Food and Waterborne Illness Surveillance and Investigation
Annual Report, Florida, 2007

Bureau of Environmental Public Health Medicine
Division of Environmental Health
Department of Health

Table of Contents

List of Tables Page

List of Tables Page

List of Tables Page

List of Figures Page

List of Figures Page

Overview

The 2007 year continued to be active for food and waterborne outbreak reporting and investigation: a total of 2,518 food and waterborne illness complaints were reported in Florida. Of these complaints, 1,594 were linked to Department of Business and Professional Regulation establishments; 783 to Department of Agriculture and Consumer Services establishments; 48 to Department of Health establishments; 39 to private homes; 4 each to the Department of Environmental Protection and to Food and Drug Administration (FDA), 3 to the Seminole Indian Nation and 1 to the Centers of Disease Control and Prevention (CDC) Vessel Sanitation Program. Foodborne outbreaks numbered 122 with 852 cases. Ten (10) waterborne outbreaks were reported in 2007, with a total of 111 cases. A total of 132 food and waterborne outbreaks with 963 cases were reported in 2007, compared with 142 outbreaks with 1,263 cases in 2006, and 131 outbreaks and 2,017 cases for 2005. Investigators were able to laboratory confirm 42 of the outbreaks associated with 417 cases (including 8 *Vibrio vulnificus* cases). The largest outbreak reported in 2007 was due to Salmonella implicating mashed potatoes in an Escambia County correctional facility with a total case count of 79, accounting for 8% of all outbreak-related cases reported in 2007. Norovirus, ciguatera *and Staphylococcus*, were implicated in the largest percentage of the total reported outbreaks (13%, 6%, and 7%, respectively). After norovirus (25% outbreak-related cases), *Salmonella* was identified as the pathogen with the largest percentage of outbreak-related cases in reported outbreaks (17%) followed by *Bacillus. cereus* (6 %). Restaurants were the exposure site in 64% of the outbreaks reported and for 41% of the cases. Multiple items (23%), multiple ingredients (15%), and fish (15%) accounted for a total of 53% of all outbreaks. Multiple items accounted for 26% of all outbreak-related cases, followed by multiple ingredients (15%) and poultry (11%). The months with the largest percentage of outbreaks reported were March and April (11% each) with the largest percentage of cases reported in January (25%). Large (greater than 10 cases) outbreaks accounted for 17% (23) of the total reported outbreaks and 62% (596) of the total cases. Selected significant outbreaks are briefly described below. Each outbreak can have up to three contributing factors from each of three groups (contamination, proliferation/amplification, survival) 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=122), Florida, 2007

Contributing Factor[1]	# Outbreaks	# Cases
Contamination Factor[2]		
Inadequate cleaning	22	170
Cross contamination	17	100
Proliferation/amplification Factor		
Inadequate cold holding	29	121
Insufficient time/temperature hot holding	11	120
Survival Factor		
Improper sanitization	5	30

[1] Each outbreak can have **one contributing factor from each of three groups (contamination, proliferation/amplification, survival)**, 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.
[2] 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[1]	# Outbreaks	# Cases
Insufficient time/T during cooking processing	3	125
Method of Preparation		
Cook/serve food	35	247
Multiple foods	23	186

Table 2: Summary of Food and Waterborne Illness Outbreaks Reported to Florida, 1989–2007[3]

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**
2007	**132**	**963**

[3] 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, 1995-2007

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**

2007	# Outbreaks	# Cases
Confirmed	48	515
Suspected	84	448
Total	**132**	**963**

Figure 1: Number of Confirmed and Suspected Food and Waterborne Outbreaks by Year, Florida, 1995-2007

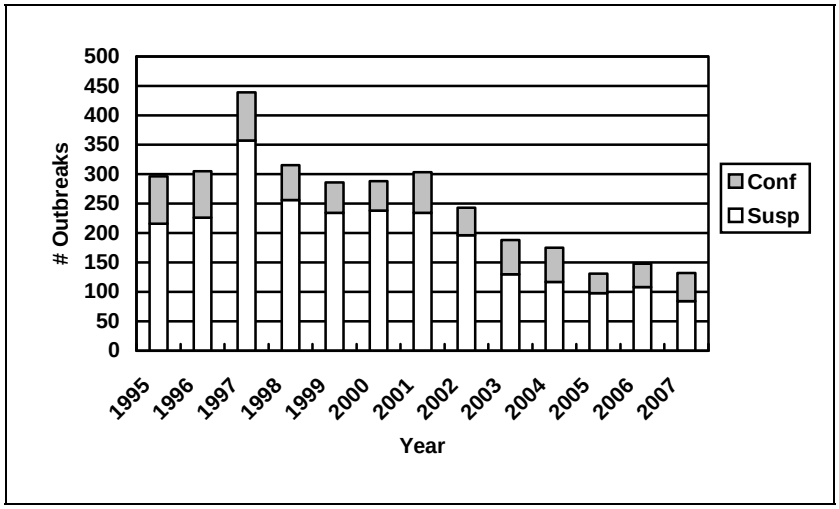


Figure 2: Number of Confirmed and Suspected Food and Waterborne Outbreak-related Cases by Year, Florida, 1995-2007

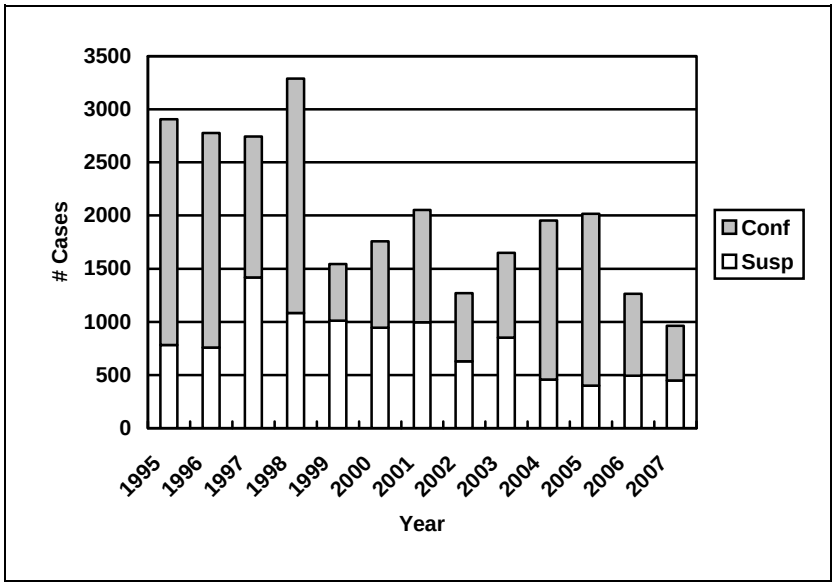
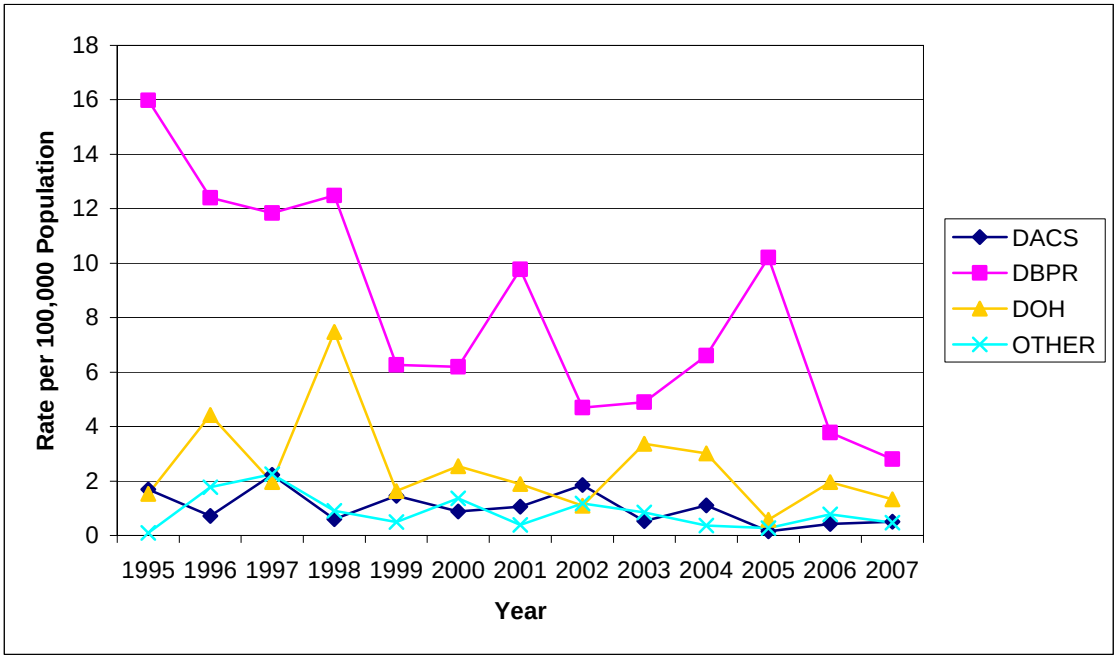


Figure 3: Rate of Food & Waterborne Outbreak-related Cases by Agency of Jurisdiction per 100,000 Population, Florida 2007



Training and Continuing Education

In 2007, 25 training sessions were held around the state specifically targeting Department of Health environmental health and epidemiology staff. 27 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 hepatitis A, *Vibrio vulnificus*, neurotoxic shellfish poisoning, *Salmonella*, recording of food and waterborne illness complaints, foodborne outbreaks related to produce, water/recreational waterborne diseases, foodborne pathogens, food safety and prevention.

Besides county health department environmental health, nursing and epidemiology staff, audiences included members of the Florida Environmental Health Association, the Florida Association of Food Protection, the National Environmental Health Association, Council of State and Territorial Epidemiologists and the International Association for Food Protection. In a cooperative effort with other agencies, training was presented to staff of the Department of Environmental Protection. Trainers also presented guest lectures at the University of Florida, Florida A & M University, and Florida State University. Other community groups who received foodborne illness prevention presentations included homeless coalitions, senior associations, the Retired Workers Council, dietary support services, the Food Safety and Food Defense Advisory Council and Association for Professionals in Infection Control and Epidemiology.

Preparedness Training 2007

In 2007, the DOH Food and Waterborne Disease Program worked closely with the Aquatic Toxins Program to produce ciguatera educational materials (wallet cards, magnets, cards, rulers, key chains and cold drink "coozies") to disseminate to county health department staff and to the public on ciguatera risk and prevention. In addition, the Food and Water Preparedness Coordinator participated in the steering committee for the planning, development and implementation of a school lunch program tabletop exercise sponsored by the Department of Agriculture and Consumer Services. The program continues to seek cost-effective training methods, and continues to convert many of our preparedness educational presentations into Adobe Presenter format. Education and training of appropriate county health departments (CHD) personnel on foodborne and waterborne disease preparedness issues is ongoing.

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 foodborne outbreak is one in which a common food has been ingested by such persons. A single case of suspected botulism, mushroom poisoning, ciguatera or paralytic shellfish poisoning, other rare disease, or a case of a disease that can be definitely related to ingestion of a food, is considered as an incident of foodborne illness and warrants further investigation.

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

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

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

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

Selected Food and Waterborne Outbreak Publications and Articles, 2007

The year 2007 was an active year for Florida food and waterborne disease investigations and a remarkable year for the number of articles published in state and national scientific journals. In total, six articles were included in the Florida Department of Health's (FL-DOH) *Epi Update* publication, one article was featured in the CDC's Morbidity and Mortality Report (MMWR), and one article was published in the Journal of Clinical Infectious Diseases. A variety of agents were the cause of the following eight outbreaks as two investigations were attributed to norovirus and other investigations were attributed to each of the following conditions: Hepatitis

A, *Salmonella*, *Clostridium botulinum*, scombroid fish poisoning, respiratory illness following a red tide event, and *Staphylococcus aureus*.

In 2007, two multi-state investigations with Florida involvement were also published in the Journal of Clinical Diseases and the MMWR. The first article featured an important multi-state hepatitis A investigation in oysters, which was conducted by the Florida Department of Health, CDC, FDA, and the Tennessee Department of Health[4]. This collaborative investigation highlighted the benefits of linking cases and food items through viral sequencing. In a similar multi-state investigation, Florida responded to a cluster of *Salmonella* serovar Pomona in 19 persons who had contact with turtles as a common exposure. Each of the cases identified produced an identical PFGE fingerprint.[5] The investigation began following a single *Salmonella* serovar Pomona case in Florida in an infant who subsequently died, prompting the review of all US cases from the 2006-07. Citations of other selected outbreak investigations are noted below. [6],[7],[8],[9],[10],[11]

[4] Bialek, S., Prethiba, G., Xia G., Glatzer, M., Motes, M., Veazey, J, Hammond, R., et al. (2007). Use of Molecular Epidemiology to Confirm a Multistate Outbreak of Hepatitis A Caused by the Consumption of Oysters. *Clinical Infectious Diseases,* 44 (6) 838–840, http://www.journals.uchicago.edu/doi/pdf/10.1086/511874?cookieSet=1=

[5] Chatfield, D., Winpisinger, K., Sumner, P., Grossman, N., Hammond, R., et al. Turtle-Associated Salmonellosis in Humans--United States, 2006-2007, MMWR 2007; 56 (26); 649-652, http://www.cdc.gov/mmwr/preview/mmwrhtml/mm5626a1.htm

[6] Voss, R., Van Zile, K., DePasquale, J. Infant Botulism, Duval County. Epi Update; Nov., 2007, http://www.doh.state.fl.us/disease_ctrl/epi/Epi_Updates/2007/November2007EpiUpdate.pdf.

[7] Terzagian, R. Scombroid Fish Poisoning Associated with Escolar, Lee County, 2007. Epi Update; May, 2007, http://www.doh.state.fl.us/disease_ctrl/epi/Epi_Updates/2007/May2007EpiUpdate.pdf .

[8] Lazensky, R., Geib, K., Reich, R. Early Detection of a Northeast Florida Red Tide, Karenia brevis, in Employees of a Nassau Beach Dredging Project. Epi Update; Nov., 2007, http://www.doh.state.fl.us/disease_ctrl/epi/Epi_Updates/2007/November2007EpiUpdate.pdf.

[9] Friedman, M., Wydotis, M. Wedding Reception Associated Norovirus Foodborne Outbreak Investigation, Pasco County, March 25, 2007. Epi Update; June, 2007, http://www.doh.state.fl.us/disease_ctrl/epi/Epi_Updates/2007/June2007EpiUpdate.pdf .

[10] Matthews, S., Harduar-Morano, L., Bodager, D. Norovirus Outbreak Associated with a Community Charity Event, Osceola County, December, 2006. Epi Update; July, 2007, http://www.doh.state.fl.us/disease_ctrl/epi/Epi_Updates/2007/July2007EpiUpdate.pdf.

[11] O'Connell, E., Suarez, J., Noya-Chaveco, P., Rivas S. Gastrointestinal Illness Outbreak at a Construction Site in Miami Beach, Miami-Dade County, June 2007. Epi Update; Nov., 2007, http://www.doh.state.fl.us/disease_ctrl/epi/Epi_Updates/2007/November2007EpiUpdate.pdf.

