Food and Waterborne Illness Surveillance and Investigation
Annual Report, Florida, 2000

Bureau of Environmental Epidemiology
Division of Environmental Health
Department of Health

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Overview

The 2000 year continued to be active for food and waterborne outbreak reporting and investigation. A total of 2,353 foodborne illness complaints were reported to counties in 2000. A total of 288 outbreaks with 1,757 cases were reported, compared to 286 outbreaks and 1,544 cases for 1999, and 315 outbreaks and 3,290 cases for 1998. Investigators were able to laboratory confirm 36 of the outbreaks (including 5 *V. vulnificus*) associated with 387 cases. Staphylococcus, Norwalk and Salmonella were implicated in the largest percentage of the total reported outbreaks (9%, 8.3%, and 6.3% respectively). Norwalk was identified in the largest percentage of cases in total reported outbreaks (34.2%) followed by Salmonella (5.7%). Restaurants were the source site in 70.8% of the outbreaks reported and in 50.8% of the cases. Multiple items (27.4%) and multiple ingredients (17%) accounted for a total of 44.4% of all outbreaks, followed by poultry (11.5%) and beef (9.4%). Multiple ingredients (15.3%) and multiple items (39.3%) accounted for 54.6% of all outbreak-associated cases, followed by water (10.8%), beef (5.5%), and poultry (8.3%). The month with the largest percentage of outbreaks reported was March (14.2%) with the largest percentage of cases reported in May (18.3%). Large (greater than 10 cases) outbreaks accounted for 10.7% (31) of the total reported outbreaks and 50.6% (890) of the total cases. Selected significant outbreaks are briefly described below. Each outbreak can have up to three factors under the current surveillance system. There are also categories for none reported, other and unknown. Aside from unknown and none reported, the six most frequent contributing factors are as follows:

Table 1: Eight Most Prevalent Contributing Factors in Foodborne Outbreaks, Florida 2000

Contributing Factor[1]	# Outbreaks	# Cases
Contamination Factor		
Bare hand contact	41	296
Cross contamination from raw ingredient of animal origin	31	202
Proliferation/amplification factor		
Inadequate cold holding	44	184
Food at room T for several hours	31	161
Survival factor		
Other	28	144
Insufficient time/T during reheating	17	113
Method of preparation factor		
Cook/serve foods	53	388
Sandwiches	28	186

[1] Each outbreak can have at least 3 of each of the four types of factor. See Tables 23-41 and Appendix for more detailed information.

Table 2: Summary of Food and Waterborne Illness Outbreaks Reported to Florida, 1989 – 2000[2]

Year	# Outbreaks	# Cases
1989	11	72
1990	7	314
1991	17	331
1992	40	1048
1993	136	890
1994	**258**	**1526**
1995	**296**	**2908**
1996	**305**	**2777**
1997	**439**	**2744**
1998	**315**	**3290**
1999	**286**	**1544**
2000	**288**	**1757**

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

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

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

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

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

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

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

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

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

Figure 1: Number of Suspected and Confirmed Outbreaks by Year, Florida, 1994 - 2000

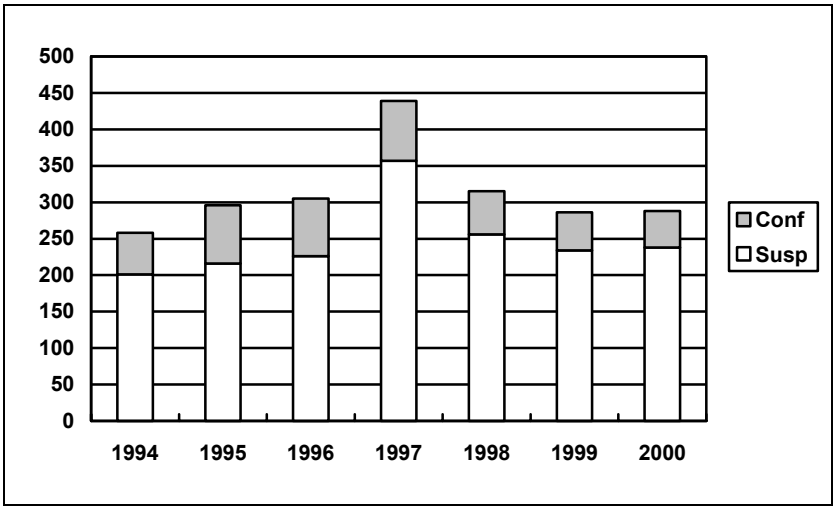
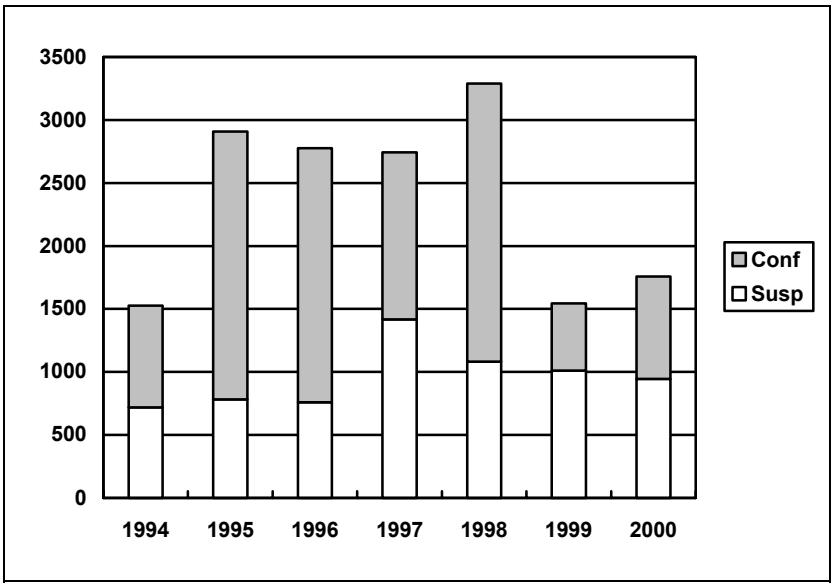


Figure 2: Number of Cases for Suspected and Confirmed Outbreaks by Year, Florida, 1994 - 2000



Training and Continuing Education

In 2000, the Food and Waterborne Disease section offered 21 training sessions within the Department of Health and 36 training and continuing education sessions to groups outside the department. Training offered to health departments and to other agencies on request (e.g. DBPR monthly district meetings) included selected aspects and procedures of food and waterborne disease investigations, a complaint workshop, how to use Epi Info software, foodborne illness investigation procedures, case studies of specific foodborne illness investigations, microbial contamination of water supplies, and aspects of specific pathogens. One-on-one training on specific aspects of food and waterborne disease surveillance and investigation is also done with recent health department employees and on request. Staff reached within the Department of Health include environmental health professionals, nurses, epidemiologists, and laboratory staff.

Groups reached outside the department included other state agencies (Department of Business and Professional Regulation (DBPR), Department of Agriculture and Consumer Services (DACS)), professional associations (Florida Environmental Health Association (FEHA); Florida Association of Food Protection (FAFP)[3], infection control practitioners, medical interns and university students (University of North Florida, Universtiy of Central Florida, University of Florida, University of South Florida and University of Miami). Oral reports with slides on state overviews and case studies of foodborne outbreaks have been given at regional epidemiology meetings, environmental health director meetings, district and statewide FEHA and FAFP meetings, to food safety and food microbiology classes at the University of Florida, epidemiology classes at the Univerisity of North Florida and to Florida's county extension agents through the Institute for Food and Agricultural Science (IFAS) at the University of Florida. The Bureau of Environmental Epidemiology also gives a two-hour basic foodborne outbreak investigation training at Basic Environmental Health Orientation. Presentations have also been made to outside organizations (at their request with travel expenses paid by the organizations) for specific presentations, e.g Osceola County School Board food workers, a spouse abuse center and the Carolina Association of Milk, Food and Environmental Sanitarians.

Waterborne Illness Investigation Training 2000

Training presentations on waterborne disease illness investigation were given at the Florida Environmental Health Association meeting on May 23, 2000, the Panhandle County Health Department staff on August 15, 2000 and at the annual epidemiology conference on October 5, 2000. Combined waterborne illness investigations and bioterrorism training was presented at regional epidemiology meetings on October 26 and 27, 2000. The total number of persons receiving the training was approximately 200.

Bioterrorism Training 2000

Because of the potential for dissemination of a biological agent in food or water, bioterrorism was added as a training topic in 2000. Bioterrorism training presentations were made at the Biomedical Waste Conference on March 3, 2000, the Weapons of Mass Destruction Conference on August 27, 2000, the Pasco and Pinellas County Health Departments on November 1, 2000 and the Hillsborough and Manatee County Health Departments on November 2, 2000. Combined waterborne illness investigations and bioterrorism training was presented regional

[3] Formerly Florida Association of Milk, Food and Environmental Sanitarians (FAMFES).

epidemiology meetings on October 26 and 27. Total persons receiving bioterrorism training was approximately 280.

Interactive and On-line Training 2000

In August 2000, interactive training modules were developed for Environmental Epidemiology, Foodborne Illness Investigations, Waterborne Illness Investigations, and Bioterrorism. These manuals were posted to the department Intranet for use in training county health department staff. In October 2000, the interactive manuals were made available to staff who did not have Internet access on CD ROM. Approximately 150 CDs were distributed by the end of 2000.

Training modules currently under development:

1) Norwalk and Norwalk-like virus
2) Developing Questionnaires and Writing Reports
3) In-Depth Overview of Common and Emerging Pathogens (e.g. Vibrios)
4) Recreational Waterborne Disease Outbreak Investigations

Outbreak Definitions

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

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

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

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

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

Selected Foodborne Outbreaks

Ciguatera Intoxication – Broward County, March, 2000

In March 2000, the infection control nurse of a local hospital reported a possible ciguatera foodborne illness associated with consumption of fish involving two individuals, one of whom reported illness. The patient presented to the ER with symptoms of weakness, tingling of the feet and hands and swelling of the fingers. The patient reported abdominal cramps within ½ hour of ingestion, diarrhea, and a painful sensation of "walking on glass." The patient also reported experiencing swelling and tingling of the fingers, and on the following day, ascending numbness in the legs, accompanied by increasing weakness. The patient implicated mahi-mahi fish eaten at 8 pm on March 17, 2000 at a local restaurant as the cause of illness. The patient's recall of food history in the 72 hours prior to onset of illness was incomplete. The patient admitted to a prior history of hypothyroidism and was under medical treatment. No other past medical history was available.

A joint investigation/inspection of the facility was conducted by the Department of Business and Professional Regulation and the Broward County Health Department. A menu review revealed that the fish listed on the menu were mahi-mahi, along with tuna, snapper, salmon, trout, and catfish. The establishment purchases fish from approved suppliers with delivery usually within a day of ordering it. At the time of the investigation, a temperature check of the fish in lower reach-in cooler-drawer (cook line) and walk-in cooler showed they were in proper temperature range. Ambient temperature of the walk-in was 38°F.

A review of the establishment's food handling procedures of the fish products revealed a use-by-date stickering system in place to ensure rotation, and verification of shelf life of fish products, along with routine recording of temperature checks of products. Observation of the food flow and preparation procedures of the implicated fish products did not reveal any handling deficiencies. Sample fish from the implicated lot were not available for testing on the date of the investigation.

In the absence of specific clinical test for ciguatoxin it is difficult to confirm ciguatera poisoning with any degree of confidence. Testing of sample fish of the remaining batches in the restaurant was not conducted, as results would not be definitive in either confirming or refuting the toxicity of the fish consumed by the complainant. However, by definition, only clinical symptoms along with a food history of fish consumption in the previous 24 hours are required to ascribe ciguatoxin poisoning, based on a clinician's diagnosis. The symptoms of ciguatera poisoning are abdominal cramps, nausea, vomiting, diarrhea, numbness and paresthesia of lips and tongue, paresthesias of the extremities, metallic taste, arthralgia, myalgia, blurred vision and paradoxical temperature reversal (cold feeling hot). Not all symptoms manifest in each patient. Most cases of ciguatera intoxication are self-limited, and supportive care is sufficient.

Ciguatera intoxication is associated with the consumption of contaminated predatory marine reef fish. The agent responsible for ciguatera poisoning is a lipid-soluble, heat-resistant, acid-stable toxin known as ciguatoxin. The toxin is produced by a single-celled free swimming dinoflagellate of the species Gambierdiscus toxicus. The dinoflagellate attaches itself to marine algae, which serves as food resource to herbivorous reef fish. The toxin subsequently moves up the food chain from smaller contaminated herbivorous fish as they are preyed upon by larger predatory fish, and thus to humans. A complete listing of the various fish that may cause ciguatera is not feasible since ciguatoxin has been identified in over 400 species. However the

risk is greatest with reef dwelling bottom-feeding fish, and includes, red snapper, barracuda, grouper, surgeonfish, horse eye jack, crevalle jack, bar jack, hogfish, moray eels, dog snapper, seabass and king mackerel. Mahi-mahi fish is not a reef dwelling fish and is not listed as a ciguatoxic fish.

Ciguatoxin contaminated fish is not detectable by sight, smell, taste, texture, or inspection. If present in the flesh of the fish, cooking or freezing does not inactivate the toxin. It is not eliminated by drying, salting, smoking, marinating, or by gastric juices. Ciguatoxin tends to accumulate in larger individual fish of the species known to be ciguatoxic as a result of the biomagnification of the dinoflagellate toxins. Fish size rules have yet to be established in deeming a fish ciguatera safe. Generally, however, the smaller sized fish would be less likely to have bioaccumulated toxins in their flesh.

Neither the restaurant nor the consumer would have prior knowledge that a particular seafood could be ciguatoxic. There is no quick, inexpensive way to identify a ciguatoxic fish in the field. Mahi-mahi or dolphin fish are a pelagic species and are not likely to be ciguatoxic. Whether there were other marine toxins present in the consumed fish, or any other pre-existing medical conditions that could have caused the complainant's symptoms, is beyond the scope of this investigation. The investigation could not establish a causal effect between reported illness and the implicated meal, nor could it support or reject any hypothesis or diagnosis regarding the nature of the complainant's illness nor its source.

Two Clusters of Gastrointestinal Illness Associated With the Consumption of "Hot and Spicy" Clams – April, 2000

During April 2000 the Palm Beach County Health Department and the Florida Department of Health, Bureau of Environmental Epidemiology were notified independently of eight people in four separate groups residing in two counties who experienced gastrointestinal illness within minutes of consuming clams. All of the suspected clams were obtained from a shellfish retailer in Brevard County. A coordinated investigation of this potential illness outbreak was initiated by the Palm Beach and Brevard County Health Departments with assistance from the Bureau of Environmental Epidemiology and the Department of Agriculture and Consumer Services.

The Osceola County cohort was made up of five persons who consumed heat-treated clams on April 15. Four of these five persons were interviewed. The cases are from two households and each household cooked and consumed the implicated clams on April 15 in their own homes. The fifth person was not available for interviewing but was described as becoming ill after consuming a single clam. Each case consumed from one to three clams prior to onset of symptoms. Four cases reported symptoms of a hot peppery sensation and nausea. Three cases described headache and a burning throat or stomach. Tachycardia, abdominal cramping, and dizziness were described by at least two cases. Other symptoms reported by at least one case were a metallic taste, swelling tongue, and vomiting. Onset of symptoms was immediate for each case with duration of 12 to 36 hours for some of the symptoms. No other epidemiologic associations other than the clams were reported for this group of people. One house had three additional guests for dinner after the clams were served and consumed. No one in this later group ate the clams and no one was ill. Foods consumed at this later gathering included crabs and rice.

