Food and Waterborne Illness Surveillance and Investigation
Annual Report, Florida, 2003

Bureau of Community Environmental Health
Division of Environmental Health
Department of Health

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Overview

The 2003 year continued to be active for food and waterborne outbreak reporting and investigation: a total of 1,945 foodborne illness complaints were reported in Florida. A total of 188 outbreaks with 1,648 cases were reported, compared to 243 outbreaks and 1,469 cases for 2002, and 303 outbreaks and 2,052 cases for 2001. Foodborne outbreaks numbered 184 (waterborne outbreaks: 4) with 1,558 cases (waterborne outbreak cases: 90). Investigators were able to laboratory confirm 43 of the outbreaks (including 13 *Vibrio vulnificus*) associated with 501 cases. *Norovirus*, *Staphylococcus*, and *Salmonella* were implicated in the largest percentage of the total reported outbreaks (15%, 8%, and 7%, respectively). *Norovirus* was identified in the largest percentage of cases in total reported outbreaks (45%) followed by *Salmonella* (11%) and *B. cereus* (4%). Restaurants were the source site in 77% of the outbreaks reported and in 52% of the cases. Multiple items (22%) and multiple ingredients (19%) accounted for a total of 41% of all outbreaks, followed by poultry (11%), shellfish (13% - this includes all single *Vibrio vulnificus* cases), and fish (10%). Multiple ingredients (11%) and multiple items (31%) accounted for 42% of all outbreak-associated cases, followed by shellfish (10%), poultry (8%), and rice (6%). The month with the largest percentage of outbreaks reported was February (12%) with the largest percentage of cases reported in December (23%). Large (greater than 10 cases) outbreaks accounted for 16% (30) of the total reported outbreaks and 70% (1160) 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 eight most frequent contributing factors are as follows:

Table 1: Eight Most Prevalent Contributing Factors in Foodborne Outbreaks (n=185), Florida 2003

Contributing Factor[1]	# Outbreaks	# Cases
Contamination Factor		
Bare hand contact	49	344
Cross contamination with food of animal origin	42	220
Proliferation/amplification factor		
Inadequate cold holding	54	363
Food at room T°	26	152
Survival factor		
Insufficient time/T° during reheating	15	126
Insufficient time/T° during cooling	5	48
Method of preparation factor		
Cook/serve foods	41	130
Multiple items	24	126

The contributing factors listed in Table 1 are areas where food worker educators and public health professionals may want to concentrate their education efforts.

[1] Each outbreak can have at least three of each of the four types of factor. See Tables 29-48 and last two pages of Appendix for more detailed information.

Table 2: Summary of Food and Waterborne Illness Outbreaks Reported to Florida DOH, 1989 – 2003[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**
2000	**288**	**1757**
2001	**303**	**2052**
2002	**243**	**1469**
2003	**188**	**1648**

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

Table 3: Suspected, Confirmed, and Total Food and Waterborne Outbreaks Reported to Florida DOH, 1994 - 2003

1994	# Outbreaks	# Cases
Confirmed	58	809
Suspected	201	719
Total	259	1528

1995	# Outbreaks	# Cases
Confirmed	79	2127
Suspected	215	779
Total	294	2906

1996	# Outbreaks	# Cases
Confirmed	81	2097
Suspected	226	759
Total	307	2856

1997	# Outbreaks	# Cases
Confirmed	80	1345
Suspected	353	1400
Total	433	2745

1998	# Outbreaks	# Cases
Confirmed	59	1937
Suspected	257	1356
Total	316	3293

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

2000	# Outbreaks	# Cases
Confirmed	50	812
Suspected	238	945
Total	288	1757

2001	# Outbreaks	# Cases
Confirmed	68	1057
Suspected	232	988
Total	300	2045

2002	# Outbreaks	# Cases
Confirmed	47	641
Suspected	199	835
Total	246	1476

2003	# Outbreaks	# Cases
Confirmed	58	795
Suspected	130	853
Total	188	1648

Figure 1: Number of Suspected and Confirmed Food and Waterborne Outbreaks by Year, Florida, 1994 - 2003

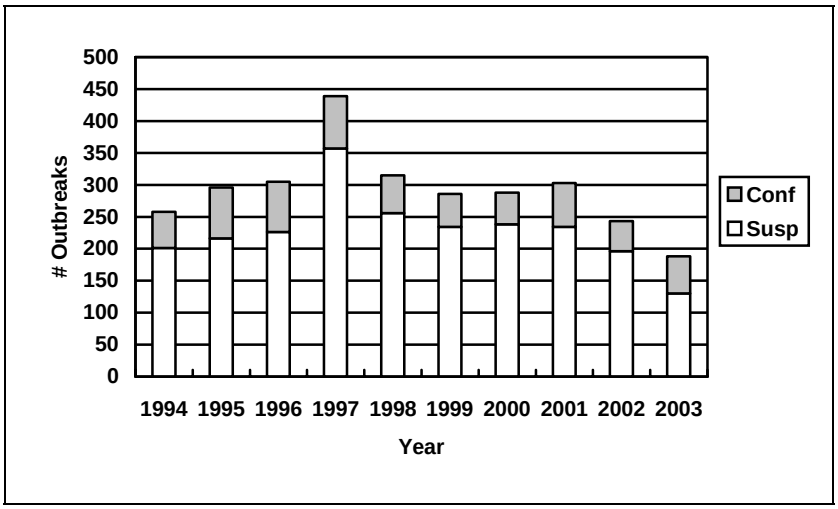
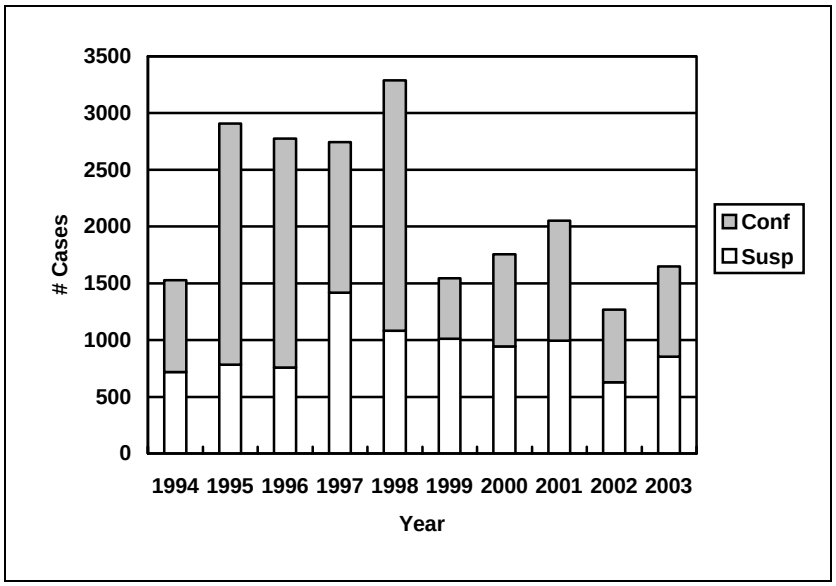


Figure 2: Number of Confirmed and Suspected Food and Waterborne Outbreak-related Cases by Year, Florida, 1994 - 2003



Training and Continuing Education

In 2003, 37 training sessions were held around the state specifically targeting Department of Health staff and 39 sessions were presented to other audiences. Training presentations included new environmental health employee orientation, refresher courses on food and waterborne disease outbreak investigation and statewide overviews of food and waterborne disease. Other special topics included *Norovirus*, *Vibrio vulnificus* for dieticians and nurses, botulism, scombroid poisoning, *Salmonella* and recreational waterborne diseases.

Besides county health department environmental health, nursing and epidemiology staff, audiences included members of the Florida Environmental Health Association, the National Environmental Health Association and local chapters of the Florida Dietetic Association, Florida Nurse Association and infection control practitioners. In a cooperative effort with other agencies, training was presented to staff of the Department of Business and Professional Regulation. Trainers also presented three guest lectures at the University of Florida to Food Safety and Sanitation, Food Science and Food Microbiology classes and an inservice to statewide county extension agents, along with a guest lecture at the University of North Florida to student dieticians.

Bioterrorism Training 2003

Of the 37 training sessions presented to Department of Health staff, four covered bioterrorism response issues. Two trainings were presented to county health department directors on waterborne disease and water security issues and two were offered to preparedness planners and epidemiologists on food and food security issues.

Training modules currently under development:

1) *Vibrio parahaemolyticus*
2) Intentional Food Contamination
3) Intentional Water Contamination
4) Florida Food and Waterborne Diseases: Ten Years of Data
5) *E. coli O157:H7*

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 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, is 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

Bacillus cereus Outbreak in a County Work Camp, Polk County, Florida, January, 2003

On January 7, 2003, the Polk County Health Department received a foodborne illness complaint describing 23 of 200 inmates who had become ill subsequent to eating lunch on January 6, 2003 at the work camp kitchen.

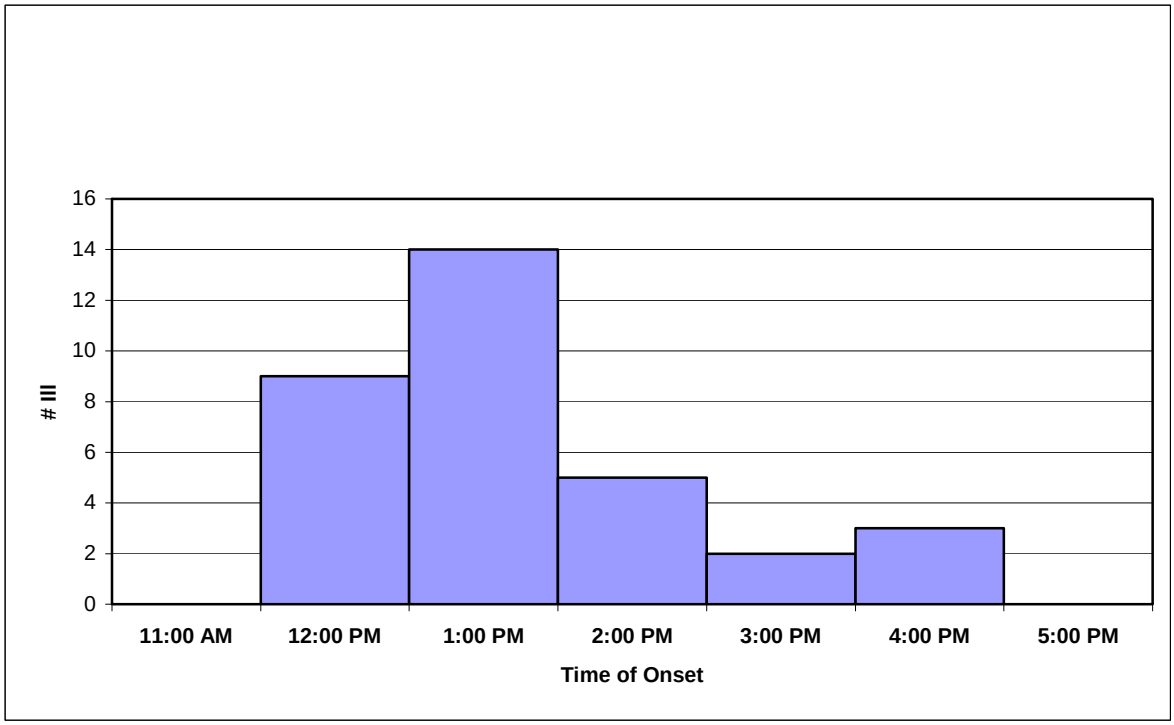
The Polk County Health Department Foodborne Illness Log was reviewed for additional cases that matched the case definition. A food surveillance form created by the prison was administered to the 23 ill inmates who consumed food from the implicated lunch on January 6, 2003. On January 16, the Polk County Health Department administered the same prison questionnaire to 75 inmates who had also eaten at the chow hall on January 6. A case was defined as any person who consumed food from the work camp chow hall on January 6 and subsequently experienced nausea, vomiting, or diarrhea. An onsite investigation was conducted on January 7, 2003 and again on January 16th. Food samples of hamburger, corn, potatoes in the preparation phase, and leftover potatoes from the implicated meal were collected on January 7th, and sent to the Bureau of Laboratories in Tampa for analysis. Statistical analysis of the data was performed using EpiInfo 2000 version 1.1.2 software, November, 2001.

Gastrointestinal illness was described by 42 (43%) of 98 inmates who responded to the questionnaire administered on January 6 and 16, 2003. Illness onsets ranged from 12:00 pm to 4:30 pm on January 6. Figure 3 depicts the onset times by one hour intervals. Predominant symptoms described were diarrhea (74%) and vomiting (71%; see Table 4 for additional symptomatology). The mean number of vomiting episodes was described as 3.3. The mean number of diarrheal episodes per 24 hour period was 3.06. The mean duration of the illness was 8.9 hours with a range of 45 minutes to 24 hours (n=11).

Table 4: Distribution of Signs and Symptoms, Polk Correctional Institution Foodborne Illness Outbreak, Polk County, January, 2003 (n=42)

Symptoms	Frequency	Percent
Diarrhea	31	74
Vomiting	30	71
Abdominal Cramps	19	45
Nausea	17	41
Headache	10	24
Dizziness	5	12
Fever	2	5

Figure 3: Time of Illness Onset on January 6, 2003, Polk Correctional Institution Foodborne Illness Outbreak, Polk County, January, 2003



Food products from the implicated meal were consumed from 11:00 am to 12:45 pm on January 6, 2003. Cooked potatoes were the only statistically implicated food product (RR=4.45, CI=1.51-13.15, p=0.00030465). Laboratory analysis of the food product samples isolated *Bacillus cereus (*10,000 CFU/g) from the cooked potatoes served at the January 6, 2003 noon meal*.* Neither the corn, hamburger, nor potatoes from food preparation yielded *Bacillus cereus*.

Environmental conditions observed and reported were significant in their ability to incubate and propagate microorganisms. The preparation procedure for the potatoes was described by the kitchen manager. Raw potatoes were removed from the walk-in cooler and placed into a large, plastic "garbage can-like" barrel that was filled with water. The potato barrel was left to sit under a well-used meat slicer for an unknown period of time. At the end of the day the potatoes were covered and placed into the walk-in refrigerator. The refrigerator temperature was noted to be less than 41º F. at the time of the onsite investigation. The next day the potatoes were removed from the walk-in cooler. A worker stated that when he removed the potato barrel's lid, there was a great stench from the barrel, but the facility used the potatoes for the January 6 meal anyway. The next step in the preparation process was to remove the potatoes with a strainer, which was noted on investigation not to be clean, and they were placed into a "Robochopper" to be cut into fine squares. They were chopped into clear acrylic bins, whose sanitizing process was unknown, and were then boiled, and subsequently fried for browning on the griddle. The cooked potatoes were then placed in stainless steel pans, and served to the inmates. The workers reported that some leftover potatoes from Sunday January 5 were mixed with the January 6 potatoes, but the menus provided by the kitchen manager did not identify potatoes being served on January 5. The kitchen inmates served the potatoes over a period of four shifts.

Additional observations noted on the inspection from January 7 included the soap dispenser by the handsink not operational, the thermometer in the warm holding unit not working, and ready to eat foods stored under raw, potentially hazardous foods. On a return visit on January 16, other environmental conditions were noted by the Environmental Health Division, one being a great food build up under the tables such that food particles were dripping off of it unto the floor. A kitchen inmate was observed cutting raw chicken, rinsing it in a strainer, and then draining pasta in the same strainer for macaroni and cheese without first cleaning and sanitizing the strainer. There were no paper towels observed at the handsinks, no kitchen staff was observed washing their hands, and one staff member was using a dirty rag to wipe his hands in effort to clean them.

This cluster of acute gastrointestinal illness is associated with the consumption of cooked potatoes at the January 6, 2003 lunch served at the Polk Correctional Institution. The onsets of illness were clustered indicating a common source exposure. There was no other epidemiological association with this group prior to illness onset that would account for the described gastrointestinal symptoms. The described symptoms and incubation period are consistent with Bacillus *cereus* intoxication. The positive laboratory results for the presence of *Bacillus cereus* in the statistically implicated food confirm this as the causative organism. Observed environmental conditions were conducive to the introduction and harborage of *Bacillus cereus* into the food preparation process and subsequent propagation to disease causing quantities.

Bacillus cereus is a Gram-positive, facultative aerobic sporeformer whose cells are large rods, and whose spores do not swell the sporangium. *B. cereus* food poisoning is the general description, although two recognized types of illness are caused by two distinct metabolites. A large molecular weight protein causes the diarrheal type of illness, while the vomiting (emetic) type of illness is believed to be caused by a low molecular weight, heat-stable peptide. 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 (emesis) rarely occurs. Symptoms persist for 24 hours in most instances.

The emetic type of food poisoning is characterized by nausea and vomiting within 0.5 to 6 h after consumption of contaminated foods. Occasionally, abdominal cramps and/or diarrhea may also occur. Duration of symptoms is generally less than 24 hours. The symptoms of this type of food poisoning parallel those caused by *Staphylococcus aureus* foodborne intoxication. The presence of large numbers of *B. cereus* (greater than 10^6 organisms/g) in a food is indicative of active growth and proliferation of the organism and is consistent with a potential hazard to health.[3]

It is important that all potentially hazardous food products be prepared, stored and held at prescribed temperatures and time periods to prevent the growth and harborage of pathogenic microorganisms. During all stages of food transportation and service, food products must be kept at prescribed safe temperatures and be protected from contamination. All food contact surfaces must be washed, rinsed and sanitized frequently. All food service employees must be trained in proper food handling and sanitary procedures. Food service managers and administrators should design and implement a process that allows for quality assurance to continually monitor hand washing practices, sanitary procedures, maintenance, and employee

[3] Food and Drug Administration, Foodborne Pathogenic Microorganisms and Natural Toxins Handbook, Web page: http://www.cfsan.fda.gov/~mow/intro.html, 01/07/05.

health. The preventive health and safety measures discussed can be addressed during routine regulatory inspections and educational food safety seminars.

Gastrointestinal Illness Outbreak Associated with a Dinner Theater, Sarasota County, Florida, March, 2003

On March 14, 2003, the Sarasota County Health Department (SCHD) received a suspected foodborne illness report involving a group of people who had attended a dinner theater on March 12, 2003. The complainant reported that a number of persons in their group of 24 were ill the next day. The SCHD contacted the dinner theater to obtain a list of menu items and a listing of ticket holders. Approximately 235 people attended the dinner theater on March 12, 2003.

