Food and Waterborne Illness Surveillance and Investigation
Annual Report, Florida, 2008

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

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Food and Waterborne Disease **Outbreak Definitions as Defined by the State of Florida Department of Health**

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 are also considered outbreaks. Other rare diseases, 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 will be investigated further but may not be reported.

Waterborne illness outbreak:

Drinking water[1]: Two criteria must be met for an event to be defined as a drinking water-associated disease outbreak. First, ≥2 persons must have experienced a similar illness after exposure to water. This criterion is waived for single cases of laboratory-confirmed primary amebic meningoencephalitis (PAM) and for single cases of chemical poisoning if water-quality data indicate contamination by the chemical. Second, epidemiologic evidence must implicate drinking water as the probable source of the illness.

Recreational water[2]: Two criteria must be met for an event to be defined as a recreational water-associated disease outbreak. First, >2 persons must have experienced a similar illness after exposure to water or air encountered in a recreational water setting. This criterion is waived for single cases of laboratory-confirmed primary amebic meningoencephalitis (PAM), single cases of wound infections, and single cases of chemical poisoning if water-quality data indicate contamination by the chemical. Second, epidemiologic evidence must implicate recreational water or the recreational water setting as the probable source of the illness. Recreational settings include swimming pools, wading pools, whirlpools, hot tubs, spas, watermarks, interactive fountains, and fresh and marine surface waters.

[1] Surveillance for Waterborne-Disease Outbreaks Associated with Drinking Water --- United States, 2001—2002, MMWR, October 22, 2004/53(SS08):23-45, http://www.cdc.gov/Mmwr/preview/mmwrhtml/ss5308a4.htm (accessed 9/8/09).
[2] Surveillance for Waterborne-Disease Outbreaks Associated with Recreational Water --- United States, 2001—2002, MMWR, October 22, 2004/53/(SS08):1-22, http://www.cdc.gov/Mmwr/preview/mmwrhtml/ss5308a1.htm (accessed 9/8/09)

Overview

In 2008, a total of 1,792 food and waterborne illness complaints were reported in Florida which is a 28% decrease compared to the 2,518 complaints that were reported in 2007. Of the 1,792 complaints, 1,409 were linked to Department of Business and Professional Regulation establishments; 243 to Department of Agriculture and Consumer Services establishments; 7 to Department of Health establishments; and 133 to home, other, or unknown establishments. A total of 100 food and waterborne outbreaks with 1,241 cases were reported in 2008, a 24% decrease compared to the 132 outbreaks with 963 cases in 2007, and 132 outbreaks and 1,263 cases in 2006. Investigators were able to laboratory confirm 35 of the outbreaks associated with 463 cases (including 7 *Vibrio vulnificus* cases). Foodborne outbreaks numbered 96 with 1,218 cases. Four (4) waterborne outbreaks were reported in 2008, with a total of 23 cases. The largest outbreak reported in 2008 was due to an unknown pathogen in a Santa Rosa County correctional facility with a total case count of 260, accounting for 21% of all outbreak-related cases reported in 2008.

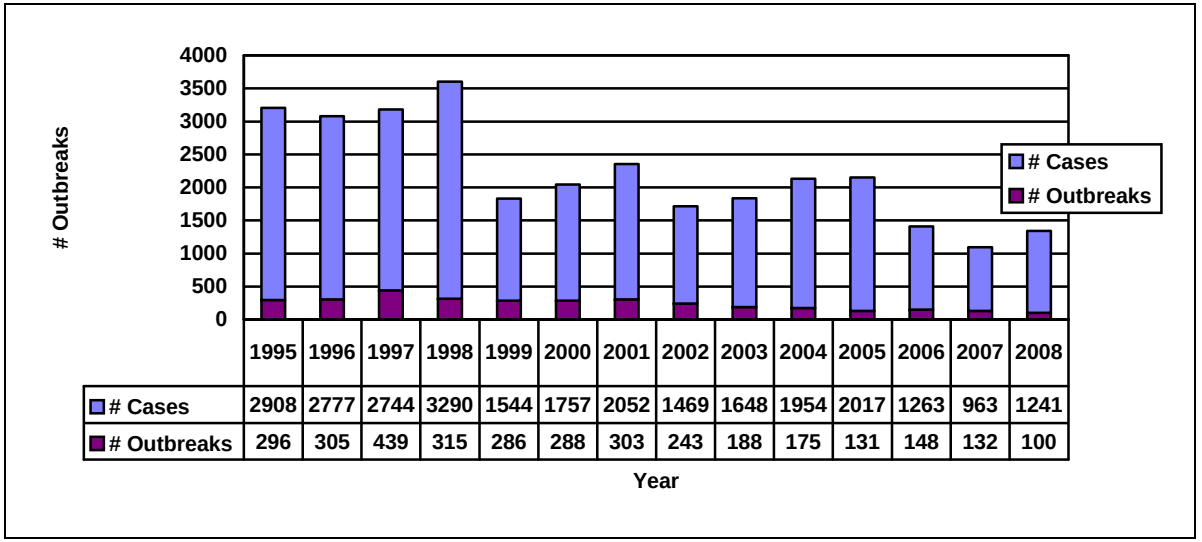
Norovirus, ciguatera and *Vibrio vulnificus* were implicated in the largest percentage of the total reported outbreaks (26%, 10%, and 7%, respectively). After norovirus (43% outbreak-related cases), *Clostridium perfringens* was identified as the pathogen with the largest percentage of outbreak-related cases in reported outbreaks (11%) followed by ciguatera (5%). Restaurants were the exposure site in 71% of the outbreaks reported and for 57% of the cases. Multiple items/ingredients (38%), poultry (12%), and fish (10%) accounted for a total of 60% of all outbreaks. Multiple items/ingredients accounted for 33% of all outbreak-related cases, followed by unknown vehicles (33%) and produce (vegetables, 12%). The month with the largest percentage of outbreaks reported was January (17%) with the largest percentage of cases reported in April (11%). Large (greater than 10 cases) outbreaks accounted for 24% (24) of the total reported outbreaks and 79% (974) of the total number of outbreak-related cases. Selected significant outbreaks are cited below. Under the current surveillance system, as many as three contributing factors from each type (contamination, proliferation/amplification, survival) can be linked to each outbreak. There are also categories for none reported, other and unknown. Please check Appendices B and C for more details on contributing factors to food and waterborne outbreaks (pp. 51-53). An investigation of notable interest in 2008 was an outbreak of Selenium-related illnesses due to excessive amounts of the element in a nutritional health supplement. The investigation involved medical health professionals, Florida Poison Information and Control Network, Food and Drug Administration, and the Florida Department of Health and resulted in a nation-wide health alert for consumers. An article on the Selenium outbreak can be found at http://archinte.ama-assn.org/cgi/content/full/170/3/256.

Table 1: Summary of Food and Waterborne Illness Outbreaks Reported to Florida, 1989–2008[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
2008	100	1241

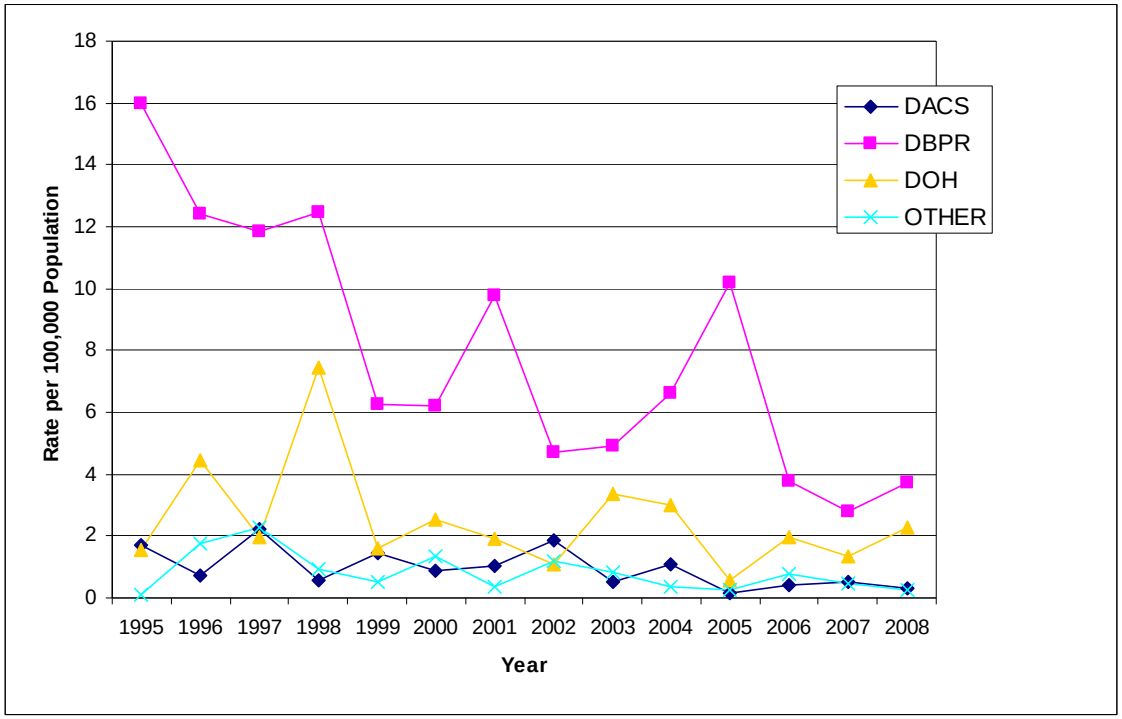
[3] The current surveillance and investigation program data began in 1994.

Figure 1: Number of Food and Waterborne Outbreaks and Outbreak-related Cases by Year, Florida, 1995-2008



	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
# Cases	2908	2777	2744	3290	1544	1757	2052	1469	1648	1954	2017	1263	963	1241
# Outbreaks	296	305	439	315	286	288	303	243	188	175	131	148	132	100

Figure 2: Rate of Food & Waterborne Outbreak-related Cases by Agency of Jurisdiction per 100,000 Population, Florida 2008



Training and Continuing Education

In 2008, 15 training sessions were held around the state specifically targeting Department of Health environmental health and epidemiology staff. Fourteen (14) 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 E. coli, Primary Amebic Meningoencephalitis (PAM), water/recreational waterborne diseases for swimming pool and bathing establishment operators, foodborne pathogens, food safety, and prevention. Approximately 1,700 people received training in 2008.

Besides County Health Department environmental health, nursing and epidemiology staff, audiences included members of the Florida Environmental Health Association districts, the National Environmental Health Association, the Florida College of Emergency Physicians, and the Florida Association of Physicians Assistants. Trainers also presented guest lectures at the University of Florida. Other community groups who received foodborne illness prevention presentations included home childcare providers, food distributors and retail market corporations, and a hospital. *Vibrio vulnificus* displays were provided to annual meetings of the Florida Association of Physicians Assistants, the Florida Dietetic Association, and the Florida College of Emergency Physicians.

Selected Food and Waterborne Outbreak Publications and Articles, 2008

The year 2008 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 (some articles refer to outbreaks from prior years). Two investigations were featured in the CDC's Morbidity and Mortality Report (MMWR), 2 were published in the NEHA Journal, 1 in the FEHA journal, and 1 in both the Epidemiology and Infection, and Marine Drugs Journals. Four newsletter articles were also published in the Bureau of Epidemiology Epi-Update Publication. Links to online publications are provided below. Other articles may be obtained from the Food and Waterborne Disease Program or can be requested from interlibrary loan. Additional information and data on food and waterborne illnesses can be obtained from the 2008 Annual Florida Morbidity Statistics Report at: http://www.doh.state.fl.us/Disease_ctrl/epi/Morbidity_Report/amr_2008.html

2008 Food and Waterborne Disease Publications:

1. Doyle, T. J> L. Stark, R. Hammond, and R.S. Hopkins. Outbreaks of Noroviral Gastroenteritis in Florida, 2006-2007. Epidemiology and Infection, April, 23:1-9.

2. Eisenstein, L. and D. Bodager. Norovirus Illness Cluster Associated with a Local Bar-B-Que Restaurant, Orange County. EpiUpdate, August/September, 2008, http://www.doh.state.fl.us/Disease_ctrl/epi/Epi_Updates/2008/AugustSept2008EpiUpdate.pdf.

3. Eisenstein, L. and D. Bodager. Outbreak of Legionellosis Associated with Exposure to a Hotel Outdoor Hot Tub, Orange County, Florida, March 2008. FEHA Journal, Fall, 100:14-19

4. Eisenstein, L. and D. Bodager . Outbreak of Giardiasis and Cryptosproidiosis Associated with a Neighborhood Interactive Fountain-Florida, 2006. NEHA Journal, October, 71(5):18-22.

5. Wansbrough, L. and M. Friedman. Foodborne Outbreak Investigation at a Resort in Clearwater, Pinellas County, May 1-4, 2008. EpiUpdate. October, 2008, http://www.doh.state.fl.us/Disease_ctrl/epi/Epi_Updates/2008/October2008EpiUpdate.pdf.

