Foodborne Illness Surveillance and Investigation
Annual Report, Florida, 1998

Bureau of Environmental Epidemiology
Division of Environmental Health
Department of Health

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Overview

The 1998 year continued to be active for food and waterborne outbreak reporting and investigation. A total of 4,449 foodborne illness complaints were reported to counties in 1998. A total of 315 outbreaks with 3,290 cases were reported, compared to 439 outbreaks and 2,744 cases for 1997, and 305 outbreaks and 2,777 cases for 1996. Investigators were able to laboratory confirm 40 of the outbreaks (including 14 *V. vulnificus*) associated with 567 cases. Staphylococcus, Norwalk and Salmonella were identified in the largest percentage of the total reported outbreaks (6% each). Norwalk was identified in the largest percentage of cases in total reported outbreaks (22.2%%) followed by B. cereus (4.6%). Restaurants were the source site in 75% of the outbreaks reported and in 48.8% of the cases. Poultry (12.7%) and beef (8.2%) were the most implicated of outbreak vehicles. Poultry accounted for 5.9% of the cases, with beef accounting for 4.8% of the cases. The month with the largest percentage of outbreaks reported was March (11.8%) with the largest percentage of cases reported in August (24.2%). Large (greater than 10 cases) outbreaks accounted for 14.3% (45) of the total reported outbreaks and 75% (2465) 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 1997

Contributing Factor	# Outbreaks	# Cases
Inadequate refrigeration (T > than prescribed)	63	317
Cross contamination	56	1070
Improper handwashing	47	668
Unclean equipment	42	219
Inadequate hot-holding	38	244
Improper cooling (lengthy cool-down)	23	94

Table 2: Summary of Foodborne Illness Outbreaks Reported to Florida, 1989 – 1998*

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**

*The current surveillance and investigation program data began in 1994

Table 3: Confirmed, Suspected and Total Outbreaks Reported to Florida, 1994 - 1998

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**

1988	# Outbreaks	# Cases
Suspected	256	1937
Confirmed	59	1353
Total	**315**	**3290**

Figure 1: Number of Suspected and Confirmed Outbreaks by Year, Florida, 1994 - 1998

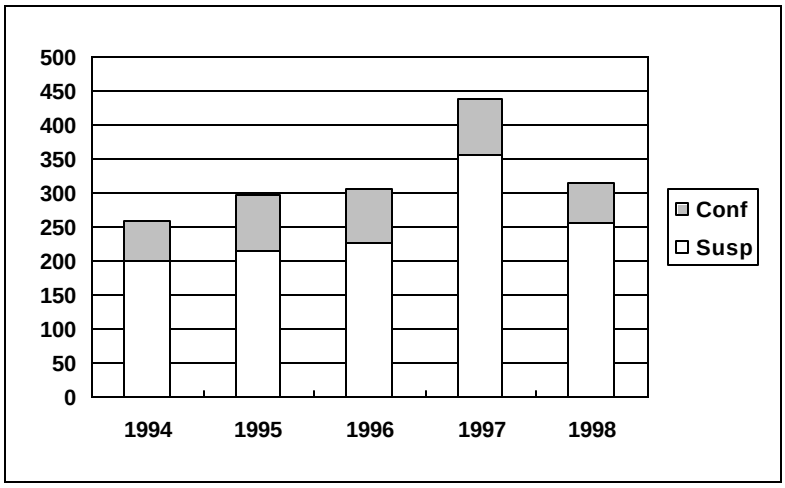
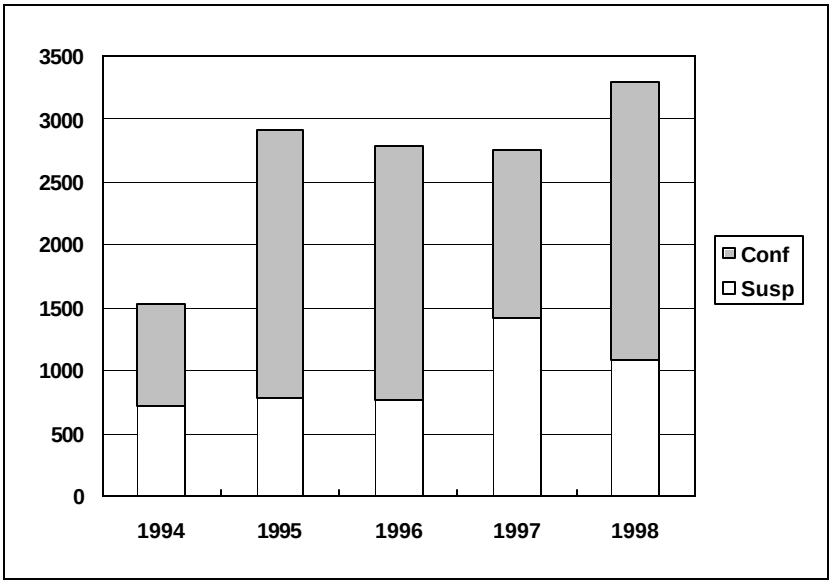


Figure 2: Number of Cases for Suspected and Confirmed Outbreaks by Year, Florida, 1994 - 1998



Training and Continuing Education

In 1998, the Food and Waterborne Disease section offered 65 training sessions within the Department of Health and 64 training and continuing education sessions to groups outside the department. Additional 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, Department of Agriculture and Consumer Services, Department of Environmental Protection), professional associations (Florida Environmental Health Association, chefs, county extension agents), industry groups (produce growers) and university students (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, district and statewide FEHA meetings, to food safety and food microbiology classes at the University of Florida, and to Florida's county extension agents through IFAS at the University of Florida. Specialized training in foodborne outbreak investigation was given to staff of the Broward County Jail system following a foodborne outbreak in the jail. 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. Foodborne Outbreaks and Fresh Produce at the American Society for Horticultural Science (Charlotte, NC) and Foodborne Outbreaks in Institutional Care Facilities for staff of the National Health Care Corporation in Atlanta, Nashville and Orlando.

Satellite training:

The Bureau of Facility Programs hosted the following for the state: USDA Retail Meat and Poultry Processing - Cooking and Cooling (June 21, 1998) and FDA Food Microbiological Control (August 11 - 13, 1998). 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 1998, a total of 119 environmental health professionals and 15 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.

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 as well as 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

Broward County Senior Citizen Outbreak, February, 1998

On February 20, 1998, the Broward County Health Department was notified of a suspected foodborne outbreak involving several senior citizen centers. The implicated foods were provided by a Broward County food processor. An investigation was initiated subsequent to 50 reported illness complaints among four Palm Beach County senior citizen sites.

A case was defined as any guest who attended the lunch on February 10, 1998 and became ill with at least two or more of the following symptoms of nausea, vomiting, cramps, diarrhea, fever, headache. All calculations were performed using Epi Info version 6.2 computer software. The attendees of the senior centers were interviewed and if they were ill, they were asked about

onset times, symptoms, duration, medical help sought, about any others who had eaten with them, and whether those eating partners had become ill.

A total of 60 persons were interviewed. Thirty five (58%) reported illness including symptoms of diarrhea (86%); abdominal cramps (87%); nausea (32%); vomiting (27%); fatigue (21%); dizziness (18%); chills (15%); fever (6%); and headache (3%). Incubation periods ranged from 1-22 hours, with a mean of 8.0 hours. Duration of illness ranged from 10-96 hours, with a mean of 16 hours. One case was hospitalized and initially diagnosed with salmonella, which was later retracted by the hospital laboratory. No other known pathogenic agent was isolated from the patient's clinical specimens. There were no deaths associated with this outbreak.

An interview was conducted with the assistant manager; the chef; and food preparation staff to discuss the purpose and procedure of the investigation. The managers were queried regarding the health status of the food handlers, kitchen staff, and drivers of the facility. According to the managers, there were no reported illnesses among employees in the prior two weeks.

Approximately 3,000 meals are prepared and served daily to sixty, (60) Dept. of Social Services, contract sites throughout Dade, Broward and Palm Beach Counties. The meals served to Broward and Dade Counties are pre-plated (950-1,000 meals. The meals (750 meals) to Palm Beach are bulk packaged and transported to the sites. Review of the food preparation procedures of the implicated meal, a chicken stir-fry cooked in a kettle, revealed there were two separate food preparation batches: 1) pre-plated meal preparation (served in Broward & Dade County) and; 2) bulk meals (served in Palm Beach County). Reports of illness were received from four sites in Palm Beach County.

Extensive review and observation of food preparation, packaging, and shipping, were conducted to identify hazardous practices, monitor critical control points and determine needed controls or corrective actions. A food flow chart was developed for the implicated meal from raw ingredients to finished product for consumption. As hazards were identified during the investigation, critical control points determined, control measures, including monitoring procedures, and/or corrective actions were considered and discussed with the managers of the facility.

Laboratory results of food samples were not significant. Laboratory results of the clinical specimens of the luncheon attendees, foodhandlers and drivers were negative for known bacterial pathogens.

The epidemiological data revealed that an outbreak occurred in four senior centers, affecting 153 persons with 50 reported illnesses. Though laboratory results of clinical specimens and food samples were inconclusive, epidemiological data and anecdotal reports suggest there was a problem with the food. A review of the affected sites reveals that three of the four sites reporting illnesses were on Route A; the fourth site is on Route C. A fifth site on Route A did not accept the food delivery for reasons of unappealing appearance.

Briefly, the food preparation process included preparing 100 pounds of rice and 40 pounds of gravy, adding frozen chicken stir fry ingredients later. Pre-plate preparation began with mixing the frozen ingredients with cold gravy and plated with the cold cooked rice on the bottom and the stir fry mix ladles on top with peas portioned separately. The bulk preparation of the implicated item was done by adding the frozen chicken stir fry ingredients with no prior cooking or heating to the hot gravy. The ingredients were then allowed to cook for 1-2 hours then portioned into bulk

stainless steel containers, covered with foil and put into Rubbermaid coolers for transportation to their respective sites.

The investigation revealed that the affected facilities would have received foods served from the top to the middle of the kettle. The significance of this association may be that between the time the frozen ingredients were added to the kettle, given the volume of frozen foods (≥500 #) and the time that bulk packaging began, the stir fry may not have attained proper cooking temperature in the upper portion of the kettle. Together with the protracted delivery process to the affected sites, and the breakdown in food storage, there was ample opportunity for massive bacterial growth given the time lapses between deliveries, holding, reheating and consumption of the food to the senior centers. Time/temperature abuse is a major contributing factor in foodborne illness.

It is believed, as there were no other contemporaneous foodborne illness reports implicating the chicken product or other ingredients, that the finished product, the chicken stir fry, was subjected to improper cooking time and time/temperature abuse and was the vehicle of the foodborne agent. The symptoms, incubation period, duration, and types of foods implicated, suggest an outbreak consistent with *Bacillus cereus* toxin mediated infection.

Ciguatera Fish Poisoning in Hendry County, May, 1998

In May 1998, the Hendry County Health Department was notified by a private physician of a family of four who sought medical treatment and was hospitalized with symptoms of gastrointestinal and neurological illnesses. Initial symptoms included: nausea, diarrhea and paresthesia (tingling) of the lips and tongue. Onset of symptoms ranged from 2- 6.5 hours (mean: 4 hours). Additional symptoms followed: cramps, vomiting, pruritus (itching), myalgia (muscle pain) and dysesthesia (temperature sensory reversal). The duration of initial symptoms was 8-24 hours. Stool cultures were negative for Salmonella, Shigella and Campylobacter.

An investigation of the family's food history identified barracuda as the suspected vehicle. Based on these findings and the distinctive symptomatology, investigators suspected ciguatera poisoning. Further investigation revealed that the barracuda was shared with two other persons, who also experienced symptoms consistent with ciguatera poisoning. The barracudas (3 in total) were caught at Riviera Beach in West Palm Beach for personal consumption. The barracudas ranged in size from 2 1/2 feet to 3 1/2 feet in length. Leftover fish samples (2 cooked filets and 1 raw filet) were collected and shipped to the FDA in Dauphin Island for laboratory analysis.

The FDA analyzed the fish specimens by sodium channel specific cytotoxicity assay. Initially, only the raw filet (which was believed to be from the same fish that caused the outbreak) was analyzed. The result of the raw filet was found to be non-toxic. However, analyses of the 2 cooked filets showed significant levels of toxicity, 6.5 and 7.9 nanograms ciguatoxin per gram tissue (as little as 0.25 nanograms ciguatoxin per gram tissue is sufficient to cause ciguatera fish poisoning in human adults). According to the FDA, the results of analysis indicate the raw filet was not from the same fish as the cooked specimens. Given these results, the remaining barracuda filets were discarded by the family.