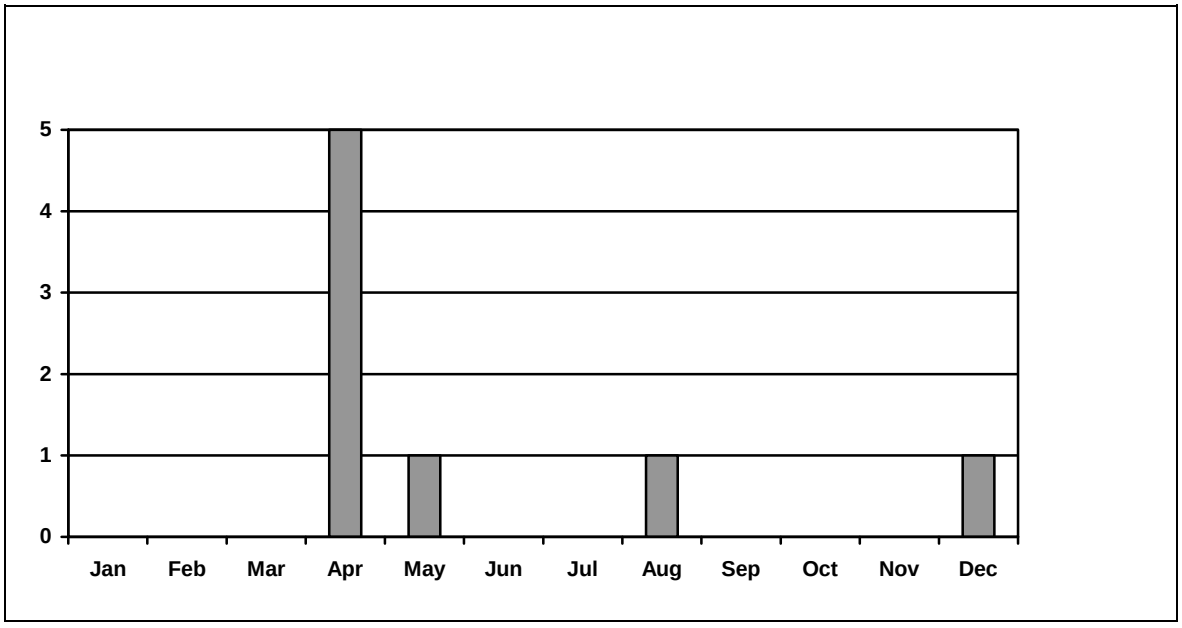
An Overview of Foodborne *Vibrio vulnificus*, Florida, 2007

For 2007, there was a total of 22 *Vibrio vulnificus* cases reported in the State of Florida, less than the previous year. Of these, the largest number included 10 wound-related cases. The other 13 cases were associated with the consumption of raw oysters (8), unknown (4) and clam (1). [12] There were 4 oyster-consumption-related deaths (2 in April, 1 in August and 1 in December), and no deaths from other exposures (see Table 4 and Figure 4). In 2006 there were 13 wound-related cases of *Vibrio vulnificus* (2 deaths), 4 from unknown exposures (0 deaths), 6 cases associated with the consumption of raw oysters (2 deaths) and 1 from crab consumption (0 death).

Table 4: Reported Cases of Food-related *Vibrio vulnificus*, Florida 2007

Exposure	# Cases
Wound	**10 (0 death)**
Oysters	**8 (4 deaths)**
Unknown	**4 (2 deaths)**
Total	22 (4 deaths)

Figure 4: Reported Cases of Vibrio vulnificus by Month from Shellfish Consumption, Florida, 2007

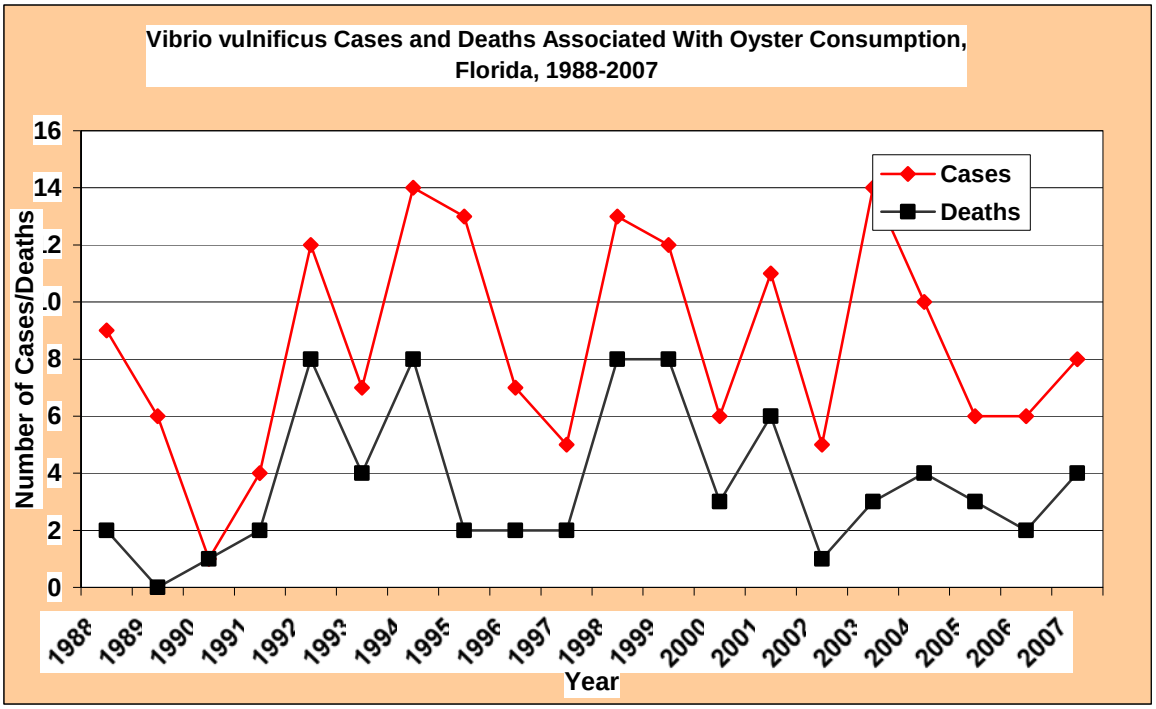


The Florida Department of Health was collaborating in a statewide *Vibrio vulnificus* education Project with the Florida Department of Agriculture and Consumer Services and with the Interstate Shellfish Sanitation Conference. Targeted audiences included high risk groups, health care practitioners and the general public. Project elements included poster displays in the public areas of several CHDs and presentations to CHDs, 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

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

brochures were present at the annual meeting of the Florida Dietetic Association and the Florida Student Nurse Association. Figure 5 shows oyster-related *Vibrio vulnificus* cases and deaths in Florida, from 1988-2007.

Figure 5: *Vibrio vulnificus* Cases and Deaths Associated With Oyster Consumption, Florida, 1988-2007



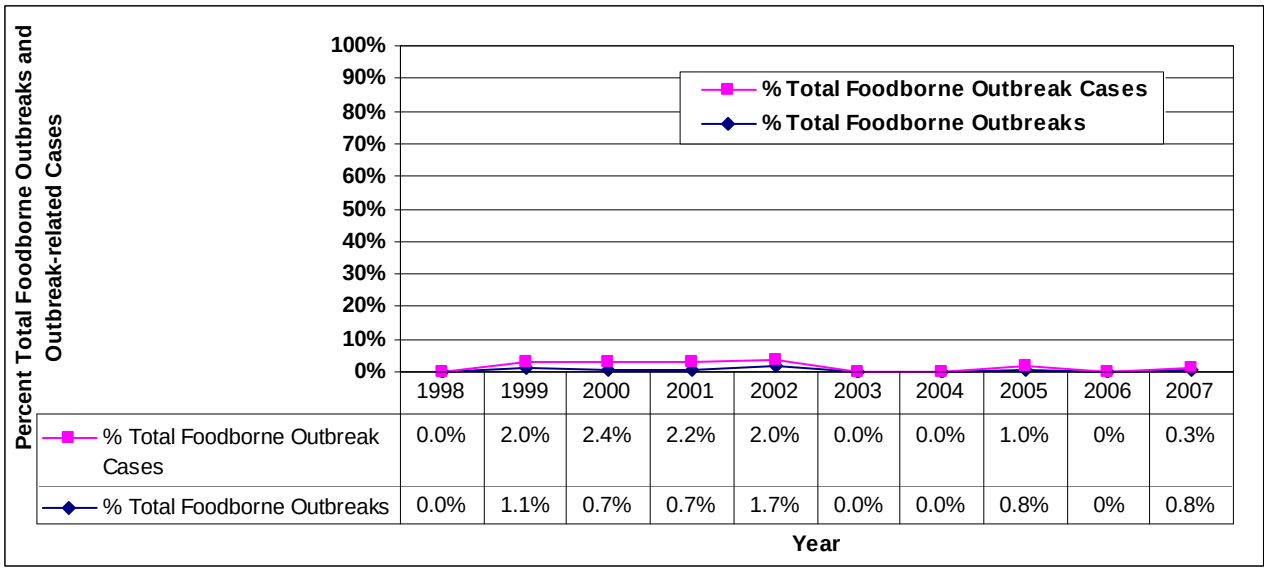
An Overview of Foodborne Hepatitis A in Florida, 1998-2007

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.[13] Florida estimates that hepatitis A accounts for 0.6% of total foodborne outbreaks (1998-2007 trend: flat - no increase or decrease) and for 0.8% of total foodborne outbreak-related cases (1998-2007 trend: upward a little less than 1%).[14,15]

Table 5: Comparison of National and Florida Percentages of Foodborne Hepatitis A

	% Total foodborne outbreaks	% Total outbreak-related cases
Nationwide (1998-2002)	0.8%	0.8%
Florida (1998- 2007)	0.6%	0.8%

Figure 6: Foodborne Hepatitis A: Percent Total Foodborne Outbreaks and Outbreak-related Cases, 1998-2007, Florida



[13] Michael Lynch, et al. Surveillance for Foodborne-Disease Outbreaks – United States, 1998-2002, Morbidity and Mortality Weekly Report, CDC Surveillance Summaries (55)SS-10, November 10, 2006.
[14] Source: Bureau of Environmental Public Health Medicine, Food and Waterborne Disease Program
[15] Source: Bureau of Environmental Public Health Medicine, Food and Waterborne Disease Program

Table 6: Number of Reported Foodborne Hepatitis A Outbreaks in Florida, 1998-2007[16]

	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Confirmed Foodborne Hepatitis A Outbreaks	0	1	2	2	4	0	0	1	0	1
Suspected Foodborne Hepatitis A Outbreaks	0	2	0	0	0	0	0	0	0	0
Total	**0**	**3**	**2**	**2**	**4**	**0**	**0**	**1**	**0**	**1**
Total # Foodborne Outbreaks	**299**	**272**	**268**	**290**	**243**	**185**	**173**	**128**	**142**	**122**
% Outbreak-related Hepatitis A	**0%**	**1.1%**	**0.7%**	**0.7%**	**1.6%**	**0%**	**0%**	**0.7%**	**0%**	**0.8%**

Table 7: Number of Foodborne Outbreak-related Hepatitis A Cases in Florida, 1998- 2007[17]

	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Confirmed Foodborne Hepatitis A Outbreak-related Cases	0	17	23	40	29	0	0	20	0	3
Suspected Foodborne Hepatitis A Outbreak-related Cases	0	12	0	0	0	0	0	0	0	0
Total	**0**	**29**	**23**	**40**	**29**	**0**	**0**	**20**	**0**	**3**
Total # Foodborne Outbreak-related Cases	**3194**	**1463**	**1527**	**1921**	**1466**	**1564**	**1911**	**1944**	**1141**	**852**
% Outbreak-related Hepatitis A Cases	**0%**	**2%**	**1.5%**	**2%**	**2%**	**0%**	**0%**	**1%**	**0%**	**0.3%**

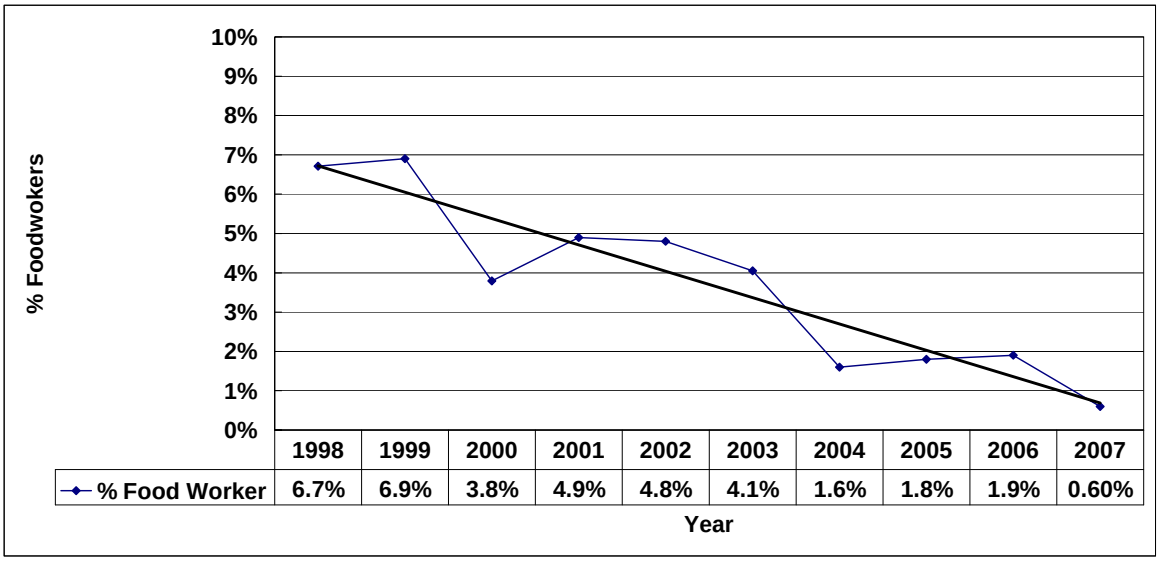
An examination of the total number of reported hepatitis A cases in Florida shows that foodworkers with hepatitis A account for 0.9% of the total confirmed hepatitis A cases statewide (1998- 2007).[18] The percentage of foodworker hepatitis A in Florida shows a downward trend of about 5% from 1998-2007.

Table 8: Percentage of Foodworker Hepatitis A Cases of Total Reported Hepatitis A Cases, Florida, 1997-2007

Statewide Confirmed Hepatitis A Cases	**1998**	**1999**	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**Total**
# Confirmed Cases	611	855	659	990	1239	370	512	654	367	324	6581
# Foodworker Cases	41	59	25	49	59	15	8	12	7	2	277
% Food Worker	6.7%	6.9%	3.8%	4.9%	4.8%	4.1%	1.6%	1.8%	1.9%	0.60%	4.2%

[16] Source: Bureau of Environmental Public Health Medicine, Food and Waterborne Disease Program
[17] Source: Bureau of Environmental Public Health Medicine, Food and Waterborne Disease Program
[18] Source: DOH Merlin Reportable Disease System

Figure 7: Hepatitis A in Florida, Percent Foodworkers of Total Cases, 1998-2007



It is easy to find a job as a foodworker 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, 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.

2007 efforts included:

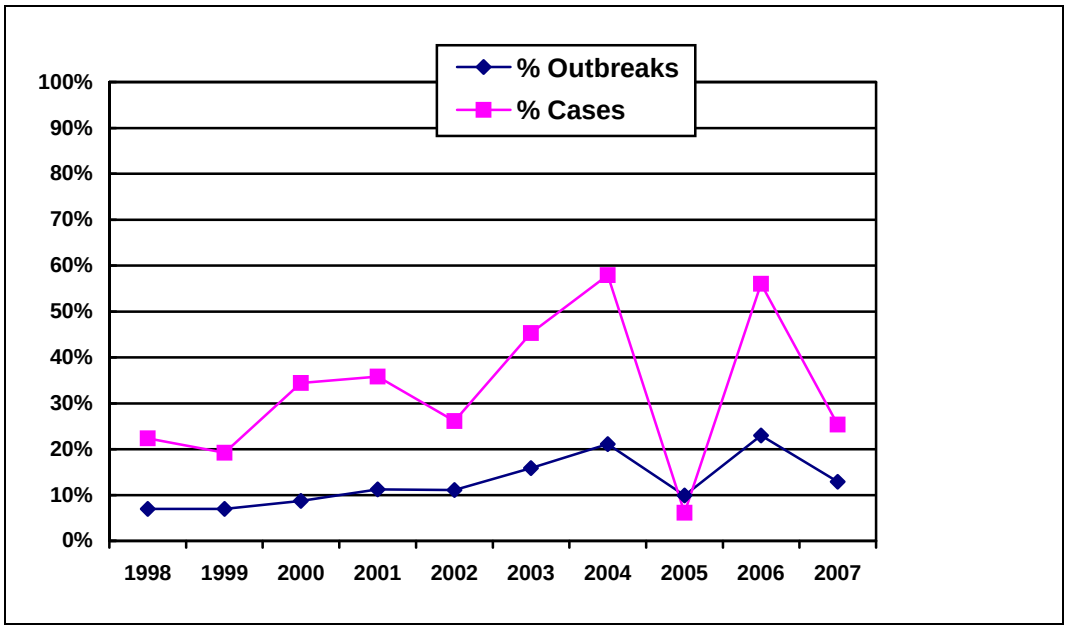
- The national and Central Florida FightBac! campaign sponsored by FDA (website provides materials for educators, the public, media, materials also available in Spanish),
- Food worker training by DBPR, DOH and DOACS, to county health departments, interested community groups, university classes,
- Refresher 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 Epidemiologists 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 Environmental Public Health Medicine 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, 1998-2007

Figure 8: Reported Outbreaks and Outbreak Related Cases of Norovirus Illness, Florida, 1998-2007



Of the estimated 23 million cases of norovirus infections 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.[19]

In Florida, 14% of total food and waterborne outbreaks (1998-2007) or 36% 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 1998-2007, there has been a total of 254 food or waterborne Norovirus outbreaks with 5,708 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.

