Food and Waterborne Illness Surveillance and Investigation
Annual Report, Florida, 2006

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

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Overview

The 2006 year continued to be active for food and waterborne outbreak reporting and investigation: a total of 4,262 food and waterborne illness complaints were reported in Florida. Of these complaints, 3,036 were linked to Department of Business and Professional Regulation establishments; 930 to Department of Agriculture and Consumer Services establishments; 100 to Department of Health establishments; and 190 to other types of facilities. Foodborne outbreaks numbered 142 with 1,141 cases. Six (6) waterborne outbreaks were reported in 2006, with a total of 122 cases. A total of 148 food and waterborne outbreaks with 1,263 cases were reported in 2006, compared with 131 outbreaks with 2,017 cases in 2005, and 175 outbreaks and 1,954 cases for 2004. Investigators were able to laboratory confirm 37 of the outbreaks associated with 762 cases (including 6 *Vibrio vulnificus* cases). The largest outbreak reported in 2006 was due to Norovirus with an unknown vehicle in Palm Beach County with a total case count of 248, accounting for 20% of all outbreak-related cases reported in 2006. Norovirus, *Staphylococcus*, and *Ciguatera* were implicated in the largest percentage of the total reported outbreaks (20%, 7%, and 7%, respectively). After the Norovirus outbreak, *Staphylococcus aureus* was identified in the largest percentage of cases in total reported outbreaks (5%) followed by Giardia (5%) and Ciguatera (5 %). Restaurants were the exposure site in 78% of the outbreaks reported and in 54% of the cases. Multiple items (21%) and fish (14%) accounted for a total of 35% of all outbreaks, followed by multiple ingredients (11%), beef and molluscan shellfish (both 7% - this includes all single *Vibrio vulnificus* cases)[1], and poultry (7%). Multiple items accounted for 35% of all outbreak-related cases, followed by recreational water (9%) and fish (6%). The month with the largest percentage of outbreaks reported was April (14%) with the largest percentage of cases in April (27%). Large (greater than 10 cases) outbreaks accounted for 15% (22) of the total reported outbreaks and 67% (846) 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 by Foodborne Outbreak (n=142), Florida, 2006

Contributing Factor[2]	# Outbreaks	# Cases
Contamination Factor[3]		
Bare hand contact	43	568
Inadequate cleaning	27	179
Proliferation/amplification Factor		
Inadequate cold holding	41	135
Insufficient time/temperature hot holding	12	43
Survival Factor		
Insufficient time/T during reheating	4	21
Insufficient time/T during cooking processing	3	14

[1] *Vibrio vulnificus* cases are also counted as outbreaks because of the virulence of the disease.
[2] Each outbreak can have at least three of each of the four types of factor, thus the outbreaks and outbreak-related cases will not add up to the actual number. See Tables 27-47 and last two pages of Appendix for more detailed information.
[3] The contamination factor of "infected person" is only attributed to 8 outbreaks, however it affected 438 outbreak-related cases, more than "inadequate cleaning."

Contributing Factor[2]	# Outbreaks	# Cases
Method of Preparation		
Cook/serve food	52	218
Multiple foods	23	214

The contributing factors listed in Table 1 are areas where food worker educators and public health professionals can concentrate their education efforts. Table 2 summarizes the total number of food and waterborne disease outbreaks for years for which records are available.

Table 2: Summary of Food and Waterborne Illness Outbreaks Reported to Florida, 1989–2006[4]

Year	# Outbreaks	# Cases
1989	11	72
1990	7	314
1991	17	331
1992	40	1048
1993	136	890
1994	**258**	**1526**
1995	**296**	**2908**
1996	**305**	**2777**
1997	**439**	**2744**
1998	**315**	**3290**
1999	**286**	**1544**
2000	**288**	**1757**
2001	**303**	**2052**
2002	**243**	**1469**
2003	**188**	**1648**
2004	**175**	**1954**
2005	**131**	**2017**
2006	**148**	**1263**

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

Table 3: Confirmed, Suspected, and Total Food and Waterborne Outbreaks and Outbreak-related Cases Reported to Florida DOH, 1995-2006

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

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

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

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

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

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

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

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

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

2004	# Outbreaks	# Cases
Confirmed	58	1498
Suspected	117	456
Total	**175**	**1954**

2005	# Outbreaks	# Cases
Confirmed	33	1617
Suspected	98	400
Total	**131**	**2017**

2006	# Outbreaks	# Cases
Confirmed	40	768
Suspected	108	495
Total	**148**	**1263**

Figure 1: Number of Confirmed and Suspected Food and Waterborne Outbreaks by Year, Florida, 1995-2006

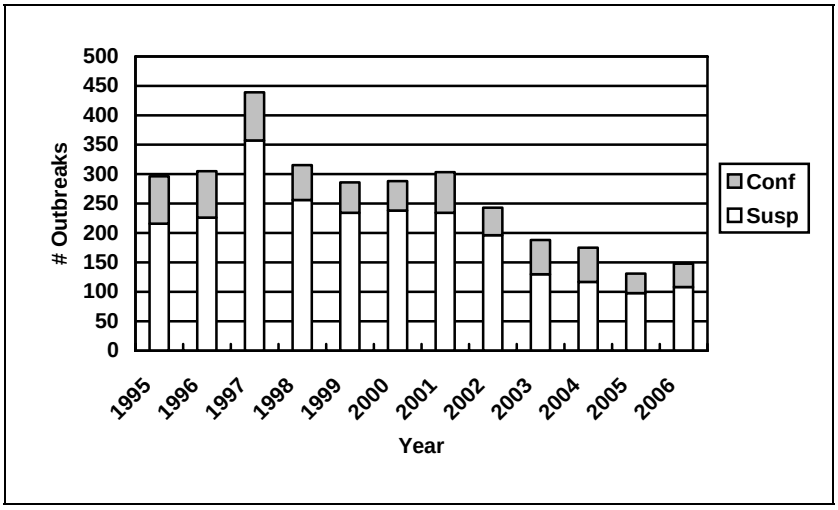


Figure 2: Number of Confirmed and Suspected Food and Waterborne Outbreak-related Cases by Year, Florida, 1995-2006

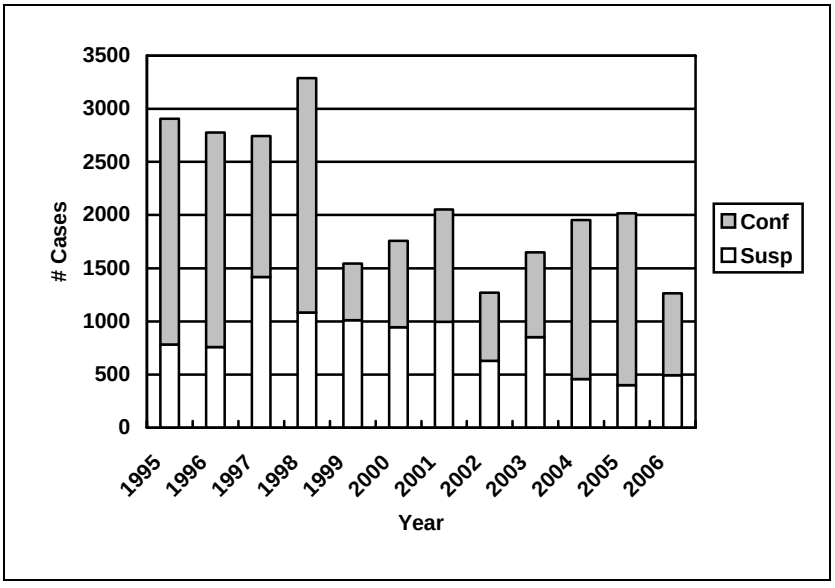
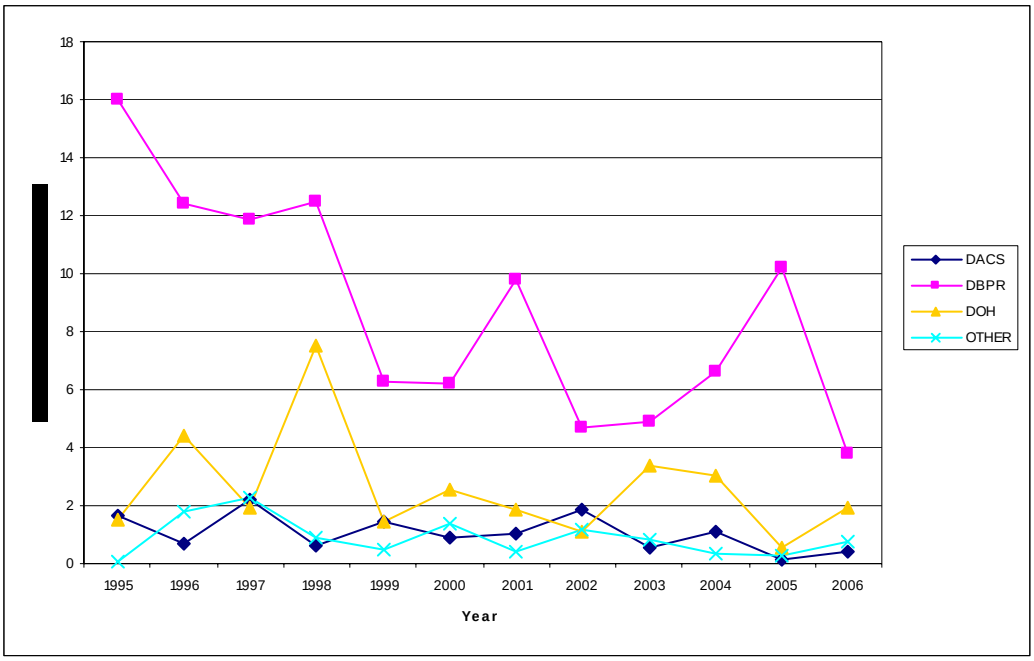


Figure 3: Rate of Food & Waterborne Outbreak-related Cases by Agency of Jurisdiction per 100,000 Population, Florida 2006



Training and Continuing Education

In 2006, 27 training sessions were held around the state specifically targeting Department of Health environmental health and epidemiology staff and 37 sessions were presented to other audiences. Training presentations included new environmental health employee orientation, and statewide overviews on food and waterborne disease outbreak disease data. Other special topics included Noroviruses, *Vibrio vulnificus*, Neurotoxic Shellfish Poisoning, Cyclospora, recreational waterborne diseases, pathogenic E. coli, and CDC gastrointestinal disease case studies.

Besides county health department environmental health, nursing and epidemiology staff, audiences included members of the Florida Environmental Health Association, the Florida Association of Food Protecion, the National Environmental Health Association and the International Association for Food Protection. In a cooperative effort with other agencies, training was presented to staff of the Department of Business and Professional Regulation and to the Fish and Wildlife Conservation Commission. Trainers also presented guest lectures at the Institute for Food and Agricultural Sciences inservice to statewide county extension agents; a guest lecture to Florida Agricultural and Mechanical University's General Epidemiology class and a guest lecture to the Tallahasseee Community College Community Health class as well as an invited seminar on *Vibrio vulnificus* at the University of Texas. Other community groups who received foodborne illness prevention presentations included the AFL CIO Local 8, home child and home health care groups, and APIC (Association for Professionals in Infection Control and Epidemiology).

Preparedness Training 2006

The Food and Waterborne Disease Preparedness Program was unable to provide training to several Regional Domestic Security Task Forces (RDSTFs) in 2006 due to lack of funding for this purpose. The program did provide speakers (regional environmental epidemiologists and other program staff) for several conferences around the state on foodborne illness issues. Preparedness presentations were given at the National Association of County and City Health Officials (NACCHO) in Washington, DC and the Annual Educational Conference of the Florida Environmental Health Association (FEHA) in Sarasota, FL. The Food and Water Preparedness Program coordinator participated on a steering committee for a Florida Food Defense Statewide Tabletop with various other agencies at the State Emergency Operations Center in February (Department of Agriculture and Consumer Services was the lead.). The program also produced promotional/preventive educational items for distribution.

Outbreak Definitions

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

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

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

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

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

Selected Foodborne Outbreaks

Neurotoxic Shellfish Poisoning from Recreationally Harvested Clams, Lee County, July 2006

Neurotoxic Shellfish Poisoning (NSP) is an illness caused by eating shellfish that have accumulated brevetoxin and its derivatives. The main symptoms include tingling and/or numbness of the lips, tongue, throat, hands and feet. Onset of this disease occurs within a few minutes to a few hours; duration is fairly short, from a few hours to several days. Recovery is complete with few sequellae; no fatalities have been reported.

During the month of July, 2006, the Lee County Health Department (LCHD) received reports of 13 individuals (5 clusters) who experienced neurological symptoms consistent with Neurotoxic Shellfish Poisoning after consuming recreationally harvested clams from an area not open to legal shellfish harvesting on Sanibel Island and Ft. Myers Beach. The 13 individuals were visitors to the area.

Cluster 1: On July 5, 2006, the Bureau of Epidemiology received an after-hours call from an ER physician to report 4 Vietnamese sisters (ages 32-56 years old) who became ill within 5 hours after eating clams from Sanibel. Two were stable and released, 2 were hospitalized; symptoms included slurred speech, muscle weakness (ataxia), and tingling/numbness of the arms. The clams were collected just offshore along the gulf side of Sanibel Island. The clams were sautéed in wine and butter. Two small clams (leftovers from the meal) were sent to the Florida Fish and Wildlife Research Institute (FWRI) in St. Petersburg for laboratory analysis. The clams were identified as *Mactrotoma fragilis* (Gmelin, 1791), a small surf clam that is common along the SW Florida coast (see http://www.shellmuseum.org/sanibel/shells_fragilis.html). The Lee CHD received verbal confirmation from FWRI that the clams were positive for brevetoxin (the Florida red tide toxin). Specimens were also sent to FDA; the results also confirmed brevetoxins in the shellfish (the level of toxicity exceeded the National Shellfish Sanitation Program (NSSP) guidance level of 20 mouse units/100g.). See Table 1 for detailed results.

On July 11, 2006, the Lee CHD reported 4 new additional NSP cases.

Cluster 2: A 49 year old female from the state of Washington presented to the ER and was treated and released for symptoms of nausea and tingling in hands and feet. Hospital records indicated she harvested clams just offshore along the gulf side of Ft. Myers Beach. She cooked the clams, ate around midnight on July 9, 2006 and developed symptoms 4 hours later on July 10, 2006. The Lee CHD has been unable to successfully contact the patient for interview.

Cluster 3: Three tourists from France (mother, son and daughter-in-law, ages 31-61 years old), who also have a residence on Sanibel presented to the ER after they developed neurological symptoms from clams they consumed. The clams were collected just offshore along the gulf side of Sanibel Island (within a quarter mile of the GPS coordinates of Cluster 1). They were unaware of the red tide in the area. The mother was admitted to the ICU; the other 2 were treated and released. Symptoms included muscle weakness, dizziness, and tingling/numbness of the extremities; the daughter in-law also experienced abdominal pain and vomiting. They ate the clams on July 10, 2006 around 8:30 pm and began having symptoms 4 hours later. The clams were heated in a pan and served with spaghetti. The clams were small in size. Each individual consumed ~ 50 clams.

On July 18, 2006, the Lee CHD reported 3 new additional NSP cases.

Cluster 4: A family of 3 (residents of Hillsborough County, FL), presented to the ER on July 17, 2006 after they developed neurological symptoms 1 hour after consuming clams they collected just offshore along the gulf side of Sanibel Island in the same area as Cluster 1. The father (45 years old) was admitted and was put on a ventilator due to preexisting health conditions (not from NSP). His symptoms included: nausea, diarrhea,

tingling, dizziness and respiratory distress. He consumed ~ 30 clams. Both mother and daughter experienced symptoms of nausea, tingling, swelling of the tongue and chest discomfort. The mother (44 years old) was treated and released; she consumed ~ 15-30 clams. The daughter (17 years old) was also admitted; she consumed ~ 5 clams. The clams were prepared as a broth and served warm. There was one leftover clam that was shipped to the Florida Fish and Wildlife Research Institute for analysis along with urine and blood serum from the 3 cases. See results in Table 4.

On July 19, 2006, the Florida Poison Control Center in Miami reported 2 additional NSP cases bringing the total number of NSP cases to 13.

Cluster 5: The Florida Poison Control Center in Miami reported 2 Miami residents (male and female, both 45 years old) who experienced symptoms of nausea, vomiting, diarrhea, tingling, abdominal pain, weakness and flushing within 2 hours of eating clams they collected off Sanibel on July 18, 2006, at the same location as the others. They did not seek medical care. Duration of illness was 18 hrs. The clams were boiled and the amount consumed is unknown. No leftover clams were available for testing.

Table 4: Laboratory Results for Samples Associated with Lee County NSP Clusters, 2006

Sample Type	Brevetoxin-Specific ELISA assay (FWRI lab)	Cytotoxicity assay (FDA lab)	Liquid chromatography-mass spectrometry (LC-MS) (FDA lab)
Clams from Cluster 1	24 ppm 42.9 ppm	Both clam extracts were positive	Levels of BTX3 (1.1 and 1.3 ppm) exceeded the mouse bioassay guidance level equivalent for this toxin (0.8 ppm)
2 urine samples from Cluster 1	A - 0.057 ppm B - 0.079 ppm	Urine “A” not positive (cannot rule out toxin activity) Urine “B” - positive	Brevetoxins were not detected under conditions used. (Urinary metabolites of brevetoxins have not been characterized.
Shellfish samples collected on Sanibel by FWRI	23.6 ppm	Clam was cytotoxic (sodium channel active)	BTX3 level (2.49 ppm)
3 urine samples from Cluster 4	E - 0.180 ug/ml (ppm) F– 0.038 ug/ml (ppm) G – 0.009 ug/ml (ppm)	Urine “E” was cytotoxic, (sodium channel specific activity could not be confirmed). Other urine specimens were negative (negative results do not rule out brevetoxins in urine, as detoxified metabolites would not be detected	Urine “E” BTX3 low level (~0.02 ppm). Other urine specimens were negative (negative results do not rule out presence of brevetoxins, as urinary metabolites have not been characterized by LC-MS).

According to the Florida Department of Agriculture and Consumer Services, Bureau of Aquaculture Environmental Services, the waters where these clams were harvested are **never** open to any commercial or recreational harvesting of oysters, clams, or mussels. The Pine Island Sound Shellfish Harvesting Area (http://www.floridaaquaculture.com/pdfmaps/62.PDF) is the nearest “open” (**Conditionally Approved** area) shellfish harvesting waters near Sanibel Island. All other waters in this general area are “always closed” to all recreational and

commercial shellfish harvesting (this is considered a criminal violation, issued by FWCC Division of Law Enforcement and includes the destruction of any shellfish).