The Palm Beach cohort was comprised of a total of three cases in two clusters who became ill after consuming raw clams on April 9 and 11 at the same food service facility in Palm Beach

County. The onset of the illnesses ranged from 20 minutes to four hours after the consumption of ½ to one dozen raw clams. This food service establishment and food product were the only common exposures for this cohort. Symptoms were described as nausea, vomiting, diarrhea, and chills. None reported neurological symptoms or hot, spicy sensations affecting the mouth or throat. None had prior complications, illnesses, or conditions that may have contributed to the illnesses. All recovered within 48 hours. Food products, in addition to the raw clams, consumed by the cases included lemon, tea, diet Pepsi, steak, Caesar salad, and French fries. The non-ill persons ate steak, fried fish, French fries, coke, and iced tea.

The onsite investigation of the food service facility in Palm Beach County did not find significant known environmental conditions that could cause the described clinical symptoms. The Osceola cohort purchased clams from the supplier in Brevard County on April 15 in the morning. One family kept the product on ice for the one-hour return trip while the other could not recall. Both families stated that they washed the clams prior to heat treatment. One household baked the clams in the oven until they opened and then cooked them five more minutes. The other household grilled the clams outdoors for 30 minutes. Both cooks as well as the food service operation stated that no seasonings were added prior to or after the preparation process prior to consumption.

The clams for the Osceola cohort were harvested on April 11 and the Palm Beach cohort clams were harvested on April 4 and 7 from the same harvest area in Indian River in Brevard County. The harvesting area located in northern Brevard County was closed at sunset on April 12 and remained closed until the investigation and analysis of the harvest area was completed. The implicated clams were removed from sale and distribution through recalls and legal action.

The chemical, biotoxin and metal analyses for the clam samples were all unremarkable for substances tested. Putricine levels of the clams analyzed were 17 PPM. The histamine and cadaverine levels were reported at 0 ppm. One clam sample from the harvest area yielded a non-toxin producing dinoflagellate found in the gut known as Prorocentrum micans. An organoleptic evaluation of the raw clams was performed and the testers did experience a distinct spicy, hot taste for some clams while other clams did not impart the sensation. The review and evaluation of the harvesting area by the Department of Agriculture and Consumer Services, Bureau of Aquaculture disclosed no significant findings that could have caused the clinical response reported by each cluster of illness and the organoleptic examiners. Bacterial surveillance was within acceptable parameters, no changes in pollution sources were noted, rainfall levels were very low before, during and after the harvest area closure, and harvesters were observed harvesting only from open areas and not discharging human waste overboard. It was noted that this particular harvest area is seldom closed.

These two separate clusters of gastrointestinal illness in Palm Beach and Osceola Counties were associated with the consumption of clams that were harvested from the same harvest area located in Brevard County. None of the seven cases reported any common exposure other than the consumption of the implicated clams. The illnesses for the four cases in the Osceola cohort were in direct response to the contact of clams in the mouth and their subsequent ingestion. Symptoms described were a combination of gastrointestinal and neurological manifestations. The three cases in the Palm Beach cohort reported symptoms of gastrointestinal illness with no reported neurological manifestations that commenced some time after contact and ingestion. The difference in latency periods and symptoms could be a result of a varying dose of the agent(s), host susceptibility, or the fact that the Palm Beach cohort consumed the clams raw and/or with other food. The Osceola cohort consumed only heat-treated clams at the time of

exposure. Case memory and interview techniques could also account for the some dissimilar symptoms reported.

The agent or agents for this self-limited outbreak were not determined. Several clams taste tested from the samples collected did impart a hot, peppery taste and some did not. No clams harvested from the identical harvest area after it was closed imparted a similar sensation. It does not appear plausible that the agent was a seasoning or chemical added to the clams during the preparation process by the food service facility or those prepared in the home. The methods of preparation were not similar and no seasonings or additives were reported to have been added. There were also anecdotal reports of persons who performed organoleptic evaluations of clams prior to this reported illness outbreak describing hot, spicy clams being harvested from this area.

It was learned that Chile had previously experienced a similar situation involving scallops in which a diatom from the Rhizosolenia family was determined to be the causative agent. This organism is easily detected in routine environmental sampling of harvest areas. It was not detected at the time of the investigation of this particular outbreak. It is also possible that the agent for this illness outbreak existed intermittently in the clam or the harvest area. The agent perhaps reacts with different hosts in differing degrees of severity if it reacts at all. Mild or less severe symptoms would not necessarily prompt a citizen to contact the County Health Department with a complaint.

Putrescine and cadaverine are biogenic amines typically found in most living organisms and in elevated amounts in dying or decomposed organisms. It is unknown what amounts are toxic or harmful to humans if ingested. The role and interaction of these compounds with microbial toxins is also largely unknown and further research in this area is recommended.

Tin Poisoning Associated with Pineapple Chunks At an Elementary School - Pasco County, April 2000

The Pasco County Health Department was informed on April 11, 2000 by the Pasco County School Board that 18 students in a local 4th grade elementary school had become ill. The students reported to the school's clinic with gastrointestinal symptoms approximately 30 minutes after the lunch period. The majority of the ill children were from one class and attended the last lunch period of the day. Early reports identified macaroni & cheese, house salad and pineapple as common foods consumed by the majority of ill persons.

An investigation of this outbreak was performed on April 12, 2000 by the Pasco County Environmental Health Office in collaboration with the Bureau of Environmental Epidemiology. Questionnaires for a case-control study were developed to better study the reported illnesses and were administered to the class of students representing the majority of the ill students. The school's clinic provided a line listing of children reporting symptoms and these children were surveyed for additional cases of illness. The school's food service director provided a menu of the meals served on April 11, 2000. The children selected their meal from the following menu: macaroni & cheese, house salad, peanut butter & jelly sandwiches, dinner roll, chicken chef salad plate, hot mixed vegetables, milk, and various fresh fruits and canned pineapple. Data including foods eaten and symptoms reported were analyzed using Epi Info 6.04c statistical software from the Centers for Disease Control and Prevention. A case was defined as any person that ate lunch on April 11, 2000 and became ill within one hour with vomiting and abdominal pain/cramps. A control was defined as a person who ate the school lunch on April

11, 2000 and did not become ill. Because initial data analysis showed a high attack rate associated with pineapple consumption, leftover pineapple chunks and unopened #10 cans of pineapple chunks were collected for laboratory analysis by the Florida Department of Agriculture and Consumer Services and the Food and Drug Administration Laboratories. The canned pineapple chunks had been locally purchased and were not obtained from the school food commodity program. Clinical specimens were not available.

Questionnaires assessing the health effects and food history were administered to 27 students on April 12. Of the 27 students surveyed, 21 became ill following the lunch on April 11, 2000. The mean onset of the symptoms was 30 minutes with a range of 15 – 45 minutes. Reported symptomology included vomiting (100%), abdominal cramps (100%) and metallic taste (33%); see Table I). Table II shows attack rates of illness in those eating specific foods for lunch on April 11, 2000.

Table 4: Frequency of Symptoms, Elementary School Lunch, April 11, 2000, Pasco County, Florida

Symptoms	Frequency	Percent
Vomiting	21	100
Abdominal Cramps	21	100
Metallic Taste	7	33

N=21

Duration of illness ranged from 2 to 5 hours with a mean of 3 hours. None of the reported cases sought physician care.

Table 5: Food-Specific Attack Rate Table, Elementary School Lunch, April 11, 2000, Pasco County, Florida*

	Number Of Persons Who Ate Specified Food				Number Of Persons Who Did Not Eat Specified Food			
Food Items Served	Ill	Not Ill	Total	% Ill	Ill	Not Ill	Total	% Ill
Pineapple Chunks	18	0	18	**100.0**	0	6	6	0.0
House Salad	17	1	18	**94.4**	3	3	6	50.0
Macaroni & Cheese	13	5	18	72.2	5	1	6	83.3
Milk	12	6	18	66.6	6	0	6	100

* Significant attack rates bolded

The results of the case–control study indicated that two of the food items served showed attack rates that were statistically significant. The most significant attack rate of illness was in those who ate the canned pineapple chunks. The odds ratio was 133.00 (CI 5.39 – >19990) and a chi-square of 18.38 (p=0.0000181). The attack rate in those eating house salad had an odds ratio of 17.0 (CI .95 – 638.57) and a chi-square of 6.13 (p=0.0132657). Laboratory investigation of the submitted leftover pineapple chunks and unopened cans of pineapple revealed elevated tin levels ranging from 92 – 112 parts per million (ppm). This indicated that some detinning had occurred in the canned pineapple product. Levels of lead and zinc were below detectable levels.

An environmental investigation was performed at the elementary school in Pasco County on April 12, 2000. All food temperatures and preparation procedures were satisfactory. No food

service employee illness was identified. Illness was only reported in children eating lunch. Food preparation procedures for the macaroni & cheese, house salad and canned fruits were examined. Several of the school's food service staff identified that a few of the cans of pineapple chunks served on April 11, 2000 were spoiled and had been discarded. A bad odor and visible film inside the container was identified in three cans that were discarded. On Tuesday, April 11th, 600 orders of macaroni & cheese, 222 house salads, 184 servings of pineapple, and 788 cartons of milk were served at school lunch. Food samples from lunch had been routinely held seven days by the elementary school according to local school policy. The Pasco School Board also reported that four other elementary schools had complained about the same lot of canned pineapple, however none of these schools reported any illness. Elementary schools identified as having pineapple with the same lot number were advised to hold any remaining cans pending return to the product's distributor.

Traceback of the canned pineapple chunks identified that the manufacturer was located in Miami, Florida. The implicated product was pineapple chunks in natural juice. Each institutional-sized can contained 108 ounces of product. The identified product's lot numbers included; 308911 – 12CX, 108912 – 11CX and 108912 -11CX. It is believed that all of these lots were canned in February 2000. It is not clear at the time of this publication which lot or lots of canned pineapple chunks were consumed by the students who became ill. The Pasco County School Board had purchased the product from a local food service distributor in Clearwater, Florida. According to the distributor, the same lots were also distributed to schools in Pinellas and Manatee counties. The school boards in these counties were notified and the product's manufacturer in Miami was also notified. The Department of Agriculture and Consumer Service and Food and Drug Administration were notified regarding the implicated lot numbers of pineapple chunks and followed up with the implicated product's processor in Miami and distributor in Clearwater. The originating source of the pineapples was identified as South Africa.

This outbreak of gastrointestinal illness is strongly associated with the consumption of canned pineapple chunks at a school lunch in Pasco County on April 11, 2000. The ill persons had no other epidemiological associations identified and the epidemiological curve of the onset of symptoms indicated a common source exposure. The very quick onset of symptoms, types of symptoms reported and duration of the illnesses are consistent with an etiology of heavy metal exposure. Elevated levels of tin were identified in the canned pineapple chunks that were tested. While currently acceptable levelsof tin are considered to be 200 ppm (200 mg/kg), there is no set standard.[4] Tin levels that would cause illness in children would presumably be lower. These laboratory results indicated that some detinning occurred in the canned product, possibly due to the acidic nature of the product or improper lining used in the cans. A different outbreak associated with pineapple juice in Seminole County in 1997 also identified elevated tin levels. Much higher levels of tin were found in that foodborne outbreak.[5] Possibly, a lower dose-response level due to the young ages of the students may have been a factor in the size of the Pasco County outbreak. Clinical specimens would have been helpful in this outbreak investigation, however they were not obtained because of the quick onset of symptoms and short duration of illness.

[4] Tin in Canned Tomatoes, MAFF (Ministry of Agriculture, Fisheries and Food, UK) News Release, November 20, 1998.

[5] Analysis of pineapple juice samples from the day care center involved in the Seminole County outbreak revealed 150 mg/L; analysis of cans of juice from the same lot showed 123ppm – 358 ppm.

Epidemiological analysis indicated a statistically significant association with the canned pineapple chunks and house salad. Traceback of the pineapple chunks was performed due to the high attack rates and problems noted with the product. The association of illness with eating house salad was thought to be due to the fact that many of those who ate the house salad and became ill also ate pineapple. It was also reported that many teachers and other school staff who had eaten only the house salad and did not consume pineapple on April 11, 2000 did not become ill.

Tin intoxication has been identified in instances involving the placement of acidic juices into unlined cans. Acidic juices and fruits are usually packaged in cans with lining that prevents contact of acidic food and the tin plating. Food grade lacquers are used as a lining in many canned foods. The extent of and condition of lining utilized in the canning process of the identified pineapple product associated with this outbreak is not known at the time of this publication.

On May 31, 2000, the Food and Drug Administration announced that the producer of the implicated pineapple chunks located in South Africa was recalling pineapple chunks packed in natural juice in 108-ounce containers, because the product contained elevated levels of tin. The recall was initiated due to the symptoms experienced by the children and the epidemiologic implication of the product. The recalled product codes mentioned were the same codes as identified in the Florida school-based outbreak. This nationwide ongoing class II recall (#F-470-0) was initiated by the product's distributor located in Miami, Florida by letter on April 13, 2000. A class two recall is defined as involving a potential health hazard situation where there is a remote probability of adverse health consequences from the use of the product. The recall was also mentioned on the Internet at the Safety Alerts.com web site.

Ciguatera Intoxication - Palm Beach County, August, 2000

On August 22, 2000, the Palm Beach County Health Department, Division of Epidemiology and Disease Control (PBCHD-DEDC) was informed by an infection control nurse at a local hospital of a possible ciguatera intoxication occurring on August 16 after three persons consumed hog snapper at a local restaurant on August 15. A separate party who had also eaten at the same restaurant on August 15 informed the PBCHD-DEDC that one of their party had eaten hog snapper and had developed similar symptoms on August 16. On August 23, the health department became aware of 2 more cases via the Florida Poison Information Center. This last cluster included two additional people who had consumed fish from the same source, bought from the same fish market, on August 12 and who became symptomatic on August 13.

The first group of three persons developed diarrhea and abdominal cramps within 5 hours after consuming the fish. Later they developed rashes, tingling and numbness in the gums, itching, weakness in legs, reversal of hot-cold sensations, and difficulty urinating, with recurring symptoms of severe itching and weakness. The person from the second party experienced symptoms including vomiting, diarrhea, abdominal pain (within 5 hours of ingestion), and later developed reversal of hot-cold sensations, body aches, itching, and weakness in the legs.

The Bureau of Environmental Epidemiology, the Palm Beach County Health Department, Division of Environmental Health (PBCHD-EH), and the Department of Business and Professional Regulation were immediately notified. A joint investigation of the restaurant was made on August 23. Invoices of the suspected fish, hog snapper, were provided to the

inspectors. No leftover hog snapper was available at the restaurant. Ten (10) pounds of hog snapper fillets had been purchased from a local fish market on August 15.

The third group of two people became ill after consuming 12 ounces each of hog snapper bought at the same fish market as above on August 12. These persons also developed symptoms compatible with ciguatera including vomiting, diarrhea, reversal of hot-cold sensations, itching, and weakness in the legs on August 13. The Florida Department of Agriculture and Consumer Services was immediately notified of the complaint. An investigation of the fish market was conducted on August 24.

A total of six cases of ciguatera intoxication from the consumption of fish bought at the same fish market from the same supplier and same lot were identified. Four of the cases consumed the fish at the same restaurant on the same day, August 15, three in one party, one in another party. Two of the cases had consumed fish 3 days earlier, August 12, at home. The fish market had bought 138 pounds of hog snapper (12 to 15 fish) from a licensed supplier in Miami-Dade County on August 12 (invoices were provided). According to the supplier, the fish had been caught in the Bahamas. All of the hog snapper had been sold. No leftover cooked or uncooked hog snapper was available for testing. No further cases were identified in this outbreak.

Ciguatera poisoning is a notifiable (reportable) disease in Florida (s. 64D-3.002(1), Florida Administrative Code) and should be reported to the local county health department by the attending physician. It is a form of human poisoning caused by the consumption of subtropical and tropical marine finfish that have accumulated naturally occurring toxins through their diet. Marine finfish most commonly implicated in ciguatera fish poisoning include the groupers, barracudas, snappers, jacks, mackerel, and triggerfish. Many other species of warm-water fish harbor ciguatera toxins. The occurrence of toxic fish is sporadic, and not all fish of a given species or from a given locality will be toxic. The ciguatera toxins can be recovered from toxic fish through tedious extraction and purification procedures. The mouse bioassay is a generally accepted method of establishing toxicity of suspect fish.