6. Hammond, R., R. Terzagian, K. Van Zile, T. Wade, R. Lowe and S. Lyda. Stool Kit Pilot Project. EpiUpdate, November, http://www.doh.state.fl.us/Disease_ctrl/epi/Epi_Updates/2008/November2008EpiUpdate.pdf.

7. Inman, W.B., D. Bodager and S. Rappel Norovirus Illness Cluster Associated with a Local Country Club, Brevard County, April 2008. EpiUpdate, October 2008, http://www.doh.state.fl.us/Disease_ctrl/epi/Epi_Updates/2008/October2008EpiUpdate.pdf.

8. Reich, A., C. Blackmore, R. Hopkins, R. Lazensky, K. Geib, and E. Ngo-Seidel., Illness Associated with Red Tide-Nassau County, Florida, 2007. MMWR, July 4, 2008, 57(26):717-720, http://www.cdc.gov/mmwr/preview/mmwrhtml/mm5726a1.htm .

9. Lazensky, R., R. Hammond, K. Van Zile, K. Geib. Cryptosporidiosis Outbreak in a Nassau County, Florida, Return Travel Group from Ireland, May 24, 2006-June 4, 2006. NEHA Journal, September, 72(2):20-24.

10. Matthews, S. D. Ginzl, D. Walsh, K. Sherin, J. Middaugh, R. Hammond, D. Bodager, et al. Primary Amebic Meningoencephalitis-Arizona, Florida and Texas, 2007. MMWR, May 30, 2008, 57(21):573-577, http://www.cdc.gov/mmwr/preview/mmwrhtml/mm5721a1.htm.

11. Watkins, S., A. Reich, L. Fleming and R. Hammond. Neurotoxic Shellfish Poisoning. Marine Drugs, 2008 6(3):431-455, http://www.mdpi.com/1660-3397/6/3/431/pdf .

An Overview of Foodborne *Vibrio vulnificus*, Florida, 2008

For 2008, there was a total of 15 *Vibrio vulnificus* cases reported in the State of Florida, less than the 22 reported in 2007. Of these, 6 were wound-related cases, 7 cases were associated with the consumption of raw oysters, and 4 were from unknown exposures[4] There were 4 oyster-consumption-related deaths (1 in April, 1 in May, and 2 in July), in addition to 2 deaths from unknown exposures (see Table 4 and Figure 4). In 2007, there were 10 wound-related cases of *Vibrio vulnificus*, 4 from unknown exposures, 4 cases associated with the consumption of raw oysters (4 deaths) and 1 from clam consumption.

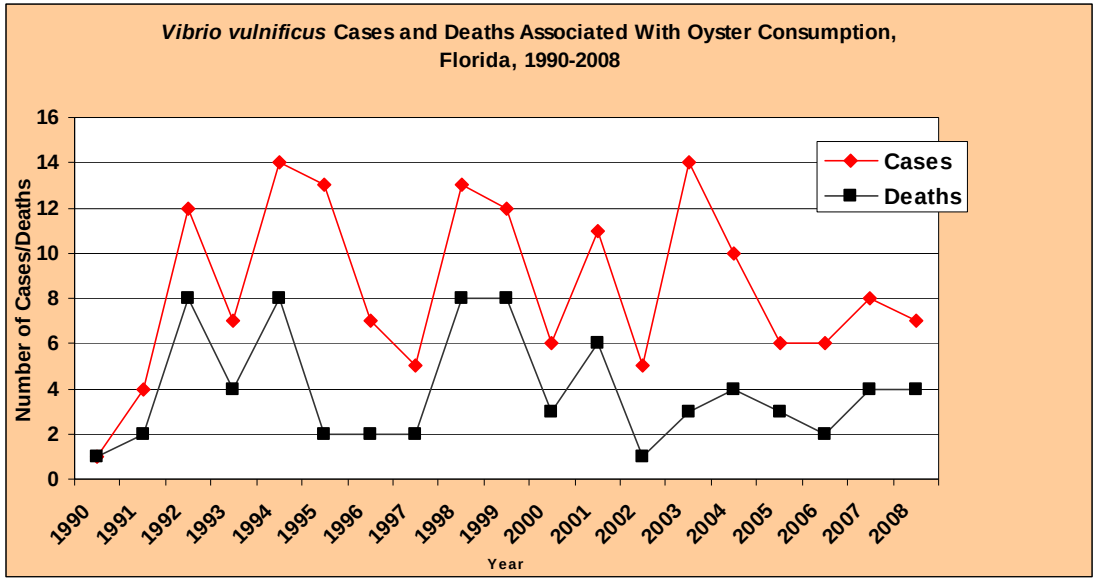
Table 2: Reported Cases of Food-related *Vibrio vulnificus*, Florida 2008

Exposure	# Cases
Wound	6 (0 death)
Oysters	7 (4 deaths)
Unknown	2 (2 deaths)
Total	**15 (6 deaths)**

The Florida Department of Health collaborated in a statewide *Vibrio vulnificus* education Project with the Florida Department of Agriculture and Consumer Services and with the Interstate Shellfish Sanitation Conference in 2008. 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 November. *Vibrio vulnificus* displays and educational brochures were presented at the annual meeting of the Florida Dietetic Association and the Florida Student Nurse Association. Figure 3 shows oyster-related *Vibrio vulnificus* cases and deaths in Florida, from 1988-2008.

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

Figure 3: Vibrio vulnificus Cases and Deaths Associated With Molluscan Shellfish Consumption, Florida. 1990-2008



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

Nationwide estimates indicate that Hepatitis A accounts for 0.8% of total foodborne outbreaks and for less than 0.8% of total foodborne outbreak-related cases . Florida estimated that Hepatitis A accounted for 0.6% of total foodborne outbreaks (1998-2007 trend: flat - no increase or decrease) and for 0.9% of total foodborne outbreak-related cases (1998-2008 trend: upward a little less than 1%).

An examination of the total number of reported hepatitis A cases in Florida shows that foodworkers with Hepatitis A accounted for 0.9% of the total confirmed Hepatitis A cases statewide (1999- 2008). The percentage of foodworker Hepatitis A cases in Florida shows a downward trend of nearly 5% from 1999-2008.

Table 3: Number of Reported Foodborne Hepatitis A Outbreaks in Florida, 1999-2008[5]

	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	Total
Total Hepatitis A Outbreaks	3	2	2	4	0	0	1	0	1	0	13
Total # Foodborne Outbreaks	272	268	290	243	185	173	128	142	122	96	1919
% Outbreaks-related to Hepatitis A	**1.1%**	**0.7%**	**0.7%**	**1.6%**	**0%**	**0%**	**0.7%**	**0%**	**0.8%**	**0%**	**0.6%**

[5] Source: Bureau of Environmental Public Health Medicine, Food and Waterborne Disease Program

Table 4: Number of Foodborne Outbreak-related Hepatitis A Cases in Florida, 1999- 2008[6]

	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	Total
Total Hepatitis A Outbreak-related Cases	29	23	40	29	0	0	20	0	3	0	144
Total # Foodborne Outbreak-related Cases	1463	1527	1921	1466	1564	1911	1944	1141	852	1218	15007
% Outbreaks-related to Hepatitis A Cases	**2%**	**1.5%**	**2%**	**2%**	**0%**	**0%**	**1%**	**0%**	**0.3%**	**0%**	**0.9%**

Table 5: Percentage of Foodworker Hepatitis A Cases of Total Reported Hepatitis A Cases, Florida, 1999-2008

Statewide Confirmed Hepatitis A Cases	**1999**	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**Total**
# Confirmed Cases	855	659	990	1239	370	512	654	367	324	324	**6581**
# Foodworker Cases	59	25	49	59	15	8	12	7	2	2	**277**
% Food Worker	**6.9%**	**3.8%**	**4.9%**	**4.8%**	**4.1%**	**1.6%**	**1.8%**	**1.9%**	**0.60%**	**0.60%**	**4.2%**

[6] Source: Bureau of Environmental Public Health Medicine, Food and Waterborne Disease Program

Hepatitis A Education for Food Workers, 2008

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 habits, and language barrier that present 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.

2008 efforts included:

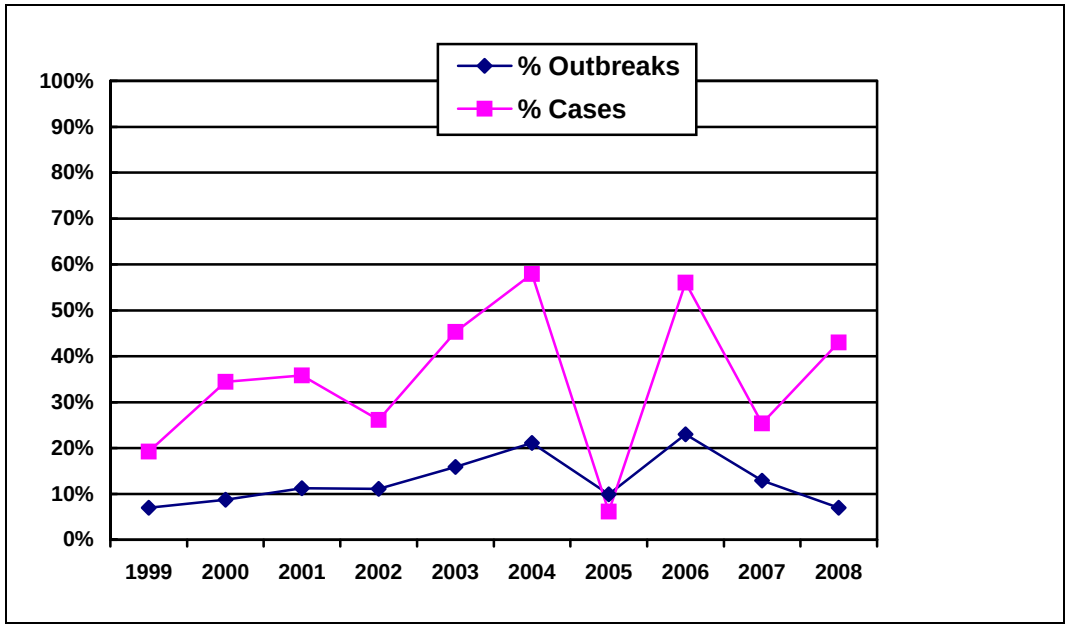
- The national and Central Florida FightBac! campaign sponsored by FDA (website provides materials for educators, the public, media, materials also available in Spanish),
- Food worker training by DBPR, DOH and DOACS, to county health departments, interested community groups, university classes,
- Refresher 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, 1998-2008

Figure 4: Reported Outbreaks and Outbreak Related Cases of Norovirus Illness, Florida, 1999-2008



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.[7]

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 1999 to 2008 there were a total of 258 food or waterborne Norovirus outbreaks with 5,708 associated cases (see Tables 1 and 2). Vehicles of transmission included sandwiches, salads, meal garnishes, oysters, recreational water and ice. The primary contributing factors were 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 involved excluding the ill foodworker(s) when possible and providing handwashing education to foodworkers and sport and commercial fishermen.