[19] 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 9: Number of Reported Food and Waterborne Norovirus Outbreaks, Florida, 1998-2007

Outbreaks	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	Total
Suspected	15	14	15	17	18	16	15	4	9	5	128
Confirmed	7	6	10	17	9	14	22	8	21	12	126
Total	**22**	**20**	**25**	**34**	**27**	**30**	**37**	**12**	**30**	**17**	**254**
% of all outbreaks	**7.0%**	**7.0%**	**8.7%**	**11.2%**	**11.1%**	**15.9%**	**21.1%**	**9.5%**	**20.2%**	**12.9%**	**11.5%**

Table 10: Number of Reported Food and Waterborne Norovirus Outbreak-related Cases, Florida, 1998-2007

Outbreak-related Cases	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	Total
Suspected	296	136	154	212	212	438	136	70	169	142	1,965
Confirmed	442	160	450	522	170	311	995	48	538	107	3,743
Total	**738**	**296**	**604**	**734**	**382**	**749**	**1131**	**118**	**707**	**249**	**5,708**
% of all outbreak-related cases	**22.4%**	**19.2%**	**34.4%**	**35.8%**	**26.1%**	**38.3%**	**57.8%**	**5.9%**	**55.9%**	**25.9%**	**31.8%**

Laboratory confirmation was obtained in 74 (29%) 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 CHDs to encourage proper stool sampling procedures. Regional food and waterborne disease epidemiologists are available to present Norovirus training to CHDs, 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, 2007

# Outbreaks	Pathogen	# Cases
1	B. cereus	28
8	Ciguatera	25
4	Cryptosporidium	55
2	E. coli O157:H7	4
1	Hepatitis A	3
1	Legionella	2
3	Naegleria fowleri	3
5	Norovirus	103
8	Salmonella	171
1	Staphylococcus	15
8	V. vulnificus	8
42	**Total**	**417**

Figure 9: Percent Reported Outbreaks (n=42) With Laboratory-Confirmed Etiologic Agents and Percent Cases (n=417) Associated With These Outbreaks, Florida, 2007

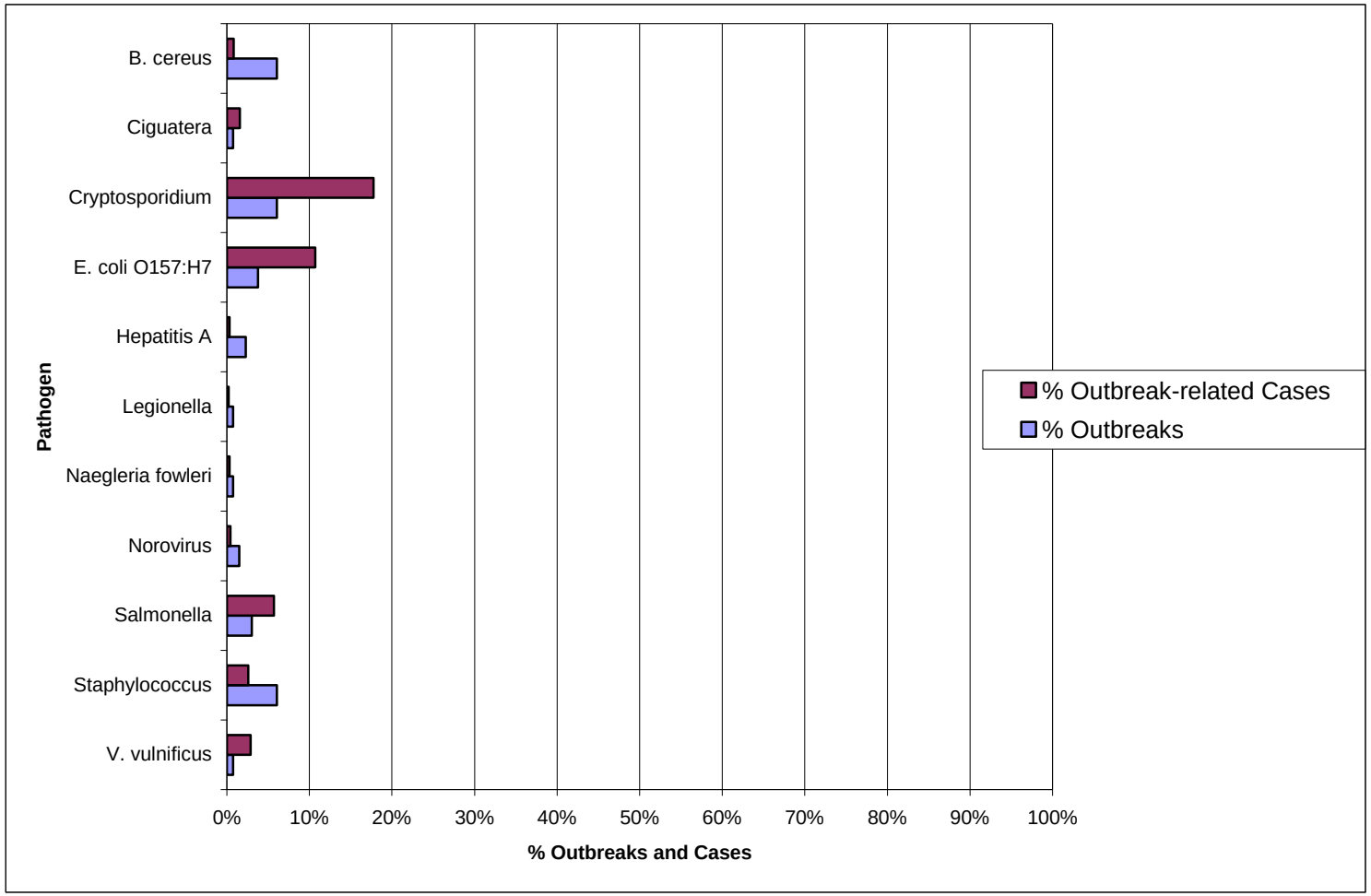
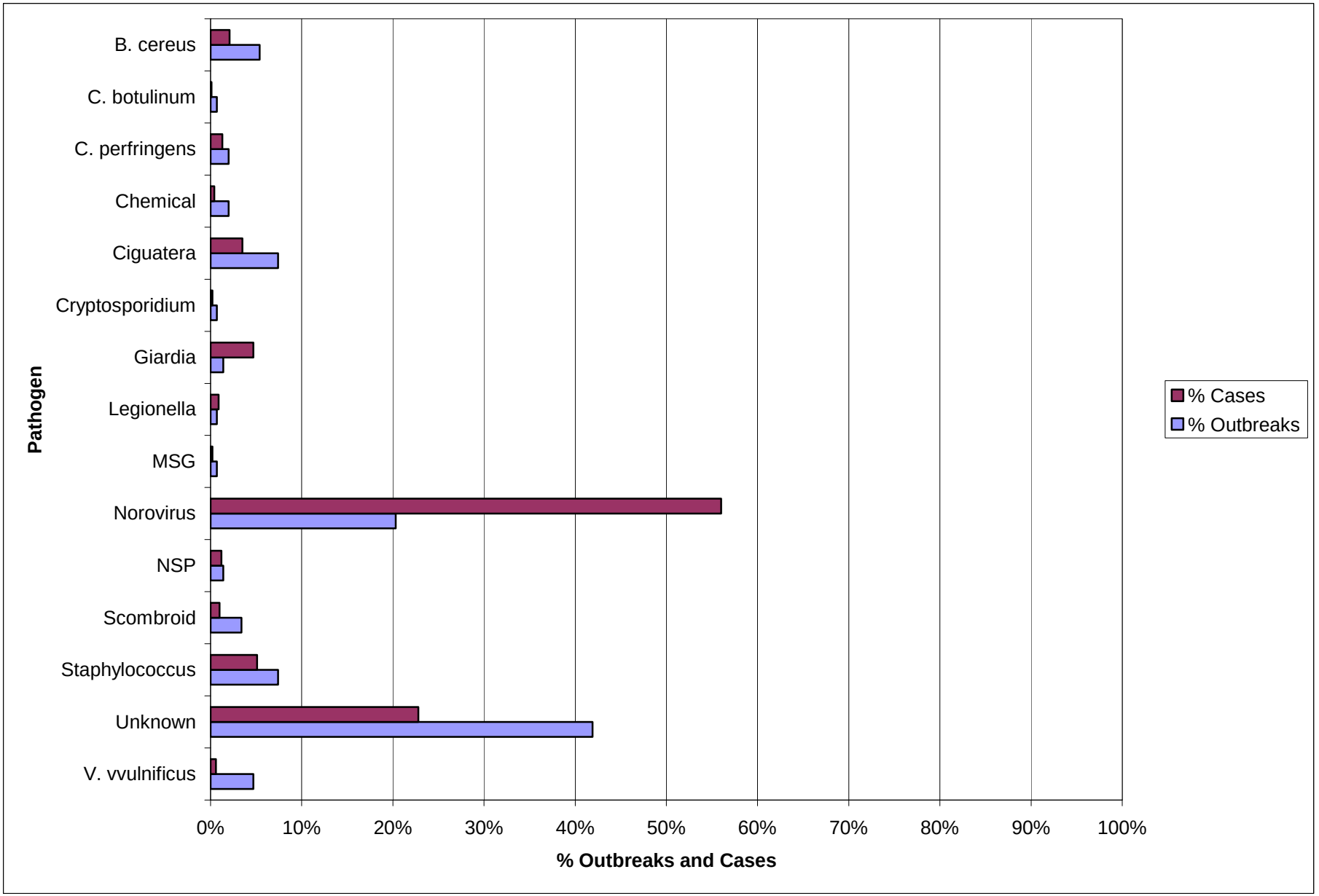
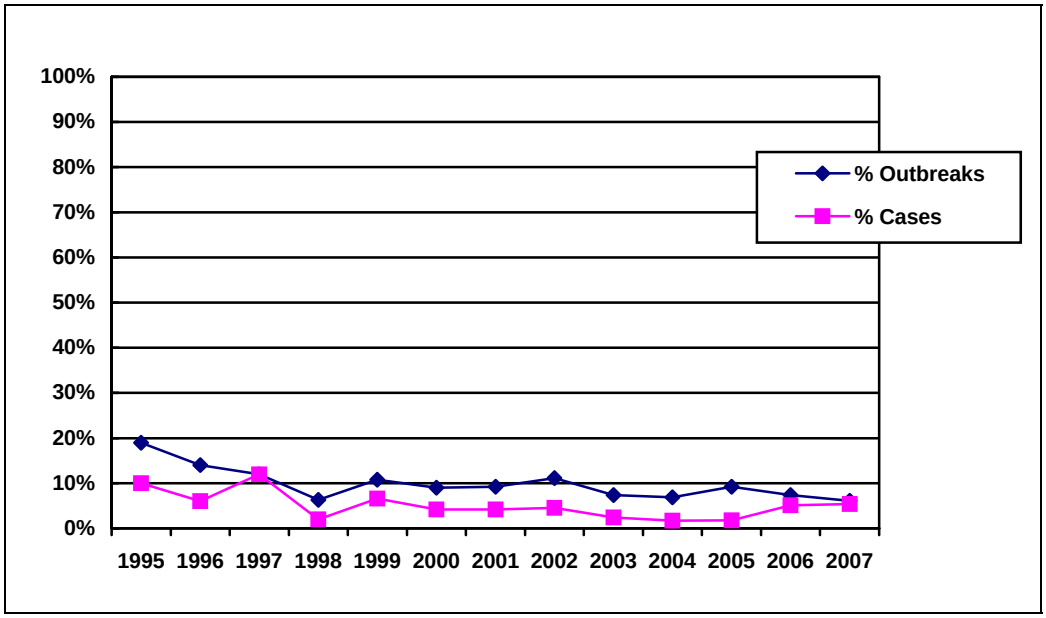


Figure 10: Percent Total Food and Waterborne Disease Outbreaks and Cases by Etiologic Agent, Florida, 2007*



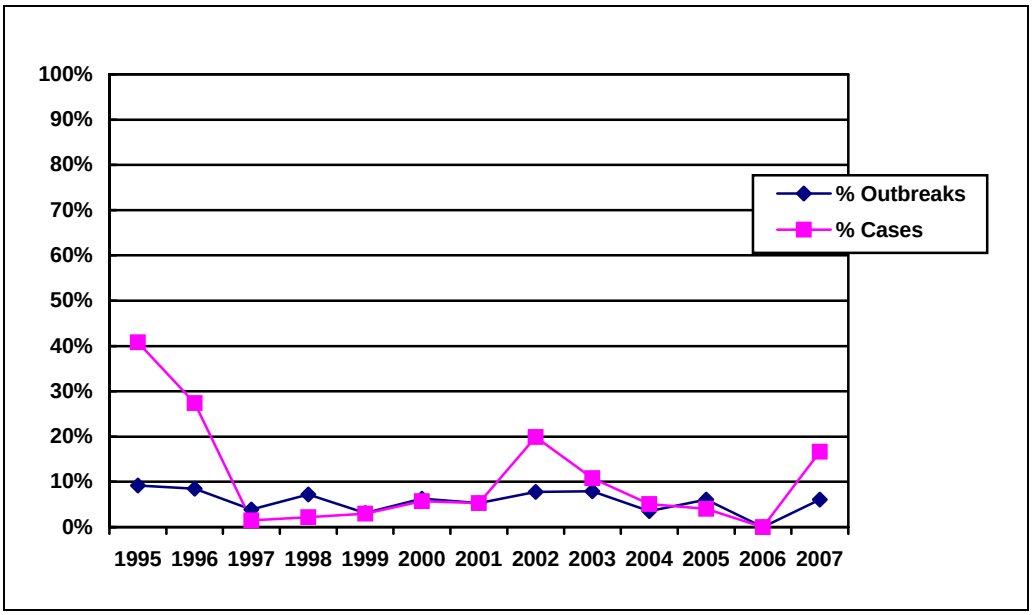
*The etiologic agent was unknown in 39% of the outbreaks and 31% of the cases.

