Food and Waterborne Illness Surveillance and Investigation
Annual Report, Florida, 2002

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

Table of Contents

List of Tables Page

List of Tables Page

List of Figures Page

List of Figures Page

Overview

The 2002 year continued to be active for food and waterborne outbreak reporting and investigation. A total of 2,866 foodborne illness complaints were reported to Florida counties in 2002. A total of 243 outbreaks with 1,469 cases were reported, compared to 303 outbreaks and 2,052 cases for 2001, and 288 outbreaks and 1,757 cases for 2000. Investigators were able to laboratory confirm 46 of the outbreaks (including 5 *Vibrio vulnificus*) associated with 548 cases. Norovirus, Staphylococcus, and Salmonella were implicated in the largest percentage of the total reported outbreaks (11%, 11%, and 5%, respectively). Norovirus was identified in the largest percentage of cases in total reported outbreaks (26%) followed by Salmonella (20%). Restaurants were the source site in 78% of the outbreaks reported and in 51% of the cases. Multiple items (22%) and multiple ingredients (22%) accounted for a total of 44% of all outbreaks, followed by poultry (11%), shellfish (9% - this includes all single *Vibrio vulnificus* cases), and fish (7%). Multiple ingredients (17%) and multiple items (29%) accounted for 46% of all outbreak-associated cases, followed by vegetables (14%), poultry (7%), and fish (5%). The month with the largest percentage of outbreaks reported was April (13%) with the largest percentage of cases reported in March (12%). Large (greater than 10 cases) outbreaks accounted for 8% (20) of the total reported outbreaks and 47% (687) 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=237), Florida 2002

Contributing Factor[1]	# Outbreaks	# Cases
Contamination Factor		
Bare hand contact	59	297
Cross contamination with food of animal origin	40	197
Proliferation/amplification factor		
Inadequate cold holding	57	218
Food at room T°	29	155
Survival factor		
Insufficient time/T° during reheating	8	33
Insufficient time/T° during cooling	8	26
Method of preparation factor		
Cook/serve foods	62	288
Multiple items	22	210

[1] Each outbreak can have at least three of each of the four types of factor. See Tables 30-49 and last two pages of Appendix for more detailed information.

Table 2: Summary of Food and Waterborne Illness Outbreaks Reported to Florida DOH, 1989 – 2002[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**

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

Table 3: Suspected, Confirmed, and Total Fooda and Waterborne Disease Outbreaks Reported to Florida DOH, 1994 - 2002

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

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

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

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

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

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

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

2001	# Outbreaks	# Cases
Suspected	235	995
Confirmed	68	1057
Total	**303**	**2052**

2002	# Outbreaks	# Cases
Suspected	196	828
Confirmed	47	641

Total	**243**	**1469**

Figure 1: Number of Suspected and Confirmed Outbreaks by Year, Florida, 1994 - 2002

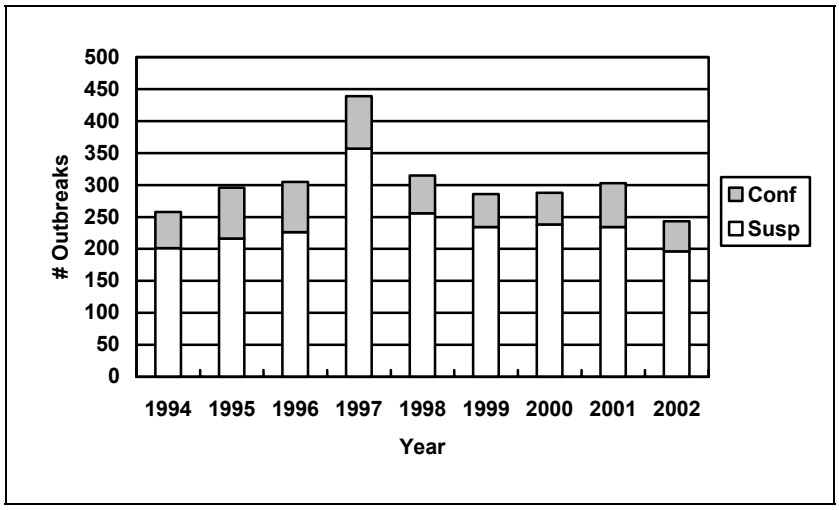
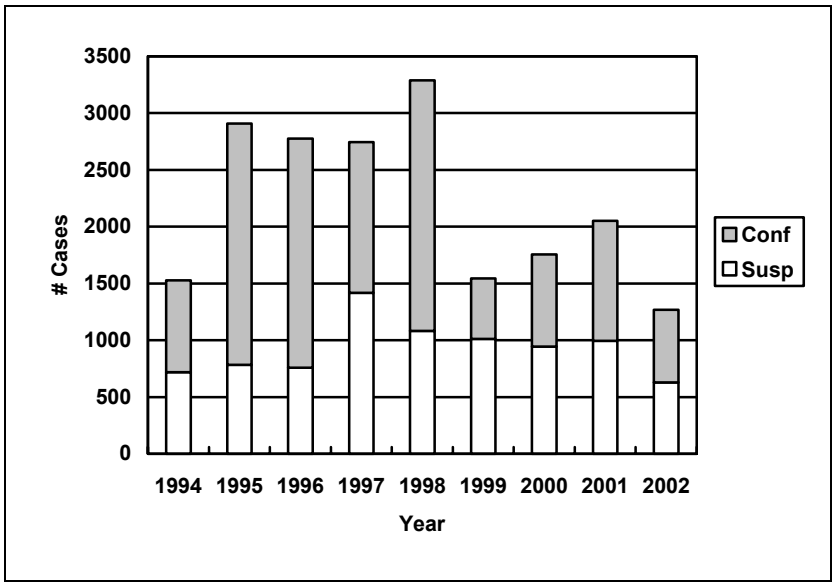


Figure 2: Number of Cases for Suspected and Confirmed Outbreaks by Year, Florida, 1994 - 2002



Training and Continuing Education

In 2002, 35 training sessions were held around the state specifically targeting Department of Health staff and 37 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 foodborne hepatitis A awareness and prevention, *Vibrio vulnificus* for restaurant inspectors, and recreational waterborne diseases. In addition, several table top exercises of simulated foodborne outbreaks exercises with a focus on an E. coli O157:H7 outbreak were held around the state.

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 a local chapter of the Florida Dietetic Association. 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.

Bioterrorism Training 2002

Of the 35 training sessions presented to Department of Health staff, one covered bioterrorism response issues. Three other bioterrorism presentations were given to outside audiences, including the ESF8 in the Orlando area, the Florida Environmental Health Associartion and to the Florida School Food Service Association.

Interactive and On-line Training 2002

Food and Waterborne Disease Program Staff facilitated the DOH-sponsored satellite training on the Safety of the Water Supply. There are plans underway to provide more online training approved for CEUs of several professions.

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

Outbreak Definitions

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

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

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

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

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

Selected Foodborne Outbreaks

Multi-County Foodborne Norovirus Outbreak at a Restaurant, Pinellas and Broward Counties, March 2002

On March 4, 2002, the Broward County Health Department was contacted by two county hospitals that 11 of 13 persons from two Broward County hospitals had become ill after visiting the Clearwater/Largo area on March 3 to attend several medical seminars. This group had dined together at a well-known Italian restaurant in Largo. Early information collected indicated that the Broward cluster became ill approximately 15-42 hours after eating with gastrointestinal symptoms. Chicken wings with blue cheese dressing was a common food consumed among this group. A follow-up telephone call to the Pinellas County Health Department Environmental Health Section identified that the health department had recently been contacted by three other unrelated groups of persons who had eaten at the same restaurant two days before the Broward cluster (4 persons, 2 persons and 1 person). Early information collected by the health department failed to identify a specific common food item among these clusters. However it was identified that chicken wings had not been consumed. The reported onset times with the Clearwater cluster of cases ranged from 12 to 24 hours.

An investigation of this outbreak was performed by the Pinellas County Health Department and the Bureau of Community Environmental Health. A list of the people from the Broward County hospitals who attended the seminars was obtained. A standard medical and food history questionnaire was administered via telephone to both the Broward and Clearwater illness clusters.

Resulting data was analyzed using Epi Info statistical analysis software. A case was defined as any person who exhibited at least diarrhea (defined as 3 or more loose stools in a 24 hour period) or vomiting and/or abdominal pains and had dined at the Italian restaurant during the period March 1-4, 2002. A control was defined as a person who dined at the same restaurant during this period and did not become ill. There was no leftover food available for laboratory analysis. In addition, clinical specimens were not available from any of the ill persons. A field investigation by the Pinellas County Health Department in conjunction with an inspection by the Department of Business and Professional Regulation (DBPR) was performed on March 5, 2002.

All of the ill people (with four controls for each person ill) from both counties were interviewed using the standard questionnaire. A total of 18 became ill following dining at the suspect restaurant from March 1-4, 2002. The mean onset of symptoms among the Clearwater cluster was 24 hours with a range of 12 - 48 hours and the mean onset among the Broward cluster was 36 hours with a range of 14 – 41 hours. Predominant symptomatology reported among both clusters was very similar. Symptoms included diarrhea (100%), vomiting (90%), and abdominal pains (44%). Duration of illness was also very similar among the two illness clusters. Duration of illness ranged from 24 to 72 hours with a mean of 48 hours. Results of the case–control study performed did not implicate any specific food items that were served at the Italian restaurant during March 1 – 4, 2002. In addition, no common food was identified among the four unrelated groups of diners. The environmental investigation performed at the restaurant included a review of preparation steps of the identified foods consumed and a kitchen facility inspection by DBPR. All food temperatures and refrigeration units were satisfactory. The only problem noted was that some of the food service equipment was dirty.

This outbreak of foodborne gastrointestinal illness appears to be a single outbreak among several illness clusters from the Clearwater area and from Broward County. The ill persons had no other significant epidemiological associations identified and the onset of symptoms were chronologically clustered indicating a common source exposure over a four day period. The incubation period, symptomatology and duration of the illness suggest an etiology of a Norovirus. No common foods could be identified among the different illness clusters except for the chicken wing appetizer among the Broward cluster. The field investigation at the identified restaurant did not identify any ill food service workers or cross-contamination; however both of these factors could help to explain why no specific common food(s) were identified.

Foodborne Hepatitis A Outbreak Linked to a Potluck Dinner, Polk County, March 2002

During the week of March 11, 2002 the Polk County Health Department became aware of a cluster of hepatitis A cases that appeared to be linked to activities associated with a church revival during the week of February 4, 2002. Activities included numerous meals throughout the week that were provided at various homes, foodservice facilities and a potluck fish fry on February 8. Onset dates of the illnesses were reported to be between March 2 and March 20, 2002. At this time, Polk County was experiencing a community-wide outbreak of hepatitis A. The county had an incidence rate of 35.8 cases of hepatitis A per 100,000 for the year 2001 compared to 5.19 statewide. During the first two months of 2002 the county reported 41% of the total cases of hepatitis A for the state. The majority of the cases were either close personal contacts of previous cases, IV drug users or people who had been incarcerated or temporarily held at the county jail. The jail was not a significant source of cases in Polk but rather a site that recognized cases during routine health screenings of new detainees from the community who were arrested on drug-related charges.

Fourteen of 71 persons who completed a standardized questionnaire became ill with hepatitis A between March 2 and 20, 2002. A case was defined as any person who had hepatitis A symptoms with either jaundice or who was IgM positive for hepatitis A and attended events associated with the church revival from February 3 through February 8, 2002. Thirteen (13) people matched the case definition for this outbreak investigation and had onsets of illness between May 2 through 12, 2002. The one case who did not meet the case definition had an onset of illness on March 20 and most likely is a secondary case or else acquired the virus from some other source. The signs and symptoms reported include jaundice (11), dark urine (10),

fatigue (10), fever (9), appetite loss (8), clay colored stools (8), abdominal pain (7), and diarrhea (3). One case had a liver transplant in March as a result of the disease and passed away during July 2002. Females accounted for 7 (54%) cases. The age of the cases ranged from 37 - 58 years with a median of 54 years. Illness duration data was not available.

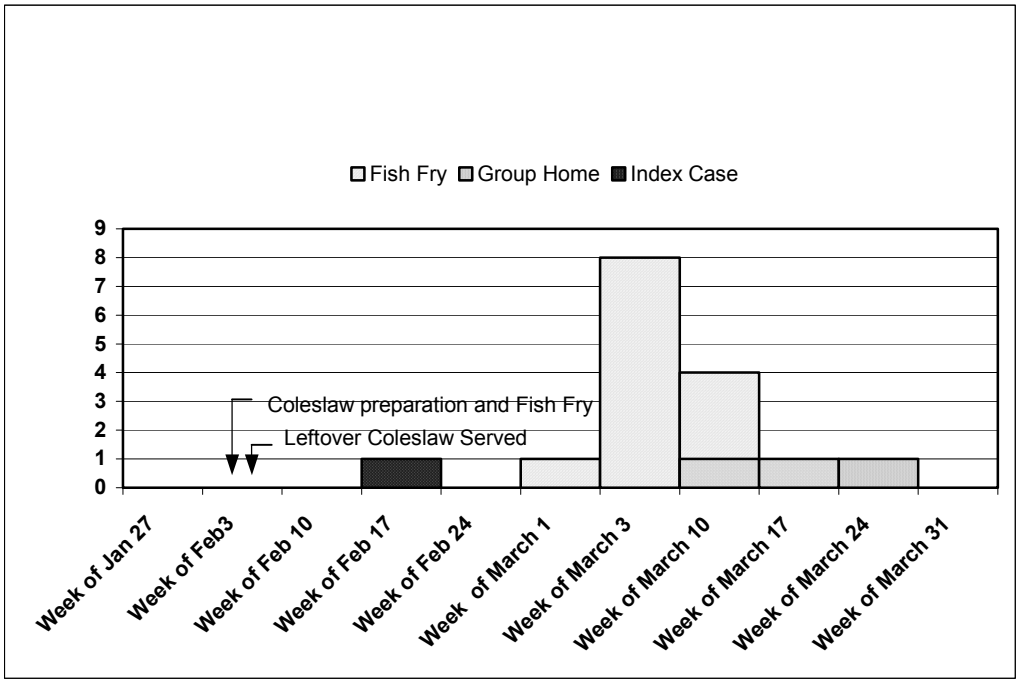
Attendance at a potluck fish fry held at a church member's house on February 8 had the highest statistical significant risk for illness. All but one case reported being at this function. The coleslaw that was served at this fish fry was a statistically significant predictor of having hepatitis A in this cohort ($p = 0.000000783$ Fisher exact 2-tailed). The risk ratio and confidence intervals could not be calculated due to a zero value in a cell of the 2X2 table. The calculated incubation period of these 13 cases of hepatitis A based on this meal as the significant exposure ranged from 22 – 47 days with a median of 29 days.

The coleslaw had been prepared at a group home facility by a church member who also attended the fish fry. The coleslaw was prepared on February 8 from raw ingredients in the group home kitchen. It was transported to and served at the fish fry that evening at the host's home. Contributing factors derived from discussion with the food preparer included the use of bare hands in food preparation and inconsistent hand washing practices. The food preparer denied direct participation of a likely index case in the food preparation process. The food preparer was IgM negative but IgG positive. Leftover coleslaw was re-served for dinner on February 9 to 10 residents of the group home.

Immune globulin was given to the non-ill group-home residents on March 20, 2002. Blood samples were collected and vaccine was given to group-home residents on March 25, 2002. A total of 7 of the 10 group home residents (70%) who had consumed the leftover coleslaw were IgM positive for hepatitis A. Two of these 7 described hepatitis A symptoms and had elevated liver function tests. One other case also reported hepatitis A symptoms. Symptoms described by these three cases were jaundice (66%), nausea (66%), vomiting (66%), malaise (66%), loss of appetite/anorexia (33%), dark urine (33%), fever (33%), abdominal pain (33%), and chills (33%). The incubation period was 36-44 days and duration of illness was not reported. Two persons who were positive for IgM and who had consumed the coleslaw had elevated liver function tests but reported no symptoms. Two other IgM positive people that consumed coleslaw reported no symptoms and their liver function tests were not elevated. Note that due to the timing of the collection of the blood samples following the administration of immune globulin it is not possible to determine if the presence of IgM+ is due to exposure to coleslaw, household cases or the immune globulin. Four other family members or frequent visitors (including the index case) of the group home were also IgM positive but had not consumed the coleslaw.

Figure 3 depicts the reported onset dates of illness of cases associated with the February 8 fish fry and the group home along with an index case. The onset date of the index case was determined through the course of multiple interviews and the use of school absentee records. The index case is a family member of the owner and resided in the group home during the time before and after the coleslaw was prepared.

Figure 3: Hepatitis A by Week of Symptom Onset, Fish Fry and Group Home Clusters, Polk County, Florida, 2002



Outbreak of Suspected Clostridium Perfringens Associated with a Barbecue Restaurant, Sarasota County, Florida, March 2002

On March 22, 2002 the Sarasota County Health Department was notified by a physician's office that 14 - 20 members of their staff had experienced illness after attending a luncheon on March 12, 2002 in their office. The symptoms reported were diarrhea and abdominal cramps. The food served at the luncheon had been prepared and delivered by a nearby barbecue restaurant.

A joint environmental inspection/investigation of the restaurant was conducted March 25, 2002 by inspectors from the Department of Business and Professional Regulation and the Department of Health. A sales invoice of the food was obtained and included chopped pork, chicken, baked beans, potato salad, garlic bread, and barbecue sauce. Beverages and ice served at the luncheon were purchased at a grocery store. On March 26, 2002 a site inspection of the physician's office was performed and initial interviews were obtained from staff members. They reported eating another common meal 24 hours before the staff meal on March 12. This meal had also been prepared and delivered by a different local restaurant. The menu items on March 11, 2002 included: lasagna, fettuccine, salad, and breadsticks. A questionnaire was developed and administered in person to all office staff and other attendees, except for four individuals. Of these four, one was administered via phone and the remaining three were self-completed. The majority of attendees were staff members, with the exception of a pharmaceutical representative and a staff member's spouse.

Data were analyzed using Epi Info 2000, version 1.1.2. A case definition was defined as any person who attended and ate at the staff luncheon on March 11 and/or March 12, 2002 and who developed subsequent diarrhea and abdominal cramping. Clinical specimens were not

obtained due to the length of time between symptomatology and reporting of the outbreak to the health department. No food samples were available for laboratory analysis.