[7] 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 6: Number of Reported Food and Waterborne Norovirus Outbreaks, Florida, 1999-2008

Outbreaks	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	Total
Total	20	25	34	27	30	37	12	30	17	26	258
% of all outbreaks	7%	9%	11%	11%	16%	21%	10%	20%	13%	7%	26%

Table 7: Number of Reported Food and Waterborne Norovirus Outbreak-related Cases, Florida, 1999-2008

Outbreak-related Cases	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	Total
Total	296	604	734	382	749	1131	118	707	249	538	5,708
% of all outbreak-related cases	19%	34%	36%	26%	38%	58%	6%	56%	26%	43%	34%

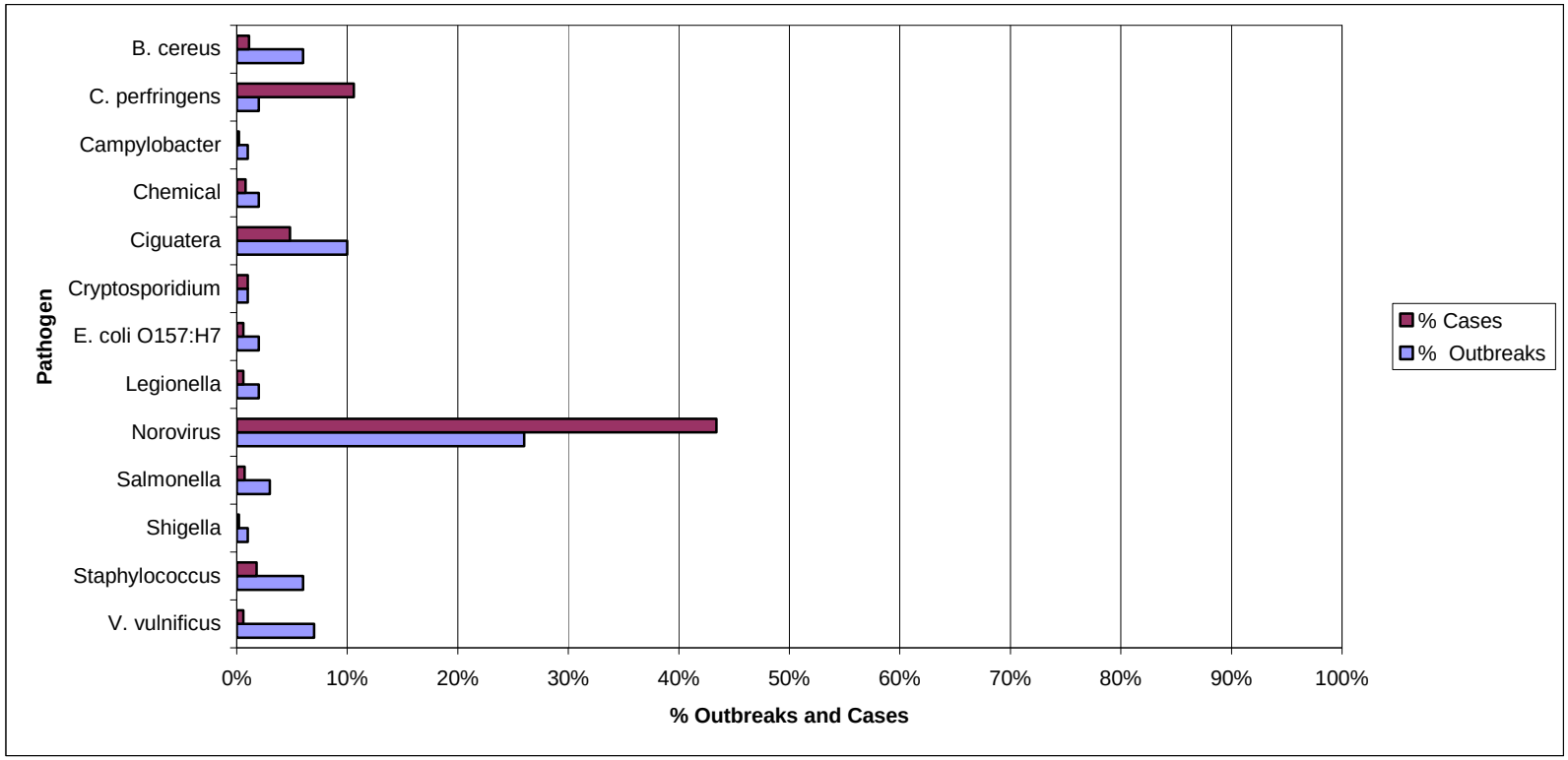
Laboratory confirmation was obtained in 74 (29%) of these outbreaks. Since the development of the Department of Health Bureau of Laboratories ability to test stools for Norovirus in 1999, food and waterborne outbreak investigations have focused on collecting both enteric and viral stool samples for ruling out or confirming 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 8: 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, 2008

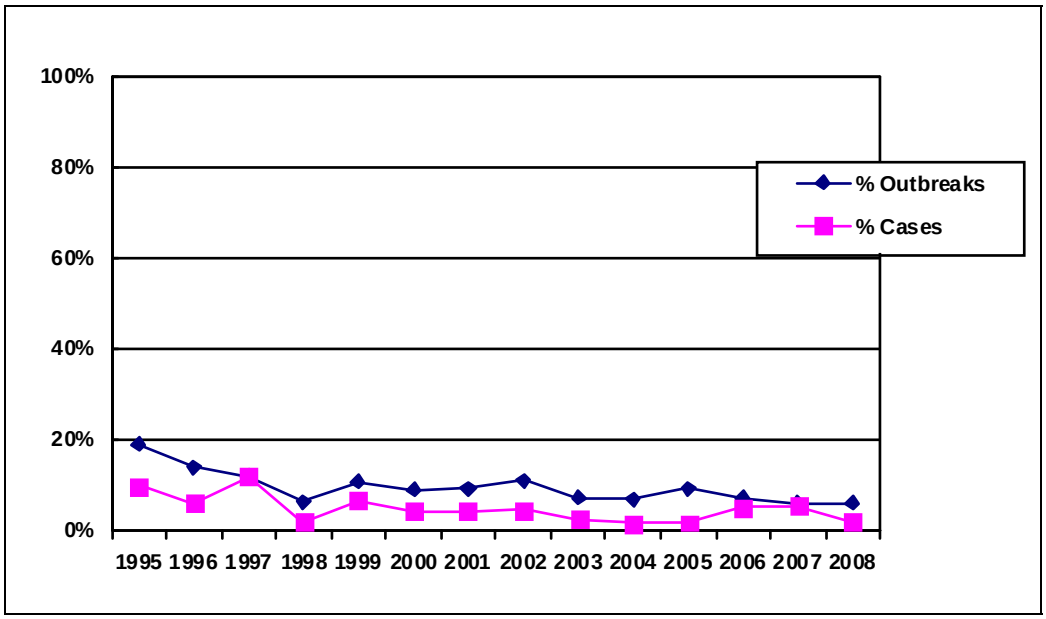
# Outbreaks With Confirmed Pathogens	% Total Outbreaks	Pathogen	# Total Cases	% Total Cases in Outbreaks with Confirmed Pathogens
1	1%	*Campylobacter*	2	0%
6	6%	Ciguatera	35	3%
1	1%	*Cryptosporidium*	13	1%
2	2%	*Legionella*	8	1%
14	14%	Norovirus	378	30%
2	2%	*Salmonella*	7	1%
1	1%	*Shigella*	2	0%
1	1%	*Staphylococcus*	11	1%
7	7%	*V. vulnificus*	7	1%
35	**35%**	**Total**	**463**	**37%**

Figure 5: Percent Total Food and Waterborne Disease Outbreaks and Cases by Etiologic Agent, Florida, 2008*



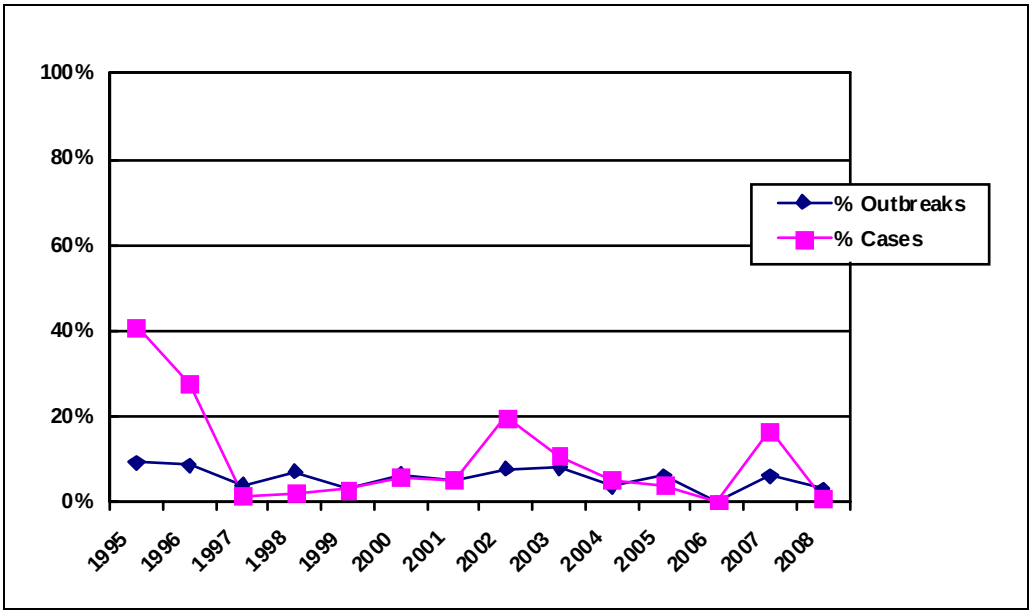
*The etiologic agent was unknown in 31% of the outbreaks and 34% of epi-linked cases.

**Figure 6: Trends of Staphylococcus in Reported Food and Waterborne Outbreaks and Outbreak-related Cases,
Florida, 1995-2008**



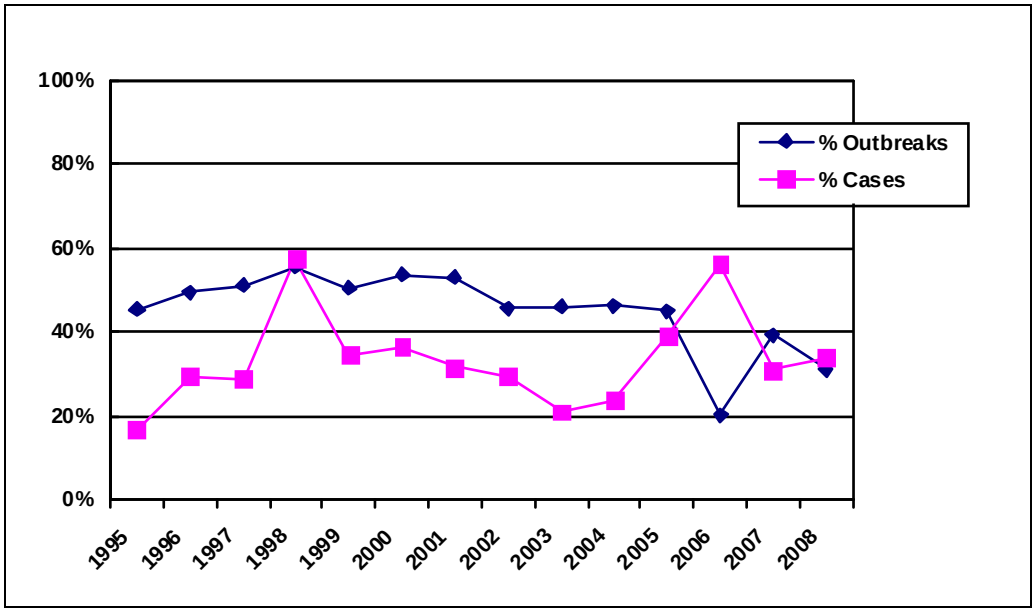
Reported food and waterborne Staphylococcus outbreaks and cases show a slight downward trend over time.

**Figure 7: Trends of Salmonella in Reported Food and Waterborne Outbreaks and Outbreak-related Cases,
Florida, 1995-2008**



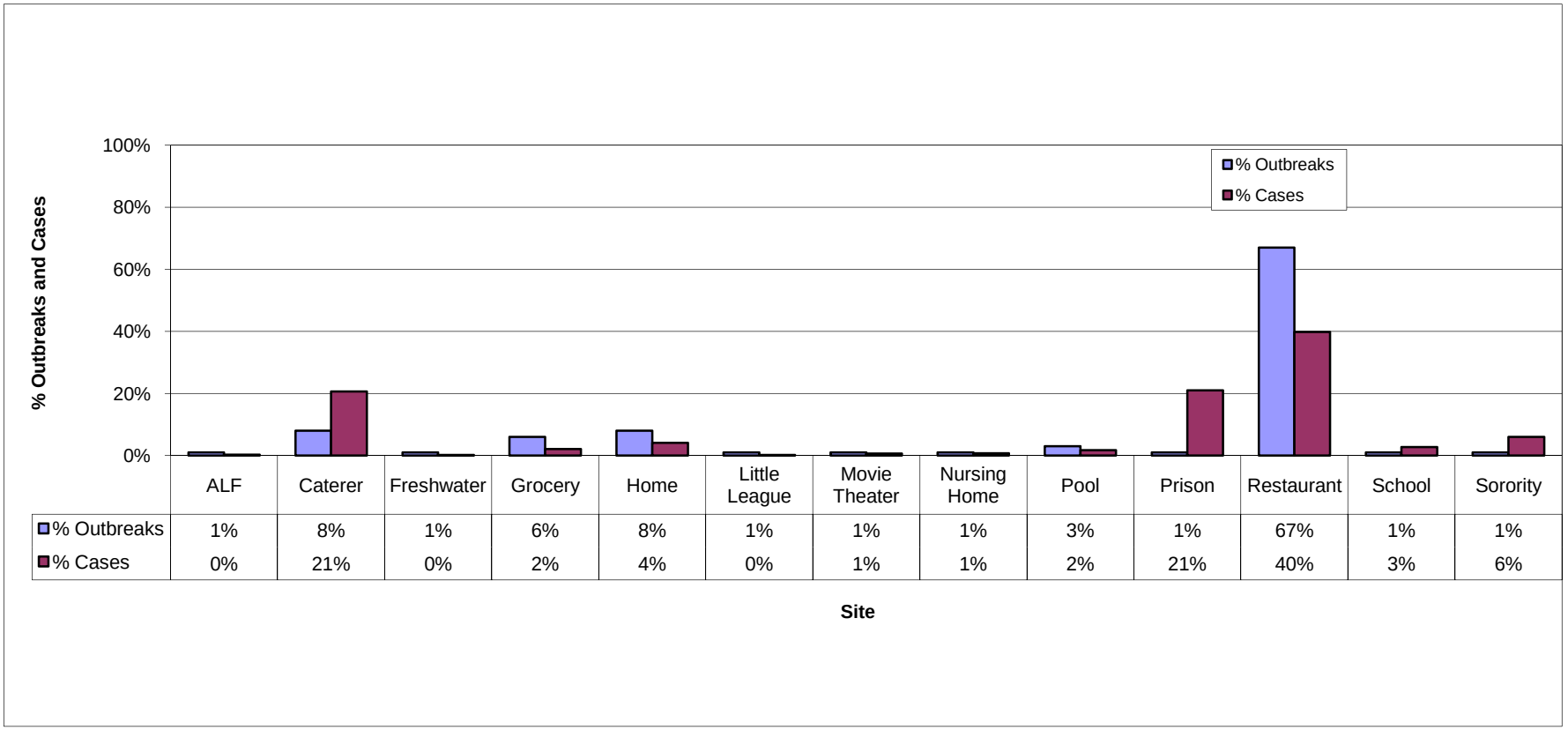
Reported food and waterborne Salmonella outbreaks and cases show a very slight downward trend over time with a slight increase in 2007.