The Bureau of Community Environmental Health developed a standardized questionnaire to obtain information regarding illness history and food and beverage consumption. Interviews were administered via telephone. A case was defined as a person who experienced diarrhea (defined as 3 or more loose stools in a 24 hour period) after eating at the dinner theater on March 12, 2003. On Tuesday, March 18, 2003, the SCHD and the Department of Business and Professional Regulation (DBPR) conducted an investigation/inspection of the dinner theater. No clinical specimens or foods from the implicated meal were available for laboratory analysis. Resulting data was analyzed in EpiInfo 2000 version 1.1.2 and SPSS version 11, statistical software.

A total of 93 people who attended the dinner theater were interviewed. People who reported illness but did not meet the case definition were classified as having indeterminate illness and were excluded. A total of 5 people were excluded from this study including 1 person who was ill prior and after and 1 person who did not eat. Of the 88 people included in this study, 38 (43%) met the case definition. The predominant symptoms reported were diarrhea (100%) and abdominal cramps (81.6%). The incubation period ranged from 1.5 - 17.5 hours, median 13 hours. Duration of symptoms ranged from 1.5 – 72 hours, median 13 hours. The ages of the cases ranged from 47 – 85 years (median 72 years old). Females accounted for 24 (63%) of the cases. None of the cases sought medical care or was hospitalized.

Six of the 37 food items served were statistically significant in the initial bivariate analysis. Logistic regression was performed on the 6 significant foods to attempt to narrow down the exposure associated with illness. This analysis shows that four of the 6 food items were statistically significant: prime rib, beets, veggie pasta, and chopped eggs.

Table 5 Logistic Regression Analysis of Illness After Eating at Dinner Theater, Sarasota County, Florida, March, 2003

Food Exposure	Odds Ratio	95.0% Confidence Interval
Prime Rib	**7.73**	**2.13-28.06**
Beets	**4.14**	**1.26-13.55**
Pasta	**4.05**	**1.16-14.17**
Eggs	**4.00**	**1.25-12.75**
Jell-o	2.28	0.65-7.99
Spinach	1.20	0.37-3.92

*Statistically significant foods bolded

During the environmental investigation, prime rib was found to have been improperly cooked (meat was undercooked). It is unclear how the other foods may have become contaminated. Other factors such as improper cooling, improper hot holding, and the possibility of improper reheating were also identified and these factors are conducive to the harboring and growth of pathogenic bacteria.

This outbreak of gastrointestinal illness was associated with the consumption of multiple foods served at the dinner theater on March 12, 2003. The onset of symptoms was chronologically clustered indicating a common point source exposure. Multivariate statistical analysis shows that the prime rib yielded the highest significant odds ratio (7.73) followed by beets (4.14), and the vegetarian pasta (4.05), while chopped eggs yielded the lowest significant odds ratio (4.00). The 95% confidence intervals for the odds ratio estimates are very wide, due to the small number of observations in the model (85). Based on the responses from the questionnaire, the symptoms reported, incubation period, duration of illness and the environmental conditions, the etiologic agent is consistent with *Clostridium perfringens* or *Bacillus cereus.* Given that neither food nor stools were available for analysis, the exact causative agent cannot be confirmed.

Clostridium perfringens is an anaerobic, spore-forming bacterium. It 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. Transmission occurs from ingestion of food contaminated by soil or feces and then held under conditions that permit multiplication of the organism. Almost all outbreaks are associated with inadequately heated or reheated meats. Spores survive normal cooking temperatures, germinate and multiply during slow cooling, storage at ambient temperatures, and/or inadequate reheating. 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. The incubation period ranges from 6 to 24 hours, but usually is between 10-12 hours. Illness is characterized by intense abdominal cramps followed by diarrhea; nausea is common, but vomiting and fever are usually absent. It is generally a mild disease of short duration, one day or less, and rarely fatal in healthy people.

Bacillus cereus is an aerobic spore former. This organism is ubiquitous in soil and the environment and is commonly found 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. Transmission occurs from ingestion of foods that has been kept at ambient temperatures after cooking, permitting multiplication of

the organisms. A wide variety of foods including meats, milk, vegetables, and fish have been associated with the diarrheal type food poisoning. Food mixtures such as sauces, puddings, soups, casseroles, pastries, and salads have frequently been incriminated in food poisoning outbreaks.[4],[5]

Recommendations for prevention of further illness at the dinner theatre include: strict adherence to measured temperature requirements and temperature tracking.[6]

[4]. Control of Communicable Diseases Manual,,Chin, James MD, MPH 2000, 17th Ed., American Public Health Association.
[5] Food and Drug Administration, Foodborne Pathogenic Microorganisms and Natural Toxins Handbook, Web page: http://www.cfsan.fda.gov/~mow/intro.html, 01/07/05.
[6] FDA Food Code, 1999. US Department of Health and Human Services, Public Health Services, Food and Drug Administration.

A *Salmonella Enterica* serovar Typhimurium Outbreak in a BBQ Restaurant, Hillsborough County, Florida, June-July, 2003

The Hillsborough County Health Department (HCHD) was informed that two persons who had eaten lunch on June 20, 2003 at a Tampa area BBQ restaurant had experienced gastrointestinal illness within 24 hours of finishing their meal. Their reported symptoms included vomiting, abdominal cramps and diarrhea. One of these two persons was hospitalized and placed on kidney dialysis. Twenty-six (26) additional ill individuals, who had all eaten food from this same BBQ restaurant during the period of June 18-26, 2003, were eventually identified. Two other individuals contracted the illness from an ill family member who had eaten at the restaurant. In total, 30 individuals were stricken by this illness, which was subsequently identified as *Salmonella Enterica* serovar Typhimurium. The use of pulsed-field gel electrophoresis (PFGE) greatly aided this investigation by identifying additional cases previously not connected to this outbreak. Of the 30 cases identified, 21 (70%) were male. The ill persons ranged in age from 3-62 years, with the median age being 42 years. Both the mean and median incubation period of the illnesses were 30.5 hours, with the range being 2-54 hours.

On July 22, 2003, the HCHD learned that a concurrent Salmonella outbreak at a daycare facility was linked to the restaurant outbreak by PFGE patterns. This daycare facility is located 5 miles from the BBQ restaurant. No epidemiologic link was found between the affected daycare attendees and the ill restaurant patrons. An environmental field investigation was performed at the BBQ restaurant on June 27, 2003 by the HCHD environmental health staff and the DBPR. Numerous sanitation, employee hygiene and temperature control violations were identified. Some of the most significant problems included roast pork and chicken at improper hot holding temperatures. Also the restaurant's kitchen handwashing sink had been removed. A DBPR warning was issued. Information from a case-control study conducted identified that BBQ sauce was the most likely food vehicle associated with this outbreak.

Salmonella is a rod-shaped, motile bacterium that has a widespread occurrence in animals, especially in poultry and swine. Three of the most common serotypes include *Enteritidis*, Typhimurium and Typhi. *S. Typhimurium* is the most prevalent species in the world.[7] Environmental sources of the organism include water, soil, insects, factory surfaces, kitchen surfaces, animal feces, raw meats, eggs, poultry, and seafood.

A person with *Salmonellosis* usually has fever, abdominal cramps, and diarrhea beginning 12 to 72 hours after consuming a contaminated food or beverage. The illness usually lasts 4 to 7 days, and most persons recover without antibiotic treatment. However, the diarrhea can be severe, and the person may be ill enough to require hospitalization. The elderly, infants, and persons with impaired immune systems are at increased risk for serious illness. It is estimated that from 2 to 4 million cases of salmonellosis occur in the U.S. annually.[8]

This outbreak of *Salmonella Enterica* serovar *Typhimurium* with one dominant PFGE pattern is strongly associated with the consumption of food at a Tampa area BBQ restaurant during the nine-day period of June 18-26, 2003. All of the identified cases had no other epidemiologic link

[7] Zoonoses and Communicable Diseases Common to Man and Animals, 2nd Ed. Pedro N. Acha and Boris Szyfres, eds. Scientific Publication #503, 4th printing, 1995. Pan American Health Organization.

[8] CDC-DBMD. 2004. Salmonella enteritidis [online]. CDC Division of Bacterial and Mycotic Diseases. [Accessed January 2005]. Available from World Wide Web (http://www.cdc.gov/ncidod/dbmd/diseaseinfo/salment_g.htm)

and the onsets of symptoms, in each case, followed consumption of food from the identified restaurant.

Outbreak of *Vibrio parahaemolyticus* Associated with Consumption of Blue Crabs, Duval County, Florida, June, 2003

On June 23, 2003, the Duval County Health Department (DCHD) Epidemiology Division received a referral from the Regional Environmental Epidemiologist regarding three people who had purchased garlic crabs, two of whom became ill after eating the garlic crabs on June 21, 2003. On June 24, 2003 an additional person contacted the DCHD to report becoming ill after consuming garlic crabs on June 21, 2003 from the same seafood market.

The onset of symptoms ranged from 2 to 12 hours after eating the garlic crabs, with the duration of illness ranging from one to seven days. All of the cases purchased the garlic crabs as takeout, and ate them within an hour of purchase. A left over food sample of the garlic crab was provided by one of the ill persons and was submitted to the state lab for analysis and yielded the following results: standard plate count/gm: 2,200,000/gm, fecal coliform MPN/gm: 40/gm, *Vibrio parahaemolyticus,* and *Vibrio alginolyticus.* Stool specimens from two of the ill persons submitted were negative.

An environmental epidemiological investigation was conducted to determine the source of the pathogens, mode of transmission, proliferation, and exposure. The seafood market sells packaged meals of crabs, shrimp, corn, and potatoes. Multiple cross contamination violations were observed in the facility including raw and cooked food products placed next to and on top of each other in the display case. Cooked food products were exposed to raw food products through contaminated food preparation and handling surfaces, improper hand/glove use, and unsuitable storage of cooked food products in perforated metal containers on the floor. Temperature abuse was another problem. The walk-in storage cooler in the back room was set at 50° F. Cooked crabs were inadequately cooled to 41° F. prior to packaging in styrofoam boxes. Cooked crabs were stored in a display case that was unable to maintain a temperature of 41° F.

Vibrio parahaemolyticus is a naturally occurring bacterial organism that inhabits coastal and estuarine waters. Infection with this pathogen may occur as single cases or in large outbreaks. Oyster consumption has been implicated in multi-state outbreaks. Smaller outbreaks are caused by consumption of cross-contaminated cooked blue crabs. *Vibrio parahaemolyticus* illness is characterized by abdominal cramps and watery dysenteric diarrhea between 2 and 48 hours after ingestion. It is typically a disease of moderate severity with duration of 1 to 7 days. Systemic infection and death rarely occur. Proper food preparation and handling practices to prevent cross contamination between raw and cooked food products and maintaining proper refrigeration of shellfish to inhibit further bacterial growth are critical to reduce the risk of *Vibrio parahaemolyticus* infection.[9,10]

In conclusion, this was an outbreak of *Vibrio parahaemolyticus* by consumption of garlic crabs. Multiple cross contamination violations and temperature abuse by the seafood market led to this outbreak.

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[9] David L. Heyman, M.D., ed. Control of Communicable Diseases Manual, 18th edition, 2004. American Public Health Association, p. 114-115.

[10] Bureau of Community Environmental Health, Food and Waterborne Disease Program.

Outbreak of Norovirus Gastroenteritis at a Wedding Rehearsal Dinner, St. Johns County, Florida, August 2003

On August 25, 2003, the St. Johns County Health Department was notified of a possible foodborne incident involving guests at a wedding rehearsal and reception dinner held on August 22 and August 23, 2003, in St. Johns County. Guest lists were obtained and interviews were conducted by the environmental health staff and the epidemiological nursing staff of the St Johns County Health Department. The Florida Department of Business and Professional Regulation conducted joint inspections with CHD staff of the food service facilities that provided the rehearsal dinner and wedding reception meals.

Forty-nine (49) persons attended the rehearsal dinner and approximately 125 persons attended the wedding reception dinner. Sixty (60) attendees completed interviews with CHD staff. All 60 persons interviewed attended the wedding reception. Forty (40) of the 60 persons interviewed attended the dress rehearsal dinner. Thirty-five (35) attendees met the case definition for illness constituting a 58.3% attack rate of illness. Onset of illness occurred on August 23 for six cases (17%) and on August 24 for 29 cases (83%). Incubation times calculated for exposure to the rehearsal dinner ranged from 24 to 49 hours with a median of 34 hours. Incubations calculated for exposure to the reception meal ranged from 30 minutes to 24 hours with a median of 9.5 hours. Duration of illness ranged from 12 hours to 120 hours with a median of 57.5 hours. Stool samples were collected for enteric and viral analyses were positive for *Norovirus* genogroup G-2.

Statistical analysis implicated exposure to the rehearsal dinner with risk of illness. Odds Ratio = 42.43, 95% Confidence Interval = 6.75<OR<350.2, Chi-Square = 28.83, p-value = 0.00000008. There was no statistical risk of illness associated with exposure to the reception meal. The initial standard multivariate analysis of rehearsal dinner food exposures did not implicate a particular food item. However, further analysis using the backward logistic regression method was conducted and the application of this supplemental analysis implicated consumption of salad as statistically significant for risk of illness; Odds Ratio= 22.22, 95% Confidence Interval= 4.35<OR<113.57. The food service facility reported no gastrointestinal illnesses among staff prior to preparations of the dinner. The source of the *Norovirus* contamination of the salad is unknown.

Norovirus Outbreak at an Elementary School in St. Lucie County, Florida, September, 2003

On September 25, 2003, the St. Lucie County Health Department was informed that teachers, students and staff from a private elementary school in St. Lucie County were ill with symptoms of a gastrointestinal illness. An environmental health and epidemiology team was organized and an investigation began immediately.

The Environmental Health Division of the St. Lucie County Health Department conducted a food service inspection. The Epidemiology Division, which included a representative from the Bureau of Community Environmental Health, collected names of ill and well persons at the school as well as a food menu list and then proceeded to develop a questionnaire that captured personal and demographic information, as well as food consumption of students and staff personnel that ate lunch at the school on September 23 and 24, 2003. Phone interviews were conducted. The case definition included students and staff personnel at the elementary school who experienced an acute gastrointestinal illness, characterized by vomiting, diarrhea, abdominal cramps, low grade fever, nausea, anorexia, and fatigue after consuming lunch on September 23 and 24. Stool samples were collected among ill individuals including all five food handlers.

The total number of cases for the food borne illness outbreak was 52 and included those individuals, students and staff who were ill and had acute gastrointestinal illness after consuming the lunch on September 23. This outbreak included a point source transmission, followed by a secondary person-to-person transmission. The male percentage of ill was 52% and the female was 48%. Ages of ill persons ranged from 90% of 5-19 year-olds and 10% 20-49 year-old. Incubation periods ranged from 17 hours to 95 hours with a median of 40 hours. All of the 52 persons ate the chef's salad ($p<0.00001$) served for lunch on September 23 (odds ratio = 18.8%, 95% CI = 8.7-40.8). Romaine lettuce and iceberg lettuce were two food items in the salad. These items demonstrated a strong association with this outbreak (romaine lettuce had odds ratio = 31.2, $p<0.00001$ and iceberg lettuce odds ratio = 9.5%, $p<0.02$). Two of the food handlers, one in particular making the chef salad, were positive for *Norovirus* G2 serotype. Food service at the school was provided by volunteer parents and they were untrained in proper food safety and personal hygiene practices.

The symptoms of *Norovirus* illness usually include nausea, vomiting, diarrhea, abdominal cramps, chills, headache, fatigue, and to a lesser extent some will experience a low-grade fever. Onset of illness is usually sudden, with symptoms appearing about 24-48 hours after ingestion of the virus, but symptoms can appear in as early as 12 hours after exposure. The illness is usually brief, with symptoms lasting 24-48 hours and have no long-term health effects related to the illness. *Norovirus*es are very contagious and can be easily spread from person to person. Both stool and vomitus are infectious. People infected with *Norovirus* are contagious from the moment they begin feeling ill to at least three days after resolution of symptoms, and some may be contagious for as long as two weeks. Susceptibility is broad, and as there are many different strains of *Norovirus*, developing immunity is not long lasting. Therefore, illness can recur throughout a person's lifetime. There is no treatment for the illness, and there is no vaccine to prevent the infection.

Prevention involves the practice of good personal hygiene and frequent hand washing before food preparation, eating, and after using the toilet. To decrease the chances of getting infected, thoroughly wash fruits and vegetables. Disinfect food contact surfaces and thoroughly cook

foods to proper temperatures. Persons who are infected with *Norovirus* should not prepare food while symptomatic and for at least 3 days after resolution of symptoms.[11]

The first recommendation to the school was to have staff, students, and kitchen personnel to follow strict hand washing procedures. A food education program was established for the kitchen staff and was instructed by the St. Lucie County Health Department. It was also recommended that anyone with gastrointestinal symptoms be excluded from school for at least 48 hours. The food service staff was instructed to utilize single-service utensils that are pre-packaged and also to provide single-service food items such as butter, sour cream, salad dressings, and cheese that are also self-contained.

Norovirus was identified as the probable cause of this outbreak. This outbreak was of point source transmission, followed by person-to-person. The outbreak was also strongly associated with the chef salad served on September 23. Most likely, the salad, mainly the lettuce, became a vehicle of transmission by an infected food handler, two of whom were positive for *Norovirus*.

Catered Home Party Outbreak, Broward County, Florida, December, 2003

On December 22, 2003 the Broward County Health Department received a suspected foodborne complaint involving a private home party of 20 attendees, 12 of whom were reported ill. The party host implicated foods purchased from a local bakery in Sunrise, FL, and stated that some foods served at the party were home prepared.

The Department of Agriculture and Consumer Services (DOACS) was notified and an inspection was conducted of the bakery. The inspection report revealed there were several cited violations, for items related to equipment condition, improper hot hold food temperature, and manager certification. According to the complainant, the following foods were picked up from the bakery at approximately 1:00 pm. on December 20, 2003:

Bocaditos (ham/cheese appetizers)	50 pieces
Pastelitos (pastry)	50 pieces
Dulce de leche cake	1 cake

The above items were immediately taken home after pick up and placed on the buffet table and held at room temperature throughout the party from 1:00 – 9:00 pm when the party ended. The following menu items were home prepared: BBQ pork ribs and egg omelet (tortilla). Also served were: a platter with sausage, cheese, olives, crackers, sprite, ice, beer, and wine. Preparation of the egg omelet began around 11:00 am. Cooked omelets were stored in the refrigerator and micro waved to reheat before serving at 5:00 pm. Preparation of the pork ribs (~ 16 lbs.) began around 2 pm. Cooked ribs were kept warm in the oven until they were served. Dinner service began at 5:30 pm. The party ended by 9:00 pm.

