Food and Waterborne Disease Program

www.foodandwaterdisease.com

FOOD AND WATERBORNE ILLNESS SURVEILLANCE AND INVESTIGATION

ANNUAL REPORT, FLORIDA, 2009

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OVERVIEW

PURPOSE

The Florida Department of Health investigate and report food and waterborne disease outbreaks, in part, as an effort to better understand and define the epidemiology of these diseases in the state. These surveillance data provide an indication of the etiologic agents, vehicles of transmission, and contributing factors associated with food and waterborne disease and help direct the public and stakeholders towards appropriate health actions to reduce illness and death caused by food and waterborne disease outbreaks.

The activities reported here are conducted and/or coordinated by Florida's Food and Waterborne Disease Program, in close partnership with county health department staff. The program facilitates outbreak investigations from preparation to intervention including:

- Planning and Preparation
- Surveillance and Outbreak Detection
- Investigation of Clusters and Outbreaks, and
- Control measures.

The Food and Waterborne Illness Surveillance and Investigation Annual Report is compiled to summarize epidemiologic data on food and waterborne disease outbreaks within the state of Florida in 2009 focusing on:

- Summarizing outbreak surveillance activities and
- Summarizing outbreak investigation findings.

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, $\geq$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

[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).

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 Vibrio 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.

THE FOOD AND WATERBORNE DISEASE PROGRAM

The Food and Waterborne disease program began in 1994 and is charged with monitoring and investigating all food and waterborne disease outbreaks in Florida. This program aims to rapidly detect, investigate, and intervene in food and waterborne disease outbreaks which could lead to preventing future outbreaks, reducing incidence of food and waterborne illness, and increasing the health of the general population. The program investigates outbreaks to prevent further spread of disease, to promote timely treatment of susceptible populations, and to prevent future similar outbreaks from occurring. With an estimated 18 M population and 83.9 M annual visitors to Florida, along with an aging and high risk population, the Department of Health continues its ongoing responsibility and authority for epidemiological investigation. The program is funded by the Departments of Business and Professional Regulation and Agriculture and Consumer Services through license fees. The Florida Department of Health's Food and Waterborne Disease Program bases its procedural activities and goals on the Florida Public Health Statutes translated through the Council to Improve Foodborne Outbreak Response (CIFOR) Guidelines for Foodborne Disease Outbreak Response recommendations. Without a coordinated Food and Waterborne Disease response, Florida would not be able to respond efficiently and in a timely manner to food and water complaints or to determine the cause of outbreaks and best practices needed to prevent them. See our website for more program details: www.foodandwaterdisease.com .

This program operates under the authority given below:

Authority

1. S. 381.006 (10), F.S. Addresses the environmental epidemiology function of DOH, including the investigation of food and waterborne disease.

2. Ss. 509.032 (2) (d) and 509.035 (1) (a), F.S. The first section addresses the adoption of rules by DBPR providing the standards and requirements for "cooperating and

[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)

coordinating with DOH in epidemiological investigations." The second section addresses the coordination between DBPR and DOH on closures of establishments due to a public health threat.

3. Rule 64D-3.029 & 64D-3.040 (4), (6), (8) & 64D-3.041, F.A.C. This rule is known as the reportable diseases rule and lists those diseases that are reportable in Florida, many of which are food and waterborne. The list also includes reporting of food and waterborne disease outbreaks as well as individually confirmed cases of illness. The rule also addresses the exclusion of foodworkers in certain situations and the posting of warnings regarding raw oyster consumption in restaurants. The rule also addresses epidemiological investigations.

4. Interagency Agreement between the Department of Business and Professional Regulation and the Department of Health (http://www.doh.state.fl.us/environment/medicine/foodsurveillance/investigation_docs/DBPR_DOH_Interagency_Agreement.pdf). This agreement clarifies the duties and responsibilities of DOH and DBPR with regard to conducting epidemiological investigations in public food service establishments licensed by DBPR.

The Food and Waterborne Disease Program carries out the activities of training and preparing county health department (CHD) staff in methods and procedures used in outbreak investigations, surveillance for the detection of food and waterborne diseases, investigation food and waterborne disease outbreaks, and reporting these incidents to appropriate authorities, with a staff of regional environmental epidemiologists (REE), a statewide coordinator, a counter bioterrorism coordinator, and administrative staff.

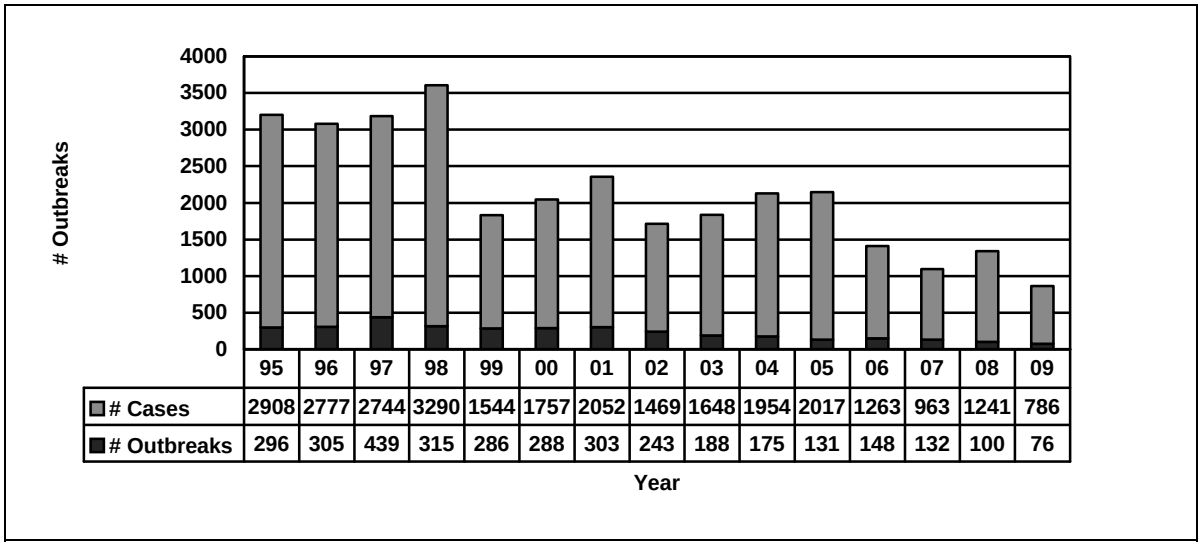
OUTBREAK SUMMARY 1995-2009

From 1995-2009, the Food and Waterborne Disease Program has investigated 3,425 outbreaks with 27,627 cases (Table 1, Figure 1). In addition to outbreak investigations, the program also follows up on 1,500 – 4,000 individual food and waterborne illness complaints every year. Training has been developed on investigation methods and specific pathogens are being presented around the state. In 2009, the number of foodborne outbreaks decreased to the lowest number since the start of the program in 1994: 76. There are several possibilities for this change that could include improved food and water safety practices, possible changes in use of outbreak definitions, and the implementation of an internal quality assurance review team to ensure consistency in reporting (deleting misclassified or inconclusive outbreaks from the data). Additional data years are needed to determine if this is a continuing positive trend. It is consistent with a national decrease in reported foodborne disease outbreaks. The rate of cases per 100,000 population decreased from 2008 (6.73 per 100,000) to 2009 (4.33 per 100,000).

TABLE 1: SUMMARY OF FOOD AND WATERBORNE ILLNESS OUTBREAKS REPORTED TO FLORIDA, 1989–2009[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
2009	76	786

FIGURE 1: NUMBER OF FOOD AND WATERBORNE OUTBREAKS AND OUTBREAK-RELATED CASES BY YEAR, FLORIDA, 1995-2009



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

PLANNING AND PREPARATION:

Having a planning and preparation system in place allows investigators to identify the source of an outbreak quickly and implement control measures more efficiently and effectively. Planning and preparation activities are far-reaching and include working with partner agencies and insuring that all know their roles and are adequately trained.

PARTNER AGENCIES

In Florida, food and waterborne disease outbreaks are coordinated through the Food and Waterborne Disease Program and county health departments; however, the regulatory authority over implicated facilities often lies under the purview of other agencies. These agencies have roles to perform that aid in the regulatory prevention, detection, investigation, and monitoring the implementation of control measures in facilities. The regulatory agencies in Florida are given below.

- The Department of Health, Division of Environmental Health regulates food service facilities and operations located in institutional settings (such as schools, assisted living facilities, and detention facilities), civic and fraternal organizations, theaters (that limit their menu to drinks, candy, popcorn, hotdogs, and nachos), and bars and lounges that don't prepare food.
- The Department of Business and Professional Regulation, Division of Hotels and Restaurants regulates public lodging and food service establishments.
- The Department of Agriculture and Consumer Service, Division of Food Safety regulates food establishments and food products in grocery stores and gas stations.
- The Department of Environmental Protection regulates public water systems.

EDUCATION AND TRAINING

Team members, county health departments and agency partners, are trained in the Food and Waterborne Disease Program's outbreak response protocols (based on CIFOR guidelines) and their role on the team by the food and waterborne disease program's regional environmental epidemiologists. The program provides training through on site classroom and some online self-study courses.

In 2009, training sessions were held around the state specifically targeting Department of Health environmental health and epidemiology staff. Sessions were also 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.

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 to public health students 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.

SURVEILLANCE AND OUTBREAK DETECTION:

Food and Waterborne disease outbreak surveillance in Florida involves the routine monitoring of food and waterborne illness complaints, confirmed enteric disease cases, and changes in normal disease trends potentially transmitted through food. The Food and Waterborne Disease Program uses pathogen specific surveillance with the Merlin system, complaint and outbreak surveillance in the statewide database, FWVSS and syndromic surveillance in the ESSENCE system.

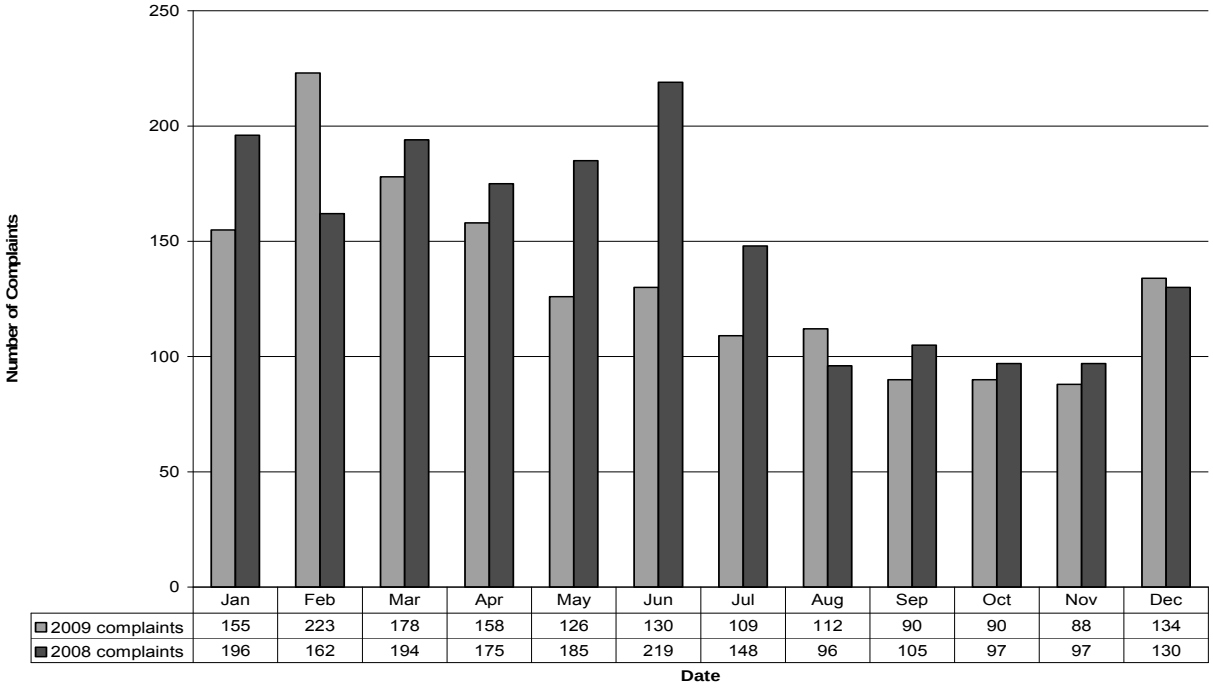
COMPLAINTS

In 2009, a total of 1,593 food and waterborne illness complaints were reported in Florida which is a 12% decrease compared to the 1,804 complaints that were reported in 2008 (Table 2). Of the 1,593 complaints, 1,265 were linked to Department of Business and Professional Regulation establishments; 205 to Department of Agriculture and Consumer Services establishments; 32 to Department of Health establishments; 3 to Department of Environmental Protection, and 88 to home, other, or unknown establishments. The months with the largest number of complaints reported in 2009 were February (223) and March (178) the months with the fewest complaints were September, October, and November (90, 90, and 88, respectively) (Figure 2). Dade and Broward counties reported the most food and waterborne illness complaints with 210 and 162 complaints respectively (Table 3).