Clinical testing procedures are not presently available for the laboratory diagnosis of ciguatera in humans. Diagnosis is based on symptom history and recent dietary history. Initial signs of poisoning occur within six hours after consumption of toxic fish and include perioral numbness and tingling (paresthesia), which may spread to the extremities, nausea, vomiting, and diarrhea. Neurological symptoms include intensified paresthesia, arthralgia, myalgia, headache, temperature sensory reversal and acute prostration. Cardiovascular signs include arrhythmia, bradycardia, or tachycardia, and reduced blood pressure. Ciguatera poisoning is usually self-limiting, and signs of poisoning often subside within several days from onset. However, in severe cases the neurological symptoms are known to persist from weeks to months.

Cryptosporidium Outbreak Associated With a Swimming Pool – Nassau County, August 2000

On August 25, 2000 the Nassau County Health Department received notification of an outbreak of gastrointestinal illness among 20 visitors from New York City who had vacationed at an Amelia Island resort. The 8 adults and 12 children visited the resort between August 13 and August 20, 2000. The families had spent the majority of their visit at the resort pool area. Meals during the week were consumed within the resort or at local restaurants.

An extensive questionnaire that recorded food and swimming pool exposures was administered to the New York group as well as to four other families from Florida and one family from Georgia who had been at the resort during the same time period. Initial interviews regarding onset of illness times and symptomology indicated that the implicated pathogen might be Cryptosporidium. Profuse watery, foul-smelling stools, anorexia and abdominal pain characterize infection with this parasite. Children often experience vomiting as well. The incubation period is 1-12 days with an average of 7 days. Symptoms may wax and wane intermittently but usually resolve in 30 days in healthy people. Humans, cattle and other domestic animals serve as reservoirs of Cryptosporidium.

A case-control study was conducted to determine risk factors for developing cryptosporidiosis. Nineteen cases and 10 controls were identified. Sixteen of the 19 cases had positive laboratory confirmation results for Cryptosporidium infection. Fourteen of the positive stools were from the New York group and 2 were from 2 Florida families. An answer to a question in the administered questionnaire indicated that the appearance of a lower pool became "cloudy" on Thursday, August 17 and "very cloudy" on Friday, August 18. The pool maintenance log documented zero chlorine levels for the pools on August 18 and that the chlorinator valves had been closed. The pool was closed on Saturday August 19 at 8 am, liquid chlorine was added to the pool water by hand and the pool was reopened at 1 pm the same day. During the investigation diaper-aged children were observed using the pool.

Statistical analysis demonstrated that consumption of foods was not a risk factor for Cryptosporidium infection. Pool exposure, however, was a significant risk factor for infection with Cryptosporidium and that the risk increased markedly by the number of hours spent in the pool. Individuals who spent between 0 and 10 hours in the pools were 7 times as likely to become ill than those who did not go in the pools (see Table 6). Individuals who spent 20 or more hours in the pools were 413 times as likely to become ill than those that did not go in the pools. The source of the Cryptosporidium contamination of the swimming pools that caused this outbreak of illness is unknown.

Table 6: Odds Ratios for Cumulative Time Spent in the Pool Cryptosporidium Oubreak, August, 2000, Nassau County, Florida

Cumulative Time Spent in Pool (hours)	Odds Ratio - (95% Confidence Interval)
0	1.00 (Reference)
>0 and <10	7.45 (1.83-30.29)
≥10 and <20	55.50 (3.36-917.77)
≥20	413.48 (6.15-27,803.47)

Waterborne crytposporidiosis associated with recreational water exposure is an emerging public health problem. Cryptosporidium oocysts are resistant to disinfection by chlorine at levels used in swimming pools and sand filtration systems are not effective in removing oocysts. There is a low infective dose for this organism and the intermittent nature of the diarrhea adds to the potential for swimming-associated infection. A person infected with Cryptosporidium can excrete oocysts for several weeks after the diarrhea has ended. Therefore, contamination of recreational water can be possible by asymptomatic carriers days or even weeks after infection.

Effective prevention strategies will require education of swimmers and facility management. Restriction of diaper-age children to certain pools and exclusion of diarrheal or incontinent swimmers may reduce risk of spreading contamination to an entire recreational facility. This outbreak was followed by two other swimming-pool-associated cryptosporidium outbreaks in St. Johns and Volusia Counties later in August. The CDC has established a website for healthy swimming and a national effort is underway to educate the public on risks and prevention efforts for recreational waterborne disease outbreaks (see: http://www.cdc.gov/healthyswimming/index.htm).

Norwalk at a Catered Wedding Reception - Escambia County, August 2000

On August 29, 2000 the Escambia County Health Department (ECHD) received a complaint that a group of people had fallen ill after eating a catered meal at a wedding reception in Pensacola, Florida on August 26. Approximately 55 people had attended this event at a private residence. The caterer involved specialized in providing food for special occasions. The bride's mother provided a list of names of the attendees.

Case histories for the attendees were obtained through questionnaires administered over the telephone. Stool samples were collected for viral analysis. In all, 50 case histories and nine viral stool samples were collected. Thirty persons experienced illness (60%). Primary symptoms were diarrhea, vomiting, abdominal cramps, and fever (see Table 7). Incubation times ranged from 10 to 53 hours with an average of 36 hours.

Table 7: Frequency of Symptoms Summary, Norwalk Outbreak, Escambia County, August, 2000

Symptoms	Frequency	Percent
Diarrhea	26	87
Nausea	23	77
Muscle Aches	22	73
Vomiting	21	70
Headache	18	60
Chills	16	53
Fever	15	50

Investigation of the caterer's facility revealed that the food had been prepared in a private home and the caterer was unlicensed and unregulated. The caterer's diaper-aged child and the caterer had both experienced diarrheal illness 3-5 days prior to the wedding reception.

The 60% attack rate among the attendees of this wedding reception indicate that there was a point source common exposure among the ill people. The food specific attack rate tables implicated cheeses, citrus punch, and chicken salad (see Table 8). Additionally, seven stool

samples from attendees, the caterer, and the caterer's diaper-aged child were positive for Norwalk-like virus, type G2. Poor personal hygiene and/or unsanitized food preparation surfaces and equipment in an unlicensed caterer resulted in this Norwalk-like viral illness outbreak. The caterer and her diaper-aged child had both experienced diarrheal illness prior to the food preparation period and both were positive for type G2 Norwalk.

Table 8: Food Specific Attack Rate Table. Norwalk Outbreak, Escambia County, August, 2000

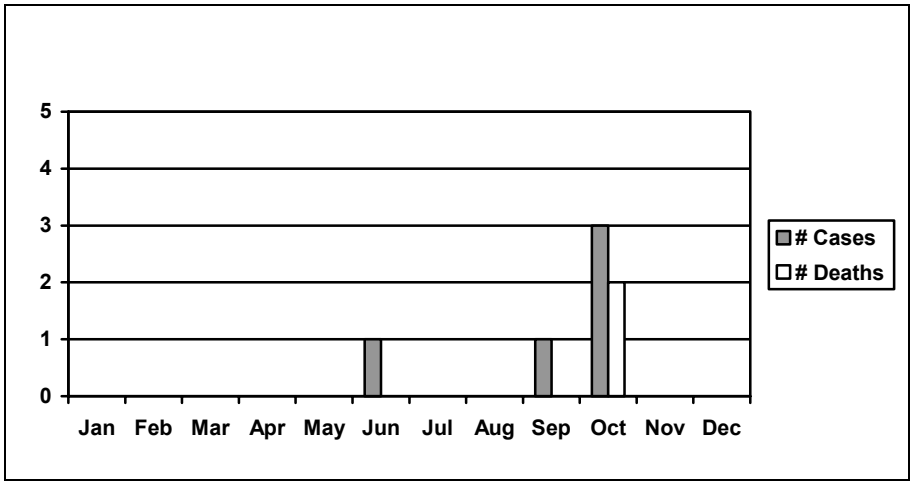
Luncheon Menu	Ate Food				Did Not Eat Food				
	Sick	Well	Total	Attack Rate	Sick	Well	Total	Attack rate	Difference
Citrus Punch	26	8	34	76%	4	12	16	25%	51%
Assorted Cheeses/crackers	28	10	38	66%	2	10	12	17%	49%
Chicken salad sandwich	24	9	33	73%	6	11	17	35%	38%
Assorted fresh fruits	23	9	32	72%	7	11	18	39%	33%
Cucumber/dill sandwich	19	7	26	73%	11	13	24	46%	27%
Pineapple/pecan sandwich	15	7	22	68%	15	13	28	54%	14%
Fresh Strawberries	14	6	20	70%	16	14	30	53%	17%
Wedding Cake	10	7	17	59%	20	13	33	61%	-2%

Norwalk disease is self-limiting, mild, and characterized by nausea, vomiting, diarrhea, and abdominal pain. Headache and low-grade fever may occur. The infectious dose is unknown but presumed to be low. Norwalk is transmitted via the fecal-oral mode of transmission via contaminated water and foods. Secondary person-to-person transmission has also been documented. Shellfish and salad ingredients are the foods most often implicated in Norwalk outbreaks. Ingestion of raw or insufficiently steamed clams and oysters poses a high risk for infection with Norwalk virus. Proper handwashing after going to the bathroom, changing diapers, working with sick people, and before handling food can help prevent the spread of this illness.

***Vibrio vulnificus*, Florida, 2000**

For 2000, there were a total of 13 *Vibrio vulnificus* cases reported in the State of Florida, a significant reduction from the previous year. Of these, 8 were wound-related. The other 5 cases were associated with the consumption of raw oysters. [6] There were 2 oyster-consumption-related deaths reported from *Vibrio vulnificus* (see Figure 3). No other deaths from exposure to *Vibrio vulnificus* were reported in 2000. In 1999 there were 6 wound-related cases of *Vibrio vulnificus* (3 deaths), and 14 cases associated with the consumption of raw oysters (10 deaths), with 2 cases of unknown exposure.

Figure 3: *Vibrio vulnificus* Cases and Deaths Due to Shellfish Consumption by Month, Florida, 2000



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

Appendix: Statewide Data Tables and Figures

Table 9: Number of Reported Outbreaks With Laboratory-Confirmed Etiologic Agents and Number of Cases Associated With These Outbreaks, Florida, 2000

# Outbreaks	Pathogen	# Cases
1	E. coli 0157:H7	2
1	Giardia	4
1	Shigella	7
1	Staphylococcus	6
1	V. parahaemolyticus	3
2	B. cereus	19
2	Chemical	22
2	Ciguatera	7
2	Hepatitis A	23
3	Other	6
4	Cryptosporidium	32
4	Norwalk virus	203
5	V. vulnificus	5
7	Salmonella	48
36	Total	387

Figure 4: Percent Reported Outbreaks With Laboratory-Confirmed Etiologic Agents and Percent Cases Associated With These Outbreaks, Florida, 2000

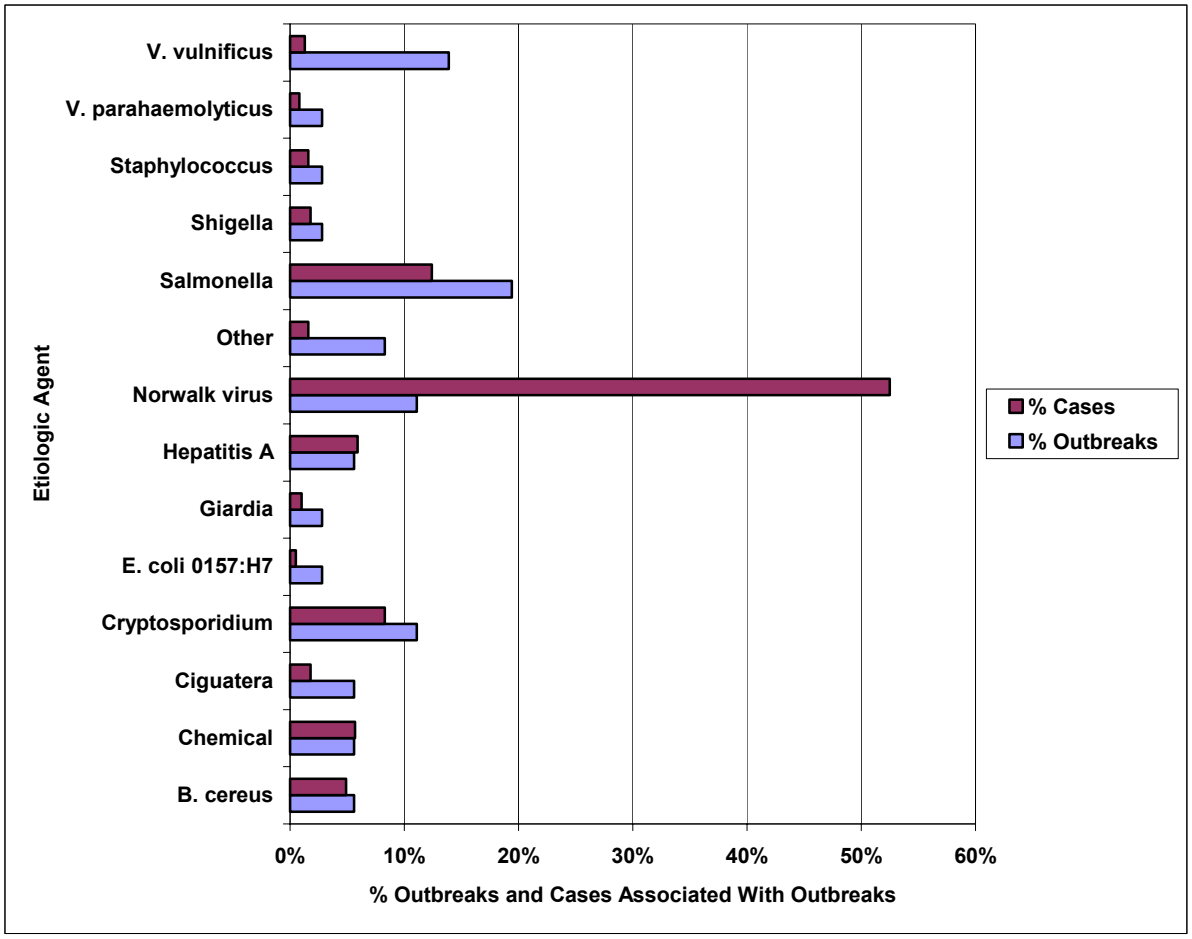
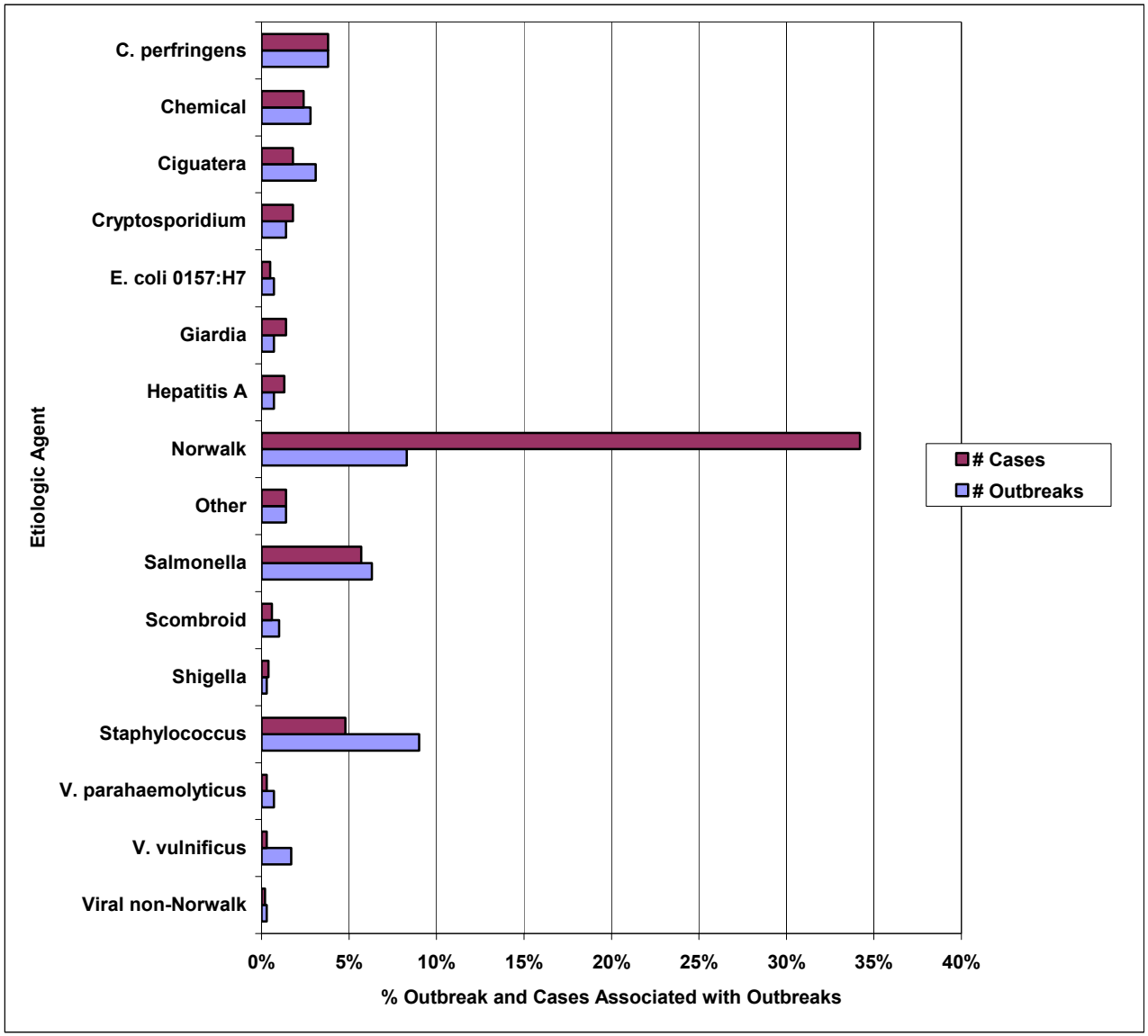