Seventeen (17) people attended the March 11 and/or March 12 luncheons. Upon analysis of the data, there were no suggestive findings to implicate the foods consumed on March 11, 2002. The following results pertain to the luncheon of March 12, 2002. Ten people (55.6%) met the case definition. The incubation periods ranged from 2 - 16.5 hours with a median of 10.5 hours. Duration of illness ranged from 30 minutes to 36 hours with a median of 18.5 hours. Frequency of symptoms included diarrhea (100%), abdominal cramps (100%), nausea (40.0%), headache (22.2%), chills (11.1%), and dizziness (10.0%). No attendees reported fever or vomiting. The age of those ill ranged from 21-59 with a median of 41.5. Males accounted for 70% of the illnesses. None of the ill persons sought medical care or were hospitalized.

Figure 4 depicts illness dates of onset, indicating a common point source exposure. Table 1 shows the relative risks and attack rates for specific foods served at the March 12 luncheon. Results of the analysis performed indicated the pork to be statistically significant (risk ratio = 4.91, p-value = 0.02).

Figure 4: Number of Gastrointestinal Illness Cases by Date of Onset, March 12, 2002 (n = 10)

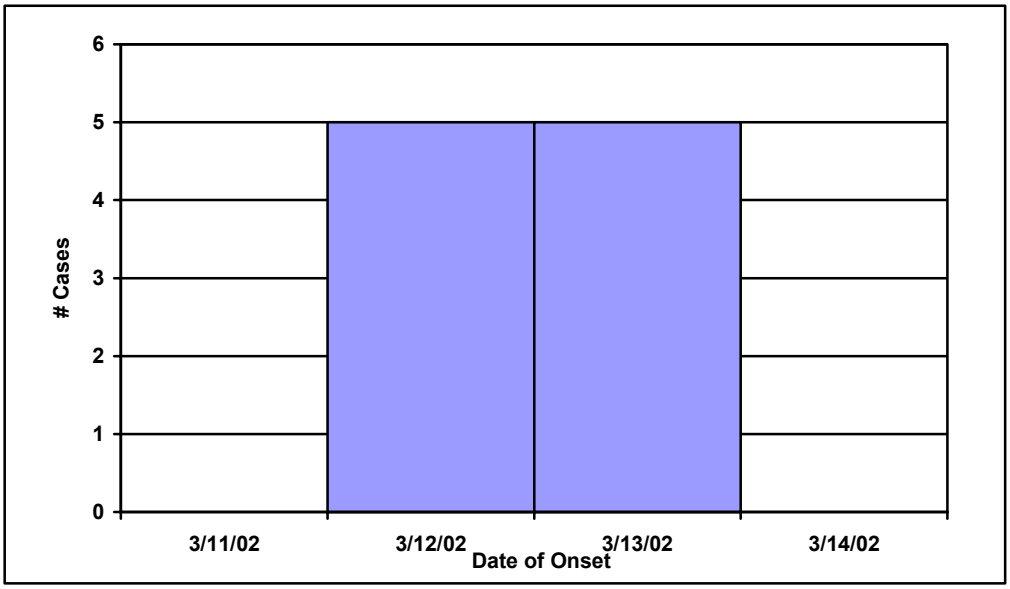


Table 4: Food-Specific Attack Rates and Risk Factors for the March 12, 2002 Luncheon

Food Lunch 3/12	# persons who ate specified food				# persons who did not eat specified food				Relative Risk	95% CI	p-value
	Ill	Well	Total	% Ill	Ill	Well	Total	% Ill			
Attend 3/12	10	7	17	58.8	0	1	1	0.00	0	Undefined	0.44
Baked Beans	8	5	13	61.5	2	2	4	50.0	1.23	0.42-3.59	0.56
Barbecue Sauce	7	3	10	70.0	3	4	7	42.9	1.63	0.63-4.21	0.27
Chicken	5	3	8	62.5	5	4	9	55.6	1.13	0.51-2.49	0.58
Coffee	1	1	2	50.0	7	6	13	53.8	0.93	0.21-4.06	0.73
Garlic Bread	8	3	11	72.7	2	4	6	33.3	2.18	0.67-7.16	0.14
Ice	2	2	4	50.0	6	5	11	54.5	0.92	0.30-2.81	0.66
Pork	**9**	**2**	**11**	**81.8**	**1**	**5**	**6**	**16.7**	**4.91**	**0.80-30.0**	**0.02**
Potato Salad	5	3	8	62.5	5	4	9	55.6	1.12	0.51-2.49	0.58
Soda	4	3	7	57.1	5	4	9	55.6	1.03	0.43-2.45	0.67
Water	2	1	3	66.7	6	6	12	50.0	1.33	0.50-3.55	0.55

*Bolded food item indicates statistically significant

On March 25, 2002, the environmental inspection of the implicated facility revealed the following violations:

- Refrigerated potentially hazardous food not covered,
- Several refrigerated food items from previous day not marked with date of preparation,
- Hot holding meats were improperly held at temperatures ranging from 105-120° F., and
- The temperature of the pork was 150° F after being reheated in a steamer.

The meat preparation process was reviewed with the owners. They stated the chicken arrives refrigerated and is stored the same. The pork is delivered frozen and thawed overnight in a sink with water before cooking the next day (not an approved defrosting method). The meat is cooked “open-pit” style with varied cooking times. The cooking of the chicken requires 2 hours and pork takes 6 to 9 hours. Readiness is determined by color and texture, according to the size of the particular meat product. Most of the meat is cooked early in the morning and held in warming trays until needed. It is then sliced and reheated in a steamer (the facility does not perform temperature measurement). Unused portions for the day are refrigerated and served the next day. For catered events and large orders, the meat is cooked and served immediately. If delivered, the facility transports the food in Cambro insulated food carriers.

On March 12, 2002 in preparation for the staff luncheon, the owner cooked the chicken and reheated the pork (temperature unknown) that had been cooked the previous day and stored in the walk-in refrigerator. The meal was delivered to the medical office at 11:45 am. It was taken out of the carrier and left on a break room table. The majority of attendees ate the food between 12 and 1:30 pm and did not reheat it. One employee brought leftovers home to their spouse, who reheated and ate the food at 5:00 pm (this individual was among those who became ill). The restaurant served a total of 205 meals on March 12, 2002 (141 servings of chicken and 64 servings of pork). Upon inquiry, the owners stated they had not received any illness complaints from patrons concerning meals served on March 12, 2002 or on any other

day within a two-week period. In addition, none of their employees were ill at the time of or 10 days prior to the day of the office luncheon.

This outbreak appears to be associated with the consumption of the pork served at the office luncheon on March 12, 2002. Thirty-six (36) of 222 people became ill after eating foods served at the event. Those who ate the pork were almost five times as likely to become ill as those who did not. The incubation, symptoms, and duration of illness suggest *Clostridium perfringens* as the causative agent. Laboratory analysis of the pork confirmed the presence of *Clostridium perfringens.*

C. 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.[3] 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.

The incubation period ranges from 6 - 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.[4]

Foodborne Norovirus Outbreak Linked to Consumption of Ice at a Summer Camp, Volusia County, Florida, June 2002

On Wednesday, June 5, 2002 the South Daytona Beach Parks and Recreation Department (SDPRD) contacted the Volusia County Health Department (VCHD) regarding unusual absenteeism and complaints of gastrointestinal illnesses among attendees of their summer camp. The summer camp had just started for the season on Monday June 3, 2002.

The SDPRD provided a registration roster of attendees, list of camp employees, schedule of activities and attendance logs for the summer camp. Inspections were conducted at all facilities that the summer camp groups had visited during field trips June 3 – 5, 2002. A questionnaire was prepared and distributed to camp counselors and parents of the camp attendees to obtain case histories. A case was defined as a person attending the SDPRD summer camp on June 3-5 and experiencing 2 or more episodes of diarrhea or vomiting in a 24 hour period and /or 2 of the following symptoms; nausea, cramps, headache or weakness. Stool samples for enteric and viral pathogens were obtained and sent to the Department of Health Bureau of Laboratories for analysis. Samples of ice from an ice machine in the lunchroom and water from water fountains used by the camp attendees were also obtained for analysis.

The summer camp had approximately 90 6 - 10 year old children in attendance from 8 am to 5 pm Monday through Friday. They met in a SDPRD building that consisted of 4 rooms: a lunchroom, art-room, game room and playroom. There were 2 outside play areas. The children

[3] FDA/CFSAN Bad Bug Book – *Clostridium perfringens*, http://www.cfsan.fda.gov/~mow/chap11.html
[4] Chin, James MD, MPH. Control of Communicable Diseases manual, 2000, 17th Ed.

were divided into 8 different groups with 10 – 15 children per group. Four (4) groups were designated A and 4 groups designated B. This designation was used for rotation of the different groups to rooms in the building and for sending certain groups on field trips. The children rotated between the playground, kitchen room, and game room and art room at 45-minute intervals. The children arrived at the camp at 8 am and were kept out on the playground or in the "kitchen room" until their numbers exceeded 36. This system was also used for aftercare from 4 to 5:30 pm.

The "kitchen room" was set up with tables and functioned as a game room as well as a lunchroom. Food service was not provided at the camp. The camp children brought their own lunches from home. The kitchen room contained an ice machine, a refrigerator and sink area. There was a sign posted on the ice machine indicating that the children were not to use it. However, the camp counselors had learned that the children were accessing the ice machine on Monday, June 3, 2002 and Tuesday June 4, 2002 with their hands and were consuming ice cubes. There were restroom facilities and water fountains in the hallway. Anecdotal information indicated that the cleaning crew found fecal material on the stall walls in both the ladies and men's restrooms on Monday June 3, 2002. Almost all of the children had used the water fountains throughout the day.

From Monday June 3 to Wednesday June 5, the camp had field trips to a municipal pool, gymnasium, skating rink and water park. One child had vomited while at the rink on Tuesday and several children vomited later that day at the camp. Investigations conducted at the pool, rink, gym and water park found there had been no ill employees. Other children's groups not associated with this particular camp that had also been at these public venues had not experienced any gastrointestinal illnesses afterward. Field trips scheduled from the camp for June 6-7 were cancelled.

Parents and counselors returned 76 case histories. Of these, 45 persons had experienced a gastrointestinal illness. Thirty-four (34) persons were considered cases and 11 were considered secondary cases. There was a 52% attack rate associated with this outbreak. The incubation period for onset of illness ranged from 24 to 57 hours, with an average onset of 33 hours. Duration of the illness ranged from 24 to 72 hours with an average of 48 hours. Primary symptoms included vomiting (86%), nausea (80%), cramps (57%), diarrhea (54%), fever (37%), weakness (31%) and headache (29%). Of the 7 stool samples submitted for viral analysis, all 7 were positive for Norwalk-Type Virus G-2. Stool samples analyzed for bacterial pathogens were negative. Water/ice samples were also negative.

During the interviewing process several parents indicated that they had observed a camp attendee vomit in the parking lot prior to entering the camp's facility on Monday June 3, 2002. It was also noted that several children vomited while at the camp. Additionally, children who had been ill and absent from the camp on one day, were returned to camp the very next day. Statistical analysis results showed no association of illness with any field trip facility. Food items consumed off premises or foods brought from home were also not associated with illness. The statistical analysis indicated an association of illness with consumption of ice from the lunchroom ice machine (p-value 0.0426). Also, exposure to the camp water fountains had a higher risk association (p-value 0.0067). Statistical analysis implicates both the water fountains and ice from the ice machine as sources of infection. The incubation periods for this outbreak suggest that the exposures began June 3 between 8-9 am. While the original source of the infection is unclear, there were multiple means of transmission.

Norovirus is a pathogen of human origin. Viral particles are transmitted to surfaces, foods, ice and other persons via feces and vomitus.[5] It is highly transmissible through these routes and doses as low as 10 viral particles are sufficient to induce illness.[6] The predominant symptom of vomiting is typical among children while adults tend to have diarrhea as the most prominent symptom.[7] Persons infected with Norwalk virus can shed these viruses fecally prior to onset of symptoms and from 3 - 21 days after symptoms have ceased.[8] Vomiters spread the virus quickly to surfaces and others via aerosolization of the vomitus. Epidemic gastroenteritis often occurs in crowded populations characteristically resulting in secondary cases via person- to - person transmission and exposure to viral particles in aerosolized vomitus.[9]

It is plausible that the infection started with a person vomiting the morning of the first day of camp. The viral particles were likely deposited onto the surfaces of the water fountains and then onto other surfaces such as tables and chairs and subsequently to the ice from the contaminated hands of the children. Others then became ill after consuming the ice. The small size of the building, rotation of the attendees by groups room-to-room and daylong exposure to each other at the camp certainly amplified the outbreak through fomite transmission. The 11 secondary cases were a result of person- to- person transmission and the adult cases in this outbreak could be attributed to parents and camp workers caring for ill children and being exposed to the virus in vomitus and/or feces.

Salmonella Javiana Outbreak in Transplant Game Particpants, Orange County, June 2002

On July 16, 2002, the Minnesota Department of Health identified two cases of *Salmonella* serotype *Javiana* infection among persons who had attended the 2002 U.S. Transplant Games held at a large sports complex in Orlando, Florida between June 25 and June 29. Isolates from the two patients were indistinguishable by pulsed-field gel electrophoresis (PFGE). The U.S. Transplant Games is a four-day athletic competition among recipients of solid organ (heart, liver, kidney, lung, and pancreas) and bone marrow transplants. Approximately 6,000 people, including 1,500 transplant recipient athletes, from the United States and five other countries participated in the 2002 Games. Multiple agencies collaborated in investigating this outbreak including the Florida Department of Health: Bureau of Community Environmental Health, the Bureau of Laboratories (the state public health laboratory), and the Orange County Health Department; the Florida Department of Agriculture and Consumer Services; the Food and Drug Administration, and the Centers for Disease Control and Prevention. Due to the potential multi-state nature of the outbreak, an EpiAid was requested by the Florida Department of Health.

Case finding activities were initiated on a nationwide level utilizing the CDC e-mail-based notification system, the Foodborne Outbreak Listserve, and PulseNet, the national molecular subtyping network for foodborne disease surveillance. On July 17, 2002, the National Kidney

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[5] CDC. Viral Agents of Gastroenteritis Public Health Importance and Outbreak Management, MMWR 1990:39 (no-5); 1-24.
[6] Glass, R, Noel, J, Ando, T, et al. The Epidemiology of Enteric Caliciviruses from Humans: A Reassessment Using New Diagnostics. Journal of Infectious Diseases 2000; 181(Suppl 2): S254-61.
[7] CDC. Viral Agents of Gastroenteritis Public Health Importance and Outbreak Management, MMWR 1990:39 (no-5); 1-24.
[8] Rockx, B, deWit, M, Vennema, H, et al. Natural History of Human Calicivirus Infection: A Prospective Cohort Study. Clinical Infectious Diseases 2002; 35:246-53.
[9] McCarthy, M, Estes, MK, Hyams, KC. Norwalk-like Virus Infection in Military Forces: Epidemic Potential, Sporadic Disease, and the Future Direction of Prevention and Control Efforts. Journal of Infectious Diseases 2000:181(Suppl 2): S387-91.

Foundation, the organizers of the Transplant Games, distributed an e-mail message to approximately 1,300 athletes informing them of the potential exposure to *Salmonella* during the games. Participants who had developed symptoms of diarrhea (>3 stools/24 hours) or fever (>101ºF) between June 25 and July 7 were requested to respond to a short CDC symptom survey.

To identify specific risk factors for infection, a web-based survey was sent electronically on July 20 to 1,100 Transplant Games attendees with known e-mail addresses, including athletes, donors, family members, and transplant professionals. Anonymous e-mail addresses for these persons were obtained from the organizers of the Transplant Games. A case was defined as fever or diarrhea with onset between June 25 - July 7 in a person who had visited Orlando. All survey respondents were questioned about places they stayed, events they attended, and foods they ate while in Orlando.

The layout of specific resorts in the theme park and their respective food courts was determined. A complete list of available food items containing potentially suspect foods at these resorts was compiled. On July 31, following a visit by investigators to the theme park, a second web-based survey containing questions about potentially suspect food items available throughout the theme park was distributed electronically to the 369 persons who responded to the first survey. Ill persons were questioned about specific foods eaten in the three days before illness onset, and well persons were questioned about the middle three days of the Transplant Games (June 26 - June 28).

The Bureau of Laboratories confirmed all *S. Javiana* isolates and performed molecular subtyping of isolates by PFGE. Microbiological evaluation of unopened boxes of diced Roma tomatoes was performed at the Bureau of Laboratories and the Florida Department of Agriculture and Consumer Services laboratory. Statistical analyses were conducted using SAS software version 8.2 (SAS Institute, Carey, N.C.). Associations with illness were expressed as adjusted odds ratios. A *p* value less than 0.05 was considered significant.

Through PulseNet and Foodborne Outbreak Listserve postings, 18 reported infections caused by *S.* Javiana with an indistinguishable PFGE pattern were identified in nine states (Illinois, Massachusetts, Michigan, Minnesota, New Hampshire, North Carolina, Pennsylvania, Tennessee, and Virginia). Among 16 patients who were interviewed, one was a Transplant Games participant and 12 others had visited the theme park during the last week of June but were not attendees of the Transplant Games. Dates of illness onset ranged from June 24 - July 8.

The symptom survey was distributed to approximately 1,500 Transplant Games attendees; a total of 47 persons responded. All 47 respondents reported developing a fever or diarrheal illness between June 25 - July 7, 2002. An electronic link to the questionnaire was distributed to 1,100 persons who attended the Transplant Games on July 20; a total of 369 (34%) persons responded by August 1. Among these, 296 (80%) responded within 48 hours. Of the 369 respondents, 94 (25%) persons reported that at least one household member had an illness that met the case definition, representing 141 ill persons. Detailed information was collected for a single person in each of the 369 households. In each household, only the person with the earliest birthday in the year was requested to complete the full survey regardless of illness status.

Among the 369 persons, 82 (22%) reported illness. The median age of ill respondents was 47 years (range: 4-71 years); 48 (59%) were transplant recipients, and 43 (53%) were receiving

immunosuppressive therapy. Dates of symptom onset ranged from June 26 to July 7 (Figure 5). Predominant symptoms included diarrhea (74/80, 93%), abdominal pain (63/80, 79%), and fever (29/57, 51%). Three respondents (4%) had been hospitalized. Fifty-one (62%) ill persons stayed at resorts located in the theme park during their time in Orlando, and 75 (91%) reported eating food items at establishments located in the theme park.

An electronic link to the second Web-based survey was distributed on July 31 to the 369 persons who responded to the first survey. By August 2, a total of 222 (60%) persons had responded to the second survey. Forty-one were ill persons. Ill persons were significantly more likely to report eating dishes containing diced Roma tomatoes than were well persons (44% of ill versus 15% of well; odds ratio [OR] 4.3; 95% confidence interval [CI] 2.1-9.1). Other food items that were significantly associated with illness on univariate analysis were dishes containing shredded iceberg lettuce (OR 3.1; 95% CI 1.8-7.4), pre-shredded mild cheddar cheese (OR 2.7, 95% CI 1.4-5.5), and fresh ground beef (OR 4.1, 95% CI 1.8-9.6). In stratified univariate analysis only eating items with diced Roma tomatoes remained significantly associated with illness.

