Foodborne Illness Surveillance and Investigation
Annual Report, Florida, 1999

Bureau of Environmental Epidemiology
Division of Environmental Health
Department of Health

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Overview

The 1999 year continued to be active for food and waterborne outbreak reporting and investigation. A total of 2,669 foodborne illness complaints were reported to counties in 1999. A total of 286 outbreaks with 1,544 cases were reported, compared to 315 outbreaks and 3,290 cases for 1998, and 439 outbreaks and 2,744 cases for 1997. Investigators were able to laboratory confirm 48 of the outbreaks (including 14 *V. vulnificus*) associated with 415 cases. Staphylococcus, Norwalk and Bacillus cereus were implicated in the largest percentage of the total reported outbreaks (10.8%, 7%, and 4.9% respectively). Norwalk was identified in the largest percentage of cases in total reported outbreaks (19.2%%) followed by Staphylococcus (6.6%). Restaurants were the source site in 82.9% of the outbreaks reported and in 68.3% of the cases. Multiple ingredients (20.6%) and multiple items (23.8%) accounted for a total of 44.4% of all outbreaks, followed by shellfish[1] (12.2%), poultry (9.8%) and beef (7.7). Multiple items (40.9%) and multiple ingredients (15.2%) accounted for 56.1% of all outbreak-associated cases, followed by shellfish (9.1%), beef (7.3%), and poultry (5.5%). The month with the largest percentage of outbreaks reported was April (10.8%) with the largest percentage of cases reported in May (17.3%). Large (greater than 10 cases) outbreaks accounted for 9.1% (26) of the total reported outbreaks and 47.5% (734) of the total cases. Selected significant outbreaks are briefly described below. Each outbreak can have up to three factors under the current surveillance system. There are also categories for none reported, other and unknown. Aside from unknown and none reported, the six most frequent contributing factors are as follows:

Table 1: Six Most Prevalent Contributing Factors in Foodborne Outbreaks, Florida 1999

Contributing Factor	# Outbreaks	# Cases
Inadequate refrigeration (T > than prescribed)	56	213
Inadequate hot holding	36	156
Cross contamination	33	344
Improper handwashing	32	145
Improper cooling (lengthy cool-down)	25	134
Unclean equipment	25	150

[1] The number of shellfish outbreaks includes 14 single cases of V. vulnificus, which are also counted as outbreaks because of the virulence of the disease.

Table 2: Summary of Foodborne Illness Outbreaks Reported to Florida, 1989 – 1999[2]

Year	# Outbreaks	# Cases
1989	11	72
1990	7	314
1991	17	331
1992	40	1048
1993	136	890
1994	**258**	**1526**
1995	**296**	**2908**
1996	**305**	**2777**
1997	**439**	**2744**
1998	**315**	**3290**
1999	**286**	**1544**

[2] The current surveillance and investigation program data began in 1994.

Table 3: Confirmed, Suspected and Total Outbreaks Reported to Florida, 1994 - 1999

1994	# Outbreaks	# Cases
Suspected	201	719
Confirmed	57	807
Total	**258**	**1526**

1995	# Outbreaks	# Cases
Suspected	216	783
Confirmed	80	2125
Total	**296**	**2908**

1996	# Outbreaks	# Cases
Suspected	226	759
Confirmed	79	2018
Total	**305**	**2777**

1997	# Outbreaks	# Cases
Suspected	357	1417
Confirmed	82	1327
Total	**439**	**2744**

1998	# Outbreaks	# Cases
Suspected	256	1937
Confirmed	59	1353
Total	**315**	**3290**

1999	# Outbreaks	# Cases
Suspected	234	1012
Confirmed	52	532
Total	**286**	**1544**

Figure 1: Number of Suspected and Confirmed Outbreaks by Year, Florida, 1994 - 1999

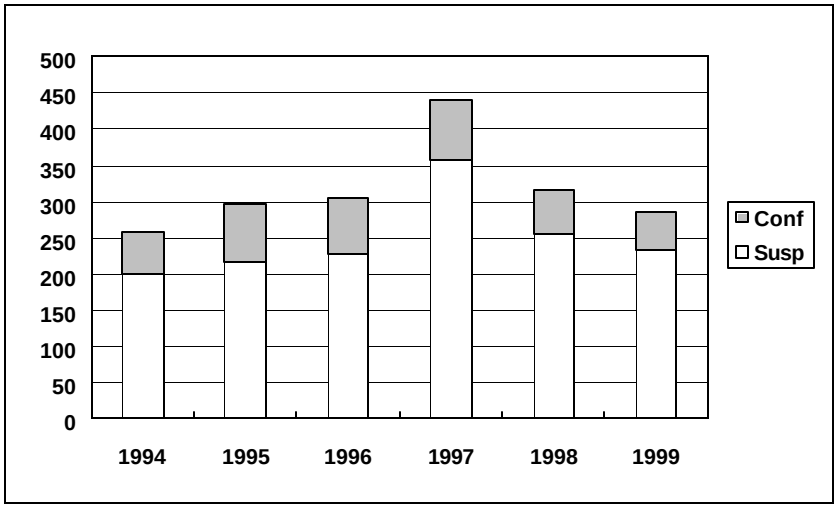
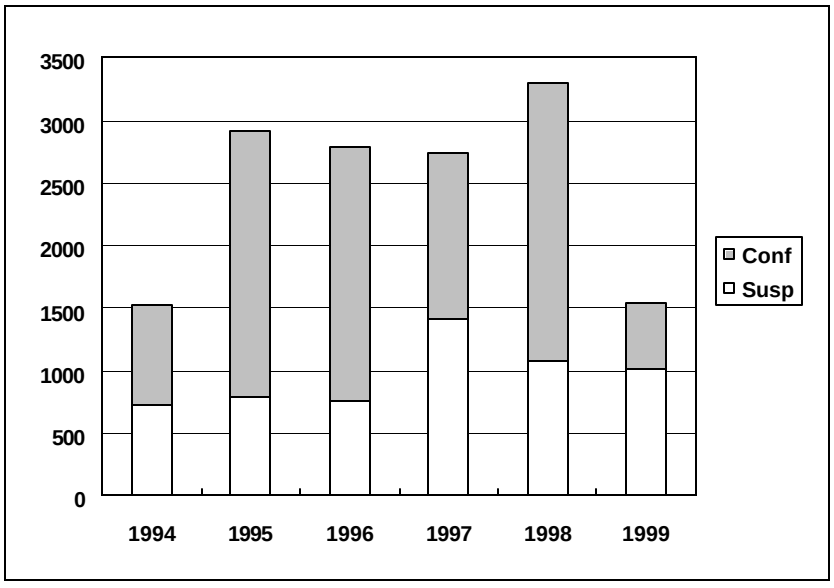


Figure 2: Number of Cases for Suspected and Confirmed Outbreaks by Year, Florida, 1994 - 1999



Training and Continuing Education

In 1999, the Food and Waterborne Disease section offered 42 training sessions within the Department of Health and 66 training and continuing education sessions to groups outside the department. Training offered to health departments and to other agencies on request (e.g. DBPR monthly district meetings) included selected aspects and procedures of food and waterborne disease investigations, how to use Epi Info software, guidelines for laboratory sampling and testing, foodborne illness investigations and Hazard Analysis and Critical Control Point (HACCP) procedures, case studies of specific foodborne illness investigations, microbial contamination of water supplies, and aspects of specific pathogens (e.g. Hepatitis A, ciguatera, salmonella, cyclospora, cryptosporidium). One-on-one training on specific aspects of food and waterborne disease surveillance and investigation is also done with recent health department employees and on request. Staff reached within the Department of Health include environmental health professionals, nurses, epidemiologists, and laboratory staff.

Groups reached outside the department included other state agencies (Department of Business and Professional Regulation (DBPR), Department of Agriculture and Consumer Services (DACS), Department of Environmental Protection (DEP)), professional associations (Florida Environmental Health Association (FEHA), infection control practitioners, county extension agents), industry groups (produce growers, crisis managers for Sodexho Marriott) and university students (University of North Florida, University of Florida and University of Miami). Oral reports with slides on state overviews and case studies of foodborne outbreaks have been given at regional epidemiology meetings, environmental health director meetings, district and statewide FEHA meetings, to food safety and food microbiology classes at the University of Florida, epidemiology classes at the Univerisity of North Florida and to Florida's county extension agents through the Institute for Food and Agricultural Science (IFAS) at the University of Florida. The Bureau of Environmental Epidemiology also gives a two-hour basic foodborne outbreak investigation training at Basic Environmental Health Orientation. Presentations have also been made to outside organizations (at their request with travel expenses paid by the organizations) for specific presentations, e.g Florida Air National Guard, Sodexho Marriott Food Safety Support Crisis Manager Symposium (Orlando, FL), Foodborne Outbreaks and Fresh Produce at the Florida Agricultural Conference and Trade Show (Lakeland, FL) and to the Produce Marketing Association (Atlanta, GA) and Foodborne Outbreaks in Institutional Care Facilities for staff of the National Health Care Corporation in Atlanta, Nashville and Orlando.

Satellite training:

Bureau of Environmental Epidemiology staff participated in the development of two satellite training presentations: National Laboratory Training Network (NLTN): Vibrio vulnificus: Not A Pearl You Want To Find (broadcast February 26, 1999) and Tracebacks of Fresh Produce and Other Commodities (broadcast June 15-16, 1999). The Bureau of Environmental Epidemiology facilitated both of these broadcasts at sites across the state in addition to the broadcast of the FDA-sponsored Foodborne Illness Investigations (March 16-18, 1999). Access was made available to staff of all state agencies, federal agencies and interested private parties.

How To Investigate Foodborne Illness Training:

This 6-hour module gives a very brief background in basic microbiology, gives the step-by-step process of a foodborne outbreak investigation, and ends with a practical exercise applying the principles used in the course. The evaluations have been very good and the course has been

very well received. The module is targeted to health department staff (environmental health and nursing) who are involved in foodborne outbreak investigations. Nursing CEUs have been obtained as well. First choice is for health department training with training offered to other agencies who have food hygiene functions when space is available (DEP, DOC, DACS, DBPR - these agencies account for approximately 7 of the environmental health professionals in the total). The regional food and waterborne illness epidemiologists have made a huge effort to ensure the success of this training. In 1999, a total of 37 environmental health professionals and 25 nurses completed this training.

Training modules currently under development:

1) Surveillance and Investigation of Waterborne Disease Outbreaks
2) Developing Questionnaires and Writing Reports
3) In-Depth Overview of Common and Emerging Pathogens
4) Recreational Waterborne Disease Outbreak Investigations

Outbreak Definitions

Foodborne illness outbreak: An outbreak is an incident in which two or more persons have the same disease, have similar symptoms, or excrete the same pathogens; and there is a time, place, and/or person association between these persons. A foodborne disease outbreak is one in which a common food has been ingested by such persons. Nevertheless, a single case of suspected botulism, mushroom poisoning, ciguatera or paralytic shellfish poisoning, other rare disease, or a case of a disease that can be definitely related to ingestion of a food, can be considered as an incident of foodborne illness and warrants further investigation.

Confirmed outbreak: A confirmed foodborne outbreak is an outbreak that has been thoroughly investigated and the results include strong epidemiological association of a food item or meal with illness. A thorough investigation is documented by

- diligent case finding,
- interviewing of ill cases and well individuals,
- collecting clinical and food lab samples where appropriate and available,
- confirmation of lab samples where possible,
- field investigation of the establishment(s) concerned, and
- statistical analysis of the information collected during the investigation.

The summary report of all of the information collected in an investigation in a confirmed outbreak will indicate a strong association with a particular food and/or etiologic agent and a group of two or more people, or single incidents as described above.

Suspected outbreak: A suspected foodborne outbreak is one for which the sum of the epidemiological evidence is not strong enough to consider it a confirmed outbreak.

Selected Foodborne Outbreaks

Salmonella Typhi Outbreak from Imported Frozen Mamey Fruit, Miami-Dade County, December 1998-February 1999

From December 1998 through February 1999, 16 cases of typhoid fever were reported to the Florida Department of Health in state residents. They had no history of international travel. The cases were not related in any obvious way other than through Hispanic ethnicity. Thirteen of the cases were in Miami-Dade county residents so the Miami-Dade County Health Department took the lead in the investigation. Two other cases were reported by Palm Beach County and one in Pinellas County.

Typhoid fever, an illness characterized by sustained fever, headache, malaise, anorexia, nonproductive cough, and constipation, is caused by the bacterium *Salmonella* Typhi. Case fatality rate is less than 1% with the prompt use of antibiotics. However, without rapid treatment 10% of cases result in death. The reservoir for this organism is humans, and transmission can occur from person to person by the fecal-oral route. The most common vehicles of transmission are food and water. Implicated vehicles in the past have been raw shellfish (oysters), raw fruits, and vegetables that may have been contaminated with human feces and urine. The incubation period for this illness is from three days to one month with an average of 8 to 14 days. The duration of symptoms can last up to two weeks, and a carrier state may extend up to 3 months. A small percentage of untreated patients become permanent carriers.

Cases of typhoid fever in Florida average about 15 per year. In Miami-Dade County the average is 3 to 10 cases per year. With 16 cases in three months exceeding the total for the yearly average for both the state and the county, investigators knew that an outbreak was likely. Initially, no vehicle could be implicated and there appeared to be nothing in common with any of the cases, except their Hispanic ethnicity. One health department investigator, aware of Hispanic dietary preferences, noticed that a few of the cases had reported consuming mamey batidos. In order to confirm the hypothesis that this was the vehicle, a matched case-control study was conducted by telephone using the initial 12 reported cases and 48 controls acquired through systematic digit dialing. This was done to determine if an initial association with mamey fruit shakes was significant. The state laboratory, performed pulse field gel electrophoresis (PFGE) on fifteen of the *Salmonella* Typhi isolates to determine if they were related. All fifteen *S.* Typhi isolates tested were identical by PFGE. Consumption of fruit shakes (batidos) made with frozen mamey was associated with illness (Matched Odds Ratio 8.8, 95% Confidence Interval 1.6 - 89.4).

The investigation included visits to all major distributors of frozen mamey pulp in Miami-Dade County and a traceback by FDA of the product in the countries of origin. Testing of various samples of the product was done by both state and federal agencies and the results showed high coliform counts. However, no *Salmonella* Typhi was isolated from the product. No local fresh mamey fruit was implicated as the harvesting and marketing period for the fresh fruit had not begun during the time of exposure of the cases. A stop sale on the frozen product was issued by the state agencies and FDA announced a nationwide warning and voluntary recall.

Contaminated frozen mamey was the likely cause of the outbreak of typhoid fever in Florida. This investigation demonstrates the power of classic epidemiologic methods combined with modern

molecular epidemiology to quickly identify outbreaks associated with ready-to-eat products heretofore not considered to be potentially hazardous.

Salmonella Anatum infections associated with unpasteurized orange juice in Sarasota County, February-March, 1999

On March 23, 1999 the Connecticut Department of Health reported to the Florida Department of Health that a one-year old boy from Connecticut who spent his vacation in Sarasota, Florida from February 27 through March 6, 1999 was diagnosed with gastrointestinal illness caused by *Salmonella* Anatum. The onset was March 6, with vomiting, diarrhea and blood in the stool. Regional epidemiologists from the Bureau of Epidemiology and from the Bureau of Environmental Epidemiology identified four additional cases. On January 19, a 63 year-old man from Palm Beach County was reported to have an infection with *S.* Anatum. On March 11, a 60-year-old woman from Sarasota County was reported with a *S.* Anatum infection with onset on February 26. On March 16, another *S.* Anatum infection in a 64-year-old woman from Sarasota County was reported whose onset date was March 3. On February 23, a one-year old boy from Duval County was reported to have an infection with *S.* Anatum with onset on February 13.