Figure 8: Trends of Unknown Pathogens in Reported Food and Waterborne Outbreaks and Outbreak-related Cases, Florida, 1995-2008



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

Figure 9: Percent Total Food and Waterborne Outbreaks and Outbreak-related Cases by Site, Florida, 2008



	ALF	Caterer	Freshwater	Grocery	Home	Little League	Movie Theater	Nursing Home	Pool	Prison	Restaurant	School	Sorority
% Outbreaks	1%	8%	1%	6%	8%	1%	1%	1%	3%	1%	67%	1%	1%
% Cases	0%	21%	0%	2%	4%	0%	1%	1%	2%	21%	40%	3%	6%

Table 9: Number of Food and Waterborne Outbreaks and Outbreak-related Cases by Site, Florida, 2008[8]

	ALF	Caterer	Freshwater	Grocery	Home	Little League	Movie Theater	Nursing Home	Pool	Prison	Restaurant	School	Sorority	Total
# Outbreaks	1	8	1	6	8	1	1	1	3	1	67	1	1	100
# Cases	4	256	2	26	51	3	7	9	21	260	494	33	75	1241

[8] 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.

Figure 10: Percent Food and Waterborne Outbreaks Reported by Agency of Jurisdiction,[9,10] Florida, 2008

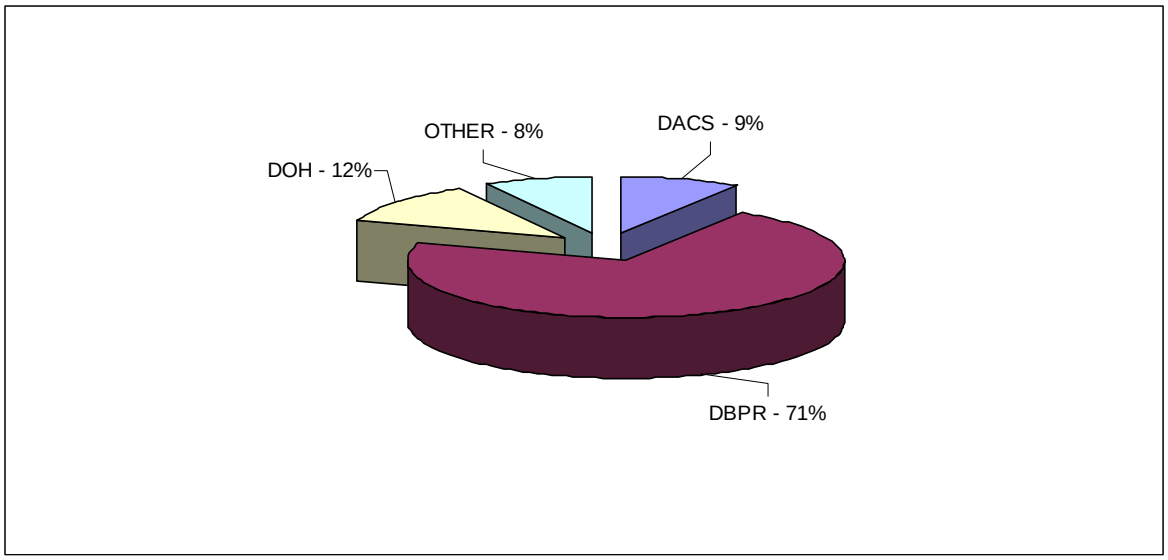
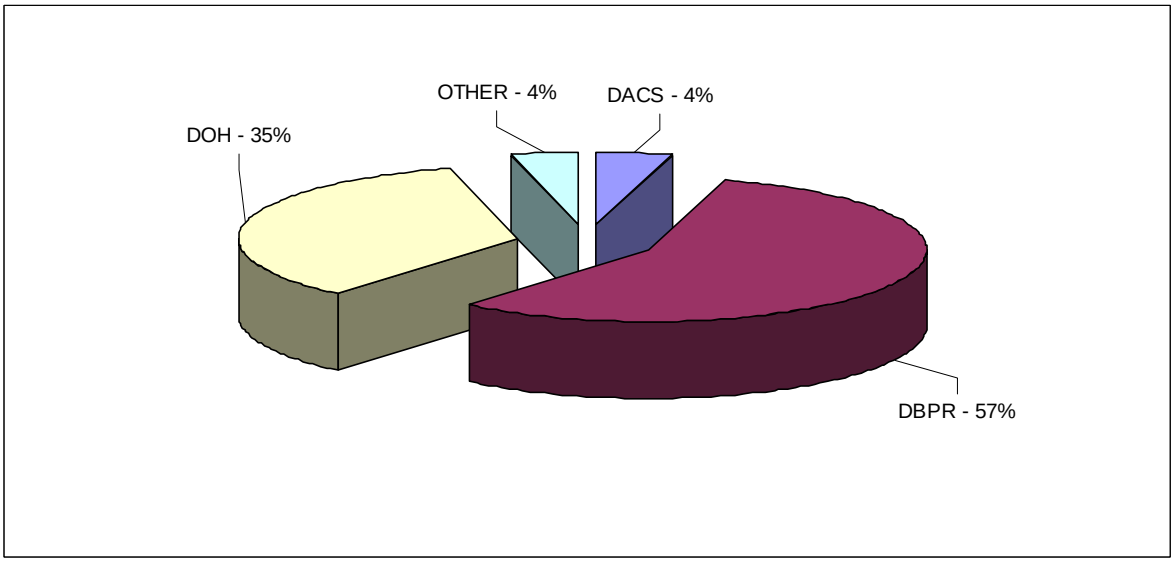


Figure 11: Percent Food and Waterborne Outbreak-related Cases Reported by Agency of Jurisdiction,[11,12] Florida, 2008



[9] 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).
[10] Data from previous years can be found in the 2002 - 2006 Annual Reports.
[11] 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).
[12] Data from previous years can be found in previous annual reports at: http://www.doh.state.fl.us/environment/medicine/foodsurveillance/annualreports.htm .

Figure 12: Reported Food and Waterborne Disease Outbreaks by Agency of Jurisdiction, 1995-2008

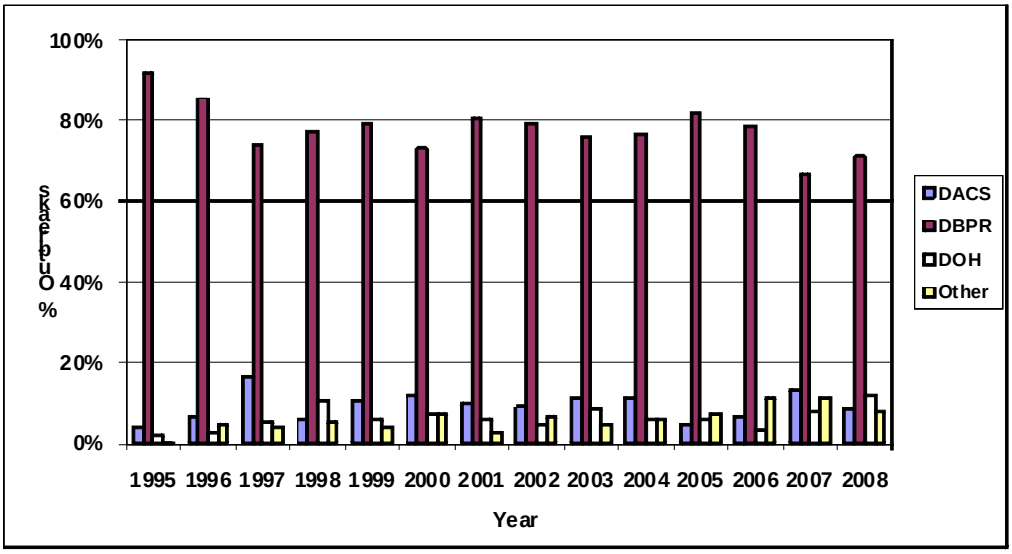


Figure 13: Cases Associated With Reported Food and Waterborne Disease Outbreaks by Agency of Jurisdiction, 1995–2008

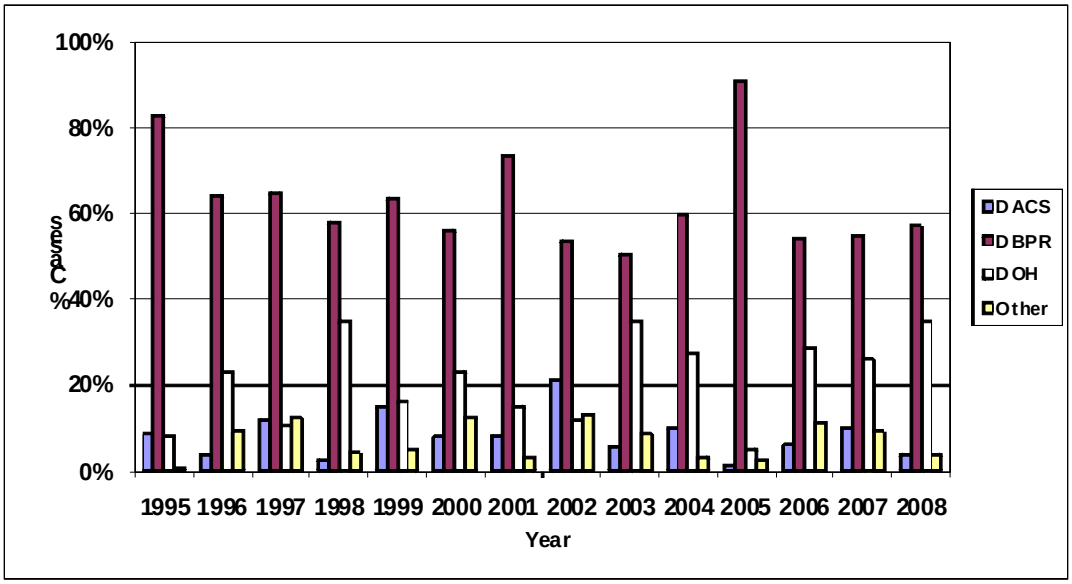
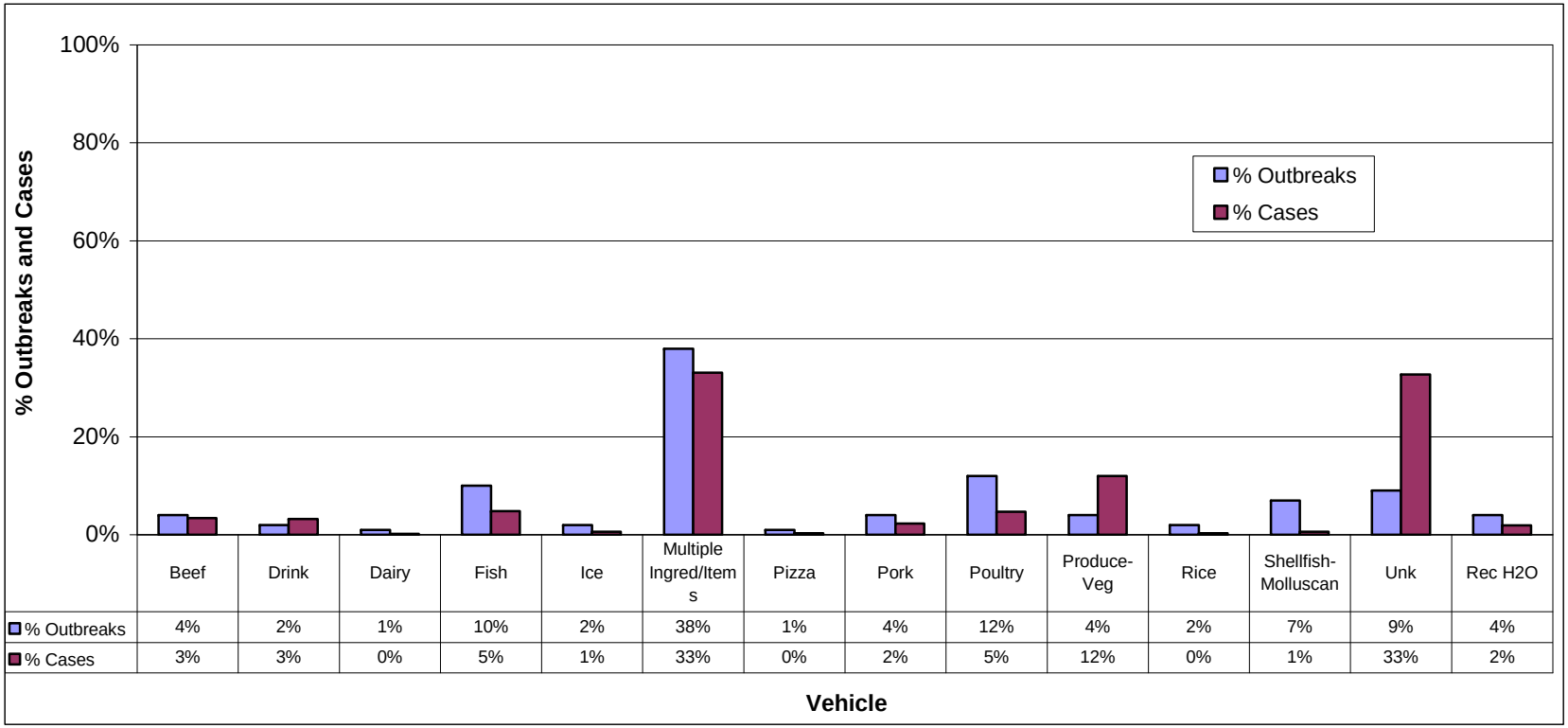