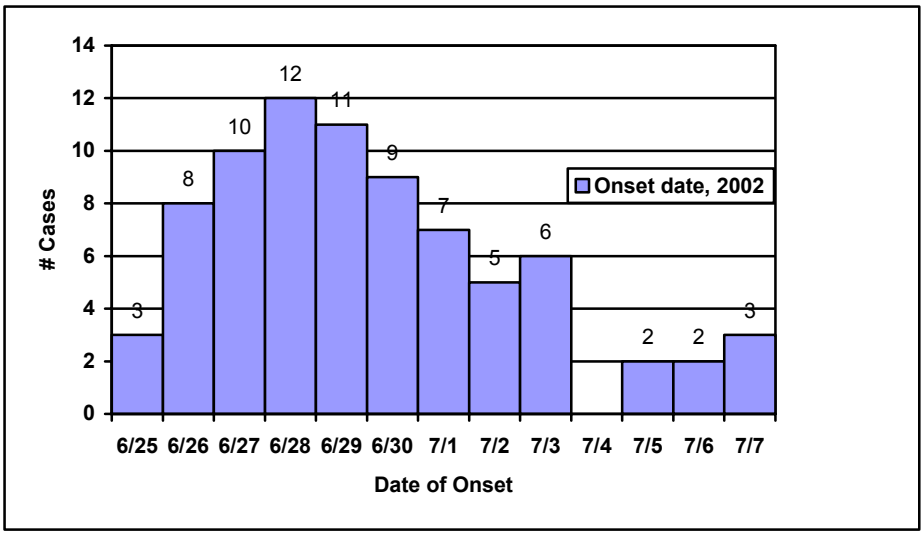
Diced Roma tomatoes were supplied to the theme park three times a week as a fresh, refrigerated, pre-packaged product from a processing plant in southwest Florida. Containers of diced Roma tomatoes were stored at 30-35º F. in a central warehouse at the theme park and delivered on a daily basis in refrigerated trucks to food establishments dispersed throughout the theme park. There were no reports of diarrheal illness among any food handlers employed at the theme park in the months of June and July 2002. Microbiological evaluation of a frozen, unopened box of diced Roma tomatoes from the plant in southwest Florida performed at the Bureau of Laboratories indicated the presence of fecal coliforms (150/gm). No Salmonella was isolated from the tomatoes.

The investigation has several limitations. A web-based investigation limited responses to only those Transplant Games attendees with known e-mail addresses and Internet access. Although responses were received from both well and ill persons, households with ill persons may have been more likely to respond to a web-based survey. Ill persons who were hospitalized may have been too ill to respond to the survey. These factors may have affected the attack rate or hospitalization rate among attendees of the Transplant Games.

The use of a web-based survey in this investigation allowed a large number of geographically dispersed persons to be questioned about potential exposures in a relatively short period of time. Although no Transplant Game associated cases were confirmed, twelve culture-confirmed cases of *S. Javiana* among visitors to the theme park who did not attend the Transplant Games were identified through PulseNet, indicating that the potential number of ill persons in this outbreak is likely to be much larger than what has been identified (estimates are that actual cases can be as much as 38 times higher than laboratory-confirmed cases).[10] The combination of molecular subtyping, web-based technology, and routine public health surveillance enhanced the outbreak investigation.

Figure 5: Diarrheal Illness Among Attendees of the 2002 US Transplant Games in Orlando, FL (n=78, total respondents: 369)

[10] Mead, Paul S., et al. Food-Related Illness and Death in the United States. Emerging Infectious Diseases, 5(5):607-625, September-October, 1999.



Foodborne Outbreak at a Wedding Rehearsal Dinner, Broward County, December 2002

On December 31, 2002, a suspected outbreak was reported to the Broward County Health Department involving approximately 140 attendees of a wedding reception. Further review of the events involved revealed that a rehearsal dinner was held at a restaurant and the wedding reception was held at a resort. Menus and guests lists with contact numbers were provided by the bride. The Department of Business and Professional Regulation was notified and inspectors were dispatched to conduct inspections of both implicated facilities.

The Department of Business and Professional Regulation inspection reports did not reveal any deficiencies in food handling procedures at the time of the inspections. The food storage temperatures were in proper range. According to the information provided by the manager of the restaurant, there were 210 plates served on December 27, 2002, including the rehearsal dinner party attendees. Restaurant records showed that 51 meals had been served at the rehearsal dinner: 12 chicken fajitas; 12 beef fajitas, 11 grilled chicken; 9 blackened chicken/pasta; 5 New York Strips; and 1 haystack chicken salad were served. Management stated that they had not received any other illness reports and there were no reported illness among the employees.

The resort provided the following information regarding the numbers of people served on specific days, including the wedding reception. On December 28, the date of the wedding reception, there were two other private parties hosted at the facility. The resort is also a hotel and according to records provided there were three banquet events, including the 144 listed as served at the wedding reception, and two smaller events, one of 17 guests, and the other of 61 guests. Additionally, there were 305 persons served in the restaurant and lounge of the hotel for a total of 527 people served on December 28, 2002. All foods are prepared in one central kitchen. There were no other reports of illness.

The guest list provided by the bride listed the guest name, contact number, reception attendance, rehearsal dinner attendance, and ill or not ill. According to the list, of the 54 rehearsal dinner attendees, 30 reported illness, 23 were not ill, and the illness status of one guest was unknown. Of the 83 present at the reception, 6 reported illness, 64 were not ill, and

13 had unknown illness status. Given these numbers, attendees of the rehearsal dinner were 14 times more likely to be ill than reception attendees

Table 5: Two-by-two Table of Illness and Attendance at Rehearsal Dinner

Rehearsal Dinner	Ill	Not Ill	Total
Yes	30	23	**53**
No	6	64	**70**
Total	**36**	**87**	**123**

Odds Ratio (OR)= 13.91 (CI 4.72-43.12)
Mantel-Haenszel p= 0.0000000

Attempts were made to contact all attendees. Those contacted by telephone were interviewed immediately and messages were left for return calls for other guests. Sixty (60) interviews were conducted. Thirty-eight (63%) of the 60 attended both the rehearsal dinner and the wedding reception. Twenty-two (37%) attended only the reception. Of the thirty-eight (38) rehearsal dinner attendees interviewed, twenty-five (25/38) reported illness, and one (1/22) of twenty-two reception only attendees reported illness. Of the ill, fourteen (14) (54%) were males, twelve (46%) were females.

Symptoms reported were nausea (89%), vomiting (80%), diarrhea (72%) with the median number of 6 episodes of diarrhea within a 24 hour period; abdominal cramps (72%); weakness 76%); fatigue (72%); sweating (48%); chills (48%); headache (42%); and fever (18%) with median temperature of 102.5°F. One attendee sought medical help but upon interview, revealed that the illness may have been unrelated to attendance to events. There were no hospitalizations or deaths associated with the events.

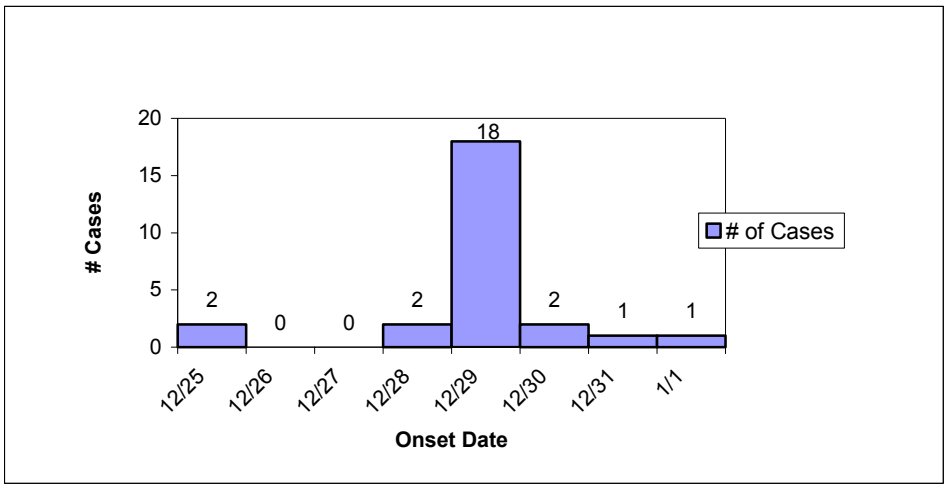
Incubation periods were calculated for those attending the rehearsal dinner and the wedding reception and are as follows:

Table 6: Incubation Periods for Rehearsal Dinner and Wedding Reception

Meals	Incubation Periods
Rehearsal Dinner 12/27/02	Median 37 Hours (mode 31 hrs)
Wedding Reception 12/28/02	Median 14 Hours (mode 7 hrs)

Two members of a family traveling by car from out of state to attend the events were ill on December 25, 2002 two days prior to the rehearsal dinner. Their exposure was not determined. The epidemic curve of those interviewed is shown on the following graph.

Figure 6: Epidemic Curve of the Broward County Wedding Outbreak, 2002



Clearly an outbreak occurred among the members of the wedding party with peak numbers of illness occurring on December 29, 2002. The epidemic curve suggests a point source exposure. Neither medical specimens nor food samples were taken to confirm the etiologic agent. However, the symptoms and median duration of illness 25 hours (40% of those ill reported duration of illness at 24 hours) are consistent with Norovirus. According to the timeline of events, the rehearsal dinner on December 27 could have been the point source of exposure with a median incubation period of 37 hours Typically, the incubation period for a Norovirus is 24 hours (range 12-50 hours) and duration of 24 hours. The median incubation period for exposure at the reception was calculated to be 14 hours, which falls within the range of incubation periods for Norovirus, however only one of 22 reception attendees interviewed reported illness, suggesting that attendance at the rehearsal dinner was the most likely exposure with 30 of 53 respondents ill.

Analysis of food histories of those interviewed revealed an association with the consumption of nachos and salsa at the rehearsal dinner. Of the 26 ill, 16 ate nachos, 9 did not eat nachos, and one did not attend the rehearsal dinner and did not eat nachos. Table 7 shows that the exposure to nachos and illness association to be 7 times more likely if nachos were consumed. Table 8 shows Association of illness with the consumption of other foods at the rehearsal dinner.

Table 7: Two-by-two Table of Illness and Nacho Consumption

Nachos	Ill	Not Ill	Total
Yes	16	5	**21**
No	10	22	**32**
Total	**26**	**27**	**53**

Odds Ratio=7.04 (CI 1.72-30.77)
Mantel-Haenszel p=0.00152

Table 8: Odds Ratios of Other Foods Consumed at the Rehearsal Dinner

Food	Odds Ratio
Salsa	3.77 (CI 0.93-16)
Grilled Herbed Chicken	3.75 (CI 0.57-31)
Fajitas	3.59 (CI 0.81-17)
Blackened Chicken	2.27 (CI 0.30-20)

The data suggest a significant association of illness with nacho consumption and decreasing order of association with other listed foods. No significant associations between illness and foods consumed at the wedding reception were found.

The symptoms, incubation, and duration of the illness reported in this outbreak are consistent with a viral agent. The suspected viral agent could be of a group of viruses that causes "stomach flu" or gastroenteritis in people. Most recently these viruses, previously referred to as Norwalk-like viruses (NLV), caliciviruses, and small round structured viruses, have been grouped and now referred to as Noroviruses.

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. Noroviruses 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]

In conclusion, though the agent of this outbreak was not laboratory-confirmed, the symptoms, incubation, and duration of the illness are consistent with a viral agent. By statistical analysis, attendance at the rehearsal dinner showed the most significant association with illness. The source of the agent and its mode of transmission are undetermined. The possibilities are that one or several members of the rehearsal dinner party already ill or incubating the virus could have infected other attendees through person-to-person contact, fomite contamination, contaminated shared foods, or through aerosolized droplets. The menu items implicated showing significant association with illness, nachos and salsa, may reflect a function of a favorite food and not that it was the vehicle of the agent.

The source and mode of transmission of the suspected viral agent could not be determined with any degree of certainty. However, the epidemic curve does suggest a single point source of

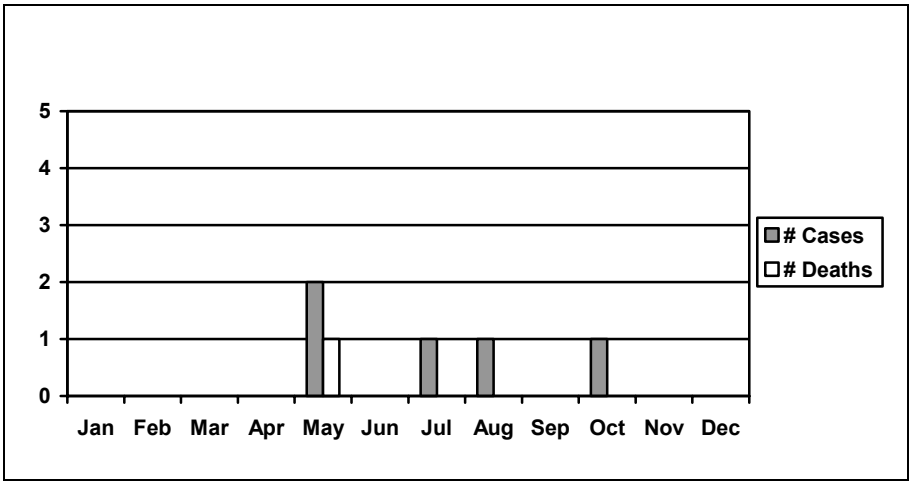
[11] Center for Disease Control (CDC) Respiratory and Enteric Viruses Branch: Viral Gastroenteritis, , August 20, 2001, http://www.cdc.gov/ncidod/dvrd/revb/gastro/Norovirus.htm.

contamination, most likely at the rehearsal dinner, and by significant association, the nachos and salsa may have been the vehicle.

***Vibrio vulnificus*, Florida, 2002**

For 2002, there was a total of 20 *Vibrio vulnificus* cases reported in the State of Florida, a significant reduction from the previous year. Of these, 10 were wound-related and 5 were from an unknown exposure. The other 5 cases were associated with the consumption of raw oysters.[12] There was 1 oyster-consumption-related death, 3 deaths from unknown exposures and 1 wound-related death reported from *Vibrio vulnificus* (see Figure 7). In 2001 there were 9 wound-related cases of *Vibrio vulnificus* (1 death), and 11 cases associated with the consumption of raw oysters (9 deaths).

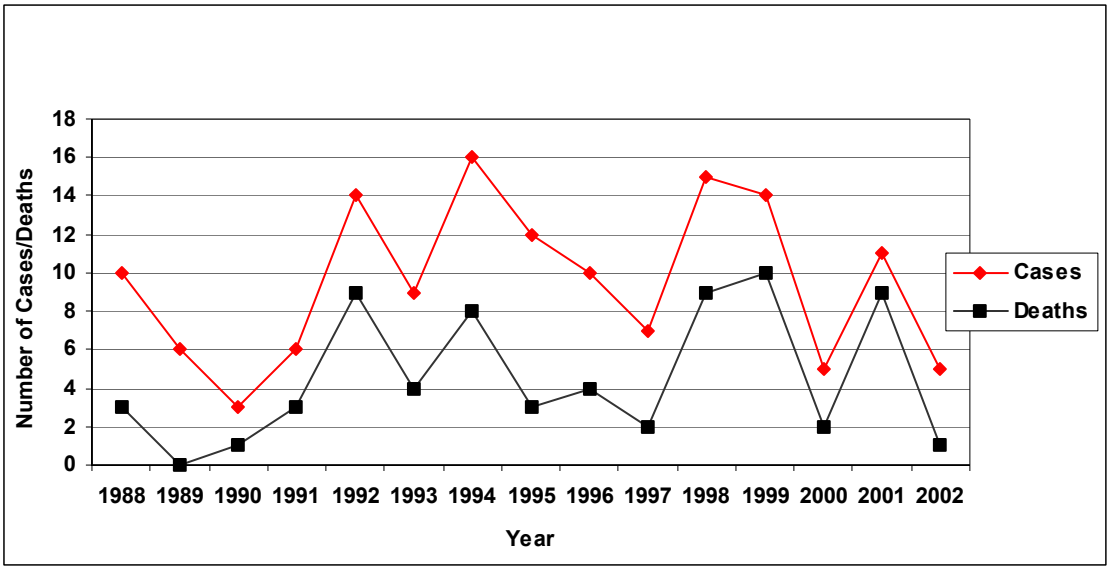
Figure 7: *Vibrio vulnificus* Cases and Deaths Due to Shellfish Consumption by Month, Florida, 2002



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 2002, project elements included articles for newsletters for the Florida Dietetic Association, Florida Nurses Assocation and the Florida Department of Business and Professional Regulation, a press release and the sending of press kits to all local television affiliates in Florida, outreach and pamphlets sent to local liver support groups, a presentation and display at the annual meeting of the Florida Dietetic Association, a display at the USDA-sponsored Food Safety Educator's Conference and the first of several *Vibrio vulnificus* presentations to local Florida Dietetic Association and Florida Nurses Assocation groups. Figure 8 shows oyster-related*Vibrio vulnificus* cases and deaths in Florida, from 1988-2002.