Note: During this investigation, one of the patients disclosed that they were aware of the toxin sometimes found in barracuda and that in their culture they perform their own tests to see if the fish is toxic. One test is to place a portion of the fish on the ground, if ants are drawn to it, then it

is okay to eat. If the ants shun the fish, then it is toxic. Another test is to place a penny on the raw fish, if the penny changes color, then it is toxic. The patient in this case usually uses both tests, but this time he only used the ants.

Vibrio parahaemolyticus and *Plesiomonas shigelloides* Outbreak Associated with Garlic Blue Crabs, Polk County, June 1998

On June 8, 1998 the Polk County Health Department was notified by Lakeland Regional Medical Center of three positive stool cultures of *Vibrio parahaemolyticus* and three positive *Plesiomonas shigelloides* stool cultures from six patients. During the confirmation process one patient was found to have both organisms in the stool culture resulting in four *Vibrio parahaemolyticus* and three *Plesiomonas shigelloides* cultures in six patients.

Case finding efforts resulted in 13 interviews with 11 reporting illnesses including the initial six with confirmed laboratory stool analyses. Three cases experienced onset on June 4 and eight cases had onset of symptoms on June 5. Each of the six laboratory-confirmed cases had illness onsets on June 5. Seven cases were treated in the emergency room with three of them having to be transported there by ambulance. All persons interviewed purchased and consumed food from the implicated food service facility between June 3 through 5. The incubation period ranged from 12 to 31 hours with a mean of 18 hours, mode of 12 hours, and a median of 13 hours. Symptoms included diarrhea (100%), nausea (100%), abdominal cramps (81.9%), vomiting (45.5%), fever (18.2%), and body ache (18.2%). The majority of the cases were still experiencing symptoms at the time of the interviews on June 11.

Food histories revealed that all eleven ill persons consumed blue crabs with garlic. The two unaffected persons interviewed consumed blue crabs without garlic (refer to Table 1 for additional information on food exposures). The reported time between purchase of the implicated food product and consumption ranged from 15 minutes to 1.5 hours with an average of 45 minutes and a mode of 30 minutes.

The preparation of the blue crabs involved receiving the product whole and cooling them until they were dormant. The blue crabs were cooked in batches. A batch of blue crabs, approximately three dozen, was placed in a vat of boiling water for approximately 14 minutes or until they floated. Then the cooked crabs were placed in a 6 inch gray plastic tub. The filled plastic tub was then placed under running water until the crabs were cool to touch. The blue crabs are then separated and sorted with one-half of the batch being placed in a plastic, insulated cooler with 6 inches of undrained ice. This portion of blue crabs is served whole, as plain non-garlic crabs. The remaining blue crabs have the top shell removed and are cleaned vigorously under running water, placed in a pile in an adjacent sink, and then scooped up with bare hands and placed into a plastic, insulated cooler with 6 inches of undrained ice. Portions of this second group of blue crabs are then placed into a pan with a butter and garlic mixture and sold to patrons upon demand. The temperature of the butter mixture was 150° F.

This facility was a one-person, unlicensed, operation. The handwash sink had only hot water and lacked soap and towels. There was no handwashing observed during the onsite investigation and the owner/food worker admitted he did not wash his hands. The plain crabs are handled very little following the cooking process while the garlic crabs are vigorously manipulated with bare hands following boiling. Proper sanitation of food contact surfaces and utensils was not performed. The facility involuntarily ceased operation on June 11, 1998 at 6:30pm.

Table 4: Food Attack Rates
***Plesiomonas shigelloides* and *Vibrio parahaemolyticus* Illness Outbreak**
Polk County, Florida, June 5, 1998

	Number Of Persons Who Ate Specified Food				Number Of Persons Who Did Not Eat Specified Food			
Food Items Served	Ill	Not Ill	Total	% Ill	Ill	Not Ill	Total	% Ill
Garlic crabs	11	o	11	100	0	2	2	n/a
Crabs (no garlic)	0	2	2	n/a	11	0	11	100
Hard Boiled Eggs	9	0	9	100	2	2	4	50
Sausage	9	0	9	100	2	2	4	50
Potatoes	9	0	9	100	2	2	4	50
Corn	9	0	9	100	2	2	4	50

Plesiomonas shigelloides has been associated with very few foodborne illness outbreaks worldwide. It is an aquatic organism and prefers fresh or brackish water but can survive in conditions of high salinity. Sources, in addition to humans, include fish, reptiles, crustaceans, birds, and other mammals. It is generally found with increasing frequency during summer months. The incubation appears to be one day with typical symptoms consisting of inflammatory diarrhea, abdominal cramps, nausea. Fever, headache and vomiting are less common. All strains can be killed by heating at 140°F for 30 minutes.

Vibrio parahaemolyticus has been associated with common source outbreaks and sporadic reports of illness linked to raw oyster consumption throughout the world. It inhabits the marine coastal environment and illnesses typically occur during the warmer months. The incubation period ranges from 12 to 24 hours with predominant symptoms of inflammatory diarrhea and abdominal cramps and occasionally nausea, vomiting, fever and headache. Outbreaks of illness are associated with the ingestion of raw or inadequately heated seafood, cross contaminated food products or by contact with contaminated water. A period of time at room temperature results in the growth of the organism to infectious levels. It can be killed by heating at 158°F for 15 minutes. It may survive at temperatures of 140°F for 15 minutes or even 176°F for several minutes.

This illness outbreak was observed and quickly reported by alert emergency room personnel due to the acute symptoms experienced by the cases who sought medical assistance over a short period of time. The collection of stool samples for analysis was prudent and thus enabled a thorough and precise epidemiological investigation. This outbreak is somewhat unique in that two organisms were found to be the etiologic agents:--*Vibrio parahaemolyticus* being associated with seafood in foodborne outbreaks and *Plesiomonas shigelloides* previously rarely seen in any foodborne outbreaks. The lack of proper handwashing between the handling of raw and ready-to-eat blue crabs was most likely the significant contributing factor to this outbreak of illness.

***Clostridium perfringens,* Sarasota County, June 1998**

In Sarasota County, 36 people became ill after attending a church event (Father's Day Picnic) that was catered by a barbecue restaurant. Only one person sought medical attention. Symptoms reported were nausea (16.6%), diarrhea (83%), abdominal cramps (67%), and headache (7.2%). Onset of symptoms ranged between 3-24 hours with a mean of 14 hours. The duration of illness ranged from 1 to 48 hours with a mean of 14.5 hours. No clinical specimens were obtained.

Food specific attack rates identified the barbecued pork and the potato salad as the suspect foods responsible for this outbreak. The attack rates for eating pork and potato salad were both 42%. Statistical analysis disclosed a significant association with the consumption of pork (OR=8.41; RR=5.27 with 95% confidence limits of 2.18<RR<12.72; Uncorrected Chi-Square=20.29 p-value=0.0000067). The potato salad also had a significant association (OR=5.03; RR=3.33 with 95% confidence limits of 1.70<RR<6.53; Uncorrected Chi-Square=14.99, p-value=0.0001018). Leftover food samples were collected from members of the church. The barbecued pork and the potato salad were both submitted to the Department of Health Bureau of Laboratories for analysis (*Clostridium perfringens*, *Bacillus cereus*, and *Staphylococcus aureus*). Both samples were negative for *Bacillus cereu*s toxins and Staphlococcus enterotoxins. *Clostridium perfringens* was found only in the barbecued pork, the potato salad was negative.

The owner/operators of the restaurant were interviewed to review menu items and preparation procedures. The findings at the time of the investigation revealed foods at improper temperatures. The day of the event the cook arrived at 6:00am to prepare for the catered meal. The pork was cooked that morning and transferred hot into insulated cambro containers for transport (no food temperatures were measured). The potato salad was a commercially prepared product and was also transported in cambro units. The restaurant personnel arrived at the event location at 11:30am The food remained in the cambro units while staff set up chafing dishes and got the grill going for hot dogs. Lunch was served at 1:00pm and ended at 2:00pm. Leftover cold foods were placed on ice. The restaurant staff offered the use of the cambro units to store the hot foods, but church members did not want to be responsible for returning the units. The picnic ended at 4:00pm, and members took the leftovers home.

Clostridium perfringens is typically associated with cooked meat products that have not been kept at proper temperatures and have been improperly cooled and reheated. In this outbreak, the food was prepared several hours in advance and maintained at unknown temperatures. Investigators did not explore whether the members who reported illness were the same members who took the leftovers home. Although the exact cause of contamination is unknown, the pork could have become contaminated during the described method of preparation and/or from inadequate hot holding of the barbecued pork.

To reduce the incidence of *Clostridium perfringens* enteritis, potentially hazardous foods should be kept at proper temperatures at all times. Keep foods at 41^{o} F or below, or at 140^{o} F and above. Cool foods rapidly in shallow containers and reheat foods rapidly to an internal temperature of 165^{o} F.

Norwalk Virus Outbreak Associated With Ice, Duval County, August, 1998

In August 1998 the Duval County Health Department (DCHD) was notified of several persons becoming ill after attending an August 23rd birthday party at a local restaurant.

The restaurant involved specializes in hosting parties for individual groups. During the investigation guest lists were obtained for other groups that held parties on August 23. Calls to these groups found three additional clusters of illnesses similar to the first group.

Case histories for the four clusters were obtained through questionnaires. Stool samples were collected for enteric and viral analysis. In all, 64 case histories were completed and 15 enteric and 13 viral stool samples were collected. Forty individuals experienced illness. Primary symptoms were diarrhea, vomiting, cramps, nausea, headache, low grade fever and fatigue. Incubation times ranged from 6-67 hours with an average of 32 hours. Duration of the illnesses ranged from 24-96 hours and averaged 59 hours.

Investigation of the food service facility noted poor hygienic practices particularly in the handling of ice. Self-serve ice and beverage equipment provided to the customers contain large ice bins that are filled from the rear of the equipment by food workers. Management noted that a worker acknowledged to have poor hygiene habits filled the ice bin for the 1pm parties.

Of all the groups that attended parties on August 23 only the 4 that were in the restaurant at 1pm experienced illness. Groups there at 10am or 3pm were not affected. The food specific attack rate table implicated the beverages with ice as being the likely vehicle of transmission with a 63% attack rate. Additionally 7 stool samples were positive for Norwalk virus and all 4 clusters had positive samples that were identical to all the clusters. The lack of proper hygiene as well as poor ice handling practices resulted in this outbreak of Norwalk viral gastroenteritis.

Burrito Associated Outbreak in Hillsborough County Schools, August, 1998

On August 26,1998 the Hillsborough County Health Department was notified by the county school system that approximately 30 children at one elementary school had become ill shortly after several consecutive lunch periods. Foods served included a beef and bean burrito, baked French fries, canned green beans, and canned pears. A field investigation was conducted at this school, and no time-temperature abuse or sanitation deficiencies were identified.

During the investigation, it was found that many other elementary schools in the county had experienced an unusual number of ill students after serving burritos from the implicated lot over a three-day period. School health personnel identified 644 cases involving vomiting beginning 10 minutes to 3 hours after lunch, in 66 individual schools throughout Hillsborough County. Most children had recovered by the end of the school day. The overall attack rate of children reporting vomiting in this outbreak was only 5-6%, which is extremely low. However, subsequent interviews indicate many more children had experienced nausea or other stomach discomfort after the implicated meals, but had not been counted as cases.

The burrito product had been produced in Chicago, Illinois at a USDA licensed facility and distributed through a wholesaler in Lakeland, Florida. The identified lot of this product had been distributed only to the Hillsborough County school system. Stop-sale notices were issued by the USDA and Hillsborough County Health Department.

A case-control study was performed at three of the affected elementary schools with the assistance of the school board. All three studies implicated the burritos as being strongly associated with illness. Results from the school with the highest number of ill students had an odds ratio from the burrito of approximately 40 (confidence interval 5 to 852), a Chi-square value of 24, and a p-value of 0.0000010, thus strongly implicating the burrito product. There were no other common foods served at all schools reporting illnesses.

DACS and USDA were notified by the County Health Department and Bureau of Environmental Epidemiology for product trace-back assistance and product testing. In addition, food samples were sent to DOH Jacksonville Laboratory for analysis. Results from the available bacteriological, toxin and metals testing were all satisfactory.

To date, the USDA Compliance Division has obtained burrito product for additional testing to include; lubricating agents, mineral oils, bacterial toxins, mycotoxins and emetic toxins. The FDA and CDC have also requested samples of the burritos. Results are currently pending.

There were several similar outbreaks late in 1997 and early in 1998 throughout the country associated with frozen burrito products. Identified outbreaks have occurred in Georgia, Kansas and Florida in Okeechobee and Collier County schools. In each outbreak, similar onsets, symptoms, duration of illness and low attack rates were observed, but different burrito processors have been associated.