TABLE 2: FOOD AND WATERBORNE DISEASE COMPLAINTS, OUTBREAKS, AND CASES REPORTED BY AGENCY OF JURISDICTION, 2008-2009

Agency	# Complaints	% Complaints	# Outbreaks	% Outbreaks	# Cases	% Cases
2008						
DACS	243	13%	9	9.00%	55	4.43%
DBPR	1410	78%	71	71.00%	703	56.65%
DEP	7	0%	0	0.00%	0	0.00%
DOH	48	3%	12	12.00%	434	34.97%
Other	96	5%	8	8.00%	49	3.95%
Total	1804	100%	100	100%	1241	100%
2009						
DACS	205	13%	5	6.58%	34	4.33%
DBPR	1265	79%	44	57.89%	446	56.74%
DEP	3	0%	0	0.00%	0	0.00%
DOH	32	2%	12	15.79%	185	23.54%
Other	88	6%	15	19.74%	121	15.39%
Total	1593	100%	76	100%	786	100%

FIGURE 2: COMPLAINTS REPORTED IN FLORIDA BY MONTH, 2008- 2009



	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2009 complaints	155	223	178	158	126	130	109	112	90	90	88	134
2008 complaints	196	162	194	175	185	219	148	96	105	97	97	130

TABLE 3: COMPLAINTS REPORTED IN FLORIDA BY COUNTY AND REGULATORY AGENCY, 2009

County	DBPR	DACS	DEP	DOH	Other	Total
Alachua	22	2	0	2	0	**26**
Baker	3	0	0	0	0	**3**
Bay	29	1	0	0	1	**31**
Bradford	1	1	0	0	0	**2**
Brevard	24	9	0	0	2	**35**
Broward	131	20	0	5	6	**162**
Calhoun	0	0	0	0	0	**0**
Charlotte	13	1	0	1	0	**15**
Citrus	12	3	0	0	0	**15**
Clay	8	5	0	0	0	**13**
Collier	43	5	0	1	0	**49**
Columbia	5	0	0	0	0	**5**
Dade	135	22	0	1	52	**210**
De Soto	3	0	0	0	0	**3**
Dixie	0	0	0	0	0	**0**
Duval	68	6	0	1	3	**78**
Escambia	61	6	0	1	0	**68**
Flagler	8	2	0	0	0	**10**
Franklin	0	0	0	0	0	**0**

County	DBPR	DACS	DEP	DOH	Other	Total
Gadsden	0	0	0	0	0	**0**
Gilchrist	0	0	0	0	0	**0**
Glades	0	0	0	1	0	**1**
Gulf	0	0	0	0	0	**0**
Hamilton	0	0	0	0	0	**0**
Hardee	0	0	0	0	0	**0**
Hendry	1	0	0	0	0	**1**
Hernando	8	3	0	0	1	**12**
Highlands	16	7	0	0	0	**23**
Hillsborough	66	9	2	1	4	**82**
Holmes	0	0	0	0	0	**0**
Indian River	12	1	0	0	0	**13**
Jackson	1	0	0	0	0	**1**
Jefferson	0	0	0	0	0	**0**
Lafayette	0	0	0	0	0	**0**
Lake	31	8	0	0	0	**39**
Lee	56	6	0	2	0	**64**
Leon	15	0	0	2	0	**17**
Levy	4	0	0	1	0	**5**
Liberty	0	0	0	0	0	**0**
Madison	0	0	0	0	0	**0**
Manatee	12	1	0	1	0	**14**
Marion	20	7	0	0	0	**27**
Martin	16	3	0	0	0	**19**
Monroe	10	6	0	0	2	**18**
Nassau	5	1	0	0	0	**6**
Okaloosa	5	0	0	1	1	**7**
Okeechobee	2	0	0	0	0	**2**
Orange	121	13	0	2	6	**142**
Osceola	7	1	0	0	0	**8**
Palm Beach	105	14	0	4	4	**127**
Pasco	14	4	0	1	0	**19**
Pinellas	44	3	1	1	1	**50**
Polk	13	3	0	0	1	**17**
Putnam	6	0	0	0	0	**6**
Saint Johns	4	2	0	0	0	**6**
Saint Lucie	9	4	0	0	0	**13**
Santa Rosa	7	0	0	0	0	**7**

County	DBPR	DACS	DEP	DOH	Other	Total
Sarasota	26	10	0	2	1	**39**
Seminole	38	8	0	0	0	**46**
Sumter	3	0	0	0	0	**3**
Suwannee	2	0	0	0	0	**2**
Taylor	0	0	0	0	0	**0**
Union	0	0	0	0	0	**0**
Volusia	12	7	0	0	3	**22**
Wakulla	0	0	0	0	0	**0**
Walton	0	0	0	0	0	**0**
Washington	0	0	0	0	0	**0**
Total	**1257**	**204**	**3**	**31**	**88**	**1583**

OUTBREAK INVESTIGATION SUMMARY 2009

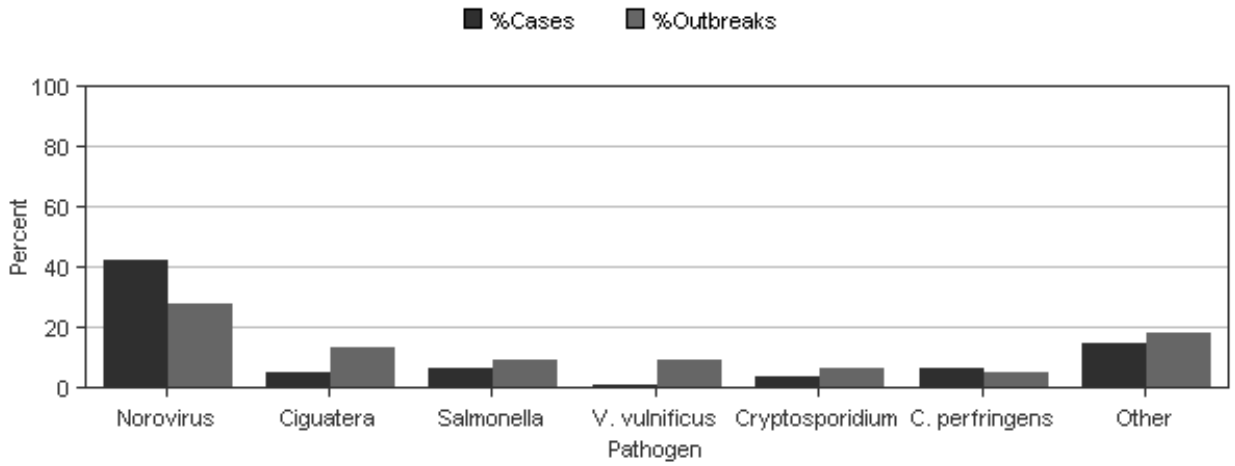
A total of 76 food and waterborne outbreaks with 786 cases were reported in 2009, a 24% decrease in outbreaks compared to the previous year (2008) 100 outbreaks with 1,247, which also showed a 24% decrease from 2007, 132 outbreaks and 963 (Table 1, Figure 1). Investigators were able to laboratory confirm 48% more outbreaks (52 outbreaks, 520 cases) than the previous year (32 outbreaks in 2008) (Table 4). Foodborne outbreaks numbered 65 with 715 cases (Table 5, and Figure 5). Eleven (11) waterborne outbreaks were reported in 2009, with a total of 71 cases (Table 5). The largest outbreak reported in 2009 was due to a norovirus outbreak in a Bay County restaurant with a total case count of 53, accounting for 7% of all outbreak-related cases reported in 2009 (Table 6).

Norovirus, ciguatera, *Salmonella* and *Vibrio vulnificus* were implicated in the largest percentage of the total reported outbreaks (17%, 13%, 9% and 9%, respectively) (Table 4, and Figure 3). After norovirus (32% outbreak-related cases), salmonella was identified as the pathogen with the largest percentage of cases in reported outbreaks (6%) followed by E. coli O157:H7 (5%). Restaurants were the exposure site in 55% of the outbreaks (42) reported and for 46% of the cases (359) (Table 7, Figure 6, and Figure 7). Multiple items/ingredients (33%), fish (16%), and recreational waters (12%) accounted for a total of 61% of all outbreaks. Multiple items/ingredients accounted for 51% of all outbreak-related cases, followed by produce-vegetables (11%) and recreational waters (8%) (Table 5 and Figure 5). The month with the largest percentage of outbreaks reported was January and August (each 14%) the largest percentage of cases were reported in May (20%) (Table 8 and Figure 8). Large (greater than 10 cases) outbreaks accounted for 33% (25) of the total reported outbreaks and 75% (588) of the total number of outbreak-related cases (Table 6).

TABLE 4: 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, 2009

# of outbreaks with confirmed pathogens	% of total outbreaks	Pathogen identified	total cases	% of cases with identified pathogen
1	1.30%	*C. PERFRINGENS*	30	3.74%
1	1.30%	*CHEMICAL*	27	3.36%
10	13.2%	*CIGUATERA*	41	5.22%
5	6.49%	*CRYPTOSPORIDIUM*	29	3.61%
1	1.30%	*E. COLI O157:H7*	42	5.23%
2	2.60%	*LEGIONELLA*	12	1.49%
3	3.90%	*N. FOWLERI*	3	0.37%
13	16.88%	*NOROVIRUS*	260	32.38%
7	9.09%	*SALMONELLA*	49	6.10%
1	1.30%	*SCOMBROID*	7	0.87%
1	1.30%	*SHIGELLA*	13	1.62%
7	9.09%	*V. VULNIFICUS*	7	0.87%
52	68.4%	Total	520	66.2%

FIGURE 3: FOOD AND WATERBORNE TOTAL OUTBREAKS - MOST COMMON PATHOGENS, 2009

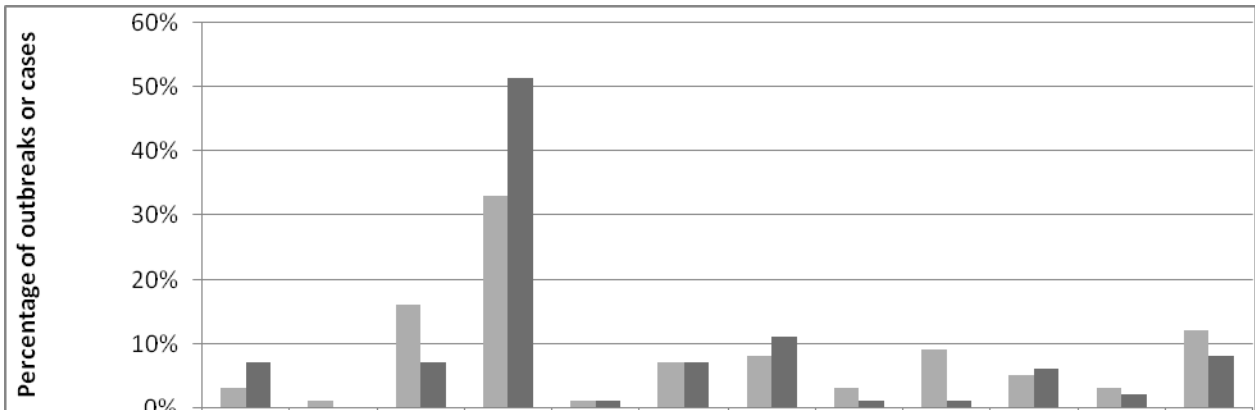


* Outbreaks with Unknown Pathogens: 10.5% (20.5% cases)

TABLE 5: NUMBER OF FOODBORNE AND WATERBORNE OUTBREAKS AND OUTBREAK-RELATED CASES BY VEHICLE, FLORIDA, 2009

GENERAL VEHICLE	Outbreaks	Cases
Foodborne Outbreaks		
SHELLFISH-CRUSTACEAN	0	0
BEVERAGE	1	3
PORK	1	4
SHELLFISH-MOLLUSCAN	7	7
RICE	2	8
UNKNOWN	4	45
BEEF	2	53
POULTRY	5	53
FISH	12	55
PRODUCE-VEGETABLE	6	83
MULTIPLE INGREDIENTS/Items	25	404
Foodborne Total	65	715
Waterborne Outbreaks		
Drinking Water	2	12
Recreational Water	9	59
Waterborne Total	11	71

FIGURE 5: FOOD AND WATERBORNE PERCENT TOTAL OUTBREAKS AND CASES BY VEHICLE, FLORIDA, 2009*



	Beef	Beverage	Fish	Multiple ingredient /items	Pork	Poultry	Produce-vegetable	Rice	Shellfish-mollusc an	Unknown	Water-drinking	Water-recreational
% Outbreak	3%	1%	16%	33%	1%	7%	8%	3%	9%	5%	3%	12%
% Cases	7%	0%	7%	51%	1%	7%	11%	1%	1%	6%	2%	8%

*Ingredients related to no outbreaks in 2009 were removed from table and include: Dairy, Ice, Pasta, Pizza, Produce Fruit, Shellfish-crustacean, and Water-other.