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

Figure 8: *Vibrio vulnificus* Cases and Deaths Associated With Oyster Consumption, Florida, 1988-2002



An Overview of Foodborne Hepatitis A in Florida, 1994- 2002[13]

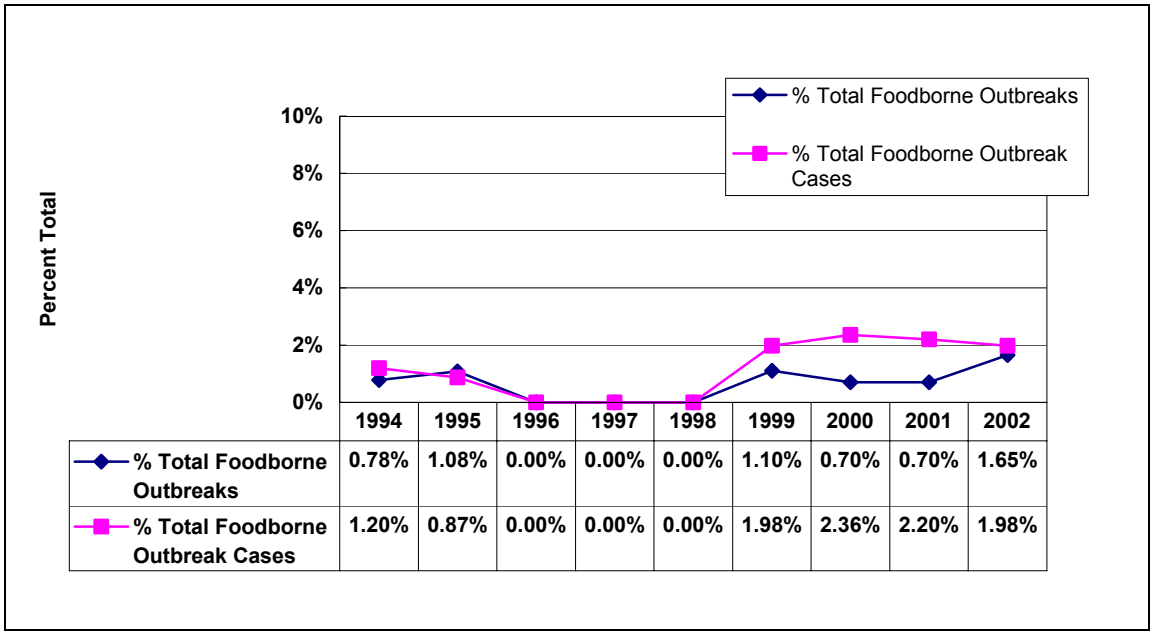
Nationwide estimates are that hepatitis A accounts for 0.8% of total foodborne outbreaks and for less than 0.8% of total foodborne outbreak-related cases .[14] Florida estimates that hepatitis A accounts for 0.66% of total foodborne outbreaks (1994-2002 trend – flat: no increase or decrease) and for .98% of total foodborne outbreak-related cases (1994- 2002 trend: upward a little less than 1%).[15,16]

Table 9: 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-YTD 2002)	0.66%	.96%

[13] 2002 data are preliminary and subject to change.
[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 Environmental Epidemiology, Food and Waterborne Disease Program
[16] Source: Bureau of Environmental Epidemiology, Food and Waterborne Disease Program

Figure 9: Foodborne Hepatitis A: % Total Foodborne Outbreaks and Outbreak-related Cases, 1994-2002, Florida



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

Table 10: Number of Reported Foodborne Hepatitis A Outbreaks in Florida, 1994- 2002[17]

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

Table 11: Number of Foodborne Outbreak-related Hepatitis A Cases in Florida, 1994- 2002[18]

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

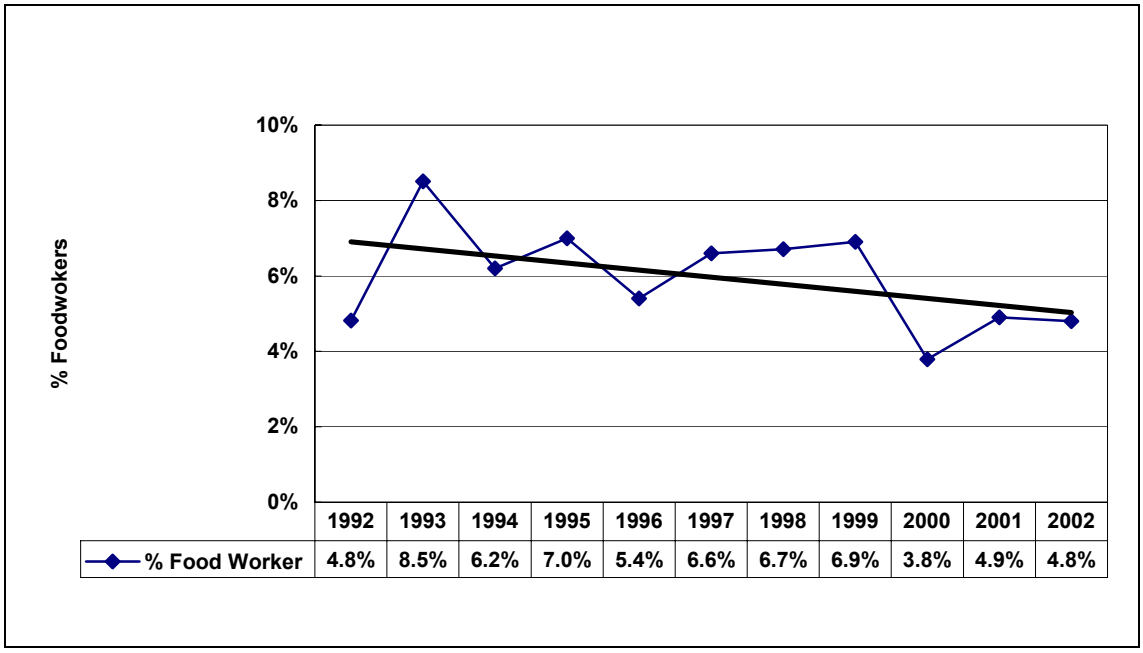
An examination of the total number of reported hepatitis A cases in Florida shows that foodworkers with hepatitis A account for 5.5% of the total confirmed hepatitis A cases statewide (1992- 2002).[19] The percentage of foodworker hepatitis A in Florida shows a slight downward trend of about 1% from 1992-June 2002.

Table 12: Percentage of Foodworker Hepatitis A Cases Reported in Florida, 1992-2002

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

Statewide Confirmed Hepatitis A Cases	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	Total
# Confirmed Cases	581	705	772	663	720	812	611	855	659	990	1239
# Foodworker Cases	28	60	48	46	39	54	41	59	25	49	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%**

Figure 10: Hepatitis A in Florida, % Foodworkers of Total Cases, 1992-2002



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 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,

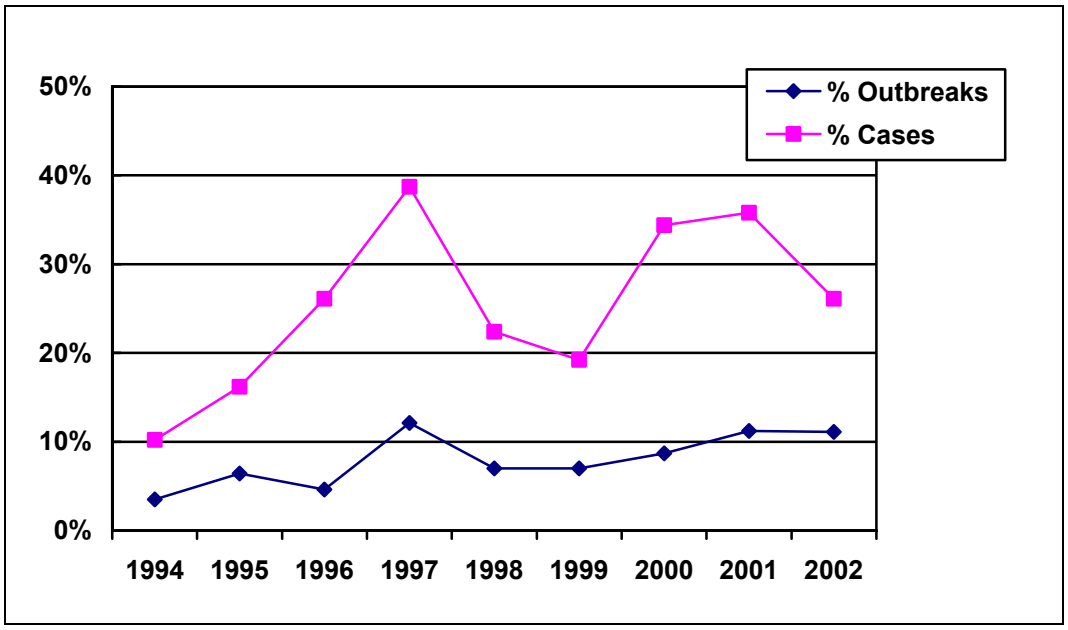
- Newsletter articles for the Department of Education Food and Nutrition Newsletter (Quarterly),
- Handwashing magnets developed and distributed through 9 Regional Food and Waterborne Disease Epidemiolgists to targeted community populations and groups. These magnets are currently being redeveloped to 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, and
- Statewide hepatitis A meeting (February 2001) with proceedings and position statement. Another meeting is scheduled for April 2003.

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.

Overview of Foodborne Norovirus Reported in Florida, 1994-2002

Figure 11: Trends in Reported Outbreaks and Outbreak Cases of Norovirus, Florida, 1994 - 2002



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 25.8% 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 1994-2002, there has been a total of 223 food or waterborne Norovirus outbreaks with 5,168 associated cases (see Tables 1 and 2). 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.

[20] Food Related Illness and Death in the United States, Mead, Paul et al. Emerging Infectious Diseases (5) 5:607-625,

Table 13: Number of Reported Foodborne Norovirus Outbreaks, Florida, 1994-2002

Outbreaks	1994	1995	1996	1997	1998	1999	2000	2001	2002	Total
Suspected	3	6	6	30	15	14	15	17	18	124
Confirmed	6	13	8	23	7	6	10	17	9	99
Total	**9**	**19**	**14**	**53**	**22**	**20**	**25**	**34**	**27**	**223**
% Total Outbreaks	**3.5%**	**6.4%**	**4.6%**	**12.1%**	**7.0%**	**7.0%**	**8.7%**	**11.2%**	**11.1%**	**8.2%**

Table 14: Number of Reported Foodborne Norovirus Outbreak-related Cases, Florida, 1994-2002

Outbreak-related cases	1994	1995	1996	1997	1998	1999	2000	2001	2002	Total
Suspected	46	51	92	377	296	136	154	212	212	1576
Confirmed	110	419	633	686	442	160	450	522	170	3592
Total	**156**	**470**	**725**	**1063**	**738**	**296**	**604**	**734**	**382**	**5168**
% Total Outbreak-related cases	**10.2%**	**16.2%**	**26.1%**	**38.7%**	**22.4%**	**19.2%**	**34.4%**	**35.8%**	**26.1%**	**25.8%**

Laboratory confirmation has been obtained in 30 (13.5%) 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. A cruise line has also requested this training.

Appendix: Statewide Data Tables and Figures

Table 15: Number of Reported Outbreaks With Laboratory-Confirmed Etiologic Agents and Number of Cases Associated With These Outbreaks, Florida, 2002

# Outbreaks	Pathogen	# Cases
1	Ciguatera	1
1	Cryptosporidium	37
1	Saxitoxin	21
1	Staphylococcus	2
1	V. parahaemolyticus	2
2	B. cereus	11
2	Campylobacter	12
2	E. coli O157:H7	4
3	Shigella	6
4	Hepatitis A	29
5	V. vulnificus	5
8	Norovirus	143
15	Salmonella	275
46	Total	548

Figure 12: Percent Reported Outbreaks With Laboratory-Confirmed Etiologic Agents and Percent Cases Associated With These Outbreaks, Florida, 2002

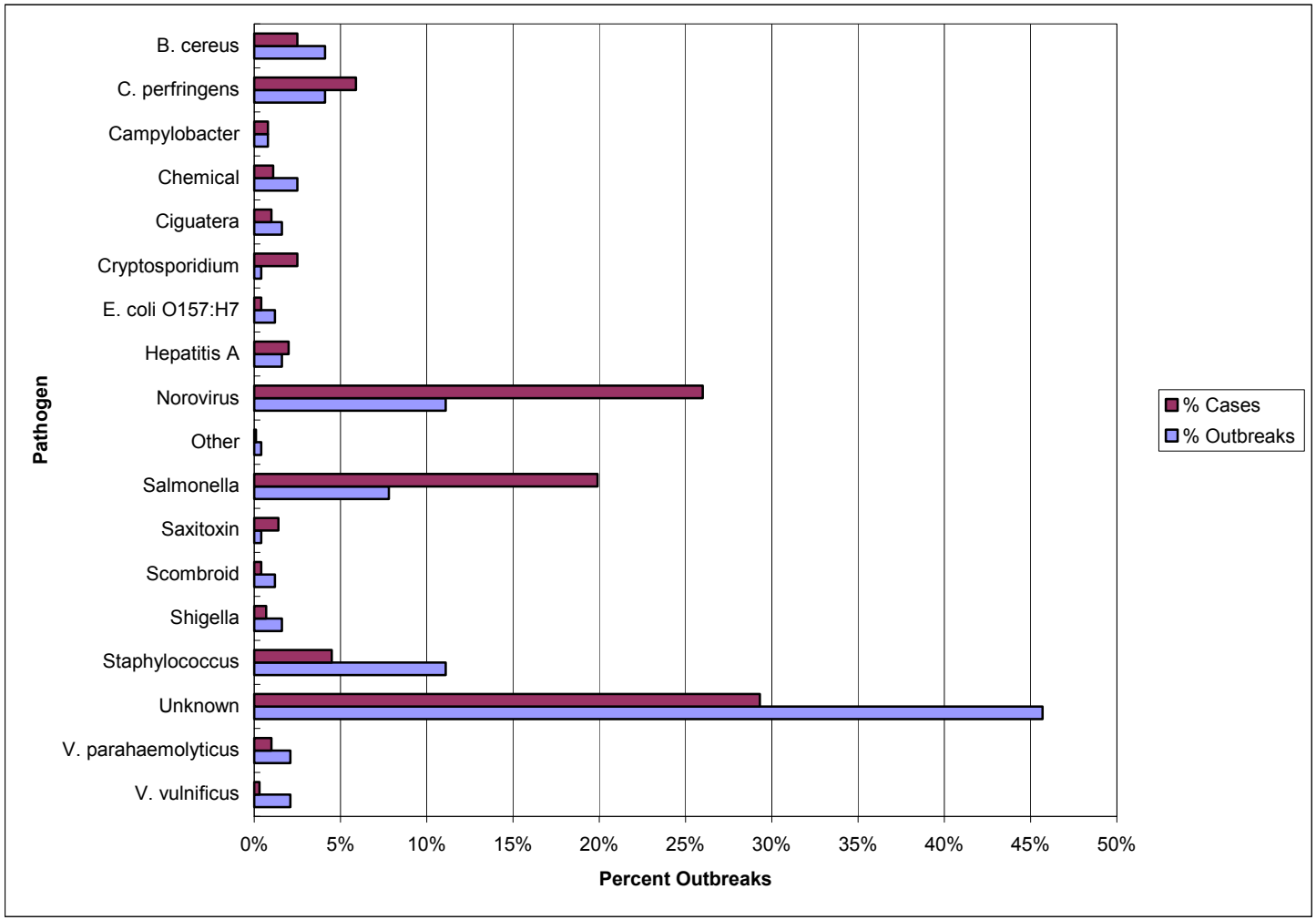
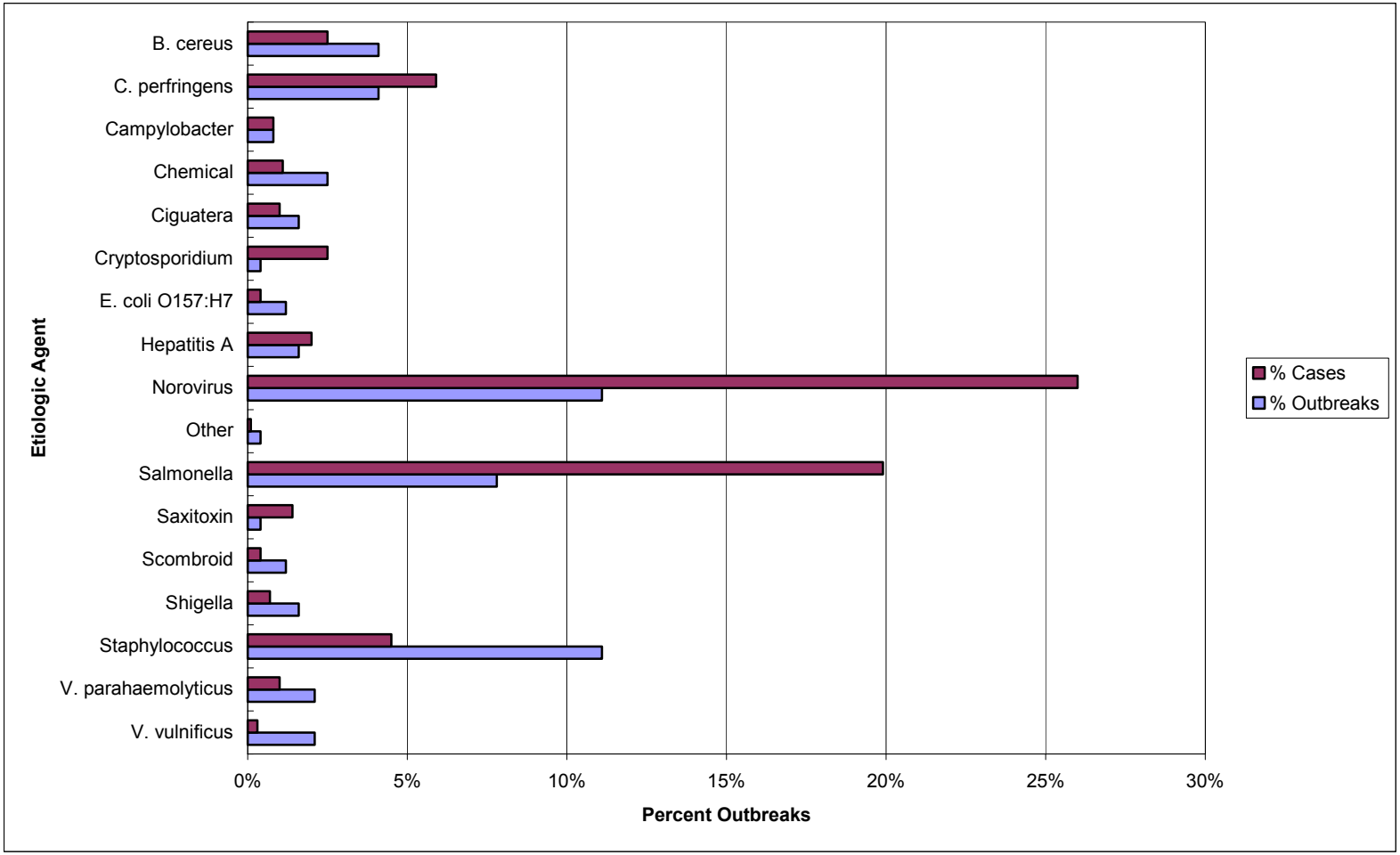
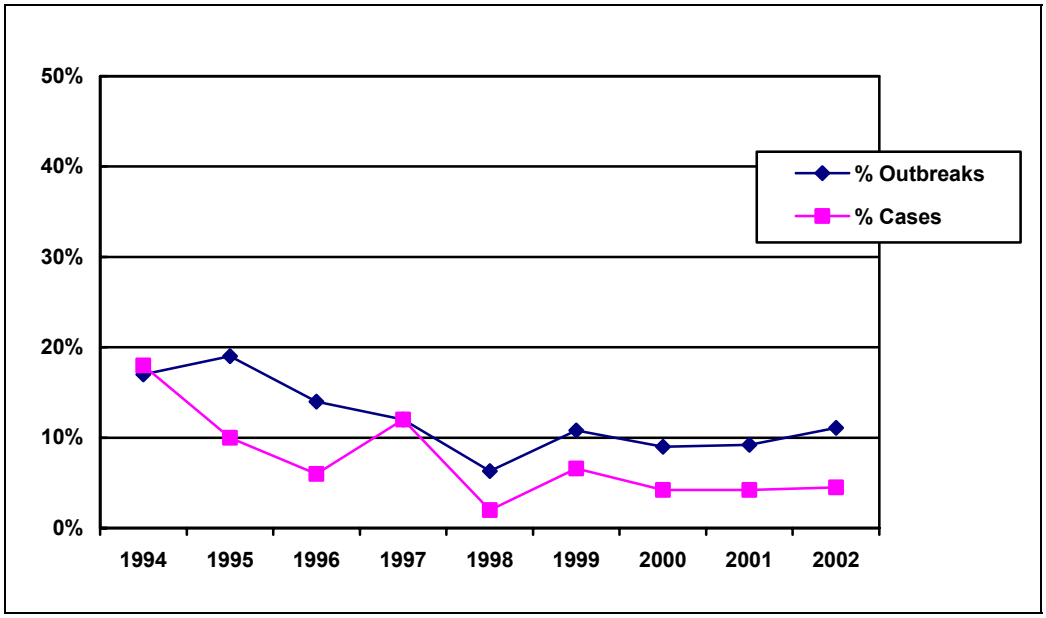