Salmonella are gram-negative, non-spore forming rods. Currently there are over 2,300 species of *Salmonella,* but only 150 have been associated with disease. The primary reservoir of *Salmonella* is the intestinal tract of domestic (pets) and wild animals and humans. Salmonellosis is an infection caused by the ingestion of raw or contaminated food or water, from person-to-person transmission or from contact with animals. There are four major contributing factors to outbreaks of salmonellosis. These include temperature abuse, inadequate cooking, contaminated raw ingredients and cross-contamination. Optimum growth temperature of *salmonella* ranges from 41 -115°F; pH range 4 – 9; and water activity range of 0.945-0.999. Symptoms of illness include headache, abdominal pain, diarrhea, fever, nausea and sometimes vomiting. Incubation period ranges from 6 – 72 hours (usually 12 – 36 hours). Duration of illness ranges from 1 – 7 days (usually 2 – 3 days). Foods associated with salmonellosis include raw and undercooked eggs/egg products, raw milk, contaminated water, meat/meat products, poultry/poultry products, raw fruits and vegetables and unpasteurized juices.

Interviews with the five cases revealed that the three cases that had been in Sarasota County during the incubation period all had consumed unpasteurized orange juice from a roadside orange grove in Nokomis shortly before becoming ill. No other commonalties were found in their food exposures. Given the cluster of three cases within 8 days from the same geographic area and with a common food exposure, the Florida Department of Health initiated an investigation.

An inspection/investigation of the facility was conducted by the Florida Department of Health and the Florida Department of Agriculture and Consumer Services reviewing processing procedures, sanitary practices, and the cultivation and harvest of the fruit.

The owner/manager of the roadside store in Sarasota County provided a list of shipping orders from the last 2 weeks in February through the first 2 weeks in March. From this list, customers who had placed orders from February 18, 26 and March 5 with Florida addresses were chosen for the study (total 251). A two-page questionnaire was designed to ask about consumption of products from the roadside store and any illness from February 1 through April 5, 1999. Exposure was defined as consumption of orange juice made at the store and/or orange- flavored ice cream made with orange juice from the store and sold at the store between January 1 and

April 5, 1999. Illness was defined as any episode of diarrhea or vomiting between February 1 and April 5, 1999. Diarrhea was defined as three or more loose stools in 24 hours.

One hundred and thirty-four (134) persons (53%) were available for the interview. Nineteen customers had not been at the roadside store of the manufacturer during the period of interest. Among the 115 customers left for the study, 7 customers reported an illness episode meeting the case definition of diarrhea or vomiting; two of them sought physician treatment; none had a stool sample done. Interviewees with orange juice consumption and/or orange-flavored ice cream were 4.2 times more likely to have had an illness than those who did not consume any of those products (attack rate 9%). The association however was not statistically significant (95% confidence interval = 0.5-33.3, Fisher exact test 0.24).

Pulse-field gel electrophoresis (PFGE) was done on stool samples of all five confirmed cases reported to the Florida Department of Health. The Florida Department of Health and the Florida Department of Agriculture and Consumer Services collected food samples for laboratory analysis. The PFGE results from the three stool isolates of the 1 Connecticut and 2 Sarasota County cases were identical, whereas the isolates from the cases in Duval and Palm Beach Counties were genetically distinct.

Of the 6 samples (4 juices, 2 ice cream) taken on April 2, 1999 from the production plant, only the orange juice from the production line tap was positive on the Reveal Salmonella Microbial Screening test. *Salmonella sp.* was detected by chromatographic antigen assay. The *Salmonella* was non-viable for culture and therefore could not be serotyped. No *Salmonella spp.* were detected in the other samples. There was no evidence of fecal coliforms; all samples were <3 MPN/gm. The laboratory analysis from the Department of Agriculture and Consumer Services on the 4 samples (2 juice, 2 ice cream) were negative for Salmonella.

The Florida Department of Health Bureau of Laboratories reported that the seven samples taken on April 13,1999 – after the store had been asked to clean the production facility – were also found to be negative for *Salmonella.* There were no coliforms present in the water samples. The 3 unopened juice samples (2 orange, 1 grapefruit) that the Department of Agriculture and Consumer Services collected on April 13 were found to be negative for *Salmonella,* however one orange juice sample contained low levels of *E.coli* (0.916 MPN), indicating fecal contamination. The pH of the orange juice was 3.65.

Several violations were detected during the site inspection. Old food and mold residue on the conveyor system leading into the juice room, mold growth on rollers and straps on the wash line, mold growth on the product areas of the juicer and in the cooler in the ice cream room. Lids for juice bottles were not stored covered in the juice room and the storage tubs for lids were soiled. The screen door to the juice room was not kept closed while processing. The area where oranges are loaded onto the conveyor leading into the processing room is not protected from the outside environment. This area is outside the building with little or no overhead protection.

The epidemiological evidence, the laboratory results and the inspection all lead to the conclusion that the orange juice and/or orange-flavored ice cream made with orange juice produced at the store may have been contaminated with *S.* Anatum and caused the gastrointestinal illness in an unknown number of customers. Three confirmed cases with *S.* Anatum were reported and 7 suspected cases were identified by the study. The fact that all three confirmed cases (2 from Sarasota County and 1 from Connecticut) had identical PFGE bands and all three had exposure to the orange juice produced at the store during the same time period strongly suggests that the

orange juice was the source of illness, especially since *S.* Anatum occurs so rarely. This assumption is further supported by the fact that the two *S.* Anatum isolates that were not epidemiologically linked to the store had different molecular patterns. It cannot be determined if the oranges were contaminated before they were sold or used for juice and ice cream production, or if the oranges or their final products became contaminated somewhere in the production or storage process. No salmonella could be cultured from the orange juice and the source of Salmonella is unknown. However, the screening test was positive which indicates that salmonella may have been present in the juice but at a low concentration. Also, the other fecal bacteria cultured in the juice could have overgrown the Salmonella when cultured in the laboratory. In any case, the fact that fecal bacteria were cultured from the juice indicates that the juice was contaminated with fecal pathogens. Mold residues on various parts of equipment that have contact with the oranges or with the juice demonstrates that the opportunity for contamination was existent.

The State of Florida was the site of another fresh-squeezed orange juice outbreak in 1995 with 63 cases attributed to S. Hartford.[3] In addition, in 1999, unpasteurized orange juice contaminated with S. Muenchen caused over 207 illnesses in several western states and Canada.[4] Australia also experienced an outbreak of S. Typhimurium in 502 people linked to unpasteurized orange juice.[5]

Foodborne Outbreak at a Catered Wedding, Broward County, April 1999

On April 16, 1999 the Broward County Health Department was notified of a suspected foodborne illness outbreak involving approximately 180 individuals attending a catered wedding reception on April 10, 1999.

The caterer was not licensed and was operating out of a home kitchen facility. According to the caterer, all foods were prepared by three food workers. There was no reported illness among the food preparation staff or the wait staff during the two weeks prior to the event. The caterer provided an extensive menu of the foods served at the wedding reception and a food preparation review was conducted of selected menu items.

All menu items were prepared by the caterer, except the boiled shrimp and cocktail sauce, which were prepared by the groom's father and delivered to the caterer's home the morning of the reception for delivery to the clubhouse by the caterer. The buffet line was set up by 4:30pm to begin food service at 6:00pm However food service was delayed till 7:00pm. Food thermometers were not available to monitor food temperatures, and temperature checks were not conducted by the food workers.

A questionnaire was administered to 76 (42%) attendees. A case was defined as anyone who attended the catered reception, and became ill with symptoms of diarrhea and one or more of

[3] Cook, K.A. et al. Outbreak of Salmonella serotype Hartford infections associated with unpasteurized orange juice. Journal of the American Medical Association, 280(17):1504-1509.
[4] Boase, J. et al. Outbreak of Salmonella serotype Muenchen infections associated with unpasteurized orange juice – United States and Canada, June 1999. Morbidity and Mortality Weekly Report, Centers for Disease Control and Prevention, July 16, 1999, 48(27):582-585.
[5] Krause, G. et al. An Outbreak of Salmonella serotype Anatum Infections Associated with Unpasteurized Orange Juice. Accepted for publication by the Southern Medical Journal, September, 2000 (no publication date at this time).

the following symptoms: abdominal cramps, nausea, headache, fatigue, or vomiting. Of the 76 interviews conducted, 28 (36.8%) reported illness and 27 met the case definition. All 27 cases (100%) reported diarrhea; 18 (67%) abdominal cramps, nausea, headache, fatigue and vomiting in descending order of frequency of reported occurrence. The median incubation period was 13 hours (range 7-46 hours); median duration was 24 hours (range 2-72). Median age was 42 (range, 9-92); 19 (74%) were female; 8 (26%) were male. There were no hospitalizations or deaths related to the outbreak.

Statistical analysis suggests the most likely vehicle of the etiologic agent to be the roast beef, as the incidence of illness was zero among those not exposed to roast beef, and 39% among those exposed to roast beef. The creamed potatoes showed statistically significant association with illness as well, however this association was most likely due to the potatoes being a favored accompaniment to roast beef. Statistically significant association of illness with any of the other foods could not be established.

Five food samples were collected and submitted to the department's Bureau of Laboratories in Jacksonville for analysis: 1) creamed potatoes, 2) roast beef, 3) shrimp, 4) chicken, and 5) cocktail sauce. All samples were negative for *B. cereus* toxin. *C. perfringens* was found in the sample of chicken. Clinical specimens were not available for testing. The food samples were co-mingled on a single plate in the refrigerator of the complainant, which could account for cross-contamination of foods with the etiologic agent.

The incubation, symptoms, and duration of illness reported and the implicated food suggest an illness consistent with a bacterial infection of *C. perfringens*. It is an anaerobic, spore-forming rod that is widely distributed in the environment and frequently occurs in the intestines of humans and many domestic and feral animals. Spores of the organism persist in soil, sediments, and areas subject to human or animal fecal pollution. The common form of perfringens poisoning is characterized by intense abdominal cramps and diarrhea which begin 8-22 hours after consumption of foods containing large numbers of *C. perfringens* bacteria capable of producing the food poisoning toxin. The disease generally lasts 24 hours. In some individuals, less severe symptoms may persist for 1 or 2 weeks. Complications and or death rarely occur.

In most cases the actual cause of poisoning by *C. perfringens* is temperature abuse of prepared foods. Because the organism is a spore former, its presence in prepared foods that have been time/temperature abused could lead to renewed growth of the organism to food poisoning levels during cool down, storage, and transportation of foods. Meats, meat products, and gravy are the food most frequently implicated.

A small domestic kitchen, intended for the preparation of food for small family groups, was used to cater an event of 200 wedding reception attendees. The limitations in the available space for preparation and storage, and the lack of temperature control equipment, in particular the lack of refrigeration, posed a problem to the safe handling, storage, and transportation of the foods during and after delivery. It is evident the home based kitchen facility did not have sufficient hot and cold holding equipment to accommodate the numbers of pans used to store and transport the foods. These circumstances coupled with the volume of foods prepared suggest time/temperature control abuse of the foods that subsequently led to a foodborne illness outbreak. Time/temperature abuse of foods is one of the leading factors in rapid bacterial growth that can lead to foodborne illness. Though laboratory techniques failed to detect the organism on the roast beef, it does not obviate the likelihood the roast beef was the most probable suspect vehicle based on the statistical analysis and the frequent association of roast beef with *C.*

perfringens outbreaks. Cross contamination may have occurred between the roast beef and the chicken.

Cyclosporasis At A Hotel Convention, Palm Beach County, May, 1999

On June 18, 1999, the Centers for Disease Control and Prevention (CDC) confirmed that multiple stool samples from infected persons in California and Wisconsin were positive for *Cyclospora cayetanensis,* a parasite, after attending a convention in Palm Beach County, Florida at the Breakers' Hotel in Palm Beach. Because of the multi-state involvement and the emerging nature of the cyclospora as a foodborne pathogen, the Florida Department of Health requested an Epi Aid from the CDC.

Cyclospora cayetanensis is a one-celled parasite causing watery diarrhea, (6 or more stools/day), nausea, anorexia, abdominal cramps, fatigue and weight loss. The median incubation is approximately one week. Diarrhea is self-limiting, but in immunocompromised persons, it can last several months. Transmission can be waterborne, but has been traced to imported berries, particularly, raspberries, as well as mesclun lettuce and basil. Cyclosporiasis can be treated with oral trimethoprim (TMP) -sulfamethoxazole (SMX). If the illness is not treated, illness can be protracted, with remitting and relapsing symptoms.

A retrospective cohort study was conducted and information about symptoms, event-food consumption, non-event meals in hotel restaurants, and international travel was collected. A case of cyclosporiasis was defined as onset of illness from 1 to 14 days after the beginning of the convention and either: a) a positive stool specimen and at least one gastrointestinal (GI) symptom or constitutional symptom, b) three or more loose stools in a 24-hour period and one other GI symptom, or c) a total of 4 or more GI symptoms. GI symptoms included nausea, vomiting, stomach cramps, gas/bloating, loss of appetite, and unintentional weight loss. Constitutional symptoms included fever, chills, muscle aches, joint aches, headaches, and fatigue.

On June 19, the CDC and the Florida Department of Health (FDOH) toured the hotel's main kitchen. A Hazard Analysis of Critical Control Point investigation was conducted to review food preparation, ordering, inventory practices, functioning of equipment, employee illness, and possible changes in the normal kitchen routine for the first 3 weeks in May. On July 16, the CDC and the FDOH returned to the hotel for additional information regarding the preparation of fresh produce. A traceback investigation for produce delivered to the hotel was also conducted.

Ninety-four (94) persons (43.9%) had illness that met the case definition, 14 (14.9%) of whom were laboratory confirmed for cyclosporiasis. Of the 94 cases, 46 (48.9%) were male, and the median age was 48 years. Incubation periods ranged from 1 day to 14 days, with a median onset of 7 days after the beginning of the convention. The major symptoms included diarrhea (97.9%), gas/bloating (90.3%), cramps (88.3%), appetite loss (86.2%), fatigue (86%), weight loss (82.2%), nausea (61.7%), headache (58.2%). No food service employee reported any gastrointestinal illness during April, May, and June, and none reported any foreign travel. No problems were found with the storage or preparation of fresh produce.

Multivariate analysis demonstrated that this was a foodborne outbreak associated with one of several convention events that was held at the hotel and the transmission vehicle was most likely either fresh strawberries, blackberries, blueberries, or raspberries served on May 13 or May 14, 1999.

Amplification of Intermittent Community Acquired Norwalk-like Virus Illness via Food, Polk County, May 1999

On May 28, 1999 the Polk County Health Department was notified that 17 to 25 people who attended a dinner party at a private residence on May 23, 1999 experienced gastrointestinal symptoms the following day. This event was attended by 30 people and was catered by a licensed food service facility. Symptoms described by the initial complainant included diarrhea, severe vomiting, and fever.

A total of 33 people were interviewed with 28 (84.8%) reporting gastrointestinal illnesses. The 33 people interviewed included 26 persons who attended the event, 2 food workers who prepared food for the event, and 5 family members of the owners of the implicated food service facility. A total of 30 of the 33 interviewed reported consuming food which was prepared for the catered event. One person consumed food on May 22 while the rest ate sometime during May 23 with the majority of the food consumption being at approximately 6pm. Six who reported illness were either owners of the implicated food service facility, food workers at the facility, or family members of the owners.