A questionnaire was developed and administered to attendees via telephone interview. Telephone interviews were conducted with 18 (90%) of the 20 attendees. They were asked if they attended the party on December 20, if they were ill, symptoms, onset, and duration of illness, medical help, and their food history. Except for immediate family groupings, there had not been any shared foods among the attendees in the 72 hours prior to the party of December 20, 2004.

[11] Center for Disease Control (CDC) Respiratory and Enteric Viruses Branch: Viral Gastroenteritis, August 20, 2001, http://www.cdc.gov/ncidod/dvrd/revb/gastro/*Norovirus*.htm.

Twelve of those interviewed (67%) reported illness with symptoms of abdominal cramps (91%), nausea (83%), fatigue (83%), chills (75%), weakness (75%), dizziness (64%), headache (64%), vomiting (50%) and sweating and numbness in descending order of magnitude. Watery diarrhea was reported in 8 (67%), however frequency was 1-2 episodes of diarrhea in a 24-hour period. No one reported fever. There were 3 who sought medical help, with undetermined diagnosis. Neither clinical samples nor food samples were tested. The median age of ill attendees was 34.5 years (range 1-64 years); 8 females and 4 males reported illness. The median incubation period was 15 hours (range 4-87 hours). Median duration of illness was 24 hours (range 12-72 hours). There were no hospitalizations and no deaths associated with this outbreak.

Table 6: Attack Rate Table for Dulce de Leche Cake in Catered Outbreak in Broward County, December 2003

Cake	Ill	Not ill	Total
Ate	12	2	14
Did not Eat	0	4	4
Total	12	6	18

Fisher Exact p=0.004

Table 7: Attack Rate Table for BBQ Ribs in Catered Outbreak in Broward County, December 2003

BBQ Ribs	Ill	Not ill	Total
Ate	12	5	17
Did not Eat	0	1	1
Total	12	6	18

Fisher Exact p=0.333

Analysis of the individual foods served at the party was performed using the Epi6 CDC software suggests that the foods most implicated as the potential vehicle of the causative agent was the dulce de leche cake. The Odds Ratio could not be calculated because no one was ill who did not eat cake or who did not eat BBQ ribs. All who reported illness ate both cake and BBQ ribs. BBQ rib consumption may have been an artefact of a favored food. No significant association between illness and the other foods consumed at the party was found.

The symptoms, predominance of abdominal cramps, minimal diarrhea, lack of fever, and incubation period of 15 hours and duration of illness reported in this outbreak, are suggestive and consistent with the toxin mediated *Clostridium perfringens* infection or *Bacillus cereus* infection.

Both *Clostridium perfringens* and *Bacillus cereus* (diarrheal toxin) food intoxication are characterized by onset of colic (abdominal cramps) followed by diarrhea, and fever is usually absent. Illness is usually mild and of short duration of 1 day or less and is rarely fatal.[12] *Clostridium perfringens* and *Bacillus cereus* foodborne outbreaks are widespread and are frequently associated with mishandled foods held at ambient temperatures or conditions allowing rapid bacterial multiplication and toxin production to levels that can cause illness.

[12] Control of Communicable Diseases Manual,,Chin, James MD, MPH 2000, 17th Ed., American Public Health Association.

Clearly the illnesses with similar symptoms, temporal relationship and common food exposures, indicate that a foodborne outbreak occurred among attendees of this party. There were no laboratory test conducted on either clinical or food specimens, and a causal relationship between foods ingested and illness cannot be established with certainty. Although all who reported illness ate both the cake and BBQ ribs, it may have been a function of the limited menu and favorite foods. However, the implicated foods have frequently been associated as vehicles of these agents. The known temperature abuse of the cake product held at ambient temperature in the home coupled with the volume of ribs prepared and potential for temperature abuse could be conducive to rapid bacterial growth and subsequent foodborne illness reported.

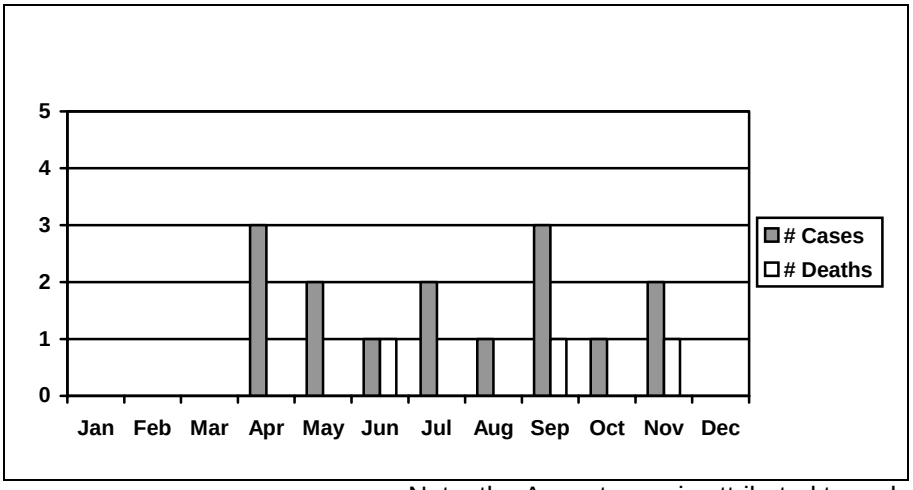
The outbreak investigation offered an opportunity for the regulatory agencies to review the conditions and food handling procedures of the retail facility, and provided the opportunity to educate the consumer on safe food handling practices in cooking, and storage of foods, prevention of cross-contamination and personal hygiene. The complainant was informed of the findings and was satisfied with the efforts made on their behalf.

An Overview of Foodborne*Vibrio vulnificus*, Florida, 2003

For 2003, there was a total of 48 *Vibrio vulnificus* cases reported in the State of Florida, a significant increase from the previous year. Of these, the largest number included 28 wound-related and 5 from an unknown exposure. The other 14 cases were associated with the consumption of raw oysters, and one with crab.[13] There were 3 oyster-consumption-related deaths, 4 deaths from unknown exposures and 2 wound-related deaths reported from *Vibrio vulnificus* (see Figure 7). In 2002 there were 10 wound-related cases of *Vibrio vulnificus* (1 death), 5 from unknown exposures (3 deaths) and 5 cases associated with the consumption of raw oysters (1 death).

[13] *Vibrio vulnificus* cases are also counted as outbreaks because of the virulence of the disease.

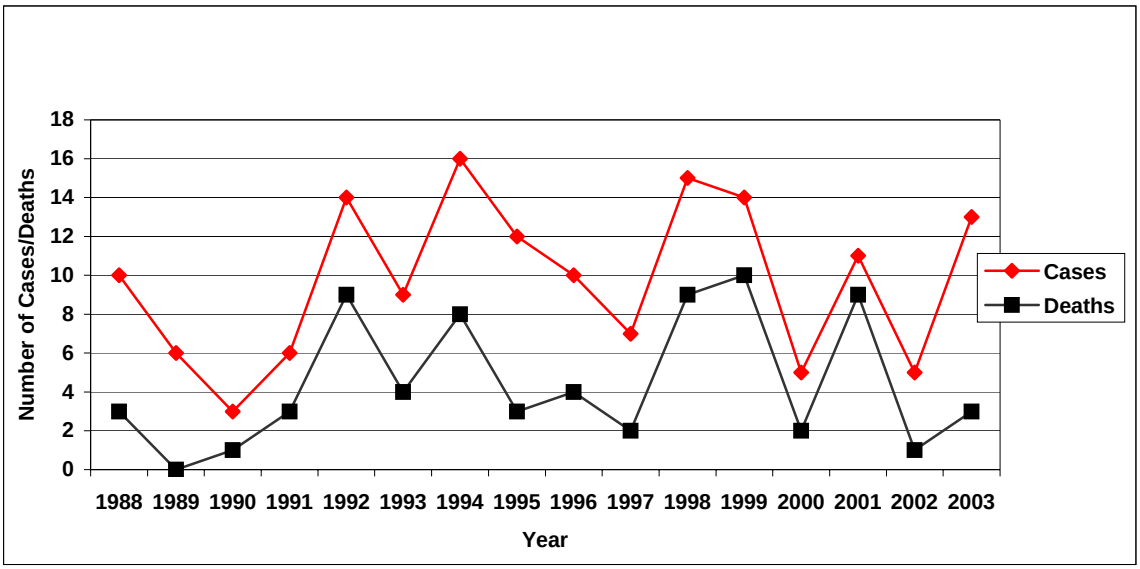
Figure 4: *Vibrio vulnificus* Cases and Deaths Due to Shellfish Consumption by Month, Florida, 2003



Note: the August case is attributed to crab consumption.

The Florida Department of Health is collaborating in a statewide *Vibrio vulnificus* Education Project with the Florida Department of Agriculture and Consumer Services and with the Interstate Shellfish Sanitation Conference. Targeted audiences include high risk groups, health care practitioners and the general public. In 2003, project elements included 18 presentations for county health department staff and other health care professionals, local members of chapters of the Florida Nurses Association and the Florida Dietetic Association, a class of student dieticians at the University of North Florida and member chefs of the Ft. Lauderdale Culinary Arts institute. A press release emphasizing the risk of raw oyster consumption by high risk groups was distributed in May. *Vibrio vulnficus* displays were present at the Florida Dietetic Association Annual Meeting, in selected Tallahassee government office buildings during National Food Safety Month, at both days and locations of the Florida Safety Expo, the Southeast Regional Food and Drug Administration Annual Meeting, Basic Environmental Health Training and the Regional Epidemiology Seminar in Daytona. Section 64D-3.013(7), F.A.C was also changed to require that oyster warning language be displayed on menus or table placards only, eliminating the language: “or elsewhere in plain view of all patrons.” Figure 5 shows oyster-related*Vibrio vulnificus* cases and deaths in Florida, from 1988-2003.

Figure 5: *Vibrio vulnificus* Cases and Deaths Associated With Oyster Consumption, Florida, 1988-2003



An Overview of Foodborne Hepatitis A in Florida, 1994- 2003

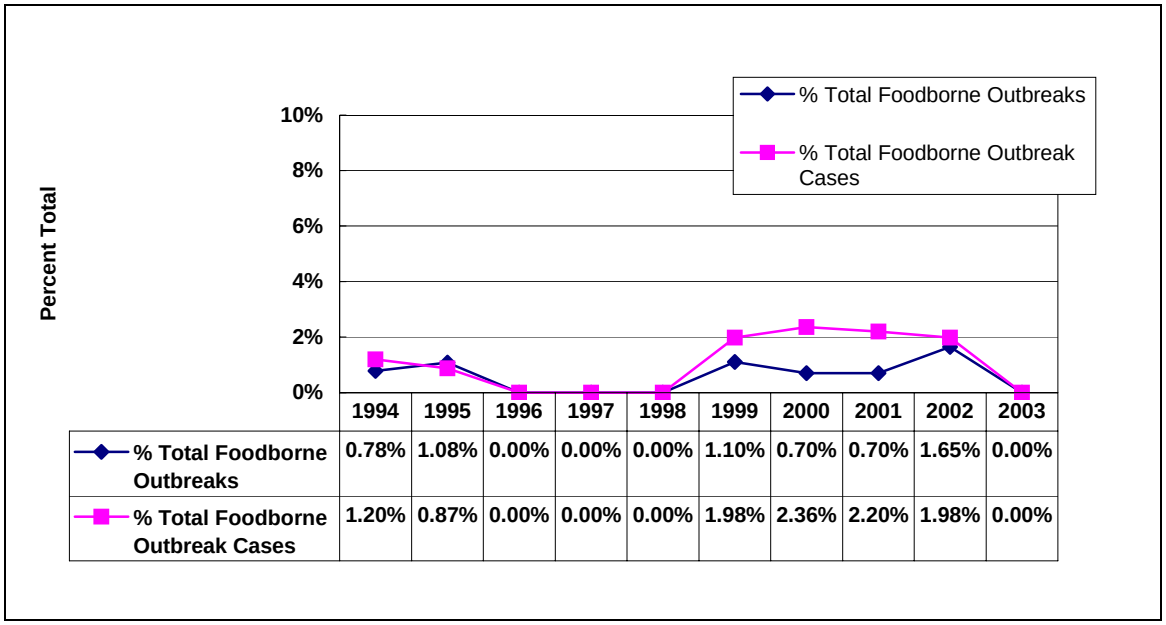
Nationwide estimates are that hepatitis A accounts for 0.8% of total foodborne outbreaks and for less than 0.8% of total foodborne outbreak-related cases .[14] Florida estimates that hepatitis A accounts for 0.6% of total foodborne outbreaks (1994-2003 trend: flat - no increase or decrease) and for .95% of total foodborne outbreak-related cases (1994- 2003 trend: upward a little less than 1%).[15,16]

Table 8: Comparison of National and Florida Percentages of Foodborne Hepatitis A

	% Total foodborne outbreaks	% Total outbreak-related cases
Nationwide (1993-1998)	0.8%	0.8%
Florida (1994- 2003)	0.6%	.95%

[14] Sonja Olsen, et al. Surveillance for Foodborne-Disease Outbreaks – United States, 1993-1997, Morbidity and Mortality Weekly Report, CDC Surveillance Summaries (49)SS-1, March 17, 2000.
[15] Source: Bureau of Community Environmental Health, Food and Waterborne Disease Program
[16] Source: Bureau of Community Environmental Health, Food and Waterborne Disease Program

Figure 6: Foodborne Hepatitis A: % Total Foodborne Outbreaks and Outbreak-related Cases, 1994-2003, Florida



	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
% Total Foodborne Outbreaks	0.78%	1.08%	0.00%	0.00%	0.00%	1.10%	0.70%	0.70%	1.65%	0.00%
% Total Foodborne Outbreak Cases	1.20%	0.87%	0.00%	0.00%	0.00%	1.98%	2.36%	2.20%	1.98%	0.00%

Table 9: Number of Reported Foodborne Hepatitis A Outbreaks in Florida, 1994- 2003[17]

	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
Confirmed Foodborne Hepatitis A Outbreaks	0	2	0	0	0	1	2	2	4	0
Suspected Foodborne Hepatitis A Outbreaks	2	1	0	0	0	2	0	0	0	0
Total	2	3	0	0	0	3	2	2	4	0
Total # Foodborne Outbreaks	**255**	**278**	**300**	**428**	**299**	**272**	**268**	**290**	**243**	**185**
% Outbreak-related Hepatitis A	**0.8%**	**1.1%**	**0%**	**0%**	**0%**	**1.1%**	**0.7%**	**0.7%**	**1.6%**	**0**

[17] Source: Bureau of Community Environmental Health, Food and Waterborne Disease Program

Table 10: Number of Foodborne Outbreak-related Hepatitis A Cases in Florida, 1994- 2003[18]

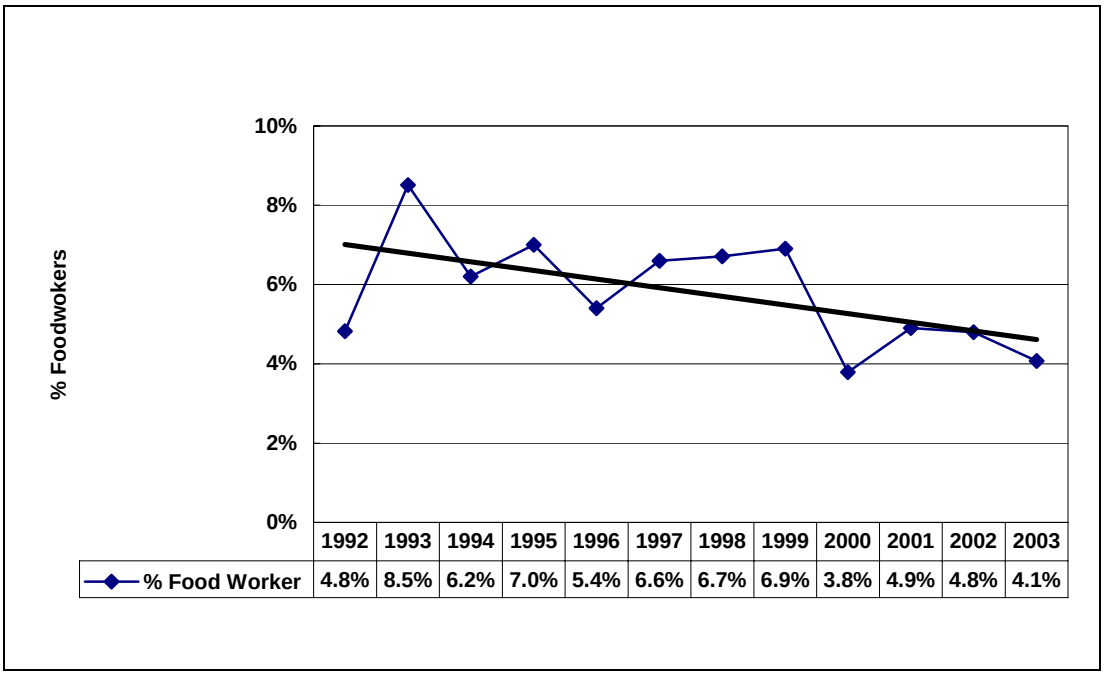
	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
Cases in Confirmed Foodborne Hepatitis A Outbreaks	0	21	0	0	0	17	23	40	29	0
Cases in Suspected Foodborne Hepatitis A Outbreaks	17	3	0	0	0	12	0	0	0	0
Total	17	24	0	0	0	29	23	40	29	0
Total # Foodborne Outbreak-related Cases	**1422**	**2755**	**2224**	**2677**	**3194**	**1463**	**1527**	**1921**	**1466**	**1564**
% Foodborne Hepatitis A Cases	**1.2%**	**0.8%**	**0%**	**0%**	**0%**	**2%**	**1.5%**	**2%**	**1.98%**	**0**

An examination of the total number of reported hepatitis A cases in Florida shows that foodworkers with hepatitis A account for 5.5% of the total confirmed hepatitis A cases statewide (1992- 2003).[19] The percentage of foodworker hepatitis A in Florida shows a slight downward trend of about 2% from 1992-2003.