Figure 13: Percent Total Outbreaks and Cases by Etiologic Agent, Florida, 2002*



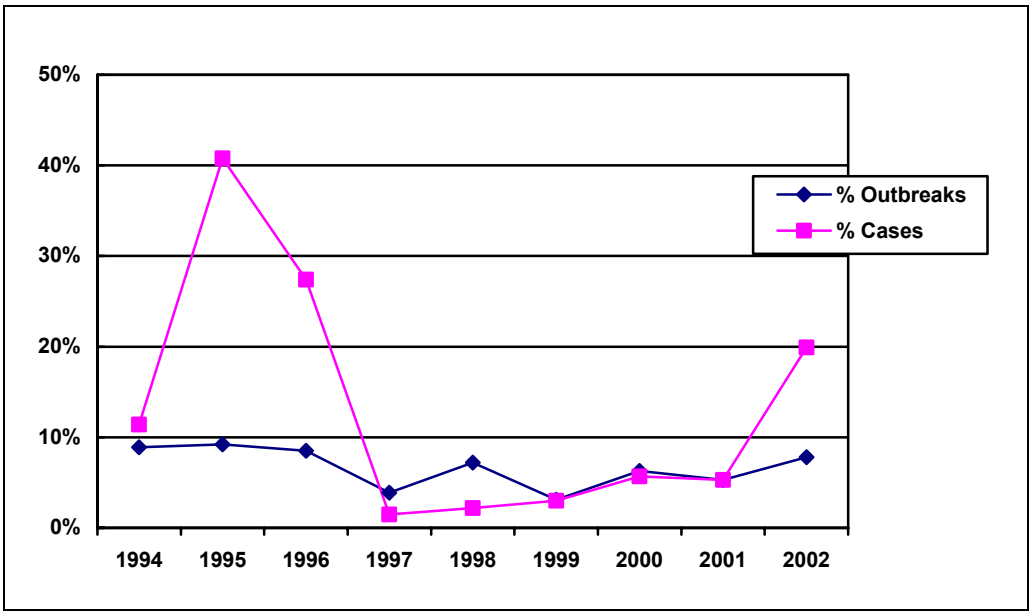
*The etiologic agent was unknown in 45.7% of the outbreaks and 29.3% of the cases.

Figure 14: Trends in Reported Outbreaks and Outbreak Cases of Foodborne Staphylococcus, Florida, 1994 - 2002



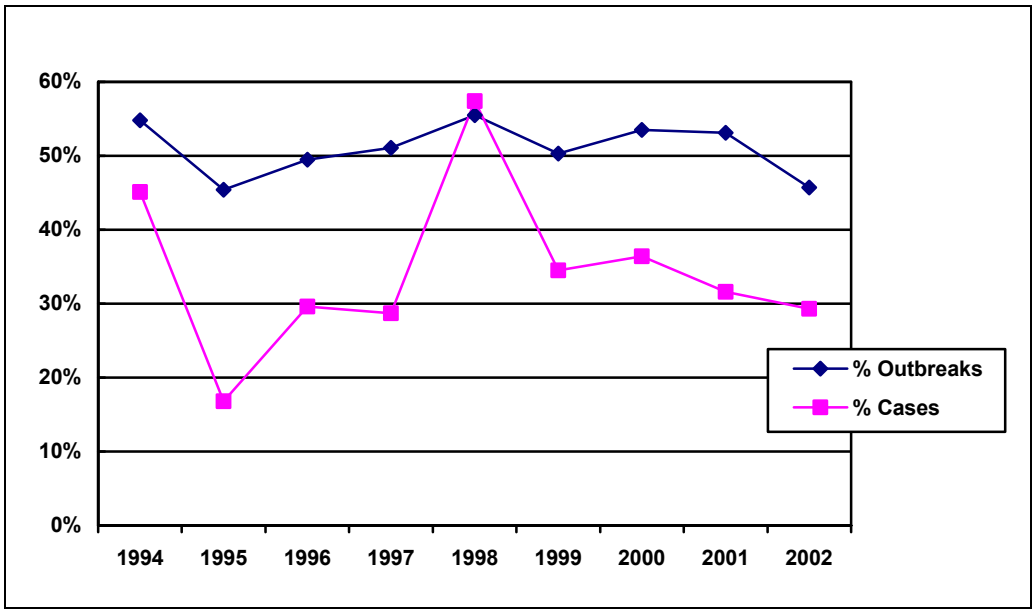
Reported food and waterborne Staphylocccus outbreaks and cases show a downward trend over time.

Figure 15: Trends in Reported Outbreaks and Outbreak Cases of Salmonella, Florida, 1994 - 2002



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

Figure 16: Trends in Reported Outbreaks and Outbreak Cases of Unknown Pathogens, Florida, 1994 - 2002



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

Figure 17: Percent Total Outbreaks and Cases by Site, Florida, 2002

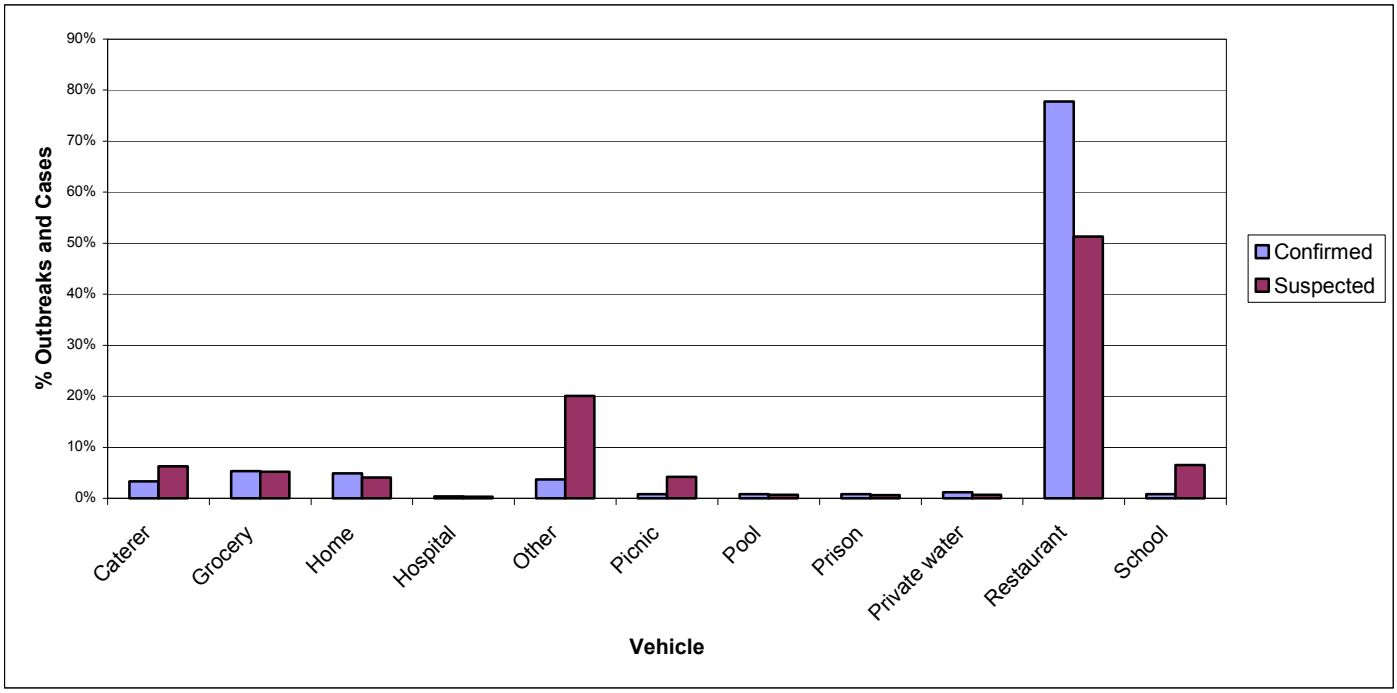


Table 16: Outbreaks by Site, Florida, 2002

Status	Caterer	Grocery	Home	Hospital	Other	Picnic	Pool	Prison	Private water	Restaurant	School	Total
Confirmed	4	2	5	0	5	2	0	0	0	29	0	47
	8.5%	4.3%	10.6%	0.0%	10.6%	4.3%	0.0%	0.0%	0.0%	61.7%	0.0%	19.3%
	50.0%	15.4%	41.7%	0.0%	55.6%	100.0%	0.0%	0.0%	0.0%	15.3%	0.0%	
Suspected	4	11	7	1	4	0	2	2	3	160	2	196
	2.0%	5.6%	3.6%	0.5%	2.0%	0.0%	1.0%	1.0%	1.5%	81.6%	1.0%	80.7%
	50.0%	84.6%	58.3%	100.0%	44.4%	0.0%	100.0%	100.0%	100.0%	84.7%	100.0%	
Total	8	13	12	1	9	2	2	2	3	189	2	243
	3.3%	5.3%	4.9%	0.4%	3.7%	0.8%	0.8%	0.8%	1.2%	77.8%	0.8%	

Table 17: Cases by Site, Florida, 2002

Status	Caterer	Grocery	Home	Hospital	Other	Picnic	Pool	Prison	Private water	Restaurant	School	Total
Confirmed	67	42	16	0	267	61	0	0	0	188	0	641
	10.5%	6.6%	2.5%	0.0%	41.7%	9.5%	0.0%	0.0%	0.0%	29.3%	0.0%	43.6%
	72.8%	54.5%	26.7%	0.0%	90.5%	100.0%	0.0%	0.0%	0.0%	24.9%	0.0%	
Suspected	25	35	44	5	28	0	10	9	10	566	96	828
	3.0%	4.2%	5.3%	0.6%	3.4%	0.0%	1.2%	1.1%	1.2%	68.4%	11.6%	56.4%
	27.2%	45.5%	73.3%	100.0%	9.5%	0.0%	100.0%	100.0%	100.0%	75.1%	100.0%	
Total	92	77	60	5	295	61	10	9	10	754	96	1469
	6.3%	5.2%	4.1%	0.3%	20.1%	4.2%	0.7%	0.6%	0.7%	51.3%	6.5%	

Table 18: Food and Waterborne Outbreaks and Cases Reported by Agency of Jurisdiction,[21] Florida, 1995 – 2002

1995				
Agency	**# Outbreaks**	**% Outbreaks**	**# Cases**	**% Cases**
DACS	10	3.9%	243	8.7%
DBPR	235	91.8%	2303	82.9%
DOH	6	2.3%	220	7.9%
OTHER	5	2.0%	13	.5%
Total	**256**	**100.0%**	**2779**	**100.0%**
1996				
Agency	**# Outbreaks**	**% Outbreaks**	**# Cases**	**% Cases**
DACS	20	6.6%	105	3.7%
DBPR	258	85.4%	1824	64.2%
DOH	9	3.0%	651	23.0%
OTHER	15	4.9%	261	9.2%
Total	**302**	**100.0%**	**2841**	**100.0%**
1997				
Agency	**# Outbreaks**	**% Outbreaks**	**# Cases**	**% Cases**
DACS	72	16.4%	334	12.2%
DBPR	323	73.7%	1777	64.8%
DOH	24	5.5%	294	10.7%
OTHER	19	4.3%	338	12.3%
Total	**438**	**100.0%**	**2743**	**100.0%**
1998				
Agency	**# Outbreaks**	**% Outbreaks**	**# Cases**	**% Cases**
DACS	20	6.3%	91	2.8%
DBPR	243	77.1%	1911	58%
DOH	35	11%	1149	34.9%
OTHER	17	5.4%	139	4.2%
Total	**315**	**100.0%**	**3290**	**100.0%**

1999				
Agency	**# Outbreaks**	**% Outbreaks**	**# Cases**	**% Cases**
DACS	30	10.5%	228	14.8%
DBPR	226	79.0%	983	63.7%
DOH	18	6.3%	255	16.5%
OTHER	12	4.2%	78	5.1%
Total	**286**	**100.0%**	**1544**	**100.0%**
2000				
Agency	**# Outbreaks**	**% Outbreaks**	**# Cases**	**% Cases**
DACS	35	12.2%	142	8.1%
DBPR	210	72.9%	986	56.1%
DOH	21	7.3%	410	23.3%
OTHER	22	7.6%	219	12.5%
Total	288	100.0%	1757	100.0%
2001				
Agency	**# Outbreaks**	**% Outbreaks**	**# Cases**	**% Cases**
DACS	31	10.2%	173	8.4%
DBPR	244	80.5%	1505	73.3%
DOH	19	3.0%	311	15.2%
OTHER	9	100.0%	63	3.1%
Total	303	10.2%	2052	100.0%
2002				
Agency	**# Outbreaks**	**% Outbreaks**	**# Cases**	**% Cases**
DACS	22	9.1%	310	21.1%
DBPR	193	79.4%	788	53.6%
DOH	11	4.5%	179	12.2%
OTHER	17	7.0%	192	13.1%
Total	243	100.0%	1469	100.0%

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

Figure 18: Reported Food and Waterborne Disease Outbreaks by Agency of Jurisdiction, 1995 - 2002

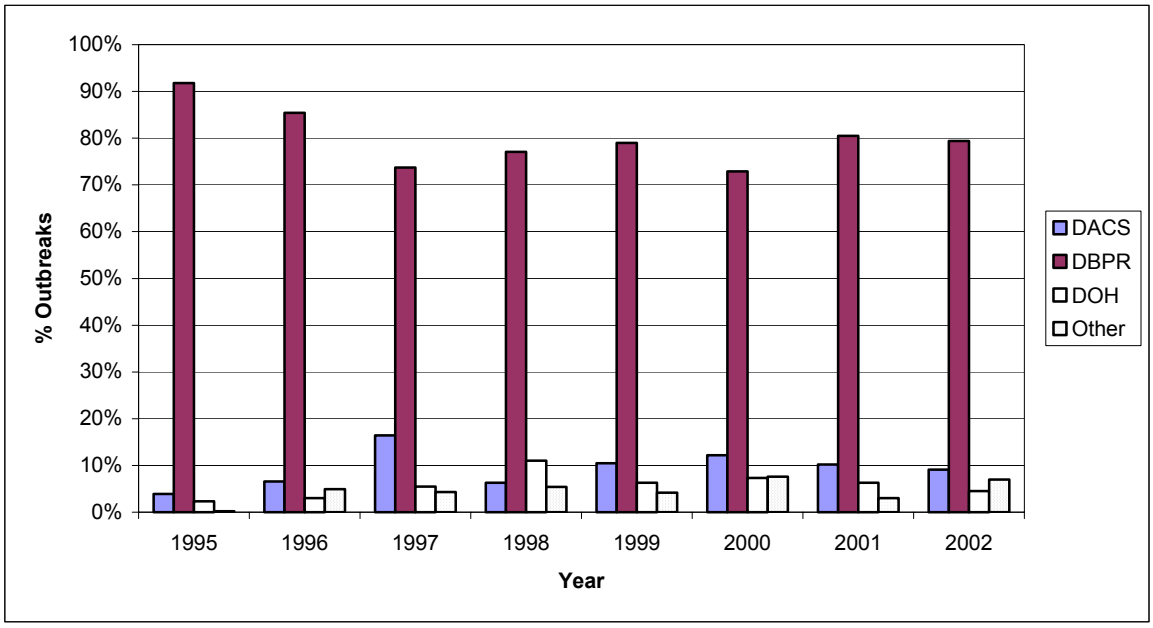


Figure 19: Cases Associated With Reported Food and Waterborne Disease Outbreaks by Agency of Jurisdiction, 1995 – 2002