The Lee CHD disseminated information to the public regarding the risks of harvesting shellfish in these unclassified (unapproved) waters. The Lee CHD sent an e-mail to county/city government and local tourist bureaus to make them aware. The tourist bureaus agreed to help contact realtors and hotel/condo complexes to put warnings out not to harvest local shellfish. There were articles in the local newspaper on July 8, 10, 18, and 19, 2006 but many times tourists may not read local papers. The shellfish poisonings were also reported on the local TV news on July 13, 2006. In addition to the press releases, the city manager of Sanibel sent police officers door to door delivering the message about not harvesting and consuming shellfish. They also activated their reverse 911 system with the same message and posted signs at beach access points. Flyers were passed out at the toll booths. An alert message on EMSystem was posted on July 18, 2006 for emergency departments in the region. An interview with the epidemiologist from Lee CHD was broadcast on the local evening news (July 18, 2006) and the morning and evening news (July 19, 2006). Information was also posted on Epi-Com (an outbreak communications and emergency notification system of the Florida Department of Health).

Diagnoses from ER physicians, signs and symptoms of the cases and laboratory confirmation from Florida Fish and Wildlife Research Institute and FDA Gulf Coast Seafood Lab confirms this outbreak of neurotoxic shellfish poisoning.

Rules have been in place for some time regarding the illegal harvest of shellfish, both for public health protection *(*Rule Chapter 5L-1, Florida Administrative Code) and for resource protection (Rule Chapter 68B-26, Florida Administrative Code), although tourists are most certainly unaware.

Recommendations:

- Shellfish should, under no circumstances, be harvested from unapproved areas.
- To promote community educational efforts and for future red tide events, it might be useful to have public service announcements and other information ready for distribution, including the fact that "**cooking these shellfish does not eliminate the toxin".**
- Post signs in all rental units and hotel rooms, warning the public about the risks and legality of self-harvesting shellfish and include contact information for the public to obtain additional information.

Note: Cases of NSP in Florida are often misdiagnosed as Paralytic Shellfish Poisoning (PSP) which can cause a much more serious illness that can result in death. According to the Fish and Wildlife Research Institute, no algal species that cause PSP have been verified in the Gulf of Mexico.

Information on the harvesting status of shellfish beds in Florida can be obtained at http://www.floridaaquaculture.com/. Click on Shellfish Harvesting, then click on the drop down menu arrow and choose Shellfish Harvesting Daily Area Status.

Incident of Illness Associated with an Intentionally Contaminated Soft Drink, Seminole County, Florida, August 2006

On August 10, 2006, the Seminole County Health Department (Seminole CHD) received notification from the Florida Department of Business and Professional Regulation of a complaint of illness in a person, who alleged that bleach was placed in her drink while working at a fast food chicken establishment in Sanford. Symptoms were initially reported as dizziness, numbness, burning in the throat, shaky and blurred vision. The onset of symptoms was reported to have occurred within five minutes of consuming a beverage obtained from the food service establishment.

The Division of Business and Professional Regulation (DBPR) conducted an inspection of the restaurant on August 16, 2006. The victim was interviewed by Seminole CHD on August 16, 2006 to elicit clinical symptoms and other details of the alleged incident, and to obtain copies of police and medical records from her parents. It was learned that the Sanford Police Department had been contacted by the complainant on August 9, 2006 and their investigation had been completed on August 10. The patient had been treated at the hospital on August 9, 2006 with a follow up physician visit on August 17, 2006. There was no food specimen available for testing.

On August 9, 2006 at approximately 8:00 pm a 17 year female experienced a variety of symptoms consistent with chemical poisoning within five minutes of swallowing a "gulp" of soda from her drink container while working at the restaurant. Upon ingestion the victim noticed that the drink had a bleach taste and one of her coworkers exclaimed "sanitizer" and laughed. The victim was taken to Central Florida Regional Hospital by Sanford Fire and Rescue for evaluation and treatment. Symptoms described by the patient to the attending physician were limited to burning chest pain, transient tingling, and a sore throat; the hospital report noted a normal ENT inspection. Symptoms described to Seminole CHD included burning throat, blurred vision, headache, numbness, and dizziness lasting for approximately 2 to 3 hours; the physician at follow-up was told by the patient that all the symptoms lasted two days.

The victim's father contacted the Sanford Police Department on August 9 at 9:30 pm to facilitate an investigation in order to determine the type of poison that was placed in the implicated container. The investigating officer discovered that chlorine sanitizer, packaged in a 1 ounce size, was dumped into a 16 ounce filled drink container by one of the employees of the restaurant, and this information was immediately relayed to the hospital. The victim reportedly discarded the drink in a waste receptacle at the restaurant immediately following ingestion, and none was available for testing. According to the MSDS from the manufacturer, the hazardous ingredient in the product as defined by OSHA is sodium dichloroisocyanurate dihydrate, which constitutes 25% of the package contents. [5]

The inspection on August 16, 2006 by the Florida Department of Business and Professional Regulation of the restaurant disclosed that toxic substances were properly stored and labeled. All required food safety education courses for managers and employees were current. There was a presence of noxious vermin in the facility unrelated to this illness report that resulted in an emergency order and closure until corrected. The facility was cleared for re-opening on August 17.

This case of foodborne illness is associated with the consumption of a soda drink intentionally contaminated with a chlorine sanitizing compound. The illness onset occurred immediately after the implicated drink was swallowed. The symptoms described by the victim and medical

[5] Procter and Gamble Website http://www.pg.com/content/pdf/01_about_pg/msds/professional_line/professional_line/Clean_Quick_Chlorine_Sanitizer.pdf , Accessed August 25, 2006.

personnel who treated the case are consistent with the ingestion of hypochlorites and related agents, and also similar to other documented chemical poisonings. There was no other known source of exposure that would cause the described symptoms. [6]

The police report indicates that the contamination of the implicated drink with the sanitizer was intentional and initiated by a co-worker or co-workers as a prank. The entire contents of a packet (approximately 28.4 grams) poured into a filled 16 ounce (approximately 470 milliliters) container and uniformly distributed would result in a concentration of sodium dichloroisocyanurate dihydrate (at 25% composition) of approximately 15 grams/liter; under those conditions this could result in the ingestion of approximately 300 milligrams in a 20 ml "gulp." By contrast, the WHO recommendation for disinfecting drinking water is no more than 3.6 mg sodium dichloroisocyanurate dihydrate/liter, where an adult would assume to drink approximately 2 liters of water per day. [7] According to the MSDS, the LD_{50} in rats for the hazardous ingredient is 735 mg/kilograms body weight (bw). The probable oral lethal dose for humans for related trichloroisocyanurate is between 0.5 to 5 g/kg bw. Under the conditions described above, the concentration of available chlorine in the drink would be approximately 8000 ppm. By comparison, greater than 5 ml/kg bw of household bleach (a concentration of 50,000 ppm) may cause corrosive damage to the oropharynx, esophagus, or stomach. [8]

Prevention of disease is the foundation of public health science. Intentional contamination of food or water with harmful chemicals by a malicious or mischievous person is difficult to prevent and severe illnesses may result. Prompt medical treatment and investigation of incidents involving illnesses resulting from an intentional contamination is critical in minimizing the health and psychological effects of such acts.

Salad-associated Norovirus G-1 at a Pizza Restaurant, Hillsborough County, September, 2006

On October 2, 2006**,** The Environmental Epidemiology section of the Hillsborough County Health Department received a call concerning a group of people who had become ill with gastrointestinal symptoms after celebrating a birthday at a local pizza restaurant. Early information indicated that 6 adults and 6 children had eaten pizza and Greek salad on September 28, 2006 at 8:00 pm with nine of the 12 persons becoming ill. There were 3 different types of pizza and Greek Salad served at the party. Three children who had eaten pizza only did not become ill.

On October 3, 2006, a call was received from another group of 3 persons who had picked up pizza and Greek salad at 8:00 pm on September 28, 2006 from the same restaurant. All 3 members of this group ate both cheese and mushroom pizza and Greek salad and subsequently became ill.

On October 4, 2006, another call was received identifying a third group of approximately 35 persons who had eaten at the restaurant at the same time as the other two groups and had

[6] CDC Website http://www.bt.cdc.gov/agent/chlorine/basics/facts.asp, Accessed August 25, 2006.
[7] Joint Expert Committee on Food Additives—Monographs and Evaluations http://www.inchem.org/documents/jecfa/jecmono/v52je21.htm, Accessed September 1, 2006.
[8] TOXNET Hazardous Substances Data Bank http://toxnet.nlm.nih.gov/cgi-bin/sis/htmlgen?HSDB, Accessed September 1, 2006.

multiple pizzas and a party salad. Some members of this group were a local soccer team and the remainder were on a soccer team from Paraguay.

On October 12, 2006, an additional party of three persons reported illness after eating lunch on September 29, 2006 at the same Italian restaurant.

A joint field investigation was held on October 2, 2006 by the Hillsborough County Health Department and the Department of Business and Professional Regulation at the implicated restaurant in Tampa. A hazard analysis was done on the implicated food items. The restaurant management staff was cooperative and informed the inspectors that an employee had become ill at the same time as the patrons. This employee had consumed a sandwich that contained the same lettuce served to the parties in question. Employee hygiene, food preparation procedures and food temperatures were examined during the field visit. Some preliminary traceback information was collected on the salad ingredients also at this time.

Patient medical and food history information was collected from the ill and non-ill attendees identified from the four separate groups who had dined on September 28 and 29, 2006. A case definition was determined to be anyone who had attended the identified Italian restaurant on September 28 and 29, 2006 and who had become ill with vomiting, diarrhea and/or abdominal pains. Stool specimens were collected from three of the restaurant attendees and forwarded to the Bureau of Laboratories, Tampa Branch Virology Lab.

Of a total of 25 persons interviewed who had dined at the implicated pizza restaurant on September 28 and 29, 2006, 18 (72%) became ill following the suspected meals. The mean onset of the symptoms was 33.3 hours with a range of 29 – 43.5 hours. The predominant symptoms reported included weakness (100%), vomiting (78%), chills (72%), headaches (61%) and diarrhea (50%; see Table 1).

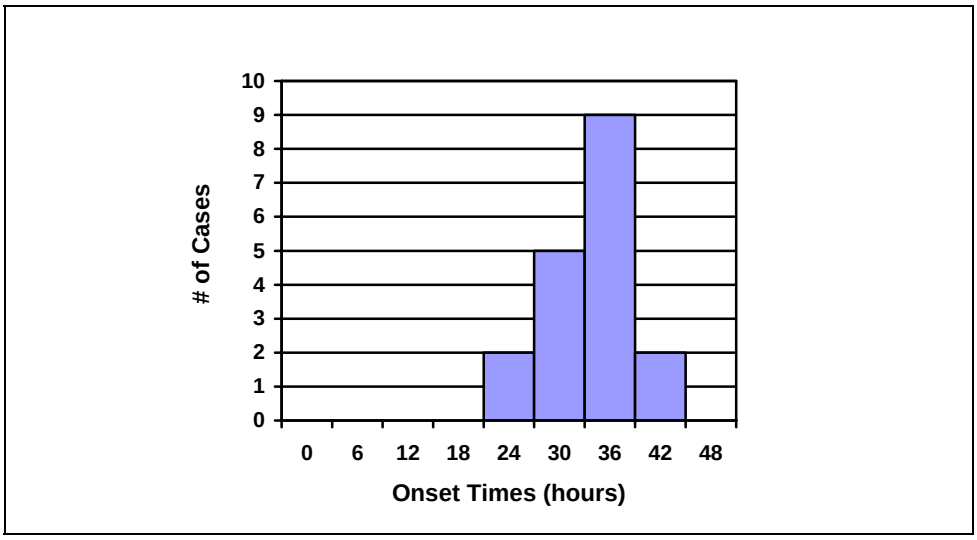
Table 5: Frequency of Symptoms, Pizza Restaurant on September 28 and 29, 2006, Hillsborough County

Symptoms	Frequency	Percent
Weakness	18	100
Vomiting	14	78
Chills	13	72
Headaches	11	61
Diarrhea	9	50
Body aches	7	39
Dizziness	4	22
Fever	2	11

n=18

The reported duration of illness for acute symptoms ranged from 12 to 48 hours. None of the cases sought physician care. The outbreak epidemiologic curve is shown in Figure 1.

Figure 4: Epidemiologic Curve By Onset of Illness, Pizza Restaurant Norovirus Outbreak, Hillsborough County, 2006



On October 4, 2006, a telephone call from the DOH Tampa Branch Laboratory reported that all three of the stool specimens collected had tested positive for Norovirus G-1. The technician mentioned that Norovirus G1 was seen only occasionally in Florida, where G2 is generally the predominant genotype identified by the laboratory. Food history information obtained from the restaurant attendees and one employee identified salad as the implicated food vehicle. The food specific attack rate for consuming salad was 95 percent. Consumption of salad was shown to be statistically significant with an odds ratio of 66.5 and a p-value of 0.0005. Ice used in soft drinks and the various pizzas were also consumed by the majority of the ill attendees, however these items were determined to not be significant.

Results from the environmental field visit at the pizza restaurant noted the following issues: Improper hot and cold food storage temperature problems, inadequate cooling and reheating of food items and possible cross-contamination in the kitchen area. Improper sanitization of food contact surfaces was also noted. The manager of the restaurant told investigators that the lettuce from the evening meal was routinely processed in large enough quantities to be served at lunch the following day. According to the restaurant manager, the heads of lettuce received are individually washed

This outbreak of gastroenteritis was determined to be associated with patronizing a local pizza restaurant in Hillsborough County on September 28 and 29, 2006. The four groups of attendees interviewed had attended no other public gatherings identified or common food items consumed. The ill persons were chronologically clustered indicating a common source exposure. Norovirus G-1 was confirmed as the foodborne pathogen associated with this outbreak from three positive stool specimens from restaurant attendees.

The consumption of salad by restaurant attendees was identified as the implicated food vehicle. Salad was determined to be statistically significant from a case/control study administered to restaurant attendees. Attendees who consumed salad were 66.5 times more likely to have become ill than those who did not consumed this food item. The overall attack rate among interviewed attendees was 72 percent. Based on the traceback information obtained during the field visit to the implicated restaurant, the lettuce used in the salad items served was from a large distributor in southern California. This is the same region that was recently implicated in two food recalls involving packaged spinach and lettuce, but for a different pathogen (E. coli O157:H7). There is no indication at this time that the implicated salad was associated with

these produce recalls. The most likely source of illness was probably an ill food worker who prepared the salad, although none was identified and no poor employee hygiene practices were observed.

To date in Hillsborough County, three large foodborne Norovirus outbreaks associated with produce consumption have been investigated. These outbreaks represent the largest foodborne outbreaks reported during 2006 in Hillsborough County. In each outbreak, produce consumption was confirmed or suspected as the food vehicle.

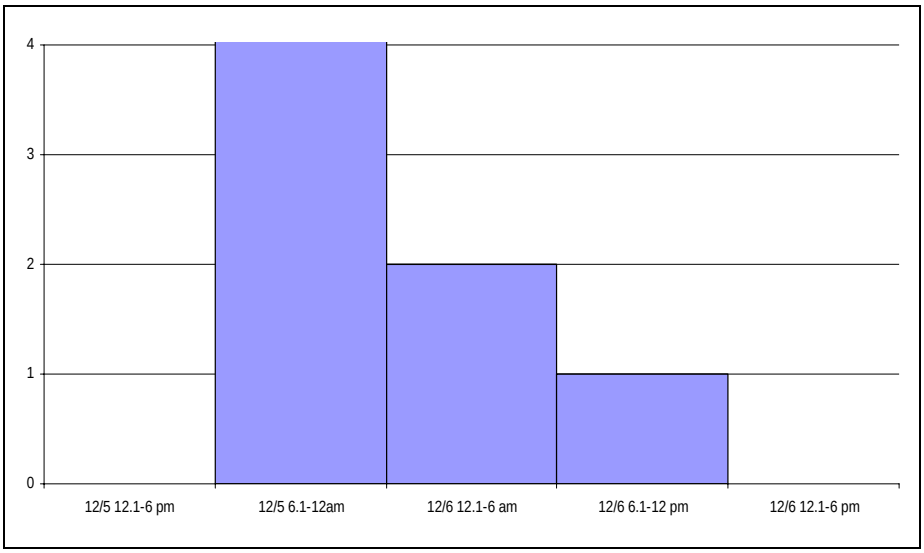
Foodborne Illness from Home Cooked Food Products, Orange County, Florida 2006

On December 7, 2006 the regional environmental epidemiologist for the central Florida area received a telephone call from a citizen of Orange County indicating she, members of her family and friends had experienced diarrheal illness following eating foods purchased from a local supermarket. The complainant stated that there was leftover food product available and all affected persons would be available for interviews. Initial symptoms described included watery diarrhea and abdominal cramping approximately 6-12 hours following the consumption of a meal prepared by the complainant consisting of snow crabs, rice and spinach.

A foodborne illness outbreak investigation was initiated on December 7, 2006 by the Bureau of Community Environmental Health, regional environmental epidemiologist. Interviews of ten ill persons were conducted using the standard food and waterborne disease complaint surveillance form. Exposure information including three day food histories and detailed clinical information was collected from each person interviewed. General food preparation methods were solicited for the food products involved in addition to the place the products were purchased. Orange County Health Department Environmental Health collected leftover spinach and rice from the complainant's home on December 7, 2006 for analysis by the Bureau of Laboratories http://www.fda.gov/ora/compliance_ref/cpg/cpgfod/cpg540-525.html in Jacksonville. A case was defined as a person who experienced diarrhea subsequent to consuming the December 5 meal prepared at the complainant's home. The regional foodborne illness complaint database was reviewed for additional cases of gastrointestinal illness with possible exposure to the facility where the food was purchased.

All ten people interviewed reported diarrheal symptoms with illness onset ranging from 9:00 pm on December 5 to 8:00 am on December 6, 2006. Refer to Figure x for details of illness onsets dates and times. No other similar illnesses or exposures were reported. These ten people were from four separate households. Symptoms reported included watery diarrhea (10), abdominal cramps (10), nausea (4), fatigue (1), and dizziness (1). Ages of ill persons ranged from 3 to 48 years old with a median of 32 years old. Seven cases were male. Duration of illness ranged from 0.5 to 3 days with a median of 1.5 days. The only common exposure reported by all ill persons was a meal comprised of spinach, snow crabs, and rice consumed between 9:30 am and 5:30 pm on December 5. One person ate the food at 9:30 am and 5:30 pm, two between 12:00 and 1:00 pm and seven between 5:00 and 5:30 pm. The calculated incubation period ranged from 4.0-13.5 hours with a median of 6.0 hours.

Figure 5: Onset of *Bacillus cereus* Gastrointestinal Illness by 6 Hour Onset December 5-6, 2006, Orange County



The laboratory analyses of the spinach and rice products were positive for *Bacillus cereus*. It was not possible to determine which specific food item was positive due to the mixing of the two food products during packaging and shipment to the laboratory. The standard plate count of the products was >100,000/gram. No *Staphylococcus* or *Clostridium* was found.

The food products implicated in this illness outbreak were purchased from a local supermarket and prepared in the home of the complainant. The spinach and snow crabs were combined and boiled at approximately 9:00 am on December 5. It was not clear if the rice for the implicated meals was prepared then also or sometime prior. Following preparation, the cooked foods were stored in a refrigerator. The complainant consumed some of the product at this time, in addition to eating at 5:00 pm on December 5. The spinach and snow crab mixture was stored either in a large container or portioned in small bowls. The mixture was microwaved prior to eating with rice for each person who ate it. The temperature of the refrigerator was not known, the internal temperature of the microwaved product was not known, and the length of time the product was at room temperature following cooking is unknown. The storage of the rice consumed with the spinach and snow crab mixture and reheating methods were not completely determined.