Campylobacter Outbreak, Duval County, September, 1998

In September, 1998 the Duval County Health Department investigated an outbreak of Campylobacteriosis associated with the consumption of undercooked chicken. The outbreak occurred among a group attending a two-day conference at a local hotel.

Interviews obtained 23 case histories from the exposed group. Of the 23, 16 persons experienced a gastrointestinal illness. Predominant symptoms included diarrhea (94%) cramps (81%), fever (67%), weakness (63%), headache (63%) and nausea (56%). Incubation times ranged from 24 to 240 hours with an average of 65 hours. Duration of the illness lasted from 24 to 160 hours with an average of 107 hours.

One stool sample was obtained for analysis and was reported positive for Campylobacter. The food specific attack rate table implicated the chicken with an 80% attack rate. Investigation of the food service facilities found numerous inadequacies, including cross contamination problems, poor handwashing practices and inconsistent temperature checks of cooked food products. The implicated chicken had been cooked from the frozen state for a short time and then placed in hot holding equipment at 140^{o} F. prior to service. The short cooking times of frozen chicken and low holding temperatures strongly suggest the chicken was undercooked. Additionally the lack of consistent food product temperature checks suggests that the staff was unaware that the food may not have been thoroughly cooked.

The gastrointestinal illness experienced by the conference attendees can be epidemiologically linked to the consumption of chicken provided by the hotel. Symptomology, incubation and duration times are consistent with foodborne Campylobacteriosis. This is also evidenced by the positive Campylobacter stool sample. Undercooked chicken is a primary source of Campylobacter organisms and according to the Centers for Disease Control and Prevention, is the primary cause of foodborne illness nationwide.

Hillsborough County Schools Soft Taco Outbreak, October, 1998

On October 8, 1998, the Hillsborough County Health Department was notified by personnel from an elementary school that they were experiencing an unusual number of students, 17, reporting gastrointestinal illness immediately following lunch that day. They suspected that these illnesses were related to the meal which had just been served. It was noted that this outbreak was very similar in nature to an outbreak involving burritos approximately six weeks earlier involving more than 600 students. Onset of vomiting was very rapid, typically within minutes, the children made a rapid recovery, and very low attack rates were noted. This elementary school has approximately 820 students, most of whom eat lunch in the school cafeteria each day. Clinic staff noted that the vast majority of ill students had eaten soft beef and bean tacos and consumed chocolate milk for lunch.

An investigation was immediately instituted at the facility on the afternoon of October 8. Available information was gathered regarding the ill students and all foods served that day in the cafeteria. A thorough food chain investigation was completed for the preparation of the tacos, since preliminary information implicated tacos as the suspected item served. It was noted that the tortillas used to make the tacos were from the same supplier that had provided the burritos implicated in the previous outbreak. Samples were collected of all available food items.

Calls were received from several other elementary schools that they had also noted an increase in the number of ill students after lunch on October 8. Only one other elementary school appeared to be experiencing numbers of cases which were clearly above normal background levels.

Case control surveys were conducted on October 9 in the two schools experiencing clearly elevated levels of illness on October 8. In both schools, all students who had initially reported illness were interviewed, together with all classmates of the three classes experiencing the highest number of cases. Only an additional seven cases were detected in these three classes, all in one classroom.

It had originally been reported that none of the fourth and fifth grade students at one school had been served tacos, since tacos were suspected as being implicated in the illnesses. All of these classes were interviewed, and none reported illness after lunch on October 8, although a number of the students had eaten the tacos.

School health administration reported that two or three cases per day of gastrointestinal illness was considered typical for the average elementary school. Additional surveys were completed, as suggested by the Centers for Disease Control and Prevention, to determine the food items served at the eleven schools reporting over three cases of illness, all of which were in the four to six case range. School health and administrative personnel at the individual schools were of the general opinion that the number of ill students that day was not above normal background levels for their particular facilities. Information was gathered on the food items served in these schools on October 8 for comparison with the two schools which did experience a significant number of cases. This data is as follows:

Table 5: Food Items Served in Hillsborough County Schools, October 8, 1998

School Name	Reported Ill	Tacos Served	8" Tortillas	Taco Seasoning	Ground Beef	Beans	Produce
Affected Schools							
Alexander	24	Y	RHSCO 8/17/98	Foothill Farms	Commodity #9400	Canned	Weyande
Schwartzkopf	13	Y	RHSCO 8/17/98	Foothill Farms	Hi-Flavor	None	Weyande
Non-Affected Schools							
Broward	6	Y	Unknown	Unknown	Unknown	None	Weyande
Citrus Park	6	Y	RHSCO 7/31/98	Foothill Farms	Hi-Flavor	None	Weyande
Claywell	5	Y	10"	Foothill Farms	Purchased	None	Weyande
Cork	4	Y	10"	Foothill Farms	Unknown	Canned	Weyande
Cypress Creek	6	N-nachos	None	None	Commodity	Canned	Weyande
Kenly	5	Y	RHSCO-date unk	Foothill Farms	Commodity	Canned	Weyande
Lanier	5	Y	Leftover-last year	Foothill Farms	Leftover roast beef	None	Weyande
Mendenhall	4	Y	RHSCO-date unk	Foothill Farms	Commodity	None	Weyande
Northwest	5	N-nachos	None	Atlantic Seasoning	Est 7423	None	Weyande
Tampa Palms	5	Y	RHSCO-date unk	Foothill Farms	Commodity	None	Weyande
Walden Lake	6	N-nachos	None	Hand-dee Pack	Hi-Flavor	Canned	Weyande

Traceback information identified that the implicated soft taco tortillas were supplied by RHSCO foods in Chicago and were produced by Atotonilco, also in Chicago. The product was dated August 17, 1998 and the product number is RM587. These frozen Amigo Brand 8" white tortillas, are packaged in 30 lb. boxes. These boxes contain sealed plastic bags, each containing twelve tortillas.

All data was analyzed using EpiInfo 6.04b, utilizing case-control survey data gathered in response to the investigation of the outbreak in the Hillsborough County Schools on October 8, 1998. Exposure refers to consumption of soft tacos, and disease refers to reported vomiting or cramps and nausea shortly after lunch on the day of the outbreak.

The case control study at Alexander Elementary School included 14 ill children and 38 controls. Data yielded an Odds Ratio of 8.80 with Confidence Limits of 1.77 to 47.63 associating illness with consumption of soft tacos. The Chi-square value was 10.35 and the p-value was 0.0012924.

The case control study at Schwartzkopf Elementary School included 13 ill children and 33 controls. Data yielded an Odds Ratio of 11.00 with Confidence Limits of 1.77 to 87.63 associating illness with consumption of soft tacos. The Chi-square value was 9.62 and the p-value was 0.0019295.

Combined data from the two schools was analyzed, and yielded an Odds Ratio of 8.16 with Confidence Limits of 2.73 to 25.20 associating illness with consumption of soft tacos. The Chi-square value was 19.30 and the p-value was 0.0000112.

All foods are currently being analyzed by the U.S. Food and Drug Administration (FDA) laboratory for suspected contaminants. Preliminary testing has yielded negative results for most typical pathogens, toxins, and chemical contaminants.

Norwalk-like Virus and Ice Consumption in a Fraternity House, Leon County, November, 1998

The Florida State University health center was notified of several cases of gastrointestinal illness in members of a fraternity on Wednesday November 4. The fraternity has 82 members, with about half of these living in the house. Students became ill on November 3 and by November 4, over 20 people were ill. Twelve sought medical care at emergency rooms of local hospitals, however none were hospitalized.

Lunch and dinner during weekdays and dinner on Sundays at the fraternity are prepared by two food handlers. Lemonade and iced tea is prepared by the food handlers and offered in a large jar. Ice is produced in a commercial ice machine in the kitchen. The ice is put in a medium-sized ice chest in the dining room where the students serve themselves.

A case-control study was conducted using food history and exposure questions related to meetings and meals between October 30 and November 2 in addition to symptoms and treatment as well as illnesses prior to the outbreak. It soon became clear that the outbreak was related to food consumed at the fraternity. Stool samples were taken of 7 cases and the 2 food handlers and were tested for enteric bacteria and viruses. Acute and convalescent sera were also taken from 16 cases and 7 controls for antibody testing.

The incubation period is estimated to be 24 - 56 hours. Predominant symptoms included nausea (90%), vomiting (84%), abdominal cramps (68%), diarrhea (65%), fever (65%), and muscle ache (61%). Symptom duration was from 1 - 43 hours with a mean of 24 hours. A cohort analysis identified the consumption of ice on Monday, November 2 as having the strongest association to illness (RR 8.07; CI 1.20-54.19; p-value = 0.001). Consumption of beverages and ice on other days were also significant, but were not as strong. The attack rate for illness among fraternity members was 42%. The attack rate for illness after ice consumption on Monday was 62%. There was no difference between ice consumption at lunch time and ice consumption at dinner time. Other food items served at the fraternity were not associated with illness.

Examination of the ice machine showed that there was a heavy mold accumulation on the inside of the water tubing and also on other areas with direct ice contact. Melted ice from five different parts of the holding bin of the ice machine was positive for coliform bacteria. The food preparers were asked to clean the machine, but melted ice from the bin still contained coliform bacteria after the machine had been cleaned twice. Test results on viruses in the melted ice were negative. However, PCR for water samples for Norwalk like viruses is still an experimental procedure. All 7 stool samples of the cases and of one of the food handlers were positive for Norwalk-like virus. No bacterial pathogens were found. To date, results of the serological tests are not available.

How the ice became contaminated is not clear. The fact that one food handler was positive for Norwalk like virus in the stool and that food handlers transfer the ice from the machine to the cooler for self-service in the common area show a potential for contamination during this

process. However, students sometimes entered the kitchen area and took ice out of the machine with their used cups. Also, the mold in the ice machine showed that there was no recent clean or routine cleaning schedule for the machine which may have facilitated ongoing growth of pathogens. It was recommended to the fraternity that an ice machine with an automatic ice dispenser be installed and that they adhere to a regular cleaning schedule.

Interstate Outbreaks

FSU versus Duke University, Norwalk-like Virus, September, 1998[1]

The Bureau of Environmental Epidemiology, Florida Department of Health, assisted the North Carolina Department of Health and Human Services in the investigation of an outbreak of Norwalk-like virus in a visiting football team from Duke University. The team arrived in Tallahassee, Florida late Friday afternoon, September 18. They were taken to a local hotel where they were served an evening meal, a snack, breakfast, and a pre-game meal. During the game, several Duke team players became ill with nausea, vomiting and diarrhea. The final score was FSU 62, Duke 13. The Bureau of Environmental Epidemiology became aware of the illnesses on Sunday afternoon, after the team had returned to North Carolina. An environmental assessment of the hotel restaurant showed no serious problems. Because it was the weekend, the Bureau of Environmental Epidemiology notified the emergency number for the North Carolina Department of Health and Human Services.

By Monday, September 21, a Tallahassee newspaper article said that 8 Florida State University football players had become ill with similar symptoms. It was agreed that North Carolina would take the lead in this investigation. A retrospective cohort study of all 108 Duke University team players and staff who shared at least one of 5 meals along with the ill FSU players was conducted. The case definition was a football team member, staff or others traveling with the team that weekend who had vomiting or diarrhea on or after Saturday, September 19. Of 64 cases, predominant symptoms included: diarrhea (95%), nausea (84%), abdominal cramps (67%), vomiting (59%), headache (59%), and fever (44%).

Of the five meals served between Friday at noontime (before the team left for Florida) and late afternoon on Saturday, only the lunch served prior to the team's departure was associated with illness (RR 6.4, 95% CI 1.7-24.0). The attack rate for the North Carolina team was 62%. A univariate analysis showed that all 3 food items from the implicated meal (turkey sandwich on a kaiser roll, frozen Snicker's bar, apple) were associated with illness. However, the multivariate analysis showed that the turkey sandwich was the only food item associated with illness (OR 4.9, 95% CI 1.3-18.9). An environmental assessment of the restaurant where the lunches were prepared revealed some problems with food preparation such as no handwashing sink, a slicer not sanitized between slicing turkey and tomatoes. In addition, products in the refrigerator were out of temperature. The owner and his employee denied any current or recent diarrhea.

Four stool samples were negative for Salmonella, Shigella, and Campylobacter. Four stool samples from Duke University players, and one from an FSU player were identical for Norwalk-like virus, Genogroup I (electron microscopy and reverse transcriptase polymerase chain reaction (PCR)). Most recent outbreaks in the United States have been associated with Genogroup II viruses. Paired sera from 2 of 3 individuals from North Carolina had greater than a four fold rise in IgG titer, including the restaurant owner who prepared the turkey sandwiches.