The owner and cook of the implicated catering business became ill on May 22, 1999 about 8:30pm and assisted with food preparation on the May 22 and 23. Two of five family members of the owner of the catering company became ill with gastrointestinal symptoms on May 22 at 10:30pm and midnight. One other family member became ill on May 23 at 8:00am. The other two family members had similar illnesses with onsets on May 24 at 10:00am and on May 26 at 11:00pm. Two of the five ill family members did not consume any of the food prepared for the May 23 event. This gastrointestinal illness was characterized by diarrhea (100%), vomiting (83.3%), aching muscles (66.7%), chills (50.0%), nausea (33.3%). Cold sweats (33.3%), headache (33.3%), dizziness (33.3%), fever (33.3%) abdominal cramps (16.7%), and sore throat (16.7%).

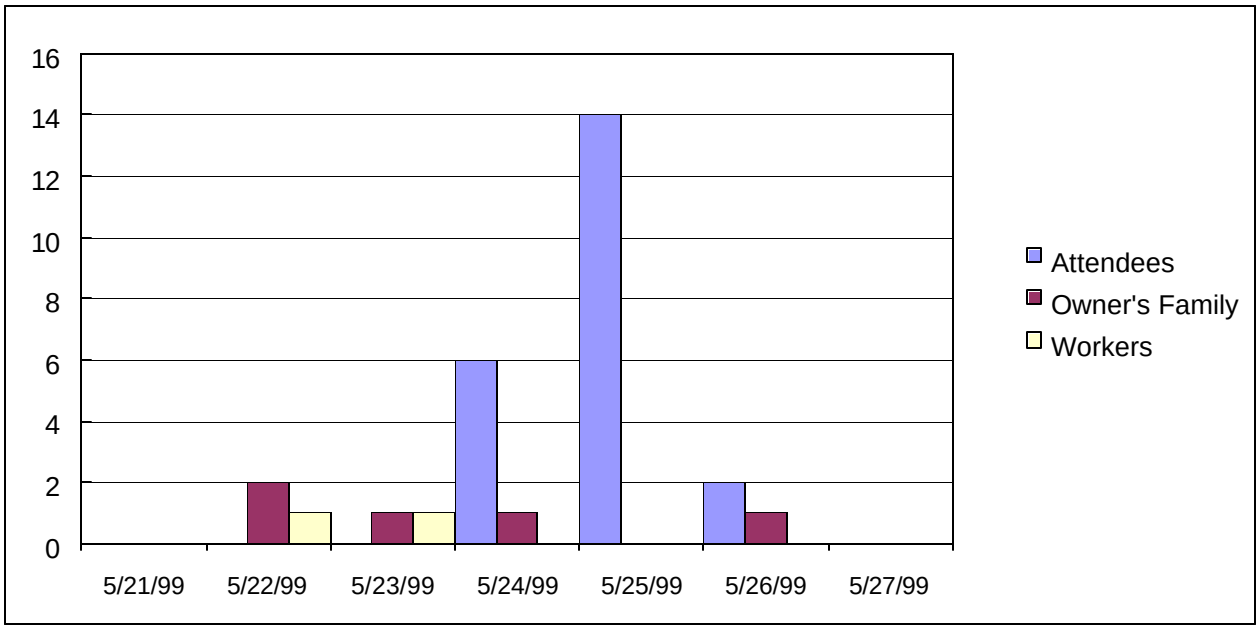
The gastrointestinal illness in this family appears to have originated with a nine-month-old baby who became ill on May 22 at 12am after attending a local church's Mother's Day Out event on May 20, 1999. The infant's mother became ill on May 22, 8:30pm and the grandmother (the caterer) became ill on May 22 approximately 8:30pm. The grandfather (husband of the caterer) became ill on May 23. The father of the infant became ill on May 24, 1999. The family had a dinner and visit on Friday, May 21, 1999. The grandmother admitted to changing the 9-month-old's diaper during this visit.

Symptoms reported by the 22 ill attendees of the implicated event included diarrhea (87.5%), nausea (78%), aching muscles (75.0%), chills (58.3%), vomiting (58.3%), abdominal cramps (58.3%), headache (52.2%), fever (47.6%), cold sweats (37.5%), dizziness (23.8%), and sore throat (4.2%). The self-reported fevers ranged from 99.0°F to 101.0°F with a mean of 99.8°F and a mode and median of 100°F. The duration of the symptoms was described a ranging from 12 to 144 hours with a mean of 45.7 hours, mode of 24 hours, and a median of 48 hours. Physician care was sought by 4 of the attendees.

The calculated incubation period for those that became ill following the consumption of food ranged from 8 to 59 hours with a mean of 34.75 hours, mode of 8 and 38 hours, and a median of

36.5 hours. Figure 3 depicts the onsets of illnesses by days for the attendees, food workers, and family members.

Figure 3: Illness by Day of Onset, Polk County Outbreak, May 1999



Fecal specimens were negative for shigella, salmonella, and campylobacter isolates. Three of eleven samples were positive for the Norwalk-like virus (NLV) with the G2 primers. The department's Bureau of Laboratories, Tampa Branch performed the fecal and food product analysis.

None of the food products demonstrated significant associations with illness. This could be due to the small sample size, the very high attack rate of outbreak, most of the food products being consumed by all who ate at the event, all or the majority of food products being contaminated, or a combination of more than one of these factors. Although the attack rate was not shown to be statistically significant, the food product that accounted for the majority of the illness was a seven-layer salad. Laboratory analysis of collected food product was inconclusive. The investigation of the implicated food service facility disclosed a lack of hand drying devices at the handwash sink, insufficient handwashing procedures, lack of temperature monitoring of potentially hazardous foods throughout the preparation, storage and transportation processes, and potential for cross contamination.

This outbreak of gastrointestinal illness was strongly associated with the consumption of food at the May 23, 1999 party at a private residence catered by a licensed catering company. The causative agent was the Norwalk-like virus based on the results of the laboratory analysis of fecal samples collected from the cases. The described symptomatology is characteristic of previously confirmed foodborne illness outbreaks associated with this virus. Food items that are frequently handled by food workers without heat treatment are generally associated with outbreaks of Norwalk-like viral illnesses. The presence of similar illnesses in the family members of food preparers and servers with illnesses occurring prior to the catered event and with secondary illness subsequent to the event is characteristic of outbreaks caused by this very

potent agent. The observed environmental conditions in this outbreak were conducive to the introduction and transmission of a viral agent.

The Norwalk-like viruses are small, structured RNA viruses classified as caliciviruses. It is an environmentally hardy virus with a low infectious dose. Humans are the only known reservoir and the virus is typically transmitted by the fecal-oral route. Transmission is generally through contaminated foods or water. Food products routinely implicated are those that are frequently handled without subsequent heat treatment. Shellfish contaminated with human feces are also associated with outbreaks. Secondary transmission to family members frequently occurs during outbreak scenarios. There is evidence of airborne transmission for people with close contact with symptomatic persons. Fomites have also been shown to contribute to the transmission of this virus. Nausea, vomiting, diarrhea, abdominal pain, myalgia, headache, malaise, and low-grade fever characterize the illness. The illness is self-limiting and the symptoms generally last 24-48 hours. The incubation period ranges from 10-50 hours although it is usually 24-48 hours.

Escherichia coli 0157:H7 Outbreak, Duval County, July, 1999

On July 1, 1999, a physician at a Jacksonville Medical Center notified the Duval County Health Department Epidemiology Program that there were seven people hospitalized with bloody diarrhea. It was also reported that they had attended a church supper on June 23, 1999. Most of the individuals became ill the weekend of June 26. The Duval County Division of Environmental Health, the Florida Bureau of Environmental Epidemiology, and the Florida Department of Agriculture and Consumer Services were asked to assist with the investigation of the outbreak.

The church routinely has church suppers from 5pm - 6pm on Wednesday evenings. During those suppers, meals are also provided for take-out. The majority of attendees are church members. There is one full-time cook. The church also operates a day care center. The same kitchen is utilized for the church and the day care center.

Individuals who attended the church supper were identified and interviewed. A case was defined as any individual who attended the supper or had take-out and developed diarrhea after June 23, 1999. A total of 50 individuals attended the church supper or had take-out on June 23. Forty-nine were interviewed and 17 (35%) met the case definition. Among those who ate at the church supper, rather than ordering take-out, 15 (41%) out of 37 were ill. For those ordering take-out, two (17%) out of 12 were ill. The mean age of cases was 59; the median was 67. The mean age among non-ill individuals was 56; the median was 59. Among cases, 53% were female and 47% were male. Among non-ill attendees, 78% were female and 22% were male. The incubation period ranged from one to seven days; the mean was three days. Symptoms included the following: diarrhea 100%, abdominal cramps 82%, fatigue 53%, bloody diarrhea 47%, nausea 41%, dizziness 29%, muscle aches 24%, fever 18%, headache 18%, and vomiting 12%,. Seven cases (41%) were hospitalized. The mean duration of illness was 6 days. None of the cases developed hemolytic uremic syndrome or thrombotic thrombocytopenic purpura. There were no deaths.

Stool samples were obtained from 14 individuals. Eight were culture positive for *E. coli* 0157:H7. Among the six culture negative cases, two were Elisa immunoassay (EIA) positive for enterohemorrhagic *E. coli*.

E. coli 0157:H7 was first identified in 1982. The incubation period ranges from 2 to 8 days, with an average of 3 to 4 days. Disease severity may range from mild non-bloody stools, to severe bloody diarrhea. The elderly and very young are more susceptible. Duration of the illness may

be several days to several weeks. Cattle are the main reservoir of infection. Outbreaks have been associated with undercooked meat, unpasteurized milk, unwashed vegetables, and apple cider. Person-to-person transmission may also occur. Waterborne outbreaks of *E.coli* O157:H7 have also been documented.

The cook was not ill prior to or after the supper. The cooks stool specimen tested negative for *E. coli* 057:H7. Foods that were served included: a beef and broccoli dish with gravy, white rice, biscuits, salad, various salad dressings, vanilla pudding, ice tea, and coffee.

The roast beef was purchased at a local meat market. It was cooked by the church cook on Tuesday, June 22, left out to cool to room temperature, and refrigerated overnight. No thermometer was used. On the morning of Wednesday, June 23, it was taken to the meat market and sliced. Approximately two hours prior to serving, the roast beef was reheated at 250 °F. Frozen broccoli was added. The oven temperature was then raised to 350 °F. The gravy was made on top of the stove and then poured over the beef and broccoli. The dish was then placed on a steam table. The rice was prepared the morning of June 23 and allowed to remain on the stove, at room temperature, until 5pm that evening. The salad consisted of pre-washed, pre-cut salad mix. It was not re-washed prior to service. Tomatoes and cucumbers were added. The tomatoes were washed prior to being added to the salad. The vanilla pudding was a canned pudding. Heated foods were served from Bunsen burners at a pass-through kitchen. Leftovers, excluding the iced tea and pudding, were reserved for children and staff at the day care center on Thursday, June 24. None of the children or staff became ill as a result of the leftovers.

Relative risks, 95% confidence intervals, chi-squares, and p-values were calculated for each food. When attack rates were analyzed, no particular food showed a statistically significant relative risk. Food specific attack rates ranged from 32% to 48%. The highest attack rates were as follows: iced tea 48%, ice in drinks 48%, and beef and broccoli (excluding those who had it reheated prior to eating) 44%. Among cases, 71% drank the ice tea, 77% had ice in their drink, and 100% had the beef and broccoli. Cases who ate earlier, between 5pm and 5:30pm, were three times more likely to become ill (Relative Risk 3.05, 95% Confidence Interval 1.03, 9.02, p-value = .018).

A limited number of foods were served at the church supper. However, no food showed a statistically significant association with the illness. The highest attack rates were associated with iced tea and consuming drinks containing ice, but both are very unlikely sources of this outbreak. The beef and broccoli was the only food eaten by 100% of the cases and it was the most likely source of this outbreak. It is most likely that the beef was either 1) inherently contaminated and never cooked to a high enough temperature to kill the bacteria; or 2) cross-contaminated when it was brought back to the meat market for slicing and then not cooked to a high enough temperature prior to serving. It appears that the leftover beef was reheated to a high enough temperature the following day, which explains why it was not associated with any illnesses in the day care center.

Outbreak of Gastroenteritis Associated With an Interactive Water Fountain at a Daytona Beachside Park, Volusia County, August, 1999

During August 23-27, the Volusia County Health Department (VCHD) received reports of three children with *Shigella sonnei* infection whose common exposure was an interactive water fountain at a beachside park that had opened August 7. Two cases of *Cryptosporidia parvum* were also identified in later stool samples from children that had played in the park fountain.

Shigellas are grouped into 4 serotypes. Group A, *S. dysenteriae*; Group B, *S.flexneri*; Group C*, S. boydii* and Group D, *S. sonnei*. *S. sonnei* species is the most common Shigella in developed countries. The only significant reservoir for Shigella bacteria is humans. The organisms are spread by direct and indirect fecal-oral transmission. Direct transmission occurs from symptomatic persons or asymptomatic carriers to others by lack of adequate personal hygiene. Indirect transmission occurs via contaminated water and milk. Shigella has a low infectious dose of 10 to 100 organisms. The incubation period ranges from 12 to 96 hours but is usually 1 to 3 days. The illness is characterized by diarrhea, fever, vomiting and cramps. The stools may contain blood and mucus. Duration of the illness is usually 4 to 7 days.

Cryptosporidia parvum is a parasitic protozoan. Reservoirs of this parasite are humans, cattle and domestic animals. Transmission is fecal-oral, person to person, animal to person and waterborne and foodborne. Outbreaks of Cryptosporidiosis have been associated with day care centers, drinking water, recreational waters; pools, waterslides and lakes as well as consumption of unpasteurized apple juice. Cryptosporidiosis has a low infectious dose and the organism is resistant to chlorination. The incubation period ranges from 1 to 12 days with an average of 7 days. The predominant symptom of cryptosporidiosis is diarrhea, which can be profuse and watery. Other symptoms include cramps, vomiting, malaise and anorexia. Symptoms may lessen and then reoccur but duration of illness is usually no more than 30 days.

The VCHD and the Bureau of Environmental Epidemiology conducted a case-control study among a sample of park attendees, including 34 members of a teenage group that had attended a beach party near the park on August 14 and 52 family members of persons who had reported illness to the health department. A case of gastrointestinal illness was defined as abdominal cramps or diarrhea (three or more loose stools within a 24-hour period) in a person who visited the park during August 7--27, with illness onset <12 days after the visit. Study participants were contacted by telephone and interviewed using a standard questionnaire.

Of 86 park visitors interviewed, 38 (44%) had illness that met the case definition. Onsets of illness occurred during August 15--September 2). The median age of ill persons was 8 years (range: 2--65 years); the median age of well persons was 15 years (range: 5--47 years). Twenty-five (66%) ill persons were male. The most common symptoms reported included diarrhea (97%), abdominal cramps (90%), fever (82%), vomiting (66%), and bloody diarrhea (13%). *S. sonnei* was isolated by culture of stool specimens from five (36%) of 14 ill persons tested. *C. parvum* oocysts were identified in stool specimens from two persons. All 38 ill persons, compared with 32 (67%) well persons, had entered the fountain. Other associated risk factors for illness included fountain water ingestion (OR=52.5; 95% CI=9.8-377.0) and consumption of food or drink at the interactive fountain (OR=4.7; 95% CI=1.6-14.3).

On August 27, investigators conducted an environmental assessment of the park, a paved area of approximately 2-3 acres adjacent to the beach in Daytona Beach, which included bathrooms, outdoor showers, vending machines, and the interactive water fountain. The fountain used recirculated water that drained from the wet deck/play area floor (no standing water) into an underground reservoir. The recirculated water passed through a hypochlorite tablet chlorination system before being pumped back to the reservoir and then to several high-pressure fountain nozzles at ground level throughout the play area. No filtration system had been installed. Investigators identified several potential opportunities for water contamination. The fountain was popular with diaper- and toddler-aged children who frequently stood directly over the nozzles.