Figure 14: Percent Total Food and Waterborne Outbreaks and Outbreak-related Cases by Vehicle, Florida, 2008

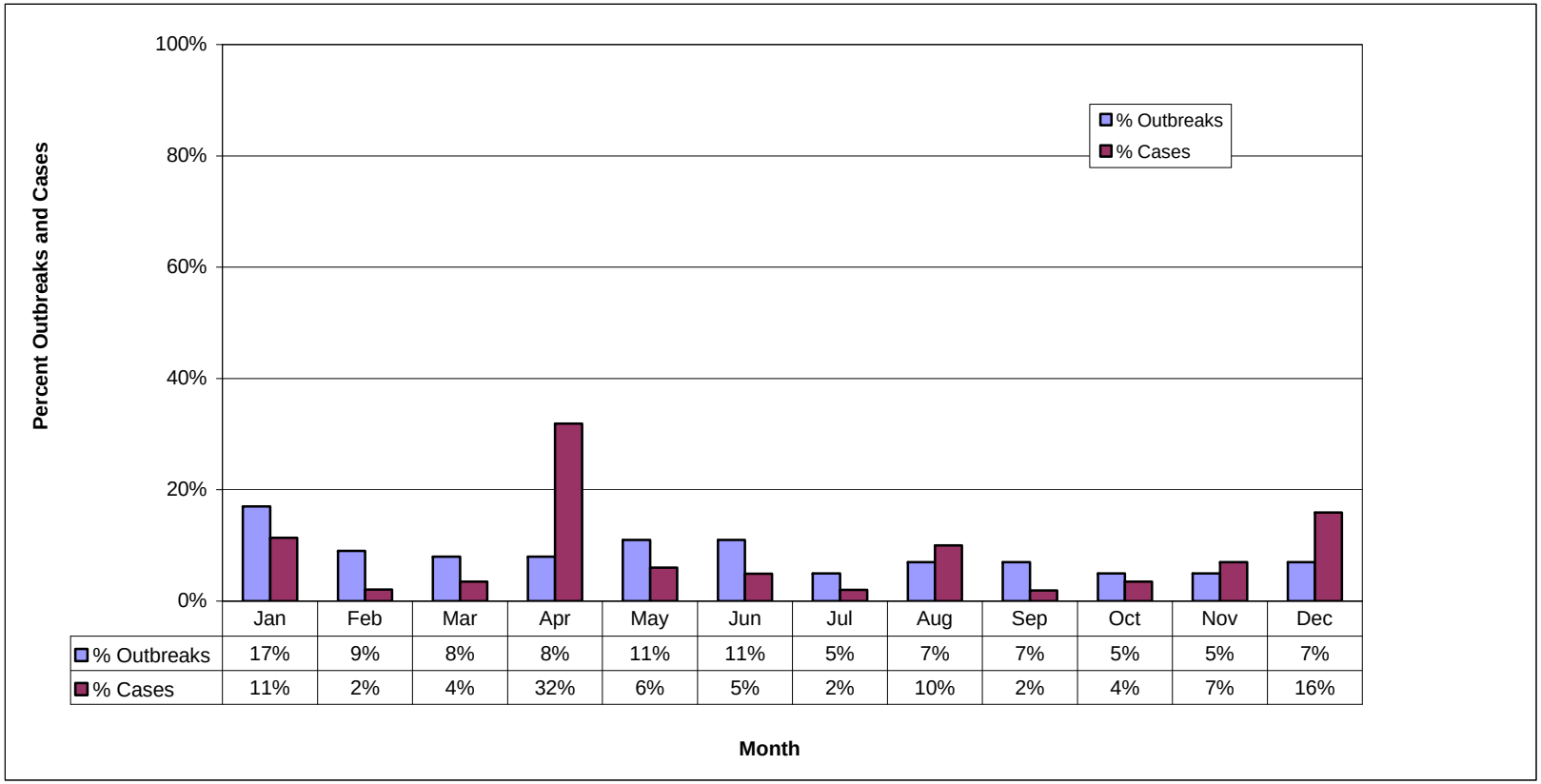


	Beef	Drink	Dairy	Fish	Ice	Multiple Ingred/Items	Pizza	Pork	Poultry	Produce-Veg	Rice	Shellfish-Molluscan	Unk	Rec H2O
% Outbreaks	4%	2%	1%	10%	2%	38%	1%	4%	12%	4%	2%	7%	9%	4%
% Cases	3%	3%	0%	5%	1%	33%	0%	2%	5%	12%	0%	1%	33%	2%

Table 10: Number of Food and Waterborne Outbreaks and Outbreak-related Cases by Vehicle, Florida, 2008

Vehicle	Beef	Drink	Dairy	Fish	Ice	Multiple Ingred/Items	Pizza	Pork	Poultry	Produce Veg	Rice	Shellfish	Unk	Water-Rec	Total
# Outbreaks	4	2	1	10	2	38	1	4	12	4	2	7	9	4	**100**
# Cases	42	40	2	59	8	411	4	28	58	149	4	7	406	23	**1241**

Figure 15: Percent Total Food and Waterborne Outbreaks and Cases by Month, Florida, 2008



	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
% Outbreaks	17%	9%	8%	8%	11%	11%	5%	7%	7%	5%	5%	7%
% Cases	11%	2%	4%	32%	6%	5%	2%	10%	2%	4%	7%	16%

Table 11: Number of Food and Waterborne Outbreaks and Outbreak-related Cases by Month, Florida, 2008

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
# Outbreaks	17	9	8	8	11	11	5	7	7	5	5	7	**100**
# Cases	141	26	44	396	74	61	25	124	23	43	87	197	**1241**

Table 12: Food and Waterborne Outbreaks with Greater Than 10 Cases (n=24), Florida, 2008[13]

County	# Cases	Site	Vehicle	Pathogen	Pathogen Confirmation
Jackson	11	Grocery	Baked Ham	Staphylococcus	Confirmed
Nassau	13	Restaurant	Grouper	Ciguatera	Confirmed
Sarasota	13	Pool	Pool	Cryptosporidium	Confirmed
Lee	20	Restaurant	Undetermined	Norovirus	Confirmed
Orange	20	Caterer	Salad, Dinner Rolls	Norovirus	Confirmed
Orange	22	Restaurant	Salads, Cold Sandwiches, Pork Wontons	Norovirus	Confirmed
Brevard	24	Restaurant	Muffins	Norovirus	Confirmed
Pinellas	29	Caterer	Various Salad Items	Norovirus	Confirmed
Lake	33	School	Ice Tea & Ice	Norovirus	Confirmed
Nassau	33	Restaurant	Meatloaf	Norovirus	Confirmed
Leon	75	Sorority	Undetermined	Norovirus	Confirmed
Orange	84	Restaurant	Coleslaw	Norovirus	Confirmed
Pinellas	13	Restaurant	Pizza & Salad Dressing	Norovirus	Suspected
Dade	15	Home	Barracuda	Ciguatera	Suspected
Broward	16	Restaurant	Multiple	Norovirus	Suspected
Pinellas	18	Caterer	Sub Sandwiches	Norovirus	Suspected
Lee	23	Restaurant	Lettuce	Norovirus	Suspected
Leon	27	Caterer	Turkey	Norovirus	Suspected
Pinellas	39	Restaurant	Various Salad Items	Norovirus	Suspected
Duval	129	Caterer	Gravy	C. perfringens	Suspected
Broward	13	Caterer	Ham	Unknown	Unknown
Osceola	14	Restaurant	Undetermined	Unknown	Unknown
Dade	30	Restaurant	Undetermined	Unknown	Unknown
Santa Rosa	260	Prison	Undetermined	Unknown	Unknown
Total Cases	**974**				

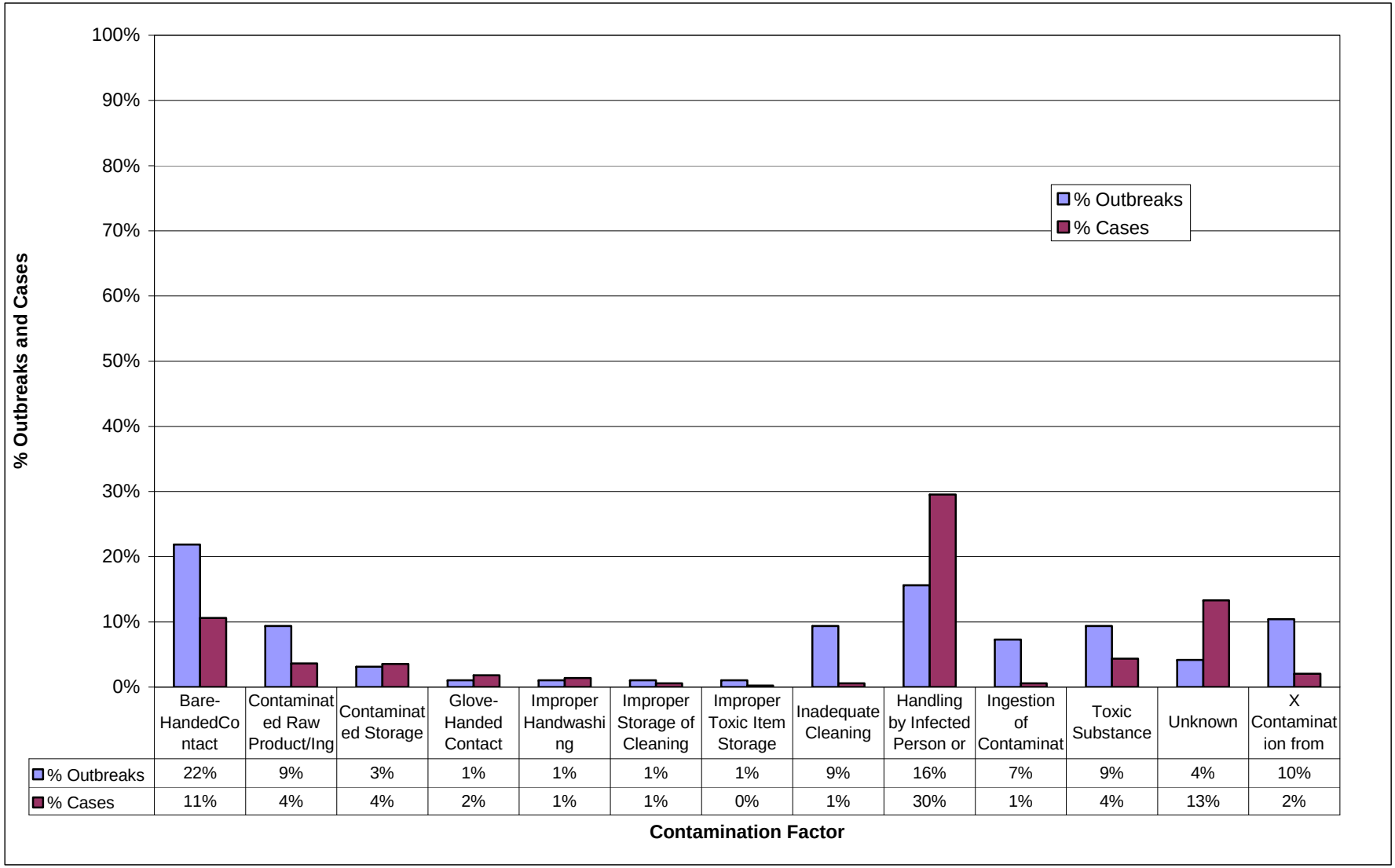
[13] The total number of outbreaks with more than ten cases is: 24 (24% of the total). The total number of cases associated with these outbreaks is 9746 (78% of the total).