Figure 11: Trends of Staphylococcus in Reported Food and Waterborne Outbreaks and Outbreak-related Cases, Florida, 1995-2007



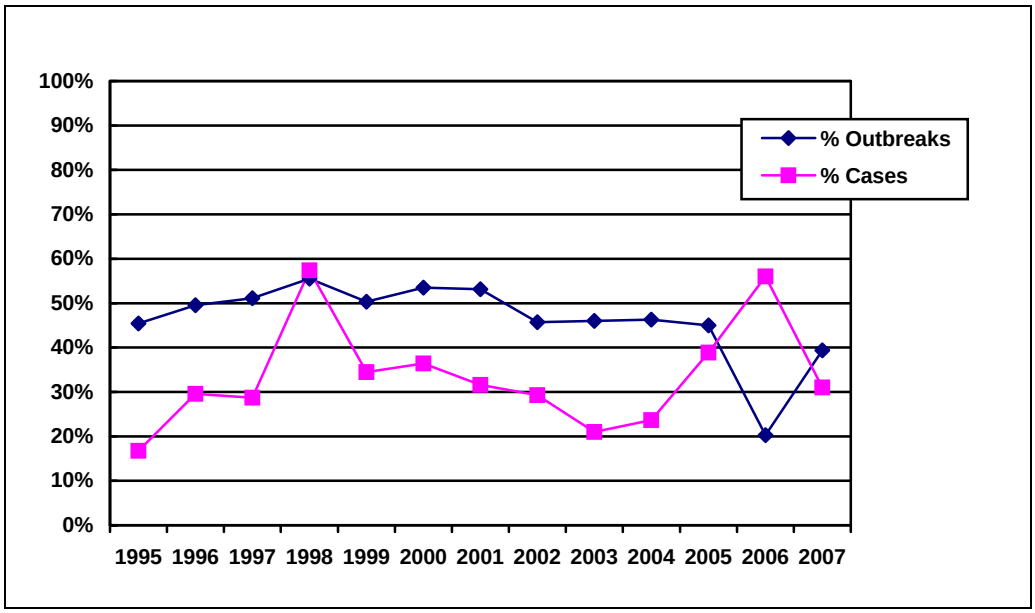
Reported food and waterborne Staphylococcus outbreaks and cases show a slight downward trend over time.

Figure 12: Trends of Salmonella in Reported Food and Waterborne Outbreaks and Outbreak-related Cases, Florida, 1995-2007



Reported food and waterborne Salmonella outbreaks and cases show a very slight downward trend over time with a slight increase in 2007.

Figure 13: Trends of Unknown Pathogens in Reported Food and Waterborne Outbreaks and Outbreak-related Cases, Florida, 1995-2007



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

Figure 14: Percent Total Food and Waterborne Outbreaks and Outbreak-related Cases by Site, Florida, 2007

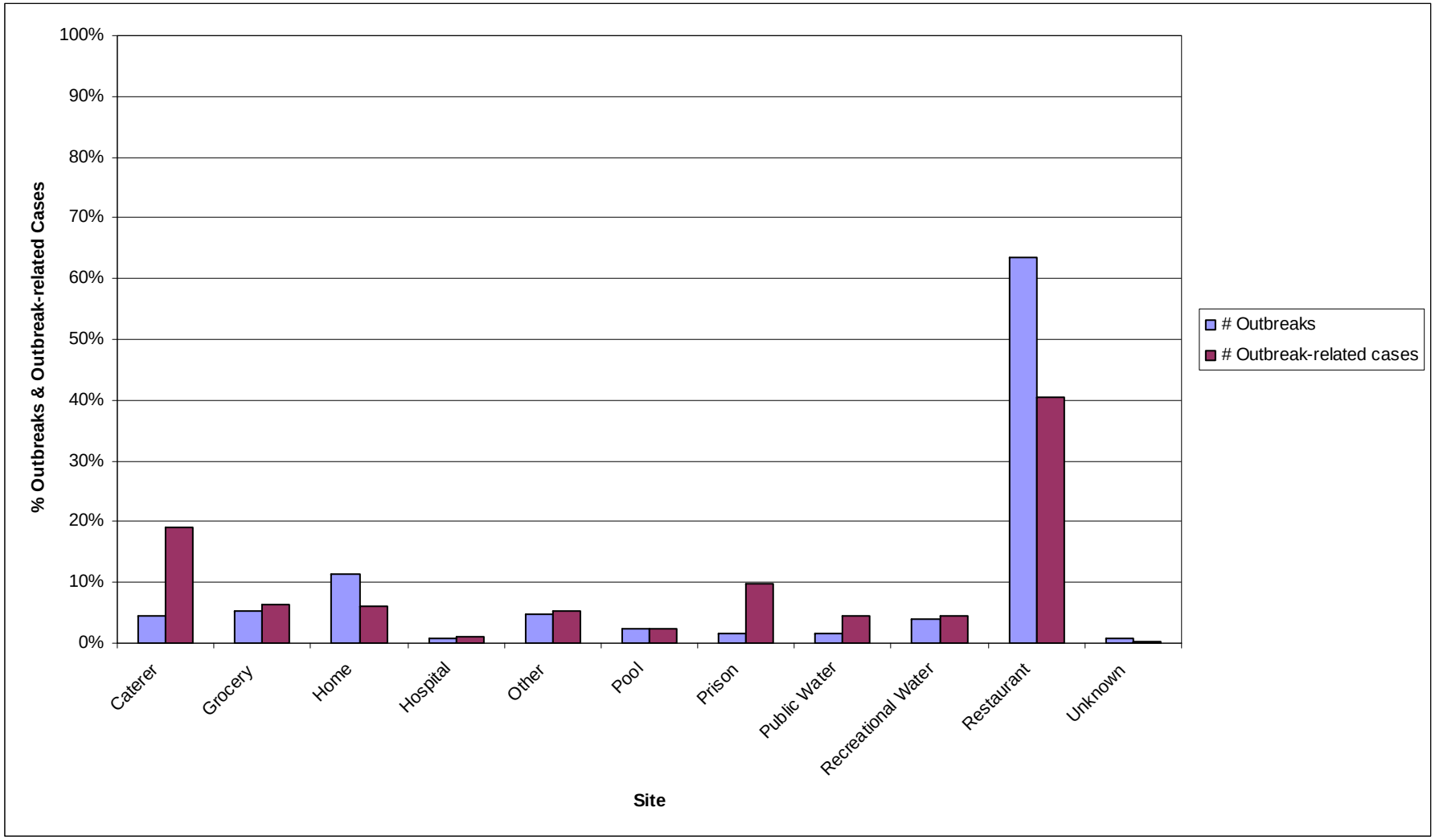


Table 12: Food and Waterborne Outbreaks by Site, Florida, 2007[20]

Status	Caterer	Grocery	Home	Hospital	Other	Pool	Prison	Public Water	Recreational Water	Restaurant	Unknown	Total
Confirmed	5	3	12	1	3	1	2	0	4	16	1	48
row %	10.4%	6.3%	25.0%	2.1%	6.3%	2.1%	4.2%	0.0%	8.4%	33.3%	2.1%	36.4%
col %	83.3%	42.9%	80.0%	100.0%	50.0%	33.3%	100.0%	0.0%	80.0%	19.0%	100.0%	
Suspected	1	4	3	0	3	2	0	2	1	68	0	84
row %	1.2%	4.8%	3.6%	0.0%	3.6%	2.4%	0.0%	2.4%	1.2%	81.0%	0.0%	63.6%
col %	16.7%	57.1%	20.0%	0.0%	50.0%	66.7%	0.0%	100.0%	20.0%	81.0%	0.0%	
Total	**6**	**7**	**15**	**1**	**6**	**3**	**2**	**2**	**5**	**84**	**1**	**132**
% Total	**4.5%**	**5.3%**	**11.4%**	**0.8%**	**4.7%**	**2.3%**	**1.5%**	**1.5%**	**3.9%**	**63.6%**	**0.8%**	

Table 13: Food and Waterborne Outbreak-related Cases by Site, Florida, 2007[21]

Status	Caterer	Grocery	Home	Hospital	Other	Pool	Prison	Public Water	Recreational Water	Restaurant	Unknown	Total
Confirmed	128	48	31	11	40	13	94	0	41	107	2	515
row %	24.9%	9.3%	6.0%	2.1%	7.7%	2.5%	18.3%	0.0%	8.0%	20.8%	0.4%	53.5%
col %	69.9%	78.7%	53.4%	100.0%	76.9%	54.2%	100.0%	0.0%	95.3%	27.4%	100.0%	
Suspected	55	13	27	0	12	11	0	44	2	284	0	448
row %	12.3%	2.9%	6.0%	0.0%	2.7%	2.5%	0.0%	9.8%	0.4%	63.4%	0.0%	46.5%
col %	30.1%	21.3%	46.6%	0.0%	23.1%	45.8%	0.0%	100.0%	4.7%	72.6%	0.0%	
Total	**183**	**61**	**58**	**11**	**52**	**24**	**94**	**44**	**43**	**391**	**2**	**963**
% Total	**19.0%**	**6.3%**	**6.0%**	**1.1%**	**5.3%**	**2.5%**	**9.8%**	**4.6%**	**4.4%**	**40.6%**	**0.2%**	

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

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

Table 14: Food and Waterborne Outbreaks and Cases Reported by Agency of Jurisdiction,[22,23] Florida, 2007

Agency	# Outbreaks	% Outbreaks	# Cases	% Cases
DACS	18	13.6%	96	10.0%
DBPR	88	66.7%	528	54.8%
DEP	1	0.8%	38	3.9%
DOH	11	8.3%	250	26.0%
OTHER	14	10.6%	51	5.3%
Total	**132**	**100.0%**	**963**	**100.0%**

Figure 15: Reported Food and Waterborne Disease Outbreaks by Agency of Jurisdiction, 1995-2007

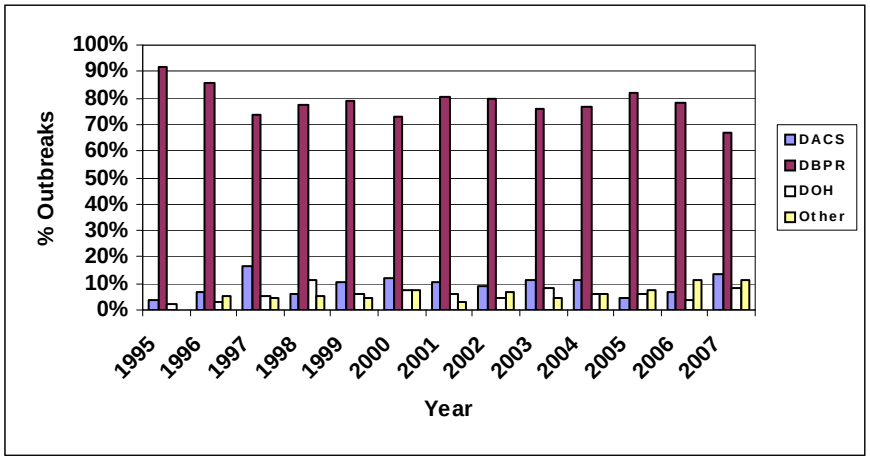
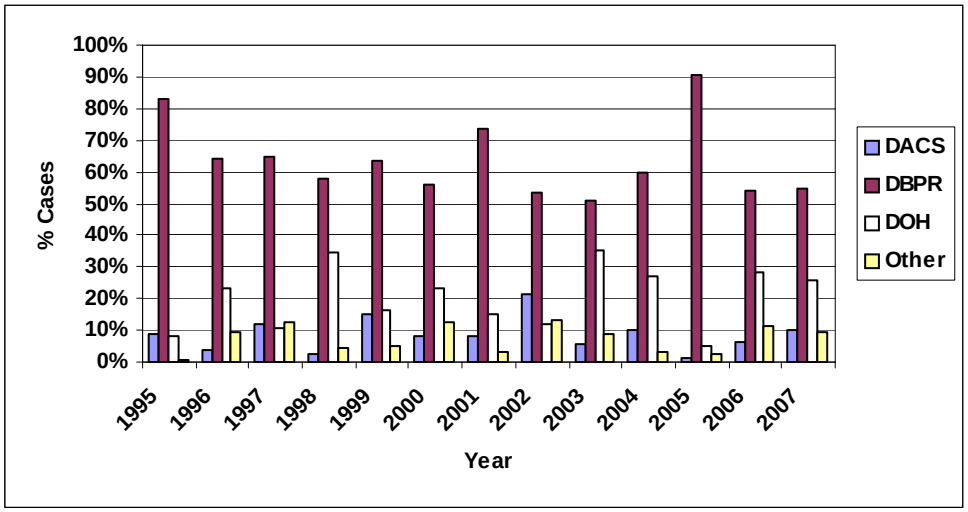


Figure 16: Cases Associated With Reported Food and Waterborne Disease Outbreaks by Agency of Jurisdiction, 1995–2007



[22] 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).
[23] Data from previous years can be found in the 2002 - 2006 Annual Reports.

Figure 17: Percent Total Food and Waterborne Outbreaks and Outbreak-related Cases by Vehicle, Florida, 2007

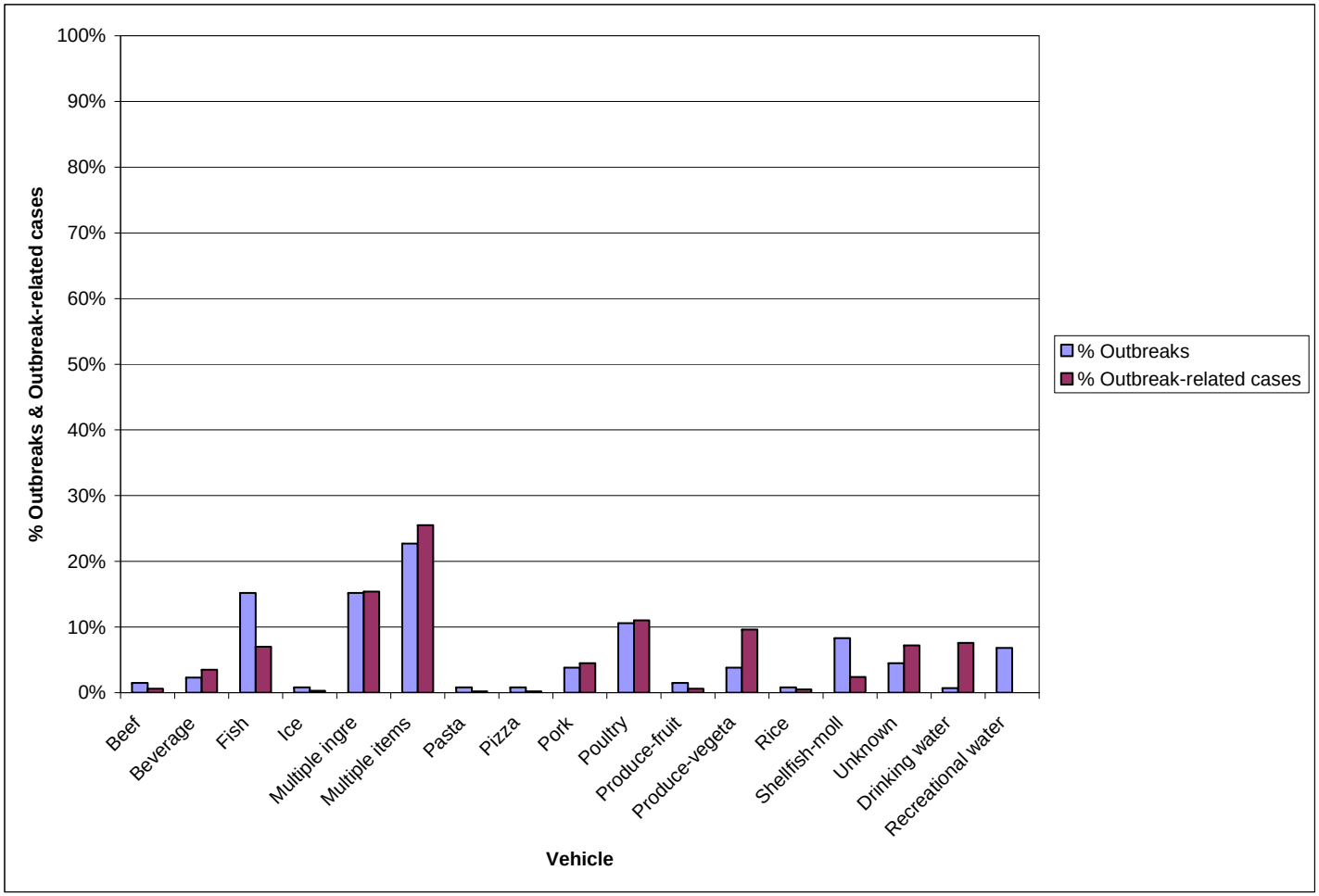


Table 15: Food and Waterborne Outbreaks by Vehicle, Florida, 2007[24]

