Negative

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

Original Caller: _____

History of others Ill:

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

Address: _____ **Phone:** _____

Illness Onset Date: ___/___/___ Time: _____ Illness Recovery Date: ___/___/___ Time: _____

Vomiting Y N Onset date: ___/___/___ Time: _____ Vomiting recovery date: ___/___/___ Time: _____

Diarrhea Y N Onset date: ___/___/___ Time: _____ Diarrhea recovery date: ___/___/___ Time: _____

Number of stools per 24 hour period: _____ Cramps Y N Fever Y N temp: _____ Bloody stools Y N

Other symptoms: _____

Foods eaten at common event:

History of others Ill:

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

Address: _____ **Phone:** _____

Illness Onset Date: ___/___/___ Time: _____ Illness Recovery Date: ___/___/___ Time: _____

Vomiting Y N Onset date: ___/___/___ Time: _____ Vomiting recovery date: ___/___/___ Time: _____

Diarrhea Y N Onset date: ___/___/___ Time: _____ Diarrhea recovery date: ___/___/___ Time: _____

Number of stools per 24 hour period: _____ Cramps Y N Fever Y N temp: _____ Bloody stools Y N

Other symptoms: _____

Foods eaten at common event:



**Foodborne Disease Outbreak Investigation Guidelines
Minnesota Department of Health**

Phone: (612) 676-5414

Fax: (612) 676-5743

The Minnesota Department of Health (MDH) has developed a model for investigating foodborne illness using a centralized group of interviewers (Team Diarrhea) coordinated with local environmental health assessment of the establishment(s) involved in the outbreak. This approach allows us to rapidly respond to reports of outbreaks, standardize outbreak investigations, maintain a statewide database of foodborne diseases, and distribute information quickly and consistently.

When local agencies learn of a possible outbreak, they should notify the Minnesota Department of Health immediately to initiate an appropriate outbreak response.

During investigations, epidemiologists at MDH and local agencies will work with a network of environmental health specialists and other health agencies to evaluate critical elements of the outbreak. Environmental health inspectors and field epidemiologists will focus on restaurant inspection, interviewing employees, and assessing food preparation and safety, while the central group of epidemiologists will coordinate patron interviews, stool collection and testing, and data analysis. MDH is responsible for compiling and storing outbreak data and for summarizing outbreaks; however, local agencies are invited to write or contribute to all final reports. MDH has an outbreak report template available for agencies that choose to write their own final reports. All final reports should be faxed or mailed to MDH within a month of completion of the outbreak investigation. Minnesota outbreak reports will be included in the annual Minnesota Department of Health Gastroenteritis Outbreak Summary. MDH will forward outbreak information to the Centers for Disease Control and Prevention for national archiving. Detailed and thorough outbreak reports are critical in assessing the burden of foodborne disease outbreaks in Minnesota and nationally. This model of foodborne disease outbreak investigation, with a core group of epidemiologists and an extensive network of environmental health specialists, local, state and federal health agencies, and field epidemiologists distributed across the state provides Minnesotans with an efficient foodborne disease surveillance system.

Investigation Guidelines

When investigating outbreaks, MDH uses the following guidelines to ensure a prompt and appropriate response to possible outbreaks and to obtain consistent and useful data from every investigation.

Particular attention has been given to areas of investigations that are easily and frequently overlooked, but which are critical to agent and vehicle identification. A sample outbreak investigation questionnaire is attached. Epidemiologic data often offers the only evidence of an outbreak source and the responsible organism. Therefore, interviews with all cases and controls must be detailed, thorough, and consistent.