[1] North Carolina information provided by Karen Becker, EIS Officer, North Carolina Department of Health.

The case definition was refined to vomiting or diarrhea at least 10 hours and no more that 50 hours following the time that the pre-trip lunch was eaten (based on a 10-50 hour incubation period for Norwalk-like viruses). Secondary cases were defined as having vomiting or diarrhea and 1) if the implicated meal was eaten, an onset time of symptoms after the longest possible incubation period for Norwalk-like viruses or 2) becoming ill without eating the implicated meal. There was a total of 42 primary cases and 22 secondary cases (including the eight FSU players). The median incubation period for primary cases was 36 hours.

The hypothesis that person-to-person transmission occurred on the football field is supported by the findings that several FSU team members had an illness compatible with Norwalk-like virus and the stool of one FSU member was identical to those from Duke University cases for Norwalk-like virus, Genogroup I (more closely related to recent European strains than to strains commonly found in American outbreaks). The investigation was hampered by a lack of cooperation on the part of both teams, coaches and physicians as well as the restaurant owner. Recommendations include education of players and support staff regarding proper handwashing practices, encouragement of team physicians to report outbreaks, and correction of food sanitation practices by the restaurant owner.

Galveston Bay *Vibrio parahaemolyticus*, June, 1998[2]

In June, Texas began noticing several clusters of people ill as a result of eating raw oysters from Galveston Bay. *Vibrio parahaemolyticus* was identified as the cause of the illnesses. The symptoms of *Vibrio parahaemolyticus* include diarrhea, abdominal cramps, nausea, vomiting, headache, fever, chills with an average incubation period of 15 hours (range: 4 - 96 hours) with a duration of about 2 1/2 days. The case definition for this outbreak was someone who had consumed raw Galveston Bay oysters who had diarrhea and abdominal cramps. The bay was closed to new harvesting on June 25, 1998. All oysters harvested in Galveston Bay since May 27, 1998 were recalled on July 1. The dealers could have been harvesting for shucking and cooking throughout the outbreak time period but they chose not to do this.

The final case count was a total of 416, including Texas (296), Florida (62: 52 residents + 10 non-residents who had consumed the oysters in Florida), California (23), Georgia (11), Oklahoma (9), Tennessee (6), Colorado (3), Virginia (1), Alabama (1), Kentucky (1), Massachusetts (1), New Jersey (1), Missouri (1). The hypothesis is that elevated water temperatures, low rainfall (extreme drought conditions) in the months preceding the outbreak along with increased salinity levels all contributed to optimal conditions for an outbreak of Vibrio parahaemolyticus. In addition, implicated harvest areas are located around the Houston Ship Channel with poorly flushed tributaries, areas subject to heavy inflow of sea water and ballast water or waste discharges. The strain involved in this outbreak was *Vibrio parahaemolyticus* 03:K6 which has been implicated in outbreaks in Japan and other Asian countries but has not been identified in the U.S. since 1972. The harvesting of Galveston Bay oysters was reopened on October 10, 1998 for cooked consumption only. Oystermen began harvesting for raw consumption in mid November 1998 when water temperatures were at or below 70^{o}-75^{o} F.

[2] Texas and outbreak overview information provided by Beverly Ray, R.N., Texas Department of Health.

Table 6: Florida Confirmed and Suspected Cases in Galveston Bay, Texas *Vibrio parahaemolyticus* Outbreak, June 1998

County of Residence	C	S
Broward	1	3
Collier	2	3
Dade	1	4
Duval	1	0
Hillsborough	0	4
Lee	1	5
Okaloosa	5	2
Palm Beach	6	4
Sarasota	2	2
Seminole	1	3
St. Lucie	0	2
Total	**20**	**32**

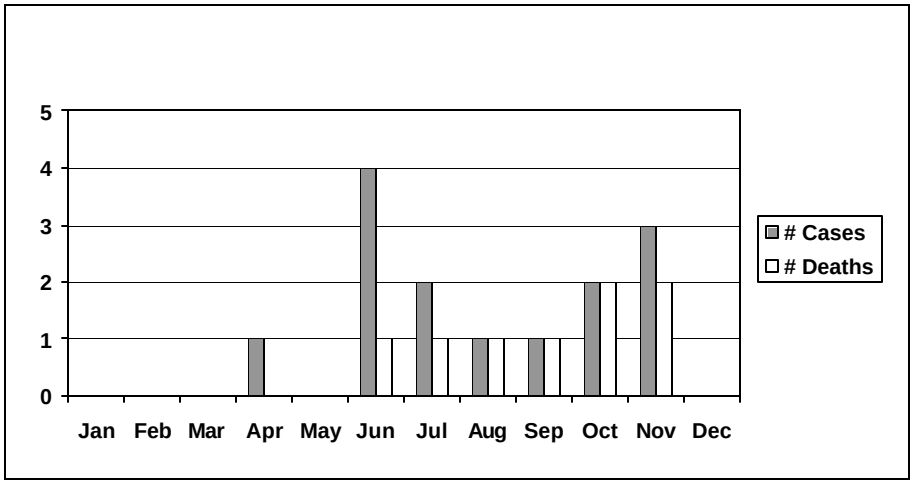
Table 7: Number of Out-of-State Cases in Galveston Bay, Texas *Vibrio parahaemolyticus* Outbreak, June 1998

State of Residence	County of Exposure	Confirmed	Suspected
California	Monroe	Vib. spp.	
New Mexico	Bay	1	
Georgia	Bay, Sarasota	2	1
Tennessee	Lee, Okaloosa	2	
Texas	Bay, Okaloosa	2	
Wisconsin	Lee, Sarasota		1
	Total	**8**	**2**

***Vibrio vulnificus*, Florida, 1998**

For 1998, there were a total of 36 *Vibrio vulnificus* cases reported in the State of Florida. Of these, 15 were wound-related and 7 were of unknown exposure. The other 14 cases were associated with the consumption of raw oysters. There were 12 deaths reported from *Vibrio vulnificus* (1 wound related, 8 oyster related and 3 unknown exposure (see Figure 1). In 1997 there were 11 wound related cases of *Vibrio vulnificus* (2 deaths), and 6 cases associated with the consumption of raw oysters (3 deaths).

Figure 3: *Vibrio vulnificus* Cases and Deaths Due to Shellfish Consumption by Month, Florida, 1998

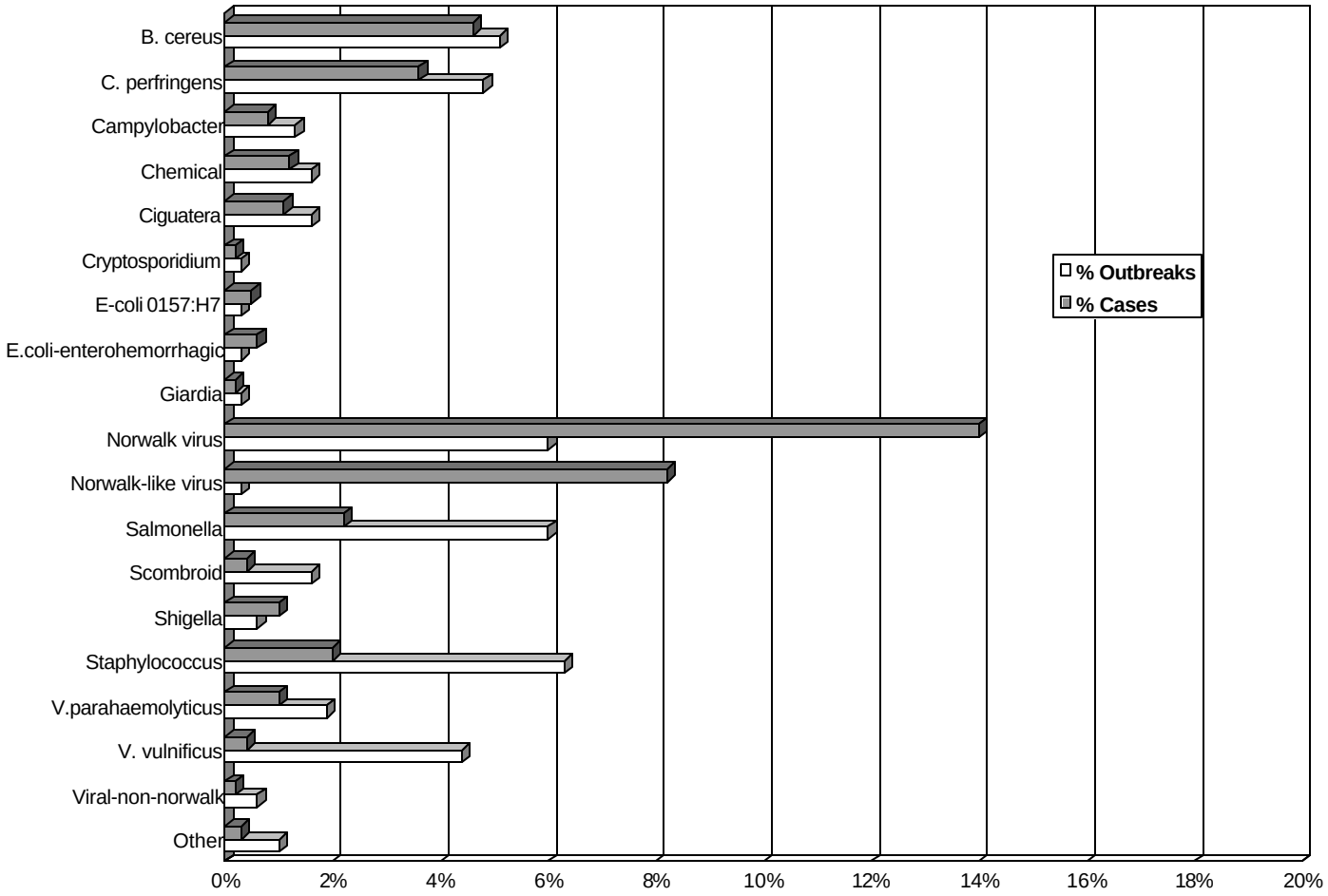


Appendix: Statewide Data Tables and Figures

Table 8: Number of Reported Outbreaks With Laboratory-Confirmed Etiologic Agents and Number of Cases Associated With These Outbreaks, Florida, 1998

# Outbreaks	Pathogen	# Cases
2	C. perfringens	43
4	Campylobacter	26
2	Chemical	36
2	Ciguatera	24
1	Cryptosporidium	7
1	E. coli 0157:H7	16
1	Giardia	7
2	Norwalk virus	71
1	Norwalk-like virus	270
2	Other	6
5	Salmonella	27
1	Scombroid	2
2	V. parahaemolyticus	18
14	V. vulnificus	14
40	**Total**	**567**

Figure 4: Percent Total Outbreaks and Cases by Etiologic Agent, Florida, 1998*



*The etiologic agent was unknown in 55.6% of the outbreaks and 57.4% of the cases.