Table 11: Percentage of Foodworker Hepatitis A Cases of Total Reported Hepatitis A Cases, Florida, 1992-2003

Statewide Confirmed Hepatitis A	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	Total
# Confirmed Cases	581	705	772	663	720	812	611	855	659	990	1,016	368	1239
# Foodworker Cases	28	60	48	46	39	54	41	59	25	49	63	15	59
% Food Worker	**4.8%**	**8.5%**	**6.2%**	**7.0%**	**5.4%**	**6.6%**	**6.7%**	**6.9%**	**3.8%**	**4.9%**	**4.8%**	**4.1%**	**4.8%**

Figure 7: Hepatitis A in Florida, % Foodworkers of Total Cases, 1992-2003



The foodworker industry is easy to enter and is very transient and mobile. Possible contributing factors to hepatitis A in foodworkers include an increase in the immigrant population who may

[18] Source: Bureau of Community Environmental Health, Food and Waterborne Disease Program
[19] Source: DOH Merlin Reportable Disease System

have cultural and socio-economic differences in food safety standards, hygiene and language barriers, generating challenges in foodworker training. An increase in hepatitis A in the groups with the most cases including drug users and men who have sex with men might also be reflected in the food industry (these groups like all others can easily find work in the food industry). More younger people entering the food service industry also present a training challenge as many have little knowledge of food safety and hygiene.

All of the above factors point to a need for better training of the food industry particularly where proper hygiene and handwashing are concerned. This is an ongoing effort on the part of inspectors, epidemiologists and health care practitioners.

Current efforts include:

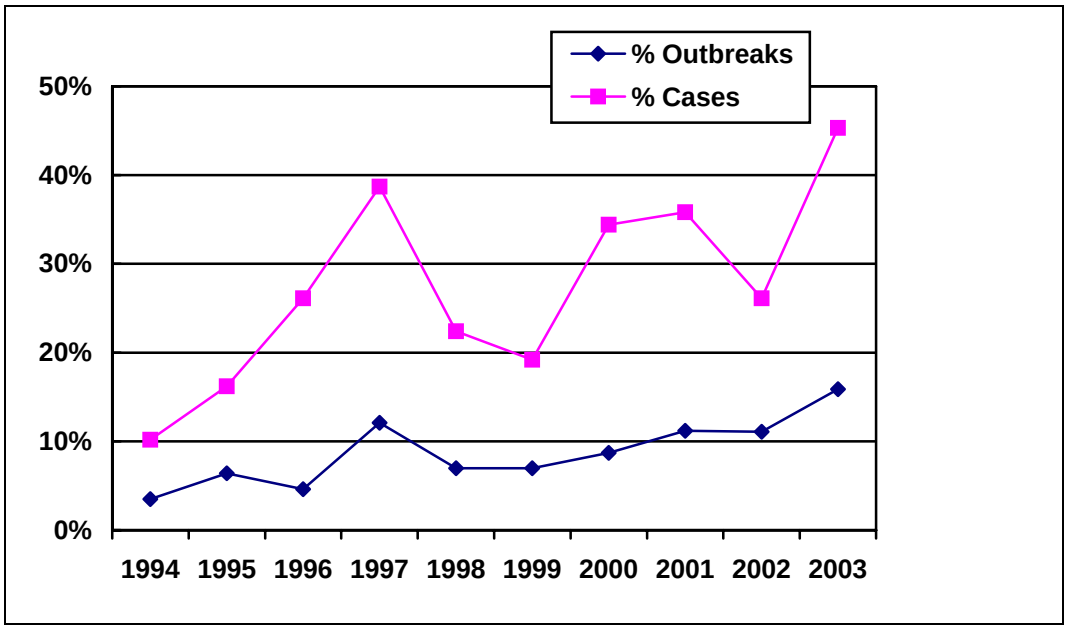
- The national FightBac! campaign sponsored by FDA (website provides materials for educators, the public, media, materials also available in Spanish),
- Food worker training by DBPR, DOH and DACS, to county health departments, interested community groups, university classes,
- Refresher training by DBPR, DOH and DACS when outbreaks occur or when food workers are confirmed for Hepatitis A,
- Development of exclusion form letter to notify other agencies of foodworker exclusions,
- Hepatitis A training by the Food and Waterborne Disease Program,
- Newsletter articles for the Hepatitis Program newsletter,
- Handwashing magnets developed and distributed through 9 Regional Food and Waterborne Disease Epidemiolgists to targeted community populations and groups. These magnets are currently being redeveloped to include magnets in Spanish and Haitian Creole as well as visual arts that are more culturally diverse,
- Adults at increased risk (MSM, IDU) vaccinated based on behavioral risk factor rather than employment.

Proposed activities for further foodborne hepatitis A prevention include:

- 2001 Grant Application from the Bureau of Community Environmental Health for funding to develop a handwashing training in middle schools was not accepted. As more grant funds become available, more applications for funding will be made.
- Bureau of Community Environmental Health Foodborne Hepatitis A WebPage:
  - How you get it
  - How to prevent it
  - Basic charts
  - Links to other websites
- More community training, discuss with the Florida Department of Education possibilities of handwashing training in classrooms, perhaps reapply for grant funding.

An Overview of Foodborne *Norovirus* Reported in Florida, 1994-2003

Figure 8: Trends of *Norovirus* in Reported Outbreaks and Outbreak Cases, Florida, 1994 - 2003



Of the estimated 23 million cases of *Norovirus* each year, foodborne *Norovirus* accounts for an estimated 9.2 million cases (67% of the total foodborne illness cases) per year nationally. It is estimated that 20,000 (32.9% total) hospitalizations and 124 (6.9% total) deaths can be attributed to foodborne *Norovirus* infections.[20]

In Florida, 8.2% of total food and waterborne outbreaks or 23.8% total food and waterborne cases can be attributed to *Norovirus* infections (no data are available on hospitalizations or deaths). Reported food and waterborne *Norovirus* outbreaks and cases show a slight upward trend over time. From 1994-2003, there has been a total of 239 food or waterborne *Norovirus* outbreaks with 5,168 associated cases (see Tables 12 and 13). Vehicles of transmission include sandwiches, salads, meal garnishes, oysters, recreational water and ice. The primary contributing factors are the lack of good personal hygiene and handwashing in addition to bare hand contact with food, as well as overboard dumping of raw sewage causing oyster-related outbreaks. Control of the outbreaks involves excluding the ill foodworker(s) where possible and appropriate, handwashing education and education of sport and commercial fishermen.

Table 12: Number of Reported Foodborne *Norovirus* Outbreaks, Florida, 1994-2003

Outbreaks	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	Total
Suspected	3	6	6	30	15	14	15	17	18	16	140
Confirmed	6	13	8	23	7	6	10	17	9	14	99
Total	**9**	**19**	**14**	**53**	**22**	**20**	**25**	**34**	**27**	**30**	**239**
% Total Outbreaks	**3.5%**	**6.4%**	**4.6%**	**12.1%**	**7.0%**	**7.0%**	**8.7%**	**11.2%**	**11.1%**	**15.9%**	**8.2%**

[20] Food Related Illness and Death in the United States, Mead, Paul et al. Emerging Infectious Diseases (5) 5:607-625, http://www.cdc.gov/ncidod/eid/vol5no5/mead.htm (as of 01/19/05)

Table 13: Number of Reported Foodborne *Norovirus* Outbreak-related Cases, Florida, 1994-2003

Outbreak-related cases	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	Total
Suspected	46	51	92	377	296	136	154	212	212	438	1576
Confirmed	110	419	633	686	442	160	450	522	170	311	3592
Total	**156**	**470**	**725**	**1063**	**738**	**296**	**604**	**734**	**382**	**749**	**5168**
% Total Outbreak-related cases	**10.2%**	**16.2%**	**26.1%**	**38.7%**	**22.4%**	**19.2%**	**34.4%**	**35.8%**	**26.1%**	**45.3**	**23.8%**

Laboratory confirmation has been obtained in 42 (17.5%) of these outbreaks. Since the development of the Department of Health Bureau of Laboratories ability to test stools for *Norovirus*, food and waterborne outbreak investigations have focused on collecting both enteric and viral stool samples for ruling out/confirmation of *Norovirus*. The Food and Waterborne Disease Program has been working with county health departments to encourage proper sampling procedures. Regional food and waterborne disease epidemiologists have also presented *Norovirus* training in several regions around the state (St. Augustine, Orlando, Ft. Myers). Future *Norovirus* training is scheduled for regional county health department staff in and around Live Oak, Panama City and Port St. Lucie. The training has also been given to a cruise line who requested it.

Appendix: Statewide Data Tables and Figures

Table 14: Number of Reported Food and Waterborne Outbreaks With Laboratory-Confirmed Etiologic Agents and Number of Cases Associated With These Outbreaks, Florida, 2003

# Outbreaks	Pathogen	# Cases
1	*B. cereus*	42
1	Chemical	2
1	Saxitoxin	2
2	*V. parahaemolyticus*	118
3	Ciguatera	5
5	*Norovirus*	142
5	Scombroid	33
12	*Salmonella*	144
13	*V. vulnificus*	13
43	Total	501

Figure 9: Percent Reported Outbreaks With Laboratory-Confirmed Etiologic Agents and Percent Cases Associated With These Outbreaks, Florida, 2003

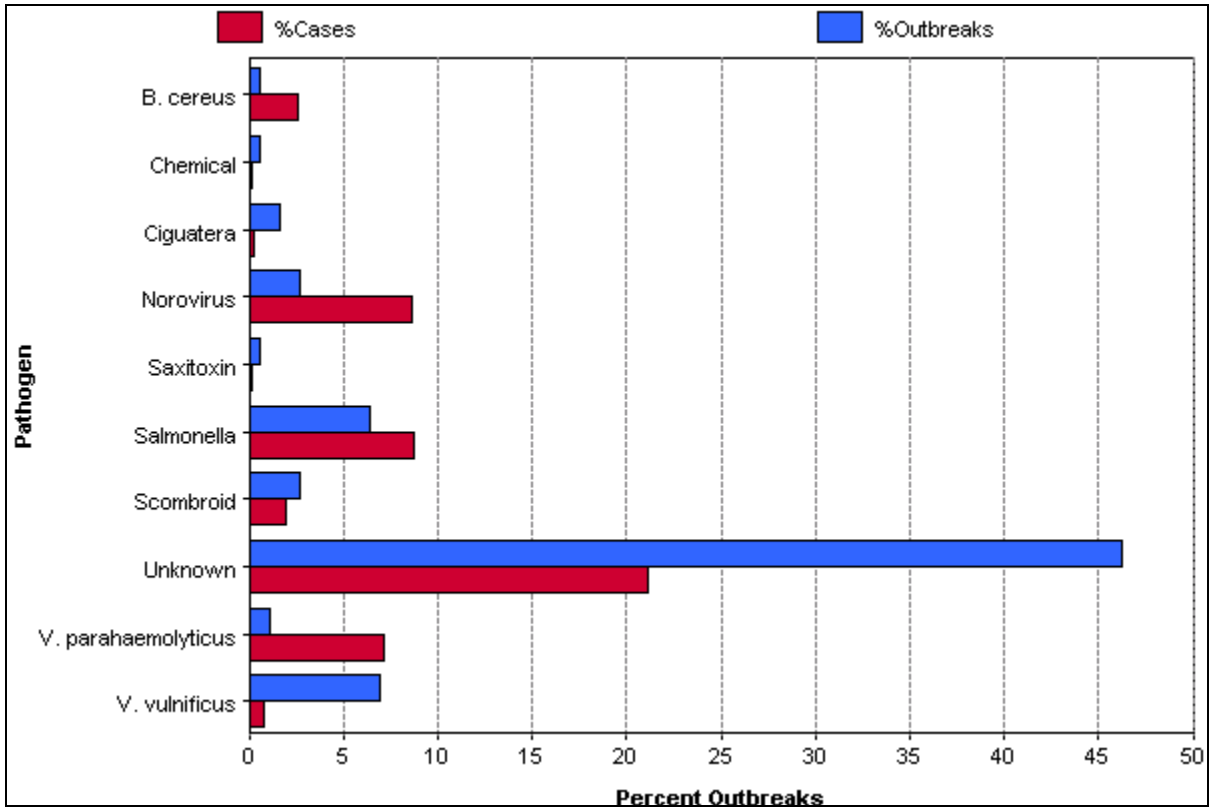
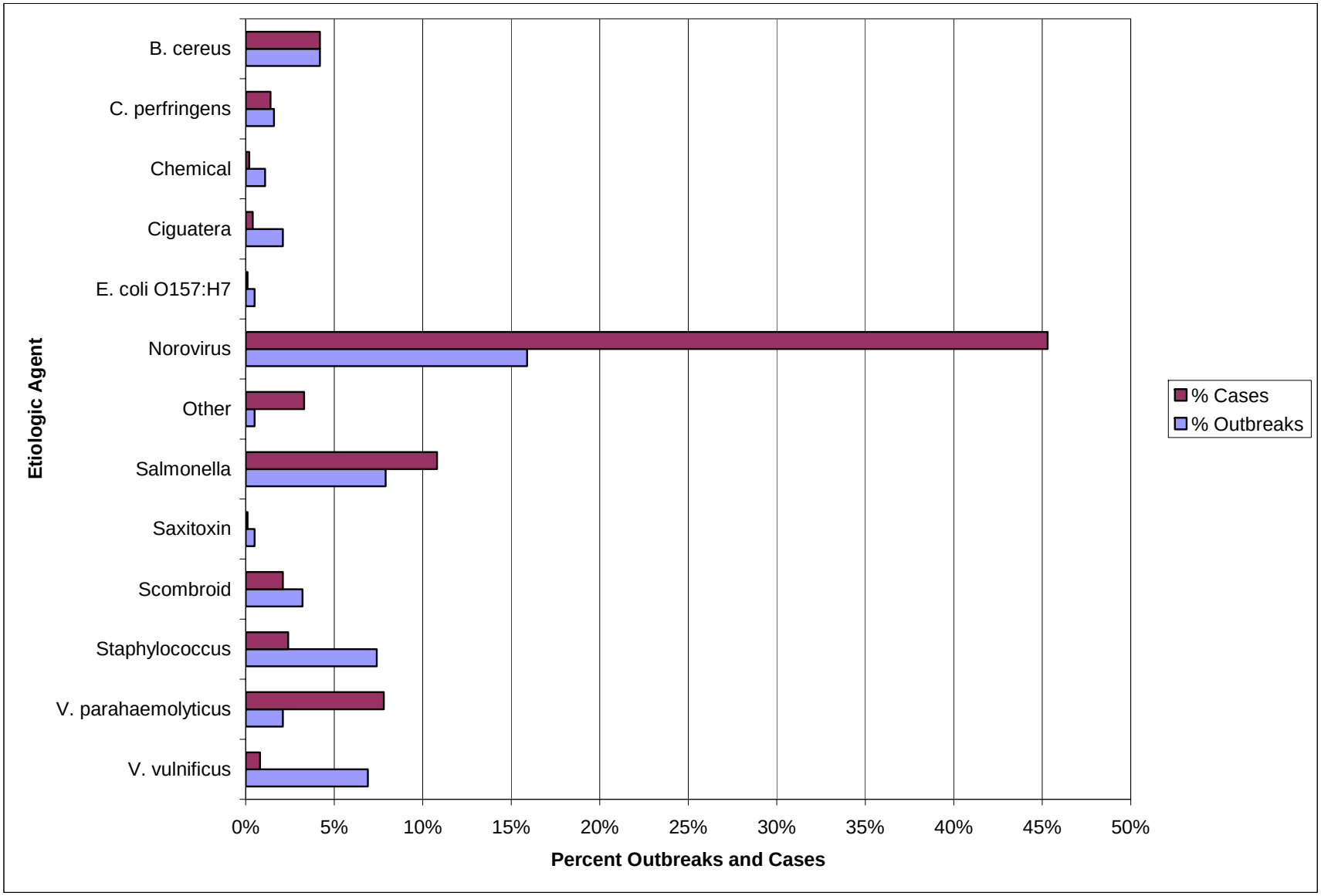
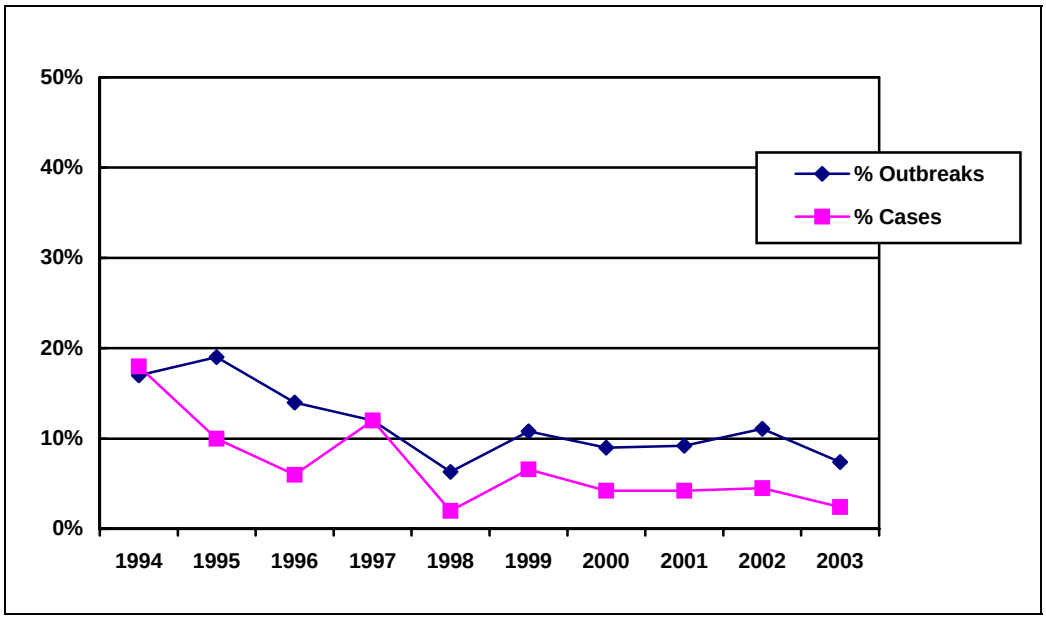


Figure 10: Percent Total Food and Waterborne Disease Outbreaks and Cases by Etiologic Agent, Florida, 2003*



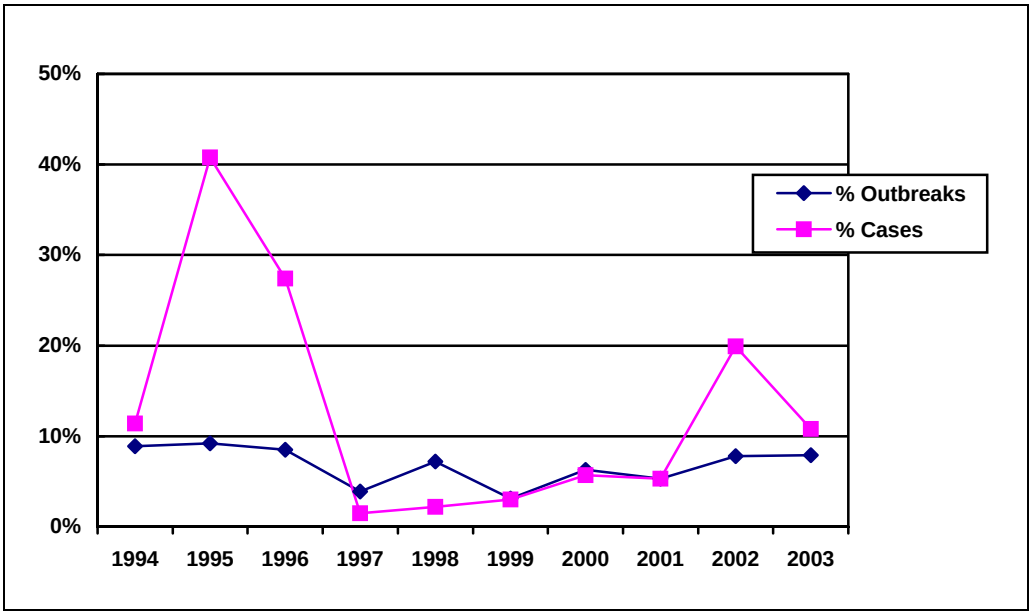
*The etiologic agent was unknown in 46% of the outbreaks and 21% of the cases.