I. Patron Investigation

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 ask if the person felt "feverish." Ask only if the person "had a fever.")
 - Temperature (highest)
 - Diarrhea (Yes/No)

- Date of diarrhea onset
- Time of diarrhea onset, in military time
- Maximum number of stools in a 24-hour period (This is critical information because the definition of diarrhea is **at least 3 loose stools in a 24-hour period**)
- Date of diarrhea onset
- Time of diarrhea onset, in military time
- Date of last episode of diarrhea
- Time of last episode of diarrhea
- Vomiting (Yes/No)
- Date of vomiting onset
- Time of vomiting onset, in military time
- Date of last episode of vomiting
- Time of last episode of vomiting, in military time
- Bloody stools (Yes/No)
- Abdominal cramps (Yes/No)
- First symptom
- Date of onset of first symptom-necessary in order to calculate the incubation period
- Time of first symptom (The specific hour of onset, in military time, is necessary to calculate the incubation period)
- Date of recovery-necessary in order to calculate the duration of illness
- Time of recovery (The specific hour of recovery, in military time, is necessary to calculate the duration of illness)
- Was person hospitalized? (Yes/No)
- If yes: where, admission date, discharge date
- Did person visit a physician? If yes, physician's name and phone number.
- Did person submit a stool culture? If yes, when.

3) Exposure History

- Ask about consumption of **every food** available to people involved in the outbreak.
- Ask specifically about **ice and water** consumption at every meal being evaluated.
- Ask specifically about **ice and water** consumed at any time other than at meals.
- Ask about all events associated with the outbreak.

Example: If the outbreak is associated with a wedding, ask about attendance at any showers, pre-wedding parties, the rehearsal dinner and the wedding reception. Occasionally, there may be two case clusters that need to be teased out in the epidemiological investigation. For example, one group may become infected at the bridal shower, and the organism may be transmitted at the wedding reception by a food vehicle such as the wedding cake made by the groom's sister the morning before the wedding.

4) Stool Cultures

Laboratory detection is most sensitive when samples are collected early in the course of illness. Always obtain stool samples as soon as possible when an outbreak is suspected. When this is not possible, samples should still be collected, even from persons whose symptoms have resolved. **Cases may continue to shed the bacteria or viruses for several days after recovery.** Persons with asymptomatic infections may excrete the organism for months.

Ideally, stool samples should be obtained from 4 to 6 cases. Samples should be refrigerated but NOT FROZEN until they are submitted to the laboratory. The exception to this is when a bacterial pathogen is suspected and specimens will not be submitted for several days, samples should be frozen until they are sent to MDH. For example, if stool kits are given to cases in a suspected *E. coli* O157:H7 outbreak on Friday and will not be delivered to MDH before Monday, samples should be frozen.

A viral pathogen (e.g., norovirus) may be suspected when the outbreak is characterized by:

- 1) median incubation period of 24-48 hours, and
- 2) vomiting in at least 50% of cases or vomiting more frequent than fever, and
- 3) median duration ≤ 2 days

A bacterial pathogen (e.g., *Salmonella*, *E. coli* O157:H7) may be suspected when the outbreak is characterized by:

- 1) fever and/or bloody stools
- 2) median duration > 2 days
- 3) median incubation period of 3 days or more (some bacterial pathogens, e.g., *Salmonella*, can have a shorter median incubation)

II. Investigation at the Food Service Establishment

- 1) When interviewing food workers, Tennessee statements should be written to reflect the needs of the investigation to share illness history information with the establishment management.
- 2) Obtain illness histories directly from **ALL** food workers and catering staff. Ask employees about illness within 10 days of the event (in some situations, such as an outbreak involving ongoing *Salmonella* transmission in a restaurant, determine if there was any employee illness in the relevant time period). Please do not rely on management assessment of illness in employees, but **interview all employees directly**. Ask about gastrointestinal illness in the families of food workers, and obtain detailed information about the foods each food worker assisted in preparing

for the event and any foods they may have consumed. Obtain stool samples from all employees who were ill prior to or following the event.

- 3) Ask management and kitchen staff about food preparation and storage practices, including:
 - food worker tasks (do workers have multiple tasks, do servers prepare any food, etc.)
 - food preparation (who, when, how, shared cutting surfaces, shared utensils, etc.)
 - bare-handed or glove-handed contact by food workers
 - pre-cooking of any dishes
 - food storage
 - cooking methods
 - cooling methods
 - reheating methods
 - warming trays used
 - serving/delivery (self serve salads, hot/cold buffet table, Sterno heaters, ice beds, etc.)
 - cleaning surfaces, dishes (who, when, how)
- 4) Food samples are rarely tested, even when epidemiologically implicated. Occasionally, the Minnesota Department of Agriculture tests food, but MDH relies almost exclusively on stool samples from cases.