Figure 5: Trends in Reported Outbreaks and Outbreak Cases of Norwalk, Florida, 1998

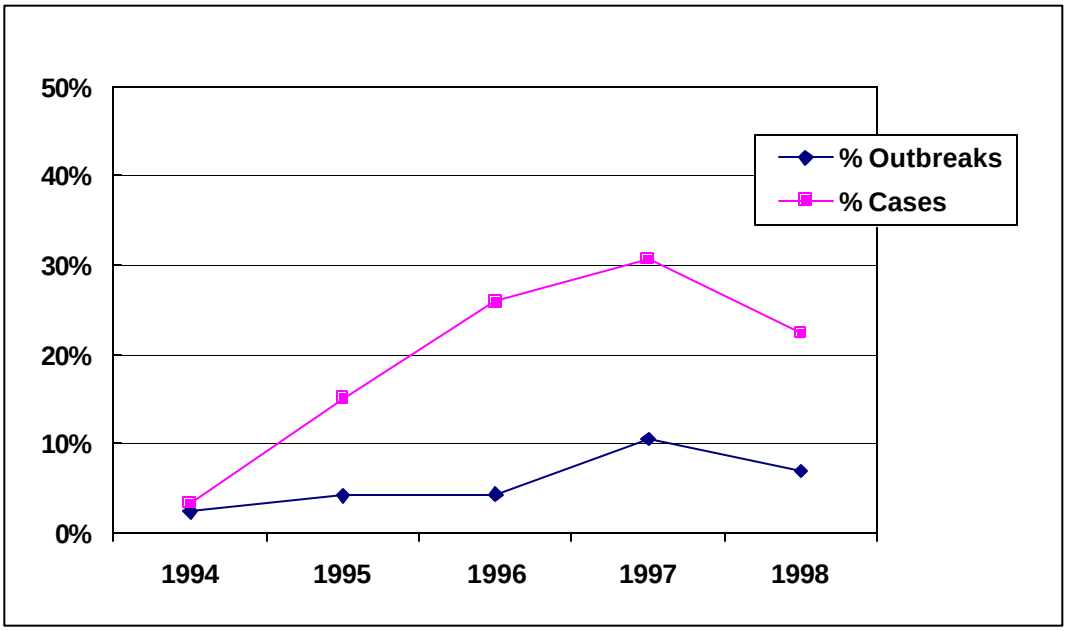


Figure 6: Trends in Reported Outbreaks and Outbreak Cases of Staphylococcus, Florida, 1998

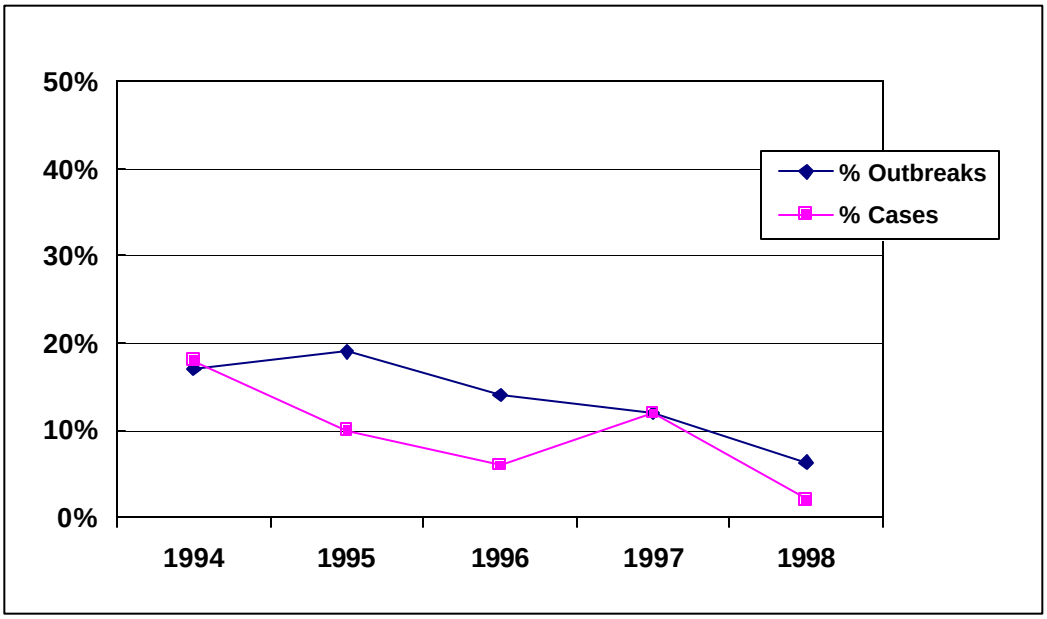


Figure 7: Trends in Reported Outbreaks and Outbreak Cases of Salmonella, Florida, 1998

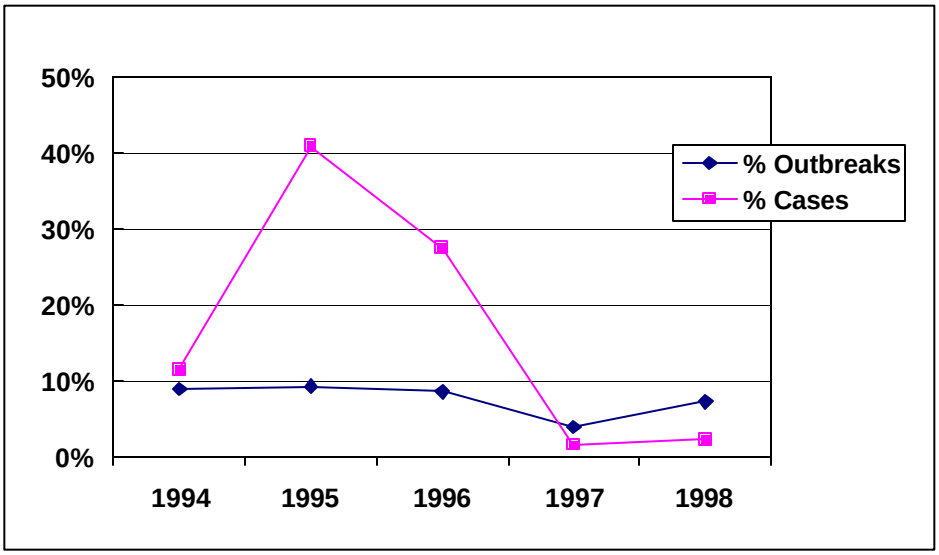


Figure 8: Trends in Reported Outbreaks and Outbreak Cases of Unknown Pathogens, Florida, 1998

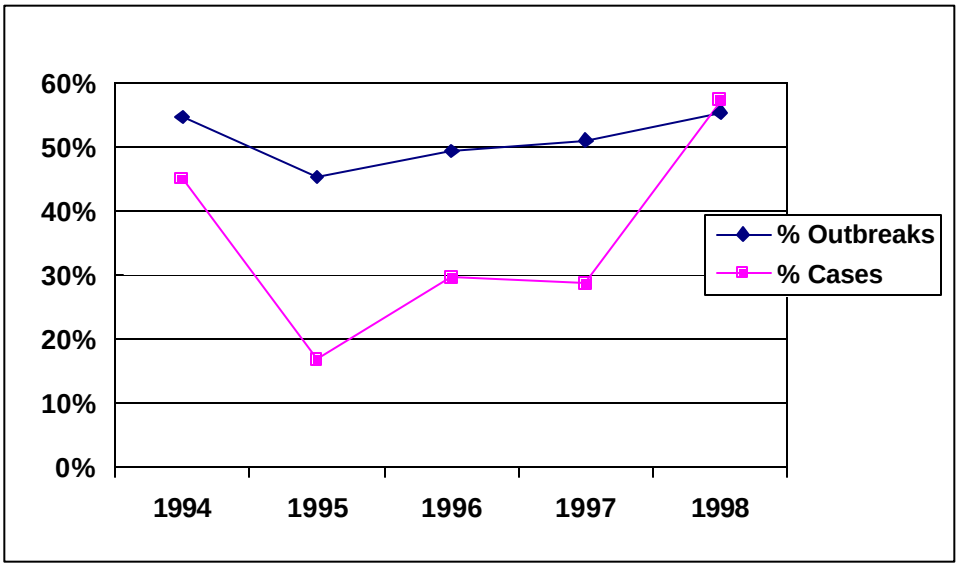


Figure 9: Percent Total Outbreaks and Cases by Site, Florida, 1998

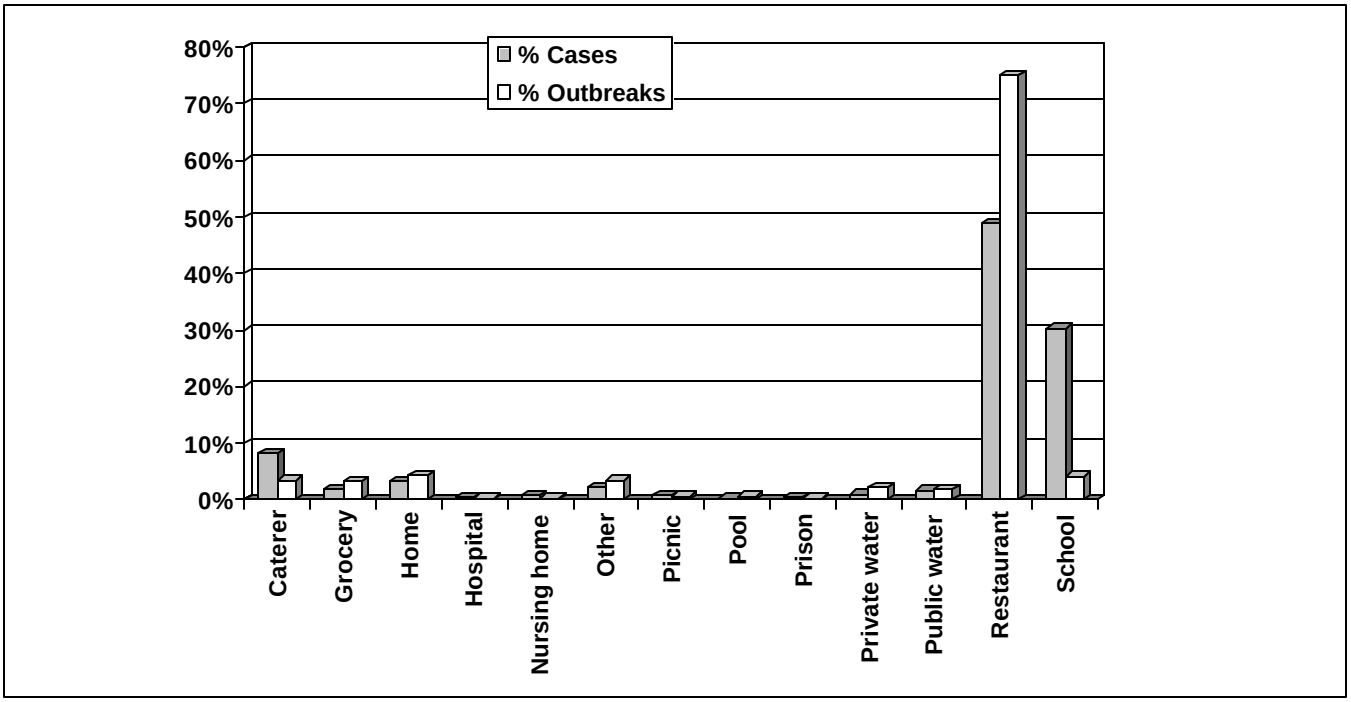


Table 9: Outbreaks by Site, Florida, 1998

Status	Caterer	Grocery	Home	Hospital	Nursing home	Other	Picnic	Pool	Prison	Private water	Public water	Restaurant	School	Total
Confirmed	3	2	4	1	0	2	2	1	1	0	2	35	6	59
	5.1%	3.4%	6.8%	1.7%	0.0%	3.4%	3.4	1.7%	1.7%	0.0%	3.4%	59.3%	10.2%	18.7%
Suspected	8	8	10	0	1	9	0	1	0	7	4	201	7	256
	3.1%	3.1%	3.9%	0.0%	0.40%	3.5%	0.0%	0.4%	0.0%	2.7%	1.6%	78.5%	2.7%	81.3%
Total	**11**	**10**	**14**	**1**	**1**	**11**	**2**	**2**	**1**	**7**	**6**	**236**	**13**	**315**
	3.5%	**3.2%**	**4.4%**	**0.3%**	**0.3%**	**3.5%**	**0.6%**	**0.6%**	**0.3%**	**2.2%**	**1.9%**	**75%**	**4.1%**	**100%**

Table 10: Cases by Site, Florida, 1998

Status	Caterer	Grocery	Home	Hospital	Nursing home	Other	Picnic	Pool	Prison	Private water	Public water	Restaurant	School	Total
Confirmed	76	21	31	14	0	32	26	7	13	0	42	906	769	1937
	3.9%	1.1%	1.6%	0.7%	0.0%	1.7%	1.3%	0.4%	0.7%	0.0%	2.2%	46.8%	39.7%	58.9%
Suspected	195	42	77	0	27	39	0	2	0	29	13	699	230	1353
	14.4%	3.1%	5.7%	0.0%	2%	2.9	0.0%	0.1%	0.0%	2.1	1%	51.7%	17%	41.1%
Total	**271**	**63**	**108**	**14**	**27**	**71**	**26**	**9**	**13**	**29**	**55**	**1605**	**999**	**3290**
	8.2%	**1.9%**	**3.3%**	**0.4%**	**0.8%**	**2.2%**	**0.8%**	**0.3%**	**0.4%**	**0.9%**	**1.7%**	**48.8%**	**30.3%**	**100%**