TABLE 6: FOOD AND WATERBORNE OUTBREAKS WITH GREATER THAN 10 CASES (N=25), FLORIDA, 2009

COUNTY	NO OF CASES	SITE	SPECIFIC VEHICLE	PATHOGEN	PATHOGEN STATUS
BAY	53	RESTAURANT	SALAD	NOROVIRUS	CONFIRMED
BROWARD	47	CATERER	FETTUCCINI ALFREDO WITH CHICKEN AND BROCCOLI	UNKNOWN	UNKNOWN
LAFAYETTE	42	PRISON	TURKEY HAM, CAKE, AND MACARONI AND CHEESE	E. COLI O157:H7	CONFIRMED
DADE	41	SCHOOL	BEEF	UNKNOWN	UNKNOWN
NASSAU	31	RESTAURANT	SALAD, ICE	NOROVIRUS	CONFIRMED
ORANGE	30	RESTAURANT	CITRUS VINAIGRETTE	NOROVIRUS	CONFIRMED
DUVAL	30	OTHER	STUFFED CHICKEN	C. PERFRINGENS	CONFIRMED
BROWARD	29	CATERER	TUNA SALAD, CHICKEN SALAD	NOROVIRUS	SUSPECTED
LEON	27	CATERER	MULTIPLE DISHES	UNKNOWN	UNKNOWN
HILLSBOROUGH	27	OTHER	RECREATIONALLY WATERBORNE EXPOSURE	CHEMICAL	CONFIRMED
PALM BEACH	25	RESTAURANT	MULTIPLE ITEMS	NOROVIRUS	CONFIRMED
LEE	24	RESTAURANT	SANDWICH WRAP	NOROVIRUS	CONFIRMED
ALACHUA	24	SCHOOL	ICE FROM ICE MACHINE AND SALAD BAR	NOROVIRUS	CONFIRMED
ORANGE	17	RESTAURANT	UNKNOWN	NOROVIRUS	CONFIRMED
PALM BEACH	15	RESTAURANT	PASTA SALAD	NOROVIRUS	SUSPECTED
BROWARD	14	RESTAURANT	MULTIPLE SANDWICHES	NOROVIRUS	CONFIRMED
BROWARD	14	RESTAURANT	UNKNOWN	SALMONELLA	CONFIRMED
PALM BEACH	13	OTHER	COOKIES	NOROVIRUS	CONFIRMED
ORANGE	13	HOME	MULTIPLE FOODS LIKELY DESERTS FROM MULTIPLE SOURCE	SHIGELLA	CONFIRMED
GLADES	13	PRISON	LIMA BEANS	UNKNOWN	UNKNOWN
DADE	13	CATERER	UNKNOWN	UNKNOWN	UNKNOWN
PALM BEACH	12	RESTAURANT	ROJA VIEJA	C. PERFRINGENS	SUSPECTED
LAFAYETTE	12	OTHER	POTLUCK-MULTIPLE FOODS	NOROVIRUS	CONFIRMED
BREVARD	11	RESTAURANT	UNKNOWN	NOROVIRUS	CONFIRMED
BREVARD	11	RESTAURANT	CHEESE PIZZA	UNKNOWN	UNKNOWN
Total	588				

The total number of outbreaks with more than ten cases is 25 (33% of the total). The total number of cases associated with these outbreaks is 588 (75% of the total)

TABLE 7: NUMBER OF FOODBORNE AND WATERBORNE OUTBREAKS AND OUTBREAK-RELATED CASES BY FACILITY TYPE, FLORIDA, 2009

	Caterer	Grocery	Home	Hospital	Nursing home	Other	Picnic	Pool	Prison	Private water	Public water	Restaurant	School	Total
Outbreaks	4	1	10	0	0	9	1	4	2	1	0	42	2	76
Cases	116	9	49	0	0	93	7	23	55	10	0	359	65	786

FIGURE 6: NUMBER OF FOODBORNE AND WATERBORNE OUTBREAKS AND OUTBREAK-RELATED CASES BY FACILITY TYPE, FLORIDA, 2009

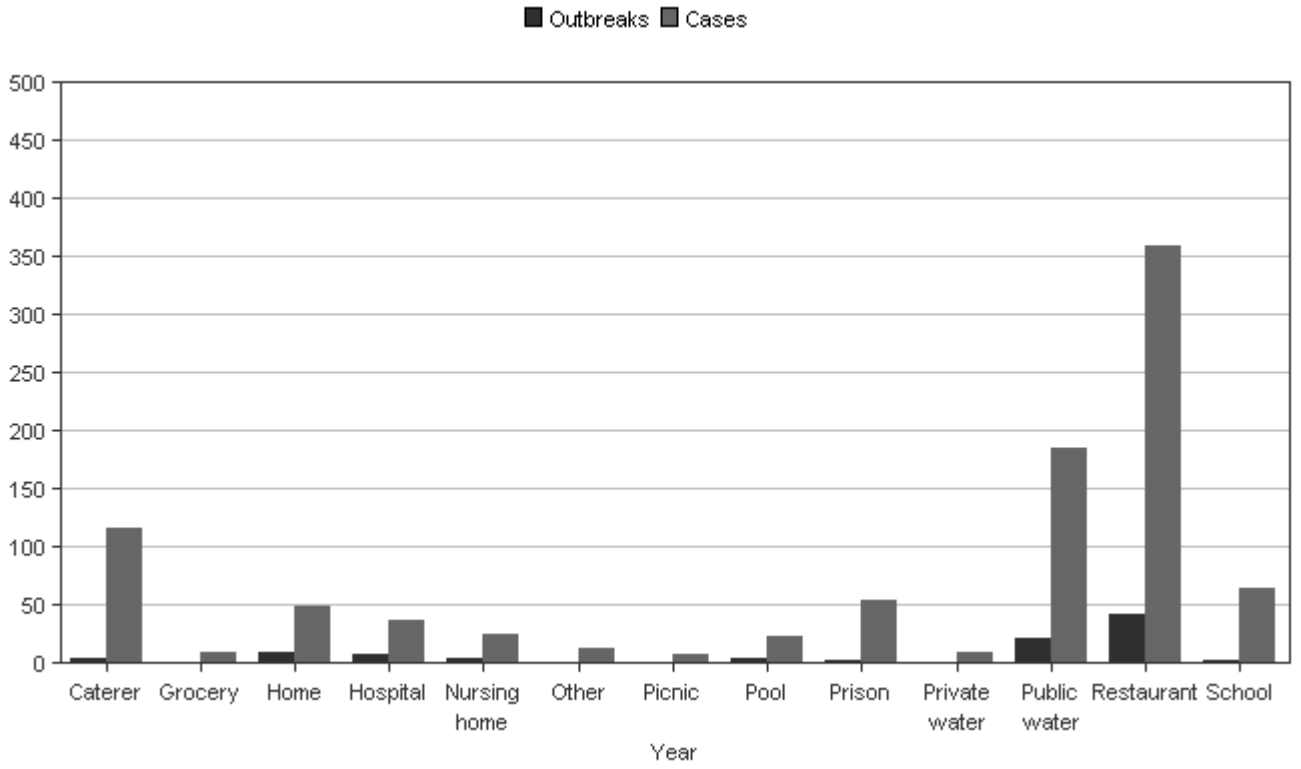


FIGURE 7: FOOD AND WATERBORNE PERCENT TOTAL OUTBREAKS AND CASES BY FACILITY TYPE, FLORIDA, 2009

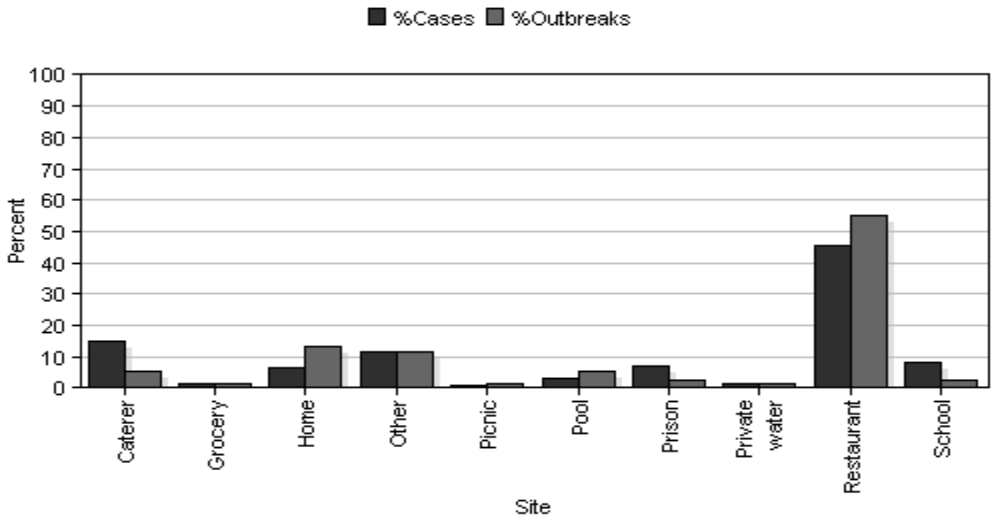
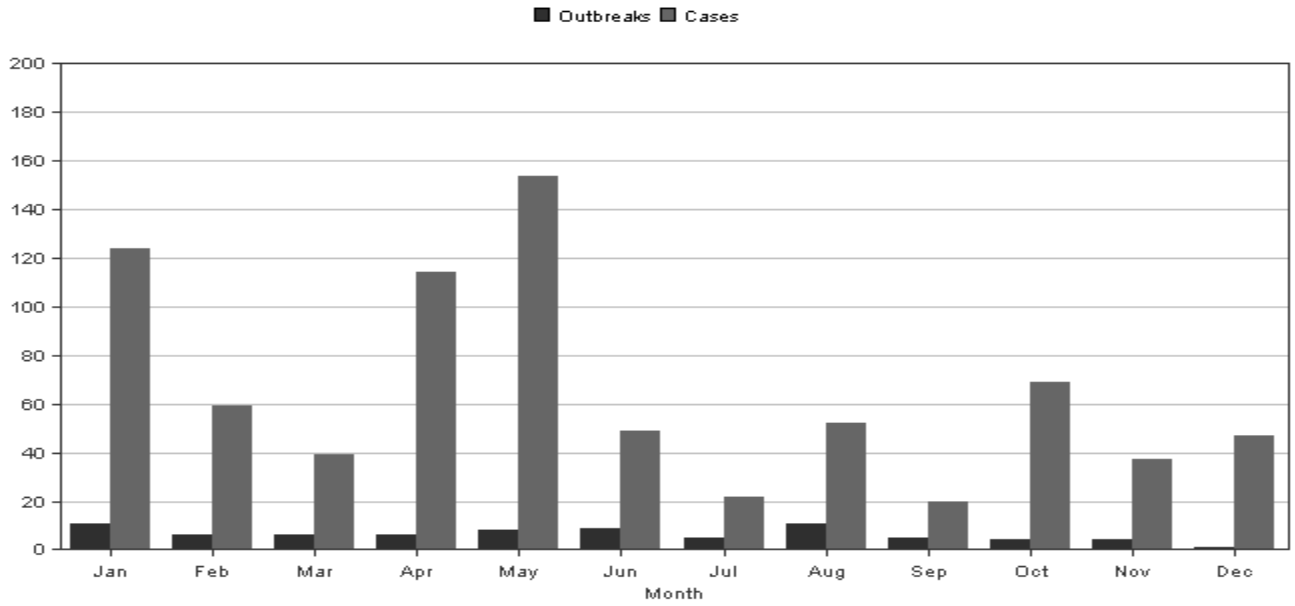


TABLE 8: FOOD AND WATERBORNE OUTBREAKS, AND RELATED CASES BY MONTH, FLORIDA, 2009

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Outbreaks	11	6	6	6	8	9	5	11	5	4	4	1	76
	14%	8%	8%	8%	11%	12%	7%	14%	7%	5%	5%	1%	
Cases	124	59	39	114	154	49	22	52	20	69	37	47	786
	16%	8%	5%	15%	20%	6%	3%	7%	3%	9%	5%	6%	

FIGURE 8: FOOD AND WATERBORNE OUTBREAKS, AND CASES BY MONTH, FLORIDA, 2009



SELECTED FLORIDA OUTBREAK PATHOGENS

Here we present 2009 information on some of the reportable diseases in Florida, *Vibrio vulnificus*, foodborne Hepatitis A, Staphyococcus, and *Salmonella*, and other outbreak related diseases with high incidence, *Norovirus* and unknown pathogens.

AN OVERVIEW OF VIBRIO *VULNIFICUS*, FLORIDA, 2009

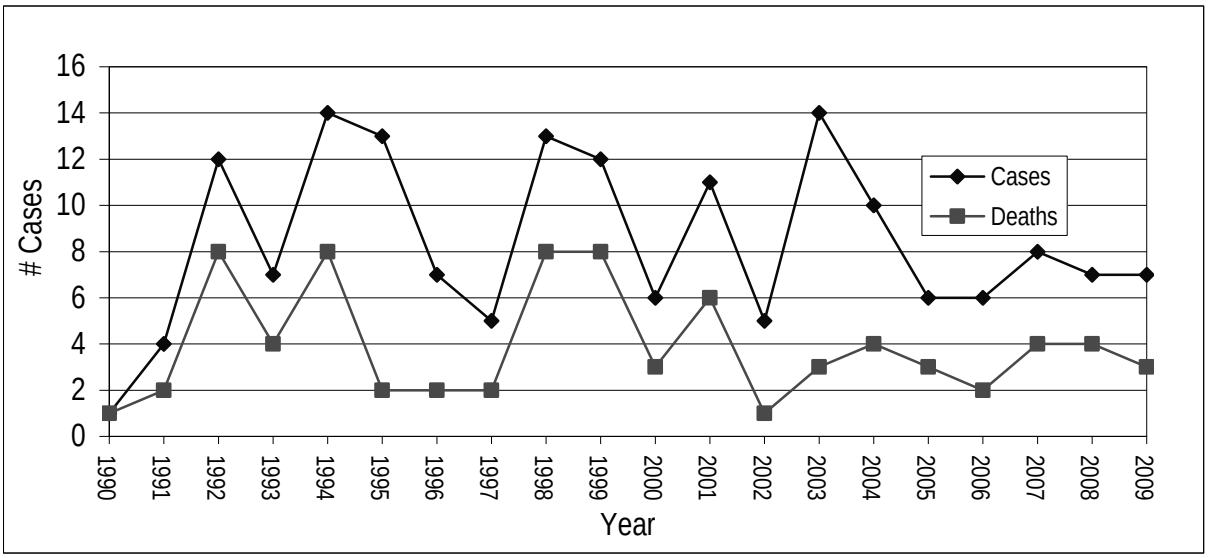
For 2009, there were a total of 24 *Vibrio vulnificus* cases reported in the State of Florida, more than the 15 reported in 2008. Of these, 13 were wound-related cases, 7 cases were associated with the consumption of raw oysters, and 4 were from unknown exposures. There was 1 wound-related death, 3 oyster consumption-related deaths, and 2 deaths from unknown exposures (see Table 9 and Figure 9).