This cluster of diarrheal illnesses is associated with the consumption of home cooked food on December 5, 2006. Common foods are the spinach, snow crab and rice mixture consumed by all the ill persons. Based on the laboratory analysis of rice and spinach products, the bacterium *Bacillus cereus* is the agent for this cluster. The illnesses were clinically similar and chronologically clustered indicating a common source exposure. Reported symptoms are compatible with illness attributed to the diarrheal type of *Bacillus cereus.* None of the ill people had any other common environmental exposure that would account for these illnesses. There was no report of anyone who ate the implicated food who was subsequently well.

There is inconclusive information of the preparation and storage methods of the implicated food to determine exactly where the breach of food safety practices occurred or with which product. Boiling of the spinach and snow crab would kill the *Bacillus* organism except for heat resistant spores which can survive and then multiply if product temperature becomes conducive to growth. The preparation details of the rice are unknown but rice is a common vehicle for the

transmission of *Bacillus cereus* if time and temperature guidelines for potentially hazardous foods are not followed.

The symptoms of *B. cereus* diarrheal type food poisoning mimic those of *Clostridium perfringens* food poisoning. The onset of watery diarrhea, abdominal cramps, and pain occurs 6-15 hours after consumption of contaminated food. Nausea may accompany diarrhea, but vomiting (emesis) rarely occurs. Symptoms persist for 24 hours in most instances.

The emetic type of food poisoning is characterized by nausea and vomiting within 0.5 to 6 hours after consumption of contaminated foods. Occasionally, abdominal cramps and/or diarrhea may also occur. Duration of symptoms is generally less than 24 hours. The symptoms of this type of food poisoning parallel those caused by Staphylococcus aureus foodborne intoxication. Some strains of *B. subtilis* and *B. licheniformis* have been isolated from lamb and chicken incriminated in food poisoning episodes. These organisms demonstrate the production of a highly heat-stable toxin which may be similar to the vomiting type toxin produced by *B. cereus*.

A wide variety of foods including meats, milk, vegetables, and fish have been associated with the diarrheal type food poisoning. The vomiting-type outbreaks have generally been associated with rice products; however, other starchy foods such as potato, pasta and cheese products have also been implicated. Food mixtures such as sauces, puddings, soups, casseroles, pastries, and salads have frequently been incriminated in food poisoning outbreaks. [9]

Pathogens seen in foodborne disease outbreaks can be controlled by basic food preparation and handling measures recommended for eating establishments. Potentially hazardous foods must be maintained at prescribed temperatures for established time periods to prevent the growth and harboring of pathogenic bacteria during periods of storage, display, and preparation. All cold items should be kept at or below 41° F. and hot items should be held at or above 140° F. Potentially hazardous food products that are pre-cooked in advance of consumption must be rapidly cooled to less than 41° F. to prevent bacteria proliferation. These types of products must also be reheated to 165° F. prior to human consumption. All food and non-food contact surfaces should be thoroughly cleaned and sanitized in a prescribed manner to prevent the harborage, transmission and growth of microbial organisms on these surfaces. It is important that all food workers follow strict hand and fingernail washing procedures when preparing food for human consumption. The outbreak points to the continual need for consumer food safety education targeting the general population. This type of information is available through a myriad of consumer, industry and government websites in addition to local organizations such as county extension services, 4H, and other such entities.

An Overview of Foodborne*Vibrio vulnificus*, Florida, 2006

For 2006, there was a total of 24 *Vibrio vulnificus* cases reported in the State of Florida, less than the previous year. Of these, the largest number included 13 wound-related cases. The other 11 cases were associated with the consumption of raw oysters (7), unknown (3) and crab (1). [10] There were 2 oyster-consumption-related deaths (one in May (exposure in April) and one in August (exposure in July), 2 deaths from wound infections, and 2 deaths from unknown

[9] USFDA Foodborne Pathogenic Microorganisms and Natural Toxins Handbook, http://vm.cfsan.fda.gov/~mow/intro.html.

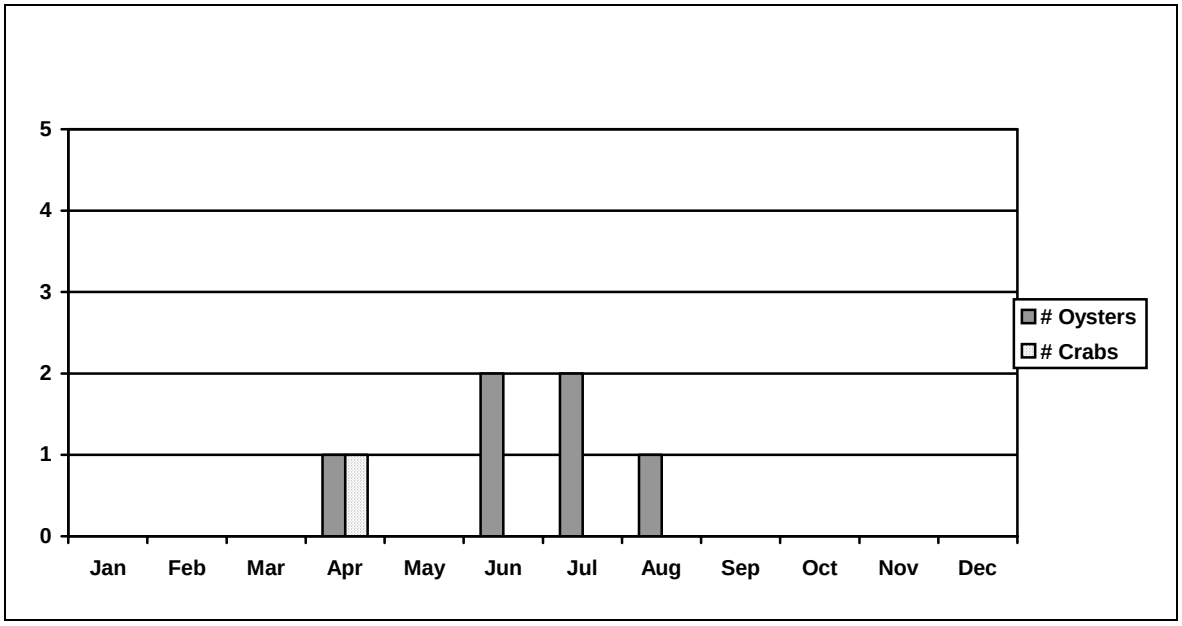
[10] *Vibrio vulnificus* cases are also counted as outbreaks because of the virulence of the disease.

exposures (see Table x and Figure x). In 2005 there were 30 wound-related cases of *Vibrio vulnificus* (2 deaths), 2 from unknown exposures (2 deaths), 6 cases associated with the consumption of raw oysters (2 deaths) and 1 each from clam (1 death) and crab.

Table 6: Reported Cases of Food-related *Vibrio vulnificus*, Florida 2006

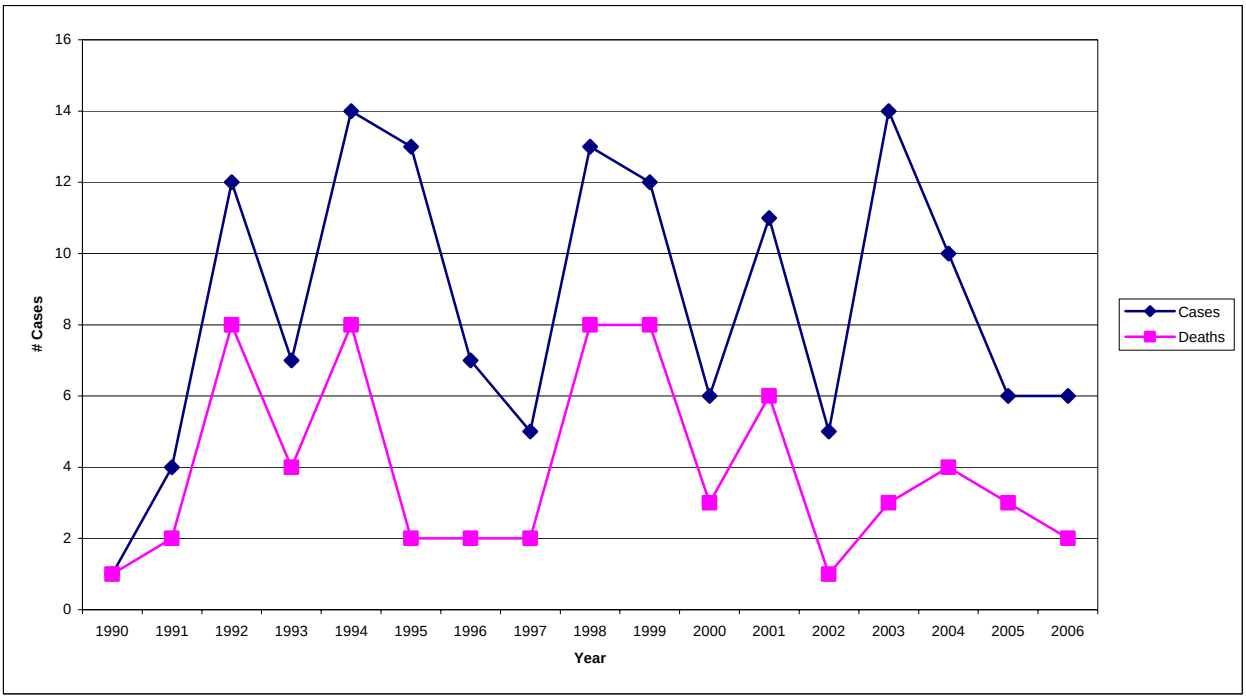
Exposure	# Cases
Wound	13 (2 death)
Oysters	7 (2 deaths)
Unknown	3 (2 deaths)
Crab	1 (0 deaths)
Total	**24 (6 deaths)**

Figure 6: Reported Cases of Vibrio vulnificus by Month from Shellfish Consumption, Florida, 2006



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. Project elements included poster displays in the public areas of several County Health Deparments and presentations to County Health Departments, professional associations and community groups on request along with sections on *Vibrio vulnificus* during university lectures on foodborne disease. Press releases emphasizing the risk of raw oyster consumption by high risk groups were distributed in May and in November. *Vibrio vulnficus* displays and educational brochures were present at the annual meeting of the Florida Dietetic Association and the Florida Student Nurse Association. Figure 5 shows related *Vibrio vulnificus* cases and deaths in Florida, from 1988-2006.

Figure 7: *Vibrio vulnificus* Cases and Deaths Associated With Molluscan Shellfish Consumption, Florida, 1988-2006



An Overview of Foodborne Hepatitis A in Florida, 1997-2006

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 .[11] Florida estimates that hepatitis A accounts for 0.5% of total foodborne outbreaks (1997-2006 trend: flat - no increase or decrease) and for 0.74% of total foodborne outbreak-related cases (1997-2006 trend: upward a little less than 1%).[12,13]

Table 7: 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 (1997- 2006)	0.5%	.74%

[11] 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.
[12] Source: Bureau of Community Environmental Health, Food and Waterborne Disease Program
[13] Source: Bureau of Community Environmental Health, Food and Waterborne Disease Program

Figure 8: Foodborne Hepatitis A: Percent Total Foodborne Outbreaks and Outbreak-related Cases, 1997-2006, Florida

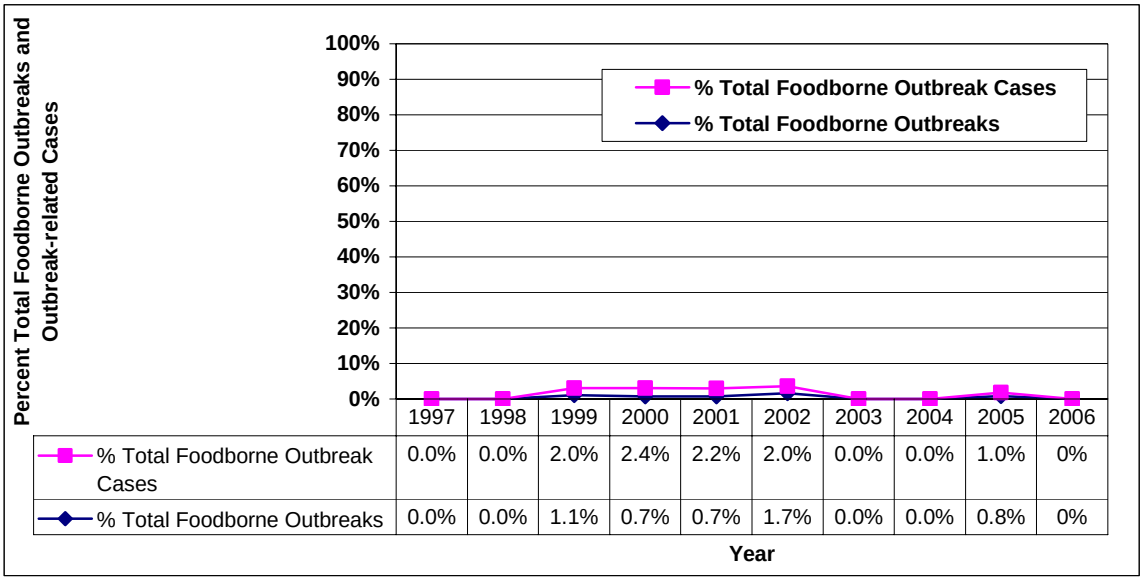


Table 8: Number of Reported Foodborne Hepatitis A Outbreaks in Florida, 1997-2006[14]

	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
Confirmed Foodborne Hepatitis A Outbreaks	0	0	1	2	2	4	0	0	1	0
Suspected Foodborne Hepatitis A Outbreaks	0	0	2	0	0	0	0	0	0	0
Total	**0**	**0**	**3**	**2**	**2**	**4**	**0**	**0**	**1**	**0**
Total # Foodborne Outbreaks	**428**	**299**	**272**	**268**	**290**	**243**	**185**	**173**	**128**	**142**
% Outbreak-related Hepatitis A	**0%**	**0%**	**1.1%**	**0.7%**	**0.7%**	**1.6%**	**0%**	**0%**	**0.7%**	**0%**

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

Table 9: Number of Foodborne Outbreak-related Hepatitis A Cases in Florida, 1997- 2006[15]

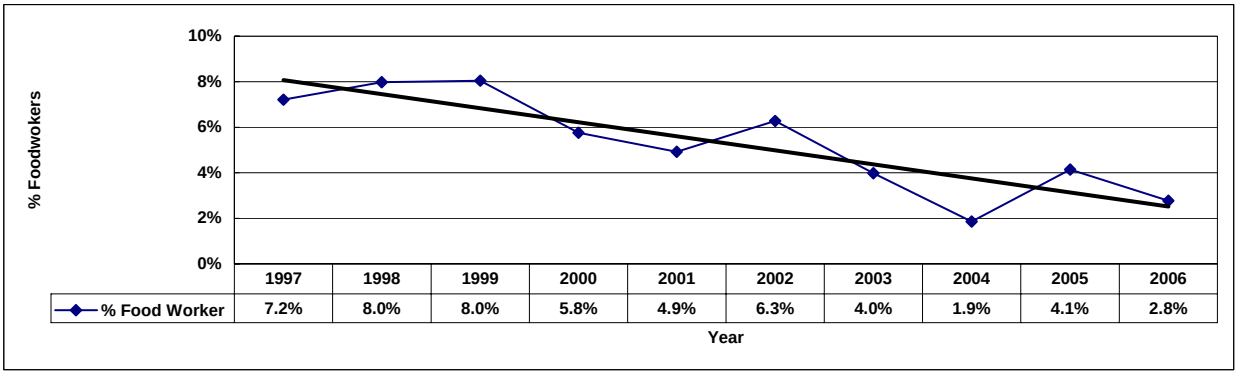
	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
Confirmed Foodborne Hepatitis A Outbreaks	0	0	17	23	40	29	0	0	20	0
Suspected Foodborne Hepatitis A Outbreaks	0	0	12	0	0	0	0	0	0	0
Total	**0**	**0**	**29**	**23**	**40**	**29**	**0**	**0**	**20**	**0**
Total # Foodborne Outbreaks	**2677**	**3194**	**1463**	**1527**	**1921**	**1466**	**1564**	**1911**	**1944**	**1141**
% Outbreak-related Hepatitis A	**0%**	**0%**	**2%**	**1.5%**	**2%**	**1.98%**	**0%**	**0%**	**1%**	**0%**

An examination of the total number of reported hepatitis A cases in Florida shows that foodworkers with hepatitis A account for 4.3% of the total confirmed hepatitis A cases statewide (1997- 2006).[16] The percentage of foodworker hepatitis A in Florida shows a downward trend of about 5% from 1997-2006.

Table 10: Percentage of Foodworker Hepatitis A Cases of Total Reported Hepatitis A Cases, Florida, 1997-2006

Statewide Confirmed Hepatitis A Cases	**1997**	**1998**	**1999**	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**Total**
# Confirmed Cases	666	539	796	591	1015	909	352	270	290	217	666
# Foodworker Cases	48	43	64	34	50	57	14	5	12	6	48
% Food Worker	7.2%	8.0%	8.0%	5.8%	4.9%	6.3%	4.0%	1.9%	4.1%	2.8%	7.2%

Figure 9: Hepatitis A in Florida, Percent Foodworkers of Total Cases, 1997-2006



It is easy to find a job in the foodworker industry and the workforce 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,

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

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). 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:

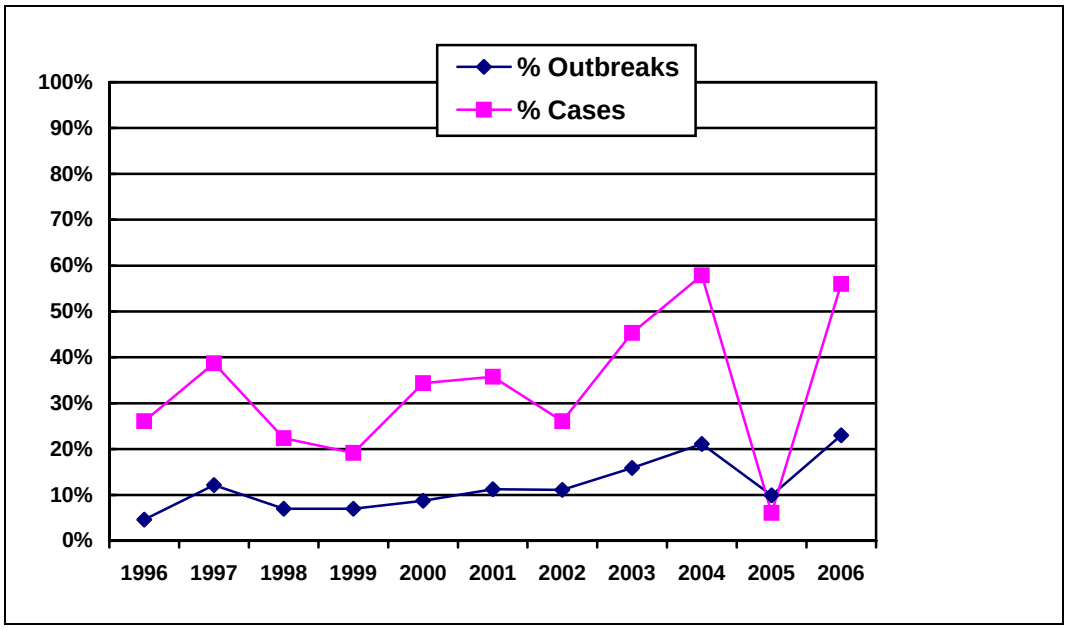
- The national and Central Florida FightBac! campaign sponsored by FDA (website provides materials for educators, the public, media, materials also available in Spanish),
- Food worker training by DBPR, DOH and DOACS, to county health departments, interested community groups, university classes,
- Refresher training by DBPR, DOH and DOACS when outbreaks occur or when food workers are confirmed for hepatitis A,
- Exclusion form letter to notify other agencies of foodworker exclusions,
- Hepatitis A training by the Food and Waterborne Disease Program,
- Hepatitis prevention efforts by the DOH Viral Hepatitis Program,
- Newsletter articles for the Hepatitis Program newsletter,
- Handwashing magnets developed and distributed through 9 Regional Food and Waterborne Disease Epidemiolgists to targeted community populations and groups. These magnets have been translated into Spanish and Haitian Creole as well as visual arts that are more culturally diverse,
- Adults at increased risk (men who have sex with men, intravenous drug users) vaccinated based on behavioral risk factor rather than employment.