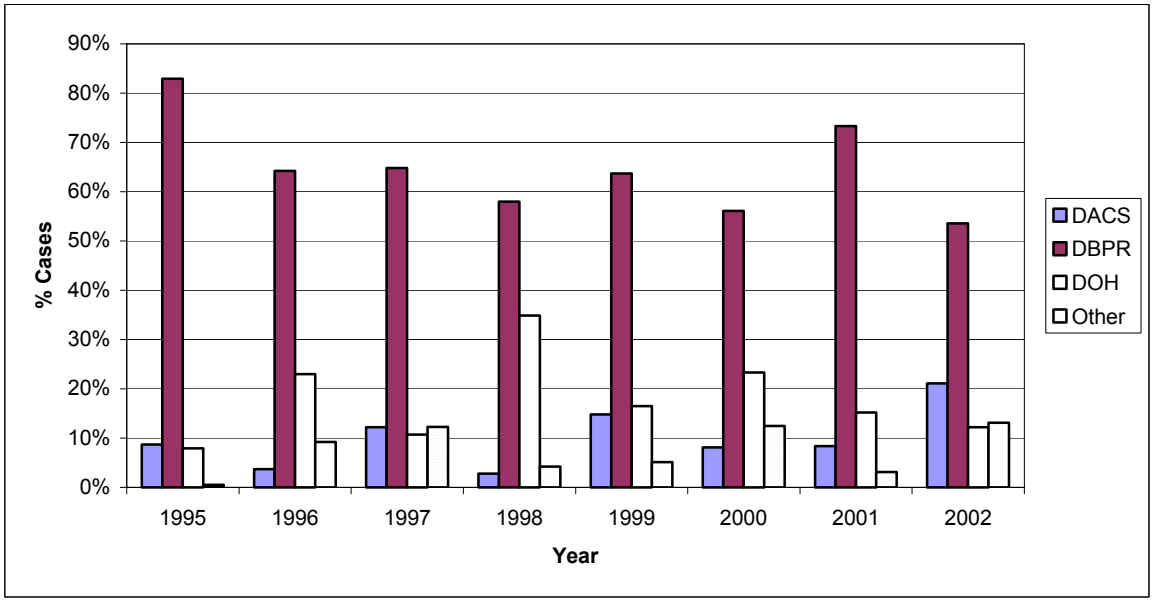


Figure 20: Percent Total Outbreaks and Cases by Vehicle, Florida, 2002

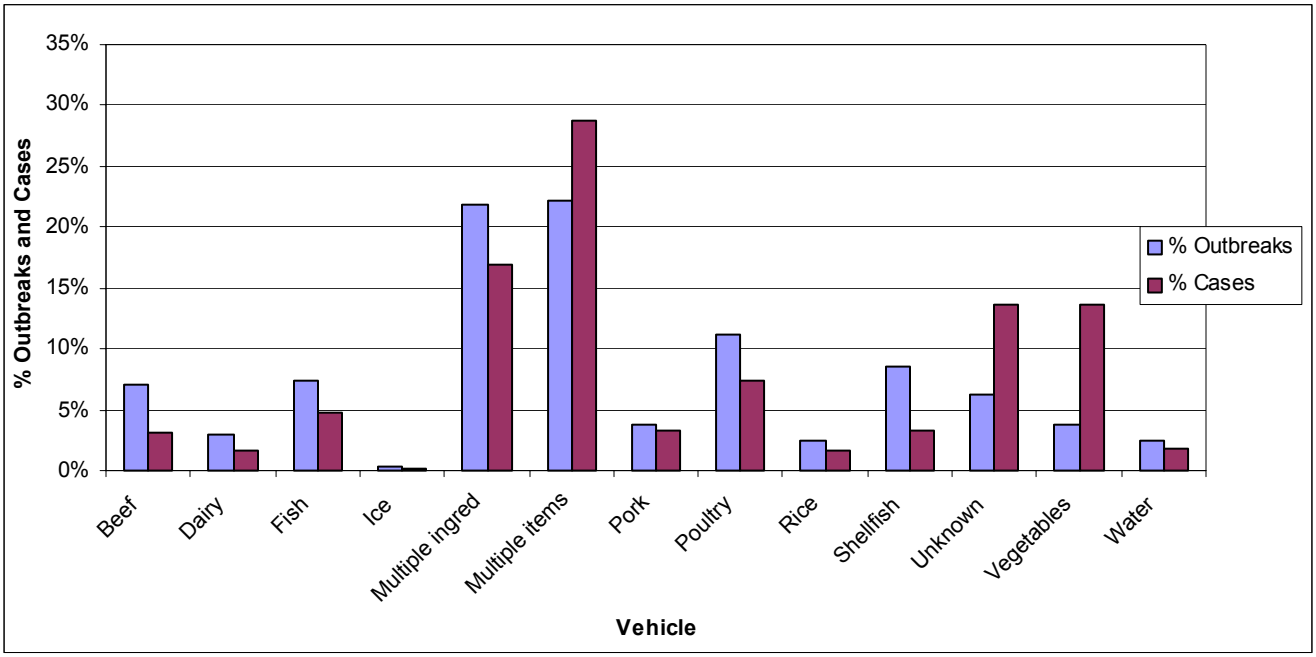


Table 19: Outbreaks by Vehicle, Florida, 2002

Status	Beef	Dairy	Fish	Ice	Multiple ingredients	Multiple items	Pork	Poultry	Rice	Shellfish	Unk	Vegetables	Water	Total
Confirmed	2	1	3	0	9	10	1	3	0	7	9	2	0	47
	4.3%	2.1%	6.4%	0.0%	19.1%	21.3%	2.1%	6.4%	0.0%	14.9%	19.1%	4.3%	0.0%	19.3%
	11.8%	14.3%	16.7%	0.0%	17.0%	18.5%	11.1%	11.1%	0.0%	33.3%	60.0%	22.2%	0.0%	
Suspected	15	6	15	1	44	44	8	24	6	14	6	7	6	196
	7.7%	3.1%	7.7%	0.5%	22.4%	22.4%	4.1%	12.2%	3.1%	7.1%	3.1%	3.6%	3.1%	80.7%
	88.2%	85.7%	83.3%	100.0%	83.0%	81.5%	88.9%	88.9%	100.0%	66.7%	40.0%	77.8%	100.0%	
Total	**17**	**7**	**18**	**1**	**53**	**54**	**9**	**27**	**6**	**21**	**15**	**9**	**6**	**243**
	7.0%	**2.9%**	**7.4%**	**0.4%**	**21.8%**	**22.2%**	**3.7%**	**11.1%**	**2.5%**	**8.6%**	**6.2%**	**3.7%**	**2.5%**	

Table 20: Cases by Vehicle, Florida, 2002

Status	Beef	Dairy	Fish	Ice	Multiple ingredients	Multiple items	Pork	Poultry	Rice	Shellfish	Unk	Vegetables	Water	Total
Confirmed	4	4	29	0	64	170	10	36	0	15	134	175	0	641
	0.6%	0.6%	4.5%	0.0%	10.0%	26.5%	1.6%	5.6%	0.0%	2.3%	20.9%	27.3%	0.0%	43.6%
	8.9%	17.4%	40.8%	0.0%	25.6%	40.3%	20.4%	33.3%	0.0%	31.3%	66.7%	87.5%	0.0%	
Suspected	41	19	42	2	186	252	39	72	24	33	67	25	26	828
	5.0%	2.3%	5.1%	0.2%	22.5%	30.4%	4.7%	8.7%	2.9%	4.0%	8.1%	3.0%	3.1%	56.4%
	91.1%	82.6%	59.2%	100.0%	74.4%	59.7%	79.6%	66.7%	100.0%	68.8%	33.3%	12.5%	100.0%	
Total	**45**	**23**	**71**	**2**	**250**	**422**	**49**	**108**	**24**	**48**	**201**	**200**	**26**	**1469**
	3.1%	**1.6%**	**4.8%**	**0.1%**	**17.0%**	**28.7%**	**3.3%**	**7.4%**	**1.6%**	**3.3%**	**13.7%**	**13.6%**	**1.8%**	

Table 21: Total Outbreaks, Florida, 2002: Etiologic Agent by Vehicle

Pathogen	Beef	Dairy	Fish	Ice	Multiple ingredients	Multiple items	Pork	Poultry	Rice	Shellfish	Unknown	Vegetables	Water	Total
B. cereus	0	0	0	0	2	1	0	1	5	1	0	0	0	10
C. perfringens	3	0	0	0	1	3	2	0	0	1	0	0	0	10
Campylobacter	0	0	0	0	0	0	0	2	0	0	0	0	0	2
Chemical	1	1	0	1	2	1	0	0	0	0	0	0	0	6
Ciguatera	0	0	4	0	0	0	0	0	0	0	0	0	0	4
Cryptosporidium	0	0	0	0	0	0	0	0	0	0	1	0	0	1
E. coli O157:H7	3	0	0	0	0	0	0	0	0	0	0	0	0	3
Hepatitis A	0	0	0	0	0	1	0	0	0	0	2	1	0	4
Norovirus	0	0	1	0	7	8	1	2	0	0	5	3	0	27
Other	0	0	0	0	0	0	0	0	0	0	0	0	1	1
Saxitoxin	0	0	1	0	0	0	0	0	0	0	0	0	0	1
Salmonella	0	0	0	0	4	7	0	6	0	0	1	1	0	19
Scombroid	0	0	3	0	0	0	0	0	0	0	0	0	0	3
Shigella	1	0	0	0	0	2	0	0	0	1	0	0	0	4
Staphylococcus	1	1	0	0	10	8	1	4	0	1	0	1	0	27
Unknown	8	5	9	0	27	23	5	12	1	8	5	3	5	111
V. parahaemolyticus	0	0	0	0	0	0	0	0	0	5	0	0	0	5
V. vulnificus	0	0	0	0	0	0	0	0	0	4	1	0	0	5
Total	**17**	**7**	**18**	**1**	**53**	**54**	**9**	**27**	**6**	**21**	**15**	**9**	**6**	**243**

Table 22: Total Cases in All Outbreaks, Florida, 2002: Etiologic Agent by Vehicle

Pathogen	Beef	Dairy	Fish	Ice	Multiple ingredients	Multiple items	Pork	Poultry	Rice	Shellfish	Unknown	Vegetables	Water	Total
B. cereus	0	0	0	0	10	3	0	3	18	2	0	0	0	36
C. perfringens	15	0	0	0	2	48	18	0	0	4	0	0	0	87
Campylobacter	0	0	0	0	0	0	0	12	0	0	0	0	0	12
Chemical	2	1	0	2	9	2	0	0	0	0	0	0	0	16
Ciguatera	0	0	15	0	0	0	0	0	0	0	0	0	0	15
Cryptosporidium	0	0	0	0	0	0	0	0	0	0	37	0	0	37
E. coli O157:H7	6	0	0	0	0	0	0	0	0	0	0	0	0	6
Hepatitis A	0	0	0	0	0	6	0	0	0	0	7	16	0	29
Norovirus	0	0	5	0	87	149	13	26	0	0	89	13	0	382
Other	0	0	0	0	0	0	0	0	0	0	0	0	2	2
Saxitoxin	0	0	21	0	0	0	0	0	0	0	0	0	0	21
Salmonella	0	0	0	0	15	97	0	16	0	0	5	159	0	292
Scombroid	0	0	6	0	0	0	0	0	0	0	0	0	0	6
Shigella	2	0	0	0	0	7	0	0	0	2	0	0	0	11
Staphylococcus	2	2	0	0	28	18	2	9	0	3	0	2	0	66
Unknown	18	20	24	0	99	92	16	42	6	18	62	10	24	431
V. parahaemolyticus	0	0	0	0	0	0	0	0	0	15	0	0	0	15
V. vulnificus	0	0	0	0	0	0	0	0	0	4	1	0	0	5
Total	**45**	**23**	**71**	**2**	**250**	**422**	**49**	**108**	**24**	**48**	**201**	**200**	**26**	**1469**

Table 23: Confirmed Outbreaks, Florida, 2002: Etiologic Agent by Vehicle

Pathogen	Beef	Dairy	Fish	Multiple Ingredients	Multiple Items	Pork	Poultry	Shellfish	Unknown	Vegetables	Total
B. cereus	0	0	0	1	0	0	0	0	0	0	**1**
C. perfringens	0	0	0	0	1	1	0	0	0	0	**2**
Campylobacter	0	0	0	0	0	0	2	0	0	0	**2**
Ciguatera	0	0	2	0	0	0	0	0	0	0	**2**
Cryptosporidium	0	0	0	0	0	0	0	0	1	0	**1**
E. coli O157: H7	1	0	0	0	0	0	0	0	0	0	**1**
Hepatitis A	0	0	0	0	1	0	0	0	2	1	**4**
Norovirus	0	0	0	2	2	0	1	0	4	0	**9**
Saxitoxin	0	0	1	0	0	0	0	0	0	0	**1**
Salmonella	0	0	0	3	3	0	0	0	1	1	**8**
Shigella	1	0	0	0	0	0	0	1	0	0	**2**
Staphylococcus	0	0	0	0	1	0	0	0	0	0	**1**
Unknown	0	1	0	3	2	0	0	0	0	0	**6**
V. parahaemolyticus	0	0	0	0	0	0	0	2	0	0	**2**
V. vulnificus	0	0	0	0	0	0	0	4	1	0	**5**
Total	**2**	**1**	**3**	**9**	**10**	**1**	**3**	**7**	**9**	**2**	**47**

Table 24: Cases in Confirmed Outbreaks, Florida, 2002: Etiologic Agent by Vehicle

Pathogen	Beef	Dairy	Fish	Multiple Ingredients	Multiple Items	Pork	Poultry	Shellfish	Unknown	Vegetables	Total
B. cereus	0	0	0	8	0	0	0	0	0	0	**8**
C. perfringens	0	0	0	0	29	10	0	0	0	0	**39**
Campylobacter	0	0	0	0	0	0	12	0	0	0	**12**
Ciguatera	0	0	8	0	0	0	0	0	0	0	**8**
Cryptosporidium	0	0	0	0	0	0	0	0	37	0	**37**
E. coli O157: H7	2	0	0	0	0	0	0	0	0	0	**2**
Hepatitis A	0	0	0	0	6	0	0	0	7	16	**29**
Norovirus	0	0	0	18	44	0	24	0	84	0	**170**
Saxitoxin	0	0	21	0	0	0	0	0	0	0	**21**
Salmonella	0	0	0	13	83	0	0	0	5	159	**260**
Shigella	2	0	0	0	0	0	0	2	0	0	**4**
Staphylococcus	0	0	0	0	2	0	0	0	0	0	**2**
Unknown	0	4	0	25	6	0	0	0	0	0	**35**
V. parahaemolyticus	0	0	0	0	0	0	0	9	0	0	**9**
V. vulnificus	0	0	0	0	0	0	0	4	1	0	**5**
Total	**4**	**4**	**29**	**64**	**170**	**10**	**36**	**15**	**134**	**175**	**641**

Table 25: Suspected Outbreaks, Florida, 2002: Etiologic Agent by Vehicle

Pathogen	Beef	Dairy	Fish	Ice	Multiple Ingredients	Multiple items	Pork	Poultry	Rice	Shellfish	Unknown	Vegetables	Water	Total
B. cereus	0	0	0	0	1	1	0	1	5	1	0	0	0	**9**
C. perfringens	3	0	0	0	1	2	1	0	0	1	0	0	0	**8**
Chemical	1	1	0	1	2	1	0	0	0	0	0	0	0	**6**
Ciguatera	0	0	2	0	0	0	0	0	0	0	0	0	0	**2**
E. coli O157:H7	2	0	0	0	0	0	0	0	0	0	0	0	0	**2**
Norovirus	0	0	1	0	5	6	1	1	0	0	1	3	0	**18**
Other	0	0	0	0	0	0	0	0	0	0	0	0	1	**1**
Salmonella	0	0	0	0	1	4	0	6	0	0	0	0	0	**11**
Scombroid	0	0	3	0	0	0	0	0	0	0	0	0	0	**3**
Shigella	0	0	0	0	0	2	0	0	0	0	0	0	0	**2**
Staphylococcus	1	1	0	0	10	7	1	4	0	1	0	1	0	**26**
Unknown	8	4	9	0	24	21	5	12	1	8	5	3	5	**105**
V. parahaemolyticus	0	0	0	0	0	0	0	0	0	3	0	0	0	**3**
Total	**15**	**6**	**15**	**1**	**44**	**44**	**8**	**24**	**6**	**14**	**6**	**7**	**6**	**196**

Table 26: Cases in Suspected Outbreaks, Florida, 2002: Etiologic Agent by Vehicle

Pathogen	Beef	Dairy	Fish	Ice	Multiple Ingredients	Multiple items	Pork	Poultry	Rice	Shellfish	Unknown	Vegetables	Water	Total
B. cereus	0	0	0	0	2	3	0	3	18	2	0	0	0	**28**
C. perfringens	15	0	0	0	2	19	8	0	0	4	0	0	0	**48**
Chemical	2	1	0	2	9	2	0	0	0	0	0	0	0	**16**
Ciguatera	0	0	7	0	0	0	0	0	0	0	0	0	0	**7**
E. coli O157:H7	4	0	0	0	0	0	0	0	0	0	0	0	0	**4**
Norovirus	0	0	5	0	69	105	13	2	0	0	5	13	0	**212**
Other	0	0	0	0	0	0	0	0	0	0	0	0	2	**2**
Salmonella	0	0	0	0	2	14	0	16	0	0	0	0	0	**32**
Scombroid	0	0	6	0	0	0	0	0	0	0	0	0	0	**6**
Shigella	0	0	0	0	0	7	0	0	0	0	0	0	0	**7**
Staphylococcus	2	2	0	0	28	16	2	9	0	3	0	2	0	**64**
Unknown	18	16	24	0	74	86	16	42	6	18	62	10	24	**396**
V. parahaemolyticus	0	0	0	0	0	0	0	0	0	6	0	0	0	**6**
Total	**41**	**19**	**42**	**2**	**186**	**252**	**39**	**72**	**24**	**33**	**67**	**25**	**26**	**828**

Figure 21: Percent Total Outbreaks and Cases by Month, Florida, 2002

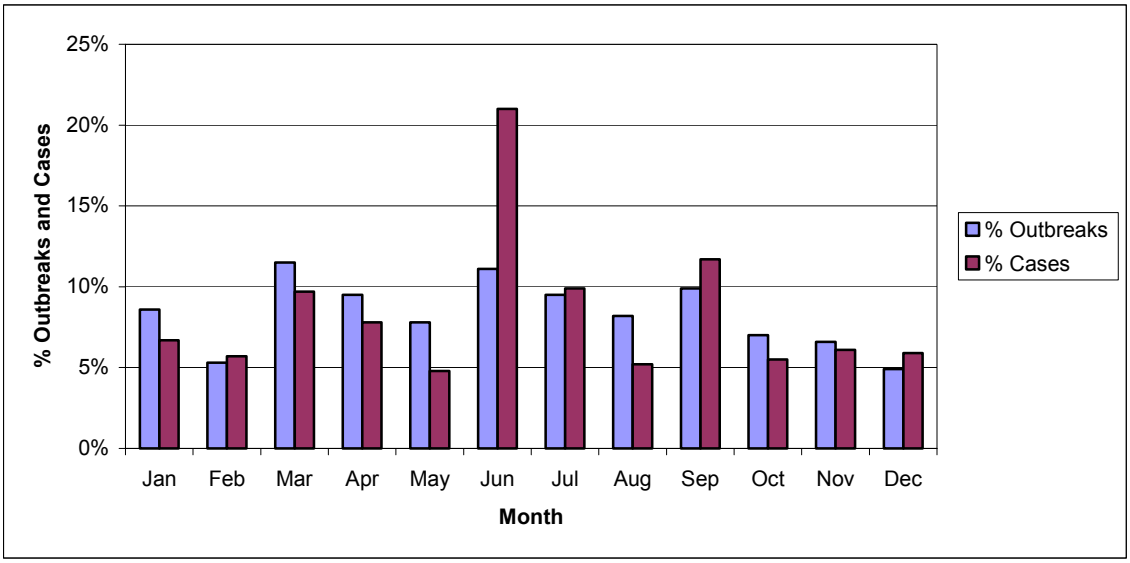


Table 27: Outbreaks by Month, Florida, 2002

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Status	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Confirmed	2	4	5	4	4	9	6	3	5	3	1	1	47
	4.3%	8.5%	10.6%	8.5%	8.5%	19.1%	12.8%	6.4%	10.6%	6.4%	2.1%	2.1%	19.3%
	9.5%	30.8%	17.9%	17.4%	21.1%	33.3%	26.1%	15.0%	20.8%	17.6%	6.3%	8.3%	
Suspected	19	9	23	19	15	18	17	17	19	14	15	11	196
	9.7%	4.6%	11.7%	9.7%	7.7%	9.2%	8.7%	8.7%	9.7%	7.1%	7.7%	5.6%	80.7%
	90.5%	69.2%	82.1%	82.6%	78.9%	66.7%	73.9%	85.0%	79.2%	82.4%	93.8%	91.7%	
Total	**21**	**13**	**28**	**23**	**19**	**27**	**23**	**20**	**24**	**17**	**16**	**12**	**243**
	8.6%	**5.3%**	**11.5%**	**9.5%**	**7.8%**	**11.1%**	**9.5%**	**8.2%**	**9.9%**	**7.0%**	**6.6%**	**4.9%**	