Table 13: Eight Most Prevalent Contributing Factors by Foodborne Outbreak (n=96), Florida, 2008

Contributing Factor[14]	# Outbreaks	# Cases
Contamination Factor		
Bare-Handed Contact	21	129
Handling by Infected Person or Carrier	15	360
Proliferation/amplification Factor		
Inadequate Cold Holding Temperature	14	49
Insufficient Time Hot Holding	7	143
Survival Factor		
Insufficient Time/Temperature Control During Cooking/Processing	3	136
Improper Sanitization	2	5
Method of Preparation		
Cook/Serve	19	58
Multiple Items	13	103

[14] 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.

Figure 16: Contamination Factor – Percent Total Foodborne Outbreaks (n=96) and Outbreak-related Cases (n=1218), Florida, 2008 [15]



	Bare-HandedContact	Contaminated Raw Product/Ing	Contaminated Storage	Glove-Handed Contact	Improper Handwashing	Improper Storage of Cleaning	Improper Toxic Item Storage	Inadequate Cleaning	Handling by Infected Person or	Ingestion of Contaminat	Toxic Substance	Unknown	X Contamination from
% Outbreaks	22%	9%	3%	1%	1%	1%	1%	9%	16%	7%	9%	4%	10%
% Cases	11%	4%	4%	2%	1%	1%	0%	1%	30%	1%	4%	13%	2%

[15] 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 14: Contamination Factor - Number of Foodborne Outbreaks (n=96) and Outbreak-related Cases (n=1218), Florida, 2008

Contamination Factor	# Outbreaks	# Cases
Bare-Handed Contact	21	129
Contaminated Raw Product/Ingredient	9	44
Contaminated Storage	3	43
Glove-Handed Contact	1	22
Improper Handwashing	1	17
Improper Storage of Cleaning Aids	1	7
Improper Toxic Item Storage	1	3
Inadequate Cleaning	9	7
Handling by Infected Person or Carrier	15	360
Ingestion of Contaminated Raw Products	7	7
Toxic Substance	9	53
Unknown	4	162
Cross Contamination from Raw Ingredient of Animal Origin	10	25

Table 15: Contamination Factor: Number of Foodborne Outbreaks (n=96) by Vehicle, Florida 2008

Contamination Factor	Beef	Drink	Dairy	Fish	Ice	Mult Ingred/ Items	Pork	Poultry	Vegetables	Rice	Molluscan Shellfish	Unk	Total
Bare-Handed Contact	1	1	0	0	1	11	2	5	0	0	0	0	21
Contaminated Raw Product/Ingredient	1	0	0	0	0	0	0	1	0	0	7	0	9
Contaminated Storage	0	0	0	0	1	1	0	0	0	0	0	1	3
Glove-Handed Contact	0	0	0	0	0	1	0	0	0	0	0	0	1
Improper Handwashing	0	0	0	0	0	0	0	0	0	0	0	1	1
Improper Storage of Cleaning Aids	0	0	0	0	0	1	0	0	0	0	0	0	1
Improper Toxic Item Storage	0	1	0	0	0	0	0	0	0	0	0	0	1
Inadequate Cleaning	0	0	0	0	1	4	1	1	1	0	0	1	9
Handling by Infected Person or Carrier	1	1	0	0	0	7	0	1	3	0	0	2	15
Ingestion of Contaminated Raw Products	0	0	0	0	0	0	0	0	0	0	7	0	7
Toxic Substance	0	0	0	9	0	0	0	0	0	0	0	0	9
Unknown	0	0	0	0	0	2	0	0	1	0	0	1	4
Cross Contamination from Raw Ingredient of Animal Origin	1	0	1	0	0	3	0	4	0	1	0	0	10
Total	**4**	**3**	**1**	**9**	**3**	**30**	**3**	**12**	**5**	**1**	**14**	**6**	**91**

Table 16: Contamination Factor: Number of Foodborne Outbreak-related Cases (n=1218) by Vehicle, Florida 2008

Contamination Factor	Beef	Drink	Dairy	Fish	Ice	Mult Ingred/ Items	Pork	Poultry	Vegetables	Rice	Molluscan Shellfish	Unk	Total
Bare-Handed Contact	2	33	0	0	3	75	4	12	0	0	0	0	129
Contaminated Raw Product/Ingredient	4	0	0	0	0	0	0	5	0	0	7	0	16
Contaminated Storage	0	0	0	0	5	9	0	0	0	0	0	14	28
Glove-Handed Contact	0	0	0	0	0	22	0	0	0	0	0	0	22
Improper Handwashing	0	0	0	0	0	0	0	0	0	0	0	7	7
Improper Storage of Cleaning Aids	0	0	0	0	0	3	0	0	0	0	0	0	3
Improper Toxic Item Storage	0	7	0	0	0	0	0	0	0	0	0	0	7
Inadequate Cleaning	0	0	0	0	5	51	2	2	84	0	0	14	158
Handling by Infected Person or Carrier	33	33	0	0	0	111	0	27	126	0	0	30	360
Ingestion of Contaminated Raw Products	0	0	0	0	0	0	0	0	0	0	7	0	7
Toxic Substance	0	0	0	53	0	0	0	0	0	0	0	0	53
Unknown	0	0	0	0	0	131	0	0	23	0	0	8	162
Cross Contamination from Raw Ingredient of Animal Origin	3	0	2	0	0	7	0	11	0	2	0	0	25
Total	42	73	2	53	13	409	6	57	233	2	14	73	977

Table 17: Contamination Factor: Number of Foodborne Outbreaks (n=96) by Pathogen, Florida 2008

Contamination Factor	*B. cereus*	*C. perfringens*	*Campy*	Chemical	Ciguatera	*E. coli* O157:H7	Norovirus	*Salmonella*	*Staph*	Unk	*V. vulnificus*	Total
Bare-Handed Contact	1	0	1	0	0	0	7	1	2	9	0	21
Contaminated Raw Product/Ingred	0	0	0	0	0	1	0	0	0	1	7	9
Contaminated Storage	0	0	0	0	0	0	0	0	0	3	0	3
Glove-Handed Contact	0	0	0	0	0	0	1	0	0	0	0	1
Improper Handwashing	0	0	0	0	0	0	1	0	0	0	0	1
Improper Storage of Cleaning Aids	0	0	0	1	0	0	0	0	0	0	0	1
Improper Toxic Item Storage	0	0	0	1	0	0	0	0	0	0	0	1
Inadequate Cleaning	0	0	1	0	0	0	4	0	0	4	0	9
Handling by Infected Person or Carrier	0	0	0	0	0	0	15	0	0	0	0	15
Ingestion of Contaminated Raw Products	0	0	0	0	0	0	0	0	0	0	7	7
Toxic Substance	0	0	0	0	9	0	0	0	0	0	0	9
Unknown	0	1	0	0	0	0	2	0	0	1	0	4
X Contamination from Raw Ingredient of Animal Origin	3	0	1	0	0	1	0	0	3	2	0	10
Total	**4**	**1**	**3**	**2**	**9**	**2**	**30**	**1**	**5**	**20**	**14**	**91**

Table 18: Contamination Factor: Number of Foodborne Outbreak-related Cases (n=1218) by Pathogen, Florida 2008

Contamination Factor	*B. cereus*	*C. perfringens*	*Campy*	Chemical	Ciguatera	*E. coli* O157:H7	Norovirus	*Salmonella*	*Staph*	Unk	*V. vulnificus*	Total
Bare-Handed Contact	4	0	2	0	0	0	88	2	4	29	0	129
Contaminated Raw Product/Ingred	0	0	0	0	0	4	0	0	0	5	7	16
Contaminated Storage	0	0	0	0	0	0	0	0	0	28	0	28
Glove-Handed Contact	0	0	0	0	0	0	22	0	0	0	0	22
Improper Handwashing	0	0	0	0	0	0	7	0	0	0	0	7
Improper Storage of Cleaning Aids	0	0	0	3	0	0	0	0	0	0	0	3
Improper Toxic Item Storage	0	0	0	7	0	0	0	0	0	0	0	7
Inadequate Cleaning	0	0	2	0	0	0	126	0	0	30	0	158
Handling by Infected Person or Carrier	0	0	0	0	0	0	360	0	0	0	0	360
Ingestion of Contaminated Raw Products	0	0	0	0	0	0	0	0	0	0	7	7
Toxic Substance	0	0	0	0	53	0	0	0	0	0	0	53
Unknown	0	129	0	0	0	0	31	0	0	2	0	162
Cross Contamination from Raw Ingredient of Animal Origin	8	0	2	0	0	3	0	0	7	5	0	25
Total	**12**	**129**	**6**	**10**	**53**	**7**	**634**	**2**	**11**	**99**	**14**	**977**

Figure 17: Proliferation/Amplification Factor: Percent Total Foodborne Outbreaks (n=96) and Outbreak-related Cases (n=1218), Florida, 2008[16]

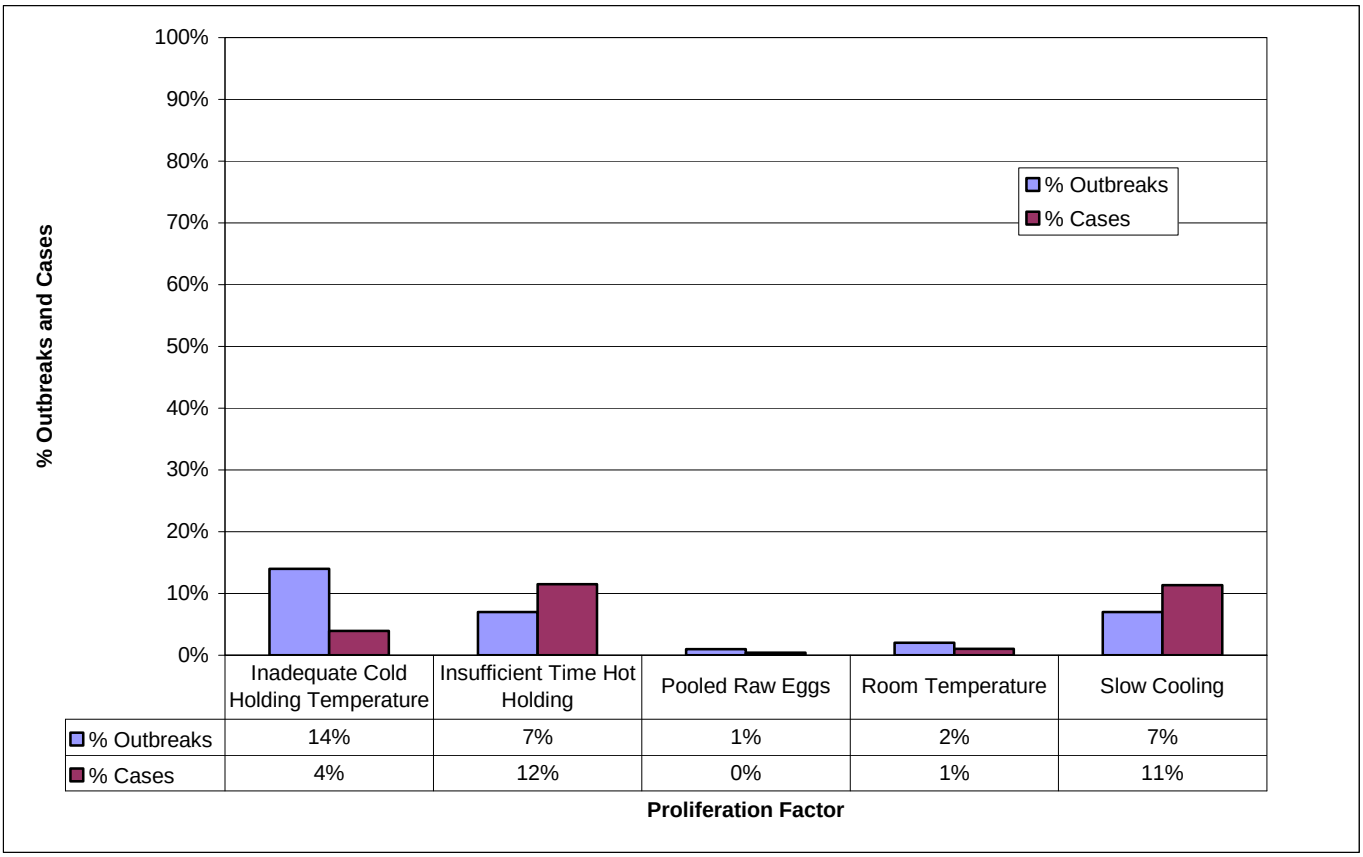


Table 19: Proliferation/Amplification Factor: Number of Foodborne Outbreaks (n=96) and Outbreak-related Cases (n=1218), Florida, 2008