Proposed activities for further foodborne hepatitis A prevention include:

- 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 search for sources of grant funding.

An Overview of Foodborne Norovirus Reported in Florida, 1997-2006

Figure 10: Trends of Norovirus in Reported Outbreaks and Outbreak Cases, Florida, 1997-2006



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 (33% total) hospitalizations and 124 (7% total) deaths can be attributed to foodborne Norovirus infections.[17]

In Florida, 12% of total food and waterborne outbreaks (1997-2006) or 33% 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 an upward trend over time. From 1997-2006, there has been a total of 290 food or waterborne Norovirus outbreaks with 6,522 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.

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

Table 11: Number of Reported Food and Waterborne Norovirus Outbreaks, Florida, 1997-2006

Outbreaks	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	Total
Suspected	30	15	14	15	17	18	16	15	4	9	153
Confirmed	23	7	6	10	17	9	14	22	8	21	137
Total	**53**	**22**	**20**	**25**	**34**	**27**	**30**	**37**	**12**	**30**	**290**
% Total Outbreaks	**12.1%**	**7.0%**	**7.0%**	**8.7%**	**11.2%**	**11.1%**	**15.9%**	**21.1%**	**9.5%**	**20.2%**	**12.4%**

Table 12: Number of Reported Food and Waterborne Norovirus Outbreak-related Cases, Florida, 1997-2006

Outbreak-related cases	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	Total
Suspected	377	296	136	154	212	212	438	136	70	169	2,200
Confirmed	686	442	160	450	522	170	311	995	48	538	4,322
Total	**1063**	**738**	**296**	**604**	**734**	**382**	**749**	**1131**	**118**	**707**	**6,522**
% Total Outbreak-related cases	**38.7%**	**22.4%**	**19.2%**	**34.4%**	**35.8%**	**26.1%**	**38.3%**	**57.8%**	**5.9%**	**55.9%**	**33.2%**

Laboratory confirmation has been obtained in 153 (53%) of these outbreaks. Since the development of the Department of Health Bureau of Laboratories ability to test stools for Norovirus in 1999, 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 stool sampling procedures. Regional food and waterborne disease epidemiologists are available to present Norovirus training to County Health Departments, professional associations and interested community groups around the state. The training has also been given to a cruise line who requested it.

Appendix: Statewide Data Tables and Figures

Table 13: Number of Reported Food and Waterborne Outbreaks With Laboratory-Confirmed Etiologic Agents and Number of Confirmed and Epi-linked Cases Associated With These Outbreaks, Florida, 2006

# Outbreaks	Pathogen	# Cases
1	B. cereus	10
1	C. botulinum	1
7	Ciguatera	30
1	Cryptosporidium	3
2	Giardia	59
1	Legionella	11
13	Norovirus	619
2	NSP	15
2	Scombroid	7
7	V. vulnificus	7
37	**Total**	**762**

Figure 11: Percent Reported Outbreaks (n=37) With Laboratory-Confirmed Etiologic Agents and Percent Cases (n=762) Associated With These Outbreaks, Florida, 2006

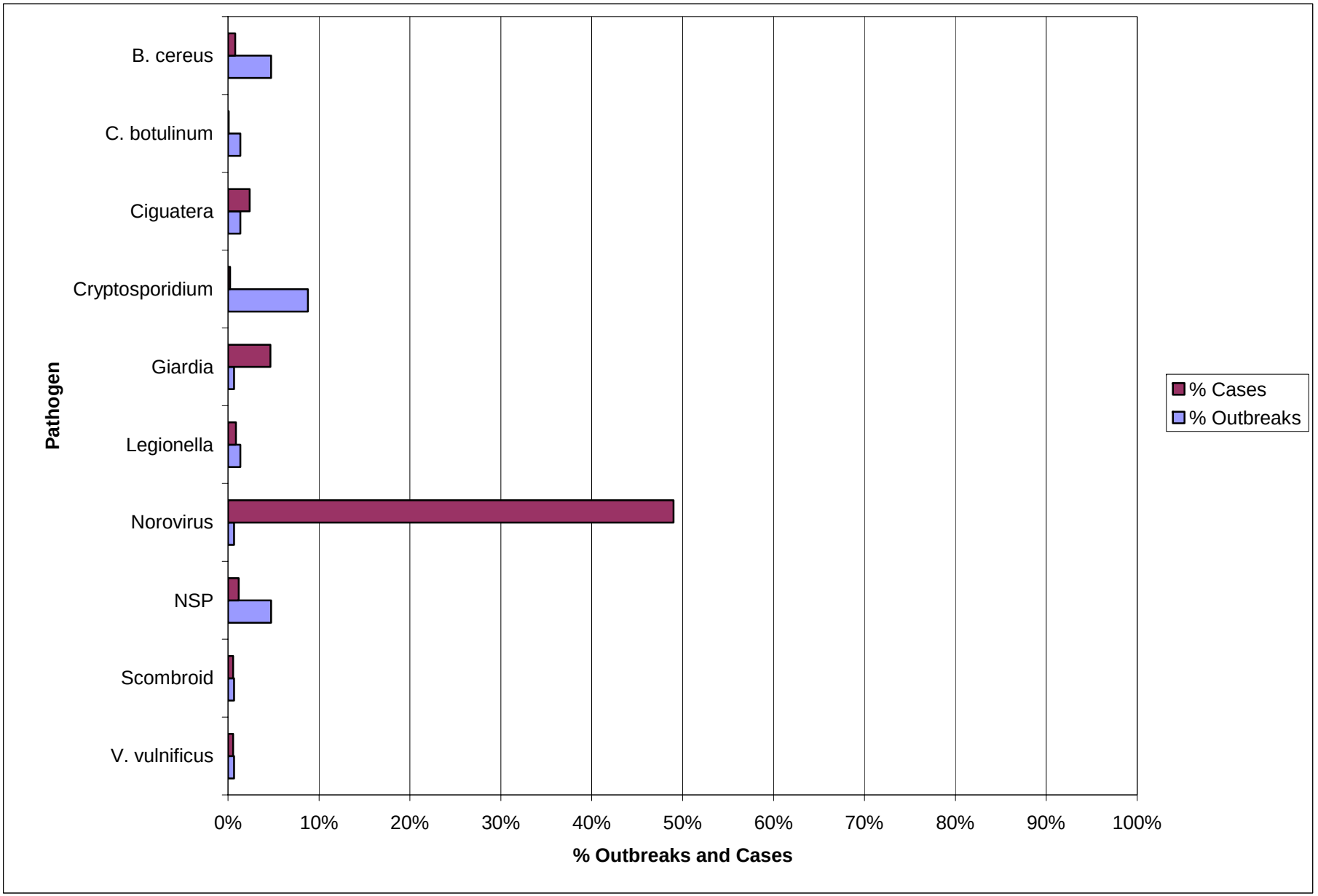
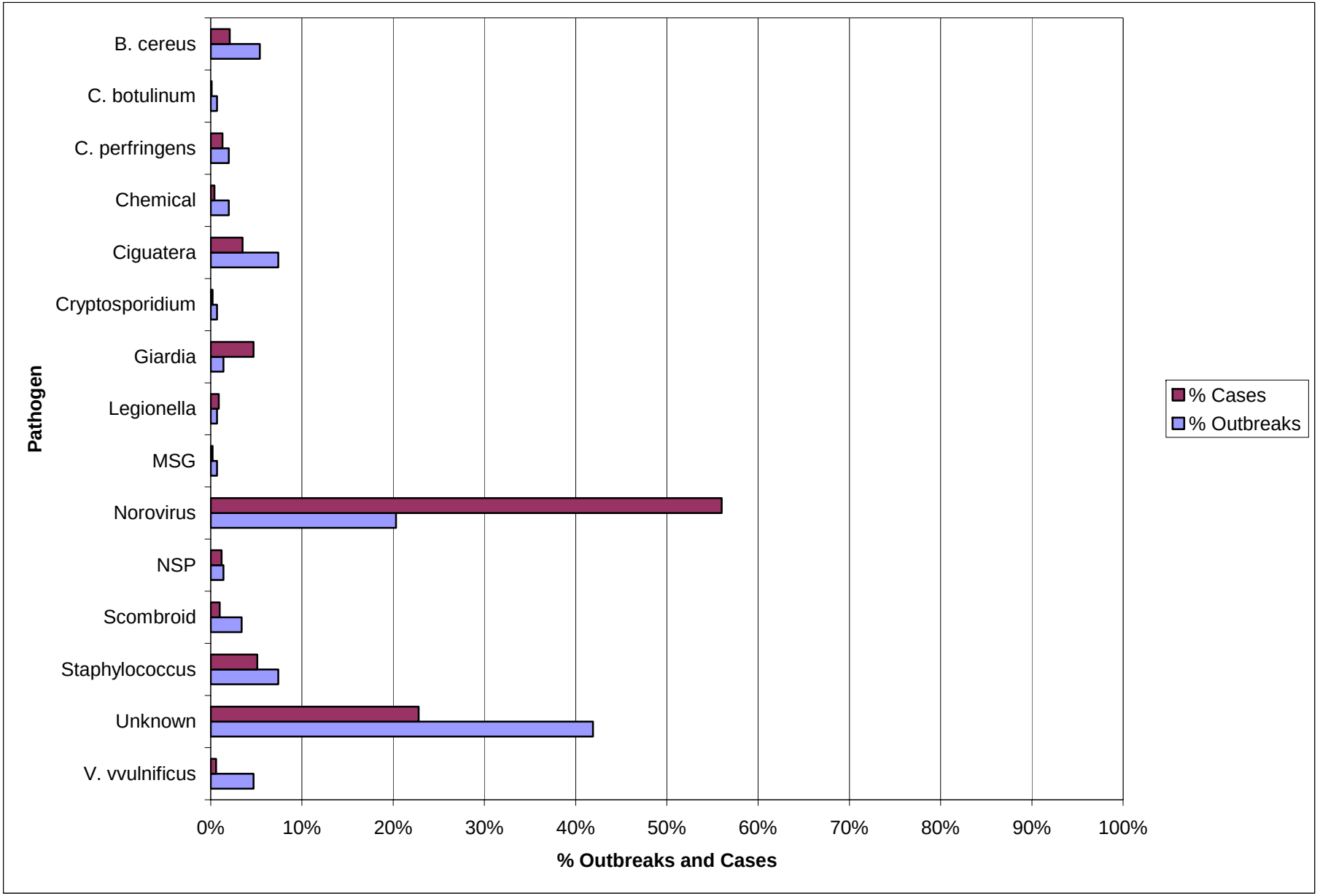
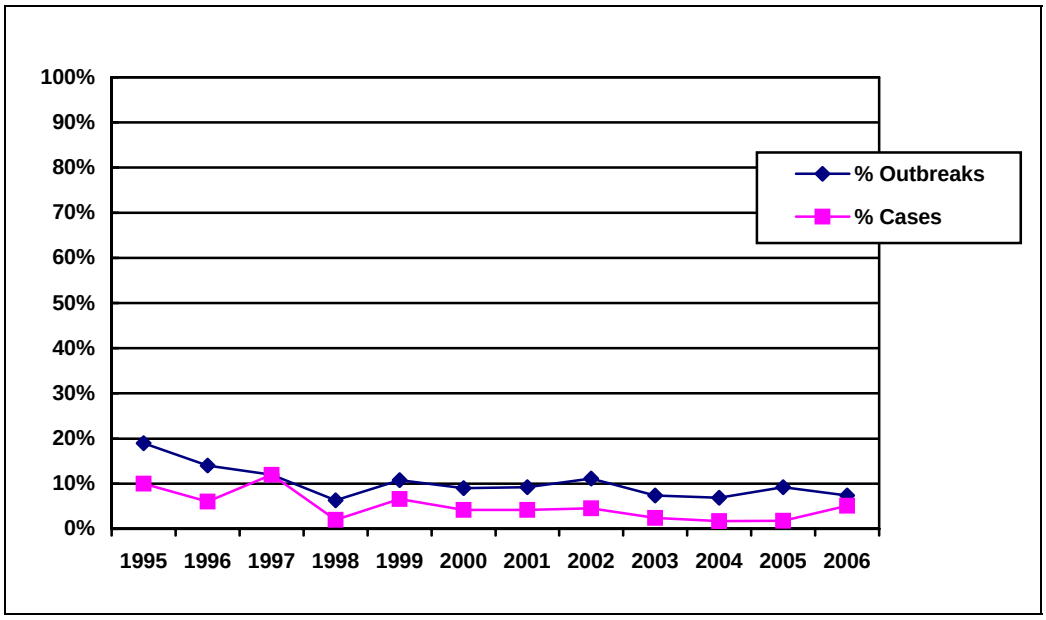


Figure 12: Percent Total Food and Waterborne Disease Outbreaks and Cases by Etiologic Agent, Florida, 2006*



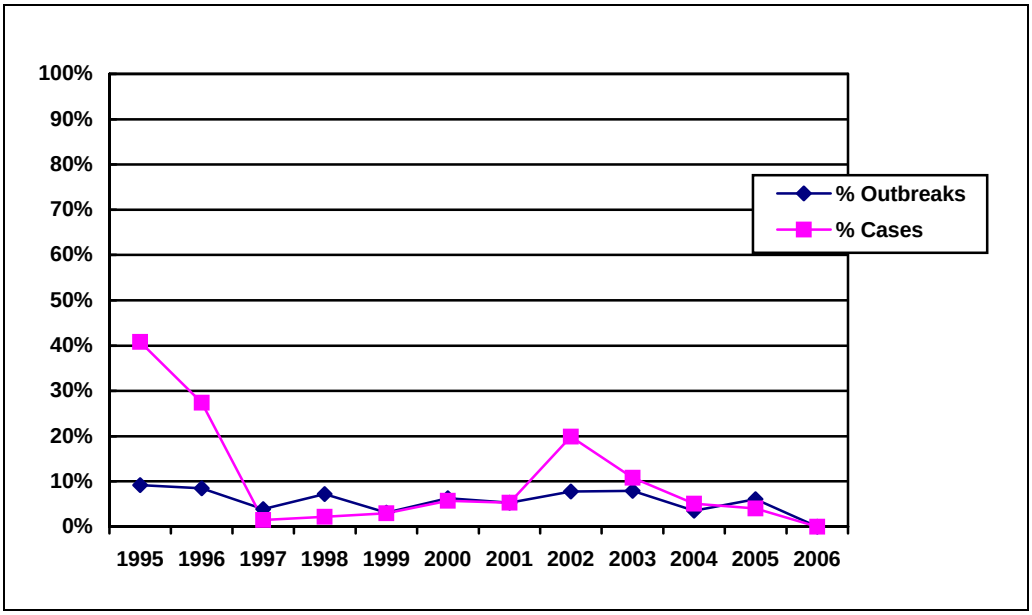
*The etiologic agent was unknown in 42% of the outbreaks and 23% of the cases.

Figure 13: Trends of Staphylococcus in Reported Food and Waterborne Outbreaks and Outbreak-related Cases, Florida, 1995-2006



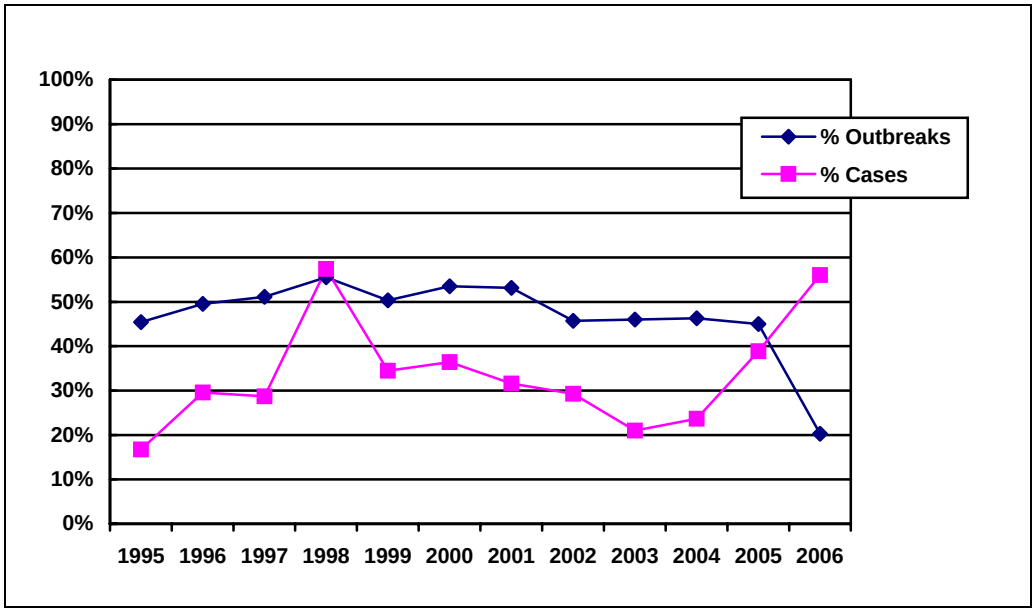
Reported food and waterborne Staphylocccus outbreaks and cases show a slight downward trend over time.

Figure 14: Trends of Salmonella in Reported Food and Waterborne Outbreaks and Outbreak-related Cases, Florida, 1995-2006



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

Figure 15: Trends of Unknown Pathogens in Reported Food and Waterborne Outbreaks and Outbreak-related Cases, Florida, 1995-2006



The amount of food and waterborne outbreaks and outbreak-related cases from unknown causes show a very slight downward trend over time.