III. Report Summarizing the Event

The final report will be entered into the statewide outbreak database and included in the state's annual summary of foodborne disease outbreaks. Every report includes the following information:

Background Section:

- Date the investigating agency was notified of outbreak
- Description of the initial report made to the investigating agency
- Date of the event

Methods Section:

- Who provided information about attendees, including names and phone numbers
- Other agencies notified of the outbreak and investigation
- Number of people who attended the event
- Case definition (The standard definition: vomiting or diarrhea after attending the event)
- Number of people interviewed
- Number who met the case definition among those interviewed

- Number of stools collected for testing
- Pathogens tested for in stools

(Note: When possible, all persons interviewed should be selected **randomly** from guest lists, not by word of mouth from cases. Cases are likely to mention other ill persons, which may bias the results. At least one control should be interviewed per case, and preferably two or more controls per case.)

Results Section:

- Percentage of interviewed cases with Fever
- Percentage of interviewed cases with Diarrhea (≥ 3 loose stools in a 24-hour period)
- Percentage of interviewed cases with Vomiting
- Percentage of interviewed cases with Bloody stools
- Percentage of interviewed cases with Abdominal cramps
- Incubation range
- Median incubation
- Duration range
- Median duration
- Results of stool testing
- Food items or events associated with illness.
- Odds ratio of implicated item(s)
- Confidence intervals for implicated item(s)
- p-values for all implicated item(s)
- All relevant information found in the establishment investigation
- Results of food worker interviews
- Results of food worker stool cultures

Conclusion Section:

- Etiologic agent
- Discussion of route of transmission (contaminated food)
- Contributing factors (cold food items contaminated by infected food worker; person to person transmission; undercooked food; improperly stored food, etc.)
- Defense of conclusion, if needed (for example, how do the symptoms, median incubation period and median duration suggest a causal agent). Discuss all plausible sources of contamination when necessary.

**SAMPLE FOODBORNE OUTBREAK
INVESTIGATION QUESTIONNAIRE**

Tennessee: Y N

Date: _____

Interviewer: _____

Name of Outbreak
City, Minnesota
Day, Month, Year

Name (Last, First): _____ Date of birth ___/___/___ Sex: M F

Street: _____ City: _____ County: _____

State: _____ Zip code: _____ Phone (H) _____ (W) _____

Case Illness History: Illness onset: Date: ___/___/___ Time: _____ Recovery: Date: ___/___/___ Time: _____

Vomiting Y N Onset: Date: ___/___/___ Time: _____ Cramps Y N Fever Y N temp: _____ Bloody stools Y N

Diarrhea Y N Onset: Date: ___/___/___ Time: _____ Maximum number of stools per 24 hour period: _____

Diarrhea Recovery Date: ___/___/___ Time: _____ (Diarrhea duration: ___ days / hours)

First symptom: _____

Other symptoms: Y N specify: _____ Onset of other symptoms: Date: ___/___/___ Time: _____

Called provider: Y N Visited provider: Y N Please circle: Clinic / ER Date of visit ___/___/___

Provider requested stool sample Y N Stool sample submitted: Y N ___/___/___ Hospitalized over night: Y N

Food History (for cases and controls): Date of meal: ___/___/___ Time of meal (military): _____

[sample menu]

Fried chicken	Y N	Soda	Y N	Type(s): _____
Ham	Y N	Fruit punch	Y N	
Au gratin potatoes	Y N	Coffee	Y N	
Baked beans	Y N	Water	Y N	
Potato salad	Y N	Ice	Y N	
Tossed salad	Y N	Other food	Y N	
dressing: _____	Y N	or drink: _____		
Angel food cake	Y N			

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

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