Proliferation Factor	# Outbreaks	# Cases
Inadequate Cold Holding Temperature	14	49
Insufficient Time Hot Holding	7	143
Pooled Raw Eggs	1	5
Room Temperature	2	13
Slow Cooling	7	141

[16] 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 20: Proliferation/Amplification Factor: Number of Foodborne Outbreaks (n=96) by Vehicle, Florida 2008

Proliferation Factor	Beef	Dairy	Multiple Ingred/Items	Pork	Poultry	Rice	Total
Inadequate Cold Holding T	0	1	6	1	4	2	14
Insufficient Time Hot Holding	1	0	5	0	0	1	7
Pooled Raw Eggs	0	0	0	0	1	0	1
Room Temperature	0	0	2	0	0	0	2
Slow Cooling	1	0	5	0	1	0	7
Total	**2**	**1**	**18**	**1**	**6**	**3**	**31**

Table 21: Proliferation/Amplification Factor: Number of Foodborne Outbreak-related Cases (n=1218) by Vehicle, Florida 2008

Proliferation Factor	Beef	Dairy	Multiple Ingred/Items	Pork	Poultry	Rice	Total
Inadequate Cold Holding T	0	2	33	2	8	4	49
Insufficient Time Hot Holding	2	0	139	0	0	2	143
Pooled Raw Eggs	0	0	0	0	5	0	5
Room Temperature	0	0	13	0	0	0	13
Slow Cooling	2	0	137	0	2	0	141
Total	**4**	**2**	**322**	**2**	**15**	**6**	**351**

Table 22: Proliferation/Amplification Factor: Number of Foodborne Outbreaks (n=96) by Etiologic Agent, Florida 2008

Pathogen	Inadequate Cold Holding T	Insufficient Time Hot Holding	Pooled Raw Eggs	Room Temperature	Slow Cooling	Total
B. cereus	3	2	0	0	2	7
C. perfringens	0	1	0	0	1	2
Campylobacter	1	0	0	0	0	1
Norovirus	1	0	0	0	0	1
Salmonella	1	0	0	1	0	2
Staphylococcus	3	1	0	0	1	5
Unknown	5	3	1	1	3	13
Total	**14**	**7**	**1**	**2**	**7**	**31**

Table 23: Proliferation/Amplification Factor: Number of Foodborne Outbreak-related Cases (n=1218) by Etiologic Agent, Florida 2008

Pathogen	Inadequate Cold Holding T	Insufficient Time Hot Holding	Pooled Raw Eggs	Room Temperature	Slow Cooling	Total
B. cereus	6	4	0	0	4	14
C. perfringens	0	129	0	0	129	258
Campylobacter	2	0	0	0	0	2
Norovirus	13	0	0	0	0	13
Salmonella	2	0	0	5	0	7
Staphylococcus	6	2	0	0	2	10
Unknown	20	8	5	8	6	47
Total	**49**	**143**	**5**	**13**	**141**	**351**

Figure 18: Survival Factor: Percent Total Foodborne Outbreaks (n=96) and Outbreak-related Cases (n=1218), Florida, 2008[17]

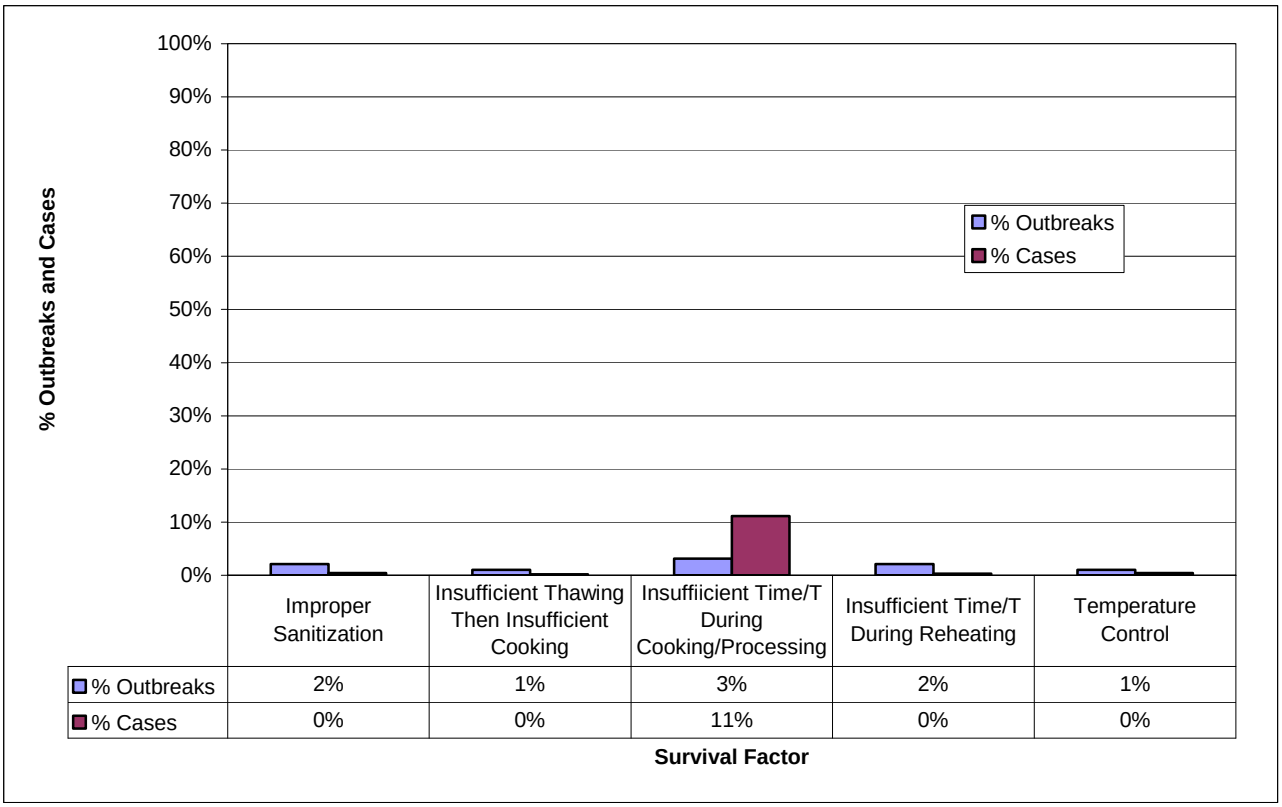


Table 24: Survival Factor:
Number of Foodborne Outbreaks (n=96) and Outbreak-related Cases (n=1218), Florida, 2008

Survival Factor	# Outbreaks	# Cases
Improper Sanitization	2	5
Insufficient Thawing Then Insufficient Cooking	1	2
Insufficient Time/T During Cooking/Processing	3	136
Insufficient Time/T During Reheating	2	4
Temperature Control	1	5

[17] 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 25: Survival Factor: Number of Foodborne Outbreaks (n=96) by Vehicle, Florida 2008

Survival Factor	Beef	Multiple Ingred/Items	Poultry	Total
Improper Sanitization	0	2	0	2
Insufficient Thawing Then Insufficient Cooking	0	0	1	1
Insufficient Time/T During Cooking/Processing	2	1	0	3
Insufficient Time/T During Reheating	0	1	1	2
Temperature Control	0	0	1	1
Total	**2**	**4**	**3**	**9**

Table 26: Survival Factor: Number of Foodborne Outbreak-related Cases (n=1218) by Vehicle, Florida 2008

Survival Factor	Beef	Multiple Ingred/Items	Poultry	Total
Improper Sanitization	0	5	0	5
Insufficient Thawing Then Insufficient Cooking	0	0	2	2
Insufficient Time/T During Cooking/Processing	7	129	0	136
Insufficient Time/T During Reheating	0	2	2	4
Temperature Control	0	0	5	5
Total	**7**	**136**	**9**	**152**

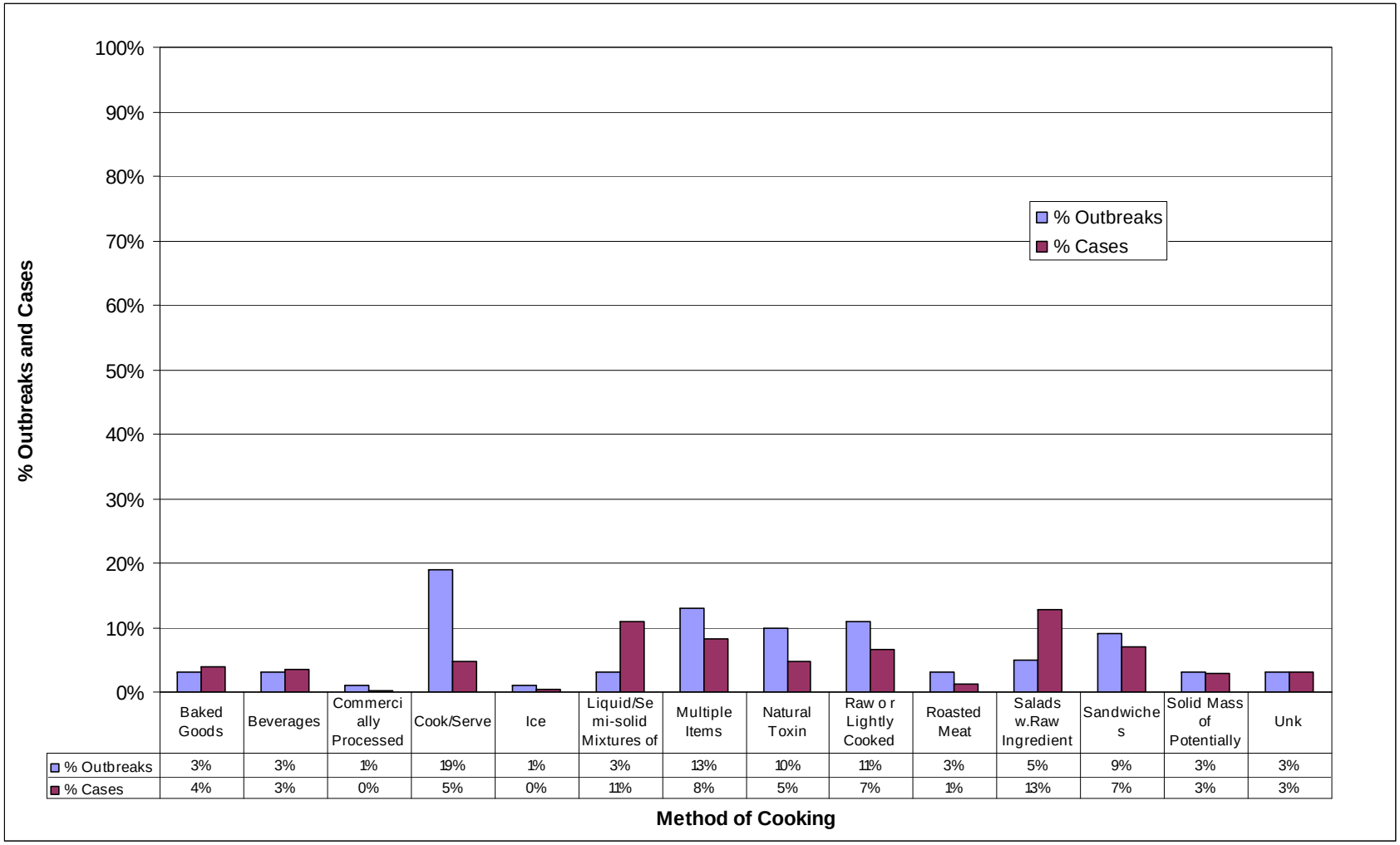
Table 27: Survival Factor: Number of Foodborne Outbreaks (n=96) by Etiologic Agent, Florida 2008

Pathogen	*C. perfringens*	*E. coli* O157:H7	*Staph*	Unk	Total
Improper Sanitization	0	0	1	1	2
Insufficient Thawing Then Insufficient Cooking	0	0	0	1	1
Insufficient Time/Temperature During Cooking/Processing	1	2	0	0	3
Insufficient Time/Temperature During Reheating	0	0	0	2	2
Temperature Control	0	0	0	1	1
Total	**1**	**2**	**1**	**5**	**9**

Table 28: Survival Factor: Number of Foodborne Outbreak-related Cases (n=1218) by Etiologic Agent, Florida 2008

Pathogen	*C. perfringens*	*E. coli* O157:H7	*Staph*	Unk	Total
Improper Sanitization	0	0	2	3	5
Insufficient Thawing Then Insufficient Cooking	0	0	0	2	2
Insufficient Time/Temperature During Cooking/Processing	129	7	0	0	136
Insufficient Time/Temperature During Reheating	0	0	0	4	4
Temperature Control	0	0	0	5	5
Total	**129**	**7**	**2**	**14**	**152**

Figure 19: Method of Preparation: Percent Foodborne Outbreaks (n=96) and Outbreak-related Cases (n=1218), Florida, 2008[18]