Chlorine levels were not monitored, and the hypochlorite tablets that deplete after 7-10 days of use had not been replaced after the park opened August 7.

On August 27, the fountain was closed by the health department. The fountain reopened December 12 after several control measures were implemented. First, a cartridge filtration system was installed, and a chlorine monitor was installed to halt fountain operation automatically when residual chlorine levels fall below 3 ppm. Second, a sign was posted advising visitors to shower before entering the fountain and to avoid fountain water consumption. Third, children in diapers were excluded from entering the fountain. No further illness has been associated with the fountain.

This report documents the second recorded outbreak of gastroenteritis associated with an interactive water fountain and highlights the risk for transmitting diarrheal illness in recreational water activities other than a traditional water-filled pool. Outbreaks of gastroenteritis associated with recreational water exposure are recognized with increased frequency. Interactive fountains using recirculating water are new to traditional waterpark amusements (i.e., slides and wave pools). Because these fountains are attractive to diaper- and toddler-aged children, recreational water may be at high risk for contamination by enteric pathogens through overt fecal accidents or rinsing of contaminated bodies in the water.

To reduce risk for contamination and disease transmission, persons visiting recreational water venues should

1) avoid entering a traditional pool or playing in an interactive fountain if they have diarrhea,
2) avoid swallowing pool or fountain water,
3) practice good hygiene by taking a soap and water shower at home or at the pool, especially after a bowel movement and before entering the water, escort young children to the toilet frequently and clean their bottoms thoroughly before allowing them to resume play (Parents should be aware that no diaper (including swim diapers or swim pants) completely prevents stool leakage. If diapered children are to play in water parks, diapers should be changed immediately after a bowel movement in restrooms where hands and bottoms can be washed thoroughly with soap and water.)
4) avoid sitting on or over fountain jets because this can increase the risk for water contamination, and
5) take precautions not to contaminate foods or beverages consumed in or near the bathing area with pool or fountain water.

Botulism Outbreak in Sarasota County, September, 1999

On September 11, 1999 the Sarasota County Health Department was informed that two females, a mother and daughter, ages 79 & 52 were admitted to Sarasota Memorial Hospital with neurological symptoms suggestive of botulism. Their symptoms included nausea, abdominal pain, vomiting, blurred/double vision, dysphagia (difficulty in swallowing), dysphonia (difficulty in speaking), dyspnea (difficulty in breathing), muscle weakness, dizziness, tightness in chest, ptosis (drooping of the upper eyelid) and paralysis. Onset of illness was 13 hours. A common meal was shared on September 8 which included; roasted chicken, baked stuffed potato, garden salad (lettuce, tomato, green onions, mushrooms) with home prepared dressing, home bottled garlic infused oil and soy milk. The daughter's husband, age 52, had also attended

this meal, however, his meal included shrimp, potato, salad and oil from the home bottled garlic as salad dressing. He became symptomatic on September 10. The emergency room observed the husband for 18 hours and sent him home with mild symptoms. On September 12, the husband returned to the emergency room and was admitted to the hospital. His symptoms included blurred/double vision, dysphonia, fatigue, and ptosis. The three patients have since received botulism anti-toxin from Centers for Disease Control and Prevention (CDC).

Botulism is an intoxication caused by a neurotoxin produced by an anaerobic, spore-forming, gram-positive, rod-shaped bacterium, *Clostridium botulinum*. The spores are heat-resistant and can survive in foods that are improperly processed. Most outbreaks are due to types A, B, and E). Type E can grow at 37° F. The organism and its spores are widely distributed in nature. They are present in soil, agricultural products, including honey, marine sediment, and the intestinal tract of animals, including fish. Symptoms of botulism include weakness, dizziness, blurred or double vision, difficulty in swallowing and speaking, paralysis, respiratory failure and death. A very small amount (a few nanograms) of toxin can cause illness. Onset of symptoms ranges from 12 hours - 8 days (usually 12 - 36 hours) after eating contaminated food. In general, the shorter the incubation period, the more severe the disease and the higher the case-fatality rate. The duration ranges from 1 - 10 days or several weeks to months. Foodborne botulism is acquired by ingestion of food in which the toxin has been formed, predominantly after inadequate heating during preservation and without subsequent adequate cooking. Foods associated with botulism are mostly in home-canned foods (vegetables and fruits); commercial processed foods (tuna, smoked fish, mushrooms, soup, garlic in oil, & cheese sauce); sautéed onions and leftover baked potatoes. Conditions that favor the growth include low acid foods (pH above 4.6), high moisture content (water activity above 0.93) low salt, food devoid of oxygen and stored unrefrigerated.

The Sarasota County Health Department and the Bureau of Environmental Epidemiology initiated an investigation. The hospital collected serum and gastric specimens and sent them to the CDC Botulism Laboratory. Case histories were elicited and recorded. Food samples from the identified common meal were obtained by the health department and were also shipped to the CDC Botulism Laboratory for analysis.

On September 14, 1999, CDC notified all departments involved that both female patients tested positive for type-A botulism. The daughter's husband's test was negative, which the lab indicated was normal for extremely low dose exposures. In addition, the garlic cloves from the home-bottled garlic infused oil tested positive for botulism toxin type A. The lab postulated that only one or two cloves of garlic were actually contaminated. The women chopped those cloves and added them to their salads. The daughter's husband may have used the same fork or other utensil and received a minute dose that way. All other foods tested were negative for type A botulism. A second bottle of garlic infused oil was sent to CDC for testing, but did not contain toxin.

A neighbor prepared the garlic infused oil, intended as Christmas presents for friends and relatives. Ingredients included cloves of garlic, rosemary, thyme and olive oil. Preparation consisted of:

- washing the jars in a home dishwasher
- adding sprigs of rosemary and thyme to the hot jars
- filling the jars with whole cloves of pre-peeled, pre-packaged Christopher Ranch garlic
- adding olive oil to within 1/2 inch of the top of the jars

- placing the jar lids and rings in boiling water, which were removed with a magnetic tool
- placing the lids and rings onto the jars
- placing the entire jar into boiling water for 25 minutes
- allowing the jars to cool at room temperature
- removing the rings from the jars to dry while the lids remained intact
- washing the jars and lids with detergent and water
- placing the dried rings on the jars and set the jars on a shelf at room temperature for later use.

Note that there was no acidification step and the product was not stored refrigerated.

The Sarasota County Health Department Environmental Health Section retrieved all jars of the product, 47 pints. They were disposed of by incineration in a bio-hazardous waste incinerator. Those jars that had already been given to friends and neighbors had either already been consumed with no ill effects or disposed of by the individuals before the health department could obtain them.

Infused oils have previously been implicated in botulism outbreaks in the United States and worldwide.[6,7,8,9] An acidification step in the preparation of garlic infused oil may be necessary to prevent the potential production of botulism toxins. As noted above, this acidification step was not utilized in the home bottling process of the suspected infused oil and the product was stored at room temperature and not refrigerated. The pH of one of the jars of garlic-in-oil was 6.4. The treatment temperatures as described were inadequate to destroy the spores formed by the organism or its toxin.

As a result of previous outbreaks in Vancouver, BC (Canada) and in the State of New York, the FDA Food Code now requires two barriers in the destruction of spores and in the prevention of toxin production in a commercial product of this type (reduced oxygen packaging): 1) destruction of the spores by heat (thermal processing) and 2) inhibition of toxin production by altering the food through acidification, controlling a_w (water activity), the use of salt and preservatives or refrigeration. Also, it is because some single barriers can result in a product unacceptable to consumers that multiple barriers are used. The common second barrier in infused oil of this kind is acidification via phosphoric or citric acid, for example. The pH of the final product should be 4.6 or less.

Christmas Dinner Banquet Outbreak, Pinellas County, December 10, 1999

On December 14, 1999 the Pinellas County Health Department was informed that approximately 60 persons who attended a Christmas dinner party at a large banquet facility in Clearwater on

[6] Morse, Dale L. et al. Garlic-in-Oil Associated Botulism: Episode Leads to Product Modification. American Journal of Public Health, Public Health Briefs, (80)11:1372-1373.
[7] Solomon, Haim et al. Evaluation of Unacidified Products Bottled in Oil for Outgrowth and Toxin Production by *Clostridium botulinum*. Journal of Food Protection, (54)8:648-649.
[8] Solomon, Haim M. and Donald A. Kautter. Outgrowth and Toxin Production by Clostridium botulinum in Bottled Chopped Garlic. Journal of Food Protection, November, 1988, (51)11:862-865.
[9] St. Louis, Michael E. et al. Botulism from Chopped Garlic: Delayed Recognition of a Major Outbreak. Annals of Internal Medicine, March, 1988, (108)3:363-368.

December 10, 1999 subsequently experienced gastrointestinal illness. Approximately 90 persons from a local medical group attended the event. Symptoms reported were abdominal cramps and diarrhea. The food for the dinner banquet was catered in-house by the banquet hall.

An investigation of this outbreak was performed by the Pinellas County Health Department and Bureau of Environmental Epidemiology. Sample menus were obtained from the facility's food service manager, along with detailed preparation and serving procedures. A list of the people who attended the dinner was obtained from the event organizer. A questionnaire was developed and administered to attendees of the implicated Christmas dinner buffet. Resulting data was analyzed using Epi Info 6.04c statistical software. A case was defined as any person who exhibited at least diarrhea (defined as 3 or more loose stools in a 24 hour period) or abdominal cramps and/or nausea and attended the Christmas dinner banquet at the Clearwater banquet hall on December 10, 1999. A control was defined as a person who attended the Christmas dinner buffet but who did not meet the case definition. Leftover turkey, dressing, gravy, scalloped potatoes, cranberries, sweet potatoes, and mini pastries from the implicated meal were provided by the banquet facility manager for laboratory analysis. Clinical specimens were not available. An onsite investigation by the Pinellas County Health Department and Bureau of Environmental Epidemiology in conjunction with an inspection by the Department of Business and Professional Regulation (DBPR) was performed on December 14, 1999.

A total of 39 (43%) people who attended the banquet responded to the questionnaire. Of these, 22 (24.4%) became ill following the suspect Christmas dinner on December 10, 1999. The mean onset of the symptoms was 11.4 hours with a range of 2 – 26 hours. Predominant symptomatology reported included diarrhea (95%), and abdominal cramps (95%; see Table 4).

Table 4: Frequency Of Symptoms, Christmas Dinner Banquet, December 10, 1999, Pinellas County, Florida

Symptoms	Frequency	Percent
Diarrhea	21	95.4
Abdominal Cramps	21	95.4
Nausea	8	36.3
Headaches	8	36.3
Loss of Appetite	8	36.3
Chills	8	36.3
Fatigue	5	18.0

N=22

Duration of illness ranged from 2 to 48 hours with a mean of 19.6 hours. None of the reported cases sought physician care. Chart 1 depicts the incubation period of the cases grouped by 2-hour periods. Table 2 shows attack rates of specific foods served at the function on November 18, 1999.

Results of the case-control study performed indicated that four of the food items served had associations with illness that were statistically significant. The most significant associations of food with illness included the turkey with the odds ratio 23.6 (CI 2.29 - 585.59) and a Chi-square of 11.48 (p=0.0007042) and the scalloped potatoes with an odds ratio of 23.0 (Cl 2.30 - 560.13) and a chi-square of 11.63 (p=0.0006499). Both foods also had high attack rates. The laboratory-cultured results of the submitted food products (sliced turkey, dressing, gravy, scalloped potatoes, cranberries, sweet potatoes, and mini pastries) from the implicated meal

were negative for the presence of any specific pathogens, however all of the seven food items submitted for analysis had moderate to high levels of fecal coliforms. This included the turkey and scalloped potatoes. Clostridium perfringens and Bacillus cereus toxin were not isolated from any of the food samples. The environmental investigation was performed at the large banquet facility in Clearwater on December 14, 1999. Preparation of all menu items served at the banquet in question were reviewed and the kitchen facility was inspected by DBPR representatives. All food temperatures and refrigeration units checked were satisfactory. The dishwashing unit however, was found to not be reaching proper sanitizing temperature.

This banquet facility is capable of preparing and serving several large parties at one time. On Friday, December 10th, two dinner parties were held at the facility. Very similar menus were used for both banquets, except that mini pastries were served at the banquet reporting illness. The second banquet did not report any illness associated with their 500 attendees. In addition, according to the chef, 40-50 employees also ate food served to both banquets, except for the mini pastries. No illness was reported in these 40-50 employees. The banquet facility was issued a warning to correct the deficiency of the dishwashing unit within two days by the DBPR.

This outbreak of gastrointestinal illness is strongly associated with the consumption of a Christmas dinner banquet at a large banquet facility in Clearwater on December 10, 1999. The ill persons had no other epidemiological associations identified and the onset of symptoms were chronologically clustered indicating a common source exposure.

The incubation period, symptomatology and duration of the illness suggest an etiology of *Clostridium perfringens* or *Bacillus cereus* (diarrheal toxin producing). *Clostridium perfringens* is an anaerobic, sporeforming bacteria. It is widely distributed in the environment and frequently occurs in the intestines of humans and many domestic and feral animals. *C. perfringens* poisoning is characterized by intense abdominal cramps and diarrhea which begin 8-22 hours after consumption of foods containing large numbers of those *C. perfringens* bacteria capable of producing the food poisoning toxin. The illness is usually over within 24 hours but less severe symptoms may persist in some individuals for 1 or 2 weeks. A few deaths have been reported as a result of dehydration and other complications. The mode of transmission involves ingestion of food that was contaminated by soil or feces and then held under conditions that permit multiplication of the organism. In most instances, the actual cause of poisoning by *C. perfringens* is temperature abuse of prepared foods. Small numbers of the organisms are often present after cooking and multiply to food poisoning levels during cool down and storage of prepared foods. Meats, meat products, and gravy are the foods most frequently implicated.

Bacillus cereus is a facultative aerobic sporeforming bacteria that produces a heat labile enterotoxin. It is found commonly in soil and at low levels in raw, dried, and processed foods. The symptoms of *B. cereus* diarrheal type food poisoning mimic those of *Clostridium perfringens* food poisoning. The onset of watery diarrhea, abdominal cramps, and pain occurs 6-15 hours after consumption of contaminated food. Nausea may accompany diarrhea, but vomiting rarely occurs. Symptoms persist for 24 hours in most instances. The mode of transmission is usually associated with the ingestion of food that has been kept at ambient temperature after cooking, permitting multiplication of the organisms. A wide variety of foods including meats, milk, vegetables, and fish have been associated with *B. cereus* diarrheal type food poisoning.

Epidemiological analysis indicates a statistically significant association with the sliced turkey and scalloped potatoes. The identification of moderate to heavy growth of fecal coliforms in the food

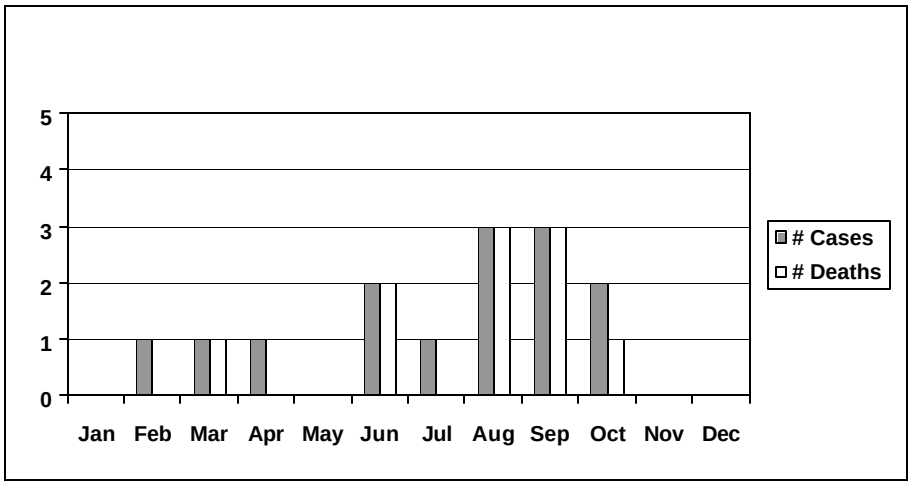
samples collected possibly indicates hand contact or improper handwashing in the catering facility. Cross-contamination of food items may also have occurred. Because there was not any food preparation ongoing during the visit to the kitchen area, no food preparation or handwashing procedures could be observed. All refrigeration units and food temperatures checked were satisfactory. The problem noted with the dishwashing unit not properly sanitizing could also be a causative factor in this outbreak.