Figure 11: Trends of Staphylococcus in Reported Food and Waterborne Outbreaks and Outbreak-related Cases, Florida, 1994 - 2003



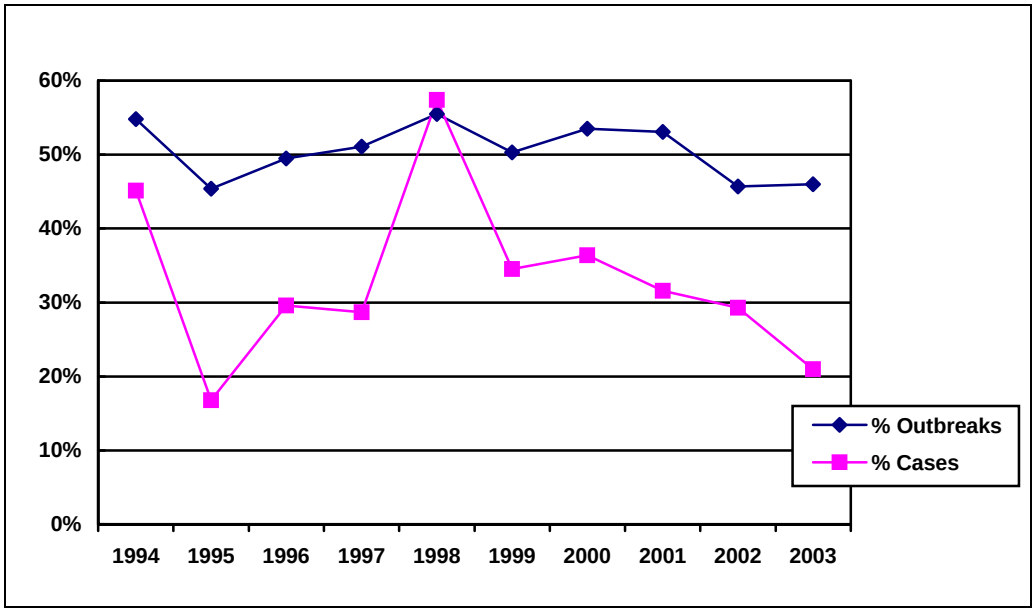
Reported food and waterborne Staphylocccus outbreaks and cases show a downward trend over time.

Figure 12: Trends of Salmonella in Reported Food and Waterborne Outbreaks and Outbreak-related Cases, Florida, 1994 - 2003



Reported food and waterborne Salmonella outbreaks and cases show a downward trend over time.

Figure 13: Trends of Unknown Pathogens in Reported Food and Waterborne Outbreaks and Outbreak-related Cases, Florida, 1994 - 2003



The percents of food and waterborne outbreaks and cases from unknown causes remain stable over time.

Figure 14: Percent Total Food and Waterborne Outbreaks and Outbreak-related Cases by Site, Florida, 2003

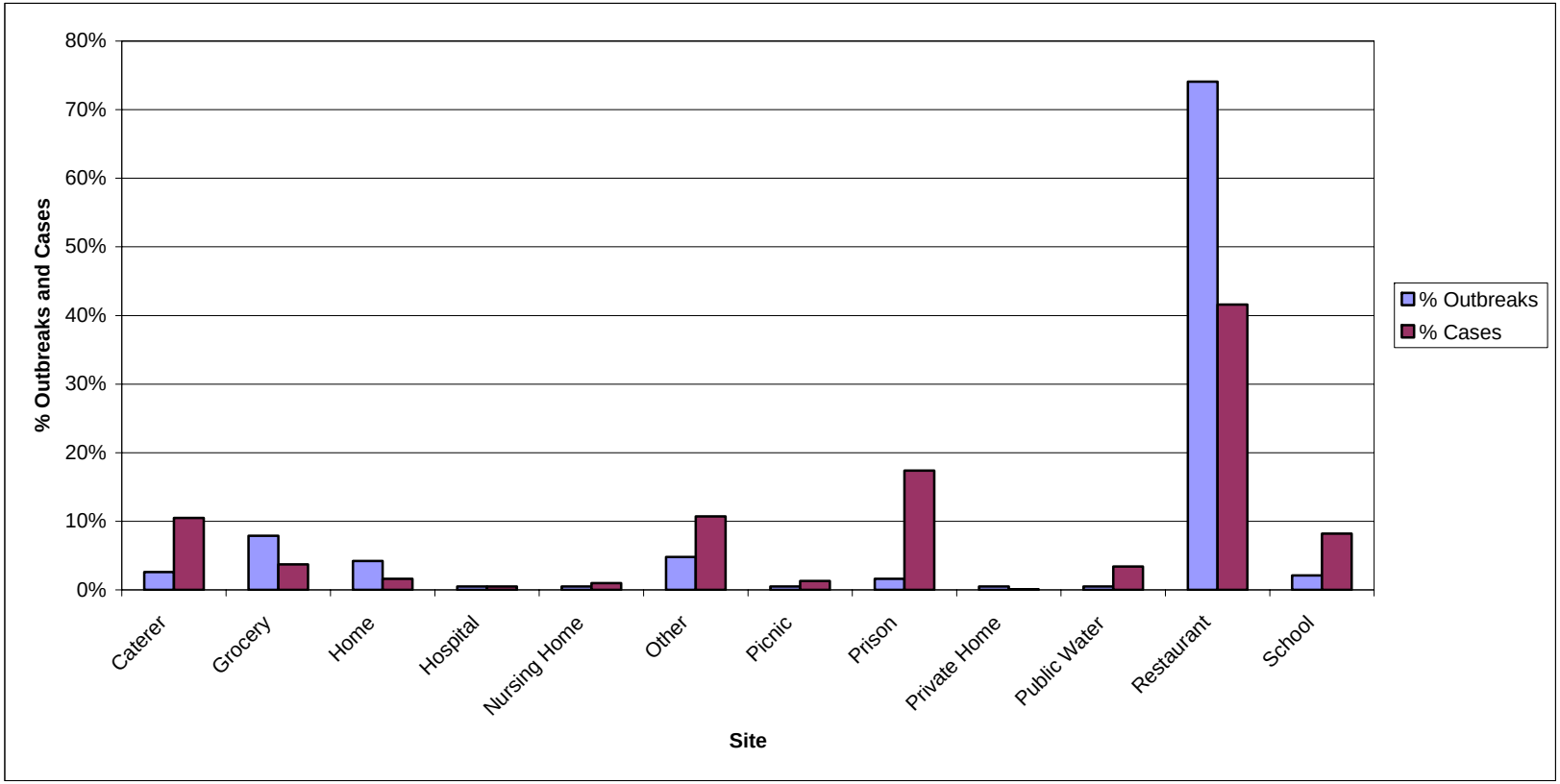


Table 15: Food and Waterborne Outbreaks by Site, Florida, 2003[21]

Status	Caterer	Grocery	Home	Hospital	Nursing Home	Other	Picnic	Prison	Private Home	Public Water	Restaurant	School	Total
Confirmed	4	2	8	0	1	3	1	1	1	1	34	2	58
	7%	3%	14%	0%	2%	5%	2%	2%	2%	2%	59%	3%	31%
	80%	13%	100%	0%	100%	33%	100%	33%	100%	100%	24%	50%	
Suspected	1	13	0	1	0	6	0	2	0	0	106	2	131
	1%	10%	0%	1%	0%	5%	0%	2%	0%	0%	81%	2%	69%
	20%	87%	0%	100%	0%	67%	0%	67%	0%	0%	76%	50%	
Total	**5**	**15**	**8**	**1**	**1**	**9**	**1**	**3**	**1**	**1**	**140**	**4**	**189**
	3%	**8%**	**4%**	**1%**	**1%**	**5%**	**1%**	**2%**	**1%**	**1%**	**74%**	**2%**	**100%**

Table 16: Food and Waterborne Outbreak-related Cases by Site, Florida, 2003[22]

Status	Caterer	Grocery	Home	Hospital	Nursing Home	Other	Picnic	Prison	Private Home	Public Water	Restaurant	School	Total
Confirmed	166	15	27	0	16	34	22	42	2	56	347	68	795
	21%	2%	3%	0%	2%	4%	3%	5%	0%	7%	44%	9%	48%
	95%	24%	100%	0%	100%	19%	100%	15%	100%	100%	50%	50%	
Suspected	8	47	0	8	0	143	0	245	0	0	341	67	859
	1%	6%	0%	1%	0%	17%	0%	29%	0%	0%	40%	8%	52%
	5%	76%	0%	100%	0%	81%	0%	85%	0%	0%	50%	50%	
Total	**174**	**62**	**27**	**8**	**16**	**177**	**22**	**287**	**2**	**56**	**688**	**135**	**1654**
	11%	**4%**	**2%**	**1%**	**1%**	**11%**	**1%**	**17%**	**0%**	**3%**	**42%**	**8%**	**100%**

[21] First percentage figure under confirmed row is a measure of the total outbreaks, the second percentage figure is a measure of the outbreaks in that column.
[22] First percentage figure under suspected row is a measure of the total cases, the second percentage figure is a measure of the cases in that column.

Table 17: Food and Waterborne Outbreaks and Cases Reported by Agency of Jurisdiction,[23][24] Florida, 2003

Agency	# Outbreaks	% Outbreaks	# Cases	% Cases
DACS	21	11.1%	91	5.5%
DBPR	143	75.7%	839	50.7%
DOH	16	8.5%	579	3.5%
OTHER	9	4.8%	145	8.8%
Total	189	100%	1654	100%

Figure 15: Reported Food and Waterborne Disease Outbreaks by Agency of Jurisdiction, 1995 - 2003

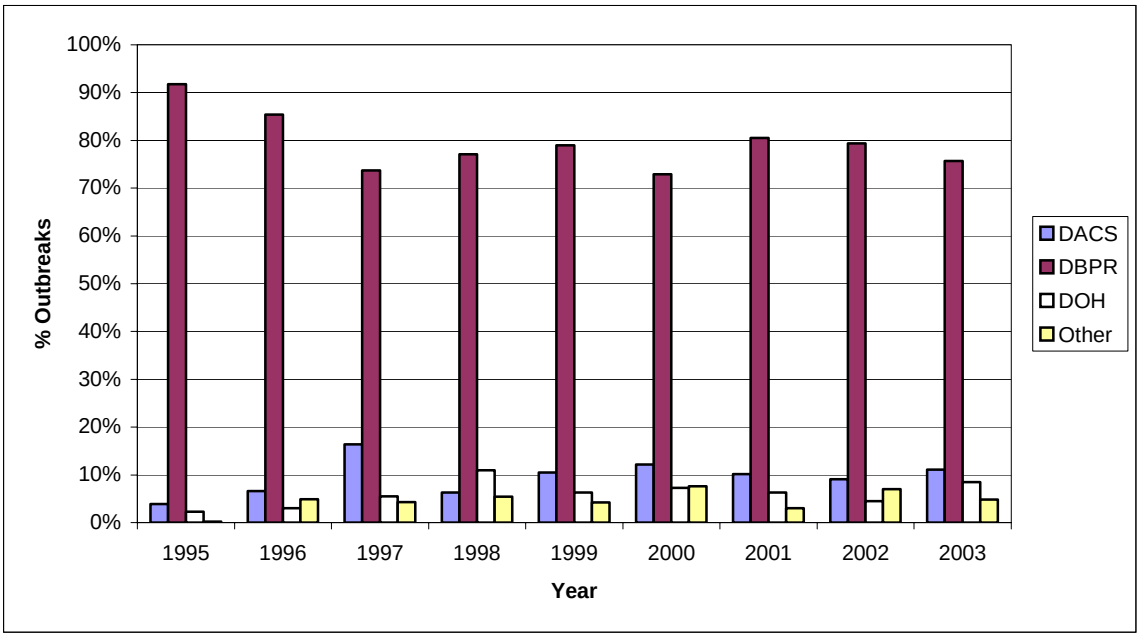
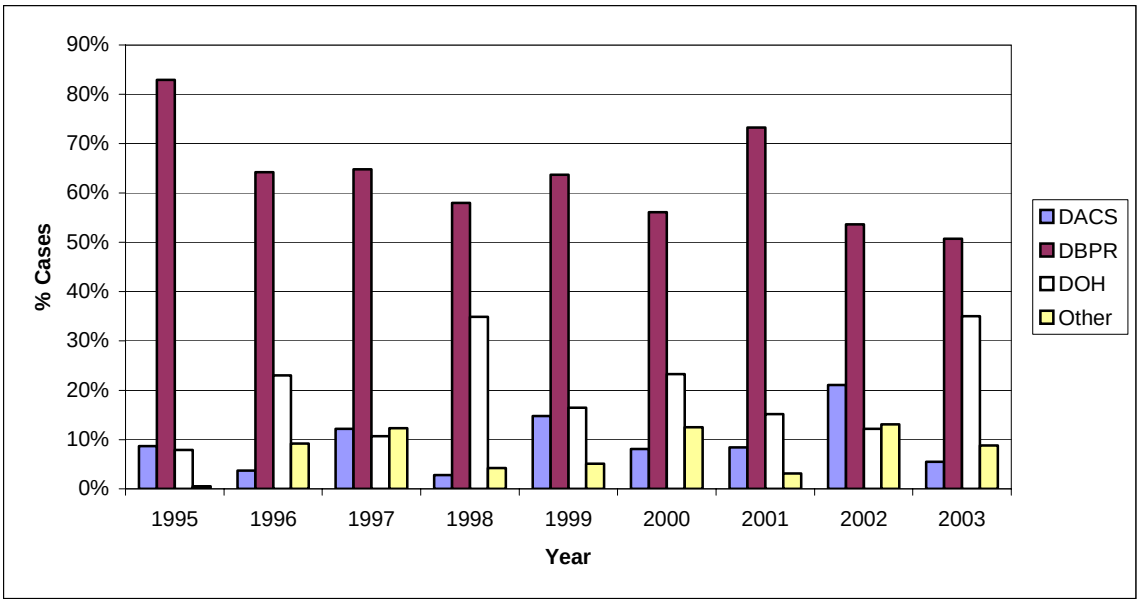


Figure 16: Cases Associated With Reported Food and Waterborne Disease Outbreaks by Agency of Jurisdiction, 1995 – 2003



[23] 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).

[24] Data from previous years can be found in the 2002 Annual Report.

Figure 17: Percent Total Food and Waterborne Outbreaks and Outbreak-related Cases by Vehicle, Florida, 2003

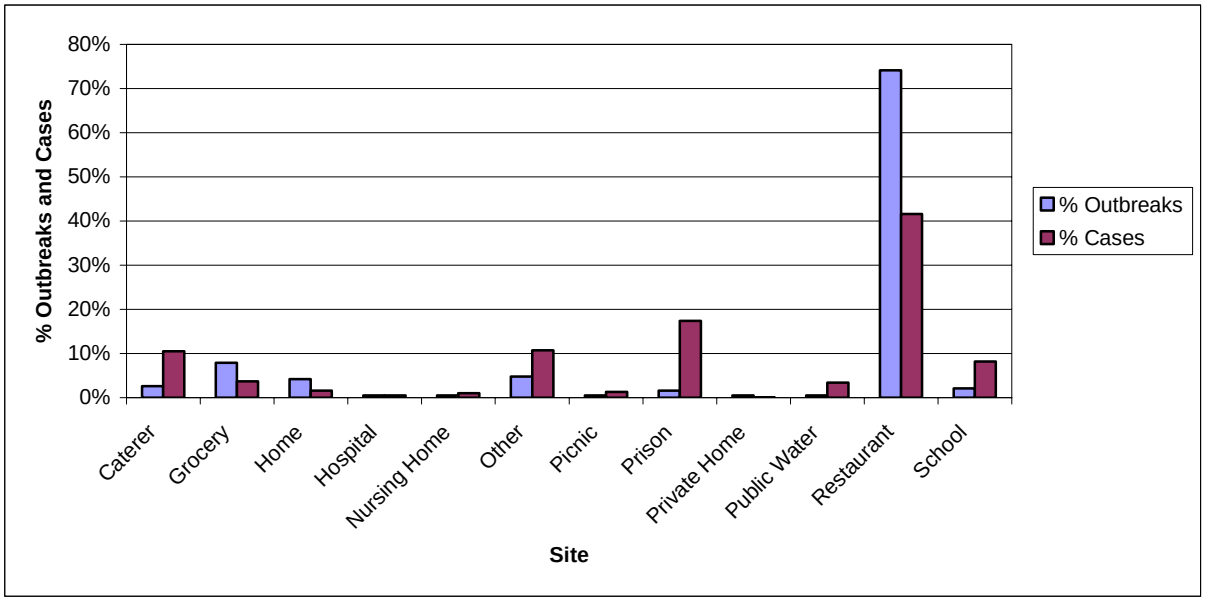


Table 18: Food and Waterborne Outbreaks by Vehicle, Florida, 2003[25]

Status	Caterer	Grocery	Home	Hospital	Nursing Home	Other	Picnic	Prison	Private Home	Public Water	Restaurant	School	Total
Confirmed	4	2	8	0	1	3	1	1	1	1	34	2	58
	7%	3%	14%	0%	2%	5%	2%	2%	2%	2%	59%	3%	31%
	80%	13%	100%	0%	100%	33%	100%	33%	100%	100%	24%	50%	
Suspected	1	13	0	1	0	6	0	2	0	0	106	2	131
	1%	10%	0%	1%	0%	5%	0%	2%	0%	0%	81%	2%	69%
	20%	87%	0%	100%	0%	67%	0%	67%	0%	0%	76%	50%	
Total	**5**	**15**	**8**	**1**	**1**	**9**	**1**	**3**	**1**	**1**	**140**	**4**	**189**
	3%	**8%**	**4%**	**1%**	**1%**	**5%**	**1%**	**2%**	**1%**	**1%**	**74%**	**2%**	**100%**

Table 19: Food and Waterborne Outbreak-related Cases by Vehicle, Florida, 2003[26]

Status	Caterer	Grocery	Home	Hospital	Nursing Home	Other	Picnic	Prison	Private Home	Public Water	Restaurant	School	Total
Confirmed	166	15	27	0	16	34	22	42	2	56	347	68	795
	21%	2%	3%	0%	2%	4%	3%	5%	0%	7%	44%	9%	48%
	95%	24%	100%	0%	100%	19%	100%	15%	100%	100%	50%	50%	
Suspected	8	47	0	8	0	143	0	245	0	0	341	67	859
	1%	6%	0%	1%	0%	17%	0%	29%	0%	0%	40%	8%	52%
	5%	76%	0%	100%	0%	81%	0%	85%	0%	0%	50%	50%	
Total	**174**	**62**	**27**	**8**	**16**	**177**	**22**	**287**	**2**	**56**	**688**	**135**	**1654**
	11%	**4%**	**2%**	**1%**	**1%**	**11%**	**1%**	**17%**	**0%**	**3%**	**42%**	**8%**	**100%**

[25] First percentage figure under confirmed row is a measure of the total outbreaks, the second percentage figure is a measure of the outbreaks in that column.
[26] First percentage figure under suspected row is a measure of the total cases, the second percentage figure is a measure of the cases in that column.