Table 28: Outbreak-associated Cases by Month, Florida, 2002

Status	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Confirmed	26	47	43	52	20	268	82	10	65	12	4	12	641
	4.1%	7.3%	6.7%	8.1%	3.1%	41.8%	12.8%	1.6%	10.1%	1.9%	0.6%	1.9%	43.6%
	26.5%	56.0%	30.1%	45.6%	28.2%	86.7%	56.6%	13.0%	37.8%	14.8%	4.5%	14.0%	
Suspected	72	37	100	62	51	41	63	67	107	69	85	74	828
	8.7%	4.5%	12.1%	7.5%	6.2%	5.0%	7.6%	8.1%	12.9%	8.3%	10.3%	8.9%	56.4%
	73.5%	44.0%	69.9%	54.4%	71.8%	13.3%	43.4%	87.0%	62.2%	85.2%	95.5%	86.0%	
Total	98	84	143	114	71	309	145	77	172	81	89	86	1469
	6.7%	5.7%	9.7%	7.8%	4.8%	21.0%	9.9%	5.2%	11.7%	5.5%	6.1%	5.9%	

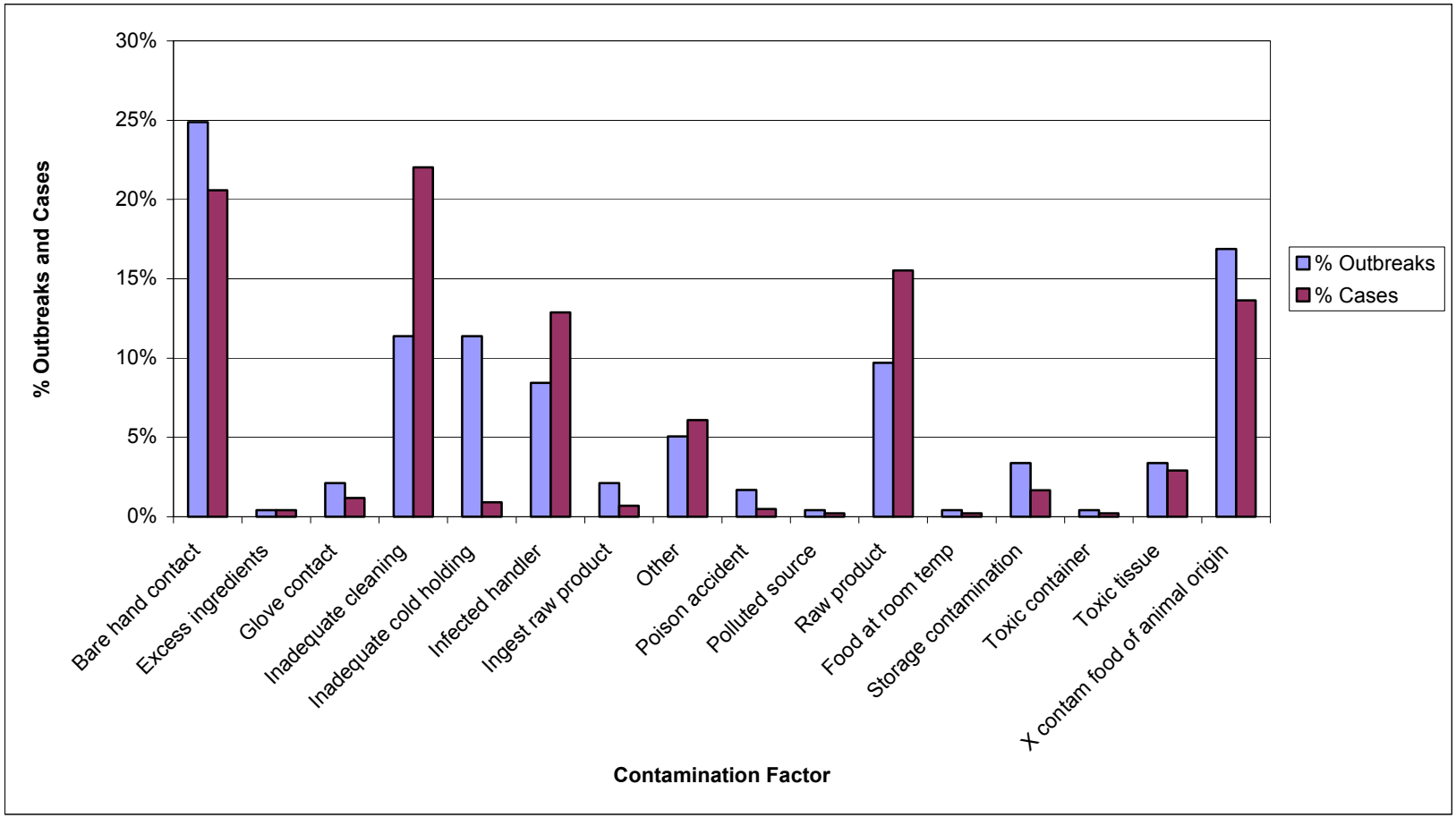
Table 29: Outbreaks With Greater Than 10 Cases (n=20), Florida, 2002[22]

Status	County	# Cases	Site	Vehicle	Pathogen	Pathogen Status
Confirmed	Hillsborough	12	Restaurant	Bread	Unknown	Unknown
Suspected	Manatee	13	Home	Ham	Norovirus	Suspected
Suspected	Flagler	14	Restaurant	Ready to eat foods	Norovirus	Suspected
Confirmed	Polk	16	Other	Coleslaw	Hepatitis A	Confirmed
Suspected	Manatee	17	Caterer	Mexican food items	C. perfringens	Suspected
Confirmed	Escambia	18	Grocery	Cold cut meats	Salmonella	Confirmed
Suspected	Pinellas	18	Restaurant	Various food items	Norovirus	Suspected
Suspected	Orange	19	Other	Baked beans	Norovirus	Suspected
Confirmed	Brevard	21	Other	Puffer fish	Saxitoxin	Confirmed
Confirmed	Hillsborough	24	Grocery	Roast turkey	Norovirus	Suspected
Confirmed	Duval	28	Restaurant	Unknown	Norovirus	Confirmed
Confirmed	Duval	29	Restaurant	Potatoes with gravy	C. perfringens	Suspected
Confirmed	Volusia	34	Other	Ice/fomites	Norovirus	Confirmed
Suspected	Broward	36	Restaurant	Unknown	Norovirus	Suspected
Confirmed	Brevard	37	Other	Unknown	Cryptosporidium	Confirmed
Confirmed	Escambia	40	Caterer	Cake w/ icing	Norovirus	Confirmed
Suspected	Dade	44	School	Unknown	Unknown	Unknown
Suspecte	Hillsboroug	52	School	Mashed potatoes, milk, pops	Norovirus	Suspected

[22] The total number of outbreaks with more than ten cases is: 20 (8.2% of the total). The total number of cases associated with these outbreaks is 687 (46.7% of the total).

d	h					
Confirmed	Orange	56	Picnic	Coleslaw potato salad	Salmonella	Confirmed
Confirmed	Orange	159	Other	Diced tomatoes	Salmonella	Confirmed
	Total Cases	687				

Figure 22: Contamination Factor – Percent Total Foodborne Outbreaks (n=290) and Cases (n=1443), Florida, 2002 [23]



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

Table 30: Contamination Factor - Number of Outbreaks (n=237) and Cases (n=1443) Associated With Foodborne Outbreaks, Florida, 2002[24]

Contamination Factor	# Outbreaks	# Cases
Bare hand contact	59	297
Excess ingredients	1	6
Glove contact	5	17
Inadequate cleaning	27	318
Inadequate cold holding	2	13
Infected handler	20	186
Ingest raw product	5	10
Other	12	88
Poison accident	4	7
Polluted source	1	3
Raw product	23	224
Room temp	1	3
Storage contamination	8	24
Toxic container	1	3
Toxic tissue	8	42
X contam food of animal origin	40	197

Table 31: Contamination Factor: Percent of Total Foodborne Outbreaks (n=237) and Cases Associated With Outbreaks (n=1443), Florida, 2002

Contamination Factor	% Outbreaks	% Cases
Bare hand contact	24.9%	20.6%
Excess ingredients	0.4%	0.4%
Glove contact	2.1%	1.2%
Inadequate cleaning	11.4%	22.0%
Inadequate cold holding	11.4%	0.9%
Infected handler	8.4%	12.9%
Ingest raw product	2.1%	0.7%
Other	5.1%	6.1%
Poison accident	1.7%	0.5%
Polluted source	0.4%	0.2%
Raw product	9.7%	15.5%
Room temp	0.4%	0.2%
Storage contamination	3.4%	1.7%
Toxic container	0.4%	0.2%
Toxic tissue	3.4%	2.9%
X contam food of animal origin	16.9%	13.7%

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

Figure 23: Proliferation/Amplification Factor: Percent Total Foodborne Outbreaks, Florida, 2002[25]

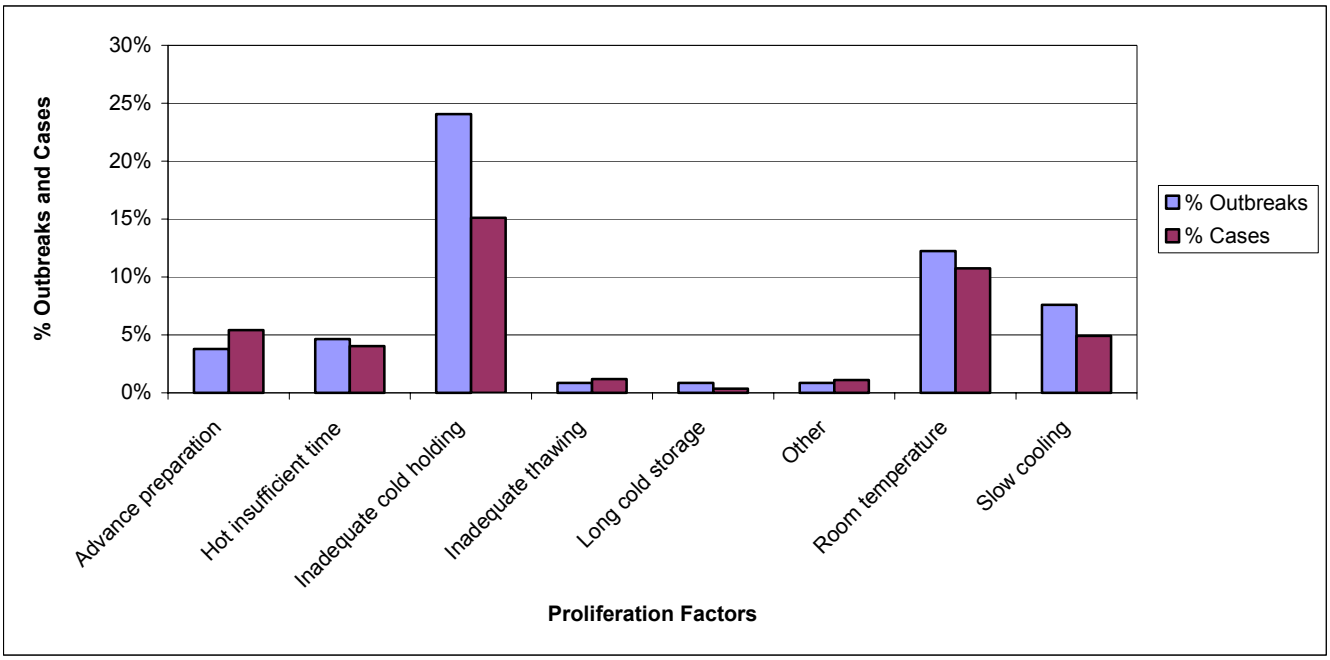


Table 32: Proliferation/Amplification Factor:
Number of Foodborne Outbreaks (n=237) and Cases Associated With Foodborne Outbreaks (n=1443), Florida, 2002

Proliferation Factor	# Outbreaks	# Cases
Advance preparation	9	78
Hot insufficient time	11	56
Inadequate cold holding	57	218
Inadequate thawing	2	17
Long cold storage	2	5
Other	2	16
Room temperature	29	155
Slow cooling	18	71

Table 33: Proliferation/Amplification Factor:
Percent Total Foodborne Outbreaks (n=237) and Cases Associated With Foodborne Outbreaks (n=1443) , Florida, 2002

Proliferation Factor	% Outbreaks	% Cases
Advance preparation	3.8%	5.4%
Hot insufficient time	4.6%	4.0%
Inadequate cold holding	24.1%	15.1%
Inadequate thawing	0.8%	1.2%
Long cold storage	0.8%	0.3%
Other	0.8%	1.1%
Room temperature	12.2%	10.7%
Slow cooling	7.6%	4.9%

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

Figure 24: Survival Factor: Percent Total Foodborne Outbreaks (n=237) and Cases Associated With Foodborne Outbreaks (n=1443), Florida, 2002[26]

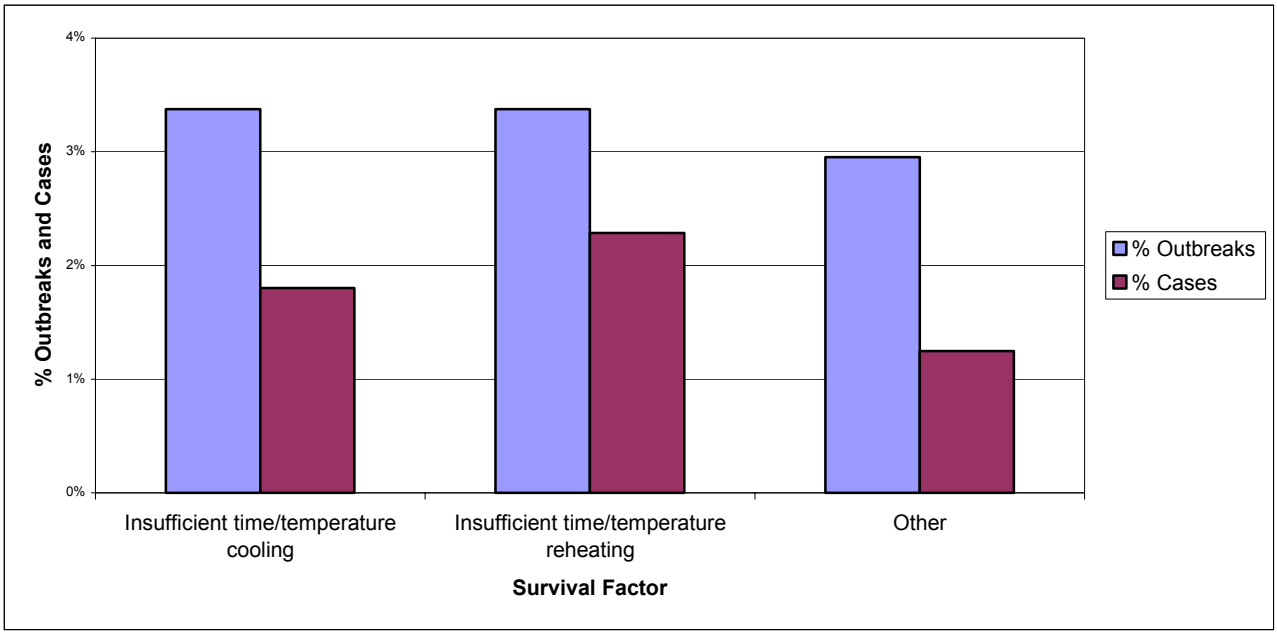


**Table 34: Survival Factor:
Number of Foodborne Outbreaks (n=237) and Cases Associated With Foodborne Outbreaks (n=1443), Florida, 2002**

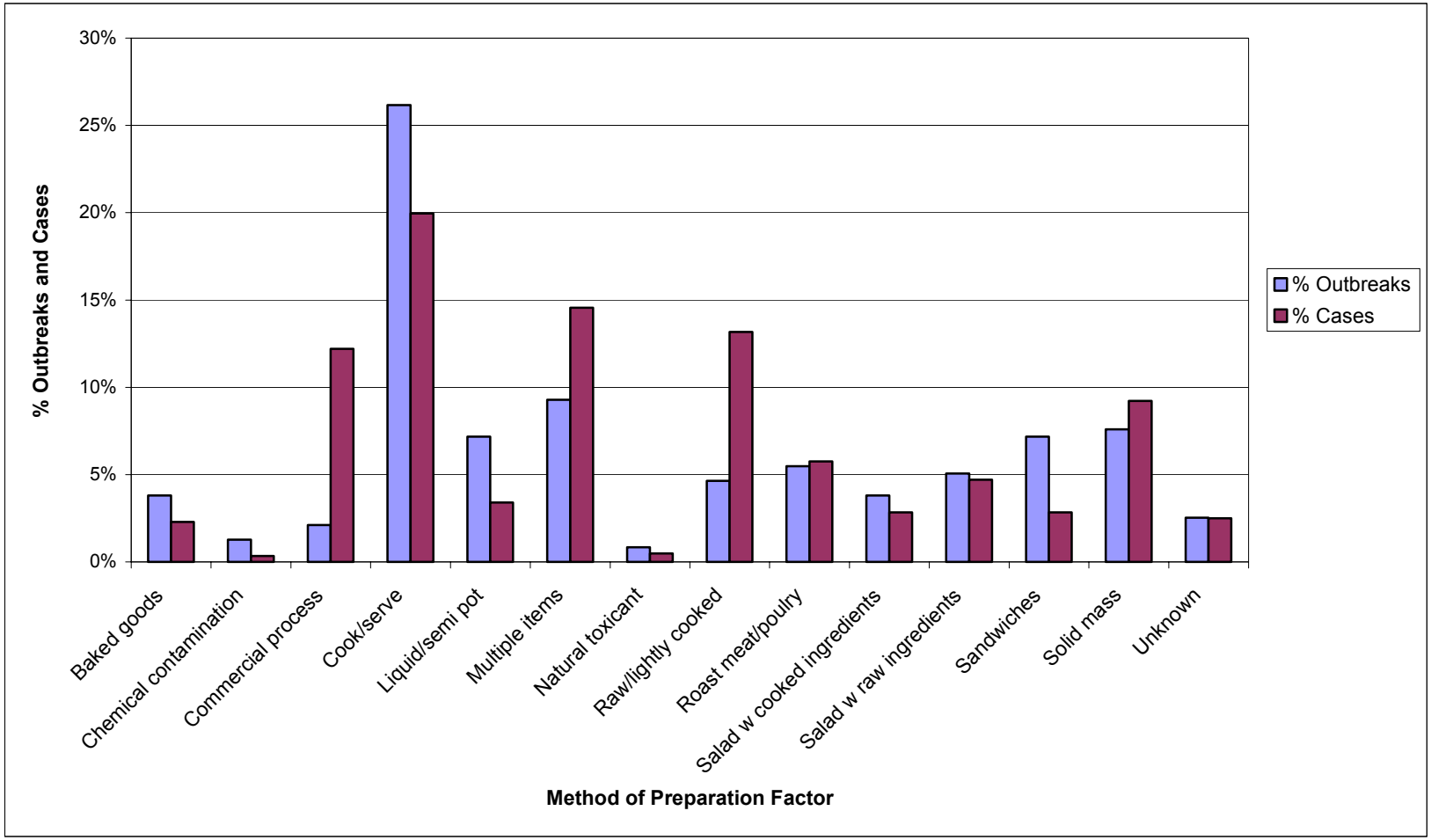
Survival Factor	# Outbreak	# Cases
Insufficient time/temperature cooling	8	26
Insufficient time/temperature reheating	8	33
Other	7	18