Figure 16: Percent Total Food and Waterborne Outbreaks and Outbreak-related Cases by Site, Florida, 2006

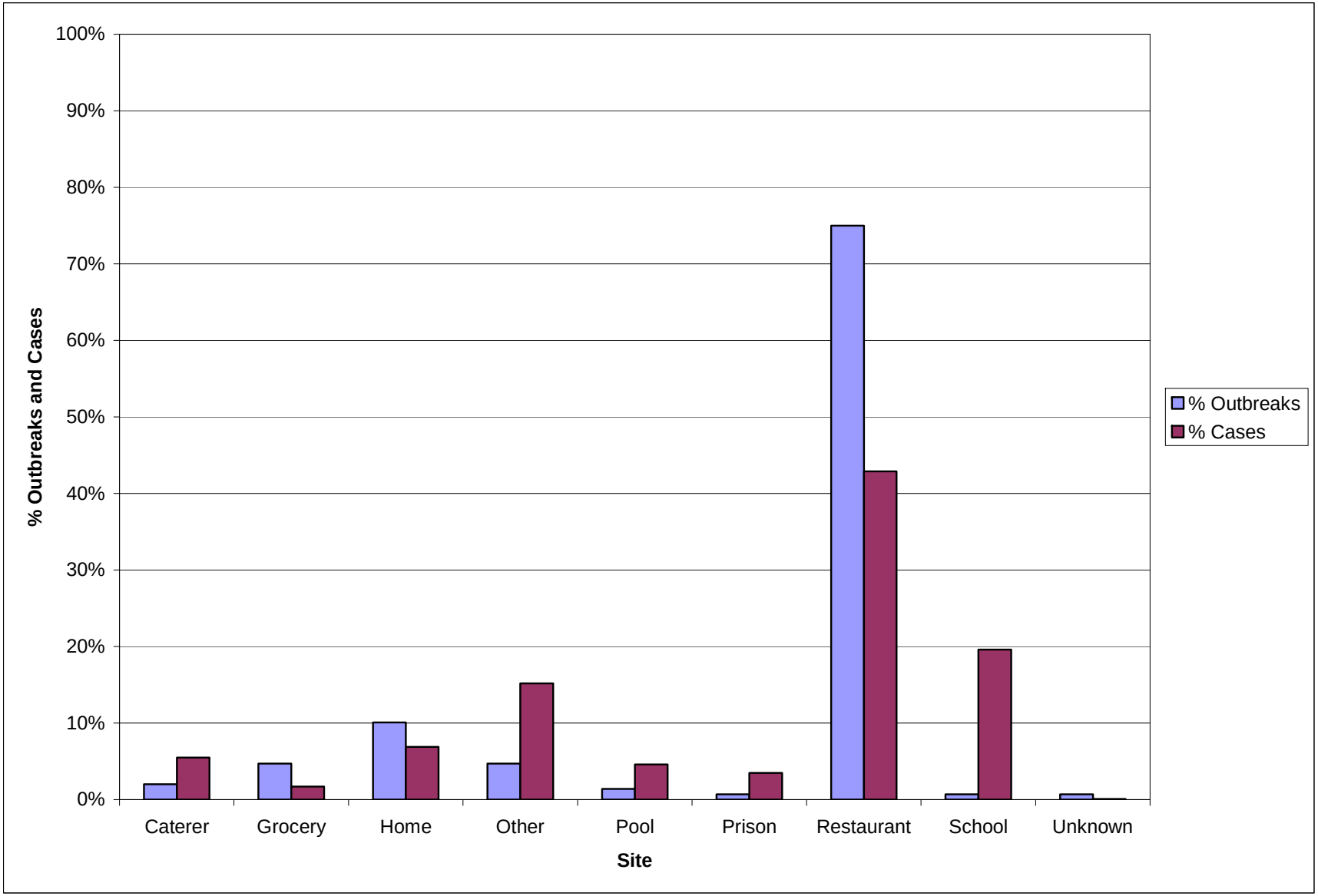


Table 14: Food and Waterborne Outbreaks by Site, Florida, 2006[18]

Status	Caterer	Grocery	Home	Other	Pool	Prison	Restaurant	School	Unknown	Total
Confirmed	1	2	11	4	1	1	18	1	1	40
row %	2.5%	5.0%	27.5%	10.0%	2.5%	2.5%	45.0%	2.5%	2.5%	27.0%
col %	33.3%	28.6%	73.3%	57.1%	50.0%	100.0%	16.2%	100.0%	100.0%	
Suspected	2	5	4	3	1	0	93	0	0	108
row %	1.9%	4.6%	3.7%	2.8%	0.9%	0.0%	86.1%	0.0%	0.0%	73.0%
col %	66.7%	71.4%	26.7%	42.8%	50.0%	0.0%	83.8%	0.0%	0.0%	
Total	3	7	15	7	2	1	111	1	1	148
% Total	**2.0%**	**4.7%**	**10.1%**	**4.7%**	**1.4%**	**0.7%**	**75.0%**	**0.7%**	**0.7%**	

Table 15: Food and Waterborne Outbreak-related Cases by Site, Florida, 2006[19]

Status	Caterer	Grocery	Home	Other	Pool	Prison	Restaurant	School	Unknown	Total
Confirmed	41	2	65	143	55	44	169	248	1	768
row %	5.3%	0.3%	8.5%	18.6%	7.2%	5.7%	22.0%	32.3%	0.1%	60.8%
col %	58.6%	9.5%	74.7%	74.5%	94.8%	100.0%	31.2%	100.0%	100.0%	
Suspected	29	19	22	49	3	0	373	0	0	495
row %	5.9%	3.8%	4.4%	9.9%	0.6%	0.0%	75.4%	0.0%	0.0%	39.2%
col %	41.4%	90.5%	25.3%	25.5%	5.2%	0.0%	68.8%	0.0%	0.0%	
Total	70	21	87	192	58	44	542	248	1	1263
% Total	**5.5%**	**1.7%**	**6.9%**	**15.2%**	**4.6%**	**3.5%**	**42.9%**	**19.6%**	**0.1%**	

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

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

Table 16: Food and Waterborne Outbreaks and Cases Reported by Agency of Jurisdiction,[20,21] Florida, 2006

Agency	# Outbreaks	% Outbreaks	# Cases	% Cases
DOACS	10	6.8%	77	6.1%
DBPR	116	78.4%	683	54.1%
DOH	5	3.4%	361	28.6%
OTHER	17	11.5%	142	11.2%
Total	**148**	**100.0%**	**1263**	**100.0%**

Figure 17: Reported Food and Waterborne Disease Outbreaks by Agency of Jurisdiction, 1995-2006

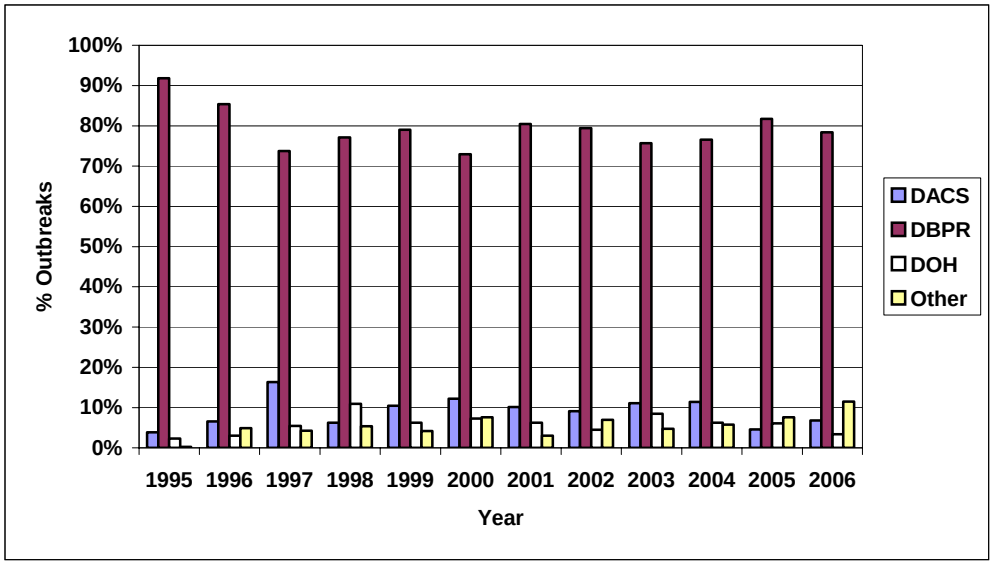
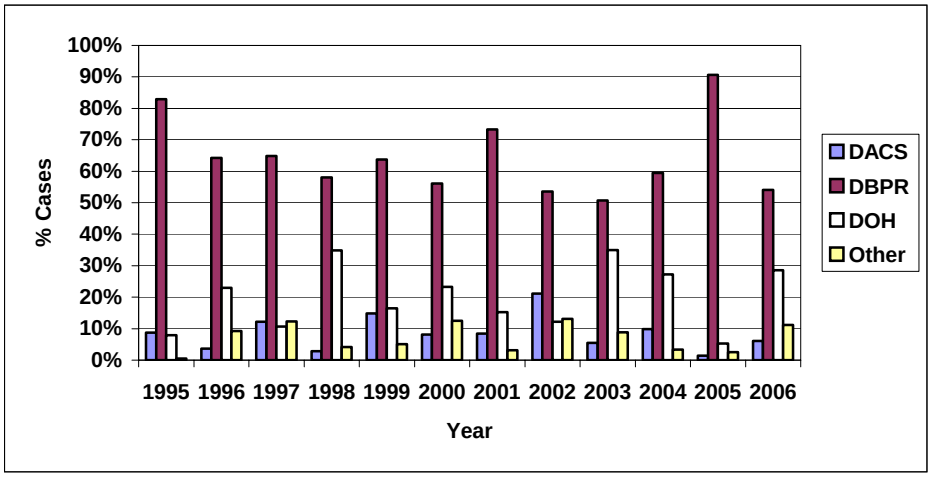


Figure 18: Cases Associated With Reported Food and Waterborne Disease Outbreaks by Agency of Jurisdiction, 1995–2006



[20] Agency of jurisdiction refers to the agency regulating the primary food source and/or food workers identified as the cause of the outbreak (DOACS = 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).
[21] Data from previous years can be found in the 2002 - 2005 Annual Reports.

Figure 19: Percent Total Food and Waterborne Outbreaks and Outbreak-related Cases by Vehicle, Florida, 2006

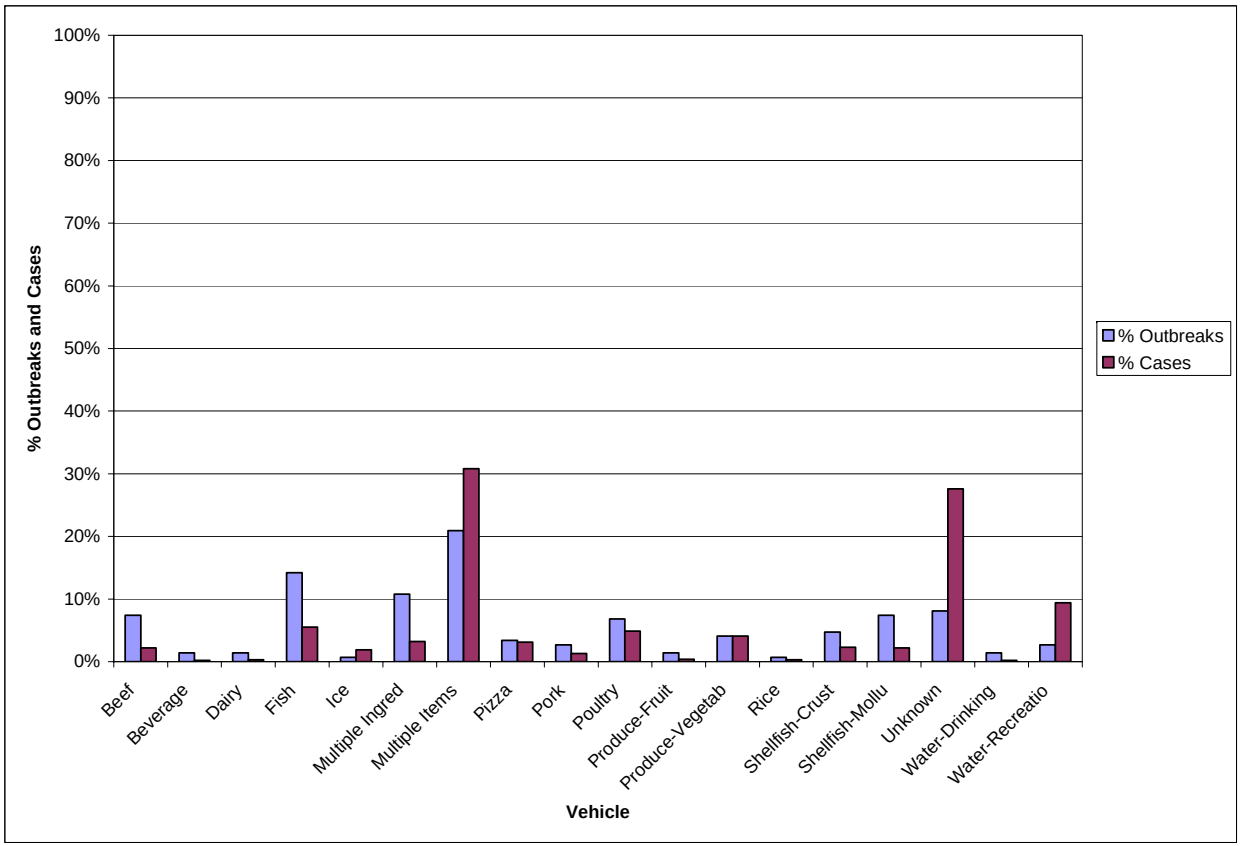


Table 17: Food and Waterborne Outbreaks by Vehicle, Florida, 2006[22]

Status	Beef	Bev	Dairy	Fish	Ice	Mult Ingred	Mult Items	Pizza	Pork	Poultry	Fruit	Veg	Rice	Shellfish Crust	Shellfish Mollu	Unk	Water Drink	Water Rec	Total
Confirmed	0	1	0	10	1	0	6	0	0	1	0	0	0	1	10	5	2	3	40
row %	0.0%	2.5%	0.0%	25.0%	2.5%	0.0%	15.0%	0.0%	0.0%	2.5%	0.0%	0.0%	0.0%	2.5%	25.0%	12.5 %	5.0%	7.5%	27.0%
col %	0.0%	50.0%	0.0%	47.6%	100.0 %	0.0%	19.4%	0.0%	0.0%	10.0%	0.0%	0.0%	0.0%	14.3%	90.9%	41.7 %	100.0 %	75.0%	
Suspected	11	1	2	11	0	16	25	5	4	9	2	6	1	6	1	7	0	1	108
row %	10.2%	0.9%	1.9%	10.2%	0.0%	14.8%	23.1%	4.6%	3.7%	8.3%	1.9%	5.6%	0.9%	5.6%	0.9%	6.5%	0.0%	0.9%	73.0%
col %	100.0 %	50.0%	100.0 %	52.4%	0.0%	100.0 %	80.6%	100.0 %	100.0 %	90.0%	100.0 %	100.0 %	100.0 %	85.7%	9.1%	58.3 %	0.0%	25.0%	
Total	**11**	**2**	**2**	**21**	**1**	**16**	**31**	**5**	**4**	**10**	**2**	**6**	**1**	**7**	**11**	**12**	**2**	**4**	**148**
	7.4%	**1.4%**	**1.4%**	**14.2%**	**0.7%**	**10.8%**	**20.9%**	**3.4%**	**2.7%**	**6.8%**	**1.4%**	**4.1%**	**0.7%**	**4.7%**	**7.4%**	**8.1%**	**1.4%**	**2.7%**	

Table 18: Food and Waterborne Outbreak-related Cases by Vehicle, Florida, 2006[23]

Status	Beef	Bev	Dairy	Fish	Ice	Mult Ingred	Mult Items	Pizza	Pork	Poultry	Fruit	Veg	Rice	Shellfish Crust	Shellfish Mollu	Unk	Water Drink	Water Rec	Total
Confirmed	0	1	0	39	24	0	221	0	0	41	0	0	0	7	26	290	3	116	768
row %	0.0%	0.1%	0.0%	5.1%	3.1%	0.0%	28.8%	0.0%	0.0%	5.3%	0.0%	0.0%	0.0%	0.9%	3.4%	37.8 %	0.4%	15.1%	60.8%
col %	0.0%	33.3%	0.0%	56.5%	100.0 %	0.0%	56.8%	0.0%	0.0%	66.1%	0.0%	0.0%	0.0%	24.1%	92.9%	83.3 %	100.0 %	97.5%	
Suspected	28	2	4	30	0	41	168	39	16	21	5	52	4	22	2	58	0	3	495
row %	5.7%	0.4%	0.8%	6.1%	0.0%	8.3%	33.9%	7.9%	3.2%	4.2%	1.0%	10.5%	0.8%	4.4%	0.4%	11.7 %	0.0%	0.6%	39.2%
col %	100.0 %	66.7%	100.0 %	43.5%	0.0%	100.0 %	43.2%	100.0 %	100.0 %	33.9%	100.0 %	100.0 %	100.0 %	75.9%	7.1%	16.7 %	0.0%	2.5%	
Total	28	3	4	69	24	41	389	39	16	62	5	52	4	29	28	348	3	119	1263
	2.2%	0.2%	0.3%	5.5%	1.9%	3.2%	30.8%	3.1%	1.3%	4.9%	0.4%	4.1%	0.3%	2.3%	2.2%	27.6 %	0.2%	9.4%	

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

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

Table 19: Total Food and Waterborne Outbreaks, Florida, 2006: Etiologic Agent by Vehicle

Pathogen	Beef	Drink	Dairy	Fish	Ice	Mult. ingred	Mult items	Pizza	Pork	Poultry	Produce-fruit	Produce-vegetab	Rice	Shellfish crust	Shellfish mollusc	Unk	Water drinking	Water rec	Total
B. cereus	1	0	0	0	0	3	3	0	0	0	0	0	1	0	0	0	0	0	8
C. botulinum	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
C. perf.	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	1	0	0	3
Chemical	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	2	0	3
Ciguatera	0	0	0	11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	11
Crypto	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
Giardia	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	2
Legionella	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
MSG	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
Norovirus	3	1	0	0	1	3	8	1	1	2	0	3	0	0	0	6	0	1	30
NSP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	2
Scombroid	0	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5
Staph.	2	0	1	2	0	1	1	0	1	3	0	0	0	0	0	0	0	0	11
Unknown	5	0	1	3	0	7	17	4	2	5	2	3	0	6	2	5	0	0	62
V. vulnificus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7	0	0	0	7
Total	**11**	**2**	**2**	**21**	**1**	**16**	**31**	**5**	**4**	**10**	**2**	**6**	**1**	**7**	**11**	**12**	**2**	**4**	**148**

Table 20: Total Food and Waterborne Outbreak-related Cases, Florida, 2006: Etiologic Agent by Vehicle