Table 20: Total Food and Waterborne Outbreaks, Florida, 2003: Etiologic Agent by Vehicle

Pathogen	Beef	Dairy	Fish	Fruit	Ice	Multiple Ingred	Multiple Items	Pork	Poultry	Rice	Shellfish	Unk	Vegetables	Water	Total
B. cereus	0	0	0	0	0	3	1	0	0	4	0	0	0	0	8
C. perfringens	0	0	0	0	0	1	1	0	1	0	0	0	0	0	3
Chemical	0	0	0	0	0	1	0	0	0	0	0	0	0	1	2
Ciguatera	0	0	4	0	0	0	0	0	0	0	0	0	0	0	4
E. coli O157:H7	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Norovirus	1	1	0	1	1	7	9	0	0	1	2	3	1	3	30
Other	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
Saxitoxin	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1
Salmonella	0	1	0	0	0	2	4	3	3	0	1	1	0	0	15
Scombroid	0	0	6	0	0	0	0	0	0	0	0	0	0	0	6
Staphylococcus	2	1	0	0	0	3	3	0	4	0	1	0	0	0	14
Unknown	9	1	7	1	0	21	23	3	12	2	4	3	1	0	87
V. parahaemolyticus	0	0	0	0	0	0	0	0	0	0	4	0	0	0	4
V. vulnificus	0	0	0	0	0	0	0	0	0	0	13	0	0	0	13
Total	**13**	**4**	**18**	**2**	**1**	**38**	**41**	**6**	**20**	**7**	**25**	**8**	**2**	**4**	**189**

Table 21: Total Food and Waterborne Outbreak-related Cases, Florida, 2003: Etiologic Agent by Vehicle

Pathogen	Beef	Dairy	Fish	Fruit	Ice	Multiple Ingred	Multiple Items	Pork	Poultry	Rice	Shellfish	Unk	Vegetables	Water	Total
B. cereus	0	0	0	0	0	57	3	0	0	10	0	0	0	0	70
C. perfringens	0	0	0	0	0	2	4	0	17	0	0	0	0	0	23
Chemical	0	0	0	0	0	1	0	0	0	0	0	0	0	2	3
Ciguatera	0	0	6	0	0	0	0	0	0	0	0	0	0	0	6
E. coli O157:H7	2	0	0	0	0	0	0	0	0	0	0	0	0	0	2
Norovirus	25	9	0	16	2	49	305	0	0	85	4	131	35	88	749
Other	0	0	0	0	0	0	0	0	0	0	0	55	0	0	55
Saxitoxin	0	0	2	0	0	0	0	0	0	0	0	0	0	0	2
Salmonella	0	29	0	0	0	7	48	25	64	0	3	3	0	0	179
Scombroid	0	0	35	0	0	0	0	0	0	0	0	0	0	0	35
Staphylococcus	6	3	0	0	0	7	11	0	11	0	2	0	0	0	40
Unknown	23	2	20	3	0	61	147	7	41	11	9	22	2	0	348
V. parahaemolyticus	0	0	0	0	0	0	0	0	0	0	129	0	0	0	129
V. vulnificus	0	0	0	0	0	0	0	0	0	0	13	0	0	0	13
Total	**56**	**43**	**63**	**19**	**2**	**184**	**518**	**32**	**133**	**106**	**160**	**211**	**37**	**90**	**1654**

Table 22: Confirmed Food and Waterborne Outbreaks, Florida, 2003: Etiologic Agent by Vehicle

Pathogen	Dairy	Fish	Fruit	Multiple Ingred	Multiple Items	Pork	Poultry	Rice	Shellfish	Unk	Vegetables	Water	Total
B. cereus	0	0	0	2	0	0	0	0	0	0	0	0	2
C. perfringens	0	0	0	0	0	0	1	0	0	0	0	0	1
Chemical	0	0	0	0	0	0	0	0	0	0	0	1	1
Ciguatera	0	3	0	0	0	0	0	0	0	0	0	0	3
Norovirus	1	0	1	2	5	0	0	0	0	1	1	3	14
Saxitoxin	0	1	0	0	0	0	0	0	0	0	0	0	1
Salmonella	1	0	0	1	2	2	2	0	1	0	0	0	9
Scombroid	0	5	0	0	0	0	0	0	0	0	0	0	5
Unknown	0	0	0	2	2	0	0	2	0	1	0	0	7
V. parahaemolyticus	0	0	0	0	0	0	0	0	2	0	0	0	2
V. vulnificus	0	0	0	0	0	0	0	0	13	0	0	0	13
Total	**2**	**9**	**1**	**7**	**9**	**2**	**3**	**2**	**16**	**2**	**1**	**4**	**58**

Table 23: Food and Waterborne Outbreak-related Cases in Confirmed Outbreaks, Florida, 2003: Etiologic Agent by Vehicle

Pathogen	Dairy	Fish	Fruit	Multiple Ingred	Multiple Items	Pork	Poultry	Rice	Shellfish	Unk	Vegetables	Water	Total
B. cereus	0	0	0	54	0	0	0	0	0	0	0	0	54
C. perfringens	0	0	0	0	0	0	17	0	0	0	0	0	17
Chemical	0	0	0	0	0	0	0	0	0	0	0	2	2
Ciguatera	0	5	0	0	0	0	0	0	0	0	0	0	5
Norovirus	9	0	16	22	119	0	0	0	0	22	35	88	311
Saxitoxin	0	2	0	0	0	0	0	0	0	0	0	0	2
Salmonella	29	0	0	4	44	23	61	0	3	0	0	0	164
Scombroid	0	33	0	0	0	0	0	0	0	0	0	0	33
Unknown	0	0	0	7	55	0	0	11	0	3	0	0	76
V. parahaemolyticus	0	0	0	0	0	0	0	0	118	0	0	0	118
V. vulnificus	0	0	0	0	0	0	0	0	13	0	0	0	13
Total	**38**	**40**	**16**	**87**	**218**	**23**	**78**	**11**	**134**	**25**	**35**	**90**	**795**

Table 24: Suspected Food and Waterborne Outbreaks, Florida, 2003: Etiologic Agent by Vehicle

Pathogen	Beef	Dairy	Fish	Fruit	Ice	Multiple Ingred	Multiple Items	Pork	Poultry	Rice	Shellfish	Unk	Vegetables	Total
B. cereus	0	0	0	0	0	1	1	0	0	4	0	0	0	6
C. perfringens	0	0	0	0	0	1	1	0	0	0	0	0	0	2
Chemical	0	0	0	0	0	1	0	0	0	0	0	0	0	1
Ciguatera	0	0	1	0	0	0	0	0	0	0	0	0	0	1
E. coli O157:H7	1	0	0	0	0	0	0	0	0	0	0	0	0	1
Norovirus	1	0	0	0	1	5	4	0	0	1	2	2	0	16
Other	0	0	0	0	0	0	0	0	0	0	0	1	0	1
Salmonella	0	0	0	0	0	1	2	1	1	0	0	1	0	6
Scombroid	0	0	1	0	0	0	0	0	0	0	0	0	0	1
Staphylococcus	2	1	0	0	0	3	3	0	4	0	1	0	0	14
Unknown	9	1	7	1	0	19	21	3	12	0	4	2	1	80
V. parahaemolyticus	0	0	0	0	0	0	0	0	0	0	2	0	0	2
Total	**13**	**2**	**9**	**1**	**1**	**31**	**32**	**4**	**17**	**5**	**9**	**6**	**1**	**131**

Table 25: Food and Waterborne Outbreak-related Cases in Suspected Outbreaks, Florida, 2003: Etiologic Agent by Vehicle

Pathogen	Beef	Dairy	Fish	Fruit	Ice	Multiple Ingred	Multiple Items	Pork	Poultry	Rice	Shellfish	Unk	Vegetables	Total
B. cereus	0	0	0	0	0	3	3	0	0	10	0	0	0	16
C. perfringens	0	0	0	0	0	2	4	0	0	0	0	0	0	6
Chemical	0	0	0	0	0	1	0	0	0	0	0	0	0	1
Ciguatera	0	0	1	0	0	0	0	0	0	0	0	0	0	1
E. coli O157:H7	2	0	0	0	0	0	0	0	0	0	0	0	0	2
Norovirus	25	0	0	0	2	27	186	0	0	85	4	109	0	438
Other	0	0	0	0	0	0	0	0	0	0	0	55	0	55
Salmonella	0	0	0	0	0	3	4	2	3	0	0	3	0	15
Scombroid	0	0	2	0	0	0	0	0	0	0	0	0	0	2
Staphylococcus	6	3	0	0	0	7	11	0	11	0	2	0	0	40
Unknown	23	2	20	3	0	54	92	7	41	0	9	19	2	272
V. parahaemolyticus	0	0	0	0	0	0	0	0	0	0	11	0	0	11
Total	**56**	**5**	**23**	**3**	**2**	**97**	**300**	**9**	**55**	**95**	**26**	**186**	**2**	**859**

Figure 18: Percent Total Food and Waterborne Outbreaks and Cases by Month, Florida, 2003

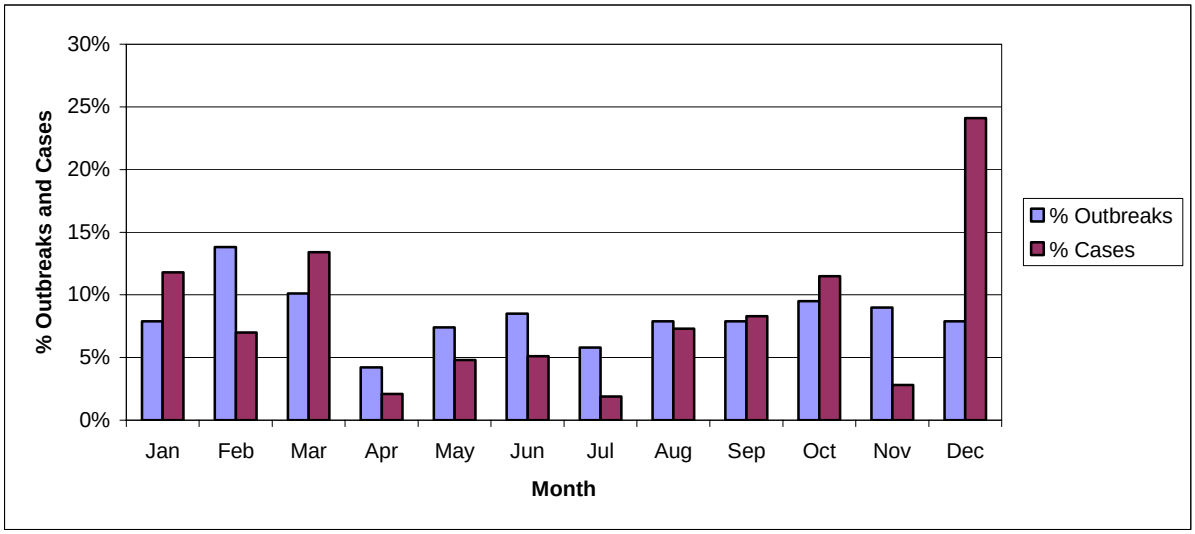


Table 26: Food and Waterborne Outbreaks by Month, Florida, 2003

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Status	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Confirmed	4	2	7	2	6	7	3	6	6	5	6	4	58
Annual	6.9%	3.4%	12.1%	3.4%	10.3%	12.1%	5.2%	10.3%	10.3%	8.6%	10.3%	6.9%	30.7%
Month	26.7%	7.7%	36.8%	25.0%	42.9%	43.8%	27.3%	40.0%	40.0%	27.8%	35.3%	26.7%	
Suspected	11	24	12	6	8	9	8	9	9	13	11	11	131
Annual	8.4%	18.3%	9.2%	4.6%	6.1%	6.9%	6.1%	6.9%	6.9%	9.9%	8.4%	8.4%	69.3%
Month	73.3%	92.3%	63.2%	75.0%	57.1%	56.3%	72.7%	60.0%	60.0%	72.2%	64.7%	73.3%	
Total	**15**	**26**	**19**	**8**	**14**	**16**	**11**	**15**	**15**	**18**	**17**	**15**	**189**
Annual	**7.9%**	**13.8%**	**10.1%**	**4.2%**	**7.4%**	**8.5%**	**5.8%**	**7.9%**	**7.9%**	**9.5%**	**9.0%**	**7.9%**	**100%**

Table 27: Food and Waterborne Outbreak-related Cases by Month, Florida, 2003

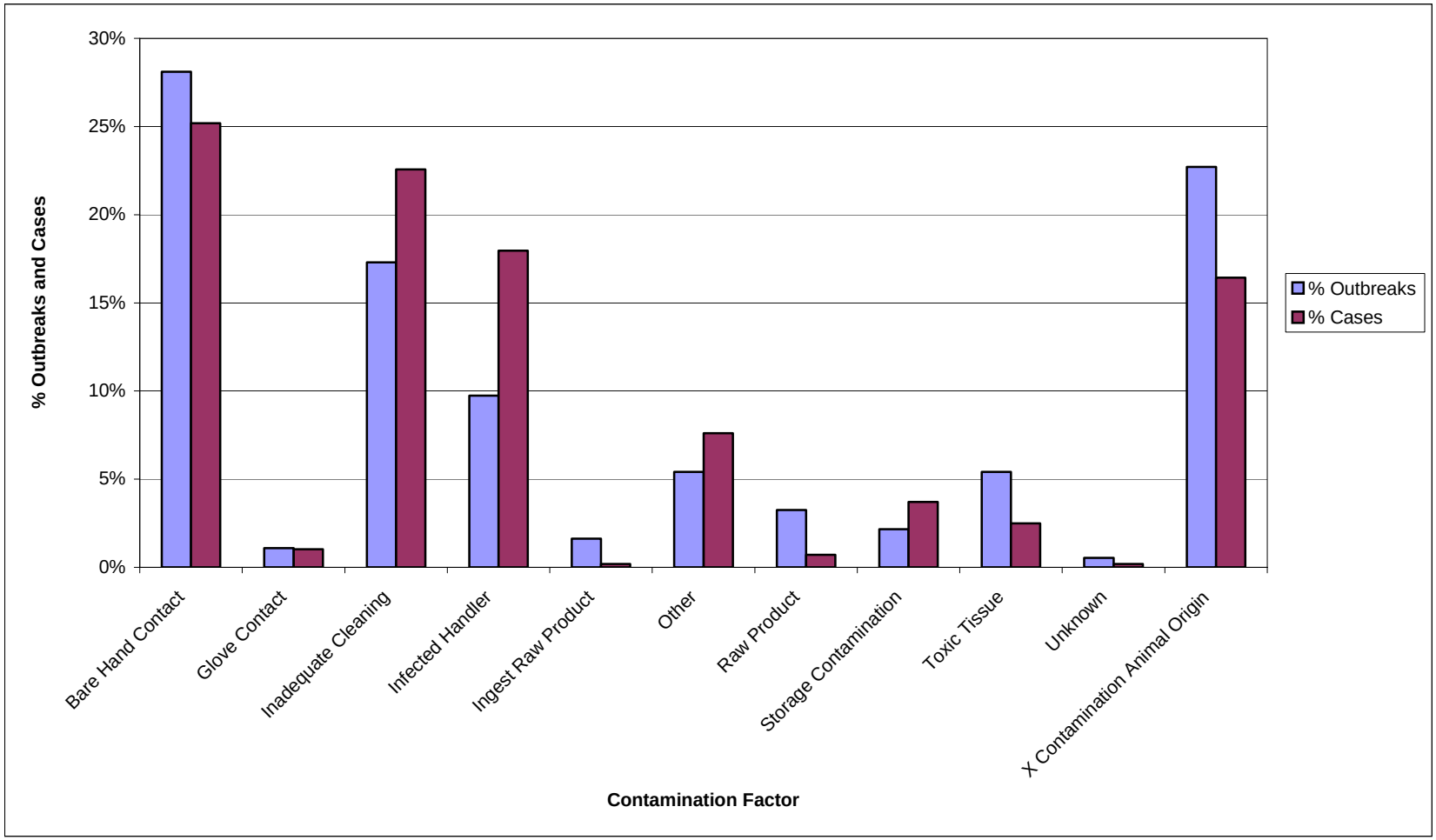
Status	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Confirmed	110	9	131	19	49	61	13	73	97	70	16	147	795
Annual	13.8%	1.1%	16.5%	2.4%	6.2%	7.7%	1.6%	9.2%	12.2%	8.8%	2.0%	18.5%	48.1%
Month	56.4%	7.8%	59.0%	55.9%	62.0%	72.6%	41.9%	60.8%	70.3%	36.6%	34.8%	36.9%	
Suspected	85	107	91	15	30	23	18	47	41	121	30	251	859
Annual	9.9%	12.5%	10.6%	1.7%	3.5%	2.7%	2.1%	5.5%	4.8%	14.1%	3.5%	29.2%	51.9%
Month	43.6%	92.2%	41.0%	44.1%	38.0%	27.4%	58.1%	39.2%	29.7%	63.4%	65.2%	63.1%	
Total	**195**	**116**	**222**	**34**	**79**	**84**	**31**	**120**	**138**	**191**	**46**	**398**	**1654**
Annual	**11.8%**	**7.0%**	**13.4%**	**2.1%**	**4.8%**	**5.1%**	**1.9%**	**7.3%**	**8.3%**	**11.5%**	**2.8%**	**24.1%**	**100%**