Figure 5: Percent Total Outbreaks and Cases by Etiologic Agent, Florida, 2000



*The etiologic agent was unknown in 53.5% of the outbreaks and 36.4% of the cases.

Figure 6: Trends in Reported Outbreaks and Outbreak Cases of Norwalk, Florida, 1994-2000

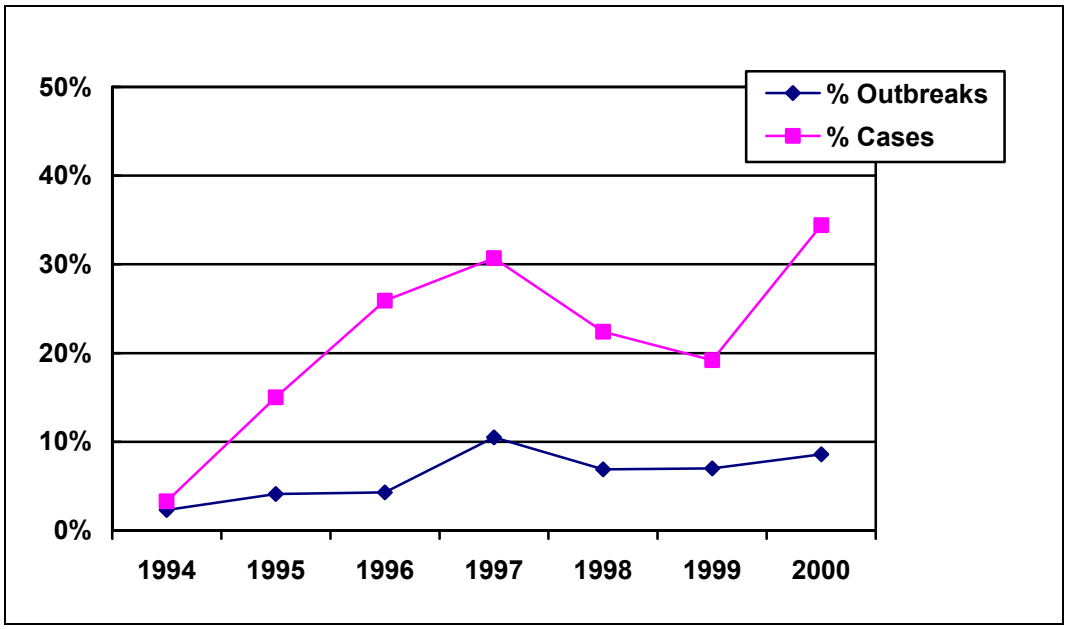


Figure 7: Trends in Reported Outbreaks and Outbreak Cases of Staphylococcus, Florida, 1994-2000

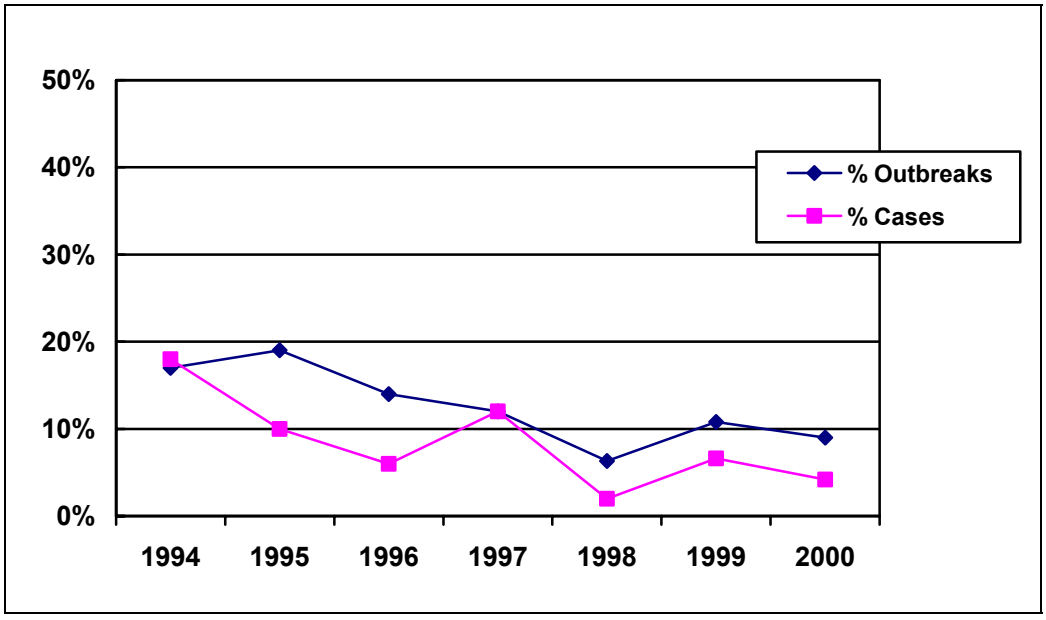


Figure 8: Trends in Reported Outbreaks and Outbreak Cases of Salmonella, Florida, 1994-2000

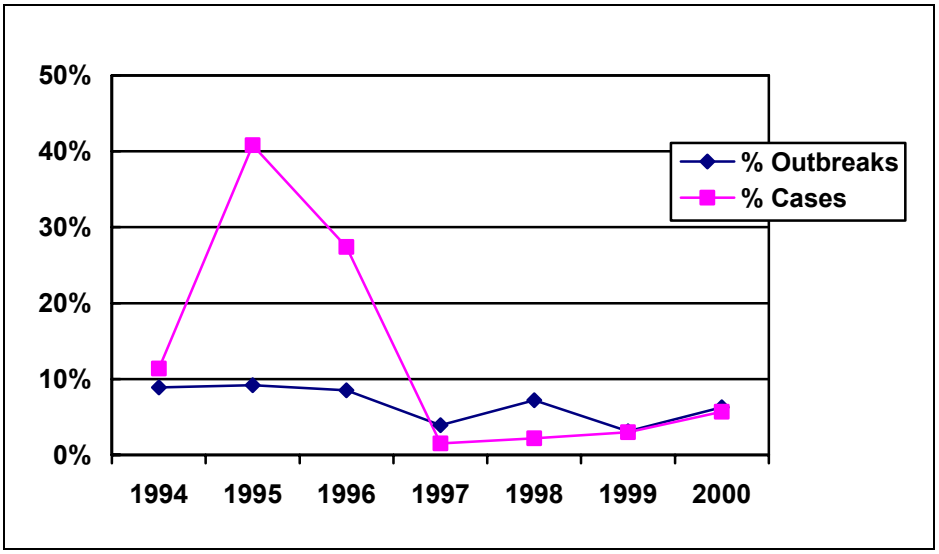


Figure 9: Trends in Reported Outbreaks and Outbreak Cases of Unknown Pathogens, Florida, 1994-2000

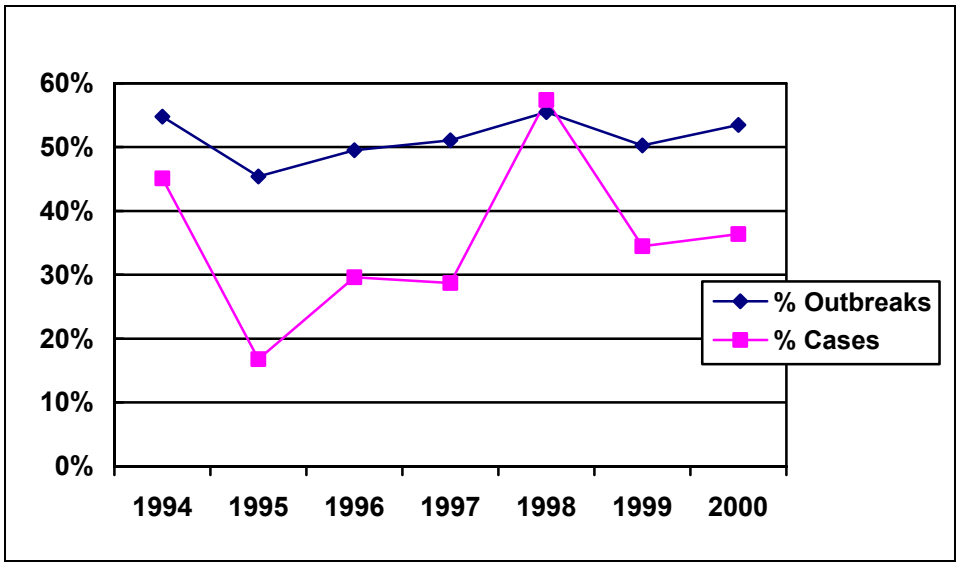


Figure 10: Percent Total Outbreaks and Cases by Site, Florida, 2000

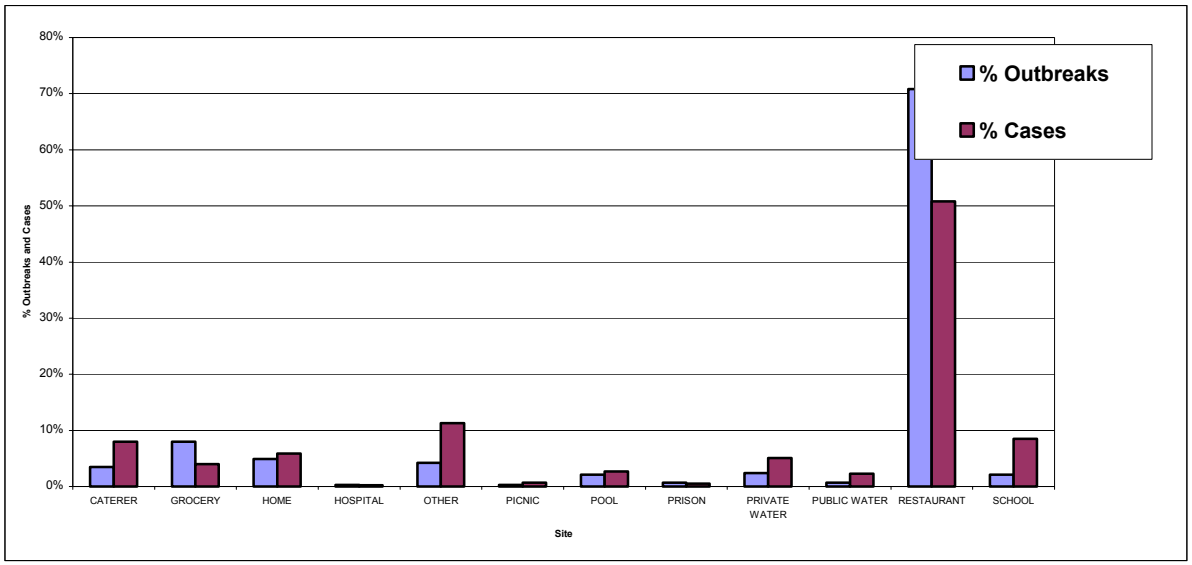


Table 10: Outbreaks by Site, Florida, 2000

Status	Caterer	Grocery	Home	Hospital	Other	Picnic	Pool	Prison	Private Water	Public Water	Restaurant	School	Total
Confirmed	3	3	4	1	5	1	5	0	2	1	21	4	50
	6.0%	6.0%	8.0%	2.0%	10.0%	2.0%	10.0%	0.0%	4.0%	2.0%	42.0%	8.0%	17.4%
Suspected	7	20	10	0	7	0	1	2	5	1	183	2	238
	2.9%	8.4%	4.2%	0.0%	2.9%	0.0%	0.4%	0.8%	2.1%	0.4%	76.9%	0.8%	82.6%
Total	**10**	**23**	**14**	**1**	**12**	**1**	**6**	**2**	**7**	**2**	**204**	**6**	**288**
	3.5%	**8.0%**	**4.9%**	**0.3%**	**4.2%**	**0.3%**	**2.1%**	**0.7%**	**2.4%**	**0.7%**	**70.8%**	**2.1%**	**100.0%**

Table 11: Cases by Site, Florida, 2000

Status	Caterer	Grocery	Home	Hospital	Other	Picnic	Pool	Prison	Private Water	Public Water	Restaurant	School	Total
Confirmed	57	14	53	4	170	13	38	0	74	19	255	115	812
	7.0%	1.7%	6.5%	0.5%	20.9%	1.6%	4.7%	0.0%	9.1%	2.3%	31.4%	14.2%	46.2%
Suspected	83	57	51	0	29	0	9	8	16	21	637	34	945
	8.8%	6.0%	5.4%	0.0%	3.1%	0.0%	1.0%	0.8%	1.7%	2.2%	67.4%	3.6%	53.8%
Total	**140**	**71**	**104**	**4**	**199**	**13**	**47**	**8**	**90**	**40**	**892**	**149**	**1757**
	8.0%	**4.0%**	**5.9%**	**0.2%**	**11.3%**	**0.7%**	**2.7%**	**0.5%**	**5.1%**	**2.3%**	**50.8%**	**8.5%**	**100.0%**

Table 12: Food and Waterborne Outbreaks and Cases Reported by Agency of Jurisdiction,[7] Florida, 1995-2000

1995

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

1996

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

1997

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

1998

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

1999

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

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

Table 12: Food and Waterborne Outbreaks and Cases Reported by Agency of Jurisdiction,[8] Florida, 1995-2000 (cont.)