It is recommended that educational food safety training be provided for staff involved in all aspects of food preparation. All new kitchen staff should also undergo a similar training program. In addition, ongoing monitoring of the dishwasher operation would insure proper sanitization of dishes, utensils and other items.

***Vibrio vulnificus*, Florida, 1999**

For 1999, there were a total of 22 *Vibrio vulnificus* cases reported in the State of Florida. Of these, 6 were wound-related and 2 were of unknown exposure. The other 14 cases were associated with the consumption of raw oysters. There were 13 deaths reported from *Vibrio vulnificus* (3 wound related and 10 oyster related (see Figure 4)). In 1998 there were 15 wound-related cases of *Vibrio vulnificus* (1 death), and 14 cases associated with the consumption of raw oysters (8 deaths), with 7 of unknown exposure (3 deaths).

Figure 4: *Vibrio vulnificus* Cases and Deaths Due to Shellfish Consumption by Month, Florida, 1999

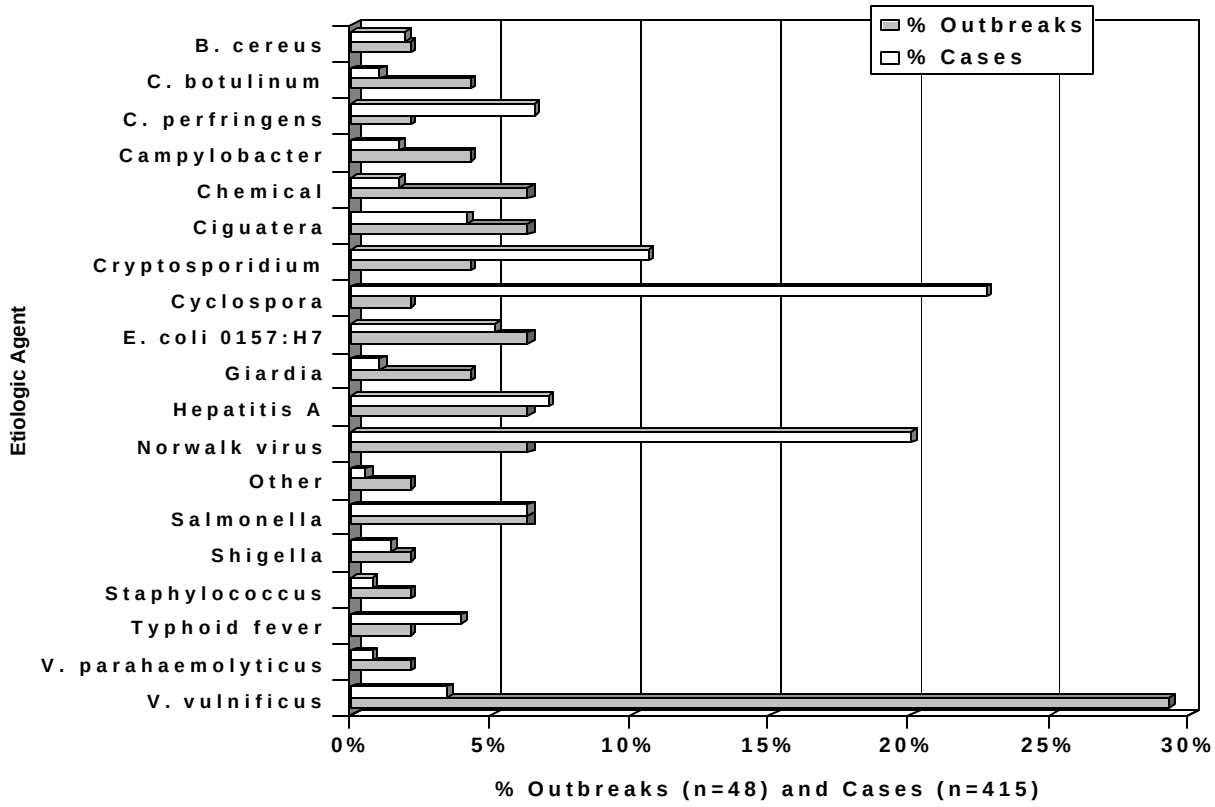


Appendix: Statewide Data Tables and Figures

Table 5: Number of Reported Outbreaks
With Laboratory-Confirmed Etiologic Agents and Number of Cases Associated With These Outbreaks, Florida, 1999

# Outbreaks	Pathogen	# Cases
1	Other	2
1	Staphylococcus	3
1	V. parahaemolyticus	3
1	Shigella	6
1	B. cereus	8
1	Typhoid fever	16
1	C. perfringens	27
1	Cyclospora	94
2	C. botulinum	4
2	Giardia	4
2	Campylobacter	7
2	Cryptosporidium	44
3	Chemical	7
3	Ciguatera	17
3	E. coli 0157:H7	21
3	Salmonella	26
3	Hepatitis A	29
3	Norwalk virus	83
14	V. vulnificus	14
48	**Total**	415

Figure 5: Percent Reported Outbreaks With Laboratory-Confirmed Etiologic Agents and Percent Cases Associated With These Outbreaks, Florida, 1999



*The etiologic agent was unknown in 50.3% of the outbreaks and 34.5% of the cases.

Figure 6: Percent Total Outbreaks and Cases by Etiologic Agent, Florida, 1999

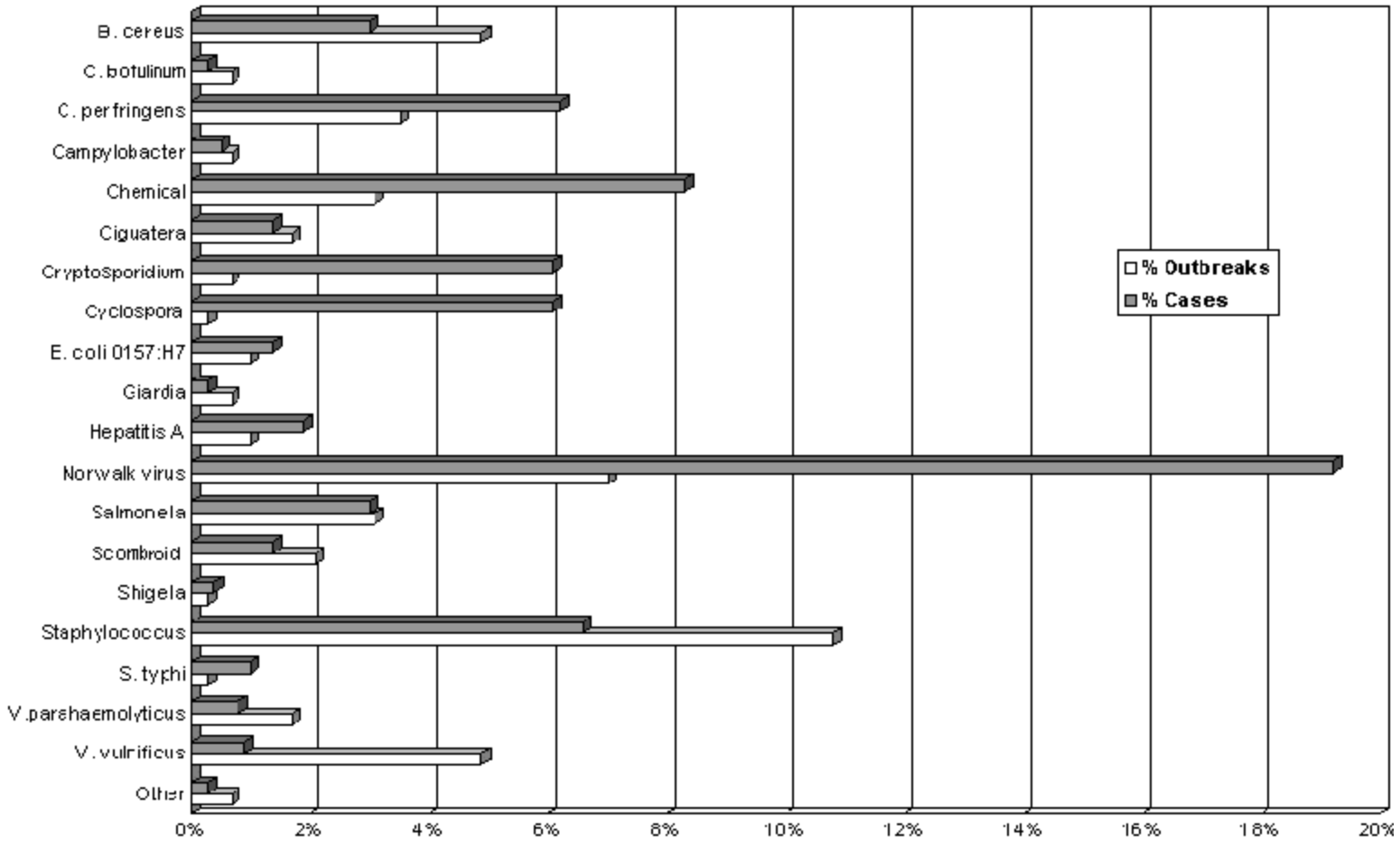


Figure 7: Trends in Reported Outbreaks and Outbreak Cases of Norwalk, Florida, 1994-1999

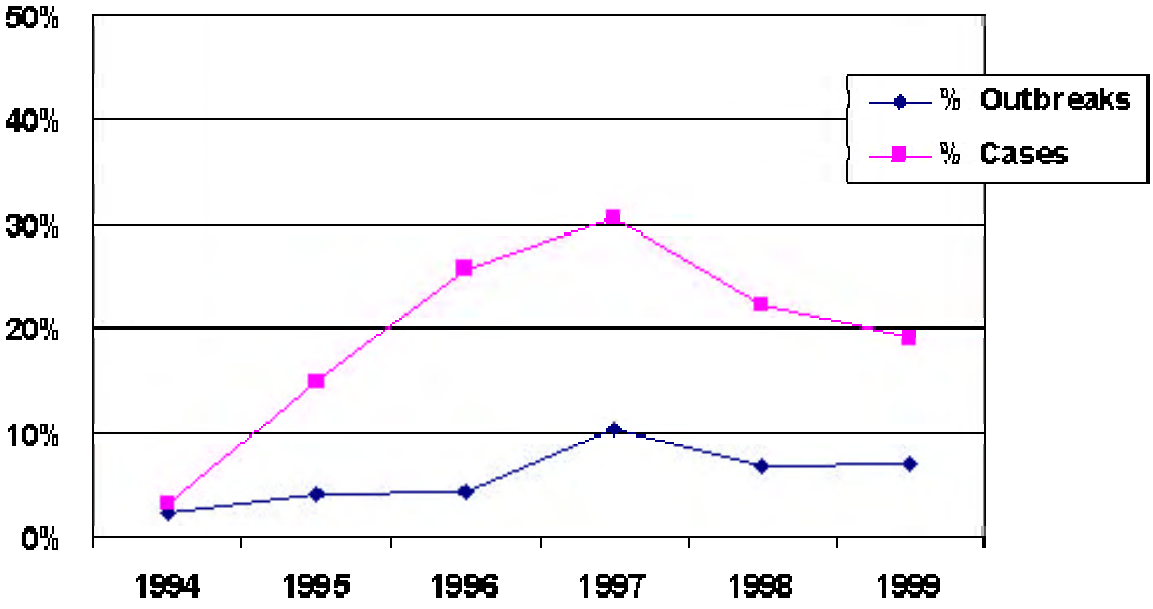


Figure 8: Trends in Reported Outbreaks and Outbreak Cases of Staphylococcus, Florida, 1994-1999

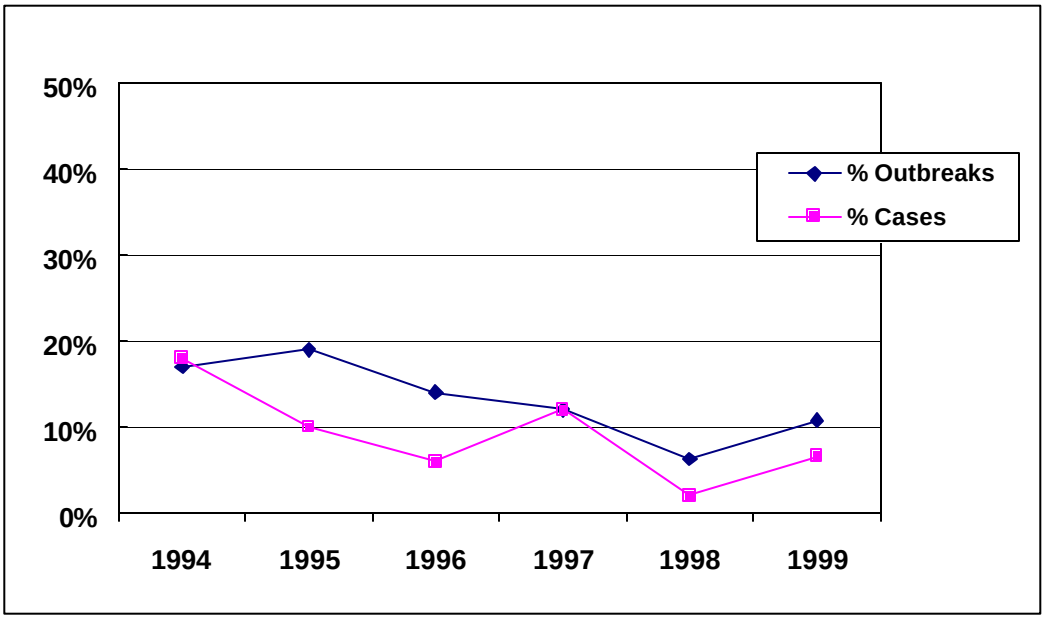


Figure 9: Trends in Reported Outbreaks and Outbreak Cases of Salmonella, Florida, 1994-1999

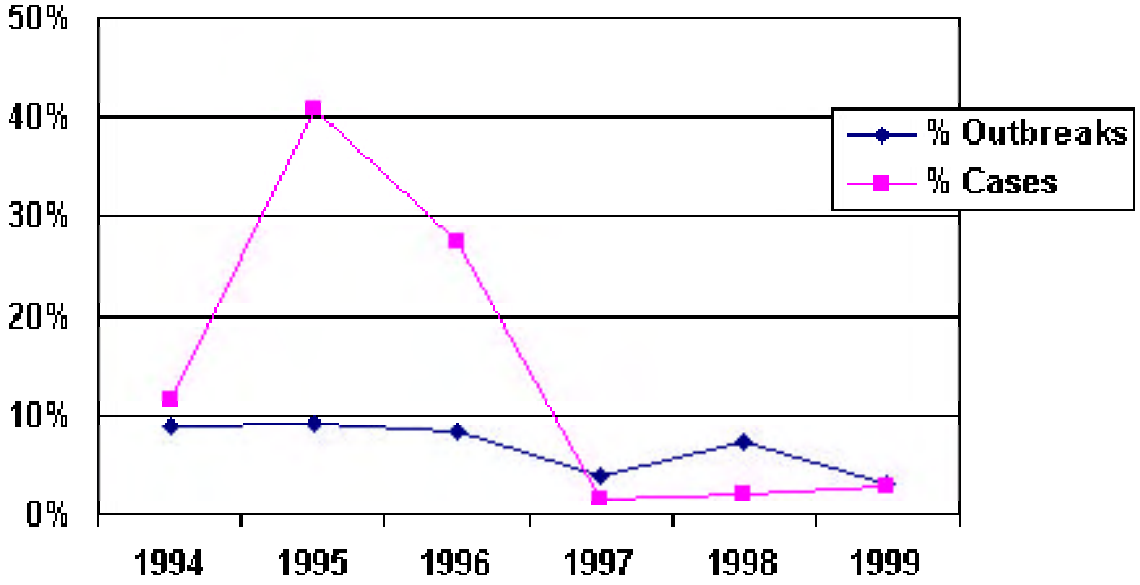


Figure 10: Trends in Reported Outbreaks and Outbreak Cases of Unknown Pathogens, Florida, 1994-1999