TABLE 9: REPORTED CASES OF *VIBRIO VULNIFICUS*, FLORIDA 2009

Exposure	Cases	Deaths
Wound	**13**	**1**
Oysters	**7**	**3**
Unknown	**4**	**2**
Total	24	6

The Florida Department of Health Food and Waterborne Disease Program continued its *Vibrio vulnificus* education campaign in 2009. Targeted audiences included high risk groups, health care practitioners and the general public. Presentations were delivered to county health departments, professional associations, community groups, universities, and Florida state agencies. Educational displays were presented and educational materials were distributed during health fairs and at a national conference. The Food and Waterborne Disease Program also continues their collaboration with the Hepatitis Prevention Program with the distribution of *Vibrio vulnificus* educational materials and participation in their World Hepatitis Day health fair at the State Capitol. The Food and Waterborne Disease Program also mentored three Masters of Public Health interns with a focus on *Vibrio vulnificus*. A press release emphasizing the risk of raw oyster consumption by high risk groups and the risk of wound exposure to marine and estuarine waters was distributed in September.

FIGURE 9: VIBRIO *VULNIFICUS* CASES AND DEATHS ASSOCIATED WITH OYSTER CONSUMPTION, FLORIDA 1990-2009



OVERVIEW OF FOODBORNE HEPATITIS A IN FLORIDA, 2000-2009

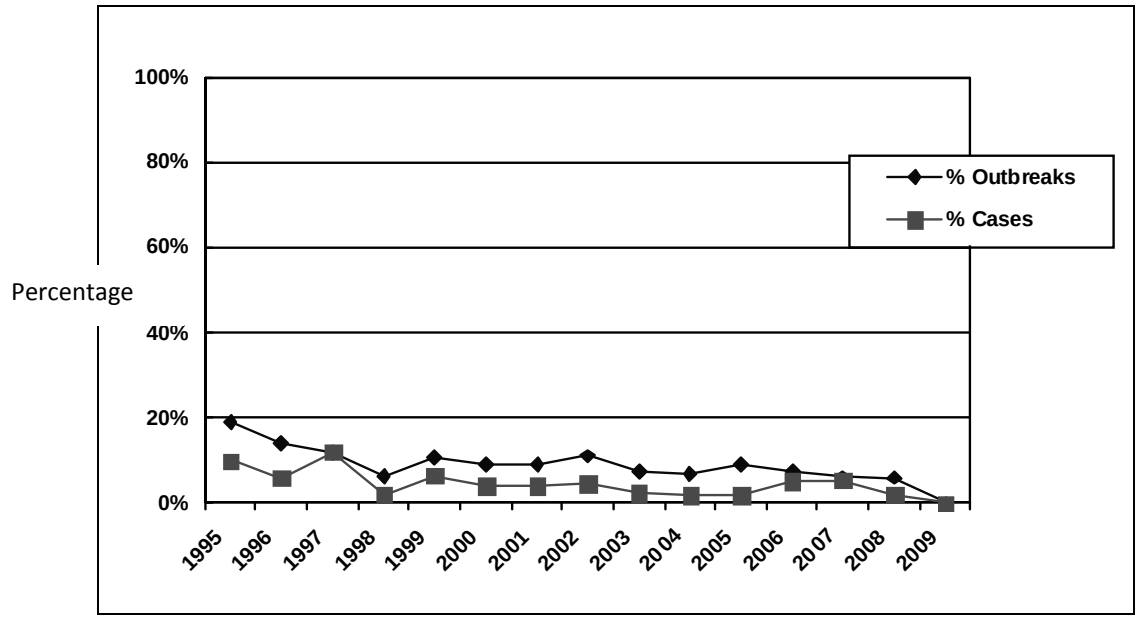
Nationwide estimates indicate that Hepatitis A accounts for 0.8% of total foodborne outbreaks and for less than 0.8% of total foodborne outbreak-related cases. No foodborne outbreaks of Hepatitis A were reported in Florida in 2009. Florida estimates (2000 – 2009) indicate that Hepatitis A accounts for 0.6% of total foodborne outbreaks and for 0.8% of total foodborne outbreak-related cases (Table 10).

Of the 184 reported cases (from the Merlin surveillance system) of Hepatitis A cases in 2009, 3 (1.63%) were food handlers. An examination of the total number of reported hepatitis A cases in Florida (2000- 2009) shows that food handlers with Hepatitis A accounted for 3.2% of the total confirmed Hepatitis A cases statewide.

TABLE 10: NUMBER OF REPORTED FOODBORNE HEPATITIS A OUTBREAKS AND RELATED CASES IN FLORIDA, 1994-2009

	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Total # Foodborne Outbreaks	**0**	**0**	**0**	**0**	**0**	**3**	**2**	**2**	**4**	**0**	**0**	**1**	**0**	**1**	**0**	**0**
% Foodborne Outbreaks	**0.00%**	**0.00%**	**0.00%**	**0.00%**	**0.00%**	**1.04%**	**0.71%**	**0.66%**	**1.65%**	**0.00%**	**0.00%**	**0.76%**	**0.00%**	**0.78%**	**0.00%**	**0.00%**
Total # Foodborne Outbreak-related Cases	**0**	**0**	**0**	**0**	**0**	**29**	**23**	**43**	**29**	**0**	**0**	**20**	**0**	**3**	**0**	**0**
% Total Foodborne Outbreak-related Cases	**0.00%**	**0.00%**	**0.00%**	**0.00%**	**0.00%**	**1.88%**	**1.33%**	**2.08%**	**1.97%**	**0.00%**	**0.00%**	**1.00%**	**0.00%**	**0.32%**	**0.00%**	**0.00%**

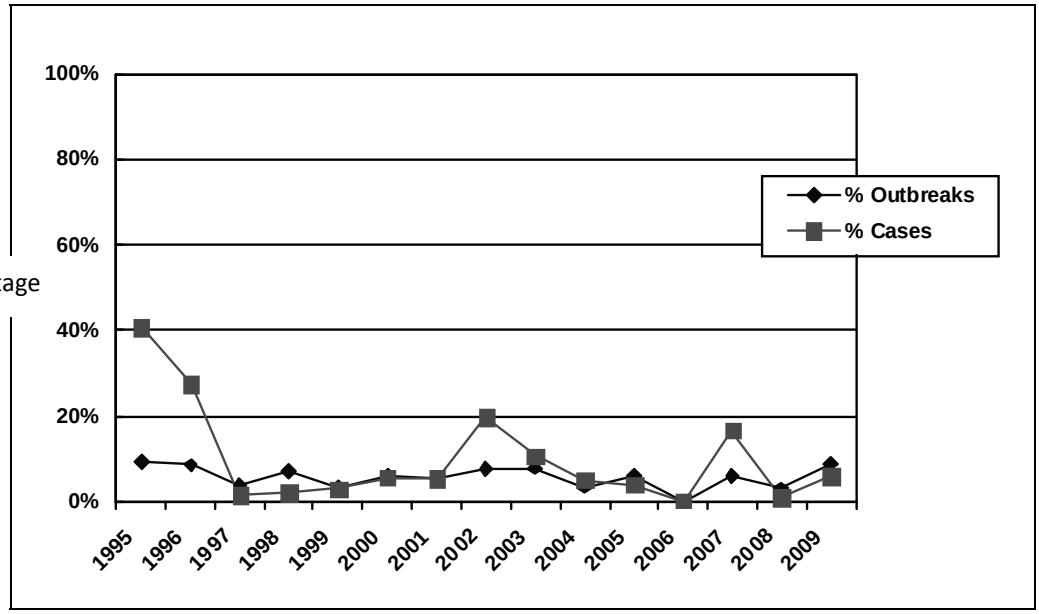
FIGURE 10: TRENDS OF STAPHYLOCOCCUS IN REPORTED FOOD AND WATERBORNE OUTBREAKS AND OUTBREAK-RELATED CASES, FLORIDA, 1995-2009



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

OVERVIEW OF SALMONELLA

FIGURE 11: TRENDS OF *SALMONELLA* IN REPORTED FOOD AND WATERBORNE OUTBREAKS AND OUTBREAK-RELATED CASES, FLORIDA, 1995-2009



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

AN OVERVIEW OF FOODBORNE NOROVIRUS REPORTED IN FLORIDA, 2000-2009

CDC estimates that *Norovirus* is the etiologic agent in approximately 50% of foodborne outbreaks in the U.S.* Of the estimated 23 million cases of *Norovirus* infections each year, foodborne Norovirus accounts for 9.2 million cases (67% of the total foodborne illness cases) nationally. In addition, foodborne *Norovirus* is attributed to approximately 20,000 (33% total) of U.S. hospitalizations and 124 (7% total) deaths. [4] It is important to note that Norovirus is not a nationally reportable condition, as such these are estimates.

In Florida, 14% of total food and waterborne outbreaks that occurred from 2000 to 2009 or 36% total food and waterborne cases can be attributed to *Norovirus* infections (no data are available on Florida hospitalizations or deaths) (Figure 12). From 2000 to 2009 there were a total of 254 food or waterborne *Norovirus* outbreaks with 5,484 associated cases (see Tables 11 and 12). Vehicles of transmission included produce, ice, beverages, and foods with multiple items or ingredients. The primary contributing factors in outbreaks in 2009 were bare and gloved hand

[4] 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)

*Centers for Disease Control and Prevention: Yellow Book, Chapter 5: Norovirus (Accessed 12/10/10): http://wwwnc.cdc.gov/travel/yellowbook/2010/chapter-5/norovirus.aspx

contact with food by a worker who is likely working while infectious. Other risk factors for outbreaks include a lack of good personal hygiene and handwashing 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.

FIGURE 12: REPORTED OUTBREAKS AND OUTBREAK RELATED CASES OF NOROVIRUS ILLNESS, FLORIDA, 2000-2009

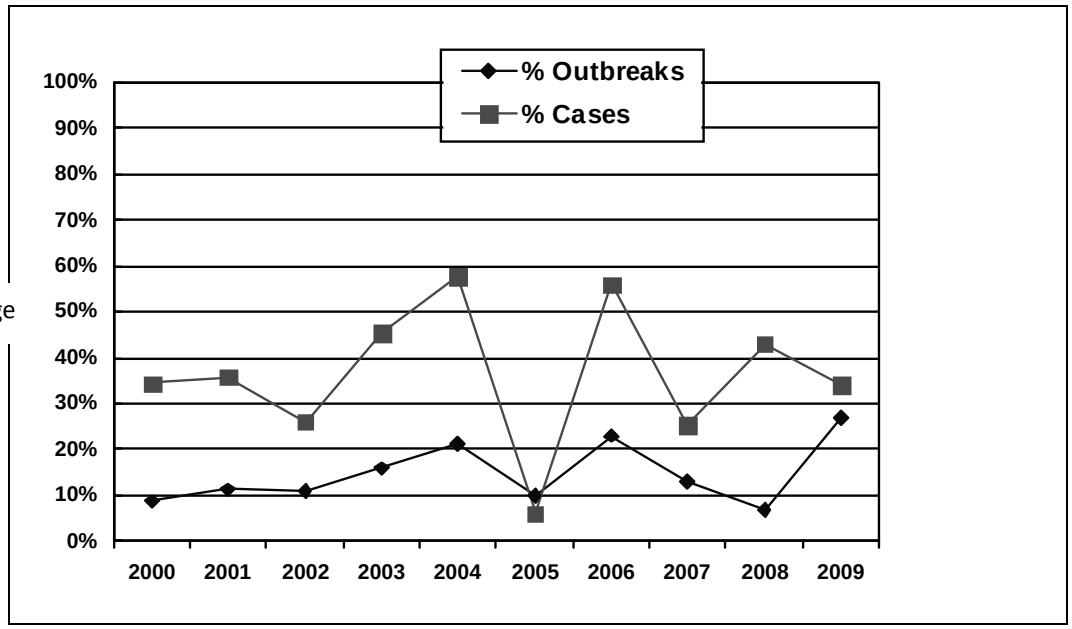


TABLE 11: NUMBER OF REPORTED FOOD AND WATERBORNE NOROVIRUS OUTBREAKS, FLORIDA, 2000-2009

Outbreaks	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	Total
Total	25	34	27	29	37	12	30	17	26	21	254
% of all outbreaks	9%	11%	11%	16%	21%	9%	20%	13%	26%	26%	14%

TABLE 12: NUMBER OF REPORTED FOOD AND WATERBORNE NOROVIRUS OUTBREAK-RELATED CASES, FLORIDA, 2000-2009

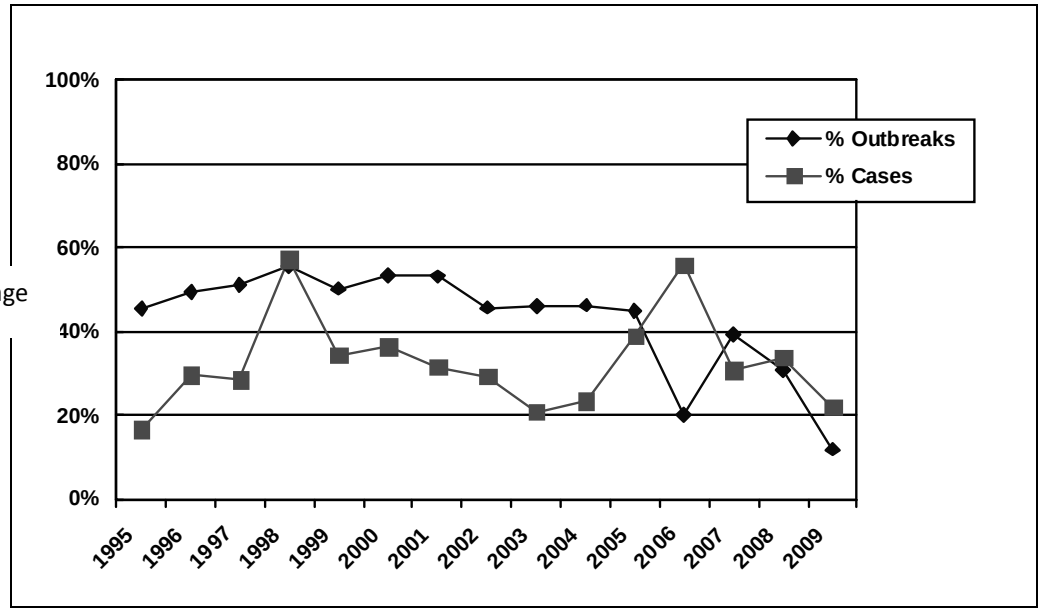
Outbreak-related Cases	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	Total
Total	603	734	382	743	1131	118	707	245	538	331	5,484
% of all outbreak-related cases	34%	36%	26%	45%	57%	6%	56%	26%	44%	42%	36%

A total of 21 *Norovirus* outbreaks involving 331 cases were investigated in 2009. Of these, 13 or 62% had laboratory confirmation. 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.