Figure 10: Percent Total Outbreaks by Vehicle, Florida, 1998

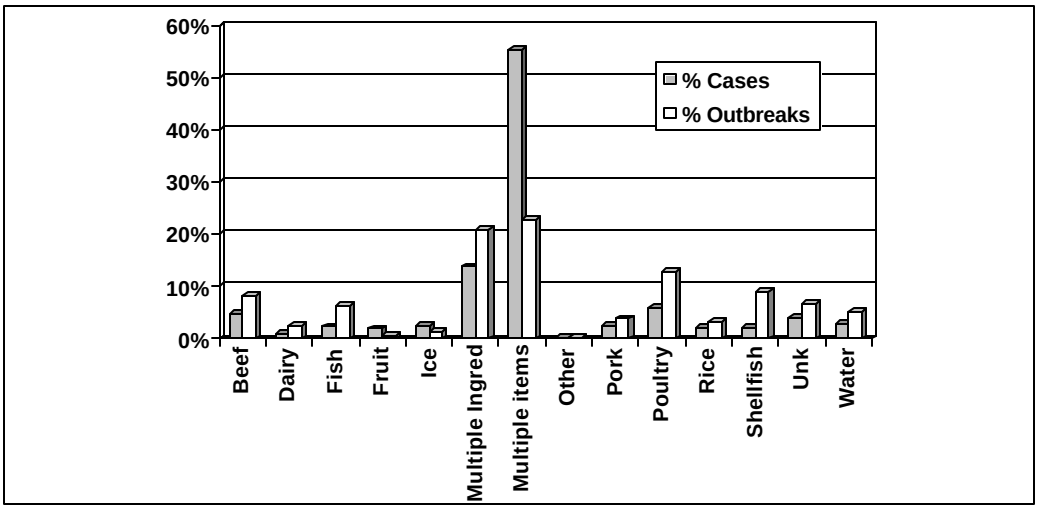


Table 11: Outbreaks by Vehicle, Florida, 1998

Status	Beef	Dairy	Fish	Fruit	Ice	Multiple Ingredients	Multiple Items	Other	Pork	Poultry	Rice	Shellfish	Unknown	Water	Total
Confirmed	5	1	5	0	2	11	10	0	3	2	1	14	2	3	59
	8.5%	1.7%	8.5%	0.0%	3.4%	18.6%	16.9%	0.0%	5.1%	3.4%	1.7%	23.7%	3.4%	5.1%	18.7%
Suspected	21	7	15	2	2	55	62	1	9	38	9	14	9	13	256
	8.2%	2.7%	5.8%	0.8%	0.8%	21.4%	24.1%	0.4%	3.5%	14.8%	3.5%	5.4%	3.5%	5.1%	81.3%
Total	**26**	**8**	**20**	**2**	**4**	**66**	**72**	**1**	**12**	**40**	**10**	**28**	**11**	**16**	**315**
	8.2%	**2.5%**	**6.3%**	**0.6%**	**1.3%**	**20.9%**	**22.8%**	**0.3%**	**3.8%**	**12.7%**	**3.2%**	**8.9%**	**3.5%**	**5.1%**	**100.0%**

Table 12: Cases by Vehicle, Florida, 1998

Status	Beef	Dairy	Fish	Fruit	Ice	Multiple ingredients	Multiple items	Other	Pork	Poultry	Rice	Shellfish	Unknown	Water	Total
Confirmed	64	7	31	0	71	171	1435	0	57	19	4	24	5	49	1937
	3.3%	0.4%	1.6%	0.0%	3.7%	8.8%	74.1%	0.0%	2.9%	1.0%	0.2%	1.2%	0.3%	2.5%	58.9%
Suspected	93	19	45	64	15	281	385	2	26	175	68	43	93	47	1353
	6.9%	1.4%	3.3%	4.7%	1.1%	20.7%	28.4%	0.1%	1.9%	12.9%	5.0%	3.2%	6.9%	3.5%	41.1%
Total	**157**	**26**	**76**	**64**	**86**	**452**	**1820**	**2**	**83**	**194**	**72**	**67**	**98**	**96**	**3290**
	4.8%	**0.8%**	**2.3%**	**1.9%**	**2.6%**	**13.7%**	**55.3%**	**0.1%**	**2.5%**	**5.9%**	**2.2%**	**2.0%**	**2.9%**	**2.9%**	**100.0%**

Table 13: Total Outbreaks, Florida, 1998: Etiologic Agent by Vehicle

Pathogen	Beef	Dairy	Fish	Fruit	Ice	Multiple ingred.	Multiple items	Pork	Poultry	Rice	Shellfish	Unknown	Water	Total
B. cereus	0	1	0	0	0	3	2	0	3	6	0	1	0	16
C. perfringens	4	0	0	0	0	0	7	4	0	0	0	0	0	15
Campylobacter	0	0	1	0	0	0	0	0	2	0	0	1	0	4
Chemical	0	0	1	0	0	3	0	0	0	0	0	0	1	5
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	1	1
E. coli 0157:H7	0	0	0	0	0	0	1	0	0	0	0	0	0	1
E. coli-enterohem.	0	0	0	0	0	0	1	0	0	0	0	0	0	1
Giardia	0	0	0	0	0	0	0	0	0	0	0	0	1	1
Norwalk virus	2	0	0	1	4	4	8	0	0	0	0	0	0	19
Norwalk-like virus	0	0	0	0	0	0	1	0	0	0	0	0	0	1
Other	0	0	0	0	0	0	0	0	0	1	1	0	1	3
Salmonella	2	1	0	0	0	2	3	2	8	0	0	1	0	19
Scombroid	0	0	5	0	0	0	0	0	0	0	0	0	0	5
Shigella	0	0	0	0	0	1	0	0	1	0	0	0	0	2
Staphylococcus	2	0	1	0	0	7	4	2	2	1	1	0	0	20
Unknown	16	6	6	1	0	45	44	4	24	2	8	7	12	175
V. parahaemolyticus	0	0	1	0	0	0	1	0	0	0	4	0	0	6
V. vulnificus	0	0	0	0	0	0	0	0	0	0	14	0	0	14
Viral-non-Norwalk	0	0	0	0	0	1	0	0	0	0	1	0	0	2
Total	**26**	**8**	**20**	**2**	**4**	**66**	**72**	**12**	**40**	**10**	**27**	**11**	**16**	**315**

Table 14: Total Cases in All Outbreaks, Florida, 1998: Etiologic Agent by Vehicle

Pathogen	Beef	Dairy	Fish	Fruit	Ice	Multiple Ingred.	Multiple Items	Pork	Poultry	Rice	Shellfish	Unknown	Water	Total
B. cereus	0	2	0	0	0	19	11	0	57	60	0	2	0	151
C. perfringens	18	0	0	0	0	0	40	60	0	0	0	0	0	118
Campylobacter	0	0	3	0	0	0	0	0	19	0	0	4	0	26
Chemical	0	0	2	0	0	3	0	0	0	0	0	0	35	40
Ciguatera	0	0	37	0	0	0	0	0	0	0	0	0	0	37
Cryptosporidia	0	0	0	0	0	0	0	0	0	0	0	0	7	7
E. coli 0157:H7	0	0	0	0	0	0	16	0	0	0	0	0	0	16
E. coli-Enterohem.	0	0	0	0	0	0	21	0	0	0	0	0	0	21
Giardia	0	0	0	0	0	0	0	0	0	0	0	0	7	7
Norwalk virus	84	0	0	62	86	57	173	0	0	0	0	0	0	562
Norwalk-like virus	0	0	0	0	0	0	270	0	0	0	0	0	0	270
Other	0	0	0	0	0	0	0	0	0	4	2	0	3	9
Salmonella	10	2	0	0	0	7	18	10	22	0	0	2	0	71
Scombroid	0	0	14	0	0	0	0	0	0	0	0	0	0	14
Shigella	0	0	0	0	0	32	0	0	2	0	0	0	0	34
Staphylococcus	4	0	3	0	0	33	10	5	6	4	2	0	0	67
Unknown	41	22	14	2	0	298	1254	8	88	4	25	89	44	1888
V. parahaemolyticus	0	0	3	0	0	0	7	0	0	0	22	0	0	32
V. vulnificus	0	0	0	0	0	0	0	0	0	0	14	0	0	14
Viral-non-Norwalk	0	0	0	0	0	3	0	0	0	0	3	0	0	6
Total	**157**	**26**	**76**	**64**	**86**	**452**	**1820**	**83**	**194**	**72**	**68**	**97**	**96**	**3290**

Table 15: Confirmed Outbreaks, Florida, 1998: Etiologic Agent by Vehicle

Pathogen	Beef	Dairy	Fish	Ice	Multiple ingred.	Multiple items	Pork	Poultry	Rice	Shellfish	Unk	Water	Total
C. perfringens	0	0	0	0	0	1	3	0	0	0	0	0	4
Campylobacter	0	0	1	0	0	0	0	2	0	0	1	0	4
Chemical	0	0	0	0	1	0	0	0	0	0	0	1	2
Ciguatera	0	0	2	0	0	0	0	0	0	0	0	0	2
Cryptosporidia	0	0	0	0	0	0	0	0	0	0	0	1	1
E. coli 0157:H7	0	0	0	0	0	1	0	0	0	0	0	0	1
Giardia	0	0	0	0	0	0	0	0	0	0	0	1	1
Norwalk virus	1	0	0	2	2	1	0	0	0	0	0	0	6
Norwalk-like virus	0	0	0	0	0	0	0	0	0	0	0	0	1
Other	0	0	0	0	0	0	0	0	1	0	0	0	1
Salmonella	1	0	0	0	0	1	0	0	0	0	0	0	2
Scombroid	0	0	2	0	0	0	0	0	0	0	0	0	2
Shigella	0	0	0	0	1	0	0	0	0	0	0	0	1
Staphylococcus	0	0	0	0	1	0	0	0	0	0	0	0	1
Unknown	3	1	0	0	6	4	0	0	0	0	0	0	14
V. parahaemolyticus	0	0	0	0	0	1	0	0	0	1	0	0	2
V. vulnificus	0	0	0	0	0	0	0	0	0	14	0	0	14
Total	**5**	**1**	**5**	**2**	**11**	**10**	**3**	**2**	**1**	**15**	**1**	**3**	**59**

Table 17: Cases in Confirmed Outbreaks, Florida, 1998: Etiologic Agent by Vehicle

Pathogen	Beef	Dairy	Fish	Ice	Multiple ingred.	Multiple items	Pork	Poultry	Rice	Shellfish	Unk	Water	Total
C. perfringens	0	0	0	0	0	18	57	0	0	0	0	0	75
Campylobacter	0	0	3	0	0	0	0	19	0	0	4	0	26
Chemical	0	0	0	0	1	0	0	0	0	0	0	35	36
Ciguatera	0	0	24	0	0	0	0	0	0	0	0	0	24
Cryptosporidia	0	0	0	0	0	0	0	0	0	0	0	7	7
E. coli 0157:H7	0	0	0	0	0	16	0	0	0	0	0	0	16
Giardia	0	0	0	0	0	0	0	0	0	0	0	7	7
Norwalk virus	44	0	0	71	33	24	0	0	0	0	0	0	172
Norwalk-like virus	0	0	0	0	0	270	0	0	0	0	0	0	270
Other	0	0	0	0	0	0	0	0	4	0	0	0	4
Salmonella	8	0	0	0	0	13	0	0	0	0	0	0	21
Scombroid	0	0	4	0	0	0	0	0	0	0	0	0	4
Shigella	0	0	0	0	32	0	0	0	0	0	0	0	32
Staphylococcus	0	0	0	0	18	0	0	0	0	0	0	0	18
Unknown	12	7	0	0	87	1087	0	0	0	0	0	0	1193
V. parahaemolyticus	0	0	0	0	0	7	0	0	0	11	0	0	18
V. vulnificus	0	0	0	0	0	0	0	0	0	14	0	0	14
Total	**64**	**7**	**31**	**71**	**171**	**1435**	**57**	**19**	**4**	**25**	**4**	**49**	**1937**

Table 17: Suspected Outbreaks, Florida, 1998: Etiologic Agent by Vehicle

Pathogen	Beef	Dairy	Fish	Fruit	Ice	Multiple ingred.	Multiple items	Pork	Poultry	Rice	Shellfish	Unknown	Water	Total
B. cereus	0	1	0	0	0	3	2	0	3	6	0	1	0	16
C. perfringens	4	0	0	0	0	0	6	1	0	0	0	0	0	11
Chemical	0	0	1	0	0	2	0	0	0	0	0	0	0	3
Ciguatera	0	0	3	0	0	0	0	0	0	0	0	0	0	3
E. coli-enterohem.	0	0	0	0	0	0	1	0	0	0	0	0	0	1
Norwalk virus	1	0	0	1	2	2	7	0	0	0	0	0	0	13
Other	0	0	0	0	0	0	0	0	0	0	1	0	1	2
Salmonella	1	1	0	0	0	2	2	2	8	0	0	1	0	17
Scombroid	0	0	3	0	0	0	0	0	0	0	0	0	0	3
Shigella	0	0	0	0	0	0	0	0	1	0	0	0	0	1
Staphylococcus	2	0	1	0	0	6	4	2	2	1	1	0	0	19
Unknown	13	5	6	1	0	39	40	4	24	2	8	7	12	161
V. parahaemolyticus	0	0	1	0	0	0	0	0	0	0	3	0	0	4
Viral-non-Norwalk	0	0	0	0	0	1	0	0	0	0	1	0	0	2
Total	**21**	**7**	**15**	**2**	**2**	**55**	**62**	**9**	**38**	**9**	**14**	**9**	**13**	**256**