Pathogen	Beef	Drink	Dairy	Fish	Ice	Mult. ingred	Mult items	Pizza	Pork	Poultry	Produce-fruit	Produce-vegetab	Rice	Shellfish crust	Shellfish mollusc	Unk	Water drinking	Water rec	Total
B. cereus	3	0	0	0	0	6	14	0	0	0	0	0	4	0	0	0	0	0	27
C. botulinum	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
C. perf.	0	0	0	0	0	3	3	0	0	0	0	0	0	0	0	10	0	0	16
Chemical	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	3	0	5
Ciguatera	0	0	0	44	0	0	0	0	0	0	0	0	0	0	0	0	0	0	44
Crypto	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3
Giardia	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	55	59
Legionella	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	11	11
MSG	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	2
Norovirus	9	2	0	0	24	10	230	3	2	44	0	42	0	0	0	291	0	50	707
NSP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	15	0	0	0	15
Scombroid	0	0	0	13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	13
Staph.	5	0	2	4	0	2	44	0	2	6	0	0	0	0	0	0	0	0	65
Unknown	11	0	2	8	0	18	96	36	12	12	5	10	0	25	6	47	0	0	288
V. vulnificus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7	0	0	0	7
Total	**28**	**3**	**4**	**69**	**24**	**41**	**389**	**39**	**16**	**62**	**5**	**52**	**4**	**29**	**28**	**348**	**3**	**119**	**1263**

Table 21: Confirmed Food and Waterborne Outbreaks, Florida, 2006: Etiologic Agent by Vehicle

Pathogen	Drink	Fish	Ice	Multiple Items	Poultry	Shellfish Crust	Shellfish Mollusc	Unk	Water Drinking	Water Recreatio	Total
B. cereus	0	0	0	1	0	0	0	0	0	0	1
C. botulinum	1	0	0	0	0	0	0	0	0	0	1
C. perfringens	0	0	0	0	0	0	0	1	0	0	1
Chemical	0	0	0	0	0	0	0	0	2	0	2
Ciguatera	0	7	0	0	0	0	0	0	0	0	7
Giardia	0	0	0	0	0	0	0	0	0	1	1
Legionella	0	0	0	0	0	0	0	0	0	1	1
Norovirus	0	0	1	4	1	0	0	2	0	1	9
NSP	0	0	0	0	0	0	2	0	0	0	2
Scombroid	0	3	0	0	0	0	0	0	0	0	3
Staphylococcus	0	0	0	1	0	0	0	0	0	0	1
Unknown	0	0	0	0	0	1	1	2	0	0	4
V. vulnificus	0	0	0	0	0	0	7	0	0	0	7
Total	**1**	**10**	**1**	**6**	**1**	**1**	**10**	**5**	**2**	**3**	**40**

Table 22: Food and Waterborne Outbreak-related Cases in Confirmed Outbreaks, Florida, 2006: Etiologic Agent by Vehicle

Pathogen	Drink	Fish	Ice	Multiple Items	Poultry	Shellfish Crust	Shellfish Mollusc	Unk	Water Drinking	Water Recreatio	Total
B. cereus	0	0	0	10	0	0	0	0	0	0	10
C. botulinum	1	0	0	0	0	0	0	0	0	0	1
C. perfringens	0	0	0	0	0	0	0	10	0	0	10
Chemical	0	0	0	0	0	0	0	0	3	0	3
Ciguatera	0	30	0	0	0	0	0	0	0	0	30
Giardia	0	0	0	0	0	0	0	0	0	55	55
Legionella	0	0	0	0	0	0	0	0	0	11	11
Norovirus	0	0	24	167	41	0	0	256	0	50	538
NSP	0	0	0	0	0	0	15	0	0	0	15
Scombroid	0	9	0	0	0	0	0	0	0	0	9
Staphylococcus	0	0	0	44	0	0	0	0	0	0	44
Unknown	0	0	0	0	0	7	4	24	0	0	35
V. vulnificus	0	0	0	0	0	0	7	0	0	0	7
Total	1	39	24	221	41	7	26	290	3	116	768

Table 23: Suspected Food and Waterborne Outbreaks, Florida, 2006: Etiologic Agent by Vehicle

Pathogen	Beef	Drink	Dairy	Fish	Mult Ingred	Mult Items	Pizza	Pork	Poultry	Produce Fruit	Produce Veg	Rice	Shellfish Crust	Shellfish Mollusc	Unk	Water Rec	Total
B. cereus	1	0	0	0	3	2	0	0	0	0	0	1	0	0	0	0	7
C. perf.	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	2
Chemical	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1
Ciguatera	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	4
Crypto	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
Giardia	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1
MSG	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1
Norovirus	3	1	0	0	3	4	1	1	1	0	3	0	0	0	4	0	21
Scombroid	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	2
Staph	2	0	1	2	1	0	0	1	3	0	0	0	0	0	0	0	10
Unknown	5	0	1	3	7	17	4	2	5	2	3	0	5	1	3	0	58
Total	**11**	**1**	**2**	**11**	**16**	**25**	**5**	**4**	**9**	**2**	**6**	**1**	**6**	**1**	**7**	**1**	**108**

Table 24: Food and Waterborne Outbreak-related Cases in Suspected Outbreaks, Florida, 2006: Etiologic Agent by Vehicle

Pathogen	Beef	Drink	Dairy	Fish	Mult Ingred	Mult Items	Pizza	Pork	Poultry	Produce Fruit	Produce Veg	Rice	Shellfish Crust	Shellfish Mollusc	Unk	Water Rec	Total
B. cereus	3	0	0	0	6	4	0	0	0	0	0	4	0	0	0	0	17
C. perf.	0	0	0	0	3	3	0	0	0	0	0	0	0	0	0	0	6
Chemical	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	2
Ciguatera	0	0	0	14	0	0	0	0	0	0	0	0	0	0	0	0	14
Crypto	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3
Giardia	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	4
MSG	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	2
Norovirus	9	2	0	0	10	63	3	2	3	0	42	0	0	0	35	0	169
Scombroid	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	4
Staph	5	0	2	4	2	0	0	2	6	0	0	0	0	0	0	0	21
Unknown	11	0	2	8	18	96	36	12	12	5	10	0	18	2	23	0	253
Total	**28**	**2**	**4**	**30**	**41**	**168**	**39**	**16**	**21**	**5**	**52**	**4**	**22**	**2**	**58**	**3**	**495**

Figure 20: Percent Total Food and Waterborne Outbreaks and Cases by Month, Florida, 2006

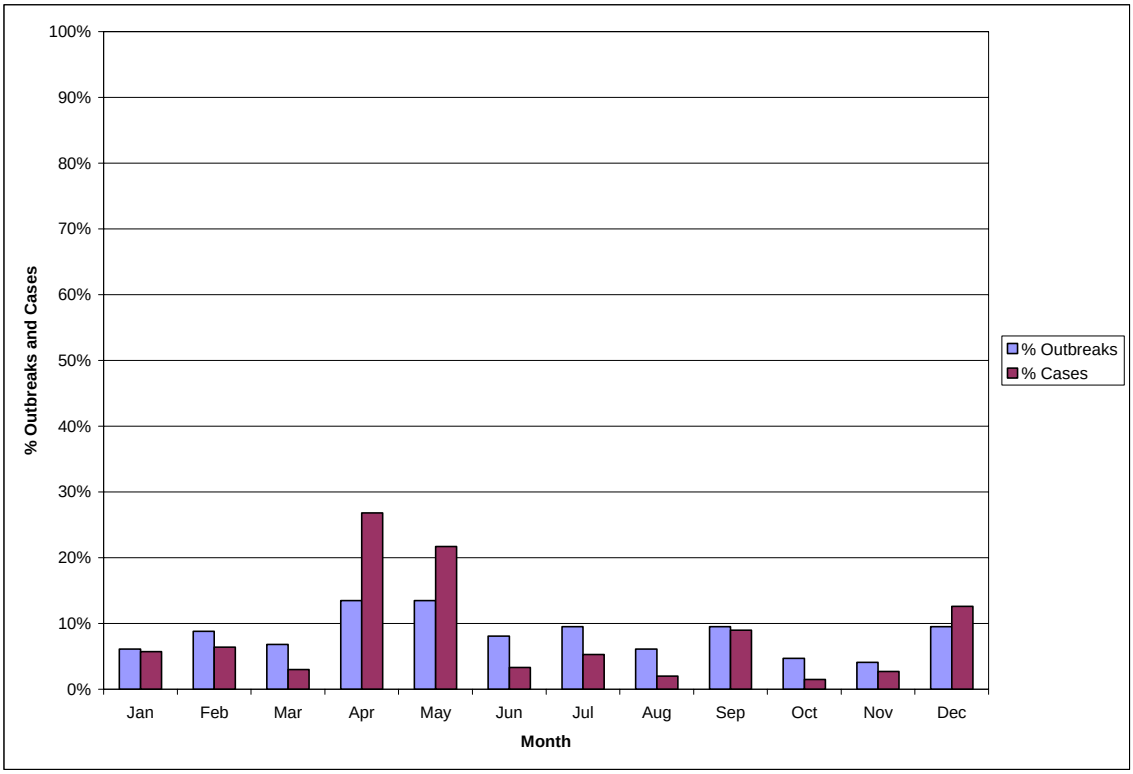


Table 25: Food and Waterborne Outbreaks by Month, Florida, 2006

Status	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Confirmed	1	1	4	5	8	2	3	3	5	1	1	6	40
row%	2.5%	2.5%	10.0%	12.5%	20.0%	5.0%	7.5%	7.5%	12.5%	2.5%	2.5%	15.0%	27.0%
col%	11.1%	7.7%	40.0%	25.0%	40.0%	16.7%	21.4%	33.3%	35.7%	14.3%	16.7%	42.9%	
Suspected	8	12	6	15	12	10	11	6	9	6	5	8	108
row%	7.4%	11.1%	5.6%	13.9%	11.1%	9.3%	10.2%	5.6%	8.3%	5.6%	4.6%	7.4%	73.0%
col%	88.9%	92.3%	60.0%	75.0%	60.0%	83.3%	78.6%	66.7%	64.3%	85.7%	83.3%	57.1%	
Total	**9**	**13**	**10**	**20**	**20**	**12**	**14**	**9**	**14**	**7**	**6**	**14**	**148**
Total %	**6.1%**	**8.8%**	**6.8%**	**13.5%**	**13.5%**	**8.1%**	**9.5%**	**6.1%**	**9.5%**	**4.7%**	**4.1%**	**9.5%**	

Table 26: Food and Waterborne Outbreak-related Cases by Month, Florida, 2006

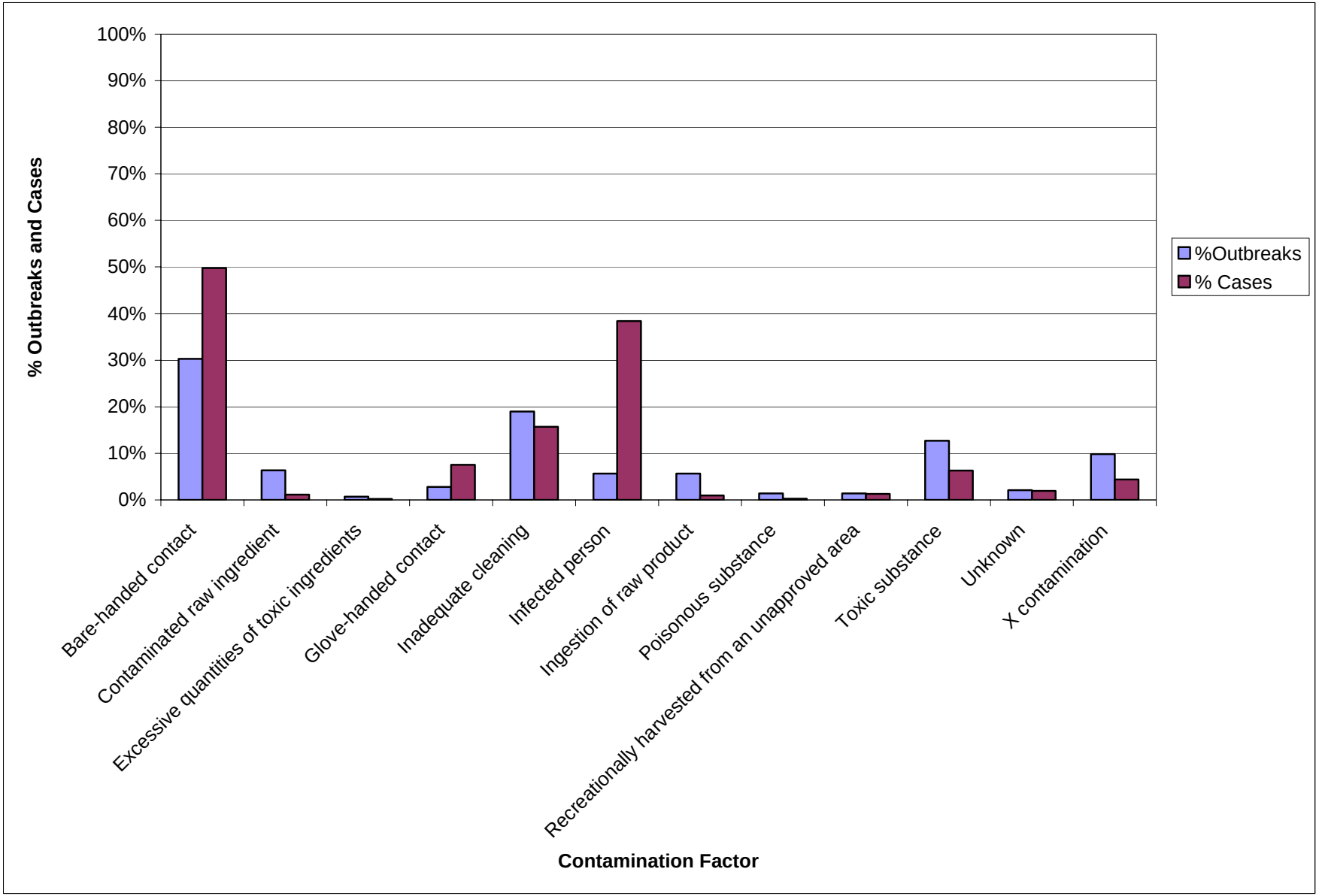
Status	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Confirmed	11	5	25	276	209	8	15	7	68	2	21	121	768
row%	1.4%	0.7%	3.3%	35.9%	27.2%	1.0%	2.0%	0.9%	8.9%	0.3%	2.7%	15.8%	60.8%
col%	15.3%	6.2%	65.8%	81.7%	76.3%	19.0%	22.4%	28.0%	59.6%	10.5%	61.8%	76.1%	
Suspected	61	76	13	62	65	34	52	18	46	17	13	38	495
row%	12.3%	15.4%	2.6%	12.5%	13.1%	6.9%	10.5%	3.6%	9.3%	3.4%	2.6%	7.7%	39.2%
col%	84.7%	93.8%	34.2%	18.3%	23.7%	81.0%	77.6%	72.0%	40.4%	89.5%	38.2%	23.9%	
Total	**72**	**81**	**38**	**338**	**274**	**42**	**67**	**25**	**114**	**19**	**34**	**159**	**1263**
Total %	**5.7%**	**6.4%**	**3.0%**	**26.8%**	**21.7%**	**3.3%**	**5.3%**	**2.0%**	**9.0%**	**1.5%**	**2.7%**	**12.6%**	

Table 27: Food and Waterborne Outbreaks With Greater Than 10 Cases (n=22), Florida, 2006[24]

Status	County	# Cases	Site	Vehicles	Pathogen	Pathogen status
Confirmed	Volusia	11	Other	Whirlpool spa	Legionella	Confirmed
Suspected	Palm Beach	12	Restaurant	Unknown	Norovirus	Suspected
Confirmed	Lee	13	Home	Clams	Nsp	Confirmed
Suspected	Palm Beach	14	Caterer	Multiple items	Norovirus	Suspected
Suspected	Martin	15	Caterer	Multiple items	Unknown	Unknown
Confirmed	Walton	15	Restaurant	Unknown	Unknown	Unknown
Suspected	Hillsborough	16	Restaurant	House salad	Norovirus	Suspected
Suspected	Dade	16	Restaurant	Unknown	Unknown	Unknown
Suspected	Polk	17	Restaurant	Pizza	Unknown	Unknown
Suspected	Hillsborough	18	Restaurant	Salad	Norovirus	Confirmed
Confirmed	Escambia	21	Other	Unk	Norovirus	Confirmed
Confirmed	Brevard	24	Restaurant	Ice	Norovirus	Confirmed
Suspected	Broward	26	Restaurant	Multiple items	Unknown	Unknown
Confirmed	Saint Johns	41	Caterer	Chicken	Norovirus	Confirmed
Confirmed	Saint Lucie	42	Restaurant	N/a	Norovirus	Confirmed
Confirmed	Osceola	43	Restaurant	Turkey or ham sandwiches	Norovirus	Confirmed
Suspected	Saint Lucie	44	Other	Multiple items	Norovirus	Confirmed
Confirmed	Holmes	44	Prison	Turkey, pork	Staphylococcus	Suspected
Confirmed	Santa Rosa	50	Other	Recreational swimmiing lake	Norovirus	Confirmed
Confirmed	Orange	55	Pool	Interactive water fountain	Giardia	Confirmed
Confirmed	Escambia	61	Other	Sub sandwich	Norovirus	Confirmed
Confirmed	Palm Beach	248	School	Unknown	Norovirus	Confirmed
	Total cases	**846**				

[24] The total number of outbreaks with more than ten cases is: 22 (14.9% of the total). The total number of cases associated with these outbreaks is 846 (66.9% of the total).

Figure 21: Contamination Factor – Percent Total Foodborne Outbreaks (n=142) and Outbreak-related Cases (n=1141), Florida, 2006 [25]



[25] Each outbreak may have up to three contamination factors, thus the numbers and percentages will not add up to the actual number of outbreaks and outbreak-related cases.