Table 28: Food and Waterborne Outbreaks With Greater Than 10 Cases (n=30), Florida, 2003[27]

Status	County	# Cases	Site	Agency	Vehicle	Pathogen Status	Pathogen
Confirmed	Broward	12	Grocery	DACS	Cake	Suspected	B. cereus
Suspected	Dade	12	School	DOH	Beef, Vegetables, Fruit	Unknown	Unknown
Confirmed	Suwannee	14	Home	OTHER	Beef ribs	Confirmed	Salmonella
Suspected	Dade	14	Restaurant	DBPR	Chicken,Salad,Rice,Vegetable	Unknown	Unknown
Confirmed	Martin	16	Nursing Home	DOH	Multiple Items	Confirmed	*Norovirus*
Confirmed	Volusia	16	School	DOH	Mixed Fruits Platter	Confirmed	*Norovirus*
Confirmed	Hillsborough	17	Restaurant	DBPR	Bbq Chicken	Suspected	C. perfringens
Confirmed	Palm Beach	17	Restaurant	DBPR	Multiple Items	Unknown	Unknown
Confirmed	Dade	18	Restaurant	DBPR	Pork Sandwiches	Confirmed	Salmonella
Confirmed	Sarasota	19	Caterer	DACS	Veggie Sandwich W/Goatcheese	Suspected	*Norovirus*
Confirmed	Polk	22	Other	OTHER	Swimming In Lake	Suspected	*Norovirus*
Confirmed	Seminole	22	Other	OTHER	Unknown	Suspected	*Norovirus*
Confirmed	Dade	23	Caterer	DBPR	Marlin Fish	Confirmed	Scombroid
Confirmed	Duval	23	Restaurant	DBPR	Multiple Ready To Eat Foods	Confirmed	*Norovirus*
Suspected	Broward	25	Restaurant	DBPR	Rice	Suspected	*Norovirus*
Confirmed	Highlands	26	Restaurant	DBPR	Ice Cream Cake Deviled Eggs	Suspected	*Norovirus*
Confirmed	Hillsborough	29	Restaurant	DBPR	Ranch Dressing	Suspected	Salmonella
Confirmed	Hillsborough	30	Restaurant	DBPR	Bbq Foods	Confirmed	Salmonella
Confirmed	St. Johns	35	Restaurant	DBPR	Salad	Confirmed	*Norovirus*
Confirmed	Sarasota	38	Restaurant	DBPR	Prime Rib,Beets,Vegpasta,Egg	Unknown	Unknown
Confirmed	Polk	42	Prison	DOH	Baked Potatoes	Confirmed	B. cereus
Suspected	Broward	50	Other	DOH	Unknown	Suspected	*Norovirus*
Confirmed	St. Lucie	52	School	DOH	Chef Salad	Confirmed	*Norovirus*
Suspected	Broward	55	School	DOH	Unknown	Suspected	Other
Confirmed	Orange	56	Public Water	OTHER	Water In 5 Gal Containers	Suspected	*Norovirus*
Confirmed	Pinellas	58	Restaurant	DBPR	Egg Salad	Confirmed	Salmonella
Suspected	Broward	59	Other	DOH	Unknown	Suspected	*Norovirus*
Suspected	Columbia	85	Prison	DOH	Spanish Rice	Suspected	*Norovirus*
Confirmed	Pinellas	115	Caterer	DBPR	Seafood Newburg	Confirmed	V. parahaemolyticus
Suspected	Union	160	Prison	DOH	Unknown – multiple food items	Suspected	*Norovirus*
	Total cases	1160					

[27] The total number of outbreaks with more than ten cases is: 30 (16% of the total). The total number of cases associated with these outbreaks is 1160 (70% of the total).

Figure 19: Contamination Factor – Percent Total Foodborne Outbreaks (n=185) and Outbreak-related Cases (n=1564), Florida, 2003 [28]



[28] Each outbreak may have up to three contamination factors.

Table 29: Contamination Factor - Number of Foodborne Outbreaks (n=185) and Outbreak-related Cases (n=1564), Florida, 2003[29]

Contamination Factor	# Outbreaks	# Cases
Bare Hand Contact	52	394
Glove Contact	2	16
Inadequate Cleaning	32	353
Infected Handler	18	281
Ingest Raw Product	3	3
Other	10	119
Raw Product	6	11
Storage Contamination	4	58
Toxic Tissue	10	39
Unknown	1	3
X Contamination Animal Origin	42	257

Table 30: Contamination Factor: Percent of Total Foodborne Outbreaks (n=185) and Outbreak-related Cases (n=1564), Florida, 2003

Contamination Factor	% Outbreaks	% Cases
Bare Hand Contact	28.1%	25.2%
Glove Contact	1.1%	1.0%
Inadequate Cleaning	17.3%	22.6%
Infected Handler	9.7%	18.0%
Ingest Raw Product	1.6%	0.2%
Other	5.4%	7.6%
Raw Product	3.2%	0.7%
Storage Contamination	2.2%	3.7%
Toxic Tissue	5.4%	2.5%
Unknown	0.5%	0.2%
X Contamination Animal Origin	22.7%	16.4%

[29] Each outbreak may have up to three contamination factors.

Figure 20: Proliferation/Amplification Factor: Percent Total Foodborne Outbreaks (n=185) and Outbreak-related Cases (n=1564), Florida, 2003[30]

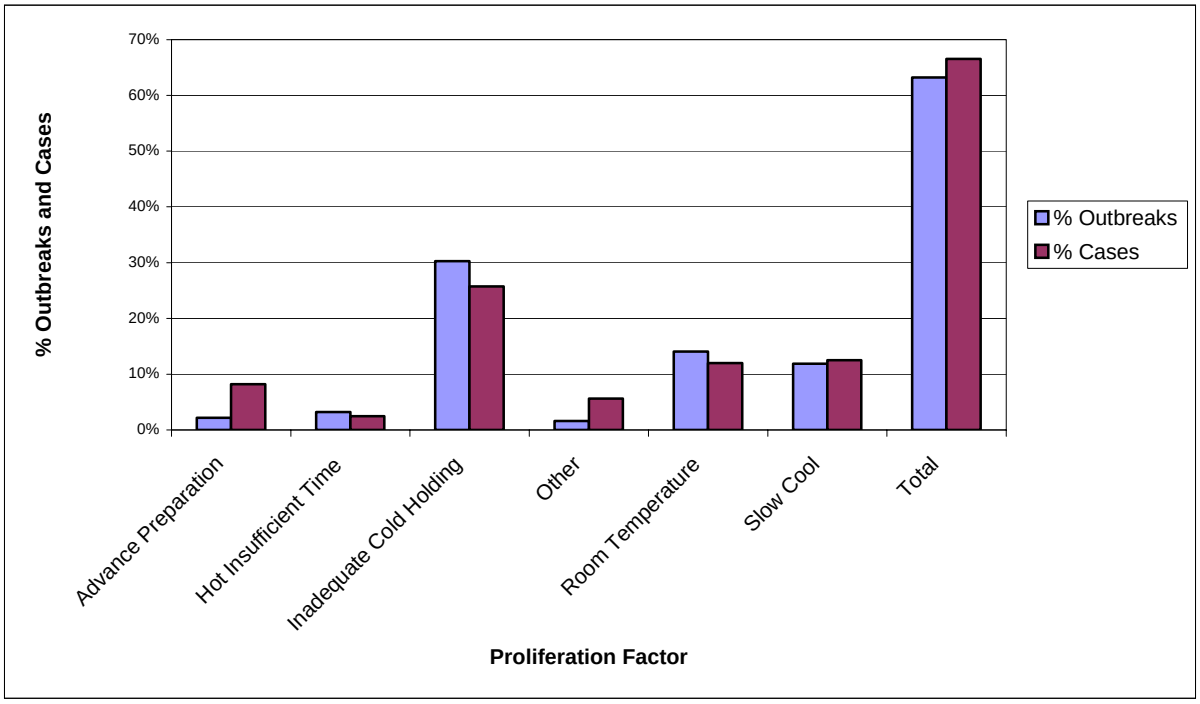


Table 31: Proliferation/Amplification Factor:
Number of Foodborne Outbreaks (n=185) and Outbreak-related Cases (n=1564), Florida, 2003

Proliferation Factor	# Outbreaks	# Cases
Advance Preparation	4	128
Hot Insufficient Time	6	39
Inadequate Cold Holding	56	402
Other	3	88
Room Temperature	26	188
Slow Cool	22	196

Table 32: Proliferation/Amplification Factor:
Percent Total Foodborne Outbreaks (n=185) and Outbreak-related Cases (n=1564), Florida, 2003

Proliferation Factor	% Outbreaks	% Cases
Advance Preparation	2.2%	8.2%
Hot Insufficient Time	3.2%	2.5%
Inadequate Cold Holding	30.3%	25.7%
Other	1.6%	5.6%
Room Temperature	14.1%	12.0%
Slow Cool	11.9%	12.5%

[30] Each outbreak may have up to three proliferation/amplification factors.

Figure 21: Survival Factor: Percent Total Foodborne Outbreaks (n=185) and Outbreak-related Cases (n=1564), Florida, 2003[31]

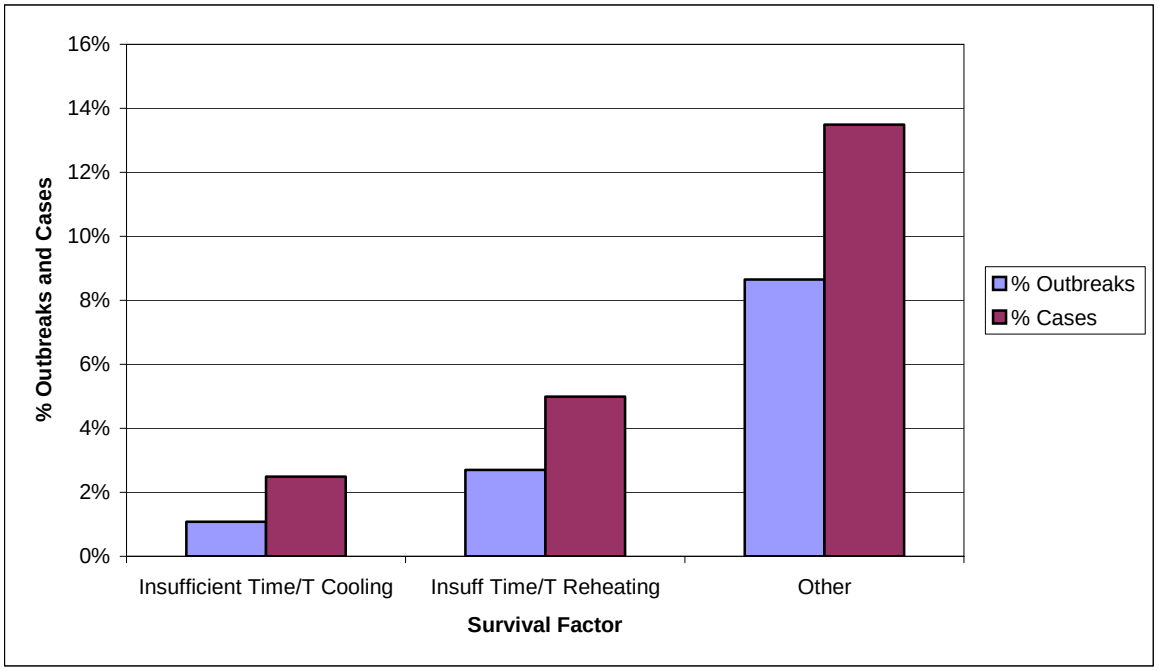


Table 33: Survival Factor:
Number of Foodborne Outbreaks (n=185) and Outbreak-related Cases (n=1564), Florida, 2003

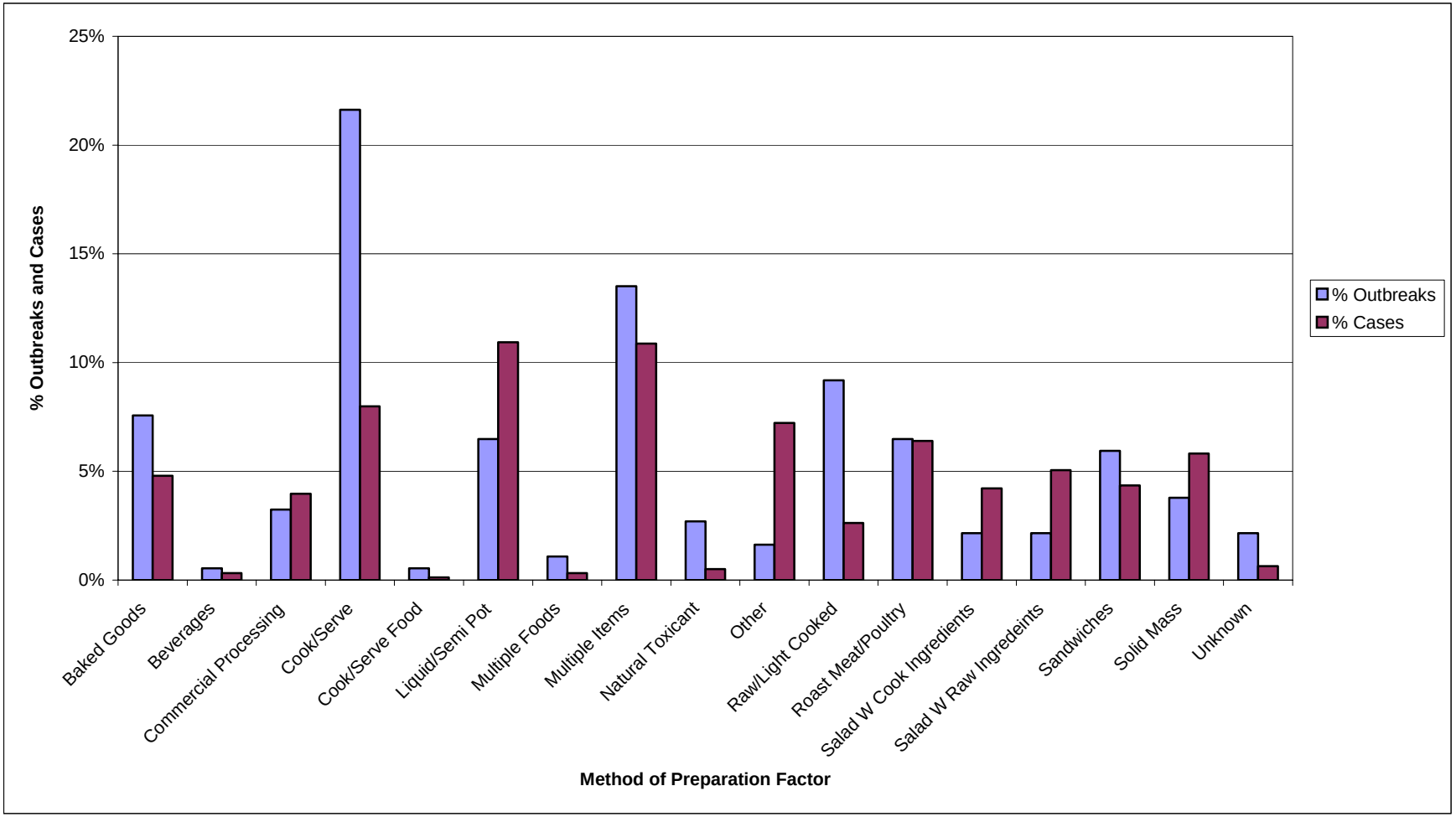
Survival Factor	# Outbreak	# Cases
Insufficient time/temperature cooling	2	39
Insufficient time/temperature reheating	5	78
Other	16	211

Table 34: Survival Factor:
Percent Total Foodborne Outbreaks (n=185) and Outbreak-related Cases (n=1564), Florida, 2003

Survival Factor	% Outbreaks	% Cases
Insufficient time/temperature cooling	1.1%	2.5%
Insufficient time/temperature reheating	2.7%	5.0%
Other	8.6%	13.5%

[31] Each outbreak may have up to three survival factors.

Figure 22: Method of Preparation Factor: Percent Foodborne Outbreaks (n=185) and Outbreak-related Cases (n=1564), Florida, 2002[32]



[32] Each outbreak may have up to three method of preparation factors.

Table 35: Method of Preparation Factor:
Number of Foodborne Outbreaks (n=185) and Outbreak-related Cases (n=1564), Florida, 2003

Method of Preparation Factor	# Outbreaks	# Cases
Baked Goods	14	75
Beverages	1	5
Commercial Processing	6	62
Cook/Serve	40	125
Cook/Serve Food	1	2
Liquid/Semi Pot	12	171
Multiple Foods	2	5
Multiple Items	25	170
Natural Toxicant	5	8
Other	3	113
Raw/Light Cooked	17	41
Roast Meat/Poultry	12	100
Salad W Cook Ingredients	4	66
Salad W Raw Ingredeints	4	79
Sandwiches	11	68
Solid Mass	7	91
Unknown	4	10

Table 36: Method of Preparation Factor:
Percent Total Foodborne Outbreaks (n=185) and Outbreak-related Cases (n=1564), Florida, 2003[33]

Method of Preparation Factor	% Outbreaks	% Cases
Baked Goods	7.6%	4.8%
Beverages	0.5%	0.3%
Commercial Processing	3.2%	4.0%
Cook/Serve	21.6%	8.0%
Cook/Serve Food	0.5%	0.1%
Liquid/Semi Pot	6.5%	10.9%
Multiple Foods	1.1%	0.3%
Multiple Items	13.5%	10.9%
Natural Toxicant	2.7%	0.5%
Other	1.6%	7.2%
Raw/Light Cooked	9.2%	2.6%
Roast Meat/Poultry	6.5%	6.4%
Salad W Cook Ingredients	2.2%	4.2%
Salad W Raw Ingredeints	2.2%	5.1%
Sandwiches	5.9%	4.3%
Solid Mass	3.8%	5.8%
Unknown	2.2%	0.6%

[33] Each outbreak may have up to three method of preparation factors.