Table 18: Cases in Suspected Outbreaks, Florida, 1998: Etiologic Agent by Vehicle

Pathogen	Beef	Dairy	Fish	Fruit	Ice	Multiple ingred.	Multiple items	Pork	Poultry	Rice	Shellfish	Unknown	Water	Total
B. cereus	0	2	0	0	0	19	11	0	57	60	0	2	0	151
C. perfringens	18	0	0	0	0	0	22	3	0	0	0	0	0	43
Chemical	0	0	2	0	0	2	0	0	0	0	0	0	0	4
Ciguatera	0	0	13	0	0	0	0	0	0	0	0	0	0	13
E. coli-enterohem.	0	0	0	0	0	0	21	0	0	0	0	0	0	21
Norwalk virus	40	0	0	62	15	24	149	0	0	0	0	0	0	290
Other	0	0	0	0	0	0	0	0	0	0	2	0	3	5
Salmonella	2	2	0	0	0	7	5	10	22	0	0	2	0	50
Scombroid	0	0	10	0	0	0	0	0	0	0	0	0	0	10
Shigella	0	0	0	0	0	0	0	0	2	0	0	0	0	2
Staphylococcus	4	0	3	0	0	15	10	5	6	4	2	0	0	49
Unknown	29	15	14	2	0	211	167	8	88	4	25	88	44	695
V. parahaemolyticus	0	0	3	0	0	0	0	0	0	0	11	0	0	14
Viral-non-Norwalk	0	0	0	0	0	3	0	0	0	0	3	0	0	6
Total	**93**	**19**	**45**	**64**	**15**	**281**	**385**	**26**	**175**	**68**	**43**	**92**	**47**	**1353**

Figure 11: Percent Total Outbreaks and Cases by Month, Florida, 1998

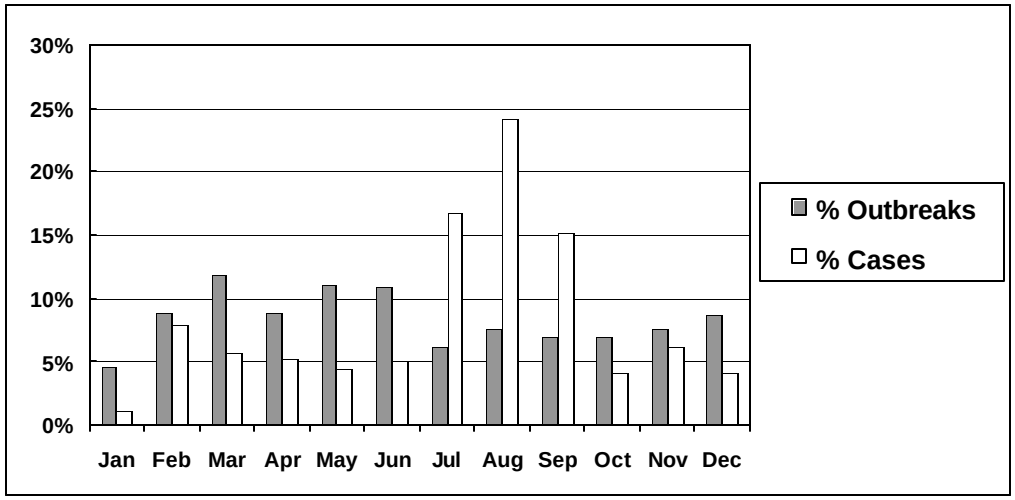


Table 19: Outbreaks by Month, 1998

Outbreaks	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Confirmed	1	6	2	3	4	10	7	7	7	4	7	1	59
	1.70%	10.30%	3.40%	5.20%	6.90%	17.20%	10.30%	12.10%	12.10 %	6.90%	12.10%	1.70%	18.50%
Suspected	13	22	35	25	31	24	13	17	15	18	17	26	256
	5.10%	8.60%	13.70 %	9.80%	12.10%	9.40%	5.10%	6.60%	5.90%	7.00%	6.60%	10.20%	81.50%
Total	14	28	37	28	35	34	20	24	22	22	24	27	315
	4.50%	**8.90%**	**11.80%**	**8.90%**	**11.10%**	**10.80%**	**6.10%**	**7.60%**	**7.00%**	**7.00%**	**7.60%**	**8.60%**	**100%**

Table 20: Cases by Month, 1998

Cases	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Confirmed	2	34	58	23	35	87	463	731	339	66	71	28	1937
	0.10%	1.80%	3.00%	1.20%	1.80%	4.50%	23.20%	38.10%	17.70%	3.40%	3.70%	1.50%	58.60%

Suspected	33	224	130	148	108	80	104	62	157	67	133	107	1353
	2.40%	16.60%	9.60%	10.90%	8.00%	5.90%	7.70%	4.60%	11.60%	5.00%	9.80%	7.90%	41.40%
Total	35	258	188	171	143	167	563	793	496	133	204	135	3290
	1.10%	**7.90%**	**5.70%**	**5.20%**	**4.40%**	**5.10%**	**16.80%**	**24.20%**	**15.20%**	**4.10%**	**6.20%**	**4.10%**	**100%**

Table 21: Outbreaks with Greater Than 10 Cases, Florida, 1998

Status	County	# Cases	Site	Vehicle	Pathogen	Pathogen Status
Confirmed	Hillsborough	644	School	Beef & bean burritos	Unknown	Unknown
Confirmed	Palm Beach	429	Restaurant	Unknow n	Unknown	Unknown
Confirmed	Miami-Dade	270	Restaurant	Fresh sliced fruit	Norwalk-like virus	Confirmed
Suspected	Collier	81	School	Beef & bean burrito	Unknown	Unknown
Suspected	Hillsborough	62	Caterer	Lettuce	Norwalk virus	Suspected
Suspected	Broward	57	School	Unknown	Unknown	Unknown
Suspected	Broward	50	Caterer	Rice	B. cereus	Suspected
Confirmed	Leon	44	School	Unknown	Norwalk virus	Suspected
Suspected	Hillsborough	43	Restaurant	Rice	B. cereus	Suspected
Suspected	Miami-Dade	40	School	Hot dogs	Norwalk virus	Suspected
Confirmed	Duval	40	Restaurant	Ice	Norwalk virus	Confirmed
Suspected	Palm Beach	39	Caterer	Caesar salad/tossed salad	Norwalk virus	Suspected
Suspected	Broward	37	School	Unknown	Unknown	Unknown
Confirmed	Sarasota	36	Caterer	Barbecued shredded pork	C. perfringens	Confirmed
Confirmed	Indian River	35	Public water	Water	Chemical	Confirmed
Confirmed	Monroe	32	Restaurant	Multiple items with parsley	Shigella	Suspected
Confirmed	Leon	31	Other	Ice	Norwalk virus	Confirmed
Confirmed	Hillsborough	30	School	Tortillas	Unknown	Unknown
Confirmed	Pasco	28	School	Pepperoni pizza	Unknown	Unknown
Suspected	Manatee	27	Nursing home	Tossed salad	Norwalk virus	Suspected
Suspected	Hillsborough	24	Restaurant	Sandwiches and salads	Norwalk virus	Suspected
Confirmed	Orange	24	Caterer	Brownies/cookies/fruit	Norwalk virus	Suspected
Suspected	Duval	22	Grocery	Cold cut meats	Norwalk virus	Suspected
Suspected	Palm Beach	22	Home	Tossed salad	Norwalk virus	Suspected
Suspected	Miami-Dade	21	Caterer	Pork, rice, beans, turkey...	E.coli-enterohem.	Suspected
Confirmed	Sarasota	19	Restaurant	Seafood salad	Norwalk virus	Suspected
Confirmed	Brevard	18	Home	Chicken, ham, stuffing	C. perfringens	Suspected
Suspected	Miami-Dade	18	Home	Turkey	Unknown	Unknown
Confirmed	Okeechobee	18	School	Chicken/beef/vege burrito	Staphylococcus	Suspected
Confirmed	Osceola	18	Restaurant	Salad	Unknown	Unknown
Confirmed	Walton	18	Picnic	Amberjack	Ciguatera	Confirmed
Confirmed	Miami-Dade	16	Caterer	Pork, rice, beans, yuca,cake	E. coli 0157:H7	Confirmed

Table 21: Outbreaks with Greater Than 10 Cases, Florida, 1998 (cont.)

Status	County	Nocases	Site	Vehicle	Pathogen	Pathogen Status
Confirmed	Duval	16	Restaurant	Chicken	Campylobacter	Confirmed
Suspected	Broward	15	Restaurant	Mushroom sauce	B. cereus	Suspected
Suspected	Miami-Dade	15	Restaurant	Pizza rolls,cake,croquettes	Unknown	Unknown
Confirmed	Miami-Dade	14	Restaurant	Antipasto, salad & entree	Unknown	Unknown
Confirmed	Gadsden	14	Hospital	Lettuce	Norwalk virus	Suspected
Confirmed	Osceola	14	Grocery	Roast pork	C. perfringens	Suspected
Suspected	Palm Beach	14	Other	Multiple items	Norwalk virus	Suspected
Confirmed	Bradford	13	Prison	Unknown	Salmonella	Confirmed
Suspected	Escambia	12	Caterer	Gravy/dressing	Unknown	Suspected
Suspected	Hillsborough	12	Home	Salads & deviled eggs	Norwalk virus	Suspected
Suspected	Lake	11	Restaurant	Salami	Unknown	Unknown
Confirmed	Polk	11	Restaurant	Blue crab	V. parahaemolyticus	Confirmed
Suspected	Volusia	11	Restaurant	Salad bar	Norwalk virus	Suspected

Table 22: Contributing Factors in Foodborne Outbreaks*, Florida 1998

Factor	# Ouitbreaks	# Cases
Temperature control	1	57
Added poisonous substance	3	37
Buffet service	3	27
Unapproved source	5	25
Hand contact	7	307
Food prepared hrs before serving	9	69
Contaminated ingredient	10	209
Inadequate reheating	11	102
Infected person	11	831
Natural toxicant	11	36
Inadequate cooking	13	112
Consumption:raw/lightly cooked	16	33
Poor personal hygiene	20	195
Improper cooling	23	94
Other	24	105
None reported	33	128
Inadequate hot-holding	38	244
Unclean equipment	42	219
Improper handwashing	47	668
Cross-contamination	56	1070
Inadequate refrigeration	63	317
Unknown	70	1073
Total	516	5958

Note: An outbreak may have up to three contributing factors.