	Baked Goods	Beverages	Commercially Processed	Cook/Serve	Ice	Liquid/Semi-solid Mixtures of	Multiple Items	Natural Toxin	Raw or Lightly Cooked	Roasted Meat	Salads w.Raw Ingredient	Sandwiches	Solid Mass of Potentially	Unk
% Outbreaks	3%	3%	1%	19%	1%	3%	13%	10%	11%	3%	5%	9%	3%	3%
% Cases	4%	3%	0%	5%	0%	11%	8%	5%	7%	1%	13%	7%	3%	3%

[18] 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 29: Method of Preparation:
Number of Foodborne Outbreaks (n=96) and Outbreak-related Cases (n=1218), Florida, 2008

Method	# Outbreaks	# Cases
Baked Goods	3	48
Beverages	3	43
Commercially Processed Foods	1	2
Cook/Serve	19	58
Ice	1	5
Liquid/Semi-solid Mixtures of Potentially Hazardous Foods	3	136
Multiple Items	13	103
Natural Toxin	10	59
Raw or Lightly Cooked	11	82
Roasted Meat	3	15
Salads with Raw Ingredients	5	158
Sandwiches	9	88
Solid Mass of Potentially Hazardous Foods	3	37
Unknown	3	38

Table 30: Method of Preparation: Number of Foodborne Outbreaks (n=96) by Vehicle, Florida 2008

Method	Beef	Drink	Dairy	Fish	Ice	Multiple Ingred/Items	Pizza	Pork	Poultry	Vegetable	Rice	Molluscan Shellfish	Unk	Total
Baked Goods	0	0	0	0	0	2	1	0	0	0	0	0	0	3
Beverages	0	2	0	0	1	0	0	0	0	0	0	0	0	3
Commercially Processed Foods	0	0	1	0	0	0	0	0	0	0	0	0	0	1
Cook/Serve	2	0	0	0	0	7	0	2	7	0	1	0	0	19
Ice	0	0	0	0	1	0	0	0	0	0	0	0	0	1
Liquid/Semi-solid Mixtures of Potentially Hazardous Foods	0	0	0	0	0	2	0	0	1	0	0	0	0	3
Multiple Items	0	0	0	0	0	11	0	0	0	0	0	0	2	13
Natural Toxin	0	0	0	10	0	0	0	0	0	0	0	0	0	10
Raw o r Lightly Cooked	1	0	0	0	0	1	0	0	0	2	0	7	0	11
Roasted Meat	0	0	0	0	0	1	0	2	0	0	0	0	0	3
Salads w. Raw Ingredients	0	0	0	0	0	3	0	0	0	2	0	0	0	5
Sandwiches	0	0	0	0	0	7	0	0	2	0	0	0	0	9
Solid Mass of Potentially Hazardous Foods	1	0	0	0	0	1	0	0	0	0	1	0	0	3
Unknown	0	0	0	0	0	0	0	0	0	0	0	0	3	3
Total	**4**	**2**	**1**	**10**	**2**	**35**	**1**	**4**	**10**	**4**	**2**	**7**	**5**	**87**

Table 31: Method of Preparation: Number of Foodborne Outbreak-related Cases (n=1218) by Vehicle, Florida 2008

Method	Beef	Drink	Dairy	Fish	Ice	Multiple Ingred/Items	Pizza	Pork	Poultry	Vegetable	Rice	Molluscan Shellfish	Unk	Total
Baked Goods	0	0	0	0	0	44	4	0	0	0	0	0	0	48
Beverages	0	40	0	0	3	0	0	0	0	0	0	0	0	43
Commercially Processed Foods	0	0	2	0	0	0	0	0	0	0	0	0	0	2
Cook/Serve	5	0	0	0	0	19	0	15	17	0	2	0	0	58
Ice	0	0	0	0	5	0	0	0	0	0	0	0	0	5
Liquid/Semi-solid Mixtures of Potentially Hazardous Foods	0	0	0	0	0	131	0	0	5	0	0	0	0	136
Multiple Items	0	0	0	0	0	82	0	0	0	0	0	0	21	103
Natural Toxin	0	0	0	59	0	0	0	0	0	0	0	0	0	59
Raw o r Lightly Cooked	4	0	0	0	0	29	0	0	0	42	0	7	0	82
Roasted Meat	0	0	0	0	0	2	0	13	0	0	0	0	0	15
Salads w. Raw Ingredients	0	0	0	0	0	51	0	0	0	107	0	0	0	158
Sandwiches	0	0	0	0	0	59	0	0	29	0	0	0	0	88
Solid Mass of Potentially Hazardous Foods	33	0	0	0	0	2	0	0	0	0	2	0	0	37
Unknown	0	0	0	0	0	0	0	0	0	0	0	0	38	38
Total	**42**	**40**	**2**	**59**	**8**	**419**	**4**	**28**	**51**	**149**	**4**	**7**	**59**	**872**

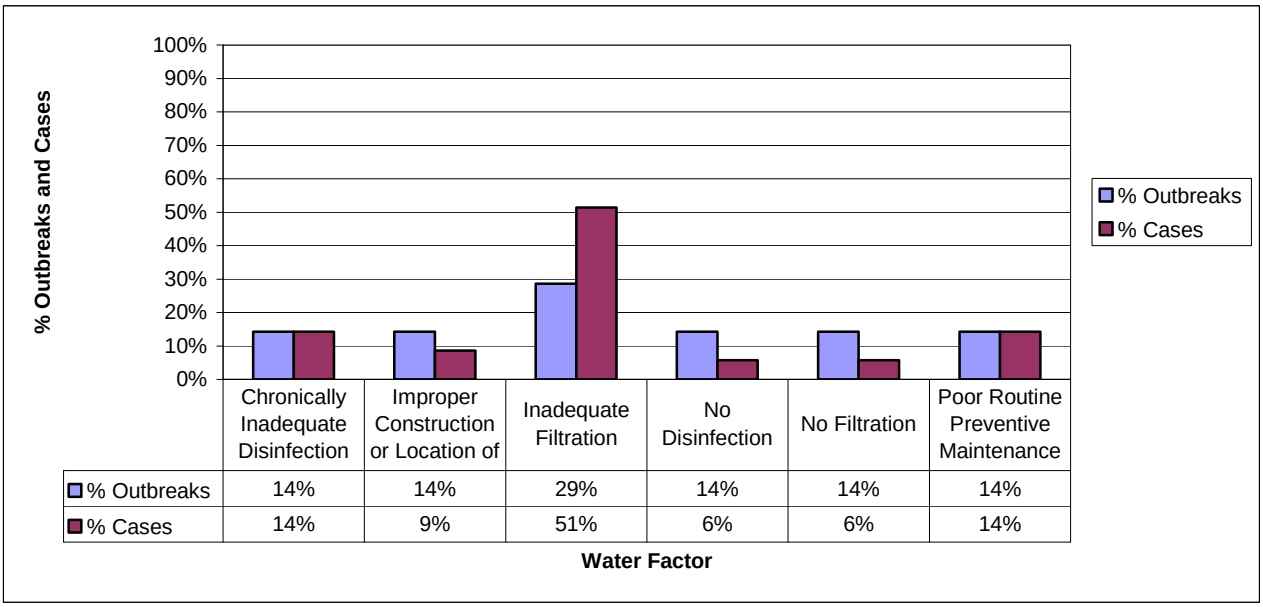
Table 32: Method of Preparation: Number of Foodborne Outbreaks (n=96) by Etiologic Agent, Florida 2008

Pathogen	*B. cereus*	*C. perfringens*	*Campy*	Chemical	Ciguatera	*E. coli* 157:H7	Norovirus	*Salmonella*	*Staph*	Unk	*V. vulnificus*	Total
Unk	0	0	0	0	0	0	3	0	0	0	0	3
Baked Goods	0	0	0	0	0	0	2	0	0	1	0	3
Drinks	0	0	0	1	0	0	2	0	0	0	0	3
Commercial Preparation	1	0	0	0	0	0	0	0	0	0	0	1
Cook/Serve	3	0	0	1	0	1	0	1	3	10	0	19
Ice	0	0	0	0	0	0	0	0	0	1	0	1
Liquid/Semi-Solid	0	1	0	0	0	0	1	0	0	1	0	3
Mult Ingred/Items	0	0	0	0	0	0	7	1	0	5	0	13
Natural Toxin	0	0	0	0	10	0	0	0	0	0	0	10
Raw Or Lightly Cooked	0	0	0	0	0	1	3	0	0	0	7	11
Roasted Meats	0	0	0	0	0	0	0	0	3	0	0	3
Salads W. Cooked/Raw Ingred	0	0	0	0	0	0	4	0	0	1	0	5
Sandwiches	0	0	1	0	0	0	4	0	0	4	0	9
Solid Mass	2	0	0	0	0	0	1	0	0	0	0	3
Total	**6**	**1**	**1**	**2**	**10**	**2**	**27**	**2**	**6**	**23**	**7**	**87**

Table 33: Method of Preparation: Number of Foodborne Outbreak-related Cases (n=1218) by Etiologic Agent, Florida 2008

Pathogen	*B. cereus*	*C. perfringens*	*Campy*	Chemical	Ciguatera	*E. coli* 157:H7	Norovirus	*Salmonella*	*Staph*	Unk	*V. vulnificus*	Total
Unk	0	0	0	0	0	0	38	0	0	0	0	38
Baked Goods	0	0	0	0	0	0	44	0	0	4	0	48
Drinks	0	0	0	7	0	0	36	0	0	0	0	43
Commercial Preparation	2	0	0	0	0	0	0	0	0	0	0	2
Cook/Serve	8	0	0	3	0	3	0	2	7	35	0	58
Ice	0	0	0	0	0	0	0	0	0	5	0	5
Liquid/Semi-Solid	0	129	0	0	0	0	2	0	0	5	0	136
Mult Ingred/Items	0	0	0	0	0	0	68	5	0	30	0	103
Natural Toxin	0	0	0	0	59	0	0	0	0	0	0	59
Raw Or Lightly Cooked	0	0	0	0	0	4	71	0	0	0	7	82
Roasted Meats	0	0	0	0	0	0	0	0	15	0	0	15
Salads W. Cooked/Raw Ingred	0	0	0	0	0	0	149	0	0	9	0	158
Sandwiches	0	0	2	0	0	0	76	0	0	10	0	88
Solid Mass	4	0	0	0	0	0	33	0	0	0	0	37
Total	**14**	**129**	**2**	**10**	**59**	**7**	**517**	**7**	**22**	**98**	**7**	**872**

Figure 20: Waterborne Disease Contributing Factors: Percent Total Waterborne Outbreaks (n=4) and Outbreak-related Cases (n=23), Florida, 2008[19]



	Chronically Inadequate Disinfection	Improper Construction or Location of	Inadequate Filtration	No Disinfection	No Filtration	Poor Routine Preventive Maintenance
% Outbreaks	14%	14%	29%	14%	14%	14%
% Cases	14%	9%	51%	6%	6%	14%

Table 34: Waterborne Disease Contributing Factors: Number of Waterborne Outbreaks (n=4) and Outbreak-related Cases (n=23), Florida, 2008

Water Factor	# Outbreaks	# Cases
Chronically Inadequate Disinfection	1	5
Improper Construction or Location of a Well or Spring	1	3
Inadequate Filtration	2	18
No Disinfection	1	2
No Filtration	1	2
Poor Routine Preventive Maintenance	1	5

[19] 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 35: Contributing Factors by Etiologic Agent for All Waterborne Outbreaks (n=4), Florida, 2008

Pathogen	Cryptosporidium	Legionella	Shigella	Total
Chronically Inadequate Disinfection	0	1	0	1
Improper Construction or Location of a Well or Spring	0	1	0	1
Inadequate Filtration	1	1	0	2
No Disinfection	0	0	1	1
No Filtration	0	0	1	1
Poor Routine Preventive Maintenance	0	1	0	1
Total	1	4	2	7

Table 36: Contributing Factors by Etiologic Agent for Cases Associated With All Waterborne Outbreaks (n=23), Florida, 2008

Pathogen	Cryptosporidium	Legionella	Shigella	Total
Chronically Inadequate Disinfection	0	5	0	5
Improper Construction or Location of a Well or Spring	0	3	0	3
Inadequate Filtration	13	5	0	18
No Disinfection	0	0	2	2
No Filtration	0	0	2	2
Poor Routine Preventive Maintenance	0	5	0	5
Total	13	18	4	35

Table 37: Line List of Waterborne Outbreaks (n=4), Florida, 2008

County	Status	# Cases	Site	Vehicle	Pathogen	Pathogen Status
Sarasota	Confirmed	13	Pool	Pool	Cryptosporidium	Confirmed
Orange	Confirmed	5	Pool	Hot Tub	Legionella	Confirmed
Orange	Confirmed	3	Pool	Hot Tub	Legionella	Confirmed
Hillsborough	Confirmed	2	Freshwater	Freshwater	Shigella	Confirmed
	Total Cases	**23**				

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[20]

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

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