Table 37: Contamination Factors by Etiologic Agent for Foodborne Outbreaks Reported in Florida (n=185), 2003

Pathogen	Bare Hand Contact	Glove Contact	Inadequate Cleaning	Infected Handler	Ingest Raw Product	Other	Raw Product	Storage Contamination	Toxic Tissue	Unknown	X Contamination Animal Origin	Total
B. cereus	3	0	4	0	0	0	0	1	0	0	7	15
C. perfringens	1	0	2	0	0	0	0	0	0	0	1	4
Chemical	1	0	0	0	0	0	0	0	0	0	1	2
Ciguatera	0	0	0	0	0	0	0	0	4	0	0	4
Norovirus	8	2	6	14	0	3	2	0	0	0	0	35
Saxitoxin	0	0	0	0	0	0	0	0	1	0	0	1
Salmonella	6	0	2	1	0	0	1	0	0	0	7	17
Scombroid	0	0	0	0	0	0	0	0	5	0	0	5
Staphylococcus	8	0	3	3	0	0	0	0	0	0	2	16
Unknown	23	0	14	0	0	6	1	3	0	1	22	70
V. parahaemolyticus	2	0	1	0	0	0	0	0	0	0	2	5
V. vulnificus	0	0	0	0	3	1	2	0	0	0	0	6
Total	52	2	32	18	3	10	6	4	10	1	42	180

Table 38: Contamination Factors by Etiologic Agent for Cases in Foodborne Outbreaks Reported in Florida (n=1564), 2003

Pathogen	Bare Hand Contact	Glove Contact	Inadequate Cleaning	Infected Handler	Ingest Raw Product	Other	Raw Product	Storage Contamination	Toxic Tissue	Unknown	X Contamination Animal Origin	Total
B. cereus	7	0	50	0	0	0	0	42	0	0	67	166
C. perfringens	17	0	19	0	0	0	0	0	0	0	2	38
Chemical	1	0	0	0	0	0	0	0	0	0	1	2
Ciguatera	0	0	0	0	0	0	0	0	6	0	0	6
Norovirus	43	16	72	240	0	95	4	0	0	0	0	470
Saxitoxin	0	0	0	0	0	0	0	0	2	0	0	2
Salmonella	125	0	33	29	0	0	3	0	0	0	114	304
Scombroid	0	0	0	0	0	0	0	0	31	0	0	31
Staphylococcus	22	0	13	12	0	0	0	0	0	0	4	51
Unknown	61	0	51	0	0	23	2	16	0	3	63	219
V. parahaemolyticus	118	0	115	0	0	0	0	0	0	0	6	239
V. vulnificus	0	0	0	0	3	1	2	0	0	0	0	6
Total	394	16	353	281	3	119	11	58	39	3	257	1534

Table 39: Proliferation/Amplification Factors by Etiologic Agent for Foodborne Outbreaks Reported in Florida (n=185), 2003

Pathogen	Advance Preparation	Hot Insufficient Time	Inadequate Cold Holding	Other	Room Temperature	Slow Cool	Total
B. cereus	1	0	3	0	4	4	12
C. perfringens	0	0	2	0	2	1	5
Chemical	0	0	1	0	1	1	3
Norovirus	1	0	1	1	4	1	8
Salmonella	2	1	9	0	2	4	18
Scombroid	0	0	3	0	0	0	3
Staphylococcus	0	2	5	0	1	2	10
Unknown	0	3	29	1	10	8	51
V. parahaemolyticus	0	0	3	0	2	1	6
V. vulnificus	0	0	0	1	0	0	1
Total	4	6	56	3	26	22	117

Table 40: Proliferation/Amplification Factors by Etiologic Agent for Cases in Foodborne Outbreaks Reported in Florida (n=1564), 2003

Pathogen	Advance Preparation	Hot Insufficient Time	Inadequate Cold Holding	Other	Room Temperature	Slow Cool	Total
B. cereus	42	0	8	0	20	49	119
C. perfringens	0	0	19	0	21	17	57
Chemical	0	0	1	0	1	1	3
Norovirus	25	0	2	85	40	3	155
Salmonella	61	14	135	0	33	64	307
Scombroid	0	0	29	0	0	0	29
Staphylococcus	0	10	12	0	4	7	33
Unknown	0	15	75	2	63	52	207
V. parahaemolyticus	0	0	121	0	6	3	130
V. vulnificus	0	0	0	1	0	0	1
Total	128	39	402	88	188	196	1041

Table 41: Survival Factors by Etiologic Agent for Foodborne Outbreaks Reported in Florida (n=185), 2003

Pathogen	Insufficient Time/T Cooling	Insufficient Time/T Reheating	Other	Total
B. cereus	0	2	2	4
Chemical	0	0	1	1
Norovirus	0	0	2	2
Salmonella	0	1	1	2
Staphylococcus	0	1	1	2
Unknown	1	1	8	10
V. parahaemolyticus	0	0	1	1
V. vulnificus	1	0	0	1
Total	2	5	16	23

Table 42: Survival Factors by Etiologic Agent for Cases in Foodborne Outbreaks Reported in Florida (n=1564), 2003

Pathogen	Insufficient Time/T Cooling	Insufficient Time/T Reheating	Other	Total
B. cereus	0	6	5	11
Chemical	0	0	1	1
Norovirus	0	0	170	170
Salmonella	0	30	3	33
Staphylococcus	0	4	3	7
Unknown	38	38	21	97
V. parahaemolyticus	0	0	8	8
V. vulnificus	1	0	0	1
Total	39	78	211	328

Table 43: Method of Preparation Factors by Etiologic Agent for Foodborne Outbreaks Reported in Florida (n=185), 2003

Pathogen	Baked Goods	Beverages	Commercial Processing	Cook/ Serve	Liquid/ Semi Pot	Multiple Foods	Multiple Items	Natural Toxicant	Other	Raw/ Lightly Cooked	Cook	Roast Meat/ Poulry	Salad w Cooked Ingred.	Salad w Raw Ingred.	Sandwiches	Solid Mass	Unk	Total
B. cereus	1	0	0	3	0	0	1	0	0		0	0	0	1	0	2	0	8
C. perfringens	1	0	0	0	1	0	0	0	0		0	1	0	0	0	0	0	3
Chemical	0	0	0	0	1	0	0	0	0		0	0	0	0	0	0	0	1
Ciguatera	0	0	0	1	0	0	0	2	0		0	0	0	0	0	0	0	3
E.coli O157:H7	0	0	0	0	0	0	0	0	0		0	0	0	0	1	0	0	1
Norovirus	1	0	3	0	0	0	5	0	3		3	0	1	3	3	0	0	22
Saxitoxin	0	0	0	1	0	0	0	1	0		0	0	0	0	0	0	0	2
Salmonella	1	0	0	2	1	0	3	0	0		0	3	1	0	1	1	1	14
Scombroid	0	0	0	4	0	0	0	1	0		0	0	0	0	0	0	0	5
Staphylococcus	1	0	1	5	1	0	3	0	0		0	1	0	0	1	0	1	14
Unknown	9	1	2	25	7	2	13	0	0		4	7	2	0	5	4	2	83
V. parahaemolyticus	0	0	0	0	1	0	0	0	0		2	0	0	0	0	0	0	3
V. vulnificus	0	0	0	0	0	0	0	1	0		8	0	0	0	0	0	0	9
Total	14	1	6	41	12	2	25	5	3		17	12	4	4	11	7	4	168

Table 44: Method of Preparation Factors by Etiologic Agent for Cases in Foodborne Outbreaks Reported in Florida (n=1564), 2003

Pathogen	Baked Goods	Beverages	Commercial Processing	Cook/ Serve	Liquid/ Semi Pot	Multiple Foods	Multiple Items	Natural Toxicant	Other	Raw/ Lightly Cooked	Cook	Roast Meat/ Poulry	Salad w Cooked Ingred.	Salad w Raw Ingred.	Sandwiches	Solid Mass	Unk	Total
B. cereus	12	0	0	8	0	0	3	0	0		0	0	0	3	0	44	0	70
C. perfringens	2	0	0	0	4	0	0	0	0		0	17	0	0	0	0	0	23
Chemical	0	0	0	0	1	0	0	0	0		0	0	0	0	0	0	0	1
Ciguatera	0	0	0	1	0	0	0	3	0		0	0	0	0	0	0	0	4
E.coli O157:H7	0	0	0	0	0	0	0	0	0		0	0	0	0	2	0	0	2
Norovirus	26	0	54	0	0	0	32	0	113		13	0	4	76	27	0	0	345
Saxitoxin	0	0	0	2	0	0	0	2	0		0	0	0	0	0	0	0	4
Salmonella	4	0	0	6	29	0	36	0	0		0	19	58	0	18	3	2	175
Scombroid	0	0	0	31	0	0	0	2	0		0	0	0	0	0	0	0	33
Staphylococcus	2	0	3	12	2	0	11	0	0		0	4	0	0	3	0	3	40
Unknown	29	5	5	67	20	5	88	0	0		9	60	4	0	18	44	5	359
V. parahaemolyticus	0	0	0	0	115	0	0	0	0		11	0	0	0	0	0	0	126
V. vulnificus	0	0	0	0	0	0	0	1	0		8	0	0	0	0	0	0	9
Total	75	5	62	127	171	5	170	8	113		41	100	66	79	68	91	10	1191

Figure 23: Waterborne Disease Factors: Percent Total Waterborne Outbreaks (n=4) and Outbreak-related Cases (n=90), Florida, 2003[34]

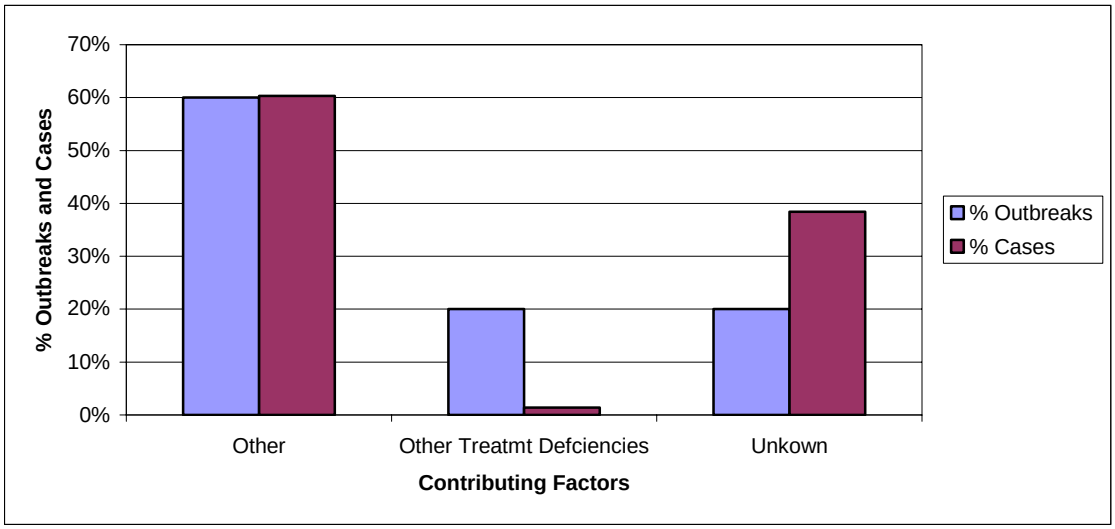


Table 45: Waterborne Disease Factors:
Number of Waterborne Outbreaks (n=4) and Outbreak-related Cases (n=90), Florida, 2003

Water	# Outbreaks	# Cases
Other	3	88
Other Treatment Defciencies	1	2
Unkown	1	56

Table 46: Waterborne Disease Factors:
Percent Total Waterborne Outbreaks (n=4) and Outbreak-related Cases (n=90) , Florida, 2003[35]

Water	% Outbreaks	% Cases
Other	60%	60%
Other Treatment Defciencies	20%	1%
Unkown	20%	38%

[34] Each outbreak may have up to three waterborne disease factors.
[35] Each outbreak may have up to three waterborne disease factors.

Table 47: Contributing Factors by Etiologic Agent for All Waterborne Outbreaks (n=4), Florida, 2003

Pathogen	Other	Other Treatment Deficiencies	Unnown	Total
Chemical	0	1	0	1
Norovirus	3	0	1	4
Total	3	1	1	5

Table 48: Contributing Factors by Etiologic Agent for Cases Associated With All Waterborne Outbreaks (n=90), Florida, 2003

Pathogen	Other	Other Treatment Deficiencies	Unnown	Total
Chemical	0	2	0	2
Norovirus	88	0	56	144
Total	88	2	56	146

Table 49: Line List of Waterborne Outbreaks, Florida, 2003

County	Status	# Cases	Site	Vehicle	Pathogen	Pathogen Status
Duval	Confirmed	2	Home	Bottled water	Chemical	Confirmed
Polk	Confirmed	10	Other	Lake exposure	*Norovirus*	Suspected
Polk	Confirmed	22	Picnic	Swimming in lake	*Norovirus*	Suspected
Orange	Confirmed	56	Public Water	Water in 5 gal containers	*Norovirus*	Suspected
	Total # Cases	**90**				

Explanation of Contributing Factors For Foodborne Illness Outbreaks From CDC Form 52.13

CDC 52.13 REV. 8/1999

The following codes are to be used to fill out Part 1 (question 9) and Part 2 (question 15).

Contamination Factors:[1]

C1 - Toxic substance part of tissue (e.g., ciguatera)
C2 - Poisonous substance intentionally added (e.g., cyanide or phenolphthalein added to cause illness)
C3 - Poisonous or physical substance accidentally/incidentally added (e.g., sanitizer or cleaning compound)
C4 - Addition of excessive quantities of ingredients that are toxic under these situations (e.g., niacin poisoning in bread)
C5 - Toxic container or pipelines (e.g., galvanized containers with acid food, copper pipe with carbonated beverages)
C6 - Raw product/ingredient contaminated by pathogens from animal or environment (e.g., *Salmonella enteriditis* in egg, Norwalk in
shellfish, *E. coli* in sprouts)
C7 - Ingestion of contaminated raw products (e.g., raw shellfish, produce, eggs)
C8 - Obtaining foods from polluted sources (e.g., shellfish)
C9 - Cross-contamination from raw ingredient of animal origin (e.g., raw poultry on the cutting board)
C10 - Bare-handed contact by handler/worker/preparer (e.g., with ready-to-eat food)
C11 - Glove-handed contact by handler/worker/preparer (e.g., with ready-to-eat food)
C12 - Handling by an infected person or carrier of pathogen (e.g., *Staphylococcu*s, *Salmonell*a, Norwalk agent)
C13 - Inadequate cleaning of processing/preparation equipment/utensils – leads to contamination of vehicle (e.g., cutting boards)
C14 - Storage in contaminated environment – leads to contamination of vehicle (e.g., store room, refrigerator)
C15 - Other source of contamination *(please describe in Comment*s)

Proliferation/Amplification Factors:[1]

P1 - Allowing foods to remain at room or warm outdoor temperature for several hours (e.g., during preparation or holding for service)
P2 - Slow cooling (e.g., deep containers or large roasts)
P3 - Inadequate cold-holding temperatures (e.g., refrigerator inadequate/not working, iced holding inadequate)
P4 - Preparing foods a half day or more before serving (e.g., banquet preparation a day in advance)
P5 - Prolonged cold storage for several weeks (e.g., permits slow growth of psychrophilic pathogens)
P6 - Insufficient time and/or temperature during hot holding (e.g., malfunctioning equipment, too large a mass of food)
P7 - Insufficient acidification (e.g., home canned foods)
P8 - Insufficiently low water activity (e.g., smoked/salted fish)
P9 - Inadequate thawing of frozen products (e.g., room thawing)
P10 - Anaerobic packaging/Modified atmosphere (e.g., vacuum packed fish, salad in gas flushed bag)
P11 - Inadequate fermentation (e.g., processed meat, cheese)
P12 - Other situations that promote or allow microbial growth or toxic production *(please describe in Comment*s)

Survival Factors:[1]

S1 - Insufficient time and/or temperature during cooking/heat processing (e.g., roasted meats/poultry, canned foods, pasteurization)
S2 - Insufficient time and/or temperature during reheating (e.g., sauces, roasts)
S3 - Inadequate acidification (e.g., mayonnaise, tomatoes canned)
S4 - Insufficient thawing, followed by insufficient cooking (e.g., frozen turkey)
S5 - Other process failures that permit the agent to survive *(please describe in Comment*s)

Method of Preparation:[2]

M1 - Foods eaten raw or lightly cooked (e.g., hard shell clams, sunny side up eggs)
M2 - Solid masses of potentially hazardous foods (e.g., casseroles, lasagna, stuffing)
M3 - Multiple foods (e.g., smorgasbord, buffet)
M4 - Cook/serve foods (e.g., steak, fish fillet)
M5 - Natural toxicant (e.g., poisonous mushrooms, paralytic shellfish poisoning)
M6 - Roasted meat/poultry (e.g., roast beef, roast turkey)
M7 - Salads prepared with one or more cooked ingredients (e.g., macaroni, potato, tuna)
M8 - Liquid or semi-solid mixtures of potentially hazardous foods (e.g., gravy, chili, sauce)
M9 - Chemical contamination (e.g., heavy metal, pesticide)
M10 - Baked goods (e.g., pies, eclairs)
M11 - Commercially processed foods (e.g., canned fruits and vegetables, ice cream)
M12 - Sandwiches (e.g., hot dog, hamburger, Monte Cristo)
M13 - Beverages (e.g., carbonated and non-carbonated, milk)
M14 - Salads with raw ingredients (e.g., green salad, fruit salad)
M15 - Other, does not fit into above categories *(please describe in Comments)*
M16 - Unknown, vehicle was not identified

[1] Frank L. Bryan, John J. Guzewich, and Ewen C. D. Todd. Surveillance of Foodborne Disease III. Summary and Presentation of Data on Vehicles and Contributory Factors; Their Value and Limitations. Journal of Food Protection, 60; 6:701-714, 1997.
[2] Weingold, S. E., Guzewich JJ, and Fudala JK. Use of foodborne disease data for HACCP risk assessment. Journal of Food Protection, 57; 9:820-830, 1994.

Factors Contributing to Water Contamination[36]

At Source:

- Overflow of sewage
- Flooding, heavy rains
- Underground seepage of sewage
- Use of a back-up source of water by a water utility
- Improper construction or location of well or spring
- Contamination through creviced limestone or fissured rock

At Treatment Plant

- No disinfection
- Temporary interruption of disinfection
- Chronically inadequate disinfection
- No filtration
- Inadequate filtration
- Deficiencies in other treatment processes

In Distribution System

- Cross connection
- Back siphonage
- Contamination of mains during construction or repair
- Contamination of storage facility

Other

[36] Waterborne Diseases Outbreak Report, CDC 52.12 (rev. 12/96).