Status	Beef	Beverage	Fish	Ice	Multiple Ingred.	Multiple Items	Pasta	Pizza	Pork	Poultry	Produce Fruit	Produce Veg.	Rice	Shellfish Molluscan	Unk.	Drinking Water	Recreational Water	Total
Confirmed	0	1	12	0	8	5	0	0	2	2	0	1	0	9	3	0	5	48
	0.0%	2.1%	25.0%	0.0%	16.7%	10.4%	0.0%	0.0%	4.2%	4.2%	0.0%	2.1%	0.0%	18.8%	6.3%	0.0%	10.4%	36.4%
	0.0%	33.3%	60.0%	0.0%	40.0%	16.7%	0.0%	0.0%	40.0%	14.3%	0.0%	20.0%	0.0%	81.8%	50.0%	0.0%	55.6%	
Suspected	2	2	8	1	12	25	1	1	3	12	2	4	1	2	3	1	4	84
	2.4%	2.4%	9.5%	1.2%	14.3%	29.8%	1.2%	1.2%	3.6%	14.3%	2.4%	4.8%	1.2%	2.4%	3.6%	1.2%	4.8%	63.6%
	100.0%	66.7%	40.0%	100.0%	60.0%	83.3%	100.0%	100.0%	60.0%	85.7%	100.0%	80.0%	100.0%	18.2%	50.0%	100.0%	44.4%	
Total	**2**	**3**	**20**	**1**	**20**	**30**	**1**	**1**	**5**	**14**	**2**	**5**	**1**	**11**	**6**	**1**	**9**	**132**
	1.5%	**2.3%**	**15.2%**	**0.8%**	**15.2%**	**22.7%**	**0.8%**	**0.8%**	**3.8%**	**10.6%**	**1.5%**	**3.8%**	**0.8%**	**8.3%**	**4.5%**	**0.7%**	**6.8%**	

Table 16: Food and Waterborne Outbreak-related Cases by Vehicle, Florida, 2007[25]

Status	Beef	Beverage	Fish	Ice	Multiple Ingred.	Multiple Items	Pasta	Pizza	Pork	Poultry	Produce Fruit	Produce Veg.	Rice	Shellfish Molluscan	Unk.	Drinking Water	Recreational Water	Total
Confirmed	0	30	42	0	112	66	0	0	22	46	0	79	0	11	53	54	515	0
	0.0%	5.8%	8.2%	0.0%	21.7%	12.8%	0.0%	0.0%	4.3%	8.9%	0.0%	15.3%	0.0%	2.1%	10.3%	10.5%	53.5%	0.0%
	0.0%	88.2%	62.7%	0.0%	75.7%	26.8%	0.0%	0.0%	51.2%	43.4%	0.0%	85.9%	0.0%	47.8%	76.8%	74.0%		0.0%
Suspected	6	4	25	3	36	180	2	2	21	60	6	13	5	12	16	19	448	6
	1.3%	0.9%	5.6%	0.7%	8.0%	40.2%	0.4%	0.4%	4.7%	13.4%	1.3%	2.9%	1.1%	2.7%	3.6%	4.2%	46.5%	1.3%
	100.0%	11.8%	37.3%	100.0%	24.3%	73.2%	100.0%	100.0%	48.8%	56.6%	100.0%	14.1%	100.0%	52.2%	23.2%	26.0%		100.0%
Total	6	34	67	3	148	246	2	2	43	106	6	92	5	23	69	73	963	6
	0.6%	3.5%	7.0%	0.3%	15.4%	25.5%	0.2%	0.2%	4.5%	11.0%	0.6%	9.6%	0.5%	2.4%	7.2%	7.2%	7.6%	0.6%

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

Table 17: Total Food and Waterborne Outbreaks (n=132), Florida, 2007: Etiologic Agent by Vehicle

Pathogen	Beef	Drinks	Fish	Ice	Multiple Ingred.	Multiple Items	Pasta	Pizza	Pork	Poultry	Produce-Fruit	Produce-Veg.	Rice	Shellfish-Molluscan	Unk	Water-Drinki	Water-Rec.	Total
B. cereus	0	0	0	0	1	5	1	0	0	0	0	1	0	0	0	0	0	8
C. perfringens	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1
Chemical	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2
Ciguatera	0	0	9	0	0	0	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	0	0	0	4	4
E. coli O157:H7	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	2
Gembylotoxin	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Hepatitis A	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Legionella	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
Norovirus	1	1	0	0	3	8	0	0	1	1	0	0	0	1	1	0	0	17
NSP	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1
Naegleria fowleri	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3
Salmonella	0	0	0	0	4	1	0	0	1	1	0	1	0	0	0	0	0	8
Scombroid	0	0	5	0	1	0	0	0	0	0	0	0	0	0	0	0	0	6
Staphylococcus	0	0	0	0	3	3	0	0	1	0	0	0	0	0	1	0	0	8
Unknown	1	0	5	1	6	13	0	1	2	11	2	3	1	1	3	1	1	52
V. vulnificus	0	0	0	0	0	0	0	0	0	0	0	0	0	8	0	0	0	8
Total	**2**	**3**	**20**	**1**	**20**	**30**	**1**	**1**	**5**	**14**	**2**	**5**	**1**	**11**	**6**	**1**	**9**	**132**

Table 18: Total Food and Waterborne Outbreak-related Cases (n=963), Florida, 2007: Etiologic Agent by Vehicle

Pathogen	Beef	Drinks	Fish	Ice	Multiple Ingred.	Multiple Items	Pasta	Pizza	Pork	Poultry	Produce-Fruit	Produce-Veg.	Rice	Shellfish-Molluscan	Unk	Water-Drinki	Water-Rec.	Total
B. cereus	0	0	0	0	2	53	2	0	0	0	0	2	0	0	0	0	0	59
C. perfringens	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	3
Chemical	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	13	14
Ciguatera	0	0	34	0	0	0	0	0	0	0	0	0	0	0	0	0	0	34
Cryptosporidium	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	55	55
E. coli O157:H7	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	4
Gembylotoxin	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4
Hepatitis A	0	3	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	3
Legionella	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7	0	0	2
Norovirus	4	30	0	0	48	117	0	0	6	29	0	0	0	4	0	0	0	245
NSP	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	3
Naegleria fowleri	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3
Salmonella	0	0	0	0	57	5	0	0	7	13	0	79	0	0	0	0	0	161
Scombroid	0	0	12	0	2	0	0	0	0	0	0	0	0	0	5	0	0	14
Staphylococcus	0	0	0	0	16	16	0	0	15	0	0	0	0	0	55	0	0	52
Unknown	2	0	17	3	19	55	0	2	15	61	6	11	5	8	0	38	2	299
V. vulnificus	0	0	0	0	0	0	0	0	0	0	0	0	0	8	0	0	0	8
Total	6	34	67	3	148	246	2	2	43	106	6	92	5	23	69	38	73	963

Table 19: Confirmed Food and Waterborne Outbreaks (n=48), Florida, 2007: Etiologic Agent by Vehicle

Pathogen	Beverage	Fish	Multiple Ingred.	Multiple Items	Pork	Poultry	Produce-Vegetable	Shellfish-Molluscan	Unknown	Water-Recreational	Total
B. cereus	0	0	0	1	0	0	0	0	0	0	1
Chemical	0	0	0	0	0	0	0	0	0	1	1
Ciguatera	0	9	0	0	0	0	0	0	0	0	9
Cryptosporidium	0	0	0	0	0	0	0	0	0	1	1
E. coli O157:H7	0	0	1	0	0	0	0	0	0	0	1
Legionella	0	0	0	0	0	0	0	0	1	0	1
Norovirus	1	0	2	2	0	0	0	0	0	0	5
NSP	0	0	0	0	0	0	0	1	0	0	1
Naegleria fowleri	0	0	0	0	0	0	0	0	0	3	3
Salmonella	0	0	4	1	1	1	1	0	0	0	8
Scombroid	0	3	0	0	0	0	0	0	0	0	3
Staphylococcus	0	0	1	1	1	0	0	0	0	0	3
Unknown	0	0	0	0	0	1	0	0	2	0	3
V. vulnificus	0	0	0	0	0	0	0	8	0	0	8
Total	**1**	**12**	**8**	**5**	**2**	**2**	**1**	**9**	**3**	**5**	**48**

Table 20: Food and Waterborne Outbreak-related Cases (n=515) in Confirmed Outbreaks, Florida, 2007: Etiologic Agent by Vehicle

Pathogen	Beverage	Fish	Multiple Ingred.	Multiple Items	Pork	Poultry	Produce-Vegetable	Shellfish-Molluscan	Unknown	Water-Recreational	Total
B. cereus	0	0	0	28	0	0	0	0	0	0	28
Chemical	0	0	0	0	0	0	0	0	0	13	13
Ciguatera	0	34	0	0	0	0	0	0	0	0	34
Cryptosporidium	0	0	0	0	0	0	0	0	0	38	38
E. coli O157:H7	0	0	2	0	0	0	0	0	0	0	2
Legionella	0	0	0	0	0	0	0	0	2	0	2
Norovirus	30	0	42	24	0	0	0	0	0	0	96
NSP	0	0	0	0	0	0	0	3	0	0	3
Naegleria fowleri	0	0	0	0	0	0	0	0	0	3	3
Salmonella	0	0	57	0	7	13	79	0	0	0	161
Scombroid	0	8	0	0	0	0	0	0	0	0	8
Staphylococcus	0	0	11	0	15	0	0	0	0	0	35
Unknown	0	0	0	0	0	33	0	0	51	0	84
V. vulnificus	0	0	0	0	0	0	0	8	0	0	8
Total	30	42	112	66	22	46	79	11	53	54	515

Table 21: Suspected Food and Waterborne Outbreaks (n=84), Florida, 2007: Etiologic Agent by Vehicle

Pathogen	Beef	Beverage	Fish	Ice	Multiple Ingred.	Multiple Items	Pasta	Pizza	Pork	Poultry	Produce-Fruit	Produce-Veg.	Rice	Shellfish-Molluscan	Unk	Water-Drinking	Water-Rec	Total
B. cereus	0	0	0	0	1	4	1	0	0	0	0	1	0	0	0	0	0	7
C. perfringens	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1
Chemical	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Cryptosporidium	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3
E. coli O157:H7	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
Gembyl.	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Hepatitis A	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Norovirus	1	0	0	0	1	6	0	0	1	1	0	0	0	1	1	0	0	12
Scombroid	0	0	2	0	1	0	0	0	0	0	0	0	0	0	0	0	0	3
Staphylococcus	0	0	0	0	2	2	0	0	0	0	0	0	0	0	1	0	0	5
Unknown	1	0	5	1	6	13	0	1	2	10	2	3	1	1	1	1	1	49
Total	**2**	**2**	**8**	**1**	**12**	**25**	**1**	**1**	**3**	**12**	**2**	**4**	**1**	**2**	**3**	**1**	**4**	**84**

Table 22: Food and Waterborne Outbreak-related Cases (n=448) in Suspected Outbreaks, Florida, 2007: Etiologic Agent by Vehicle

Pathogen	Beef	Beverage	Fish	Ice	Multiple Ingred.	Multiple Items	Pasta	Pizza	Pork	Poultry	Produce-Fruit	Produce-Veg.	Rice	Shellfish-Molluscan	Unk	Water-Drinking	Water-Rec	Total
B. cereus	0	0	0	0	2	25	2	0	0	0	0	2	0	0	0	0	0	31
C. perfringens	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	3
Chemical	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Cryptosporidium	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	17	17
E. coli O157:H7	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	2
Gembyl.	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4
Hepatitis A	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
Norovirus	4	0	0	0	6	93	0	0	6	29	0	0	0	4	7	0	0	149
Scombroid	0	0	4	0	2	0	0	0	0	0	0	0	0	0	0	0	0	6
Staphylococcus	0	0	0	0	5	7	0	0	0	0	0	0	0	0	5	0	0	17
Unknown	2	0	17	3	19	55	0	2	15	28	6	11	5	8	4	38	2	215
Total	6	4	25	3	36	180	2	2	21	60	6	13	5	12	16	38	19	448

Figure 18: Percent Total Food and Waterborne Outbreaks and Cases by Month, Florida, 2007

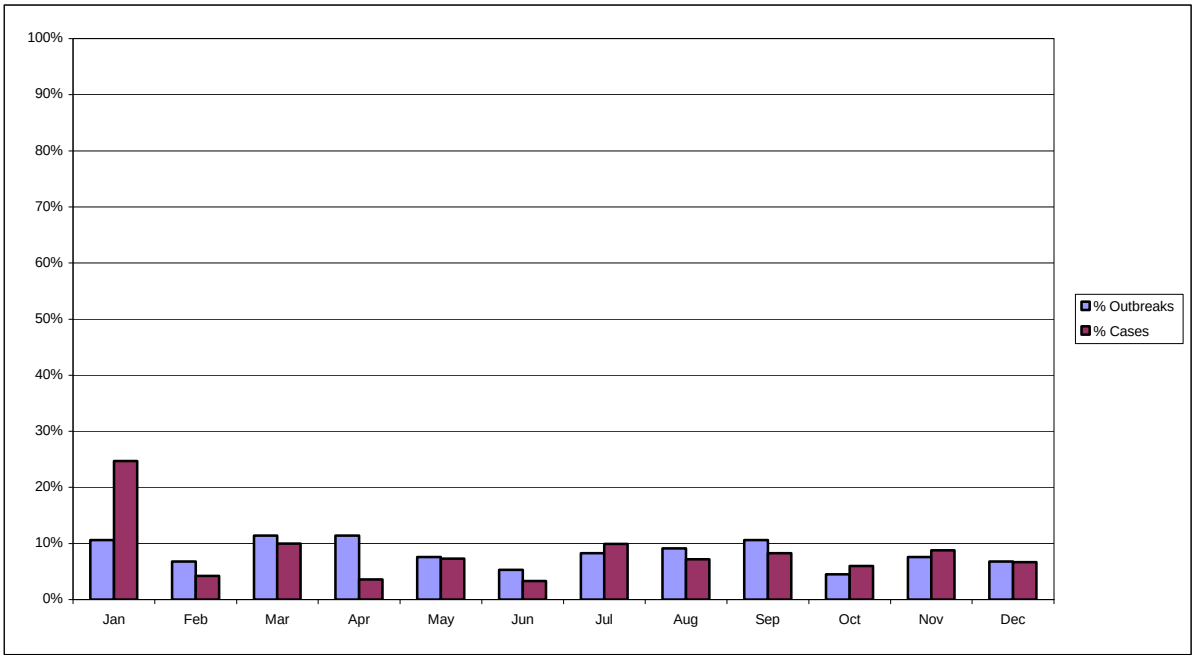


Table 23: Food and Waterborne Outbreaks by Month, Florida, 2007

Status	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Confirmed	8	2	5	5	5	3	3	4	7	0	2	4	48
row%	16.7%	4.2%	10.4%	10.4%	10.4%	6.3%	6.3%	8.3%	14.6%	0.0%	4.2%	8.3%	36.4%
col%	57.1%	22.2%	33.3%	33.3%	50.0%	42.9%	27.3%	33.3%	50.0%	0.0%	20.0%	44.4%	
Suspected	6	7	10	10	5	4	8	8	7	6	8	5	84
row%	7.1%	8.3%	11.9%	11.9%	6.0%	4.8%	9.5%	9.5%	8.3%	7.1%	9.5%	6.0%	63.6%
col%	42.9%	77.8%	66.7%	66.7%	50.0%	57.1%	72.7%	66.7%	50.0%	100.0%	80.0%	55.6%	
Total	**14**	**9**	**15**	**15**	**10**	**7**	**11**	**12**	**14**	**6**	**10**	**9**	**132**
Total %	**10.6%**	**6.8%**	**11.4%**	**11.4%**	**7.6%**	**5.3%**	**8.3%**	**9.1%**	**10.6%**	**4.5%**	**7.6%**	**6.8%**	