OVERVIEW OF UNKNOWN PATHOGENS IN FLORIDA OUTBREAKS

FIGURE 13: TRENDS OF UNKNOWN PATHOGENS IN REPORTED FOOD AND WATERBORNE OUTBREAKS AND OUTBREAK-RELATED CASES, FLORIDA, 1995-2009



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

CONTRIBUTING FACTORS: INVESTIGATION FINDINGS

In 2009, CDC launched the National Outbreak Reporting System (NORS). Under this current surveillance system, the contributing factors and food specific data were modified. Foodborne contributing factors are defined as the food safety practices and behaviors which most likely contributed to a foodborne illness outbreak. These contributing factors are classified according to contamination, proliferation (bacterial agents only), and survival (microbial agents only). Food specific data include method of processing, method of preparation and level of preparation. Foodborne contributing factors were unknown for 8 outbreaks involving 118 cases. For waterborne outbreaks the contributing factors have been expanded to improve risk factor data and are sectioned according to the type of water venue including: recreational water treated venue, recreational water untreated venue, drinking water, and water not intended for drinking (WNID).

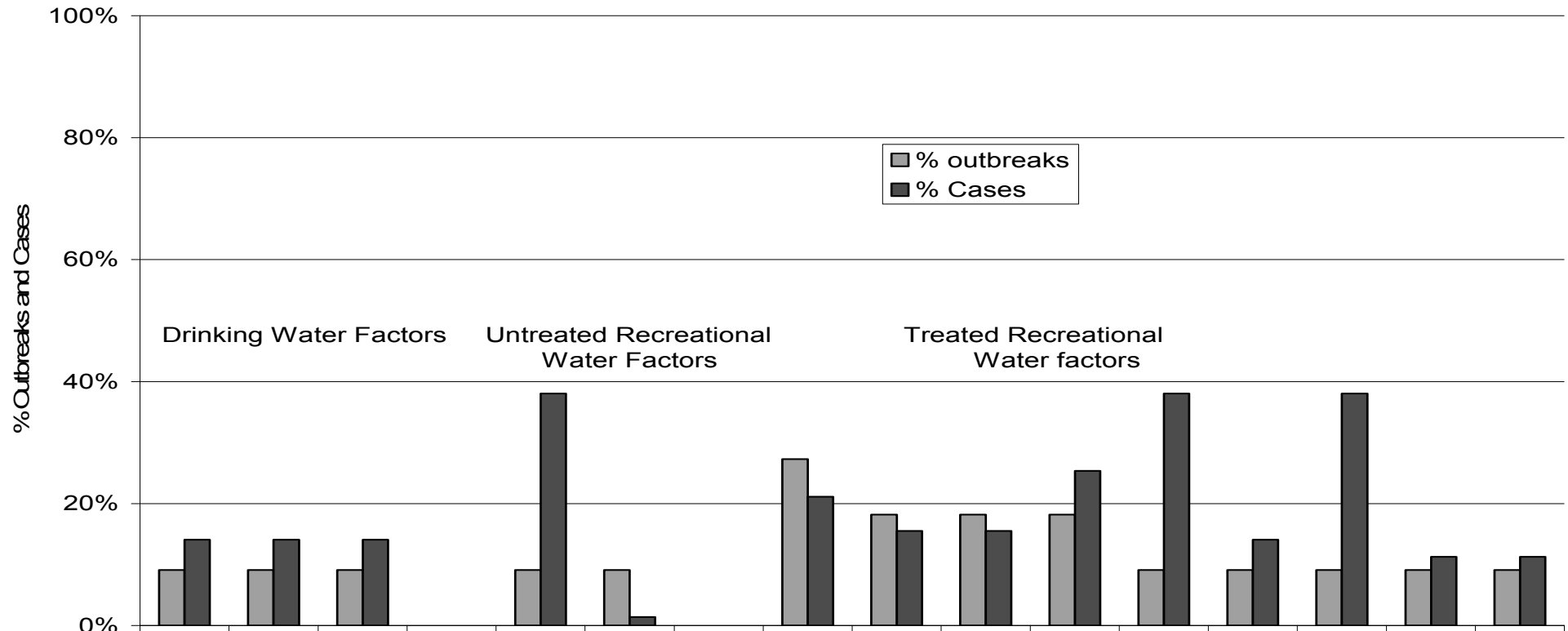
Please check Appendix A for descriptions of contributing factors to food and waterborne outbreaks. Additional data on each contributing factor (contamination, proliferation, survival, and preparation method) is located in Appendix B.

TABLE 13: EIGHT MOST PREVALENT CONTRIBUTING FACTORS IN FOODBORNE OUTBREAKS, FLORIDA (N=65), 2009

Contributing Factor	# Outbreaks	# Cases
CONTAMINATION FACTOR		
C1 - Toxic substance part of the tissue	10	41
C10 - Bare-handed contact by a food handler/worker/preparer who is suspected to be infectious	15	185
PROLIFERATION FACTOR		
P1 - Food preparation practices that support proliferation of pathogens (during food preparation)	5	108
SURVIVAL FACTOR		
S5 - Other process failures that permit pathogen survival	1	27
METHOD FACTOR		
3 - Ready to eat food: Manual preparation, No cook step	19	208
1 - Prepared in the home	11	118

WATERBORNE DISEASE CONTRIBUTING FACTORS FOR OUTBREAKS 2009

FIGURE 14: WATERBORNE DISEASE CONTRIBUTING FACTORS: PERCENT TOTAL WATERBORNE OUTBREAKS (N=11) AND OUTBREAK-RELATED CASES (N=71), FLORIDA, 2009[5]



	Deficiency in building/h	Legionella species in water	No disinfection		Operator error	High risk activity by case		Fecal/vomitus accidents	Primary intended use of	Patrons continued to swim	Disinfectant control system	Operator error	No supplemental	Incorrect settings on	Inadequate water quality	No shock or hyperchlo
% outbreaks	9%	9%	9%		9%	9%		27%	18%	18%	18%	9%	9%	9%	9%	9%
% Cases	14%	14%	14%		38%	1%		21%	15%	15%	25%	38%	14%	38%	11%	11%

[5] 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 14: WATERBORNE DISEASE CONTRIBUTING FACTORS: NUMBER OF WATERBORNE OUTBREAKS (N=11) AND OUTBREAK-RELATED CASES (N=71), FLORIDA, 2009[6]

Contributing Water Factors	Outbreaks	Cases
Drinking Water Factors		
Deficiency in building/home-specific water treatment after the water meter or property line	1	10
Legionella species in water system	1	10
No disinfection	1	10
Unknown	1	2
Recreational Water untreated Factors		
Operator error	1	27
High risk activity by case	1	1
Seasonal variation in water quality	1	1
Unknown	2	7
Recreational Water treated Factors		
Fecal/vomitus accidents	3	15
Primary intended use of water is by diaper/toddler-aged children (e.g. kiddie pool)	2	11
Patrons continued to swim when ill or within 2 weeks of being ill	2	11
Disinfectant control system malfunctioning, inadequate, or lacking	1	8
Operator error	1	27
No supplemental disinfection installed that would have inactivated pathogen (e.g. Cryptosporidium)	0	0
Incorrect settings on disinfectant control system	1	27
Inadequate water quality monitoring	1	8
No shock or hyperchlorination policy	1	8

[6] 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 15: CONTRIBUTING FACTORS BY ETIOLOGIC AGENT FOR ALL WATERBORNE OUTBREAKS (N=11), FLORIDA, 2009

Pathogen	# Cases	Recreational Water Treated*			Untreated Recreational Water*	Drinking Water*	Water Not for Drinking*
Chemical	27	Operator error	Incorrect settings on disinfectant control system				
Cryptosporidium	6				Unknown		
Cryptosporidium	8	Disinfectant Control System Malfunctioning, Inadequate, Or Lacking	Inadequate Water Quality Monitoring	No Shock Or Hyperchlorination Policy			
Cryptosporidium	6	Primary Intended Use Of Water Is By Diaper/Toddler-Aged Children	Fecal/Vomitus Accidents	Patrons Continued To Swim When Ill Or Within 2 Weeks Of Being Ill			
Cryptosporidium	5	Primary Intended Use Of Water Is By Diaper/Toddler-Aged Children	Fecal/Vomitus Accidents	Patrons Continued To Swim When Ill Or Within 2 Weeks Of Being Ill			
Cryptosporidium	4		Fecal/Vomitus Accidents				
Legionella	10	Disinfectant Control System Malfunctioning, Inadequate, Or Lacking		No Supplemental Disinfection Installed That Would Have Inactivated Pathogen (E.G. Cryptosporidium)		No Disinfection Legionella Species In Water System Deficiency In Building/Home-Specific Water Treatment After The Water Meter Or Property Line	
Legionella	2					Unknown	
N. *fowleri*	1				Seasonal Variation In Water Quality		
N. *fowleri*	1					High risk activity by case	
N. *fowleri*	1					Unknown	

*CDC Categories

TABLE 16: LINE LIST OF WATERBORNE OUTBREAKS (N=11), FLORIDA, 2009

COUNTY	# CASES	SITE	SPECIFIC VEHICLE	PATHOGEN
DADE	10	PRIVATE WATER	FILTERED DISTRIBUTION SYSTEM WATER	LEGIONELLA
SEMINOLE	2	OTHER	SHOWER HEADS	LEGIONELLA
HILLSBOROUGH	27	OTHER	RECREATIONALLY WATERBORNE EXPOSURE	CHEMICAL
PALM BEACH	6	OTHER	RECREATIONAL WATER-UNTREATED	CRYPTOSPORIDIUM
ORANGE	8	POOL	SWIMMING POOL	CRYPTOSPORIDIUM
ORANGE	6	POOL	SWIMMING POOL	CRYPTOSPORIDIUM
ORANGE	5	POOL	MULTIPLE POOLS	CRYPTOSPORIDIUM
SANTA ROSA	4	POOL	SWIMMING POOL	CRYPTOSPORIDIUM
NASSAU	1	OTHER	RECREATIONAL FRESH WATER LAKE	N. FOWLERI
POLK	1	OTHER	LAKE	N. FOWLERI
ORANGE	1	OTHER	LAKE	N. FOWLERI

CONTROL MEASURES

The food and waterborne disease program works with county health departments and regulatory agencies to recommend control measures that will prevent further illnesses in an outbreak. Two of the program's control measures are described here.

FOOD WORKER EXCLUSIONS

The program works with regulatory agencies to ensure that food managers and workers are trained in the importance of reporting unusual patterns of illness among workers or customers and food code requirements for disease reporting. The program keeps a toolkit for reference by county health departments and the public on the current guidelines for food worker exclusions.

RECALLS

The Food and Waterborne Disease Program since 2003 has been alerting the public health community of recall notices that have been distributed by the Food and Drug Administration (FDA) and the United States Department of Agriculture (USDA), Food Safety and Inspection Service. The recall notice information is obtained from the FDA & USDA web sites and also from the recalls.gov web site. This recalls information is generally involving class 1 & 2 recalls and is distributed to health department and other partner agencies through e-mail and the Florida Department of Health EpiCom network. A searchable recalls database was developed and is located on the Food and Waterborne Disease Programs website.

http://www.myfloridaeh.com/medicine/foodsurveillance/Recalls_Page.htm

During 2009, 125 recall notices were distributed to the public health community through the EpiCom network. These recalls included; FDA enforcement reports, product allergy alerts, foreign materials in food items and numerous other recalls due to potential chemical, bacterial and viral contaminations. Some of the recalls involved salmonella contamination of pet foods. Some of the most common pathogens involved in recalls notices were salmonella, listeria, E.coli. and Norovirus. The largest number of recalls during 2009, involved peanut butter and related products due to these food items being implicated in a nationwide *Salmonella Typhimurium* outbreak.