Figure 12: Number of Outbreaks and Number of Cases by Contributing Factor, Florida, 1998

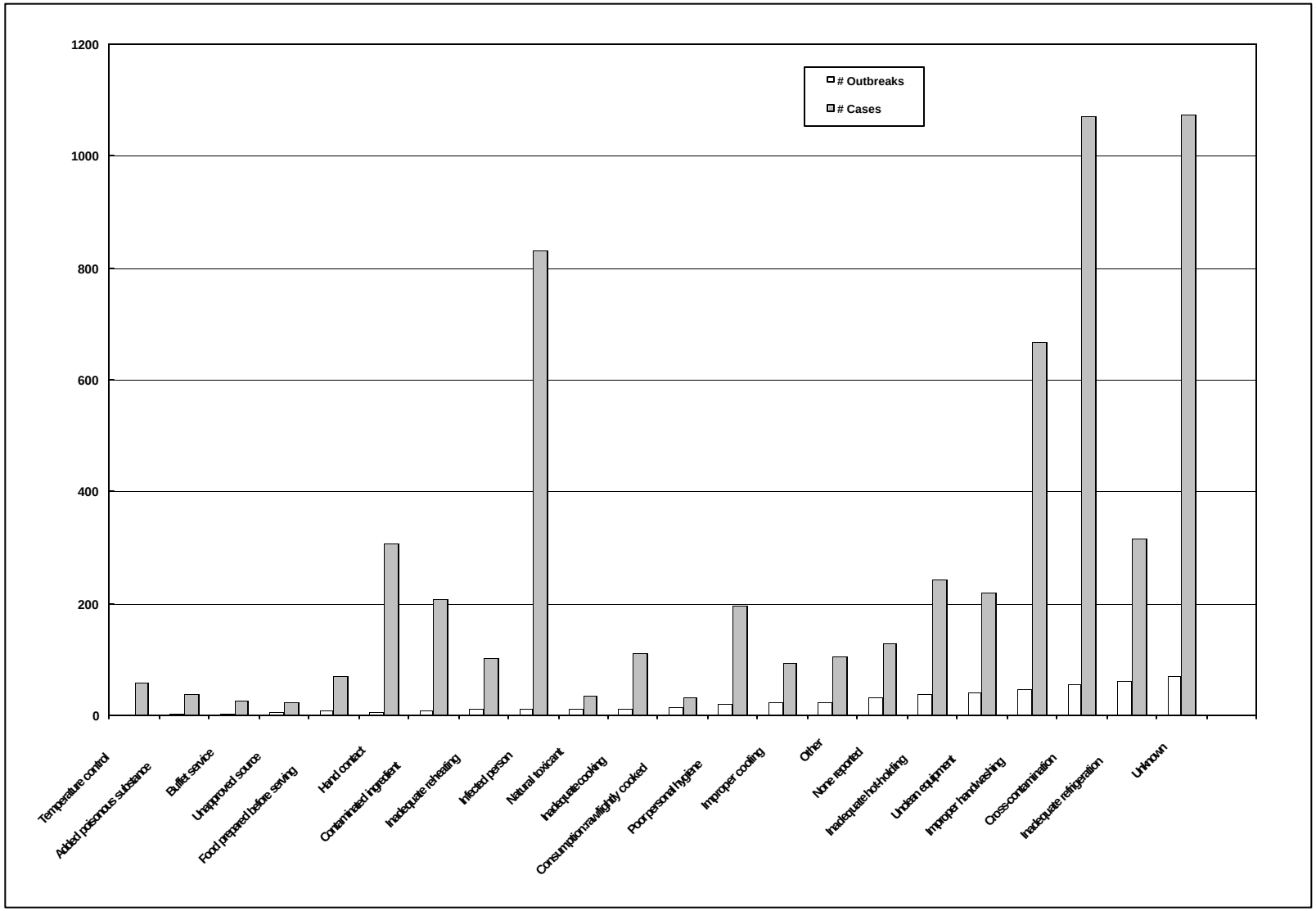


Table 23: Contributing Factors by Pathogen for Outbreaks Reported in Florida, 1998

Factor	B. cereus	C. perf.	Campy.	Chem.	Cigua.	Crypto.	E. coli 0157	E.coli-enterohem.	Giardia	Norwalk	Other	Salmonella	Scom.	Shigella	Staph	Unk.	Vibrio p.	V. v.	Viral	Total
Added poisonous substance	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
Buffet service	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0	3
Consumption: raw/lightly cooked	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	13	0	16
Contaminated ingredient	1	0	0	0	0	0	0	0	0	4	0	0	0	1	0	4	0	0	0	10
Cross-contamination	2	1	0	0	0	1	0	0	0	6	1	5	0	1	6	31	2	0	0	56
Food prepared hours before serving	0	2	0	0	0	0	0	0	0	1	0	2	0	0	1	3	0	0	0	9
Hand contact	0	0	0	0	0	0	0	0	0	3	0	1	0	0	1	0	1	0	1	7
Improper cooling	5	6	0	0	0	0	0	0	0	0	0	2	0	0	3	7	0	0	0	23
Improper handwashing	2	2	0	0	0	0	0	0	0	2	1	7	0	0	5	24	3	0	1	47
Inadequate cooking	2	2	1	0	0	0	0	0	0	0	0	2	0	0	2	2	1	1	0	13
Inadequate hot-holding	4	4	0	0	0	0	0	0	0	1	0	2	0	0	3	23	1	0	0	38
Inadequate refrigeration	9	7	1	0	0	0	0	0	0	3	1	1	2	0	8	28	2	1	0	63
Inadequate reheating	0	6	0	0	0	0	0	0	0	0	0	0	0	0	1	4	0	0	0	11
Infected person	0	0	0	0	0	1	0	0	0	5	0	2	0	0	0	3	0	0	0	11
Natural toxicant	0	0	0	1	4	0	0	0	0	0	0	0	5	0	0	0	0	1	0	11
None reported	1	0	1	0	0	0	0	0	0	0	0	3	0	1	1	26	0	0	0	33
Other	0	0	0	0	0	0	0	0	1	1	1	3	0	0	3	15	0	0	0	24
Poor personal hygiene	2	1	1	0	0	0	0	0	0	6	0	0	0	0	1	8	0	0	1	20
Temperature control	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1
Unapproved source	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	4	0	0	0	5

Unclean equipment	1	5	1	0	0	0	0	0	0	2	1	2	0	0	4	24	2	0	0	42
Unknown	2	1	3	1	0	0	1	1	0	2	0	2	0	0	0	57	0	0	0	70
Total	**33**	**37**	**8**	**5**	**4**	**2**	**1**	**1**	**1**	**37**	**6**	**35**	**7**	**3**	**39**	**266**	**12**	**16**	**3**	**516**

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

Factor	B. cereus	C. perf.	Campy.	Chem.	Cigua.	Crypto.	E. coli 0157	E.coli-enterohem.	Giardia	Norwalk	Other	Salmonella	Scom.	Shigella	Staph.	Unk.	Vibrio p.	V. v.	Viral	Total
Added poisonous substance	0	0	0	37	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	37
Buffet service	2	0	0	0	0	0	0	0	0	19	0	0	0	0	0	6	0	0	0	27
Consumption: raw/lightly cooked	15	0	0	0	0	0	0	0	0	0	2	0	0	0	0	3	0	13	0	33
Contaminated ingredient	7	0	0	0	0	0	0	0	0	132	0	0	0	32	0	38	0	0	0	209
Cross-contamination	4	5	0	0	0	7	0	0	0	412	3	13	0	32	18	558	18	0	0	1070
Food prepared hours before serving	0	38	0	0	0	0	0	0	0	14	0	8	0	0	3	6	0	0	0	69
Hand contact	0	0	0	0	0	0	0	0	0	285	0	4	0	0	4	0	11	0	3	307
Improper cooling	15	48	0	0	0	0	0	0	0	0	0	8	0	0	6	17	0	0	0	94
Improper handwashing	4	7	0	0	0	0	0	0	0	84	4	31	0	0	13	503	19	0	3	668
Inadequate cooking	65	12	16	0	0	0	0	0	0	0	0	5	0	0	5	4	4	1	0	112
Inadequate hot-holding	50	64	0	0	0	0	0	0	0	14	0	5	0	0	6	103	2	0	0	244
Inadequate refrigeration	89	25	4	0	0	0	0	0	0	48	4	3	8	0	22	101	12	1	0	317
Inadequate reheating	0	56	0	0	0	0	0	0	0	0	0	0	0	0	2	44	0	0	0	102
Infected person	0	0	0	0	0	7	0	0	0	374	0	17	0	0	0	433	0	0	0	831
Natural toxicant	0	0	0	2	19	0	0	0	0	0	0	0	14	0	0	0	0	1	0	36
None reported	8	0	3	0	0	0	0	0	0	0	0	12	0	2	18	85	0	0	0	128
Other	0	0	0	0	0	0	0	0	7	27	3	7	0	0	7	54	0	0	0	105
Poor personal hygiene	7	4	4	0	0	0	0	0	0	144	0	0	0	0	2	31	0	0	3	195
Temperature control	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	57	0	0	0	57
Unapproved source	0	0	0	0	0	0	0	0	0	0	0	13	0	0	0	12	0	0	0	25
Unclean equipment	7	29	4	0	0	0	0	0	0	48	4	6	0	0	11	101	9	0	0	219

Unknown	4	3	9	1	0	0	16	21	0	43	0	10	0	0	0	966	0	0	0	1073
Total	**277**	**291**	**40**	**40**	**19**	**14**	**16**	**21**	**7**	**1644**	**20**	**142**	**22**	**66**	**117**	**3122**	**75**	**16**	**9**	**5958**

Table 25: Contributing Factors by Vehicle for Outbreaks Reported in Florida, 1998

Factor	Beef	Dairy	Fish	Fruit	Ice	Multiple ingred.	Multiple items	Other	Pork	Poultry	Rice	Shellfish	Unk.	Water	Total
Added poisonous substance	0	0	0	0	0	2	0	0	0	0	0	0	0	1	3
Buffet service	0	0	0	0	0	1	0	0	0	0	1	0	1	0	3
Consumption:raw/lightly cooked	0	0	0	0	0	2	0	0	0	0	0	14	0	0	16
Contaminated ingredient	0	0	0	1	1	4	3	0	0	0	0	1	0	0	10
Cross-contamination	7	2	1	0	0	12	15	0	0	5	2	2	2	8	56
Food prepared hours before serving	3	0	0	0	0	0	2	0	2	2	0	0	0	0	9
Hand contact	0	0	0	0	2	1	2	0	0	0	0	2	0	0	7
Improper cooling	4	1	1	0	0	4	5	0	3	4	1	0	0	0	23
Improper handwashing	3	2	2	1	0	9	13	0	1	7	3	5	1	0	47
Inadequate cooking	4	0	0	0	0	1	0	0	0	6	0	2	0	0	13
Inadequate hot-holding	4	0	0	0	0	8	12	0	3	7	3	1	0	0	38
Inadequate refrigeration	4	3	3	0	0	20	18	0	2	4	3	3	3	0	63
Inadequate reheating	1	0	0	0	0	1	7	0	2	0	0	0	0	0	11
Infected person	1	0	0	0	0	2	5	0	0	2	0	0	0	1	11
Natural toxicant	0	0	10	0	0	0	0	0	0	0	0	1	0	0	11
None reported	4	0	3	0	0	4	6	1	4	8	2	1	0	0	33
Other	2	2	0	0	0	5	1	0	0	1	0	1	0	12	24
Poor personal hygiene	1	1	1	0	2	2	9	0	0	1	1	0	2	0	20
Temperature control	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1
Unapproved source	0	0	0	0	0	3	2	0	0	0	0	0	0	0	5
Unclean equipment	5	1	0	0	0	10	12	0	2	6	3	2	1	0	42
Unknown	3	2	1	1	1	17	22	0	1	12	1	4	5	0	70
Total	46	14	22	3	6	108	134	1	20	65	20	39	16	22	516

Table 26: Contributing Factors by Vehicle for Cases in Outbreaks Reported in Florida, 1998

Factor	Beef	Dairy	Fish	Fruit	Ice	Multiple ingred.	Multiple items	Other	Pork	Poultry	Rice	Shellfish	Unk.	Water	Total
Added poisonous substance	0	0	0	0	0	2	0	0	0	0	0	0	0	35	37
Buffet service	0	0	0	0	0	19	0	0	0	0	2	0	6	0	27
Consumption:raw/lightly cooked	0	0	0	0	0	18	0	0	0	0	0	15	0	0	33
Contaminated ingredient	0	0	0	62	40	67	33	0	0	0	0	7	0	0	209
Cross-contamination	54	7	3	0	0	95	828	0	0	18	4	14	13	34	1070
Food prepared hours before serving	8	0	0	0	0	0	14	0	39	8	0	0	0	0	69
Hand contact	0	0	0	0	15	4	274	0	0	0	0	14	0	0	307
Improper cooling	10	3	2	0	0	9	30	0	23	15	2	0	0	0	94
Improper handwashing	7	4	6	62	0	32	492	0	2	25	10	23	5	0	668
Inadequate cooking	16	0	0	0	0	15	0	0	0	76	0	5	0	0	112
Inadequate hot-holding	12	0	0	0	0	32	86	0	45	19	48	2	0	0	244
Inadequate refrigeration	9	10	10	0	0	83	106	0	6	61	10	8	14	0	317
Inadequate reheating	9	0	0	0	0	5	67	0	21	0	0	0	0	0	102
Infected person	40	0	0	0	0	18	762	0	0	4	0	0	0	7	831
Natural toxicant	0	0	35	0	0	0	0	0	0	0	0	1	0	0	36
None reported	13	0	7	0	0	25	30	2	14	25	10	2	0	0	128
Other	5	4	0	0	0	17	27	0	0	3	0	2	0	47	105
Poor personal hygiene	4	3	2	0	48	5	111	0	0	7	3	0	12	0	195
Temperature control	0	0	0	0	0	0	0	0	0	0	0	0	57	0	57
Unapproved source	0	0	0	0	0	9	16	0	0	0	0	0	0	0	25
Unclean equipment	13	5	0	0	0	50	101	0	16	16	10	4	4	0	219
Unknown	12	9	4	2	31	187	748	0	2	48	2	11	17	0	1073
Total	212	45	69	126	134	692	3725	2	168	325	101	108	128	123	5958