Table 24: Food and Waterborne Outbreak-related Cases by Month, Florida, 2007

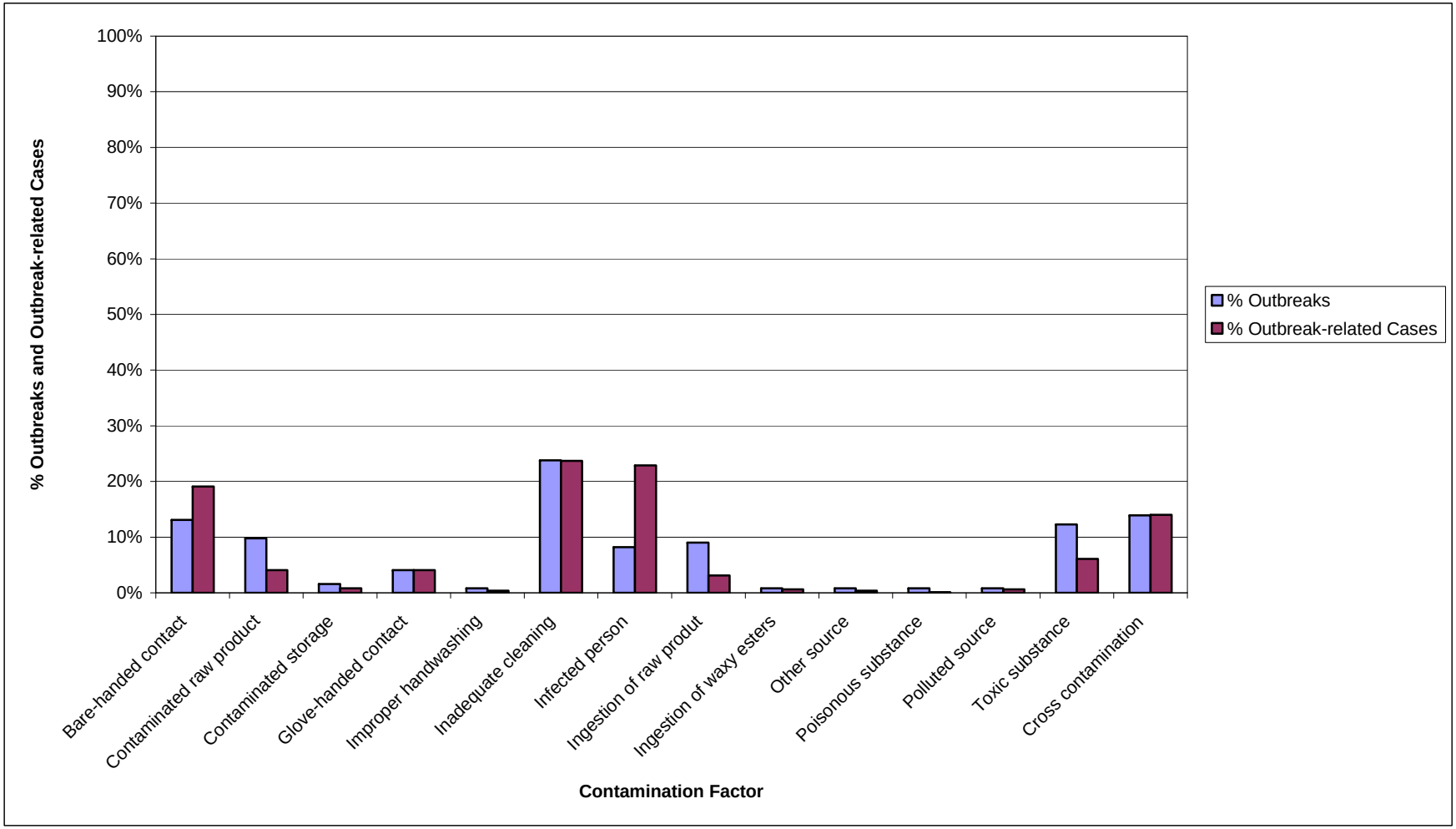
Status	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Confirmed	155	19	48	5	43	17	68	30	24	0	56	50	515
row%	30.1%	3.7%	9.3%	1.0%	8.3%	3.3%	13.2%	5.8%	4.7%	0.0%	10.9%	9.7%	53.5%
col%	65.1%	47.5%	50.0%	14.3%	61.4%	53.1%	71.6%	43.5%	30.0%	0.0%	65.9%	76.9%	
Suspected	83	21	48	30	27	15	27	39	56	58	29	15	448
row%	18.5%	4.7%	10.7%	6.7%	6.0%	3.3%	6.0%	8.7%	12.5%	12.9%	6.5%	3.3%	46.5%
col%	34.9%	52.5%	50.0%	85.7%	38.6%	46.9%	28.4%	56.5%	70.0%	100.0%	34.1%	23.1%	
Total	238	40	96	35	70	32	95	69	80	58	85	65	963
Total %	24.7%	4.2%	10.0%	3.6%	7.3%	3.3%	9.9%	7.2%	8.3%	6.0%	8.8%	6.7%	

Table 25: Food and Waterborne Outbreaks With Greater Than 10 Cases (n=23), Florida, 2007[26]

Outbreak Status	County	# Cases	Site	Specific Vehicle	Pathogen	Pathogen Status
Suspected	Broward	13	Home	Multiple items	Norovirus	Suspected
Suspected	Pinellas	13	Restaurant	BBQ pork	Unknown	Unknown
Suspected	Hillsborough	15	Restaurant	Yellow rice, black beans & roast pork	B. cereus	Suspected
Suspected	Broward	16	Restaurant	Multiple items	Norovirus	Confirmed
Suspected	Charlotte	29	Restaurant	Stuffed chicken breast cordon bleu	Norovirus	Suspected
Suspected	Palm Beach	38	Public Water	Drinking water	Unknown	Unknown
Suspected	Hernando	55	Caterer	Multiple foods	Norovirus	Confirmed
Confirmed	Dade	11	Hospital	Stuffing	Staphylococcus	Suspected
Confirmed	Pasco	12	Grocery	Peanut butter	Salmonella	Confirmed
Confirmed	Palm Beach	13	Caterer	Turkey drumstick	Salmonella	Confirmed
Confirmed	Osceola	13	Pool	Public swimming pool	Chemical	Suspected
Confirmed	Lee	14	Restaurant	Ranch dressing	Salmonella	Confirmed
Confirmed	Highlands	15	Restaurant	Greek salad house salad lettuce	Norovirus	Suspected
Confirmed	Calhoun	15	Prison	Smoked pork	Staphylococcus	Confirmed
Confirmed	Highlands	16	Caterer	Chicken salad	Norovirus	Confirmed
Confirmed	Pasco	26	Caterer	Pasta salad	Norovirus	Suspected
Confirmed	Palm Beach	28	Caterer	Multiple items	B. Cereus	Confirmed
Confirmed	Dade	29	Restaurant	Imperial rice (rice and chicken)	Salmonella	Confirmed
Confirmed	Nassau	30	Shrimp Festival	Lemonade	Norovirus	Suspected
Confirmed	Orange	33	Grocery	Roasted chicken	Unknown	Unknown
Confirmed	Indian River	38	Interactive Water Fountain	Interactive water fountain	Cryptosporidium	Confirmed
Confirmed	Escambia	45	Caterer	Undetermined	Unknown	Unknown
Confirmed	Escambia	79	Prison	Mashed potatoes	Salmonella	Confirmed

[26] The total number of outbreaks with more than ten cases is: 23 (17.4% of the total). The total number of cases associated with these outbreaks is 596 (61.9% of the total).

Figure 19: Contamination Factor – Percent Total Foodborne Outbreaks (n=122) and Outbreak-related Cases (n=852), Florida, 2007 [27]



[27] Each outbreak may have up to three contamination factors (see Appendix B) and page 8, thus the numbers and percentages will not add up to the actual number of outbreaks and outbreak-related cases.

Table 26: Contamination Factor - Number of Foodborne Outbreaks (n=122) and Outbreak-related Cases (n=852), Florida, 2007

Contamination Factor	# Outbreaks	# Outbreak-related Cases
Bare-handed contact	16	137
Contaminated raw product	12	29
Contaminated storage	2	6
Glove-handed contact	5	29
Improper handwashing	1	3
Inadequate cleaning	29	170
Infected person	10	164
Ingestion of raw product	11	22
Ingestion of waxy esters	1	4
Other source	1	3
Poisonous substance	1	1
Polluted source	1	4
Toxic substance	15	44
Cross contamination	17	100

Table 27: Contamination Factor: Percent of Total Foodborne Outbreaks (n=122) and Outbreak-related Cases (n=852), Florida, 2007

Contamination Factor	% Outbreaks	% Outbreak-related Cases
Bare-handed contact	13.1%	19.1%
Contaminated raw product	9.8%	4.1%
Contaminated storage	1.6%	0.8%
Glove-handed contact	4.1%	4.1%
Improper handwashing	0.8%	0.4%
Inadequate cleaning	23.8%	23.7%
Infected person	8.2%	22.9%
Ingestion of raw product	9.0%	3.1%
Ingestion of waxy esters	0.8%	0.6%
Other source	0.8%	0.4%
Poisonous substance	0.8%	0.1%
Polluted source	0.8%	0.6%
Toxic substance	12.3%	6.1%
Cross contamination	13.9%	14.0%

Table 28: Contamination Factor: Number of Foodborne Outbreaks (n=122) by Vehicle, Florida 2007

Contamination Factor	Beef	Beverage	Fish	Ice	Multiple ingredients	Multiple items	Pizza	Pork	Poultry	Produce-fruit	Produce-vegetable	Shellfish-molluscan	Unknown	Total
Bare-handed contact	0	1	1	0	2	6	0	0	3	0	2	0	1	16
Contaminated raw product	0	0	1	0	1	0	0	0	1	0	0	0	0	3
Contaminated source	0	0	0	0	1	1	0	0	0	0	0	0	0	2
Glove-handed contact	0	0	0	0	2	2	0	1	0	0	0	0	0	5
Improper handwashing	0	0	0	0	1	0	0	0	0	0	0	0	0	1
Inadequate cleaning	1	1	0	1	4	10	1	3	5	1	2	0	0	29
Infected person	1	1	0	0	5	1	0	1	0	0	0	0	1	10
Ingestion of raw product	0	0	0	0	0	1	0	0	0	0	0	10	0	11
Ingestion of waxy esters	0	0	1	0	0	0	0	0	0	0	0	0	0	1
Other source	0	0	0	0	0	0	0	0	0	0	0	1	0	1
Poisonous substance	0	1	0	0	0	0	0	0	0	0	0	0	0	1
Toxic substance	0	0	13	0	1	0	0	0	0	0	0	1	0	15
Cross contamination	0	0	2	0	3	2	0	2	5	1	2	0	0	17
Contaminated raw product	0	0	0	0	0	0	0	0	0	0	0	9	0	9
Polluted source	0	0	0	0	0	0	0	0	0	0	0	1	0	1
Total	**2**	**4**	**18**	**1**	**20**	**23**	**1**	**7**	**14**	**2**	**6**	**22**	**2**	**122**

Table 29: Contamination Factor: Number of Foodborne Outbreak-related Cases (n=852) by Vehicle, Florida 2007

Contamination Factor	Beef	Beverage	Fish	Ice	Multiple ingredients	Multiple items	Pizza	Pork	Poultry	Produce-fruit	Produce-vegetable	Shellfish-molluscan	Unknown	Total
Bare-handed contact	0	3	2	0	18	19	0	0	9	0	81	0	5	137
Contaminated raw product	0	0	2	0	2	0	0	0	13	0	0	12	0	29
Contaminated substance	0	0	0	0	3	3	0	0	0	0	0	0	0	6
Glove-handed contact	0	0	0	0	10	17	0	2	0	0	0	0	0	29
Improper handwashing	0	0	0	0	3	0	0	0	0	0	0	0	0	3
Inadequate cleaning	4	3	0	3	24	59	2	22	44	2	7	0	0	170
Infected person	4	30	0	0	51	55	0	15	0	0	0	0	0	155
Ingestion of raw product	0	0	0	0	0	2	0	0	0	0	0	20	0	22
Ingestion of waxy esters	0	0	4	0	0	0	0	0	0	0	0	0	0	4
Other source	0	0	0	0	0	0	0	0	0	0	0	3	0	3
Poisonous substance	0	1	0	0	0	0	0	0	0	0	0	0	0	1
Toxic substance	0	0	39	0	2	0	0	0	0	0	0	3	0	44
Cross contamination	0	0	4	0	16	6	0	20	44	4	6	0	0	100
Infected person	0	0	0	0	4	0	0	0	0	0	0	0	5	9
Polluted source	0	0	0	0	0	0	0	0	0	0	0	4	0	4
Total	**8**	**37**	**51**	**3**	**133**	**161**	**2**	**59**	**110**	**6**	**94**	**42**	**10**	**716**

Table 30: Contamination Factor: Number of Foodborne Outbreaks (n=122) by Pathogen, Florida 2007

Pathogen	B. cereus	Chemical	Ciguatera	Hepatitis A	Norovirus	NSP	Salmonella	Scombroid	Staph	Unk	V. vulnificus	Gembylotoxin	Total
Bare-handed contact	0	0	0	1	1	0	2	0	4	8	0	0	16
Contaminated raw product	0	0	0	0	1	0	2	0	0	1	8	0	12
Contaminated source	0	0	0	0	0	0	0	0	0	2	0	0	2
Glove-handed contact	0	0	0	0	3	0	0	0	0	2	0	0	5
Improper handwashing	0	0	0	0	0	0	0	0	1	0	0	0	1
Inadequate cleaning	3	0	0	1	4	0	3	0	1	17	0	0	29
Infected person	0	0	0	0	6	0	0	0	3	1	0	0	10
Ingestion of raw product	0	0	0	0	1	0	0	0	0	2	8	0	11
Ingestion of waxy esters	0	0	0	0	0	0	0	0	0	0	0	1	1
Other source	0	0	0	0	0	1	0	0	0	0	0	0	1
Poisonous substance	0	1	0	0	0	0	0	0	0	0	0	0	1
Toxic substance	0	0	8	0	0	1	0	6	0	0	0	0	15
Cross contamination	0	0	0	0	0	0	3	0	0	14	0	0	15
Polluted source	0	0	0	0	1	0	0	0	0	0	0	0	1
Total	**3**	**1**	**8**	**2**	**17**	**2**	**10**	**6**	**9**	**47**	**16**	**1**	**122**

Table 31: Contamination Factor: Number of Foodborne Outbreak-related Cases (n=852) by Pathogen, Florida 2007

Pathogen	B. cereus	Chemical	Ciguatera	Hepatitis A	Norovirus	NSP	Salmonella	Scombroid	Staph	Unk	V. vulnificus	Gembylotoxin	Total
Bare-handed contact	0	0	0	3	16	0	84	0	14	20	0	0	137
Contaminated raw product	0	0	0	0	4	0	15	0	0	2	8	0	29
Contaminated source	0	0	0	0	0	0	0	0	0	6	0	0	6
Glove-handed contact	0	0	0	0	23	0	0	0	0	6	0	0	29
Improper handwashing	0	0	0	0	0	0	0	0	3	0	0	0	3
Inadequate cleaning	20	0	0	3	37	0	14	0	5	91	0	0	170
Infected person	0	0	0	0	137	0	0	0	23	4	0	0	164
Ingestion of raw product	0	0	0	0	4	0	0	0	0	10	8	0	22
Ingestion of waxy esters	0	0	0	0	0	0	0	0	0	0	0	4	4
Other source	0	0	0	0	0	3	0	0	0	0	0	0	3
Poisonous substance	0	1	0	0	0	0	0	0	0	0	0	0	1
Toxic substance	0	0	27	0	0	3	0	14	0	0	0	0	44
Cross contamination	0	0	0	0	0	0	21	0	0	79	0	0	100
Polluted source	0	0	0	0	4	0	0	0	0	0	0	0	4
Total	**20**	**1**	**27**	**6**	**225**	**6**	**134**	**14**	**45**	**218**	**16**	**4**	**716**