**Table 35: Survival Factor:
Percent Total Foodborne Outbreaks (n=237) and Cases Associated With Foodborne Outbreaks (n=1443), Florida, 2002**

Survival Factor	% Outbreaks	% Cases
Insufficient time/temperature cooling	3.4%	1.8%
Insufficient time/temperature reheating	3.4%	2.3%
Other	3.0%	1.2%

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

Figure 25: Method of Preparation Factor: Percent Foodborne Outbreaks (n=237) and Outbreak-related Cases (n=1443), Florida, 2002[27]



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

Table 36: Method of Preparation Factor:
Number of Foodborne Outbreaks (n=237) and Cases Associated With Foodborne Outbreaks (n=1443), Florida, 2002

Method of Preparation	# of Outbreaks	# of Cases
Baked goods	9	33
Chemical contamination	3	5
Commercial process	5	176
Cook/serve	62	288
Liquid/semi liquid potentially hazardous	17	49
Multiple items	22	210
Natural toxicant	2	7
Raw/lightly cooked	11	190
Roast meat/poulry	13	83
Salad w cooked ingredients	9	41
Salad w raw ingredients	12	68
Sandwiches	17	41
Solid mass	18	133
Unknown	6	36

Table 37: Method of Preparation Factor:
Percent Total Foodborne Outbreaks (n=237) and Cases Associated With Foodborne Outbreaks (n=1443) , Florida, 2002[28]

Method of Preparation	# of Outbreaks	# of Cases
Baked goods	3.8%	2.3%
Chemical contamination	1.3%	0.3%
Commercial process	2.1%	12.2%
Cook/serve	26.2%	20.0%
Liquid/semi liquid potentially hazardous	7.2%	3.4%
Multiple items	9.3%	14.6%
Natural toxicant	0.8%	0.5%
Raw/lightly cooked	4.6%	13.2%
Roast meat/poulry	5.5%	5.8%
Salad w cooked ingredients	3.8%	2.8%
Salad w raw ingredients	5.1%	4.7%
Sandwiches	7.2%	2.8%
Solid mass	7.6%	9.2%
Unknown	2.5%	2.5%

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

Table 38: Contamination Factors by Etiologic Agent for Foodborne Outbreaks Reported in Florida (n=237), 2002

Pathogen	Bare hand contact	Excess ingred	Glove contact	Inad cleaning	Inad cold holding	Infected handler	Ingest raw product	Other	Poison accident	Polluted source	Raw product	Room T	Storage contam	Toxic container	Toxic tissue	X contam animal	Total
B. cereus	1	0	0	1	1	0	0	0	0	0	6	0	0	0	0	0	**9**
C. perfringens	1	0	0	0	1	1	0	0	0	0	3	1	0	0	0	1	**8**
Campylobacter	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	**2**
Chemical	0	1	0	0	0	0	0	0	4	0	0	0	0	1	0	0	**6**
Ciguatera	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	**4**
E. coli O157:H7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	**1**
Hepatitis A	2	0	0	1	0	3	0	0	0	0	0	0	0	0	0	0	**6**
Norovirus	9	0	1	1	0	9	2	1	0	0	4	0	0	0	0	0	**27**
Saxitoxin	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	**1**
Salmonella	1	0	0	4	0	1	0	1	0	0	5	0	0	0	0	9	**21**
Scombroid	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	**3**
Shigella	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0	**2**
Staphylococcus	14	0	2	4	0	2	0	1	0	0	0	0	0	0	0	6	**29**
Unknown	29	0	2	14	0	4	1	8	0	1	1	0	6	0	0	20	**86**
V. parahaemolyticus	1	0	0	1	0	0	0	0	0	0	4	0	1	0	0	2	**9**
V. vulnificus	0	0	0	0	0	0	2	1	0	0	0	0	0	0	0	0	**3**
Total	**59**	**1**	**5**	**27**	**2**	**20**	**5**	**12**	**4**	**1**	**23**	**1**	**8**	**1**	**8**	**40**	**217**

Table 39: Contamination Factors by Etiologic Agent for Cases in Foodborne Outbreaks Reported in Florida (n=1443), 2002

Pathogen	Bare hand contact	Excess ingred	Glove contact	Inad cleaning	Inad cold holding	Infected handler	Ingest raw product	Other	Poison accident	Polluted source	Raw product	Room T	Storage contam	Toxic container	Toxic tissue	X contam animal	Total
B. cereus	3	0	0	2	10	0	0	0	0	0	13	0	0	0	0	0	28
C. perfringens	2	0	0	0	3	17	0	0	0	0	12	3	0	0	0	2	39
Campylobacter	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	8
Chemical	0	6	0	0	0	0	0	0	7	0	0	0	0	3	0	0	16
Ciguatera	0	0	0	0	0	0	0	0	0	0	0	0	0	0	15	0	15
E. coli O157:H7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2
Hepatitis A	22	0	0	6	0	24	0	0	0	0	0	0	0	0	0	0	52
Norovirus	129	0	5	18	0	119	5	34	0	0	17	0	0	0	0	0	327
Saxitoxin	0	0	0	0	0	0	0	0	0	0	0	0	0	0	21	0	21
Salmonella	5	0	0	229	0	7	0	9	0	0	167	0	0	0	0	107	524
Scombroid	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	0	6
Shigella	0	0	0	2	0	0	0	0	0	0	0	0	2	0	0	0	4
Staphylococcus	34	0	5	11	0	4	0	2	0	0	0	0	0	0	0	14	70
Unknown	96	0	7	48	0	15	3	42	0	3	2	0	20	0	0	64	300
V. parahaemolyticus	2	0	0	2	0	0	0	0	0	0	13	0	2	0	0	4	23
V. vulnificus	0	0	0	0	0	0	2	1	0	0	0	0	0	0	0	0	3
Total	**297**	**6**	**17**	**318**	**13**	**186**	**10**	**88**	**7**	**3**	**224**	**3**	**24**	**3**	**42**	**197**	1438

Table 40: Proliferation/Amplification Factors by Etiologic Agent for Foodborne Outbreaks Reported in Florida (n=237), 2002

Pathogen	Advance preparation	Hot insufficient time	Inad cold holding	Inad thawing	Long cold storage	Other	Room T	Slow cool	Total
B. cereus	3	0	2	0	1	0	3	2	**11**
C. perfringens	1	2	1	1	0	0	3	2	**10**
Campylobacter	0	0	1	0	0	0	0	0	**1**
Norovirus	0	0	0	0	0	0	2	0	**2**
Salmonella	1	0	5	0	0	2	5	3	**16**
Scombroid	0	0	2	0	0	0	0	0	**2**
Shigella	0	0	2	0	0	0	0	0	**2**
Staphylococcus	1	0	11	0	0	0	5	6	**23**
Unknown	3	9	30	1	1	0	10	5	**59**
V. parahaemolyticus	0	0	3	0	0	0	1	0	**4**
Total	**9**	**11**	**57**	**2**	**2**	**2**	**29**	**18**	**130**

Table 41: Proliferation/Amplification Factors by Etiologic Agent for Cases in Foodborne Outbreaks Reported in Florida (n=1443), 2002

Pathogen	Advance preparation	Hot insufficient time	Inad cold holding	Inad thawing	Long cold storage	Other	Room T	Slow cool	Total
B. cereus	12	0	10	0	3	0	6	4	**35**
C. perfringens	2	18	4	10	0	0	19	24	**77**
Campylobacter	0	0	4	0	0	0	0	0	**4**
Norovirus	0	0	0	0	0	0	14	0	**14**
Salmonella	56	0	76	0	0	16	72	13	**233**
Scombroid	0	0	4	0	0	0	0	0	**4**
Shigella	0	0	4	0	0	0	0	0	**4**
Staphylococcus	2	0	26	0	0	0	12	14	**54**
Unknown	6	38	79	7	2	0	25	16	**173**
V. parahaemolyticus	0	0	11	0	0	0	7	0	**18**
Total	**78**	**56**	**218**	**17**	**5**	**16**	**155**	**71**	**616**

Table 42: Survival Factors by Etiologic Agent for Foodborne Outbreaks Reported in Florida (n=237), 2002

Pathogen	Insuff time/T cooling	Insuff time/T reheating	Other	Total
C. perfringens	0	5	1	6
Campylobacter	0	1	0	1
Salmonella	2	0	1	3
Staphylococcus	2	1	0	3
Unknown	4	1	5	10
Total	**8**	**8**	**7**	**23**

Table 43: Survival Factors by Etiologic Agent for Cases in Foodborne Outbreaks Reported in Florida (n=1443), 2002

Pathogen	Insuff time/T cooling	Insuff time/T reheating	Other	Total
C. perfringens	0	5	1	**6**
Campylobacter	0	1	0	**1**
Salmonella	2	0	1	**3**
Staphylococcus	2	1	0	**3**
Unknown	4	1	5	**10**
Total	**8**	**8**	**7**	**23**

Table 44: Method of Preparation Factors by Etiologic Agent for Foodborne Outbreaks Reported in Florida (n=237), 2002

Pathogen	Baked goods	Chemical contamination	Commercial process	Cook/ serve	Liquid/ semi pot	Multiple items	Natural toxicant	Raw/light cooked	Roast meat/ poultry	Salad w cooked ingred	Salad w raw ingred	Sandwiches	Solid mass	Unknown	Total
B. cereus	0	0	0	2	1	0	0	0	0	0	0	0	6	0	**9**
C. perfringens	0	0	0	1	2	1	0	0	4	0	0	0	0	0	**8**
Campylobacter	0	0	0	2	0	0	0	0	0	0	0	0	0	0	**2**
Chemical	0	3	0	2	1	0	0	0	0	0	0	0	0	0	**6**
Ciguatera	0	0	0	3	0	0	1	0	0	0	0	0	0	0	**4**
E. coli O157:H7	0	0	0	1	0	0	0	0	0	0	0	0	0	0	**1**
Hepatitis A	0	0	0	0	0	0	0	0	0	0	1	0	0	2	**3**
Norovirus	0	0	0	2	0	5	0	0	1	3	5	3	1	1	**21**
Saxitoxin	0	0	0	1	0	0	0	0	0	0	0	0	0	0	**1**
Salmonella	0	0	1	6	0	4	0	2	1	0	0	0	2	1	**17**
Scombroid	0	0	0	2	0	0	1	0	0	0	0	0	0	0	**3**
Shigella	0	0	0	1	0	1	0	0	0	0	0	1	0	0	**3**
Staphylococcus	5	0	1	7	0	4	0	0	0	3	0	5	1	0	**26**
Unknown	4	0	3	29	13	7	0	6	7	2	6	8	8	2	**95**
V. parahaemolyticus	0	0	0	3	0	0	0	1	0	1	0	0	0	0	**5**
V. vulnificus	0	0	0	0	0	0	0	2	0	0	0	0	0	0	**2**
Total	**9**	**3**	**5**	**62**	**17**	**22**	**2**	**11**	**13**	**9**	**12**	**17**	**18**	**6**	**206**

Table 45: Method of Preparation Factors by Etiologic Agent for Cases in Foodborne Outbreaks Reported in Florida (n=1443), 2002

Pathogen	Baked goods	Chemical contamination	Commercial process	Cook/ serve	Liquid/ semi pot	Multiple items	Natural toxicant	Raw/light cooked	Roast meat/ poultry	Salad w cooked ingred	Salad w raw ingred	Sandwiches	Solid mass	Unknown	Total
B. cereus	0	0	0	5	3	0	0	0	0	0	0	0	18	0	**26**
C. perfringens	0	0	0	2	4	17	0	0	30	0	0	0	0	0	**53**
Campylobacter	0	0	0	12	0	0	0	0	0	0	0	0	0	0	**12**
Chemical	0	5	0	8	3	0	0	0	0	0	0	0	0	0	**16**
Ciguatera	0	0	0	10	0	0	5	0	0	0	0	0	0	0	**15**
E. coli O157:H7	0	0	0	2	0	0	0	0	0	0	0	0	0	0	**2**
Hepatitis A	0	0	0	0	0	0	0	0	0	0	16	0	0	11	**27**
Norovirus	0	0	0	32	0	93	0	0	24	24	28	7	19	7	**234**
Saxitoxin	0	0	0	21	0	0	0	0	0	0	0	0	0	0	**21**
Salmonella	0	0	159	73	0	66	0	161	2	0	0	0	61	7	**529**
Scombroid	0	0	0	4	0	0	2	0	0	0	0	0	0	0	**6**
Shigella	0	0	0	2	0	2	0	0	0	0	0	2	0	0	**6**
Staphylococcus	14	0	2	17	0	8	0	0	0	11	0	10	2	0	**64**
Unknown	19	0	15	89	39	24	0	25	27	4	24	22	33	11	**332**
V. parahaemolyticus	0	0	0	11	0	0	0	2	0	2	0	0	0	0	**15**
V. vulnificus	0	0	0	0	0	0	0	2	0	0	0	0	0	0	**2**
Total	**33**	**5**	**176**	**288**	**49**	**210**	**7**	**190**	**83**	**41**	**68**	**41**	**133**	**36**	**1360**

Figure 26: Waterborne Disease Factors: Percent Total Waterborne Outbreaks (n=11), Florida, 2002[29][30]

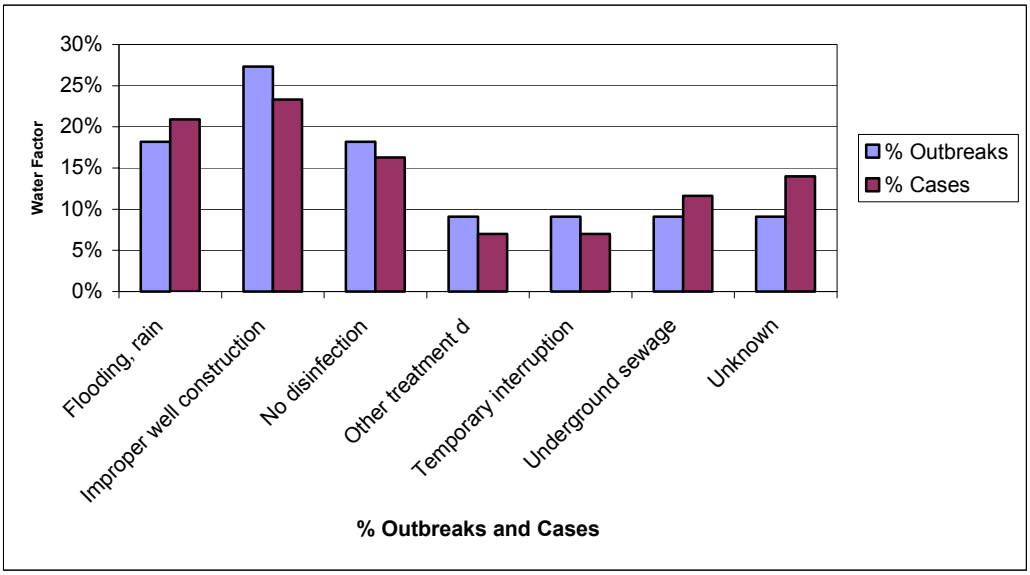


**Table 46: Waterborne Disease Factor:
Number of Waterborne Outbreaks (n=11) and Cases Associated With Waterborne Outbreaks (n=43), Florida, 2002**

Water Factors	# Outbreaks	# Cases
Flooding, rain	2	9
Improper well construction	3	10
No disinfection	2	7
Other treatment d	1	3
Temporary interruption	1	3
Underground sewage	1	5
Unknown	1	6
Total	**11**	**43**

**Table 47: Waterborne Disease Factors:
Percent Total Waterborne Outbreaks (n=11) and Cases Associated With Waterborne Outbreaks (n=43) , Florida, 2002[31]**

Water Factors	% Outbreaks	% Cases
Flooding, rain	18.2%	20.9%
Improper well construction	27.3%	23.3%
No disinfection	18.2%	16.3%
Other treatment deficiencies	9.1%	7.0%
Temporary interruption	9.1%	7.0%
Underground sewage	9.1%	11.6%
Unknown	9.1%	14.0%
Total	**100.0%**	**100.0%**

[29] Each outbreak may have up to three waterborne disease factors.
[30] All waterborne outbreaks in 2002 were reported by a single county: Hillsborough.
[31] Each outbreak may have up to three waterborne disease factors.

Table 48: Contributing Factors by Etiologic Agent for All Waterborne Outbreaks (n=11), Florida, 2002

Pathogen	Flooding, rain	Improper well construction	No disinfection	Other treatmt deficiencies	Temporary interruption	Underground sewage	Unknown	Total
Other	1	1	1	0	0	0	0	**3**
Unknown	1	2	1	1	1	1	1	**8**
Total	**2**	**3**	**2**	**1**	**1**	**1**	**1**	**11**

Table 49: Contributing Factors by Etiologic Agent for Cases Associated With All Waterborne Outbreaks (n=43), Florida, 2002

Pathogen	Flooding, rain	Improper well construction	No disinfection	Other treatmt deficiencies	Temporary interruption	Underground sewage	Unknown	Total
Other	1	1	1	0	0	0	0	**3**
Unknown	1	2	1	1	1	1	1	**8**
Total	**2**	**3**	**2**	**1**	**1**	**1**	**1**	**11**

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[32]

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

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