FOOD AND WATERBORNE OUTBREAK PUBLICATIONS AND ARTICLES

The year 2009 was an active time period for Florida food and waterborne disease investigations and a remarkable year for the number of articles published in scientific journals (some articles refer to outbreaks from prior years). Two investigations were featured the FEHA journal, and 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 2009 Annual Florida Morbidity Statistics Report at:

http://www.doh.state.fl.us/Disease_ctrl/epi/Morbidity_Report/2009/amr_2009.html

2009 FOOD AND WATERBORNE DISEASE PUBLICATIONS:

1. George, M; Lazensky, R. *E. Coli* O157:H7 Outbreak in a Correctional Institution, May 2009, Lafayette County. *Epi Update Publication*, Oct 2009. http://www.doh.state.fl.us/disease_ctrl/epi/October2009EpiUpdate.pdf
2. Friedman MA, Alfsen AC, and King D. (2009). Elevated Chlorine Level Exposure at a Zoo Splash fountain in Hillsborough County. *Florida Journal of Environmental Health,* 4(201), 10-12.
3. Bodager, Dean, Walsh, Donna, Osias, Tiery, and Overfield, David. "*Legionella* Positive Environmental Samples from a Hot Tub at a Local Resort Hotel, Orange County, December, 2008", *Florida Journal of Environmental Health*, Spring, 2009, Issue 202, p.5-6.
4. Bodager, Dean, Donna Walsh, Tiery Osias, Tania Harper, "Legionnaires' Disease Outbreak Associated with a Health Fitness Club, Orange County, Florida, June-September 2008", *EPI UPDATE*, March, 2009. http://www.doh.state.fl.us/disease_ctrl/epi/Epi_Updates/2009/March2009EpiUpdate.pdf
5. Hutchinson, Richard. Investigation of a Foodborne Outbreak, April 2009, Bay County Florida. *EpiUpdate*, July, 2009, http://www.doh.state.fl.us/disease_ctrl/epi/epi_updates/2009/July2009EpiUpdate.pdf
6. Hutchinson, Richard. Leon County Illness Outbreak after a Wedding. *EpiUpdate*, July, 2009, http://www.doh.state.fl.us/disease_ctrl/epi/epi_updates/2009/July2009EpiUpdate.pdf

SELECTED 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 2008, 23:1-9.
2. 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
3. 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.
4. 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 .
5. 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.
6. 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.
7. 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 .

APPENDIX A: EXPLANATION OF CONTRIBUTING FACTORS FOR FOODBORNE ILLNESS OUTBREAKS FROM CDC FORM 52.13

LIST OF CONTRIBUTING FACTORS OF FOODBORNE ILLNESS OUTBREAKS

Source: CDC Form 52.13, NORS.

☐ Contributing Factors Unknown

CONTAMINATION FACTORS:

C1 – Toxic substance part of the tissue
C2 – Poisonous substance intentionally/deliberately added
C3 – Poisonous substance accidentally/inadvertently added
C4 – Addition of excessive quantities of ingredients that are toxic in large amounts
C5 – Toxic container
C6 – Contaminated raw product – food was intended to be consumed after a kill step
C7 – Contaminated raw product – food was intended to be consumed raw or undercooked/underprocessed
C8 – Foods originating from sources shown to be contaminated or polluted (such as a growing field or harvest area)
C9 – Cross-contamination of ingredients (cross-contamination does not include ill food workers)
C10 – Bare-hand contact by a food handler/worker/preparer who is suspected to be infectious
C11 – Glove-hand contact by a food handler/worker/preparer who is suspected to be infectious
C12 – Other mode of contamination (excluding cross-contamination) by a food handler/worker/preparer who is suspected to be infectious
C13 – Foods contaminated by non-food handler/worker/preparer who is suspected to be infectious
C14 – Storage in contaminated environment
C15 – Other source of contamination
C-N/A – Contamination Factors - Not Applicable

PROLIFERATION/AMPLIFICATION FACTORS:

P1 – Food preparation practices that support proliferation of pathogens (during food preparation)
P2 – No attempt was made to control the temperature of implicated food or the length of time food was out of temperature control (during food service or display of food)
P3 – Improper adherence of approved plan to use Time as a Public Health Control
P4 – Improper cold holding due to malfunctioning refrigeration equipment
P5 – Improper cold holding due to an improper procedure or protocol
P6 – Improper hot holding due to malfunctioning equipment
P7– Improper hot holding due to improper procedure or protocol
P8 – Improper/slow cooling
P9 – Prolonged cold storage
P10 – Inadequate modified atmosphere packaging
P11 – Inadequate processing (acidification, water activity, fermentation)
P12 – Other situations that promoted or allowed microbial growth or toxic production
P-N/A – Proliferation/Amplification Factors - Not Applicable

SURVIVAL FACTORS:

S1 – Insufficient time and/or temperature control during initial cooking/heat processing S2 – Insufficient time and/or temperature during reheating
S3 – Insufficient time and/or temperature control during freezing
S4 – Insufficient or improper use of chemical processes designed for pathogen destruction
S5 – Other process failures that permit pathogen survival
S-N/A – Survival Factors - Not Applicable

FOOD SPECIFIC DATA:

METHOD OF PROCESSING

(Prior to point-of-service: Processor):

1 – Pasteurized (e.g., liquid milk, cheese, and juice etc)
2 – Unpasteurized (e.g., liquid milk, cheese, and juice etc)
3 – Shredded or diced
4 – Pre-packaged (e.g., bagged lettuce or other produce)
5 – Irradiation
6 – Pre-washed
7 – Frozen
8 – Canned
9 – Acid treatment (e.g., commercial potato salad with vinegar, etc)
10 – Pressure treated (e.g., oysters, etc)
11 – Other
12 – Unknown

METHOD OF PREPARATION

(At point-of-service: Retail: restaurant, grocery store): Select only one

1 – Prepared in the home
2 – Ready to eat food: No manual preparation, No cook step. (e.g., sliced cheese, pre-packaged deli meats; whole raw fruits; pre-shucked raw oysters, etc)
3 – Ready to eat food: Manual preparation, No cook step. (e.g., cut fresh fruits and vegetables, chicken salad made from canned chicken, etc)
4 – Cook and Serve Foods: Immediate service. (e.g., soft-cooked eggs, hamburgers, etc)
5 – Cook and hot hold prior to service. (e.g., soups, hot vegetables, mashed potatoes, etc)
6 – Advance preparation: Cook, cool, serve (e.g., sliced roast beef from a whole cooked roast, etc)
7 – Advance preparation: Cook, cool, reheat, serve (e.g., casseroles, soups, sauces, chili, etc)
8 – Advance preparation: Cook, cool, reheat, hot hold, serve (e.g., chili, refried beans, etc)
9 – Advance preparation: Cook-chill and Reduced Oxygen Packaging (ROP) (e.g., sauces, gravies, cheeses, etc packaged under ROP)
10 – Other
11 – Unknown

LEVEL OF PREPARATION**:**

Select only one

1 – Foods eaten raw with minimal or no processing. (e.g., washing, cooling)
2 – Foods eaten raw with some processing. (e.g., no cooking, fresh cut and/or packaged raw)
3 – Foods eaten heat processed. (e.g., cooked: a microbiological kill step was involved in processing)

LIST OF WATERBORNE CONTRIBUTING FACTORS

Source: CDC Form 52.12, NORS

RECREATIONAL WATER TREATED VENUES

CDC 52.12 (NORS) – Contributing Factors

1) People

• Out of compliance with bather load/density requirements
• Primary intended use of water is by diaper/toddler-aged children (e.g. kiddie pool)
• Heavy use by child care center groups
• Fecal/vomitus accidents
• Patrons continued to swim when ill or within 2 weeks of being ill
• Operator error
• Intentional contamination (explain in remarks)

2) Facility Design

• Combined pool filtration systems led to cross contamination
• Hygiene facilities inadequate or distant (e.g. no toilets, no diaper changing facilities)
• Spray feature water demand higher than treatment system capacity so water returns to features and bypasses filtration/treatment system
• No supplemental disinfection installed that would have inactivated pathogen (e.g. Cryptosporidium) - For example, this would apply in a cryptosporidiosis outbreak if the pool had chlorination but no UV disinfection.
• Water temperatures ≥ 300C (≥ 86°F)
• Cross connection with wastewater or non-potable water

3) Maintenance: Equipment and Operation

• Disinfectant control system malfunctioning, inadequate, or lacking (e.g. hand feed)
• Incorrect settings on disinfectant control system
• pH control system malfunctioning inadequate, or lacking (e.g. hand feed)
• Incorrect settings on pH control system
• Filtration system malfunctioning or inadequate (e.g. low flow rate)
• Supplemental disinfection system malfunctioning (e.g. ultraviolet light, ozone)
• Insufficient system checks so breakdown detection delayed- For example, a breakdown in the system was not detected promptly because the system was not checked often enough or thoroughly enough.
• No preventive maintenance programs to reduce breakdowns- For example, there was a lack of scheduled maintenance to keep the components of the system in good working order.
• Remote monitoring system in use
• Ventilation insufficient for indoor aquatic facilities
• Chemical handling error (e.g. chemical hookup, improper mixing or application) - For example, a chemical feed line was not clamped before disconnecting, resulting in a spill or chemical mixing (e.g., chlorine and acid) OR chemicals were mixed together or applied incorrectly (e.g. by staff members).
• Maintenance chemicals not flushed from system before opening to swimmers- For example, the pool was not closed to swimmers during maintenance or was reopened before maintenance steps were completed.
• Low or zero water flow combined with continuous feed of chemicals resulted in excess chemicals in water
• Extensive slime/biofilm formation
• Recent construction
• Cyanurate level excessive
• Lack of draining/cleaning
• Stagnant water in spa piping was aerosolized

CDC 52.12 (NORS) – Contributing Factors

4) Policy and Management

• No aquatics operators on payroll who have received state/local certified training
• Untrained/inadequately trained staff on duty
• Unclear communication chain for reporting problems
• Inadequate water quality monitoring (e.g. inadequate test kit, inadequate testing frequency)
• Employee illness policies absent or not enforced
• Missing or poor chemical handling policies, practices, and training
• No operator on duty at the time of incident
• Facility falls outside aquatic health code
• No shock or hyperchlorination policy

5) Unknown or insufficient information to assign deficiencies

CDC 52.12 NORS Contributing Factors

1) People

• Out of compliance with bather load/density requirements
• Primary intended use of water is by diaper/toddler aged children (e.g., kiddie pool area)
• Heavy use by child care center groups
• Fecal/vomitus accident
• Patrons continued to swim when ill or within 2 weeks of being ill
• Operator error
• Intentional contamination (explain in remarks)

2) Swim Area Design

• Hygiene facilities inadequate or distant (e.g. no toilets, no diaper changing facilities)
• Malfunctioning or inadequate onsite wastewater treatment
• Poor siting/design of onsite wastewater treatment system
• Stagnant or poorly circulating water in swim area

3) Water Quality

• Heavy rainfall and runoff
• Sanitary sewer overflow (SSO) impact
• Combined sewer overflow (CSO) impact
• Domestic animal contamination (e.g., livestock, pets)
• Wildlife contamination - Birds
• Wildlife contamination - Mammals
• Wildlife contamination - Fish kill
• Wastewater treatment plant effluent flows past swim area
• Wastewater treatment facility malfunction
• Sewer line break
• Nearby biosolid/land application site (e.g., human or animal waste application)
• Contamination from agricultural chemical application (e.g., fertilizer, pesticides)
• Contamination from chemical pollution not related to agricultural application
• Water temperatures ≥ 300C (≥ 86°F)
• Seasonal variation in water quality (e.g. lake/reservoir turnover events)
• Inappropriate dumping of sewage into water body (e.g. boat, RV)
• Algal bloom
• Dumping of ballast water
• Tidal wash (i.e., tide exchange or influence by inland water)

4) Policy and Management

• Aquatics operator has not received state/local certified training
• Untrained/inadequately trained staff on duty
• Unclear communication chain for reporting problems
• Employee illness policies absent or not enforced
• No operator on duty at the time of incident

5) Unknown or insufficient information to assign deficiencies

DRINKING WATER

CDC 52.12 NORS Contributing Factors

Source Water Factors

• Sanitary sewer overflow (SSO)
• Combined sewer overflow (CSO)
• Malfunctioning onsite wastewater treatment system
• Sewage treatment plant malfunction
• Sewer line break
• Poor siting/design of wastewater treatment system
• Nearby biosolid/land application site (e.g., human or animal waster application)
• Contamination from agricultural chemical application (e.g., fertilizer, pesticides)
• Contamination from chemical pollution not related to agricultural application
• Contamination by a chemical that the current treatment methods were not designed to remove
• Domestic animal contamination (e.g., livestock, concentrated feeding operations, pets)
• Wildlife contamination – Birds
• Wildlife contamination – Mammals
• Wildlife contamination – Fish Kill
• Flooding/heavy rains
• Algal bloom
• Seasonal variation in water quality (e.g., lake/reservoir turnover events, resort community with seasonal loading)
• Low water table (e.g., drought, over-pumping)
• Ground water under direct influence of surface water (e.g., shallow well)
• Contamination through limestone or fissured rock (e.g., karst)
• Contaminated recharge water
• Use of an alternate source of water by a water utility
• Mixing of raw water from different sources
• Improper construction or location of a well or spring
• Water system intake failure (e.g., cracked well casing, cracked intake pipe)
• Intentional Contamination (explain in remarks)
• Other, specify:
• Unknown

Treatment Factors

- Change in treatment process
- No disinfection
- Temporary interruption of disinfection
- Chronically inadequate disinfection
- No filtration
- Inadequate filtration
- Deficiencies in other treatment processes
- Corrosion in or leaching from pipes or storage tanks
- Pipe/component failure or break (e.g., pipes, tanks, valves)
- Contamination during construction or repair of pipes/components
- Construction or repair of pipes/components without evidence of contamination
- Operator error
- Other, specify:
- Unknown