Table 28: Contamination Factor - Number of Foodborne Outbreaks (n=142) and Outbreak-related Cases (n=1141), Florida, 2006

Contamination factor	# Outbreaks	# Cases
Bare-handed contact	43	568
Contaminated raw ingredient	9	13
Excessive quantities of toxic ingredients	1	2
Glove-handed contact	4	86
Inadequate cleaning	27	179
Infected person	8	438
Ingestion of raw product	8	11
Poisonous substance	2	3
Recreationally harvested from an unapproved area	2	15
Toxic substance	18	72
Unknown	3	22
X contamination	14	50

Table 29: Contamination Factor: Percent of Total Foodborne Outbreaks (n=142) and Outbreak-related Cases (n=1141), Florida, 2006

Contamination factor	% Outbreaks	% Cases
Bare-handed contact	30.3%	49.8%
Contaminated raw ingredient	6.3%	1.1%
Excessive quantities of toxic ingredients	0.7%	0.2%
Glove-handed contact	2.8%	7.5%
Inadequate cleaning	19.0%	15.7%
Infected person	5.6%	38.4%
Ingestion of raw product	5.6%	1.0%
Poisonous substance	1.4%	0.3%
Recreationally harvested from an unapproved area	1.4%	1.3%
Toxic substance	12.7%	6.3%
Unknown	2.1%	1.9%
X contamination	9.9%	4.4%

Table 30: Contamination Factor: Number of Foodborne Outbreaks (n=142) by Vehicle, Florida 2006

Factor	Beef	Drink	Dairy	Fish	Ice	Mult ingred	Mult items	Pizza	Pork	Poultry	Fruit	Veg	Crustacean	Mollusc	Unk	Pot H_2O	Rec H_2O	Total
Bare-handed contact	8	1	1	0	1	7	13	1	1	3	1	1	2	0	3	0	0	43
Contaminated raw product	0	0	0	0	0	1	1	0	0	0	0	0	0	7	0	0	0	9
Excessive quantities of toxic ingredients	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1
Glove-handed contact	0	0	0	1	0	0	3	0	0	0	0	0	0	0	0	0	0	4
Inadequate cleaning	3	0	0	1	1	2	10	1	0	2	2	0	3	0	2	0	0	27
Infected person	0	0	0	0	0	1	2	0	0	1	1	0	0	0	2	0	1	8
Ingestion of raw product	0	0	0	0	0	1	0	0	0	0	0	0	0	7	0	0	0	8
Poisonous substance	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	2
Toxic substance	0	0	0	16	0	0	0	0	0	0	0	0	0	2	0	0	0	18
Unknown	0	0	0	1	0	0	0	0	0	0	0	0	0	0	2	0	0	3
X contamination	3	0	0	0	0	2	2	1	0	2	1	1	1	0	1	0	0	14
Recreationally caught from unapproved source	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	2
Total	**14**	**1**	**1**	**19**	**2**	**15**	**32**	**3**	**1**	**8**	**5**	**2**	**6**	**18**	**11**	**1**	**1**	**140**

Table 31: Contamination Factor: Number of Foodborne Outbreak-related Cases (n=1141) by Vehicle, Florida 2006

Contamination Factor	Beef	Drink	Dairy	Fish	Ice	Mult ingred	Mult items	Pizza	Pork	Poultry	Fruit	Veg	Crustacean	Mollusc	Unk	Pot H_2O	Rec H_2O	Total
Bare-handed contact	22	2	2	0	24	18	153	3	2	46	2	8	11	0	275	0	0	568
Contaminated raw product	0	0	0	0	0	4	2	0	0	0	0	0	0	7	0	0	0	13
Excessive quantities of toxic ingredients	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	2
Glove-handed contact	0	0	0	2	0	0	84	0	0	0	0	0	0	0	0	0	0	86
Inadequate cleaning	7	0	0	2	24	6	96	10	0	4	5	0	13	0	12	0	0	179
Infected person	0	0	0	0	0	2	85	0	0	41	3	0	0	0	257	0	50	438
Ingestion of raw product	0	0	0	0	0	4	0	0	0	0	0	0	0	7	0	0	0	11
Poisonous substance	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	1	0	3
Toxic substance	0	0	0	57	0	0	0	0	0	0	0	0	0	15	0	0	0	72
Unknown	0	0	0	3	0	0	0	0	0	0	0	0	0	0	19	0	0	22
X contamination	8	0	0	0	0	7	6	4	0	4	2	8	7	0	4	0	0	50
Recreationally caught from unapproved source	0	0	0	0	0	0	0	0	0	0	0	0	0	15	0	0	0	15
Total	**37**	**2**	**2**	**64**	**48**	**43**	**428**	**17**	**2**	**95**	**12**	**16**	**31**	**44**	**582**	**1**	**50**	**1474**

Table 32: Contamination Factor: Number of Foodborne Outbreaks (n=142) by Pathogen, Florida 2006

Contamination Factor	*B. cereus*	*C. perf.*	Chemical	Ciguatera	MSG	Noro	NSP	Scombroid	Staph	Unk	*V. vulnificus*	Total
Bare-handed contact	2	1	0	0	0	17	0	0	4	19	0	43
Contaminated raw product	0	0	0	0	0	0	0	0	0	2	7	9
Excessive quantities of toxic ingredients	0	0	0	0	1	0	0	0	0	0	0	1
Glove-handed contact	0	0	0	0	0	2	0	0	1	1	0	4
Inadequate cleaning	2	1	0	0	0	6	0	0	4	14	0	27
Infected person	0	0	0	0	0	5	0	0	0	3	0	8
Ingestion of raw product	0	0	0	0	0	0	0	0	0	1	7	8
Poisonous substance	0	0	2	0	0	0	0	0	0	0	0	2
Toxic substance	0	0	0	11	0	0	2	5	0	0	0	18
Unknown	0	0	0	0	0	2	0	0	0	1	0	3
X contamination	1	0	0	0	0	3	0	0	2	8	0	14
Recreationally caught from unapproved source	0	0	0	0	0	0	2	0	0	0	0	2
Total	**5**	**2**	**2**	**11**	**1**	**35**	**4**	**5**	**11**	**50**	**14**	**140**

Table 33: Contamination Factor: Number of Foodborne Outbreak-related Cases (n=1141) by Pathogen, Florida 2006

Contamination Factor	B. cereus	C. perf.	Chemical	Ciguatera	MSG	Noro	NSP	Scombroid	Staph	Unk	*V. vulnificus*	Total
Bare-handed contact	5	3	0	0	0	455	0	0	9	96	0	568
Contaminated raw product	0	0	0	0	0	0	0	0	0	6	7	13
Excessive quantities of toxic ingredients	0	0	0	0	2	0	0	0	0	0	0	2
Glove-handed contact	0	0	0	0	0	58	0	0	2	26	0	86
Inadequate cleaning	5	3	0	0	0	84	0	0	8	79	0	179
Infected person	0	0	0	0	0	424	0	0	0	14	0	438
Ingestion of raw product	0	0	0	0	0	0	0	0	0	4	7	11
Poisonous substance	0	0	3	0	0	0	0	0	0	0	0	3
Toxic substance	0	0	0	44	0	0	15	13	0	0	0	72
Unknown	0	0	0	0	0	19	0	0	0	3	0	22
X contamination	3	0	0	0	0	15	0	0	5	27	0	50
Recreationally caught from unapproved source	0	0	0	0	0	0	15	0	0	0	0	15
Total	**13**	**6**	**3**	**44**	**2**	**1055**	**30**	**13**	**24**	**270**	**14**	**1474**

Figure 22: Proliferation/Amplification Factor: Percent Total Foodborne Outbreaks (n=142) and Outbreak-related Cases (n=1141), Florida, 2006[26]

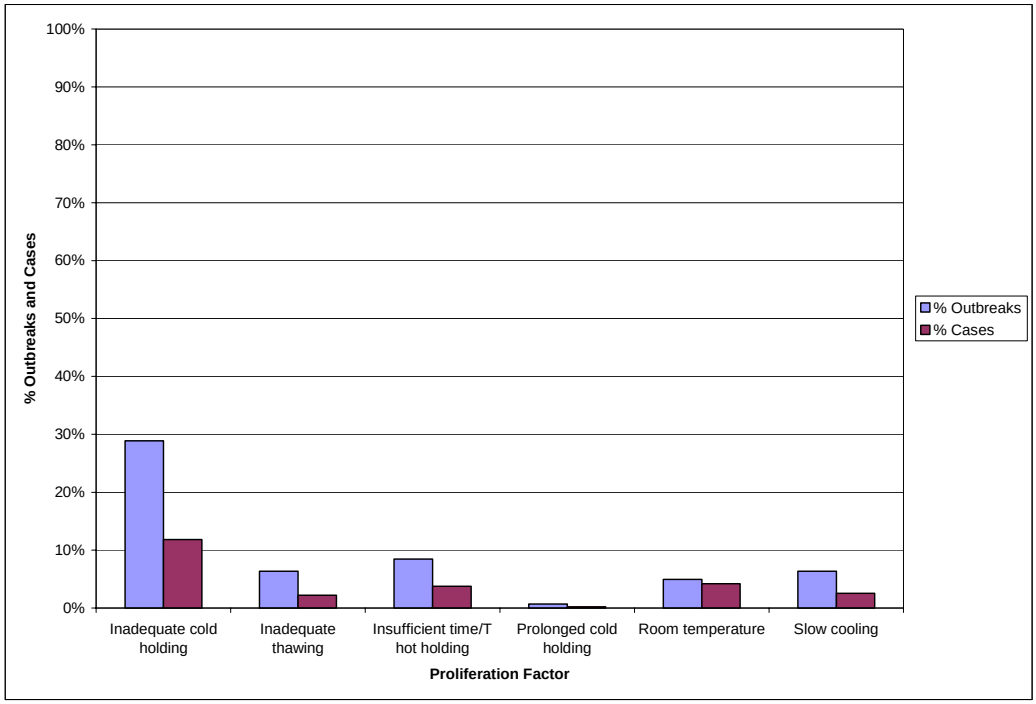


Table 34: Proliferation/Amplification Factor:
Number of Foodborne Outbreaks (n=142) and Outbreak-related Cases (n=1141), Florida, 2006

Proliferation Factor	# Outbreaks	# Cases
Inadequate cold holding	41	135
Inadequate thawing	9	25
Insufficient time/T hot holding	12	43
Prolonged cold holding	1	2
Room temperature	7	48
Slow cooling	9	29

Table 35: Proliferation/Amplification Factor:
Percent Total Foodborne Outbreaks (n=142) and Outbreak-related Cases (n=1141), Florida, 2006

Proliferation Factor	# Outbreaks	# Cases
Inadequate cold holding	28.9%	11.8%
Inadequate thawing	6.3%	2.2%
Insufficient time/T hot holding	8.5%	3.8%
Prolonged cold holding	0.7%	0.2%
Room temperature	4.9%	4.2%
Slow cooling	6.3%	2.5%

[26] Each outbreak may have up to three proliferation/amplification factors, thus the numbers and percentages will not add up to the actual number of outbreaks and outbreak-related cases.

Table 36: Proliferation/Amplification Factor: Number of Foodborne Outbreaks (n=142) by Vehicle, Florida 2006

Proliferaton Factor	Beef	Bev	Fish	Mult Ingred	Mul Items	Pizza	Pork	Poultry	Fruit	Veg	Crustacean	Unk	Total
Inadequate cold holding	6	1	5	7	9	2	0	2	1	1	4	3	41
Inadequate thawing	1	0	1	1	3	1	0	0	0	0	1	1	9
Insufficient time/T hot holding	2	0	1	0	6	0	0	0	1	0	2	0	12
Prolonged cold holding	0	0	0	0	0	0	0	0	0	0	1	0	1
Room temperature	0	0	0	1	3	0	1	0	0	0	1	1	7
Slow cooling	2	0	0	2	3	0	0	1	0	1	0	0	9
Total	**11**	**1**	**7**	**11**	**24**	**3**	**1**	**3**	**2**	**2**	**9**	**5**	**79**

Table 37: Proliferation/Amplification Factor: Number of Foodborne Outbreak-related Cases (n=1141) by Vehicle, Florida 2006

Proliferaton Factor	Beef	Bev	Fish	Mult Ingred	Mul Items	Pizza	Pork	Poultry	Fruit	Veg	Crustacean	Unk	Total
Inadequate cold holding	14	1	13	16	25	14	0	4	2	2	21	23	135
Inadequate thawing	2	0	2	2	9	4	0	0	0	0	2	4	25
Insufficient time/T hot holding	4	0	2	0	20	0	0	0	2	0	15	0	43
Prolonged cold holding	0	0	0	0	0	0	0	0	0	0	2	0	2
Room temperature	0	0	0	4	24	0	9	0	0	0	7	4	48
Slow cooling	5	0	0	5	15	0	0	2	0	2	0	0	29
Total	**25**	**1**	**17**	**27**	**93**	**18**	**9**	**6**	**4**	**4**	**47**	**31**	**282**

Table 38: Proliferation/Amplification Factor: Number of Foodborne Outbreaks (n=142) by Etiologic Agent, Florida 2006

Proliferaton Factor	*B. cereus*	*C. botulinum*	*C. perfringens*	Scombroid	Staphylococcus	Unknown	*V. vulnificus*	Total
Inadequate cold holding	5	1	1	5	3	26	0	41
Inadequate thawing	2	0	0	0	1	6	0	9
Insufficient time/T hot holding	1	0	1	0	2	8	0	12
Prolonged cold holding	0	0	0	0	0	1	0	1
Room temperature	2	0	0	0	0	5	0	7
Slow cooling	3	0	1	0	1	4	0	9
Total	**13**	**1**	**3**	**5**	**7**	**50**	**1**	**80**

Table 39: Proliferation/Amplification Factor: Number of Foodborne Outbreak-related Cases (n=1141) by Etiologic Agent, Florida 2006

Proliferaton Factor	*B. cereus*	*C. botulinum*	*C. perfringens*	Scombroid	Staphylococcus	Unknown	V. vulnificus	Total
Inadequate cold holding	10	1	3	13	7	101	0	135
Inadequate thawing	4	0	0	0	2	19	0	25
Insufficient time/T hot holding	2	0	3	0	4	34	0	43
Prolonged cold holding	0	0	0	0	0	2	0	2
Room temperature	20	0	0	0	0	28	0	48
Slow cooling	15	0	3	0	2	9	0	29
Total	**51**	**1**	**9**	**13**	**15**	**193**	**1**	**283**

Figure 23: Survival Factor: Percent Total Foodborne Outbreaks (n=142) and Outbreak-related Cases (n=1141), Florida, 2006[27]

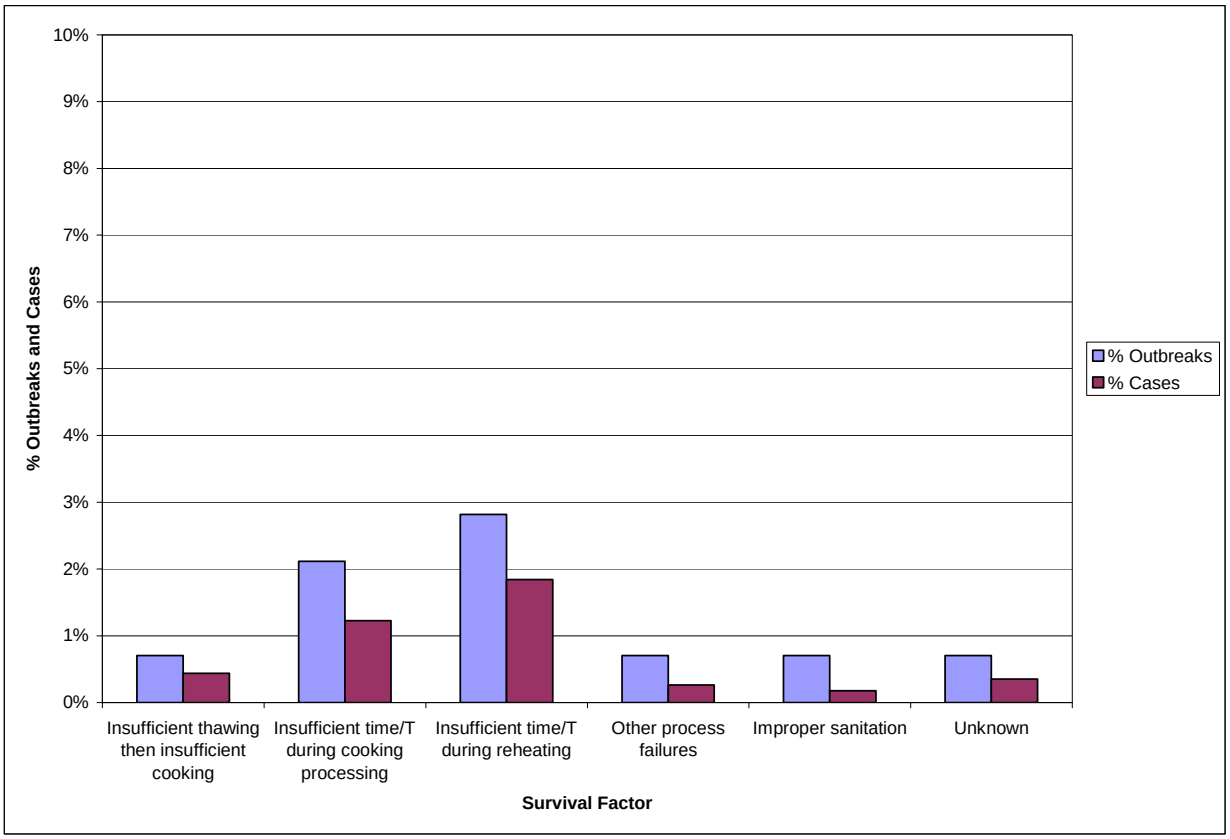


Table 40: Survival Factor:
Number of Foodborne Outbreaks (n=142) and Outbreak-related Cases (n=1141), Florida, 2006

Survival Factor	# Outbreaks	# Cases
Insufficient thawing then insufficient cooking	1	5
Insufficient time/T during cooking processing	3	14
Insufficient time/T during reheating	4	21
Other process failures	1	3
Improper sanitation	1	2
Unknown	1	4

Table 41: Survival Factor:
Percent Total Foodborne Outbreaks (n=142) and Outbreak-related Cases (n=1141), Florida, 2006

Survival Factor	% Outbreaks	% Cases
Insufficient thawing then insufficient cooking	0.7%	0.4%
Insufficient time/T during cooking processing	2.1%	1.2%
Insufficient time/T during reheating	2.8%	1.8%
Other process failures	0.7%	0.3%
Improper sanitation	0.7%	0.2%
Unknown	0.7%	0.4%

[27] Each outbreak may have up to three survival factors, thus the numbers and percentages will not add up to the actual number of outbreaks and outbreak-related cases.