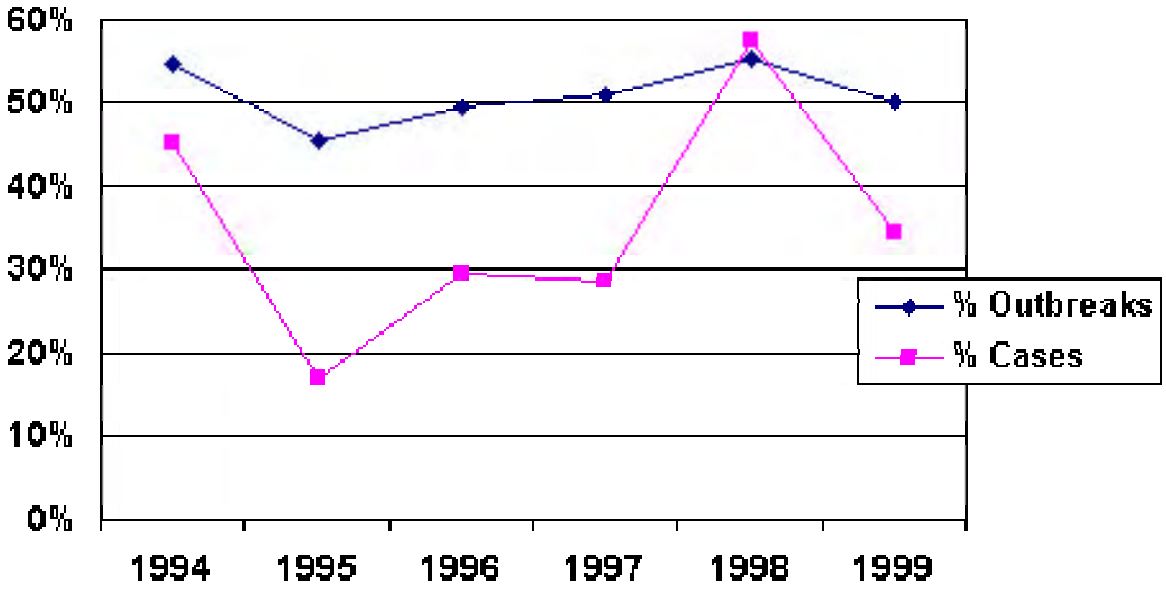


Figure 11: Percent Total Outbreaks and Cases by Site, Florida, 1999

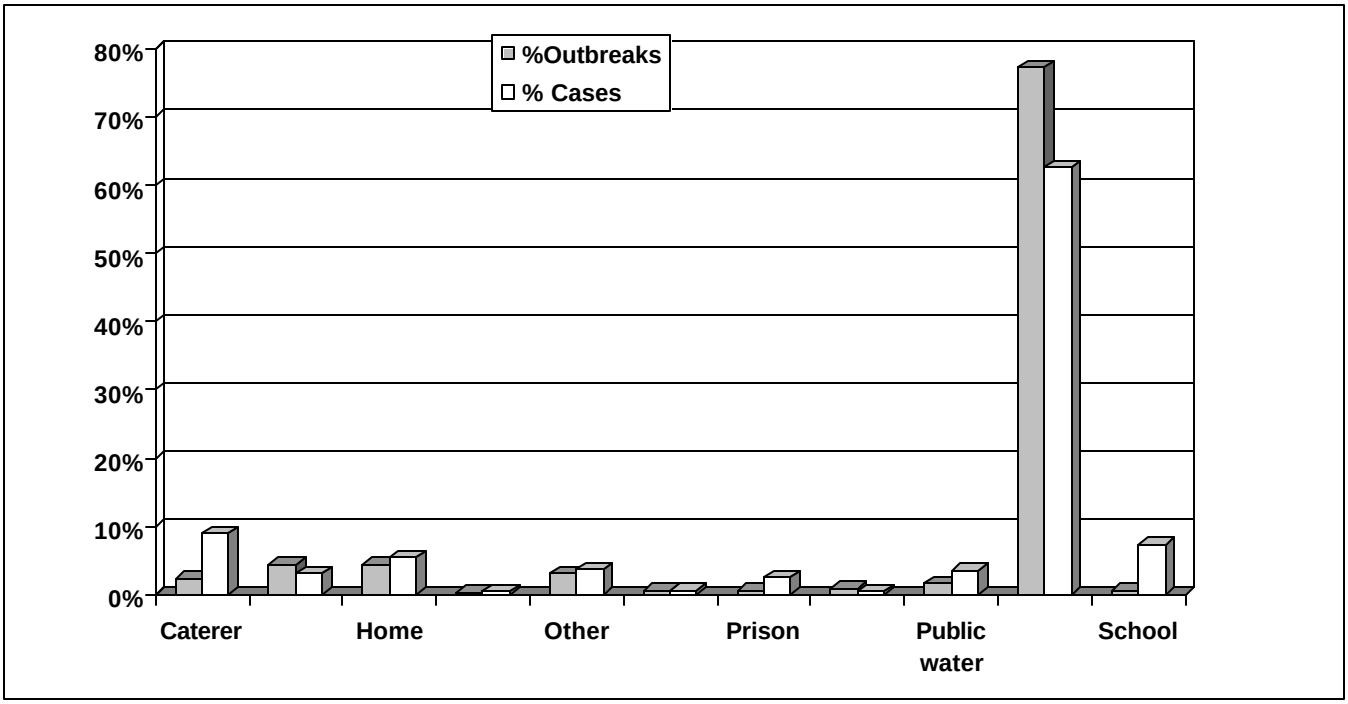


Table 6: Outbreaks by Site, Florida, 1999

Status	Caterer	Grocery	Home	Nursing home	Other	Pool	Prison	Private water	Public water	Restaurant	School	Total
Confirmed	3	2	6	0	6	2	2	1	3	27	0	52
	5.80%	3.80%	11.50%	0.00%	11.50%	3.80%	3.80%	1.90%	5.80%	51.90%	0.00%	18.20%
Suspected	4	19	7	1	3	0	0	2	2	194	2	234
	1.70%	8.10%	3.00%	0.40%	1.30%	0.00%	0.00%	0.90%	0.90%	82.90%	0.90%	81.80%
Total	**7**	**21**	**13**	**1**	**9**	**2**	**2**	**3**	**5**	**221**	**2**	**286**
	2.40%	**7.30%**	**4.50%**	**0.30%**	**3.10%**	**0.70%**	**0.70%**	**1.00%**	**1.70%**	**77.30%**	**0.70%**	**100%**

Table 7: Cases by Site, Florida, 1999

Status	Caterer	Grocery	Home	Nursing home	Other	Pool	Prison	Private water	Public water	Restaurant	School	Total
Confirmed	68	4	39	0	46	11	39	2	48	275	0	532
	12.80%	0.80%	7.30%	0.00%	8.60%	2.10%	7.30%	0.40%	9.00%	51.70%	0.00%	34.50%
Suspected	70	64	44	6	11	0	0	5	7	691	114	1012
	6.90%	6.30%	4.30%	0.60%	1.10%	0.00%	0.00%	0.50%	0.70%	68.30%	11.30%	65.50%
Total	**138**	**68**	**83**	**6**	**57**	**11**	**39**	**7**	**55**	**966**	**114**	**1544**
	8.90%	**4.40%**	**5.40%**	**0.40%**	**3.70%**	**0.70%**	**2.50%**	**0.50%**	**3.60%**	**62.60%**	**7.40%**	**100%**

Table 8: Food and Waterborne Outbreaks and Cases Reported by Agency of Jurisdiction,[10] Florida, 1999

1999

Agency	# Outbreaks	% Outbreaks	# Cases	% Cases
DACS	30	10.5%	228	14.8%
DBPR	226	79.0%	983	63.7%
DOH	18	6.3%	255	16.5%
OTHER	12	4.2%	78	5.1%
Total	**286**	**100.0%**	**1544**	**100.0%**

1998

Agency	# Outbreaks	% Outbreaks	# Cases	% Cases
DACS	20	6.3%	91	2.8%
DBPR	243	77.1%	1911	58%
DOH	35	11%	1149	34.9%
OTHER	17	5.4%	139	4.2%
Total	**315**	**100.0%**	**3290**	**100.0%**

1997

Agency	# Outbreaks	% Outbreaks	# Cases	% Cases
DACS	72	16.4%	334	12.2%
DBPR	323	73.7%	1777	64.8%
DOH	24	5.5%	294	10.7%
OTHER	19	4.3%	338	12.3%
Total	**438**	**100.0%**	**2743**	**100.0%**

1996

Agency	# Outbreaks	% Outbreaks	# Cases	% Cases
DACS	20	6.6%	105	3.7%
DBPR	258	85.4%	1824	64.2%
DOH	9	3.0%	651	23.0%
OTHER	15	4.9%	261	9.2%
Total	**302**	**100.0%**	**2841**	**100.0%**

1995

Agency	# Outbreaks	% Outbreaks	# Cases	% Cases
DACS	10	3.9%	243	8.7%
DBPR	235	91.8%	2303	82.9%
DOH	6	2.3%	220	7.9%
OTHER	5	2.0%	13	.5%
Total	**256**	**100.0%**	**2779**	**100.0%**

[10] Agency of jurisdiction refers to the agency regulating the primary food source and/or food workers identified as the cause of the outbreak (DACS = Department of Agriculture and Consumer Services, DBPR = Department of Business and Professional Regulation, DOH = Department of Health, OTHER = most often private homes or events, occasionally other state or federal agencies).

Figure 12: Percent Total Outbreaks and Cases by Vehicle, Florida, 1999

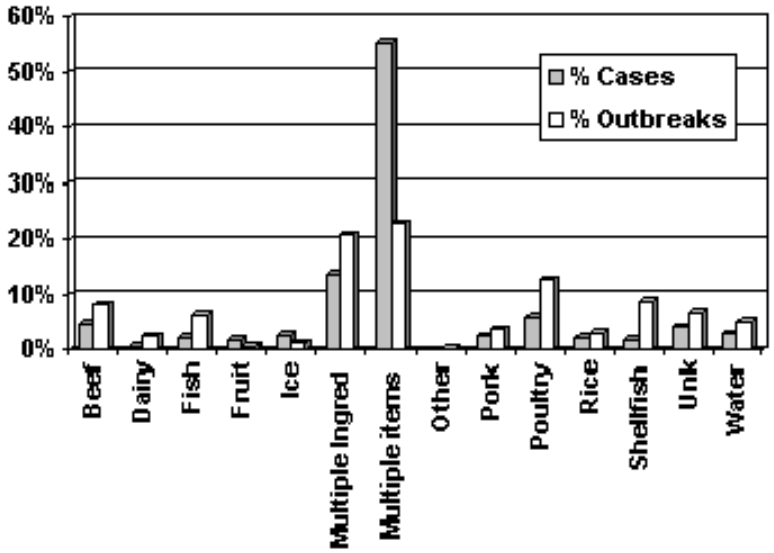


Table 9: Outbreaks by Vehicle, Florida, 1999

Status	Beef	Dairy	Fish	Fruit	Multiple ingred	Multiple items	Pork	Poultry	Rice	Shellfish	Unk	Vegetable	Water	Total
Confirmed	2	0	3	2	7	10	0	1	0	16	1	1	9	52
	3.80%	0.00%	5.80%	3.80%	13.50%	19.20%	0.00%	1.90%	0.00%	30.80%	1.90%	1.90%	17.30%	18.20%
Suspected	20	5	22	4	52	58	6	27	3	19	7	6	5	234
	8.50%	2.10%	9.40%	1.70%	22.20%	24.80%	2.60%	11.50%	1.30%	8.10%	3.00%	2.60%	2.10%	81.80%
Total	**22**	**5**	**25**	**6**	**59**	**68**	**6**	**28**	**3**	**35**	**8**	**7**	**14**	**286**
	7.70%	**1.70%**	**8.70%**	**2.10%**	**20.60%**	**23.80%**	**2.10%**	**9.80%**	**1.00%**	**12.20%**	**2.80%**	**2.40%**	**4.90%**	**100%**

Table 10: Cases by Vehicle, Florida, 1999

Status	Beef	Dairy	Fish	Fruit	Multiple ingred	Multiple items	Pork	Poultry	Rice	Shellfish	Unk	Vegetable	Water	Total
Confirmed	23	0	17	26	61	296	0	3	0	19	13	8	66	532
	4.30%	0.00%	3.20%	4.90%	11.50%	55.60%	0.00%	0.60%	0.00%	3.60%	2.40%	1.50%	12.40%	34.50%
Suspected	89	13	65	17	174	336	19	82	8	122	45	27	15	1012
	8.80%	1.30%	6.40%	1.70%	17.20%	33.20%	1.90%	8.10%	0.80%	12.10%	4.40%	2.70%	1.50%	65.50%
Total	112	13	82	43	235	632	19	85	8	141	58	35	81	1544
	7.30%	0.80%	5.30%	2.80%	15.20%	40.90%	1.20%	5.50%	0.50%	9.10%	3.80%	2.30%	5.20%	100%

Table 11: Total Outbreaks, Florida, 1999: Etiologic Agent by Vehicle

Pathogen	Beef	Dairy	Fish	Fruit	Multiple ingred	Multiple items	Pork	Poultry	Rice	Shellfish	Unk	Vegetable	Water	Total
B. cereus	0	0	0	1	5	3	0	3	1	0	0	1	0	**14**
C. botulinum	0	0	0	0	1	0	0	0	0	0	1	0	0	**2**
C. perfringens	2	0	1	0	1	4	1	1	0	0	0	0	0	**10**
Campylobacter	0	0	0	0	0	1	0	0	0	0	0	0	1	**2**
Chemical	0	0	0	1	3	2	0	0	0	0	0	0	3	**9**
Ciguatera	0	0	5	0	0	0	0	0	0	0	0	0	0	**5**
Cryptosporidia	0	0	0	0	0	0	0	0	0	0	0	0	2	**2**
Cyclospora	0	0	0	0	0	1	0	0	0	0	0	0	0	**1**
E. coli 0157:H7	2	0	0	0	0	0	0	0	0	0	0	0	1	**3**
Giardia	0	0	0	0	0	0	0	0	0	0	0	0	2	**2**
Hepatitis A	0	0	0	0	1	2	0	0	0	0	0	0	0	**3**
Norwalk virus	0	0	0	0	4	10	0	0	0	3	1	2	0	**20**
Other	0	0	0	0	1	0	0	0	0	1	0	0	0	**2**
Salmonella	0	0	0	1	3	1	0	4	0	0	0	0	0	**9**
Scombroid	0	0	5	0	0	0	0	0	0	0	1	0	0	**6**
Shigella	1	0	0	0	0	0	0	0	0	0	0	0	0	**1**
Staphylococcus	3	2	0	0	10	5	1	7	0	2	0	1	0	**31**
Typhoid fever	0	0	0	1	0	0	0	0	0	0	0	0	0	**1**
Unknown	14	3	13	2	30	38	4	13	2	12	5	3	5	**144**
V. parahaemolyticus	0	0	1	0	0	1	0	0	0	3	0	0	0	**5**
V. vulnificus	0	0	0	0	0	0	0	0	0	14	0	0	0	**14**
Total	**22**	**5**	**25**	**6**	**59**	**68**	**6**	**28**	**3**	**35**	**8**	**7**	**14**	**286**