Distribution and Storage Factors

- Cross-connection of potable and nonpotable water pipes resulting in backflow
- Low pressure or change in water pressure in the distribution system
- Change in water flow direction in the distribution system
- Mixing of treated water from different sources
- Pipe/Component failure or break (e.g., pipes, tanks, valves)
- Corrosion in or leaching from pipes or storage tanks
- Contamination of mains during construction or repair (e.g., a water main)
- Construction or repair of mains without evidence of contamination (e.g., a water main)
- Scheduled flushing of the distribution system
- Contamination of storage facility
- Aging water distribution components (e.g., pipes, tanks, valves)
- Water Temperature ≥ 30°C (≥ 86°F)
- Intentional contamination (explain in remarks)
- Other, specify
- Unknown

Factors Outside the Jurisdiction of Water/Utility or at the Point of Use

- Legionella species in water system
- Cross-connection of potable and nonpotable water pipes resulting in backflow
- Lack of backflow prevention in plumbing
- Low pressure or change in water pressure in the plumbing
- Change in water flow direction in the plumbing
- Corrosion in or leaching from pipes or storage tanks
- Pipe/component failure or break (e.g., pipes, tanks, valves)
- Aging plumbing components (e.g., pipes, tanks, valves)
- Contamination of plumbing during construction or repair
- Construction or repair of plumbing without evidence of contamination
- Deficiency in building/home-specific water treatment after the water meter or property line
- Deficiency or contamination of equipment/devices using or distributing water
- Contamination during commercial bottling or making beverage or ice

• Contamination during shipping, hauling, or storage
• Contamination at point of use - Tap
• Contamination at point of use - Hose
• Contamination at point of use – Commercially-bottled water
• Contamination at point of use – Container, bottle, or pitcher
• Contamination at point of use – Unknown
• Water Temperature ≥ 30°C (≥ 86°F)
• Intentional Contamination (explain in remarks)
• Other, specify:
• Unknown

WNID

CDC 52.12 NORS Contributing Factors

Water Not Intended for Drinking or Water of Unknown Intent (WNID/WUI) Factors

• Cooling tower/evaporative condenser – shutdown for >3 days without draining to waste
• Cooling tower/evaporative condenser – lack of maintenance program
• Cooling tower/evaporative condenser – lack of qualified water quality specialist
• Cooling tower/evaporative condenser – presence of scale or corrosion
• Cooling tower/evaporative condenser – presence of dirt, organic matter, or other debris in cold water basin
• Cooling tower/evaporative condenser – absence of drift eliminators
• Cooling tower/evaporative condenser – presence of damaged drift eliminators
• Cooling tower/evaporative condenser – history of recent repairs to the device
• Cooling tower/evaporative condenser – siting of device near building air intakes
• Cooling tower/evaporative condenser – siting of device near windows that can be opened
• Cooling tower/evaporative condenser – siting of device in immediate area of kitchen exhaust fans, live, plants, truck bays, or other sources of organic matter
• Cooling tower/evaporative condenser – construction on the premises of the device within 6 months before the index case
• Cooling tower/evaporative condenser – construction within 100 meters of the premises of the device within 6 months before the index case
• Ornamental fountain – presence of submerged lighting
• Ornamental fountain – lack of written cleaning and maintenance program
• Ornamental fountain – presence of dirt, organic matter, or other debris in the water basin
• Broken/damaged sewer pipe
• Recycling of water
• Water temperature ≥ 30°C (≥ 86°F)
• Other, Specify:
• Unknown

APPENDIX B: ADDITIONAL DATA TABLES

ETIOLOGICAL AGENTS BY VEHICLE

TABLE 17: FOOD AND WATERBORNE OUTBREAKS: ETIOLOGIC AGENT BY VEHICLE, 2009

Pathogen	Beef	Beverage	Fish	Multiple ingredient	Multiple items	Pork	Poultry	Produce-vegetable	Rice	Shellfish-molluscan	Unknown	Water-drinking	Water-recreational	Total
B. *cereus*	0	0	0	1	1	0	0	0	2	0	0	0	0	4
C. *perfringens*	1	0	0	0	0	1	2	0	0	0	0	0	0	4
Chemical	0	0	0	0	0	0	0	0	0	0	0	0	1	1
Ciguatera	0	0	10	0	0	0	0	0	0	0	0	0	0	10
Cryptosporidium	0	0	0	0	0	0	0	0	0	0	0	0	5	5
E. *coli* O157:H7	0	0	0	0	1	0	0	0	0	0	0	0	0	1
Legionella	0	0	0	0	0	0	0	0	0	0	0	2	0	2
N. *fowleri*	0	0	0	0	0	0	0	0	0	0	0	0	3	3
Norovirus	0	1	0	5	8	0	0	5	0	0	2	0	0	21
Salmonella	0	0	1	0	2	0	3	0	0	0	1	0	0	7
Scombroid	0	0	1	0	0	0	0	0	0	0	0	0	0	1
Shigella	0	0	0	0	1	0	0	0	0	0	0	0	0	1
Staphylococcus	0	0	0	0	1	0	0	0	0	0	0	0	0	1
Unknown	1	0	0	2	3	0	0	1	0	0	1	0	0	8
V. *vulnificus*	0	0	0	0	0	0	0	0	0	7	0	0	0	7
Total	2	1	12	8	17	1	5	6	2	7	4	2	9	76

* Ingredients related to no outbreaks in 2009 were removed from table and include: Dairy, Ice Pasta, Pizza, Produce Fruit, Shellfish-crustacean, and Water-other.

TABLE 18: FOOD AND WATERBORNE OUTBREAK-RELATED CASES: ETIOLOGIC AGENT BY VEHICLE, 2009

Pathogen	Beef	Beverage	Fish	Multiple ingredient	Multiple items	Pork	Poultry	Produce-vegetable	Rice	Shellfish-molluscan	Unknown	Water-drinking	Water-recreational	Total
B. *cereus*	0	0	0	2	2	0	0	0	8	0	0	0	0	12
C. *perfringens*	12	0	0	0	0	4	34	0	0	0	0	0	0	50
Chemical	0	0	0	0	0	0	0	0	0	0	0	0	27	27
Ciguatera	0	0	41	0	0	0	0	0	0	0	0	0	0	41
Cryptosporidium	0	0	0	0	0	0	0	0	0	0	0	0	29	29
E. *coli* O157:H7	0	0	0	0	42	0	0	0	0	0	0	0	0	42
Legionella	0	0	0	0	0	0	0	0	0	0	0	12	0	12
N. *fowleri*	0	0	0	0	0	0	0	0	0	0	0	0	3	3
Norovirus	0	3	0	77	153	0	0	70	0	0	28	0	0	331
Salmonella	0	0	7	0	9	0	19	0	0	0	14	0	0	49
Scombroid	0	0	7	0	0	0	0	0	0	0	0	0	0	7
Shigella	0	0	0	0	13	0	0	0	0	0	0	0	0	13
Staphylococcus	0	0	0	0	2	0	0	0	0	0	0	0	0	2
Unknown	41	0	0	58	46	0	0	13	0	0	3	0	0	161
V. *vulnificus*	0	0	0	0	0	0	0	0	0	7	0	0	0	7
Total	12	3	41	2	2	4	34	70	8	7	28	12	27	786

* Ingredients related to no outbreaks in 2009 were removed from table and include: Dairy, Ice, Pasta, Pizza, Produce Fruit, Shellfish-crustacean, and Water-other.

FOODBORNE CONTAMINATION FACTORS FOR OUTBREAKS

TABLE 19: CONTAMINATION FACTOR - NUMBER OF OUTBREAKS AND CASES ASSOCIATED WITH FOODBORNE OUTBREAKS, FLORIDA OUTBREAKS (N=65) AND CASES (N=715), 2009

Contamination Factor	# Outbreaks	# Cases
C-N/A - Contamination Factors - Not Applicable	9	78
C1 - Toxic substance part of the tissue	10	41
C2 - Poisonous substance intentionally/deliberately added	0	0
C3 - Poisonous substance accidentally/inadvertently added	0	0
C4 - Addition of excessive quantities of ingredients that are toxic in large amounts	0	0
C5 - Toxic container	0	0
C6 - Contaminated raw product - food was intended to be consumed after a kill step	2	15
C7 - Contaminated raw product - food was intended to be consumed raw or undercooked / under-processed	8	14
C8 - Foods originating from sources shown to be contaminated or polluted (such as a growing field or harvest area)	0	0
C9 - Cross-contamination of ingredients (cross contamination does not include ill food workers)	5	52
C10 - Bare-handed contact by a food handler/worker/preparer who is suspected to be infectious	15	185
C11 - Glove-hand contact by a food handler/worker/preparer who is suspected to be infectious	9	201
C12 - Other mode of contamination (excluding X-contamination) by a food worker who is suspected to be infectious	1	25
C13 - Foods contaminated by non-food handler/worker/preparer who is suspected to be infectious	1	17
C14 - Storage in contaminated environment	1	3
C15 - Other source of contamination	2	44

TABLE 20: CONTAMINATION FACTOR - PERCENT OF TOTAL FOODBORNE OUTBREAKS (N=65) AND CASES ASSOCIATED WITH OUTBREAKS (N=715), FLORIDA, 2009

Contamination Factor	% Outbreaks	% Cases
C1 - Toxic substance part of the tissue	15.4%	5.73%
C2 - Poisonous substance intentionally/deliberately added	0.00%	0.00%
C3 - Poisonous substance accidentally/inadvertently added	0.00%	0.00%
C4 - Addition of excessive quantities of ingredients that are toxic in large amounts	0.00%	0.00%
C5 - Toxic container	0.00%	0.00%
C6 - Contaminated raw product - food was intended to be consumed after a kill step	3.08%	2.10%
C7 - Contaminated raw product - food was intended to be consumed raw or undercooked / under-processed	12.31%	1.96%
C8 - Foods originating from sources shown to be contaminated or polluted (such as a growing field or harvest area)	0.00%	0.00%
C9 - Cross-contamination of ingredients (cross contamination does not include ill food workers)	7.69%	7.27%
C10 - Bare-handed contact by a food handler/worker/preparer who is suspected to be infectious	23.08%	25.87%
C11 - Glove-hand contact by a food handler/worker/preparer who is suspected to be infectious	13.85%	28.11%
C12 - Other mode of contamination (excluding X-contamination) by a food worker who is suspected to be infectious	1.54%	3.50%
C13 - Foods contaminated by non-food handler/worker/preparer who is suspected to be infectious	1.54%	2.38%
C14 - Storage in contaminated environment	1.54%	0.42%
C15 - Other source of contamination	3.08%	6.15%
C-N/A - Contamination Factors - Not Applicable	13.85%	10.91%

TABLE 21: CONTAMINATION FACTORS BY ETIOLOGIC AGENT FOR FOODBORNE OUTBREAKS REPORTED IN FLORIDA (N=65), 2009

Pathogen	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11	C12	C13	C14	C15	NA	Total
B. *cereus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	4
C. *perfringens*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2
Ciguatera	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10
E. *coli* O157:H7	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1
Norovirus	0	0	0	0	0	0	0	0	3	11	7	1	1	0	1	0	24
Salmonella	0	0	0	0	0	2	0	0	2	2	0	0	0	0	0	2	8
Scombroid	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1
Shigella	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Staphylococcus	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
Unknown	0	0	0	0	0	0	0	0	0	0	1	0	0	1	1	1	4
V. *vulnificus*	0	0	0	0	0	0	7	0	0	0	0	0	0	0	0	0	7
Total	10	0	0	0	0	2	8	0	5	14	9	1	1	1	2	20	63

* The following contamination factors were related to no foodborne outbreaks in 2009 were removed from table: Chemical, Cryptosporidium, Legionella, and N. *fowleri*.

TABLE 22: CONTAMINATION FACTORS BY ETIOLOGIC AGENT FOR CASES IN FOODBORNE OUTBREAKS REPORTED IN FLORIDA (N=715), 2009

Pathogen	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11	C12	C13	C14	C15	NA	Total
B. *cereus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12	12
C. *perfringens*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	16	50
Ciguatera	41	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	41
E. *coli* O157:H7	0	0	0	0	0	0	0	0	0	0	42	0	0	0	0	0	42
Norovirus	0	0	0	0	0	0	0	0	41	174	153	25	17	0	0	0	462
Salmonella	0	0	0	0	0	15	0	0	11	9	0	0	0	0	0	9	44
Scombroid	0	0	0	0	0	0	7	0	0	0	0	0	0	0	0	0	7
Shigella	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Staphylococcus	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	2
Unknown	0	0	0	0	0	0	0	0	0	0	6	0	0	3	0	41	77
V. *vulnificus*	0	0	0	0	0	0	7	0	0	0	0	0	0	0	0	0	7
Total	41	0	0	0	0	15	14	0	52	185	201	25	17	3	0	78	744