2000

Agency	# Outbreaks	% Outbreaks	# Cases	% Cases
DACS	35	12.2%	142	8.1%
DBPR	210	72.9%	986	56.1%
DOH	21	7.3%	410	23.3%
OTHER	22	7.6%	219	12.5%
Total	288	100.0%	1757	100.0%

Figure 11: Reported Food and Waterborne Disease Outbreaks by Agency of Jurisdiction, 1995-2000

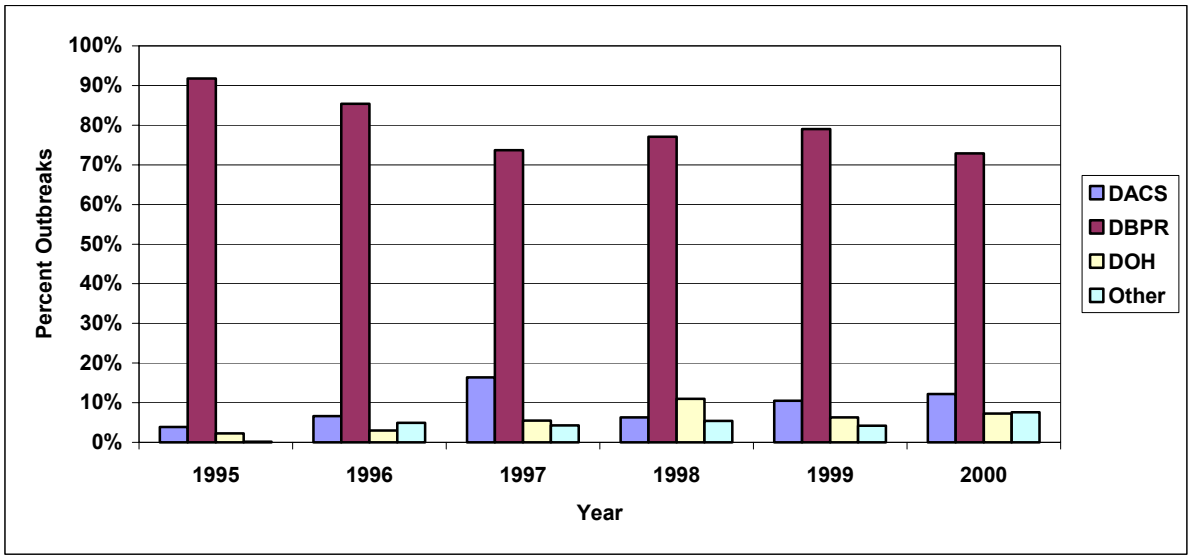
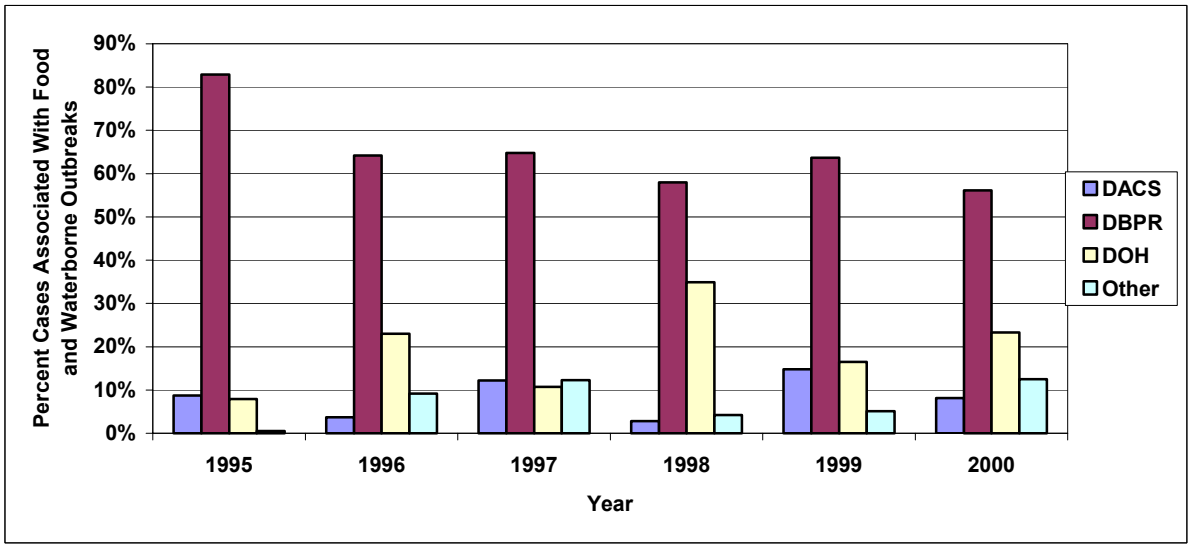


Figure 12: Cases Associated With Reported Food and Waterborne Disease Outbreaks by Agency of Jurisdiction, 1995-2000



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

Figure 13: Percent Total Outbreaks and Cases by Vehicle, Florida, 2000

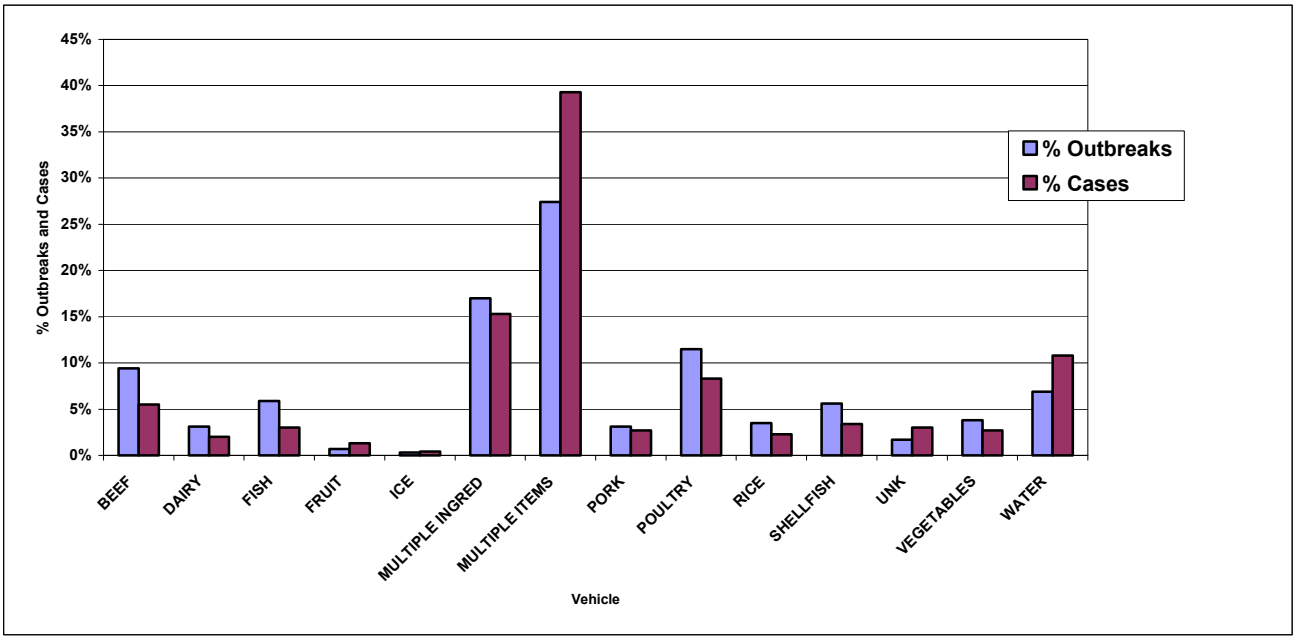


Table 13: Outbreaks by Vehicle, Florida, 2000

Status	Beef	Dairy	Fish	Fruit	Ice	Multiple Ingred	Multiple Items	Pork	Poultry	Rice	Shellfish	Unk	Vegetables	Water	Total
Confirmed	1	0	6	1	1	5	12	2	3	1	8	0	1	9	50
	2.0%	0.0%	12.0%	2.0%	2.0%	10.0%	24.0%	4.0%	6.0%	2.0%	16.0%	0.0%	2.0%	18.0%	17.4%
Suspected	26	9	11	1	0	44	67	7	30	9	8	5	10	11	238
	10.9%	3.8%	4.6%	0.4%	0.0%	18.5%	28.2%	2.9%	12.6%	3.8%	3.4%	2.1%	4.2%	4.6%	82.6%
Total	**27**	**9**	**17**	**2**	**1**	**49**	**79**	**9**	**33**	**10**	**16**	**5**	**11**	**20**	**288**
	9.4%	**3.1%**	**5.9%**	**0.7%**	**0.3%**	**17.0%**	**27.4%**	**3.1%**	**11.5%**	**3.5%**	**5.6%**	**1.7%**	**3.8%**	**6.9%**	**100.0%**

Table 14: Cases by Vehicle, Florida, 2000

Status	Beef	Dairy	Fish	Fruit	Ice	Multiple Ingred	Multiple Items	Pork	Poultry	Rice	Shellfish	Unk	Vegetables	Water	Total
Confirmed	4	0	26	21	7	83	416	22	32	15	35	0	19	132	812
	0.5%	0.0%	3.2%	2.6%	0.9%	10.2%	51.2%	2.7%	3.9%	1.8%	4.3%	0.0%	2.3%	16.3%	46.2%
Suspected	92	36	27	2	0	186	275	25	113	25	24	53	29	58	945
	9.7%	3.8%	2.9%	0.2%	0.0%	19.7%	29.1%	2.6%	12.0%	2.6%	2.5%	5.6%	3.1%	6.1%	53.8%
Total	**96**	**36**	**53**	**23**	**7**	**269**	**691**	**47**	**145**	**40**	**59**	**53**	**48**	**190**	**1757**
	5.5%	**2.0%**	**3.0%**	**1.3%**	**0.4%**	**15.3%**	**39.3%**	**2.7%**	**8.3%**	**2.3%**	**3.4%**	**3.0%**	**2.7%**	**10.8%**	**100.0%**

Table 15: Total Outbreaks, Florida, 2000: Etiologic Agent by Vehicle

Pathogen	Beef	Dairy	Fish	Fruit	Ice	Multiple Ingred	Multiple Items	Pork	Poultry	Rice	Shellfish	Unk	Vegetables	Water	Total
B. cereus	1	1	0	0	0	0	1	1	2	4	0	0	2	0	12
C. perfringens	1	0	0	0	0	3	5	1	0	0	0	0	1	0	11
Chemical	0	0	0	2	0	3	0	0	0	0	1	0	1	1	8
Ciguatera	0	0	9	0	0	0	0	0	0	0	0	0	0	0	9
Cryptosporidium	0	0	0	0	0	0	0	0	0	0	0	0	0	4	4
E. coli 0157:H7	1	0	0	0	0	0	0	0	1	0	0	0	0	0	2
Giardia	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2
Hepatitis A	0	0	0	0	0	1	1	0	0	0	0	0	0	0	2
Norwalk Virus	0	1	0	0	0	5	15	0	1	0	1	0	1	0	24
Other	0	0	0	0	0	2	0	0	0	0	0	0	0	2	4
Salmonella	1	0	0	0	0	2	4	2	7	0	0	1	1	0	18
Scombroid	0	0	3	0	0	0	0	0	0	0	0	0	0	0	3
Shigella	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1
Staphylococcus	5	2	0	0	0	9	2	1	5	0	1	0	0	1	26
Unknown	18	5	5	0	0	24	50	4	17	6	6	4	5	10	154
V. parahaemolyticus	0	0	0	0	0	0	0	0	0	0	2	0	0	0	2
V. vulnificus	0	0	0	0	0	0	0	0	0	0	5	0	0	0	5
Viral non-Norwalk	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1
Total	**27**	**9**	**17**	**2**	**1**	**49**	**79**	**9**	**33**	**10**	**16**	**5**	**11**	**20**	**288**

Table 16: Total Cases in All Outbreaks, Florida, 2000: Etiologic Agent by Vehicle

Pathogen	Beef		Fish	Fruit	Ice	Multiple Ingred	Multiple Items	Pork	Poultry	Rice	Shellfish	Unk	Vegetables	Water	Total
B. cereus	4	2	0	0	0	0	6	4	4	22	0	0	7	0	49
C. perfringens	13	0	0	0	0	12	31	9	0	0	0	0	2	0	67
Chemical	0	0	0	23	0	13	0	0	0	0	2	0	3	1	42
Ciguatera	0	0	31	0	0	0	0	0	0	0	0	0	0	0	31
Cryptosporidium	0	0	0	0	0	0	0	0	0	0	0	0	0	32	32
E. coli 0157:H7	7	0	0	0	0	0	0	0	2	0	0	0	0	0	9
Giardia	0	0	0	0	0	0	0	0	0	0	0	0	0	25	25
Hepatitis A	0	0	0	0	0	21	2	0	0	0	0	0	0	0	23
Norwalk virus	0	6	0	0	0	109	430	0	17	0	20	0	19	0	601
Other	0	0	0	0	0	4	0	0	0	0	0	0	0	21	25
Salmonella	2	0	0	0	0	7	29	16	37	0	0	6	3	0	100
Scombroid	0	0	10	0	0	0	0	0	0	0	0	0	0	0	10
Shigella	0	0	0	0	7	0	0	0	0	0	0	0	0	0	7
Staphylococcus	12	4	0	0	0	28	4	6	19	0	5	0	0	6	84
Unknown	58	24	12	0	0	75	186	12	66	18	22	47	14	105	639
V. parahaemolyticus	0	0	0	0	0	0	0	0	0	0	5	0	0	0	5
V. vulnificus	0	0	0	0	0	0	0	0	0	0	5	0	0	0	5
Viral non Norwalk	0	0	0	0	0	0	3	0	0	0	0	0	0	0	3
Total	**96**	**36**	**53**	**23**	**7**	**269**	**691**	**47**	**145**	**40**	**59**	**53**	**48**	**190**	**1757**

Table 17: Confirmed Outbreaks, Florida, 2000: Etiologic Agent by Vehicle

Pathogen	Beef	Fish	Fruit	Ice	Multiple Ingred	Multiple Items	Pork	Poultry	Rice	Shellfish	Vegetables	Water	Total
B. cereus	1	0	0	0	0	0	0	0	1	0	0	0	2
C. perfringens	0	0	0	0	0	1	1	0	0	0	0	0	2
Chemical	0	0	1	0	0	0	0	0	0	0	0	1	2
Ciguatera	0	5	0	0	0	0	0	0	0	0	0	0	5
Cryptosporidium	0	0	0	0	0	0	0	0	0	0	0	4	4
Hepatitis A	0	0	0	0	1	1	0	0	0	0	0	0	2
Norwalk virus	0	0	0	0	1	7	0	0	0	1	1	0	10
Other	0	0	0	0	2	0	0	0	0	0	0	2	4
Salmonella	0	0	0	0	0	1	1	2	0	0	0	0	4
Scombroid	0	1	0	0	0	0	0	0	0	0	0	0	1
Shigella	0	0	0	1	0	0	0	0	0	0	0	0	1
Staphylococcus	0	0	0	0	0	0	0	0	0	0	0	1	1
Unknown	0	0	0	0	1	2	0	1	0	1	0	1	6
V. parahaemolyticus	0	0	0	0	0	0	0	0	0	1	0	0	1
V. vulnificus	0	0	0	0	0	0	0	0	0	5	0	0	5
Total	**1**	**6**	**1**	**1**	**5**	**12**	**2**	**3**	**1**	**8**	**1**	**9**	**50**

Table 18: Cases in Confirmed Outbreaks, Florida, 2000: Etiologic Agent by Vehicle

Pathogen	Beef	Fish	Fruit	Ice	Multiple Ingred	Multiple Items	Pork	Poultry	Rice	Shellfish	Vegetables	Water	Total
B. cereus	4	0	0	0	0	0	0	0	15	0	0	0	19
C. perfringens	0	0	0	0	0	3	9	0	0	0	0	0	12
Chemical	0	0	21	0	0	0	0	0	0	0	0	1	22
Ciguatera	0	22	0	0	0	0	0	0	0	0	0	0	22
Cryptosporidium	0	0	0	0	0	0	0	0	0	0	0	32	32
Hepatitis A	0	0	0	0	21	2	0	0	0	0	0	0	23
Norwalk virus	0	0	0	0	51	360	0	0	0	20	19	0	450
Other	0	0	0	0	4	0	0	0	0	0	0	21	25
Salmonella	0	0	0	0	0	17	13	22	0	0	0	0	52
Scombroid	0	4	0	0	0	0	0	0	0	0	0	0	4
Shigella	0	0	0	7	0	0	0	0	0	0	0	0	7
Staphylococcus	0	0	0	0	0	0	0	0	0	0	0	6	6
Unknown	0	0	0	0	7	34	0	10	0	7	0	72	130
V. parahaemolyticus	0	0	0	0	0	0	0	0	0	3	0	0	3
V. vulnificus	0	0	0	0	0	0	0	0	0	5	0	0	5
Total	**4**	**26**	**21**	**7**	**83**	**416**	**22**	**32**	**15**	**35**	**19**	**132**	**812**