Table 42: Survival Factor: Number of Foodborne Outbreaks (n=142) by Vehicle, Florida 2006

Survival Factor	Beef	Dairy	Mult Ingred	Mult items	Crustacean	Mollusc	Total
Insufficient thawing then insufficient cooking	0	0	0	1	0	0	1
Insufficient time/T during cooking processing	1	0	1	0	0	1	3
Insufficient time/T during reheating	0	0	1	2	1	0	4
Other process failures	1	0	0	0	0	0	1
Improper sanitation	0	1	0	0	0	0	1
Unknown	0	0	1	0	0	0	1
Total	**2**	**1**	**3**	**3**	**1**	**1**	**11**

Table 43: Survival Factor: Number of Foodborne Outbreak-related Cases (n=1141) by Vehicle, Florida 2006

Survival Factor	Beef	Dairy	Mult Ingred	Mult items	Crustacean	Mollusc	Total
Insufficient thawing then insufficient cooking	0	0	0	5	0	0	5
Insufficient time/T during cooking processing	3	0	0	0	7	4	14
Insufficient time/T during reheating	0	0	2	12	7	0	21
Other process failures	3	0	0	0	0	0	3
Improper sanitation	0	2	0	0	0	0	2
Unknown	0	0	4	0	0	0	4
Total	**6**	**2**	**6**	**17**	**14**	**4**	**49**

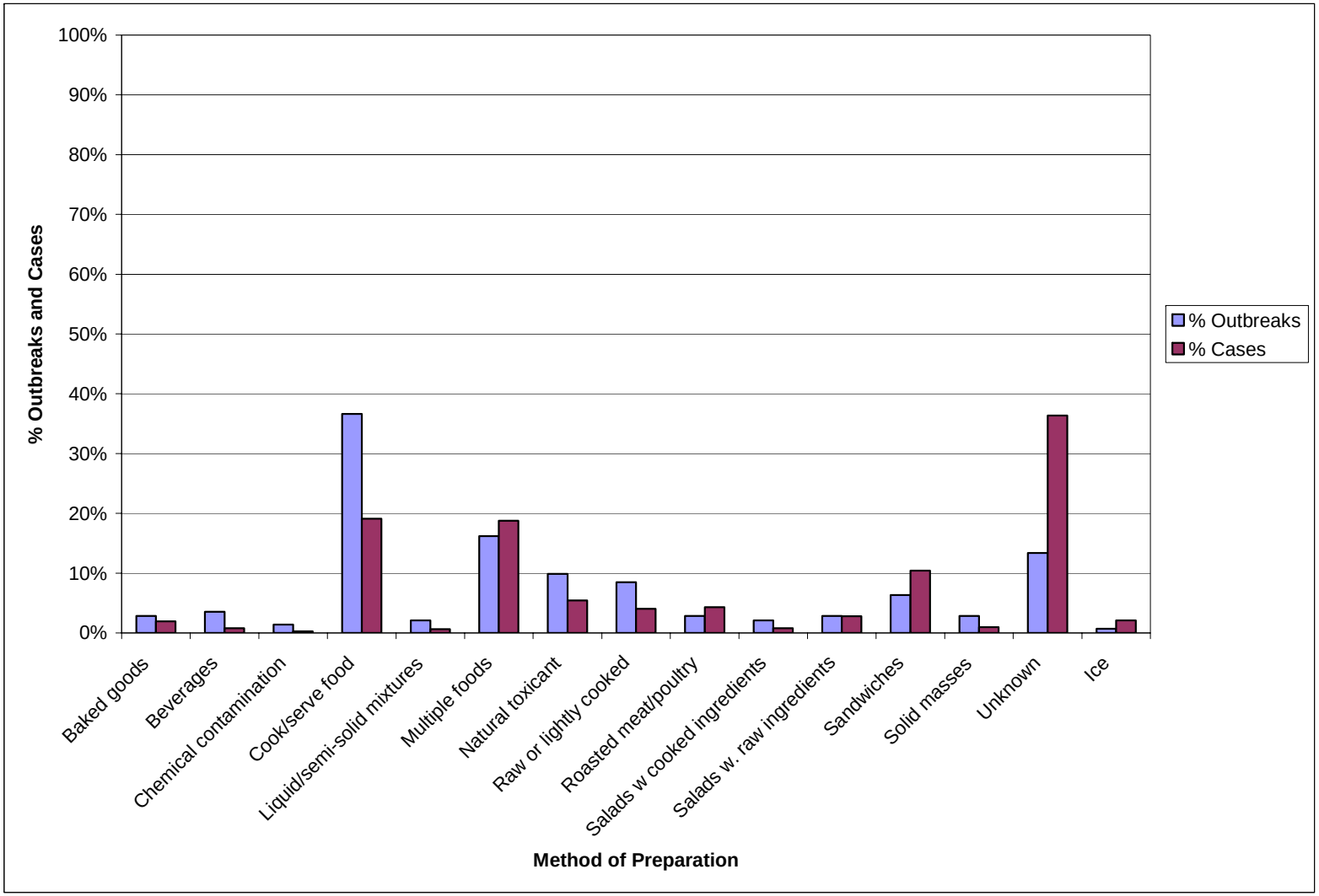
Table 44: Survival Factor: Number of Foodborne Outbreaks (n=142) by Etiologic Agent, Florida 2006

Survival Factor	*B. cereus*	Unknown	Total
Insufficient thawing then insufficient cooking	0	1	1
Insufficient time/T during cooking processing	1	2	3
Insufficient time/T during reheating	2	2	4
Other process failures	0	1	1
Improper sanitation	0	1	1
Unknown	0	1	1
Total	**3**	**8**	**11**

Table 45: Survival Factor: Number of Foodborne Outbreak-related Cases (n=1141) by Etiologic Agent, Florida 2006

Survival Factor	*B. cereus*	Unknown	Total
Insufficient thawing then insufficient cooking	0	5	5
Insufficient time/T during cooking processing	3	11	14
Insufficient time/T during reheating	12	9	21
Other process failures	0	3	3
Improper sanitation	0	2	2
Unknown	0	4	4
Total	**15**	**34**	**49**

Figure 24: Method of Preparation: Percent Foodborne Outbreaks (n=142) and Outbreak-related Cases (n=1141), Florida, 2006[28]



[28] Each outbreak may have up to three methods of preparation, thus the numbers and percentages will not add up to the actual number of outbreaks and outbreak-related cases.

Table 46: Method of Preparation:
Number of Foodborne Outbreaks (n=142) and Outbreak-related Cases (n=1141), Florida, 2006

Method of Preparation	# Outbreaks	# Cases
Baked goods	4	22
Beverages	5	9
Chemical contamination	2	3
Cook/serve food	52	218
Liquid/semi-solid mixtures	3	7
Multiple foods	23	214
Natural toxicant	14	62
Raw or lightly cooked	12	46
Roasted meat/poultry	4	49
Salads w cooked ingredients	3	9
Salads w. raw ingredients	4	32
Sandwiches	9	119
Solid masses	4	11
Unknown	19	415
Ice	1	24

Table 47: Method of Preparation:
Percent Total Foodborne Outbreaks (n=142) and Outbreak-related Cases (n=1141), Florida, 2006

Method of Preparation	# Outbreaks	# Cases
Baked goods	2.8%	1.9%
Beverages	3.5%	0.8%
Chemical contamination	1.4%	0.3%
Cook/serve food	36.6%	19.1%
Liquid/semi-solid mixtures	2.1%	0.6%
Multiple foods	16.2%	18.8%
Natural toxicant	9.9%	5.4%
Raw or lightly cooked	8.5%	4.0%
Roasted meat/poultry	2.8%	4.3%
Salads w cooked ingredients	2.1%	0.8%
Salads w. raw ingredients	2.8%	2.8%
Sandwiches	6.3%	10.4%
Solid masses	2.8%	1.0%
Unknown	13.4%	36.4%
Ice	0.7%	2.1%

Table 48: Method of Preparation: Number of Foodborne Outbreaks (n=142) by Vehicle, Florida 2006

Method of Preparation	Beef	Bev	Dairy	Fish	Ice	Mult Ingred	Mult Items	Pizza	Pork	Poultry	Fruit	Veg	Rice	Crustacean	Mollusc	Unk	Pot-H_2O	Total
Baked goods	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	4
Beverages	0	2	1	0	0	0	0	0	0	0	1	0	0	0	0	0	1	5
Chemical contamination	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2
Cook/serve food	6	0	0	17	0	7	1	1	3	9	0	0	1	6	1	0	0	52
Liquid/semi-solid	0	0	1	0	0	2	0	0	0	0	0	0	0	0	0	0	0	3
Multiple foods	0	0	0	0	0	0	21	0	0	0	0	0	0	0	0	2	0	23
Natural toxicant	0	0	0	12	0	0	0	0	0	0	0	0	0	0	2	0	0	14
Raw or lightly cooked	0	0	0	0	0	1	0	0	0	0	0	1	0	0	10	0	0	12
Roasted meat/poultry	2	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	4
Salads w cooked ingredients	1	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	3
Salads w. raw ingredients	0	0	0	0	0	0	0	0	0	0	1	3	0	0	0	0	0	4
Sandwiches	1	0	0	2	0	2	2	0	0	1	0	0	0	1	0	0	0	9
Solid masses of food	1	0	0	0	0	1	0	0	0	0	0	1	1	0	0	0	0	4
Unknown	0	0	0	0	0	1	7	0	0	0	0	1	0	0	0	10	0	19
Ice	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
Total	**11**	**2**	**2**	**31**	**1**	**16**	**31**	**5**	**4**	**11**	**2**	**6**	**2**	**7**	**13**	**12**	**3**	**159**

Table 49: Method of Preparation: Number of Foodborne Outbreak-related Cases (n=1141) by Vehicle, Florida 2006

Method of Preparation	Beef	Bev	Dairy	Fish	Ice	Mult Ingred	Mult Items	Pizza	Pork	Poultry	Fruit	Veg	Rice	Crustacean	Mollusc	Unk	Pot-H_2O	Total
Baked goods	0	0	0	0	0	0	0	22	0	0	0	0	0	0	0	0	0	22
Beverages	0	3	2	0	0	0	0	0	0	0	3	0	0	0	0	0	1	9
Chemical contamination	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3
Cook/serve food	17	0	0	52	0	16	10	17	13	60	0	0	4	27	2	0	0	218
Liquid/semi-solid	0	0	2	0	0	5	0	0	0	0	0	0	0	0	0	0	0	7
Multiple foods	0	0	0	0	0	0	195	0	0	0	0	0	0	0	0	19	0	214
Natural toxicant	0	0	0	47	0	0	0	0	0	0	0	0	0	0	15	0	0	62
Raw or lightly cooked	0	0	0	0	0	4	0	0	0	0	0	16	0	0	26	0	0	46
Roasted meat/poultry	5	0	0	0	0	0	0	0	3	41	0	0	0	0	0	0	0	49
Salads w cooked ingredients	2	0	0	0	0	7	0	0	0	0	0	0	0	0	0	0	0	9
Salads w. raw ingredients	0	0	0	0	0	0	0	0	0	0	2	30	0	0	0	0	0	32
Sandwiches	2	0	0	5	0	4	104	0	0	2	0	0	0	2	0	0	0	119
Solid masses of food	2	0	0	0	0	3	0	0	0	0	0	2	4	0	0	0	0	11
Unknown	0	0	0	0	0	2	80	0	0	0	0	4	0	0	0	329	0	415
Ice	0	0	0	0	24	0	0	0	0	0	0	0	0	0	0	0	0	24
Total	**28**	**3**	**4**	**104**	**24**	**41**	**389**	**39**	**16**	**103**	**5**	**52**	**8**	**29**	**43**	**348**	**4**	**1240**

Table 50: Method of Preparation: Number of Foodborne Outbreaks (n=142) by Etiologic Agent, Florida 2006

Method of Preparation	*B. cereus*	*C. botulinum*	*C. perfringens*	Chemical	Ciguatera	Giardia	MSG	Norovirus	NSP	Scombroid	Staph	Unkn	*V. vulnificus*	Total
Baked goods	0	0	0	0	0	0	0	1	0	0	0	3	0	4
Beverages	0	1	0	1	0	0	0	1	0	0	0	2	0	5
Chemical contamination	0	0	0	2	0	0	0	0	0	0	0	0	0	2
Cook/serve food	5	0	1	0	9	1	1	6	0	5	8	16	0	52
Liquid/semi-solid	0	0	0	0	0	0	0	0	0	0	1	2	0	3
Multiple foods	2	0	1	1	0	0	0	7	0	0	0	12	0	23
Natural toxicant	0	0	0	0	10	0	0	0	2	2	0	0	0	14
Raw or lightly cooked	0	0	0	0	0	0	0	1	2	0	0	2	7	12
Roasted meat/poultry	1	0	0	0	0	0	0	1	0	0	0	2	0	4
Salads w cooked ingredients	0	0	0	0	0	0	0	2	0	0	0	1	0	3
Salads w. raw ingredients	0	0	0	0	0	0	0	2	0	0	0	2	0	4
Sandwiches	0	0	0	0	0	0	0	2	0	0	1	6	0	9
Solid masses of food	1	0	0	0	0	0	0	1	0	0	0	2	0	4
Unknown	0	0	1	0	0	0	0	5	0	0	1	12	0	19
Ice	0	0	0	0	0	0	0	1	0	0	0	0	0	1
Total	**9**	**1**	**3**	**4**	**19**	**1**	**1**	**30**	**4**	**7**	**11**	**62**	**7**	**159**

Table 51: Method of Preparation: Number of Foodborne Outbreak-related Cases (n=1141) by Etiologic Agent, Florida 2006

Method of Preparation	*B. cereus*	*C. botulinum*	*C. perfringens*	Chemical	Ciguatera	Giardia	MSG	Norovirus	NSP	Scombroid	Staph	Unkn	*V. vulnificus*	Total
Baked goods	0	0	0	0	0	0	0	3	0	0	0	19	0	22
Beverages	0	1	0	10	0	0	0	2	0	0	0	5	0	9
Chemical contamination	0	0	0	30	0	0	0	0	0	0	0	0	0	3
Cook/serve food	20	0	3	0	32	4	2	56	0	13	17	71	0	218
Liquid/semi-solid	0	0	0	0	0	0	0	0	0	0	2	5	0	7
Multiple foods	4	0	3	20	0	0	0	130	0	0	0	75	0	214
Natural toxicant	0	0	0	0	43	0	0	0	15	4	0	0	0	62
Raw or lightly cooked	0	0	0	0	0	0	0	16	15	0	0	8	7	46
Roasted meat/poultry	3	0	0	0	0	0	0	41	0	0	0	5	0	49
Salads w cooked ingredients	0	0	0	0	0	0	0	7	0	0	0	2	0	9
Salads w. raw ingredients	0	0	0	0	0	0	0	26	0	0	0	6	0	32
Sandwiches	0	0	0	0	0	0	0	104	0	0	2	13	0	119
Solid masses of food	4	0	0	0	0	0	0	2	0	0	0	5	0	11
Unknown	0	0	10	0	0	0	0	287	0	0	44	74	0	415
Ice	0	0	0	0	0	0	0	24	0	0	0	0	0	24
Total	**31**	**1**	**16**	**60**	**75**	**4**	**2**	**698**	**30**	**17**	**65**	**288**	**7**	**1240**

Figure 25: Waterborne Disease Contributing Factors: Percent Total Waterborne Outbreaks (n=6) and Outbreak-related Cases (n=122), Florida, 2006[29]

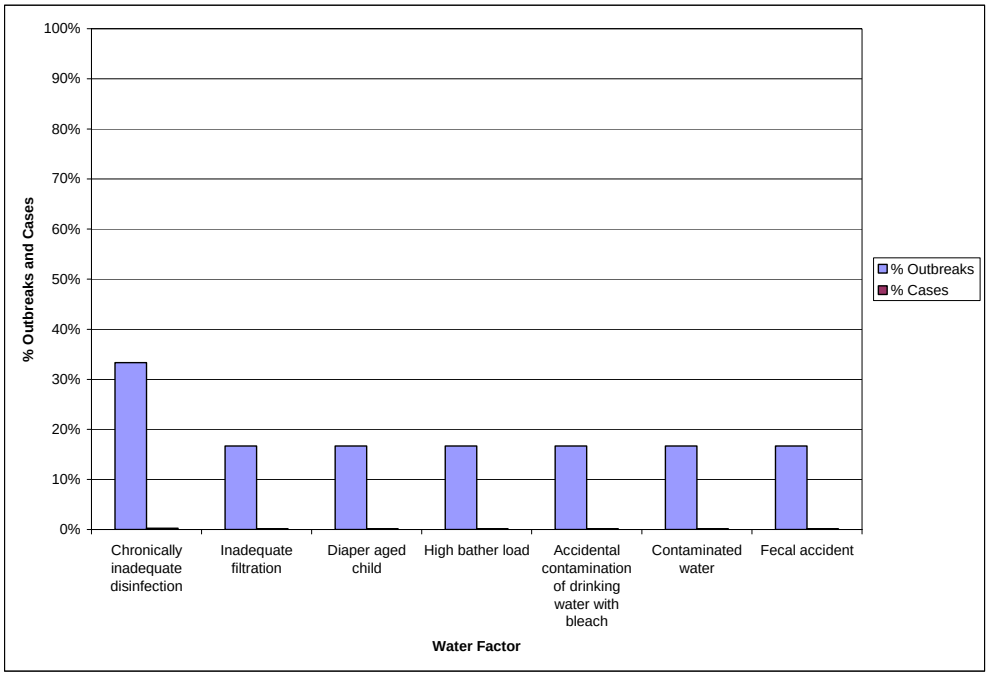


**Table 52: Waterborne Disease Contributing Factors:
Number of Waterborne Outbreaks (n=6) and Outbreak-related Cases (n=122), Florida, 2006**

Water Factors	# Outbreaks	# Cases
Chronically inadequate disinfection	2	66
Inadequate filtration	1	55
Diaper aged child	1	3
High bather load	1	3
Accidental contamination of drinking water with bleach	1	2
Contaminated water	1	50
Fecal accident	1	3

**Table 53: Waterborne Disease Contributing Factors:
Percent Total Waterborne Outbreaks (n=6) and Outbreak-related Cases (n=122), Florida, 2006**

Water Factors	# Outbreaks	# Cases
Chronically inadequate disinfection	33.3%	0.3%
Inadequate filtration	16.7%	0.1%
Diaper aged child	16.7%	0.1%
High bather load	16.7%	0.1%
Accidental contamination of drinking water with bleach	16.7%	0.1%
Contaminated water	16.7%	0.1%
Fecal accident	16.7%	0.1%

[29] Each outbreak may have up to three waterborne disease contributing factors, thus the numbers and percentages will not add up to the actual number of outbreaks and outbreak-related cases.

Table 54: Contributing Factors by Etiologic Agent for All Waterborne Outbreaks (n=6), Florida, 2006

Water Factor	Chemical	Cryptosporidium	Giardia	Legionella	Norovirus	Total
Chronically inadequate disinfection	0	0	1	1	0	2
Inadequate filtration	0	0	1	0	0	1
Diaper aged child	0	1	0	0	0	1
High bather load	0	1	0	0	0	1
Accidental contamination of drinking water with bleach	2	0	0	0	0	2
Contaminated water	0	0	0	0	2	2
Fecal accident	0	1	0	0	0	1
Total	**2**	**3**	**2**	**1**	**2**	**10**

Table 55: Contributing Factors by Etiologic Agent for Cases Associated With All Waterborne Outbreaks (n=122), Florida, 2006

Water Factor	Chemical	Cryptosporidium	Giardia	Legionella	Norovirus	Total
Chronically inadequate disinfection	0	0	55	11	0	66
Inadequate filtration	0	0	55	0	0	55
Diaper aged child	0	3	0	0	0	3
High bather load	0	3	0	0	0	3
Accidental contamination of drinking water with bleach	4	0	0	0	0	4
Contaminated water	0	0	0	0	100	100
Fecal accident	0	3	0	0	0	3
Total	**4**	**9**	**110**	**11**	**100**	**234**

Table 56: Line List of Waterborne Outbreaks (n=6), Florida, 2006

County	Status	# Cases	Site	Vehicle	Pathogen	Pathogen Status
Seminole	Confirmed	1	Restaurant	Soft drink	Chemical	Suspected
Broward	Confirmed	2	Restaurant	Water	Chemical	Suspected
Orange	Suspected	3	Pool	Swimming attraction(s) At Resort Hotel	Cryptosporidium	Confirmed
Volusia	Confirmed	11	Other	Whirlpools	Legionella	Confirmed
Santa Rosa	Confirmed	50	Other	Recreational swimming lake	Norovirus	Confirmed
Orange	Confirmed	55	Pool	Interactive water fountain	Giardia	Confirmed
	Total	**122**				

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

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[30]

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

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