Table 12: Total Cases in All Outbreaks, Florida, 1999: Etiologic Agent by Vehicle

Pathogen	Beef	Dairy	Fish	Fruit	Multiple ingred	Multiple items	Pork	Poultry	Rice	Shellfish	Unk	Vegetable	Water	Total
B. cereus	0	0	0	3	17	7	0	11	4	0	0	4	0	**46**
C. botulinum	0	0	0	0	3	0	0	0	0	0	1	0	0	**4**
C. perfringens	22	0	2	0	4	59	3	5	0	0	0	0	0	**95**
Campylobacter	0	0	0	0	0	2	0	0	0	0	0	0	5	**7**
Chemical	0	0	0	3	9	109	0	0	0	0	0	0	7	**128**
Ciguatera	0	0	21	0	0	0	0	0	0	0	0	0	0	**21**
Cryptosporidia	0	0	0	0	0	0	0	0	0	0	0	0	44	**44**
Cyclospora	0	0	0	0	0	94	0	0	0	0	0	0	0	**94**
E. coli 0157:H7	19	0	0	0	0	0	0	0	0	0	0	0	2	**21**
Giardia	0	0	0	0	0	0	0	0	0	0	0	0	4	**4**
Hepatitis A	0	0	0	0	4	25	0	0	0	0	0	0	0	**29**
Norwalk virus	0	0	0	0	43	202	0	0	0	14	23	14	0	**296**
Other	0	0	0	0	3	0	0	0	0	2	0	0	0	**5**
Salmonella	0	0	0	10	19	4	0	13	0	0	0	0	0	**46**
Scombroid	0	0	19	0	0	0	0	0	0	0	2	0	0	**21**
Shigella	6	0	0	0	0	0	0	0	0	0	0	0	0	**6**
Staphylococcus	9	5	0	0	44	11	3	17	0	5	0	8	0	**102**
Typhoid fever	0	0	0	16	0	0	0	0	0	0	0	0	0	**16**
Unknown	56	8	38	11	89	117	13	39	4	98	32	9	19	**533**
V. parahaemolyticus	0	0	2	0	0	2	0	0	0	8	0	0	0	**12**
V. vulnificus	0	0	0	0	0	0	0	0	0	14	0	0	0	**14**
Total	**112**	**13**	**82**	**43**	**235**	**632**	**19**	**85**	**8**	**141**	**58**	**35**	**81**	**1544**

Table 13: Confirmed Outbreaks, Florida, 1999: Etiologic Agent by Vehicle

Pathogen	Beef	Fish	Fruit	Multiple ingred	Multiple items	Poultry	Shellfish	Unk	Vegetable	Water	Total
B. cereus	0	0	0	1	0	0	0	0	0	0	**1**
C. botulinum	0	0	0	1	0	0	0	0	0	0	**1**
C. perfringens	0	0	0	0	2	0	0	0	0	0	**2**
Campylobacter	0	0	0	0	1	0	0	0	0	1	**2**
Chemical	0	0	0	2	0	0	0	0	0	3	**5**
Ciguatera	0	3	0	0	0	0	0	0	0	0	**3**
Cryptosporidia	0	0	0	0	0	0	0	0	0	2	**2**
Cyclospora	0	0	0	0	1	0	0	0	0	0	**1**
E. coli 0157:H7	1	0	0	0	0	0	0	0	0	1	**2**
Giardia	0	0	0	0	0	0	0	0	0	1	**1**
Hepatitis A	0	0	0	0	1	0	0	0	0	0	**1**
Norwalk virus	0	0	0	1	5	0	0	0	0	0	**6**
Other	0	0	0	0	0	0	1	0	0	0	**1**
Salmonella	0	0	1	1	0	0	0	0	0	0	**2**
Shigella	1	0	0	0	0	0	0	0	0	0	**1**
Staphylococcus	0	0	0	0	0	1	0	0	1	0	**2**
Typhoid fever	0	0	1	0	0	0	0	0	0	0	**1**
Unknown	0	0	0	1	0	0	0	1	0	1	**3**
V. parahaemolyticus	0	0	0	0	0	0	1	0	0	0	**1**
V. vulnificus	0	0	0	0	0	0	14	0	0	0	**14**
Total	**2**	**3**	**2**	**7**	**10**	**1**	**16**	**1**	**1**	**9**	**52**

Table 14: Cases in Confirmed Outbreaks, Florida, 1999: Etiologic Agent by Vehicle

Pathogen	Beef	Fish	Fruit	Multiple ingred	Multiple items	Poultry	Shellfish	Unk	Vegetable	Water	Total
B. cereus	0	0	0	8	0	0	0	0	0	0	8
C. botulinum	0	0	0	3	0	0	0	0	0	0	3
C. perfringens	0	0	0	0	49	0	0	0	0	0	49
Campylobacter	0	0	0	0	2	0	0	0	0	5	7
Chemical	0	0	0	7	0	0	0	0	0	7	14
Ciguatera	0	17	0	0	0	0	0	0	0	0	17
Cryptosporidia	0	0	0	0	0	0	0	0	0	44	44
Cyclospora	0	0	0	0	94	0	0	0	0	0	94
E. coli 0157:H7	17	0	0	0	0	0	0	0	0	2	19
Giardia	0	0	0	0	0	0	0	0	0	2	2
Hepatitis A	0	0	0	0	17	0	0	0	0	0	17
Norwalk virus	0	0	0	26	134	0	0	0	0	0	160
Other	0	0	0	0	0	0	2	0	0	0	2
Salmonella	0	0	10	14	0	0	0	0	0	0	24
Shigella	6	0	0	0	0	0	0	0	0	0	6
Staphylococcus	0	0	0	0	0	3	0	0	8	0	11
Typhoid fever	0	0	16	0	0	0	0	0	0	0	16
Unknown	0	0	0	3	0	0	0	13	0	6	22
V. parahaemolyticus	0	0	0	0	0	0	3	0	0	0	3
V. vulnificus	0	0	0	0	0	0	14	0	0	0	14
Total	**23**	**17**	**26**	**61**	**296**	**3**	**19**	**13**	**8**	**66**	**532**

Table 15: Suspected Outbreaks, Florida, 1999: Etiologic Agent by Vehicle

Pathogen	Beef	Dairy	Fish	Fruit	Multiple ingred	Multiple items	Pork	Poultry	Rice	Shellfish	Unk	Vegetable	Water	Total
B. cereus	0	0	0	1	4	3	0	3	1	0	0	1	0	**13**
C. botulinum	0	0	0	0	0	0	0	0	0	0	1	0	0	**1**
C. perfringens	2	0	1	0	1	2	1	1	0	0	0	0	0	**8**
Chemical	0	0	0	1	1	2	0	0	0	0	0	0	0	**4**
Ciguatera	0	0	2	0	0	0	0	0	0	0	0	0	0	**2**
E. coli 0157:H7	1	0	0	0	0	0	0	0	0	0	0	0	0	**1**
Giardia	0	0	0	0	0	0	0	0	0	0	0	0	1	**1**
Hepatitis A	0	0	0	0	1	1	0	0	0	0	0	0	0	**2**
Norwalk virus	0	0	0	0	3	5	0	0	0	3	1	2	0	**14**
Other	0	0	0	0	1	0	0	0	0	0	0	0	0	**1**
Salmonella	0	0	0	0	2	1	0	4	0	0	0	0	0	**7**
Scombroid	0	0	5	0	0	0	0	0	0	0	1	0	0	**6**
Staphylococcus	3	2	0	0	10	5	1	6	0	2	0	0	0	**29**
Unknown	14	3	13	2	29	38	4	13	2	12	4	3	4	**141**
V. parahaemolyticus	0	0	1	0	0	1	0	0	0	2	0	0	0	**4**
Total	**20**	**5**	**22**	**4**	**52**	**58**	**6**	**27**	**3**	**19**	**7**	**6**	**5**	**234**

Table 16: Cases in Suspected Outbreaks, Florida, 1999: Etiologic Agent by Vehicle

Pathogen	Beef	Dairy	Fish	Fruit	Multiple ingred	Multiple items	Pork	Poultry	Rice	Shellfish	Unk	Vegetable	Water	Total
B. cereus	0	0	0	3	9	7	0	11	4	0	0	4	0	38
C. botulinum	0	0	0	0	0	0	0	0	0	0	1	0	0	1
C. perfringens	22	0	2	0	4	10	3	5	0	0	0	0	0	46
Chemical	0	0	0	3	2	109	0	0	0	0	0	0	0	114
Ciguatera	0	0	4	0	0	0	0	0	0	0	0	0	0	4
E. coli 0157:H7	2	0	0	0	0	0	0	0	0	0	0	0	0	2
Giardia	0	0	0	0	0	0	0	0	0	0	0	0	2	2
Hepatitis A	0	0	0	0	4	8	0	0	0	0	0	0	0	12
Norwalk virus	0	0	0	0	17	68	0	0	0	14	23	14	0	136
Other	0	0	0	0	3	0	0	0	0	0	0	0	0	3
Salmonella	0	0	0	0	5	4	0	13	0	0	0	0	0	22
Scombroid	0	0	19	0	0	0	0	0	0	0	2	0	0	21
Staphylococcus	9	5	0	0	44	11	3	14	0	5	0	0	0	91
Unknown	56	8	38	11	86	117	13	39	4	98	19	9	13	511
V. parahaemolyticus	0	0	2	0	0	2	0	0	0	5	0	0	0	9
Total	**89**	**13**	**65**	**17**	**174**	**336**	**19**	**82**	**8**	**122**	**45**	**27**	**15**	**1012**

Figure 13: Percent Total Outbreaks and Cases by Month, Florida, 1999

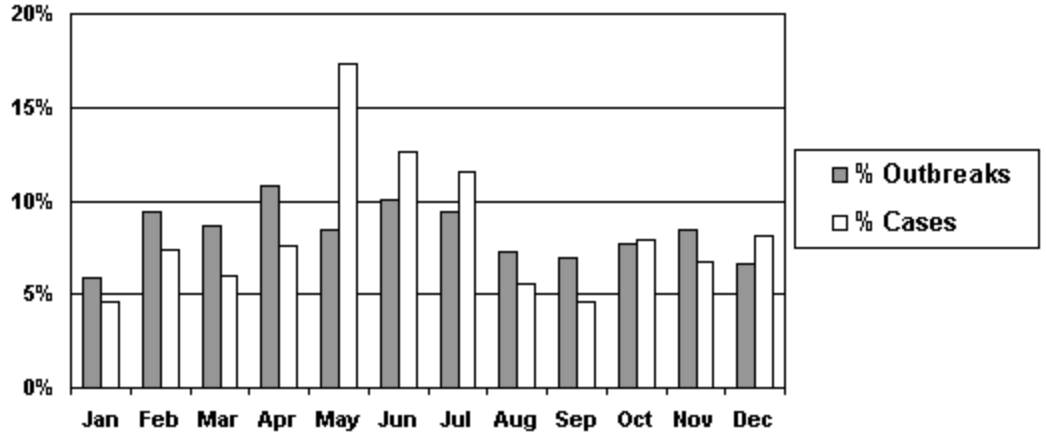


Table 17: Outbreaks by Month, 1999

Outbreaks	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Confirmed	2	4	4	5	4	6	6	5	5	7	1	3	52
	3.80%	7.70%	7.70%	9.60%	7.70%	11.50%	11.50%	9.60%	9.60%	13.50%	1.90%	5.80%	18.20%
Suspected	15	23	21	26	20	23	21	16	15	15	23	16	234
	6.40%	9.80%	9.00%	11.10 %	8.50%	9.80%	9.00%	6.80%	6.40%	6.40%	9.80%	6.80%	81.80%
Total	**17**	**27**	**25**	**31**	**24**	**29**	**27**	**21**	**20**	**22**	**24**	**19**	**286**
	5.90%	**9.40%**	**8.70%**	**10.80%**	**8.40%**	**10.10%**	**9.40%**	**7.30%**	**7.00%**	**7.70%**	**8.40%**	**6.60%**	**100%**

Table 18: Cases by Month, 1999

Cases	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Confirmed	4	33	30	35	32	129	101	47	12	59	15	35	532
	0.80%	6.20%	5.60%	6.60%	6.00%	24.20%	19.00%	8.80%	2.30%	11.10%	2.80%	6.60%	34.50%
Suspected	67	82	62	83	235	65	78	40	59	63	88	90	1012
	6.60%	8.10%	6.10%	8.20%	23.20%	6.40%	7.70%	4.00%	5.80%	6.20%	8.70%	8.90%	65.50%
Total	**71**	**115**	**92**	**118**	**267**	**194**	**179**	**87**	**71**	**122**	**103**	**125**	**1544**
	4.60%	**7.40%**	**6.00%**	**7.60%**	**17.30%**	**12.60%**	**11.60%**	**5.60%**	**4.60%**	**7.90%**	**6.70%**	**8.10%**	**100%**

Table 19: Outbreaks with Greater Than 10 Cases, Florida, 1999

Status	County	# Cases	Site	Vehicle	Pathogen	Pathogen status
Suspected	Dade	106	School	Juice, milk	Chemical	Suspected
Confirmed	Palm Beach	94	Restaurant	Multiple items, fruit	Cyclospora	Confirmed
Suspected	Broward	66	Restaurant	Shrimp	Unknown	Unknown
Confirmed	Duval	46	Restaurant	Ready-to-eat foods	Norwalk virus	Confirmed
Confirmed	Volusia	38	Public water	Interactive water fountain	Cryptosporidium, Shigella	Confirmed
Suspected	Palm Beach	28	Caterer	Cheese and potato chips	Norwalk virus	Suspected
Confirmed	Broward	27	Caterer	Beef, potato	C. perfringens	Confirmed
Confirmed	Brevard	26	Home	Deviled eggs or roast beef	Norwalk virus	Suspected
Confirmed	Collier	26	Restaurant	Fried mushrooms,chickensalad	Norwalk virus	Suspected
Confirmed	Hillsborough	25	Prison	Meals at jail	Norwalk virus	Suspected
Suspected	Lee	23	Caterer	Unknown	Norwalk virus	Suspected
Confirmed	Pinellas	22	Caterer	Turkey, scalloped potatoes	C. perfringens	Suspected
Suspected	Pinellas	19	Home	Ground beef	Unknown	Unknown
Confirmed	Polk	19	Caterer	Salad	Norwalk virus	Confirmed
Suspected	Broward	18	Restaurant	Roast beef	C. perfringens	Suspected
Confirmed	Volusia	18	Restaurant	Macaroni salad,ice	Norwalk virus	Confirmed
Confirmed	Duval	17	Other	Roast beef	E. coli 0157:H7	Confirmed
Confirmed	Orange	17	Restaurant	Sandwiches	Hepatitis A	Confirmed
Confirmed	Dade	16	Other	Mamey pulp"batidos"	Typhoid fever	Confirmed
Suspected	Hillsborough	16	Restaurant	Pizza	Staphylococcus	Suspected
Suspected	Orange	16	Restaurant	Multiple buffet items	Norwalk virus	Suspected
Confirmed	Orange	15	Restaurant	Amberjack and mahi mahi	Ciguatera	Confirmed
Confirmed	Hillsborough	14	Prison	Bread	Salmonella	Confirmed
Confirmed	Santa Rosa	13	Restaurant	Unknown	Unknown	Unknown
Suspected	Dade	11	Caterer	Chicken , rice , potatoes	Unknown	Unknown
Suspected	Orange	11	Restaurant	Chicken wings	Unknown	Unknown

Table 20: Contributing Factors in Foodborne Outbreaks,[11] Florida 1999

Factor	# Outbreaks	# Cases
Anaerobic packaging	1	3
Buffet service	1	4
Poor dry storage	1	3
Toxic container	2	4
Unapproved source	3	20
Added poisonous substance	4	11
Inadequate cookng	7	87
Contaminated ingredients	9	152
Hand contact	11	122
Inadequate reheating	12	92
Infected person	14	239
Consumption:raw/lightly cooked	16	50
Food prepared hrs before serving	17	111
Natural toxicant	17	45
None reported	17	185
Other	24	145
Poor personal hygiene	24	175
Improper cooling	25	134
Unclean equipment	25	150
Improper handwashing	32	145
Cross-contamination	33	344
Inadequate hot-holding	36	156
Inadequate refrigeration	56	213
Unknown	80	242
Total	**467**	**2832**

[11] An outbreak may have up to three contributing factors.