Figure 20: Proliferation/Amplification Factor: Percent Total Foodborne Outbreaks (n=122) and Outbreak-related Cases (n=852), Florida, 2007[28]

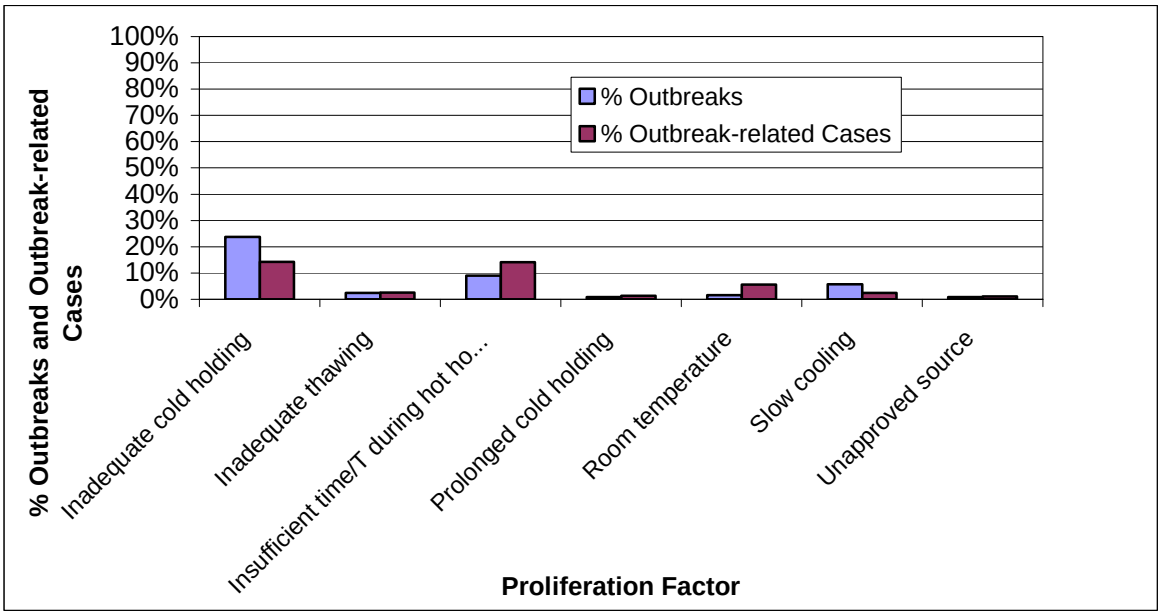


**Table 32: Proliferation/Amplification Factor:
Number of Foodborne Outbreaks (n=122) and Outbreak-related Cases (n=852), Florida, 2007**

Proliferation Factor	# Outbreaks	# Outbreak-related Cases
Inadequate cold holding	29	121
Inadequate thawing	3	22
Insufficient time/T during hot holding	11	120
Prolonged cold holding	1	11
Room temperature	2	48
Slow cooling	7	21
Unapproved source	1	9

**Table 33: Proliferation/Amplification Factor:
Percent Total Foodborne Outbreaks (n=122) and Outbreak-related Cases (n=852), Florida, 2007**

Proliferation Factor	% Outbreaks	% Outbreak-related Cases
Inadequate cold holding	23.8%	14.2%
Inadequate thawing	2.5%	2.6%
Insufficient time/T during hot holding	9.0%	14.1%
Prolonged cold holding	0.8%	1.3%
Room temperature	1.6%	5.6%
Slow cooling	5.7%	2.5%
Unapproved source	0.8%	1.1%

[28] Each outbreak may have up to three proliferation/amplification factors (see Appendix B and page 8), thus the numbers and percentages will not add up to the actual number of outbreaks and outbreak-related cases.

Table 34: Proliferation/Amplification Factor: Number of Foodborne Outbreaks (n=122) by Vehicle, Florida 2007

Proliferation	Fish	Multiple Ingredients	Multiple Items	Pasta	Pork	Poultry	Produce-Vegetable	Total
Unapproved source	0	0	1	0	0	0	0	1
Inadequate cold holding	4	5	10	1	3	4	2	29
Inadequate thawing	0	1	2	0	0	0	0	3
Insufficient time/T hot holding	0	2	6	0	1	1	1	11
Prolonged cold holding	0	1	0	0	0	0	0	1
Room temperature	0	0	0	0	1	1	0	2
Slow cooling	0	2	2	0	1	0	2	7
Total	**4**	**11**	**21**	**1**	**6**	**6**	**5**	**54**

Table 35: Proliferation/Amplification Factor: Number of Foodborne Outbreak-related Cases (n=852) by Vehicle, Florida 2007

Proliferation	Fish	Multiple Ingredients	Multiple Items	Pasta	Pork	Poultry	Produce-Vegetable	Total
Unapproved source	0	0	9	0	0	0	0	9
Inadequate cold holding	9	15	45	2	30	11	9	121
Inadequate thawing	0	2	20	0	0	0	0	22
Insufficient time/T hot holding	0	6	18	0	15	2	79	120
Prolonged cold holding	0	11	0	0	0	0	0	11
Room temperature	0	0	0	0	15	33	0	48
Slow cooling	0	6	9	0	2	0	4	21
Total	9	40	101	2	62	46	92	352

Table 36: Proliferation/Amplification Factor: Number of Foodborne Outbreaks (n=122) by Etiologic Agent, Florida 2007

Proliferation Factor	*B. cereus*	Salmonella	Scombroid	Staphylococcus	Unknown	Total
Unapproved source	0	0	0	1	0	1
Inadequate cold holding	3	1	3	5	17	29
Inadequate thawing	1	0	1	1	0	3
Insufficient time/T hot holding	1	3	0	2	5	11
Prolonged cold holding	0	0	0	1	0	1
Room T	0	0	0	1	1	2
Slow cooling	1	0	0	2	4	7
Total	**6**	**4**	**4**	**13**	**27**	**54**

Table 37: Proliferation/Amplification Factor: Number of Foodborne Outbreak-related Cases (n=852) by Etiologic Agent, Florida 2007

Proliferation Factor	*B. cereus*	Salmonella	Scombroid	Staphylococcus	Unknown	Total
Unapproved source	0	0	0	9	0	9
Inadequate cold holding	19	5	7	27	63	121
Inadequate thawing	15	0	2	5	0	22
Insufficient time/T hot holding	2	89	0	17	12	120
Prolonged cold holding	0	0	0	11	0	11
Room T	0	0	0	15	33	48
Slow cooling	2	0	0	7	12	21
Total	**38**	**94**	**9**	**91**	**120**	**352**

Figure 21: Survival Factor: Percent Total Foodborne Outbreaks (n=122) and Outbreak-related Cases (n=852), Florida, 2007[29]

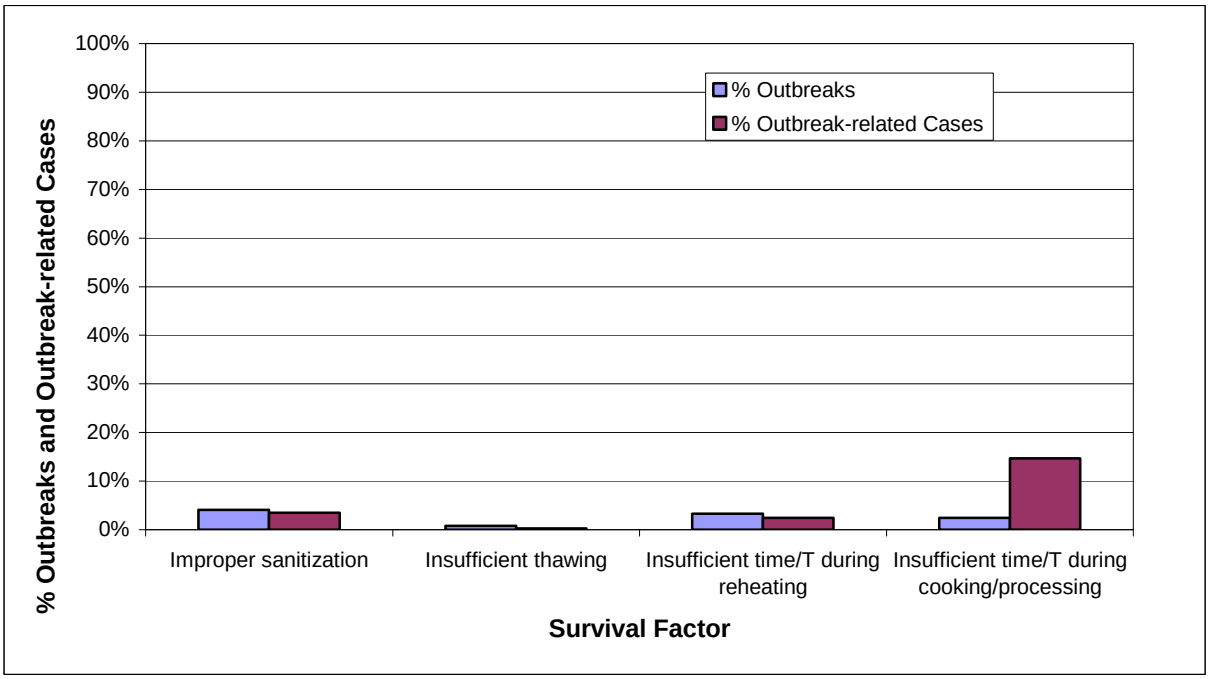


Table 38: Survival Factor:
Number of Foodborne Outbreaks (n=122) and Outbreak-related Cases (n=852), Florida, 2007

Survival Factor	# Outbreaks	# Outbreak-related Cases
Improper sanitization	5	30
Insufficient thawing	1	2
Insufficient time/T during reheating	4	21
Insufficient time/T during cooking/processing	3	125

Table 39: Survival Factor:
Percent Total Foodborne Outbreaks (n=122) and Outbreak-related Cases (n=852), Florida, 2007

Survival Factor	% Outbreaks	% Outbreak-related Cases
Improper sanitization	4.1%	3.5%
Insufficient thawing	0.8%	0.2%
Insufficient time/T during reheating	3.3%	2.5%
Insufficient time/T during cooking/processing	2.5%	14.7%

[29] Each outbreak may have up to three survival factors (see Appendix B and page 8), thus the numbers and percentages will not add up to the actual number of outbreaks and outbreak-related cases.

Table 40: Survival Factor: Number of Foodborne Outbreaks (n=122) by Vehicle, Florida 2007

Survival Factor	Fish	Multiple Ingredients	Multiple Items	Pasta	Pork	Poultry	Produce-Vegetable	Total
Improper sanitization	0	1	3	1	0	0	0	5
Insufficient thawing then insufficient cooking	0	0	1	0	0	0	0	1
Insufficient time/T during cooking	0	0	0	0	0	2	1	3
Insufficient time/T during reheating	1	0	1	0	1	0	1	4
Total	**1**	**1**	**5**	**1**	**1**	**2**	**2**	**13**

Table 41: Survival Factor: Number of Foodborne Outbreak-related Cases (n=852) by Vehicle, Florida 2007

Survival Factor	Fish	Multiple Ingredients	Multiple Items	Pasta	Pork	Poultry	Produce-Vegetable	Total
Improper sanitization	0	4	24	2	0	0	0	30
Insufficient thawing then insufficient cooking	0	0	2	0	0	0	0	2
Insufficient time/T during cooking	0	0	0	0	0	46	79	125
Insufficient time/T during reheating	2	0	2	0	15	0	2	21
Total	**2**	**4**	**28**	**2**	**15**	**46**	**81**	**178**

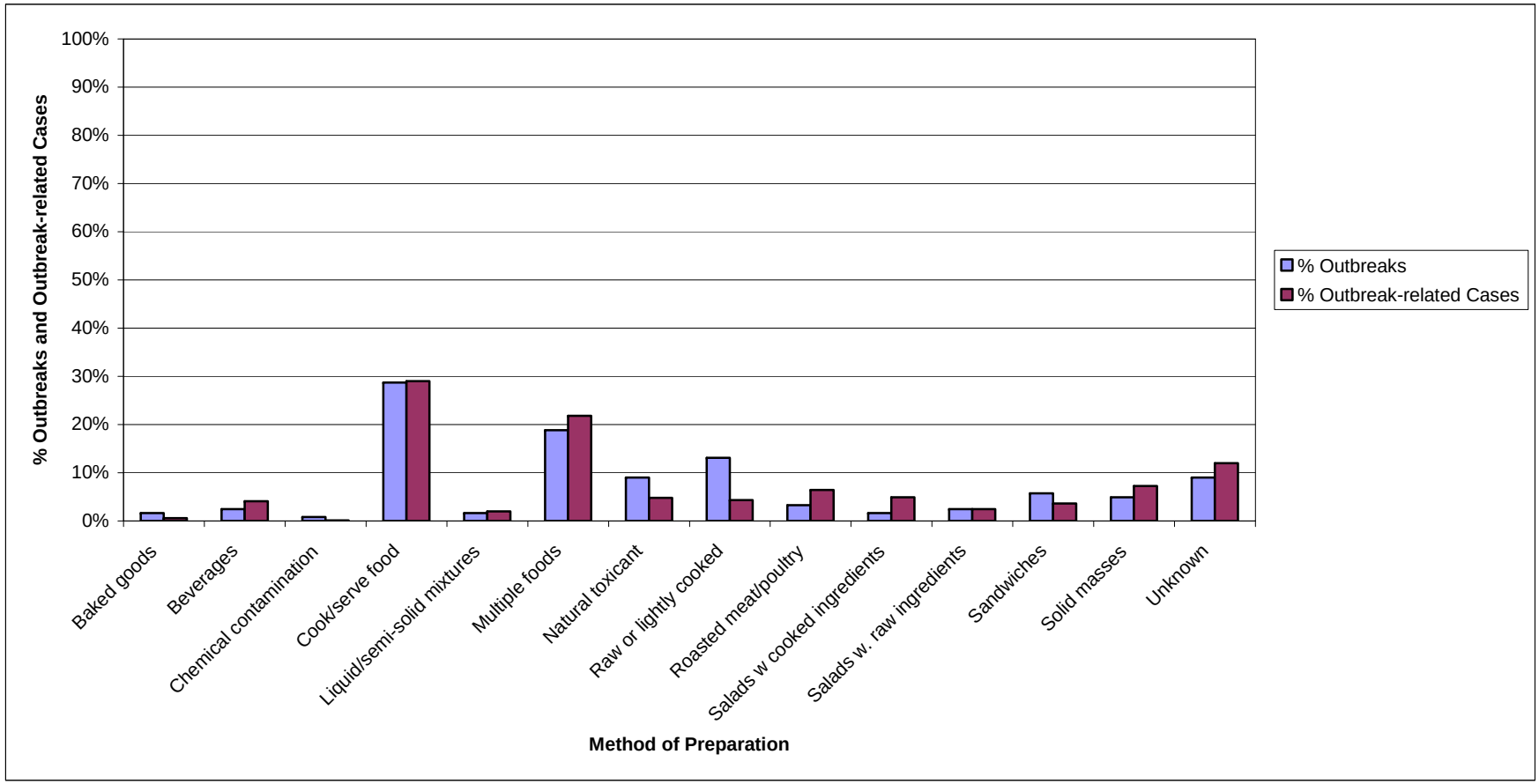
Table 42: Survival Factor: Number of Foodborne Outbreaks (n=122) by Etiologic Agent, Florida 2007