Table 19: Suspected Outbreaks, Florida, 2000: Etiologic Agent by Vehicle

Pathogen	Beef	Dairy	Fish	Fruit	Multiple ingred	Multiple items	Pork	Poultry	Rice	Shellfish	Unk	Vegetables	Water	Total
B. cereus	0	1	0	0	0	1	1	2	3	0	0	2	0	10
C. perfringens	1	0	0	0	3	4	0	0	0	0	0	1	0	9
Chemical	0	0	0	1	3	0	0	0	0	1	0	1	0	6
Ciguatera	0	0	4	0	0	0	0	0	0	0	0	0	0	4
E. coli 0157:H7	1	0	0	0	0	0	0	1	0	0	0	0	0	2
Giardia	0	0	0	0	0	0	0	0	0	0	0	0	2	2
Norwalk virus	0	1	0	0	4	8	0	1	0	0	0	0	0	14
Salmonella	1	0	0	0	2	3	1	5	0	0	1	1	0	14
Scombroid	0	0	2	0	0	0	0	0	0	0	0	0	0	2
Staphylococcus	5	2	0	0	9	2	1	5	0	1	0	0	0	25
Unknown	18	5	5	0	23	48	4	16	6	5	4	5	9	148
V. parahaemolyticus	0	0	0	0	0	0	0	0	0	1	0	0	0	1
Vira -non-Norwalk	0	0	0	0	0	1	0	0	0	0	0	0	0	1
Total	**26**	**9**	**11**	**1**	**44**	**67**	**7**	**30**	**9**	**8**	**5**	**10**	**11**	**238**

Table 20: Cases in Suspected Outbreaks, Florida, 2000: Etiologic Agent by Vehicle

Pathogen	Beef	Dairy	Fish	Fruit	Multiple Ingred	Multiple Items	Pork	Poultry	Rice	Shellfish	Unk	Vegetables	Water	Total
B. cereus	0	2	0	0	0	6	4	4	7	0	0	7	0	30
C. perfringens	13	0	0	0	12	28	0	0	0	0	0	2	0	55
Chemical	0	0	0	2	13	0	0	0	0	2	0	3	0	20
Ciguatera	0	0	9	0	0	0	0	0	0	0	0	0	0	9
E. coli 0157:H7	7	0	0	0	0	0	0	2	0	0	0	0	0	9
Giardia	0	0	0	0	0	0	0	0	0	0	0	0	25	25
Norwalk virus	0	6	0	0	58	70	0	17	0	0	0	0	0	151
Salmonella	2	0	0	0	7	12	3	15	0	0	6	3	0	48
Scombroid	0	0	6	0	0	0	0	0	0	0	0	0	0	6
Staphylococcus	12	4	0	0	28	4	6	19	0	5	0	0	0	78
Unknown	58	24	12	0	68	152	12	56	18	15	47	14	33	509
V. parahaemolyticus	0	0	0	0	0	0	0	0	0	2	0	0	0	2
Viral non-Norwalk	0	0	0	0	0	3	0	0	0	0	0	0	0	3
Total	**92**	**36**	**27**	**2**	**186**	**275**	**25**	**113**	**25**	**24**	**53**	**29**	**58**	**945**

Figure 14: Percent Total Outbreaks and Cases by Month, Florida, 2000

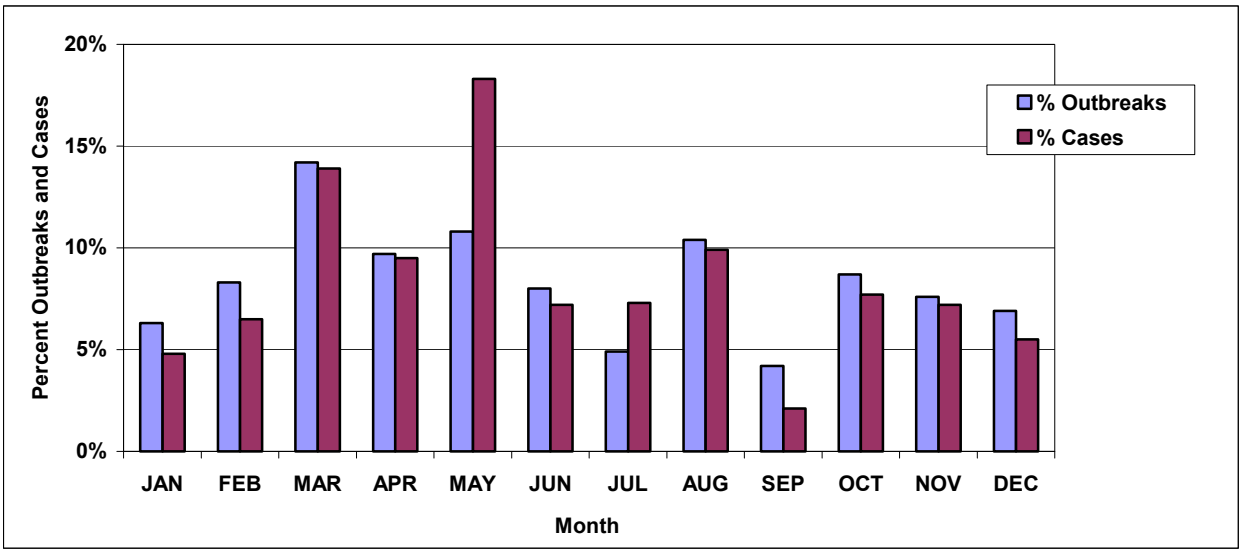


Table 21: Outbreaks by Month, 2000

Status	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Confirmed	2	5	6	2	7	3	2	10	3	6	2	2	50
	4.0%	10.0%	12.0%	4.0%	14.0%	6.0%	4.0%	20.0%	6.0%	12.0%	4.0%	4.0%	17.4%
Suspected	16	19	35	26	24	20	12	20	9	19	20	18	238
	6.7%	8.0%	14.7%	10.9%	10.1%	8.4%	5.0%	8.4%	3.8%	8.0%	8.4%	7.6%	82.6%
Total	**18**	**24**	**41**	**28**	**31**	**23**	**14**	**30**	**12**	**25**	**22**	**20**	**288**
	6.3%	**8.3%**	**14.2%**	**9.7%**	**10.8%**	**8.0%**	**4.9%**	**10.4%**	**4.2%**	**8.7%**	**7.6%**	**6.9%**	**100.0%**

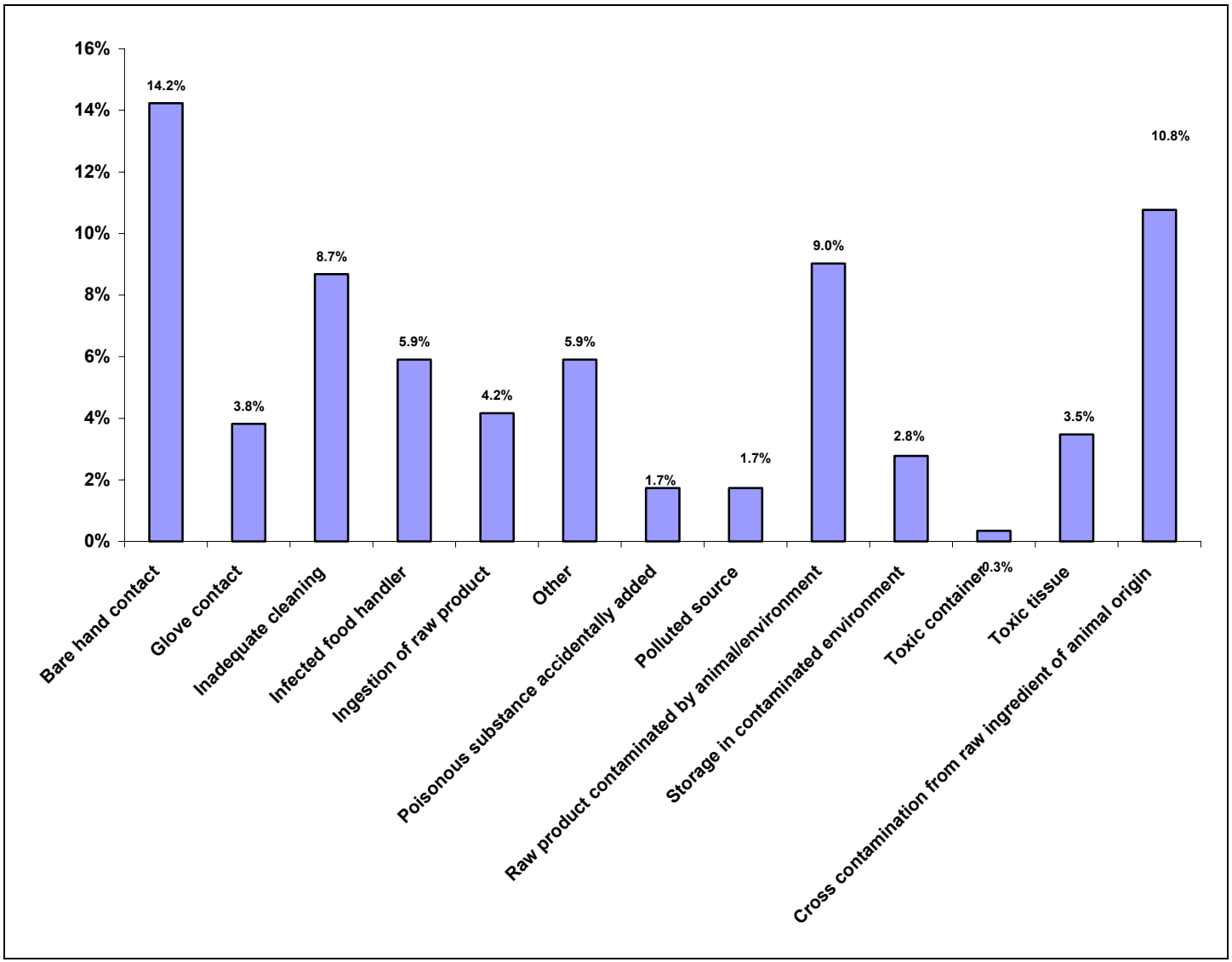
Table 22: Cases by Month, 2000

Status	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Confirmed	22	40	139	28	191	25	78	95	11	72	71	40	812
	2.7%	4.9%	17.1%	3.4%	23.5%	3.1%	9.6%	11.7%	1.4%	8.9%	8.7%	4.9%	46.2%
Suspected	63	74	106	139	130	102	51	79	26	64	55	56	945
	6.7%	7.8%	11.2%	14.7%	13.8%	10.8%	5.4%	8.4%	2.8%	6.8%	5.8%	5.9%	53.8%
Total	**85**	**114**	**245**	**167**	**321**	**127**	**129**	**174**	**37**	**136**	**126**	**96**	**1757**
	4.80%	**6.50%**	**13.90%**	**9.50%**	**18.30%**	**7.20%**	**7.30%**	**9.90%**	**2.10%**	**7.70%**	**7.20%**	**5.50%**	**100%**

Table 23: Outbreaks With Greater Than 10 Cases, Florida, 2000

County	Status	# Cases	Site	Vehicle	Pathogen	Pathogen status
Orange	Confirmed	142	Other	Soda machine, pizza	Norwalk virus	Confirmed
Collier	Confirmed	88	School	Ham, turkey, bread, coleslaw	Norwalk virus	Suspected
Hillsborough	Confirmed	72	Private Water	Well water	Unknown	Unknown
Hillsborough	Confirmed	51	Restaurant	Deli sandwiches	Norwalk virus	Suspected
Lee	Confirmed	45	Restaurant	Sub sandwiches	Norwalk virus	Suspected
Escambia	Confirmed	35	Caterer	Chicken salad, punch, cheese	Norwalk virus	Confirmed
Palm Beach	Suspected	32	School	Turkey stir fry	Norwalk virus	Suspected
Leon	Suspected	29	Caterer	Sliced/diced meat	Unknown	Unknown
Pinellas	Confirmed	26	Restaurant	Various cold-cut sandwiches	Unknown	Unknown
Seminole	Confirmed	26	Restaurant	Chicken or salad	Norwalk virus	Suspected
Lake	Confirmed	21	Restaurant	Unknown	Hepatitis A	Confirmed
Pasco	Confirmed	21	School	Canned pineapple chunks	Chemical	Confirmed
Pasco	Suspected	21	Public Water	Drinking water	Giardia	Suspected
Statewide	Confirmed	20	Home	Raw oysters	Norwalk virus	Confirmed
Hillsborough	Confirmed	19	Public Water	Drinking water	Other	Suspected
Hillsborough	Confirmed	19	Restaurant	Salad	Norwalk virus	Suspected
Nassau	Confirmed	19	Pool	Pool water	Cryptosporidium	Confirmed
Duval	Suspected	18	Restaurant	Multiple items	Norwalk virus	Suspected
Hillsborough	Confirmed	18	Home	Ham, cake, ice	Norwalk virus	Suspected
Broward	Suspected	17	Caterer		Norwalk virus	Suspected
Hillsborough	Confirmed	17	Other	Bbq cChicken	Salmonella	Confirmed
Hillsborough	Confirmed	17	Caterer	Tuna & chicken salad & ice	Salmonella	Suspected
Pinellas	Confirmed	15	Restaurant	Rice	B. cereus	Confirmed
Hillsborough	Suspected	14	Restaurant	Pizza, ice	Norwalk virus	Suspected
Pasco	Suspected	14	Caterer	Milk	Unknown	Unknown
Duval	Confirmed	13	Picnic	Ribs	Salmonella	Confirmed
Palm Beach	Suspected	13	Restaurant	Beef stir fry	C. perfringens	Suspected
Palm Beach	Suspected	13	Restaurant	Salads	Norwalk virus	Suspected
Monroe	Suspected	12	Restaurant	Seafood and salads	Unknown	Unknown
Palm Beach	Suspected	12	Restaurant	Skirt steak and pizza	C. perfringens	Suspected
Brevard	Suspected	11	Restaurant	Salsa,t-chips, beef burritos	C. perfringens	Suspected

Figure 15: Contamination Factor: Percent Total Foodborne Outbreaks (n=268), Florida, 2000[9]



[9] An outbreak may have up to three contamination factors.