Figure 14: Number of Outbreaks and Number of Cases by Contributing Factor, Florida, 1999

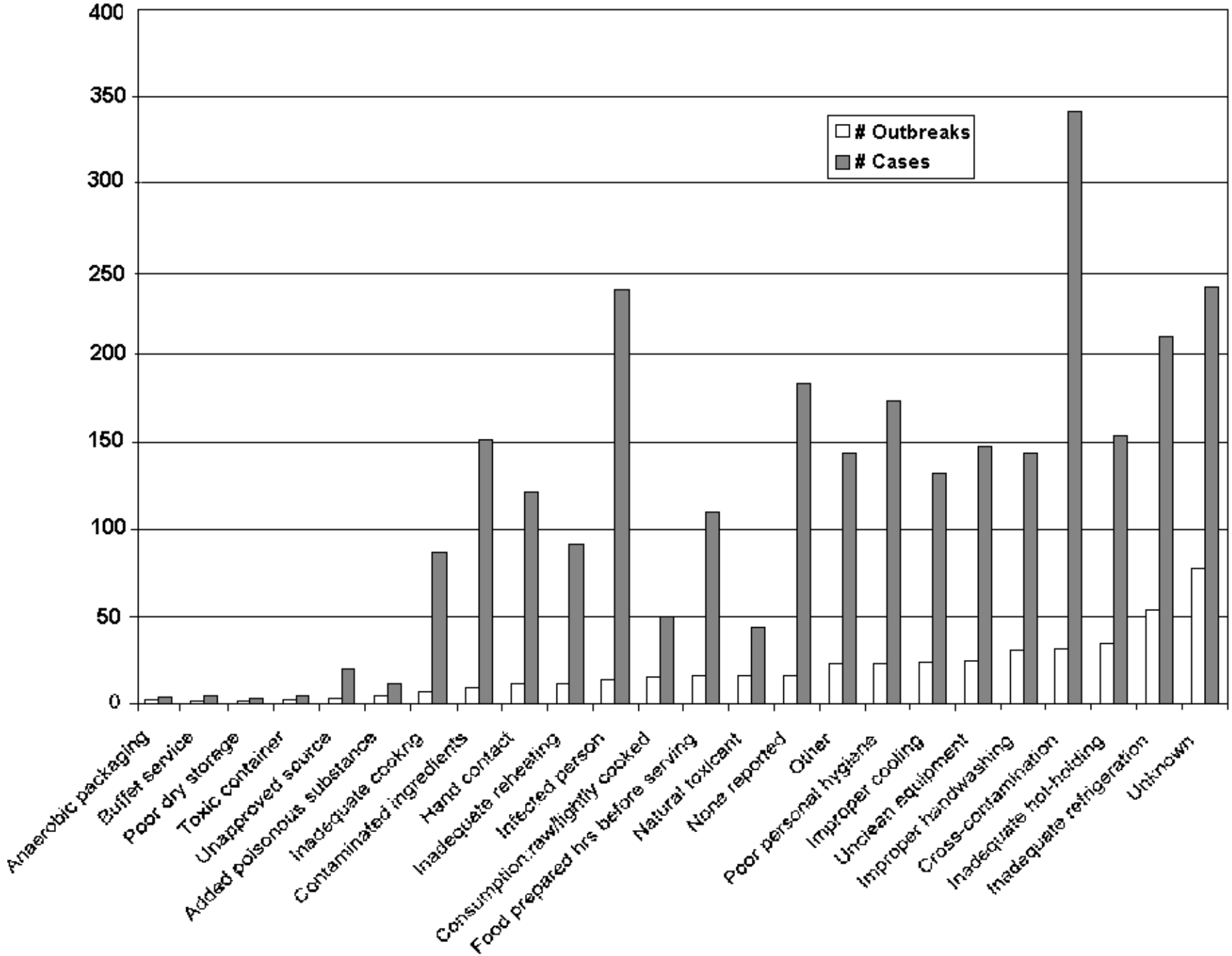


Table 21: Contributing Factors by Etiologic Agent for Outbreaks Reported in Florida, 1999

Factor	B. cereus	C. bot.	C. perf.	Campy	Chem	Ciguatera	Crypto	Cyclosp	E-coli 0157:H7	Giardia	HepA	Norwalk	Other	Salmonella	Scombroid	Shigella	Staph	Typhoid	Unk	V.. para.	V. vul ..	Total
Added poisonous substance	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	4
Anaerobic pckg.	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Buffet service	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
Raw/lightly cooked	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	1	2	10	16
Contam. ingred.	1	0	0	0	1	0	0	1	1	0	0	2	1	0	0	0	0	1	0	1	0	9
Cross-contam.	0	0	1	2	0	0	0	1	1	2	0	5	0	3	0	0	5	0	12	1	0	33
Food prep. hrs. before serving	7	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	6	0	0	17
Hand contact	0	0	1	0	0	0	0	0	0	0	0	5	0	1	0	0	2	0	2	0	0	11
Improper cooling	6	0	3	0	0	0	0	0	0	0	0	2	0	2	0	0	1	0	11	0	0	25
Improper handwashing	0	0	0	0	0	0	0	0	0	0	1	2	0	0	0	1	11	0	17	0	0	32
Inad. cooking	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	4	0	0	7
Inad. hot-holding	2	0	5	1	0	0	0	0	0	0	0	0	0	2	0	0	10	0	15	1	0	36
Inad. refrig.	6	0	2	1	0	0	0	0	0	0	0	1	0	1	1	0	11	0	30	3	0	56
Inad. reheat.	1	0	3	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	6	0	0	12
Infected person	0	0	0	0	0	0	1	0	0	0	1	9	0	2	0	1	0	0	0	0	0	14
Natural toxicant	0	0	0	0	0	5	0	0	0	0	0	0	1	0	2	0	0	0	0	0	9	17
None reported	1	0	0	0	1	0	0	0	1	0	1	1	0	0	1	0	0	0	11	0	0	17
Other	1	1	0	0	1	0	2	0	1	0	0	3	0	0	0	0	6	0	5	1	3	24
Poor dry storage	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
Poor personal hygiene	2	0	0	0	1	0	0	0	0	0	1	4	0	1	0	1	5	0	9	0	0	24
Toxic container	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	2
Unapproved source	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	3
Unclean equipment	0	0	0	0	1	0	0	0	0	0	0	2	0	3	0	0	7	0	12	0	0	25
Unknown	2	1	1	0	2	0	0	0	0	0	1	2	0	3	2	0	1	0	63	0	2	80
Total	29	4	18	4	11	7	3	2	5	2	5	41	2	19	6	3	63	2	208	9	24	467

Table 22: Contributing Factors by Etiologic Agent for Cases in Outbreaks Reported in Florida, 1999

Factor	B. cereus	C. bot.	C. perf.	Campy	Chem	Ciguatera	Crypto	Cyclosp	E-coli 0157:H7	Giardia	HepA	Norwalk	Other	Salmonella	Scombroid	Shigella	Staph	Typhoid	Unk	V.. para.	V. vul..	Total
Added poisonous substance	0	0	0	0	9	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	11
Anaerobic pckg.	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
Buffet service	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	4
Raw/lightly cooked	0	0	0	0	0	0	0	0	0	0	0	27	0	0	0	0	0	0	8	5	10	50
Contam. ingred.	2	0	0	0	2	0	0	94	17	0	0	15	3	0	0	0	0	16	0	3	0	152
Cross-contam.	0	0	22	7	0	0	0	94	17	4	0	58	0	19	0	0	11	0	109	3	0	344
Food prep. hrs. before serving	18	0	7	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	82	0	0	111
Hand contact	0	0	22	0	0	0	0	0	0	0	0	87	0	2	0	0	5	0	6	0	0	122
Improper cooling	20	0	12	0	0	0	0	0	0	0	0	48	0	17	0	0	2	0	35	0	0	134
Improper handwashing	0	0	0	0	0	0	0	0	0	0	17	37	0	0	0	6	34	0	51	0	0	145
Inad. cooking	0	3	0	0	0	0	0	0	0	0	0	0	0	6	0	0	3	0	75	0	0	87
Inad. hot-holding	5	0	62	2	0	0	0	0	0	0	0	0	0	5	0	0	30	0	49	3	0	156
Inad. refrig.	20	0	35	2	0	0	0	0	0	0	0	25	0	6	2	0	40	0	77	6	0	213
Inad. reheat.	2	0	37	0	0	0	0	0	17	0	0	0	0	0	0	0	3	0	33	0	0	92
Infected person	0	0	0	0	0	0	38	0	0	0	17	161	0	17	0	6	0	0	0	0	0	239
Natural toxicant	0	0	0	0	0	21	0	0	0	0	0	0	2	0	13	0	0	0	0	0	9	45
None reported	4	0	0	0	106	0	0	0	2	0	8	16	0	0	2	0	0	0	47	0	0	185
Other	2	3	0	0	4	0	44	0	2	0	0	54	0	0	0	0	16	0	15	2	3	145
Poor dry storage	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	3
Poor personal hygiene	10	0	0	0	2	0	0	0	0	0	17	78	0	10	0	6	25	0	27	0	0	175
Toxic container	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	4
Unapproved source	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	16	0	0	0	20
Unclean equipment	0	0	0	0	2	0	0	0	0	0	0	51	0	27	0	0	32	0	38	0	0	150
Unknown	5	1	2	0	6	0	0	0	0	0	4	15	0	8	4	0	7	0	188	0	2	242
Total	88	10	199	11	132	25	82	188	55	4	63	672	5	117	21	18	212	32	852	22	24	2832

Table 23: Contributing Factors by Vehicle for Outbreaks Reported in Florida, 1998

	Beef	Dairy	Fish	Fruit	Multiple ingred.	Multiple items	Pork	Poultry	Rice	Shellfish	Unk.	Vegetable	Water	Total
Added poisonous substance	0	0	0	0	3	0	0	0	0	0	0	0	1	4
Anaerobic pckg.	0	0	0	0	1	0	0	0	0	0	0	0	0	1
Buffet service	0	0	0	0	0	0	0	0	0	0	1	0	0	1
Consumption:raw/lightly cooked	0	0	2	0	0	1	0	0	0	13	0	0	0	16
Contaminated ingredient	1	0	0	1	2	2	0	0	0	2	0	1	0	9
Cross-contamination	3	0	0	1	2	12	0	5	0	4	0	1	5	33
Food prepared hours before serving	0	1	0	2	4	5	1	1	2	1	0	0	0	17
Hand contact	0	0	0	0	4	3	0	2	0	1	0	1	0	11
Improper cooling	0	1	0	1	7	7	2	4	2	0	1	0	0	25
Improper handwashing	4	1	1	0	11	7	1	4	1	1	0	1	0	32
Inadequate cooking	1	0	0	0	1	1	0	2	0	2	0	0	0	7
Inadequate hot-holding	3	0	0	0	5	13	2	9	1	2	0	1	0	36
Inadequate refrigeration	5	0	4	1	12	17	0	12	2	3	0	0	0	56
Inadequate reheating	2	0	0	0	2	7	1	0	0	0	0	0	0	12
Infected person	1	0	0	0	5	7	0	0	0	0	0	0	1	14
Natural toxicant	0	0	7	0	0	0	0	0	0	10	0	0	0	17
None reported	1	1	3	0	3	7	0	0	0	0	1	1	0	17
Other	3	1	0	0	4	1	1	1	0	4	1	1	7	24
Poor dry storage	0	0	0	0	1	0	0	0	0	0	0	0	0	1
Poor personal hygiene	1	1	0	1	7	4	1	4	0	0	2	3	0	24
Toxic container	0	0	0	0	0	1	0	0	0	0	0	0	1	2
Unapproved source	0	0	2	1	0	0	0	0	0	0	0	0	0	3
Unclean equipment	2	1	0	1	10	5	0	1	1	1	2	0	1	25
Unknown	7	1	9	2	16	24	1	4	0	10	4	1	1	80
Total	34	8	28	11	100	124	10	49	9	54	12	11	17	467

Table 24: Contributing Factors by Vehicle for Cases in Outbreaks Reported in Florida, 1998

	Beef	Dairy	Fish	Fruit	Multiple ingred.	Multiple items	Pork	Poultry	Rice	Shellfish	Unk.	Vegetable	Water	Total
Added poisonous substance	0	0	0	0	9	0	0	0	0	0	0	0	2	11
Anaerobic pckg.	0	0	0	0	3	0	0	0	0	0	0	0	0	3
Buffet service	0	0	0	0	0	0	0	0	0	0	4	0	0	4
Consumption:raw/lightly cooked	0	0	10	0	0	19	0	0	0	21	0	0	0	50
Contaminated ingredient	17	0	0	16	5	96	0	0	0	9	0	9	0	152
Cross-contamination	24	0	0	10	5	176	0	24	0	77	0	9	19	344
Food prepared hours before serving	0	3	0	9	11	11	3	2	6	66	0	0	0	111
Hand contact	0	0	0	0	36	74	0	4	0	3	0	5	0	122
Improper cooling	0	3	0	6	31	43	5	17	6	0	23	0	0	134
Improper handwashing	16	3	2	0	33	65	3	10	2	3	0	8	0	145
Inadequate cooking	4	0	0	0	3	3	0	9	0	68	0	0	0	87
Inadequate hot-holding	25	0	0	0	13	61	9	32	2	6	0	8	0	156
Inadequate refrigeration	12	0	12	3	44	93	0	36	6	7	0	0	0	213
Inadequate reheating	36	0	0	0	5	49	2	0	0	0	0	0	0	92
Infected person	6	0	0	0	54	141	0	0	0	0	0	0	38	239
Natural toxicant	0	0	34	0	0	0	0	0	0	11	0	0	0	45
None reported	2	2	6	0	16	149	0	0	0	0	6	4	0	185
Other	9	3	0	0	9	26	3	2	0	5	23	5	60	145
Poor dry storage	0	0	0	0	3	0	0	0	0	0	0	0	0	3
Poor personal hygiene	6	2	0	10	36	68	2	10	0	0	29	12	0	175
Toxic container	0	0	0	0	0	3	0	0	0	0	0	0	1	4
Unapproved source	0	0	4	16	0	0	0	0	0	0	0	0	0	20
Unclean equipment	6	2	0	10	77	37	0	2	2	2	10	0	2	150
Unknown	20	3	20	8	51	78	2	9	0	27	19	2	3	242
Total	183	21	88	88	444	1192	29	157	24	305	114	62	125	2832