Survival Factor	B. cereus	Salmonella	Staphylococcus	Unknown	Total
Improper sanitization	2	0	1	3	6
Insufficient thawing then insufficient cooking	1	0	0	0	1
Insufficient time/T during cooking	0	2	0	1	3
Insufficient time/T during reheating	1	0	0	0	1
Total	**4**	**2**	**1**	**4**	**11**

Table 43: Survival Factor: Number of Foodborne Outbreak-related Cases (n=852) by Etiologic Agent, Florida 2007

Survival Factor	B. cereus	Salmonella	Staphylococcus	Unknown	Total
Improper sanitization	17	0	5	13	35
Insufficient thawing then insufficient cooking	2	0	0	0	2
Insufficient time/T during cooking	0	92	0	33	125
Insufficient time/T during reheating	2	0	0	0	2
Total	**21**	**92**	**5**	**46**	**164**

Figure 22: Method of Preparation: Percent Foodborne Outbreaks (n=122) and Outbreak-related Cases (n=852), Florida, 2007[30]



[30] 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 44: Method of Preparation:
Number of Foodborne Outbreaks (n=122) and Outbreak-related Cases (n=852), Florida, 2007

Method of Preparation	# Outbreaks	# Outbreak-related Cases
Baked goods	2	5
Beverages	3	35
Chemical contamination	1	1
Cook/serve food	35	247
Liquid/semi-solid mixtures	2	17
Multiple foods	23	186
Natural toxicant	11	41
Raw or lightly cooked	16	37
Roasted meat/poultry	4	55
Salads w cooked ingredients	2	42
Salads w. raw ingredients	3	21
Sandwiches	7	31
Solid masses	6	62
Unknown	11	102

Table 45: Method of Preparation:
Percent Total Foodborne Outbreaks (n=122) and Outbreak-related Cases (n=852), Florida, 2007

Method of Preparation	% Outbreaks	% Outbreak-related Cases
Baked goods	1.6%	0.6%
Beverages	2.5%	4.1%
Chemical contamination	0.8%	0.1%
Cook/serve food	28.7%	29.0%
Liquid/semi-solid mixtures	1.6%	2.0%
Multiple foods	18.9%	21.8%
Natural toxicant	9.0%	4.8%
Raw or lightly cooked	13.1%	4.3%
Roasted meat/poultry	3.3%	6.5%
Salads w cooked ingredients	1.6%	4.9%
Salads w. raw ingredients	2.5%	2.5%
Sandwiches	5.7%	3.6%
Solid masses	4.9%	7.3%
Unknown	9.0%	12.0%

Table 46: Method of Preparation: Number of Foodborne Outbreaks (n=122) by Vehicle, Florida 2007

Method	Beef	Drinks	Fish	Ice	Multiple Ingredients	Multiple Items	Pasta	Pizza	Pork	Poultry	Produce-Fruit	Produce-Vegetable	Rice	Shellfish-Molluscan	Unk	Total
Baked goods	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	2
Beverages	0	2	0	0	1	0	0	0	0	0	0	0	0	0	0	3
Chemical contamination	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Cook/serve food	2	0	11	0	3	2	1	0	2	11	1	2	0	0	0	35
Liquid/semi-solid	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	2
Multiple foods	0	0	1	0	0	21	0	0	0	1	0	0	0	0	0	23
Natural toxicant	0	0	10	0	0	0	0	0	0	0	0	0	0	1	0	11
Raw or lightly	0	0	0	1	1	1	0	0	0	0	1	1	0	11	0	16
Roasted meat/poultry	0	0	0	0	0	0	0	0	3	1	0	0	0	0	0	4
Salads w cooked ingredients	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	2
Salads w. raw ingredients	0	0	0	0	1	1	0	0	0	0	0	1	0	0	0	3
Sandwiches	0	0	1	0	5	1	0	0	0	0	0	0	0	0	0	7
Solid masses	0	0	0	0	4	0	0	0	0	0	0	1	1	0	0	6
Unknown	0	0	0	0	1	4	0	0	0	1	0	0	0	0	5	11
Total	**2**	**3**	**23**	**1**	**21**	**30**	**1**	**1**	**5**	**14**	**2**	**5**	**1**	**12**	**5**	**126**

Table 47: Method of Preparation: Number of Foodborne Outbreak-related Cases (n=852) by Vehicle, Florida 2007

Method	Beef	Drinks	Fish	Ice	Multiple Ingredients	Multiple Items	Pasta	Pizza	Pork	Poultry	Produce-Fruit	Produce-Vegetable	Rice	Shellfish-Molluscan	Unk	Total
Baked goods	0	0	0	0	3	0	0	2	0	0	0	0	0	0	0	5
Beverages	0	33	0	0	2	0	0	0	0	0	0	0	0	0	0	35
Chemical contamination	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Cook/serve food	6	0	38	0	7	21	2	0	21	67	4	81	0	0	0	247
Liquid/semi-solid	0	0	0	0	17	0	0	0	0	0	0	0	0	0	0	17
Multiple foods	0	0	2	0	0	181	0	0	0	3	0	0	0	0	0	186
Natural toxicant	0	0	38	0	0	0	0	0	0	0	0	0	0	3	0	41
Raw or lightly	0	0	0	3	2	2	0	0	0	0	2	5	0	23	0	37
Roasted meat/poultry	0	0	0	0	0	0	0	0	22	33	0	0	0	0	0	55
Salads w cooked ingredients	0	0	0	0	42	0	0	0	0	0	0	0	0	0	0	42
Salads w. raw ingredients	0	0	0	0	2	15	0	0	0	0	0	4	0	0	0	21
Sandwiches	0	0	4	0	18	9	0	0	0	0	0	0	0	0	0	31
Solid masses	0	0	0	0	55	0	0	0	0	0	0	2	5	0	0	62
Unknown	0	0	0	0	3	29	0	0	0	3	0	0	0	0	67	102
Total	**6**	**34**	**82**	**3**	**151**	**257**	**2**	**2**	**43**	**106**	**6**	**92**	**5**	**26**	**67**	**882**

Table 48: Method of Preparation: Number of Foodborne Outbreaks (n=122) by Etiologic Agent, Florida 2007

Pathogen	Baked goods	Drinks	Chemical contam.	Cook/ serve food	Liquid/ semi-solid	Multiple foods	Natural toxicant	Raw or lightly cooked	Roasted meat/ poultry	Salads w cooked ingred.	Salads w raw ingred.	Sand-wiches	Solid masses	Unk	Total
B. cereus	0	0	0	3	0	5	0	0	0	0	0	0	0	0	8
C. perfringens	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1
Chemical	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1
Ciguatera	0	0	0	3	0	0	9	0	0	0	0	0	0	0	12
E. coli O157:H7	0	0	0	0	0	0	0	0	0	0	1	1	0	0	2
Gembylotoxin	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1
Hepatitis A	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
Norovirus	0	1	0	4	0	6	0	1	0	2	1	2	0	1	18
NSP	0	0	0	0	0	0	1	1	0	0	0	0	0	0	2
Salmonella	0	0	0	2	1	1	0	1	1	0	0	0	2	0	8
Scombroid	0	1	0	5	0	0	0	0	0	0	0	0	0	0	6
Staphylococcus	0	0	0	2	1	2	0	0	0	0	0	1	1	2	9
Unknown	2	0	0	16	0	8	0	5	3	0	1	3	3	8	49
V. vulnificus	0	0	0	0	0	0	0	8	0	0	0	0	0	0	8
Total	**2**	**3**	**1**	**35**	**2**	**23**	**11**	**16**	**4**	**2**	**3**	**7**	**6**	**11**	**126**

Table 49: Method of Preparation: Number of Foodborne Outbreak-related Cases (n=852) by Etiologic Agent, Florida 2007

Pathogen	Baked goods	Drinks	Chemical contam.	Cook/ serve food	Liquid/ semi-solid	Multiple foods	Natural toxicant	Raw or lightly cooked	Roasted meat/ poultry	Salads w cooked ingred.	Salads w raw ingred.	Sand-wiches	Solid masses	Unk	Total
B. cereus	0	0	0	6	0	53	0	0	0	0	0	0	0	0	59
C. perfringens	0	0	0	0	0	3	0	0	0	0	0	0	0	0	3
Chemical	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1
Ciguatera	0	0	0	15	0	0	34	0	0	0	0	0	0	0	49
E. coli O157:H7	0	0	0	0	0	0	0	0	0	0	2	2	0	0	4
Gembylotoxin	0	0	0	0	0	0	4	0	0	0	0	0	0	0	4
Hepatitis A	0	3	0	0	0	0	0	0	0	0	0	0	0	0	3
Norovirus	0	30	0	55	0	92	0	4	0	42	15	15	0	7	260
NSP	0	0	0	0	0	0	3	3	0	0	0	0	0	0	6
Salmonella	0	0	0	92	14	5	0	2	7	0	0	0	41	0	161
Scombroid	0	2	0	12	0	0	0	0	0	0	0	0	0	0	14
Staphylococcus	0	0	0	18	3	7	0	0	0	0	0	2	11	14	55
Unknown	5	0	0	49	0	26	0	20	48	0	4	12	10	81	255
V. vulnificus	0	0	0	0	0	0	0	8	0	0	0	0	0	0	8
Total	**5**	**35**	**1**	**247**	**17**	**186**	**41**	**37**	**55**	**42**	**21**	**31**	**62**	**102**	**882**

Figure 23: Waterborne Disease Contributing Factors: Percent Total Waterborne Outbreaks (n=10) and Outbreak-related Cases (n=111), Florida, 2007[31]

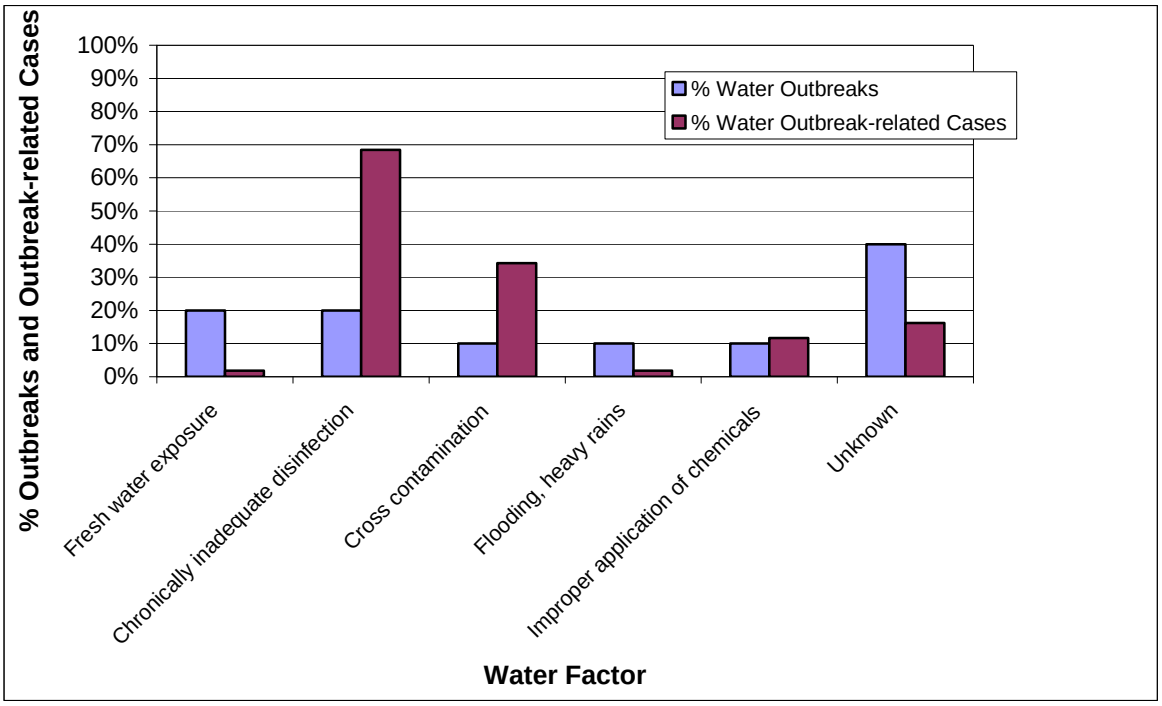


Table 50: Waterborne Disease Contributing Factors:
Number of Waterborne Outbreaks (n=10) and Outbreak-related Cases (n=111), Florida, 2007

Water Factor	# Water Outbreaks	# Water Outbreak-related Cases
Fresh water exposure	2	2
Chronically inadequate disinfection	2	76
Cross contamination	1	38
Flooding, heavy rains	1	2
Improper application of chemicals	1	13
Unknown	4	18

Table 51: Waterborne Disease Contributing Factors:
Percent Total Waterborne Outbreaks (n=10) and Outbreak-related Cases (n=111), Florida, 2007

Water Factor	% Water Outbreaks	% Water Outbreak-related Cases
Fresh water exposure	20%	2%
Chronically inadequate disinfection	20%	68%
Cross contamination	10%	34%
Flooding, heavy rains	10%	2%
Improper application of chemicals	10%	12%
Unknown	40%	16%

[31] 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 52: Contributing Factors by Etiologic Agent for All Waterborne Outbreaks (n=10), Florida, 2007

Water Factor	Chemical	Cryptosporidium	Naegleria fowleri	Unknown	Total
Fresh water exposure	0	0	2	0	2
Chronically inadequate disinfection	0	1	0	1	2
Cross contamination	0	1	0	0	1
Flooding, heavy rain	0	0	0	1	1
Improper application of chemicals	1	0	0	0	1
Unknown	0	3	1	0	4

Table 53: Contributing Factors by Etiologic Agent for Cases Associated With All Waterborne Outbreaks (n=111), Florida, 2007

Water Factor	Chemical	Cryptosporidium	Naegleria fowleri	Unknown	Total
Fresh water exposure	0	0	2	0	2
Chronically inadequate disinfection	0	38	0	38	76
Cross contamination	0	38	0	0	38
Flooding, heavy rain	0	0	0	2	2
Improper application of chemicals	13	0	0	0	13
Unknown	0	17	1	0	18

Table 54: Line List of Waterborne Outbreaks (n=10), Florida, 2007

County	Status	# Cases	Site	Specific Vehicle	Pathogen	Pathogen Status
Palm Beach	Suspected	38	Public water	Drinking water	Unknown	Unknown
Orange	Confirmed	1	Lake	Lake water exposure	Naegleria fowleri	Confirmed
Collier	Suspected	8	Pool	Condo swimming pool	Cryptosporidium	Confirmed
Palm Beach	Suspected	6	Public water	Water	Cryptosporidium	Confirmed
Indian River	Confirmed	38	Interactive water fountain	interactive water fountain	Cryptosporidium	Confirmed
Pasco	Suspected	2	Beach	Recreational water exposure	Unknown	Unknown
Osceola	Confirmed	13	Pool	public swimming pool	Chemical	Suspected
Osceola	Confirmed	1	Lake	lake water exposure	Naegleria fowleri	Confirmed
Orange	Confirmed	1	Fresh water	unknown	Naegleria fowleri	Confirmed
Marion	Suspected	3	Pool	pool water	Cryptosporidium	Confirmed

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

Page 2
CDC 52.13 REV. 8/1999

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

Contamination Factors:[1]

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

Proliferation/Amplification Factors:[1]

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

Survival Factors:[1]

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

Method of Preparation:[2]

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

M16 - Unknown, vehicle was not identified

[1] Frank L. Bryan, John J. Guzewich, and Ewen C. D. Todd. Surveillance of Foodborne Disease III. Summary and Presentation of Data on Vehicles and Contributory Factors; Their Value and Limitations. Journal of Food Protection, 60; 6:701-714, 1997.

[2] Weingold, S. E., Guzewich JJ, and Fudala JK. Use of foodborne disease data for HACCP risk assessment. Journal of Food Protection, 57; 9:820-830, 1994.

Appendix C: Factors Contributing to Water Contamination[32]

At Source:

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

At Treatment Plant

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

In Distribution System

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

Other

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