Table 24: Contamination Factor - Number of Outbreaks and Cases Associated With Foodborne Outbreaks, Florida, 2000[10]

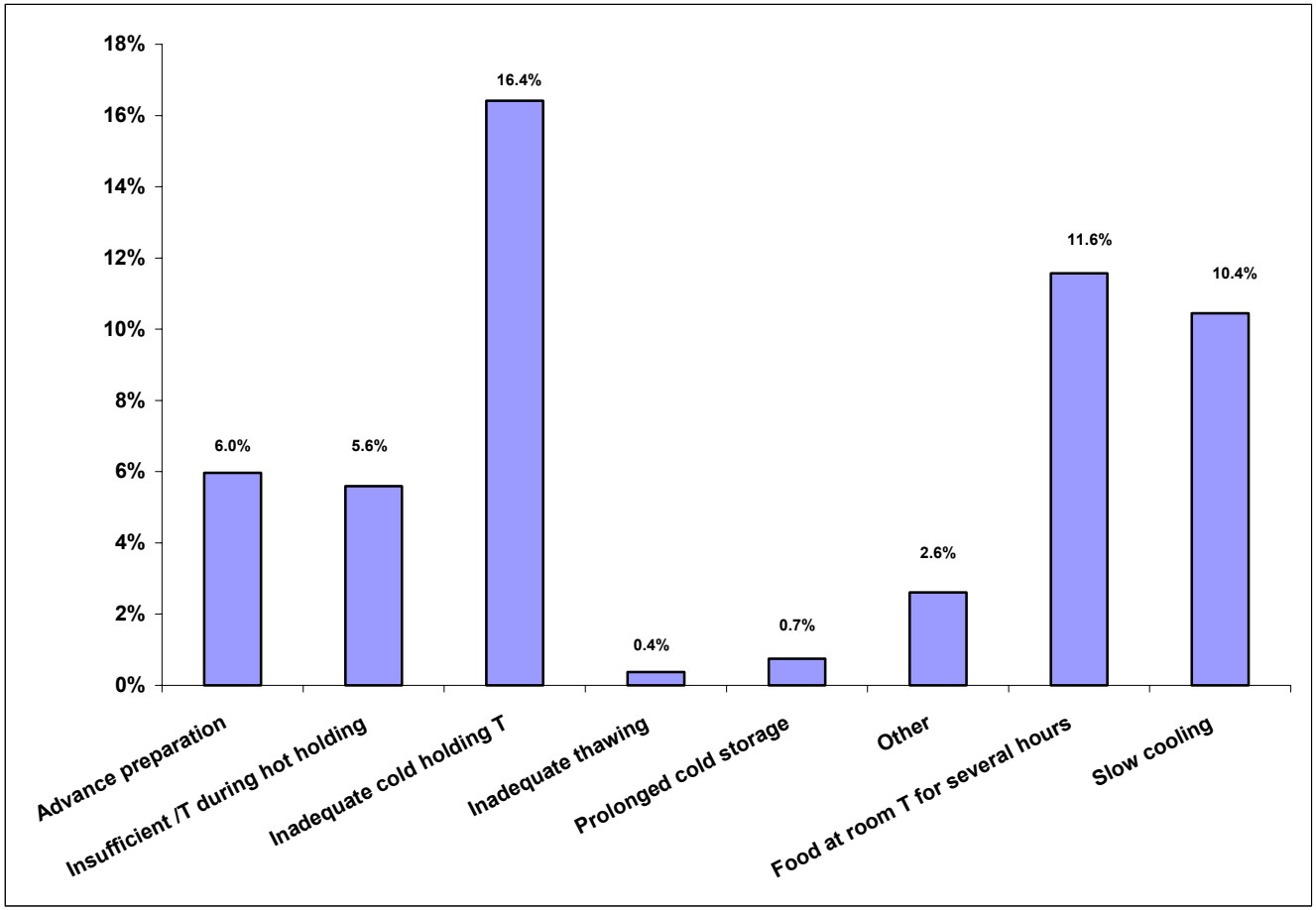
Contamination Factor	# Outbreaks	# Cases
Bare hand contact	41	296
Glove contact	11	278
Inadequate cleaning	25	124
Infected food handler	17	269
Ingestion of raw product	12	68
Other	17	370
Poisonous substance accidentally added	5	14
Polluted source	5	54
Raw product contaminated by animal/environment	26	116
Storage in contaminated environment	8	36
Toxic container	1	21
Toxic tissue	10	33
Cross contamination from raw ingredient of animal origin	31	202

Table 25: Contamination Factor: Percent of Total Foodborne Outbreaks (n=268) and Cases Associated With Outbreaks (n=1567), Florida, 2000

Contamination Factor	# Outbreaks	# Cases
Bare hand contact	15.3%	18.9%
Glove contact	4.1%	17.7%
Inadequate cleaning	9.3%	7.9%
Infected food handler	6.3%	17.2%
Ingestion of raw product	4.5%	4.3%
Other	6.3%	23.6%
Poisonous substance accidentally added	1.9%	0.9%
Polluted source	1.9%	3.4%
Raw product contaminated by animal/environment	9.7%	7.4%
Storage in contaminated environment	3.0%	2.3%
Toxic container	0.4%	1.3%
Toxic tissue	3.7%	2.1%
Cross contamination from raw ingredient of animal origin	11.6%	12.9%

[10] An outbreak may have up to three contamination factors.

Figure 16: Proliferation/Amplification Factor:
Percent Total Foodborne Outbreaks (n=268), Florida, 2000[11]



[11] An outbreak may have up to three proliferation/amplification factors.

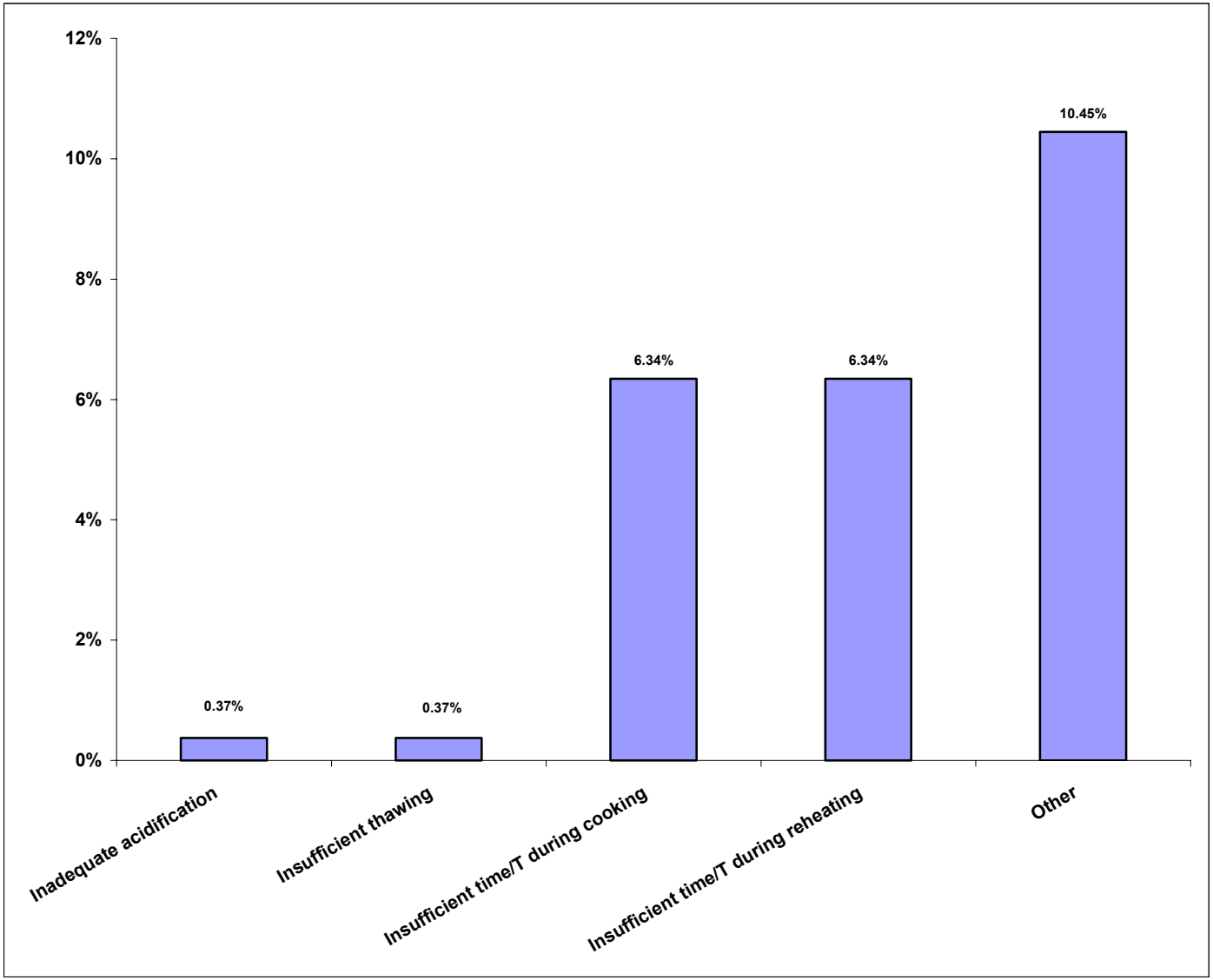
Table 26: Proliferation/Amplification Factor:
Number of Foodborne Outbreaks and Cases Associated With Foodborne Outbreaks, Florida, 2000

Proliferation Factors	# Outbreaks	# Cases
Advance preparation	16	108
Insufficient /T during hot holding	15	81
Inadequate cold holding T	44	184
Inadequate thawing	1	2
Prolonged cold storage	2	6
Other	7	55
Food at room T for several hours	31	161
Slow cooling	28	105

Table 27: Proliferation/Amplification Factor:
Percent Total Foodborne Outbreaks (n=268) and Cases Associated With Foodborne Outbreaks (n=1567) , Florida, 2000

Proliferation Factors	# Outbreaks	# Cases
Advance preparation	6.0%	6.9%
Insufficient /T during hot holding	5.6%	5.2%
Inadequate cold holding T	16.4%	11.7%
Inadequate thawing	0.4%	0.1%
Prolonged cold storage	0.7%	0.4%
Other	2.6%	3.5%
Food at room T for several hours	11.6%	10.3%
Slow cooling	10.4%	6.7%

Figure 17: Survival Factor: Percent Total Foodborne Outbreaks (n=268), Florida, 2000[12]



[12] An outbreak may have up to three survival factors.

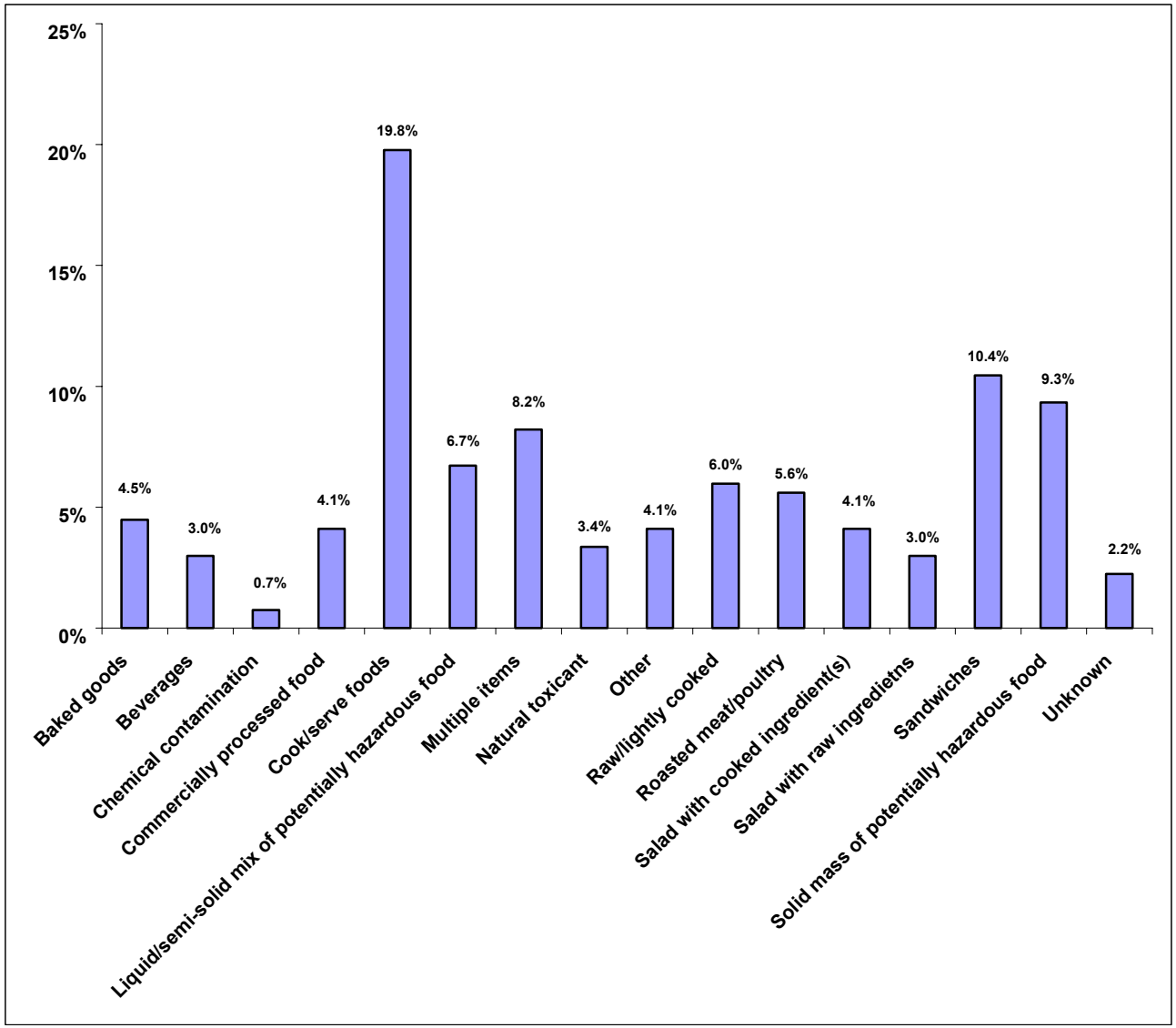
Table 28: Survival Factor:
Percent Total Foodborne Outbreaks (n=268), Florida, 2000

Survival Factors	# Outbreaks	# Cases
Inadequate acidification	1	2
Insufficient thawing	1	2
Insufficient time/T during cooking	17	82
Insufficient time/T during reheating	17	113
Other	28	144

Table 29: Survival Factor:
Percent Total Foodborne Outbreaks (n=268) and Cases Associated With Foodborne Outbreaks (n=1567) , Florida, 2000

Survival Factors	% Outbreaks	% Cases
Inadequate acidification	0.37%	0.1%
Insufficient thawing	0.37%	0.1%
Insufficient time/T during cooking	6.34%	5.2%
Insufficient time/T during reheating	6.34%	7.2%
Other	10.45%	9.2%

Figure 18: Method of Preparation Factor: Percent Total Foodborne Outbreaks (n=268), Florida, 2000[13]



[13] An outbreak may have up to three method of preparation factors.

Table 30: Method of Preparation Factor:
Number of Foodborne Outbreaks and Cases Associated With Foodborne Outbreaks, Florida, 2000

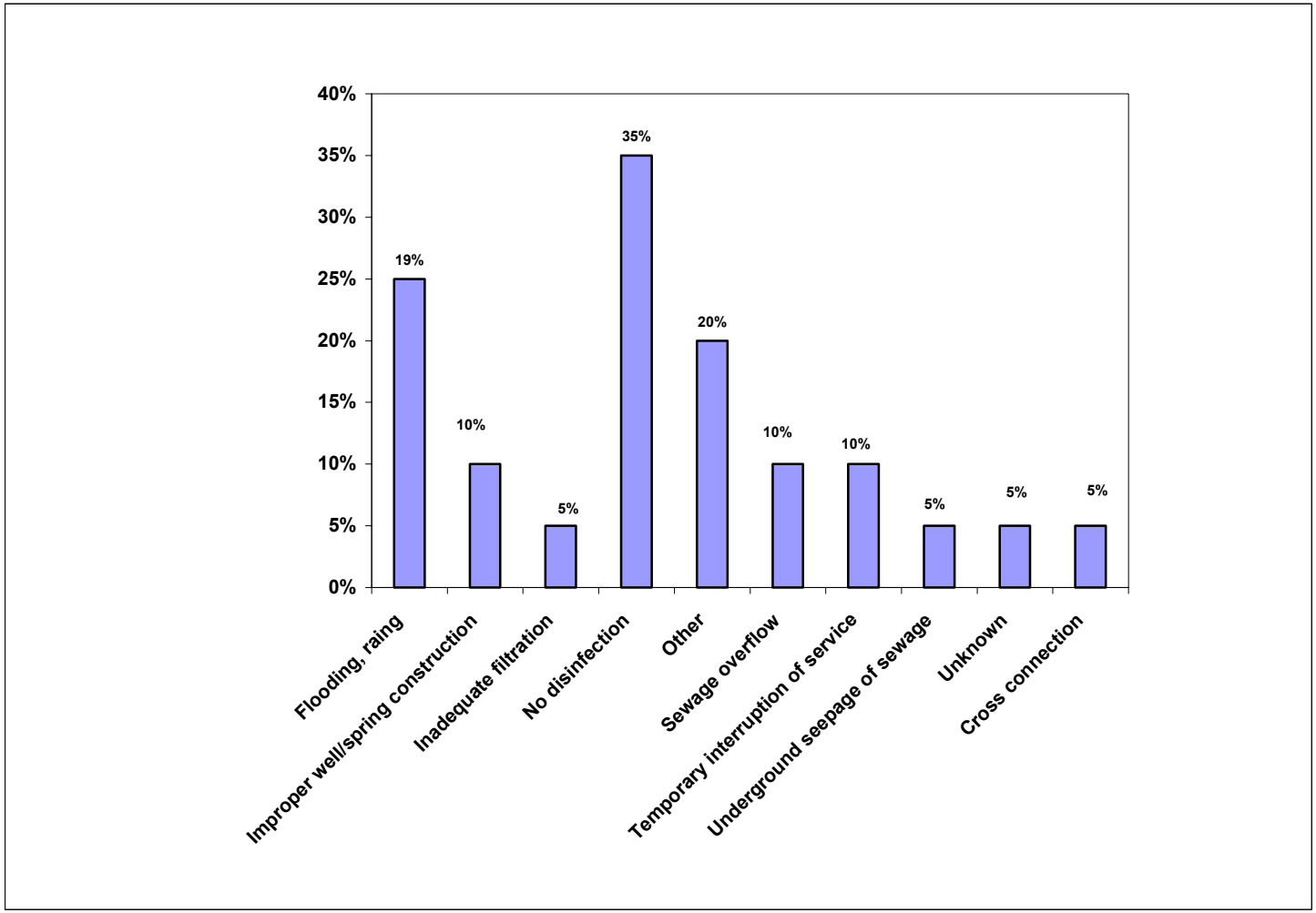
Method of Preparation Factor	# Outbreaks	# Cases
Baked goods	12	55
Beverages	8	25
Chemical contamination	2	4
Commercially processed food	11	62
Cook/serve foods	53	388
Liquid/semi-solid mix of potentially hazardous food	18	75
Multiple items	22	242
Natural toxicant	9	29
Other	11	214
Raw/lightly cooked	16	59
Roasted meat/poultry	15	76
Salad with cooked ingredient(s)	11	47
Salad with raw ingredietns	8	89
Sandwiches	28	186
Solid mass of potentially hazardous food	25	94
Unknown	6	28

Table 31: Method of Preparation Factor:
Percent Total Foodborne Outbreaks (n=268) and Cases Associated With Foodborne Outbreaks (n=1567) , Florida, 2000[14]

Method of Preparation Factor	# Outbreaks	# Cases
Baked goods	4.5%	3.5%
Beverages	3.0%	1.6%
Chemical contamination	0.7%	0.3%
Commercially processed food	4.1%	4.0%
Cook/serve foods	19.8%	24.8%
Liquid/semi-solid mix of potentially hazardous food	6.7%	4.8%
Multiple items	8.2%	15.4%
Natural toxicant	3.4%	1.9%
Other	4.1%	13.7%
Raw/lightly cooked	6.0%	3.8%
Roasted meat/poultry	5.6%	4.9%
Salad with cooked ingredient(s)	4.1%	3.0%
Salad with raw ingredietns	3.0%	5.7%
Sandwiches	10.4%	11.9%
Solid mass of potentially hazardous food	9.3%	6.0%
Unknown	2.2%	1.8%

[14] An outbreak may have up to three method of preparation factors.

Figure 19: Waterborne Disease Factors: Percent Total Waterborne Outbreaks, Florida, 2000[15]



[15] An outbreak may have up to three waterborne disease factors.

Table 32: Waterborne Disease Factor:
Number of Waterborne Outbreaks and Cases Associated With Waterborne Outbreaks, Florida, 2000

Waterborne Disease Factors	# Outbreaks	# Cases
Flooding, rain	5	14
Improper well/spring construction	2	6
Inadequate filtration	1	9
No disinfection	7	112
Other	4	32
Sewage overflow	2	23
Temporary interruption of service	2	28
Underground seepage of sewage	1	72
Unknown	1	2
Cross connection	1	4

Table 33: Waterborne Disease Factors:
Percent Total Waterborne Outbreaks (n=20) and Cases Associated With Waterborne Outbreaks (n=190) , Florida, 2000[16]

Waterborne Disease Factors	# Outbreaks	# Cases
Flooding, rain	25%	7.4%
Improper well/spring construction	10%	3.2%
Inadequate filtration	5%	4.7%
No disinfection	35%	58.9%
Other	20%	16.8%
Sewage overflow	10%	12.1%
Temporary interruption of service	10%	14.7%
Underground seepage of sewage	5%	37.9%
Unknown	5%	1.1%
Cross connection	5%	2.1%

[16] An outbreak may have up to three waterborne disease factors.

Table 34: Contamination Factors by Etiologic Agent for Foodborne Outbreaks Reported in Florida (n=268), 2000

Pathogen	Bare hand contact	Glove contact	Inadequate cleaning	Infected handler	Ingestion raw product	Other	Poison accident	Polluted source	Raw product	Storage contamination	Toxic container	Toxic tissue	X contam animal	Total
B. cereus	1	1	1	0	0	0	0	0	5	1	0	0	4	13
C. perfringens	0	0	2	0	0	2	0	0	5	1	0	0	1	11
Chemical	0	0	0	0	0	0	2	0	0	0	1	0	0	3
Ciguatera	0	0	0	0	0	0	0	0	0	0	0	9	0	9
Cryptosporidium	0	0	0	0	0	1	0	3	0	0	0	0	0	4
E. coli 0157:H7	0	0	0	0	0	1	0	0	0	0	0	0	0	1
Hepatitis A	1	0	0	2	1	0	0	0	0	0	0	0	0	4
Norwalk virus	6	4	2	8	2	4	0	1	2	0	0	0	3	32
Other	0	0	1	0	0	0	1	0	0	0	0	0	0	2
Salmonella	5	0	1	1	0	0	0	0	5	1	0	0	5	18
Scombroid	0	0	0	0	0	0	0	0	0	0	0	1	0	1
Shigella	0	0	0	0	0	1	0	0	0	1	0	0	0	2
Staphylococcus	14	2	3	3	0	0	1	1	0	0	0	0	3	27
Unknown	14	4	15	2	4	7	1	0	9	4	0	0	14	74
V. parahaemolyticus	0	0	0	0	1	0	0	0	0	0	0	0	1	2
V. vulnificus	0	0	0	0	4	1	0	0	0	0	0	0	0	5
Viral non-Norwalk	0	0	0	1	0	0	0	0	0	0	0	0	0	1
Total	**41**	**11**	**25**	**17**	**12**	**17**	**5**	**5**	**26**	**8**	**1**	**10**	**31**	**209**

Table 35: Contaminating Factors by Etiologic Agent for Cases in Foodborne Outbreaks Reported in Florida (n=1567), 2000

Pathogen	Bare hand contact	Glove contact	Inadequate cleaning	Infected handler	Ingest raw product	Other	Poison accident	Polluted source	Raw product	Storage contamination	Toxic container	Toxic tissue	X contam animal	Total
B. cereus	15	2	3	0	0	0	0	0	14	2	0	0	16	52
C. perfringens	0	0	5	0	0	25	0	0	23	6	0	0	2	61
Chemical	0	0	0	0	0	0	3	0	0	0	21	0	0	24
Ciguatera	0	0	0	0	0	0	0	0	0	0	0	31	0	31
Cryptosporidium	0	0	0	0	0	5	0	29	0	0	0	0	0	34
E. coli 0157:H7	0	0	0	0	0	7	0	0	0	0	0	0	0	7
Hepatitis A	21	0	0	23	21	0	0	0	0	0	0	0	0	65
Norwalk virus	155	251	39	200	26	299	0	20	29	0	0	0	62	1081
Other	0	0	2	0	0	0	2	0	0	0	0	0	0	4
Salmonella	17	0	4	4	0	0	0	0	28	2	0	0	37	92
Scombroid	0	0	0	0	0	0	0	0	0	0	0	2	0	2
Shigella	0	0	0	0	0	7	0	0	0	7	0	0	0	14
Staphylococcus	35	9	8	6	0	0	7	5	0	0	0	0	9	79
Unknown	53	16	63	33	15	26	2	0	22	19	0	0	73	322
V. parahaemolyticus	0	0	0	0	2	0	0	0	0	0	0	0	3	5
V. vulnificus	0	0	0	0	4	1	0	0	0	0	0	0	0	5
Vira -non-Norwalk	0	0	0	3	0	0	0	0	0	0	0	0	0	3
Total	296	278	124	269	68	370	14	54	116	36	21	33	202	1881

Table 36: Proliferation/Amplification Factors by Etiologic Agent for Foodborne Outbreaks Reported in Florida (n=268), 2000

Pathogen	Advance preparation	Hot insufficient time	Inadequate cold holding	Inadequate thawing	Long cold storage	Other	Room temp	Slow cool	Total
B. cereus	3	2	3	1	0	0	5	3	17
C. perfringens	4	3	1	0	0	0	5	8	21
Cryptosporidium	0	0	0	0	0	1	0	0	1
E. coli 0157:H7	0	0	2	0	0	0	0	0	2
Hepatitis A	0	0	0	0	0	1	0	0	1
Norwalk virus	1	1	1	0	0	1	2	0	6
Other	0	0	0	0	0	1	0	0	1
Salmonella	3	0	3	0	0	0	3	2	11
Scombroid	0	0	0	0	1	0	0	0	1
Staphylococcus	2	1	7	0	0	0	5	2	17
Unknown	3	8	26	0	1	3	11	12	64
V. parahaemolyticus	0	0	1	0	0	0	0	1	2
Total	16	15	44	1	2	7	31	28	144

Table 37: Proliferation/Amplification Factors by Etiologic Agent for Cases in Foodborne Outbreaks Reported in Florida (n=1567), 2000

Pathogen	Advance preparation	Hot insufficient time	Inadequate cold holding	Inadequate thawing	Long cold storage	Other	Room temp	Slow cool	Total
B. cereus	10	6	20	2	0	0	19	7	64
C. perfringens	19	28	3	0	0	0	27	51	128
Cryptosporidium	0	0	0	0	0	19	0	0	19
E. coli 0157:H7	0	0	9	0	0	0	0	0	9
Hepatitis A	0	0	0	0	0	21	0	0	21
Norwalk virus	6	17	7	0	0	5	43	0	78
Other	0	0	0	0	0	2	0	0	2
Salmonella	39	0	25	0	0	0	9	4	77
Scombroid	0	0	0	0	4	0	0	0	4
Staphylococcus	4	2	24	0	0	0	21	5	56
Unknown	30	28	93	0	2	8	42	35	238
V. parahaemolyticus	0	0	3	0	0	0	0	3	6
Total	108	81	184	2	6	55	161	105	702

Table 38: Survival Factors by Etiologic Agent for Foodborne Outbreaks Reported in Florida (n=268), 2000

Pathogen	Inadequate acidification	Insuff thawing & cooking	Insufficient time/T during cooking	Insufficinet time/T during reheating	Other	Total
B. cereus	0	0	2	1	1	4
C. perfringens	0	0	0	9	0	9
Cryptosporidium	0	0	0	0	1	1
Norwalk virus	0	0	0	1	3	4
Other	1	0	0	0	0	1
Salmonella	0	0	4	2	2	8
Staphylococcus	0	0	5	0	5	10
Unknown	0	0	5	3	16	24
V. parahaemolyticus	0	1	1	0	0	2
Viral non-Norwalk	0	0	0	1	0	1
Total	1	1	17	17	28	64

Table 39: Survival Factors by Etiologic Agent for Cases in Foodborne Outbreaks Reported in Florida (n=1567), 2000

Pathogen	Inadequate acidification	Insuff thawing & cooking	Insufficient time/T during cooking	Insufficinet time/T during reheating	Other	Total
B. cereus	0	0	5	6	2	13
C. perfringens	0	0	0	53	0	53
Cryptosporidium	0	0	0	0	19	19
Norwalk virus	0	0	0	17	58	75
Other	2	0	0	0	0	2
Salmonella	0	0	30	19	5	54
Staphylococcus	0	0	27	0	10	37
Unknown	0	0	18	15	50	83
V. parahaemolyticus	0	2	2	0	0	4
Viral non-Norwalk	0	0	0	3	0	3
Total	2	2	82	113	144	343

Table 40: Method of Preparation Factors by Etiologic Agent for Foodborne Outbreaks Reported in Florida (n=268), 2000

Pathogen	Baked goods	Beverages	Chemical contamination	Commercial processing	Cook/ serve	Liquid /semi-solid	Multiple items	toxicant	Other	Raw/lightly cooked	Roast meat/poulry	Salad (cooked ingredients)	Salad (raw ingredients)	Sandwiches	Solid mass	Unk	Total
B. cereus	0	0	0	1	1	2	1	0	0	1	1	0	0	1	3	0	11
C. perfringens	0	0	0	0	1	4	5	0	0	0	2	0	0	0	4	0	16
Chemical	1	3	1	1	2	0	0	0	0	0	0	0	0	0	0	0	8
Ciguatera	0	0	0	0	2	0	0	7	0	0	0	0	0	0	0	0	9
Cryptosporidia	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1
E. coli 0157:H7	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	2
Hepatitis A	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
Norwalk virus	2	0	0	1	6	0	5	0	2	2	2	2	3	2	0	1	28
Other	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
Salmonella	0	0	0	0	4	0	1	0	2	1	1	1	2	3	0	1	16
Scombroid	0	0	0	0	1	0	0	1	0	0	0	0	0	2	0	0	4
Shigella	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1
Staphylococcus	3	0	0	2	8	3	1	0	0	0	3	2	0	3	0	0	25
Unknown	5	4	1	6	28	9	9	1	5	7	6	6	3	15	16	4	125
V. parahaemolyticus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1
V. vulnificus	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	4
Viral non-Norwalk	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
Total	12	8	2	11	53	18	22	9	11	16	15	11	8	28	25	6	255

Table 41: Method of Preparation Factors by Etiologic Agent for Cases in Foodborne Outbreaks Reported in Florida (n=1567), 2000

Pathogen	Baked goods	Beverages	Chemical contamination	Commercial processing	Cook/ serve	Liquid/semi solid	Multiple items	Natural toxicant	Other	Raw/ lightly cooked	Roast meat/ poultry	Salad (cooked ingredients)	Sala(raw ingredients)	Sandwiches	Solid mass	Unk	Total
B. cereus	0	0	0	1	1	2	1	0	0	1	1	0	0	1	3	0	11
C. perfringens	0	0	0	0	1	4	5	0	0	0	2	0	0	0	4	0	16
Chemical	1	3	1	1	2	0	0	0	0	0	0	0	0	0	0	0	8
Ciguatera	0	0	0	0	2	0	0	7	0	0	0	0	0	0	0	0	9
Cryptosporidium	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1
E. coli 0157:H7	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	2
Hepatitis A	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
Norwalk virus	2	0	0	1	6	0	5	0	2	2	2	2	3	2	0	1	28
Other	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
Salmonella	0	0	0	0	4	0	1	0	2	1	1	1	2	3	0	1	16
Scombroid	0	0	0	0	1	0	0	1	0	0	0	0	0	2	0	0	4
Shigella	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1
Staphylococcus	3	0	0	2	8	3	1	0	0	0	3	2	0	3	0	0	25
Unknown	5	4	1	6	28	9	9	1	5	7	6	6	3	15	16	4	125
V. parahaemolyticus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1
V. vulnificus	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	4
Viral non-Norwalk	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
Total	12	8	2	11	53	18	22	9	11	16	15	11	8	28	25	6	255

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[17]

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

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