FOODBORNE PROLIFERATION/AMPLIFICATION FACTORS FOR OUTBREAKS

FIGURE 15: PROLIFERATION/AMPLIFICATION FACTOR: PERCENT TOTAL FOODBORNE OUTBREAKS, FLORIDA, 2009

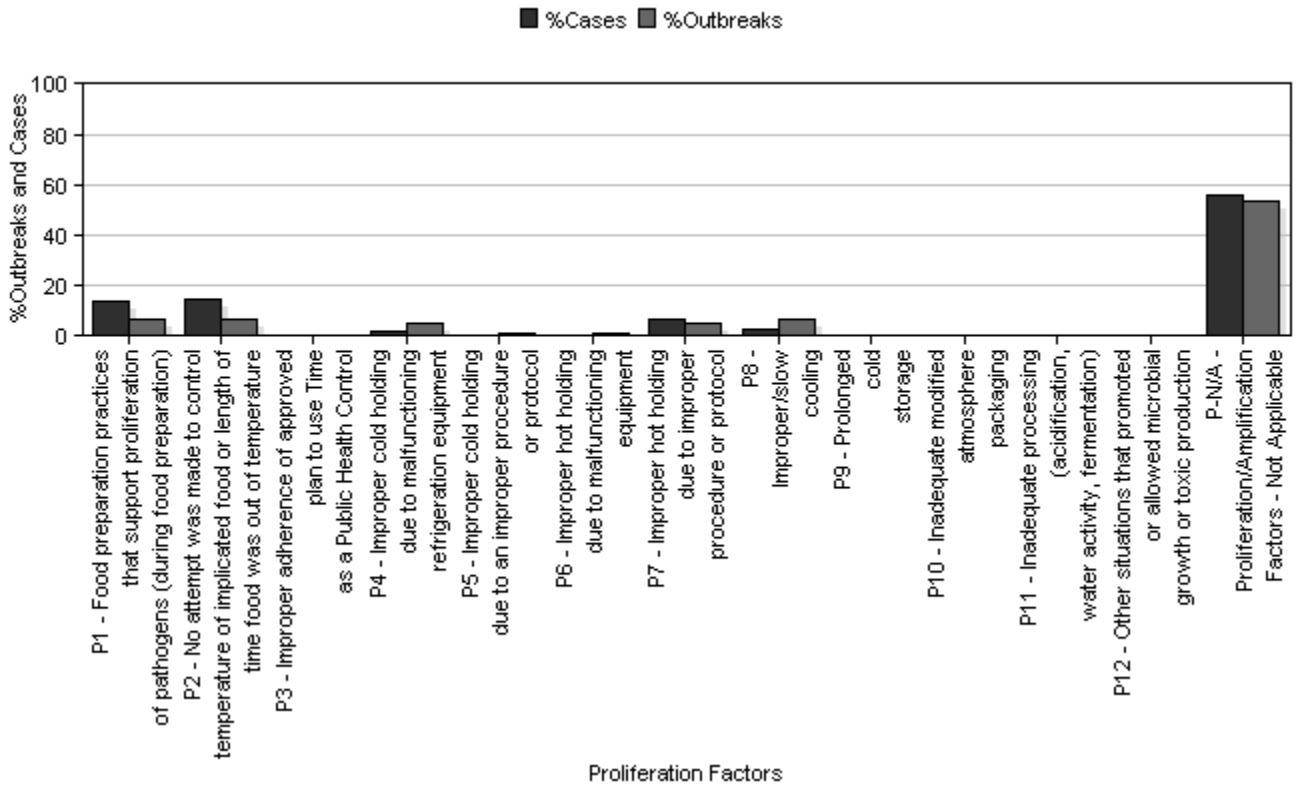


TABLE 23: PROLIFERATION/AMPLIFICATION FACTOR: NUMBER OF FOODBORNE OUTBREAKS AND CASES ASSOCIATED WITH FOODBORNE OUTBREAKS, FLORIDA OUTBREAKS (N=65) AND CASES (N=715), 2009

Proliferation Factor	# Outbreaks	# Cases
P1 - Food preparation practices that support proliferation of pathogens (during food preparation)	5	108
P2 - No attempt was made to control temperature of implicated food or length of time food was out of temperature	5	113
P3 - Improper adherence of approved plan to use Time as a Public Health Control	0	0
P4 - Improper cold holding due to malfunctioning refrigeration equipment	4	13
P5 - Improper cold holding due to an improper procedure or protocol	1	2
P6 - Improper hot holding due to malfunctioning equipment	1	2
P7 - Improper hot holding due to improper procedure or protocol	4	50
P8 - Improper/slow cooling	5	24
P9 - Prolonged cold storage	0	0
P10 - Inadequate modified atmosphere packaging	0	0
P11 - Inadequate processing (acidification, water activity, fermentation)	0	0
P12 - Other situations that promoted or allowed microbial growth or toxic production	0	0
P-N/A - Proliferation/Amplification Factors - Not Applicable	41	440

TABLE 24: PROLIFERATION/AMPLIFICATION FACTOR: PERCENT TOTAL FOODBORNE OUTBREAKS (N=65) AND CASES ASSOCIATED WITH FOODBORNE OUTBREAKS (N=715), FLORIDA, 2009

Proliferation Factor	% Outbreaks	% Cases
P1 - Food preparation practices that support proliferation of pathogens (during food preparation)	7.69%	15.10%
P2 - No attempt was made to control temperature of implicated food or length of time food was out of temperature	7.69%	15.80%
P3 - Improper adherence of approved plan to use Time as a Public Health Control	0.00%	0.00%
P4 - Improper cold holding due to malfunctioning refrigeration equipment	6.15%	1.82%
P5 - Improper cold holding due to an improper procedure or protocol	1.54%	0.28%
P6 - Improper hot holding due to malfunctioning equipment	1.54%	0.28%
P7 - Improper hot holding due to improper procedure or protocol	6.15%	6.99%
P8 - Improper/slow cooling	7.69%	3.36%
P9 - Prolonged cold storage	0.00%	0.00%
P10 - Inadequate modified atmosphere packaging	0.00%	0.00%
P11 - Inadequate processing (acidification, water activity, fermentation)	0.00%	0.00%
P12 - Other situations that promoted or allowed microbial growth or toxic production	0.00%	0.00%
P-N/A - Proliferation/Amplification Factors - Not Applicable	63.08%	61.54%

TABLE 25: PROLIFERATION/AMPLIFICATION FACTORS BY ETIOLOGIC AGENT FOR FOODBORNE OUTBREAKS REPORTED IN FLORIDA (N=65), 2009

Pathogen	P1	P2	P3	P4	P5	P6	P7	P8	P9	P10	P11	P12	N/A	Total
B. *cereus*	0	0	0	1	1	1	0	4	0	0	0	0	0	7
C. *perfringens*	1	1	0	0	0	0	1	1	0	0	0	0	0	4
Chemical	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ciguatera	0	0	0	0	0	0	0	0	0	0	0	0	10	10
Cryptosporidium	0	0	0	0	0	0	0	0	0	0	0	0	0	0
E. *coli* O157:H7	0	0	0	0	0	0	0	0	0	0	0	0	1	1
Legionella	0	0	0	0	0	0	0	0	0	0	0	0	0	0
N. *fowleri*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Norovirus	0	0	0	0	0	0	0	0	0	0	0	0	20	20
Salmonella	2	2	0	2	0	0	0	0	0	0	0	0	2	8
Scombroid	0	0	0	1	0	0	0	0	0	0	0	0	0	1
Shigella	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Staphylococcus	0	0	0	0	0	0	1	0	0	0	0	0	0	1
Unknown	2	2	0	0	0	0	2	0	0	0	0	0	1	7
V. *vulnificus*	0	0	0	0	0	0	0	0	0	0	0	0	7	7
Total	5	5	0	4	1	1	4	5	0	0	0	0	41	66

TABLE 26: PROLIFERATION/AMPLIFICATION FACTORS BY ETIOLOGIC AGENT FOR CASES IN FOODBORNE OUTBREAKS REPORTED IN FLORIDA (N=715), 2009

Pathogen	P1	P2	P3	P4	P5	P6	P7	P8	P9	P10	P11	P12	N/A
B. *cereus*	0	0	0	2	2	2	0	12	0	0	0	0	0
C. *perfringens*	30	30	0	0	0	0	4	12	0	0	0	0	0
Chemical	0	0	0	0	0	0	0	0	0	0	0	0	0
Ciguatera	0	0	0	0	0	0	0	0	0	0	0	0	41
Cryptosporidium	0	0	0	0	0	0	0	0	0	0	0	0	0
E. *coli* O157:H7	0	0	0	0	0	0	0	0	0	0	0	0	42
Legionella	0	0	0	0	0	0	0	0	0	0	0	0	0
N. *fowleri*	0	0	0	0	0	0	0	0	0	0	0	0	0
Norovirus	0	0	0	0	0	0	0	0	0	0	0	0	328
Salmonella	10	15	0	4	0	0	0	0	0	0	0	0	16
Scombroid	0	0	0	7	0	0	0	0	0	0	0	0	0
Shigella	0	0	0	0	0	0	0	0	0	0	0	0	0
Staphylococcus	0	0	0	0	0	0	2	0	0	0	0	0	0
Unknown	68	68	0	0	0	0	44	0	0	0	0	0	6
V. *vulnificus*	0	0	0	0	0	0	0	0	0	0	0	0	7
Total													

FOODBORNE SURVIVAL FACTORS FOR OUTBREAKS

TABLE 27: SURVIVAL FACTOR: NUMBER OF FOODBORNE OUTBREAKS AND OUTBREAK-RELATED CASES (N=65) AND CASES ASSOCIATED WITH FOODBORNE OUTBREAKS (N=715), FLORIDA, 2009

Survival Factor	# Outbreaks	# Cases
S1 - Insufficient time and/or temperature control during initial cooking/heat processing	3	76
S2 - Insufficient time and/or temperature during reheating	3	69
S3 - Insufficient time and/or temperature control during freezing	0	0
S4 - Insufficient or improper use of chemical processes designed for pathogen destruction	0	0
S5 - Other process failures that permit pathogen survival	1	27
S-N/A - Survival Factors - Not Applicable	52	479

TABLE 28: SURVIVAL FACTOR: PERCENT TOTAL FOODBORNE OUTBREAKS AND CASES ASSOCIATED WITH FOODBORNE OUTBREAKS, FLORIDA OUTBREAKS (N=65) AND CASES (N=715), 2009

Survival Factor	% Outbreaks	% Cases
S1 - Insufficient time and/or temperature control during initial cooking/heat processing	4.62%	10.63%
S2 - Insufficient time and/or temperature during reheating	4.62%	9.65%
S3 - Insufficient time and/or temperature control during freezing	0.00%	0.00%
S4 - Insufficient or improper use of chemical processes designed for pathogen destruction	0.00%	0.00%
S5 - Other process failures that permit pathogen survival	1.54%	3.78%
S-N/A - Survival Factors - Not Applicable	80.00%	66.99%

FIGURE 16: SURVIVAL FACTOR: PERCENT TOTAL FOODBORNE OUTBREAKS (N=65) AND CASES ASSOCIATED WITH FOODBORNE OUTBREAKS (N=715), FLORIDA, 2009

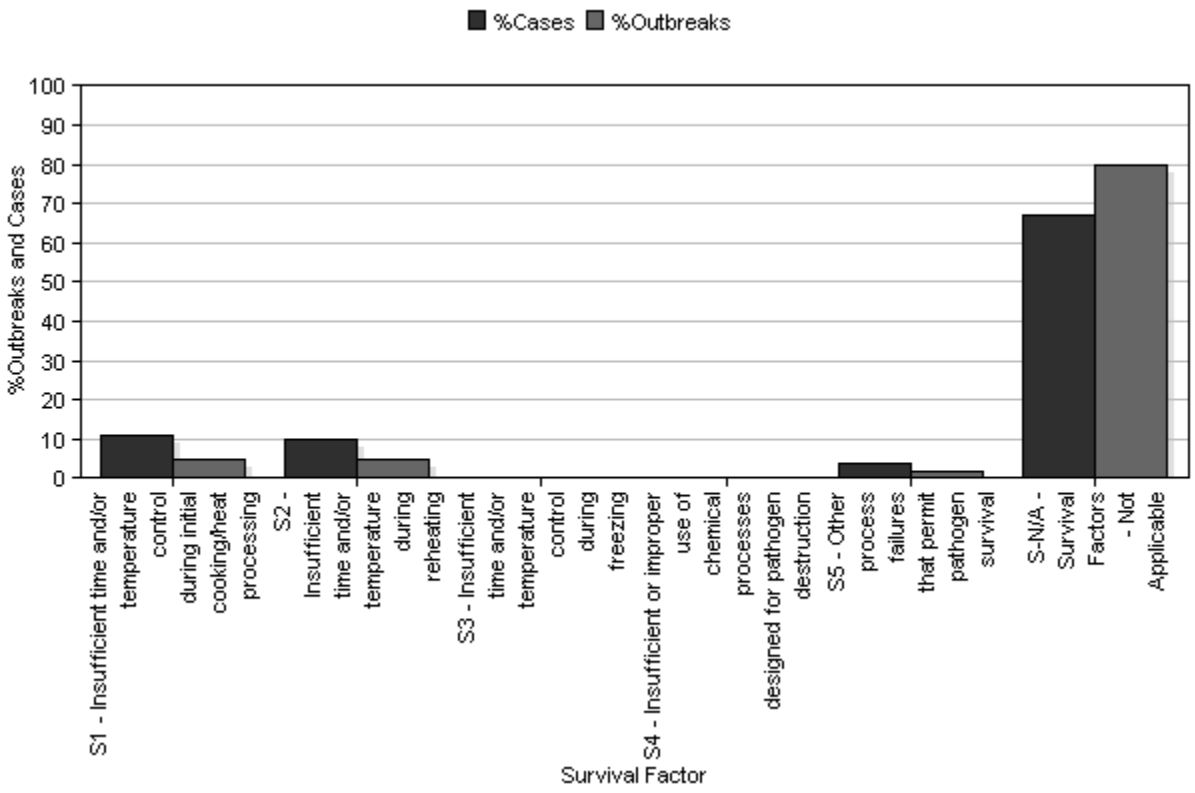


TABLE 29: SURVIVAL FACTORS BY ETIOLOGIC AGENT FOR FOODBORNE OUTBREAKS REPORTED IN FLORIDA (N=65), 2009

Pathogen	S1	S2	S3	S4	S5	N/A	Total
B. *cereus*	0	0	0	0	0	4	4
C. *perfringens*	0	2	0	0	0	1	3
Chemical	0	0	0	0	0	0	0
Ciguatera	0	0	0	0	0	10	10
Cryptosporidium	0	0	0	0	0	0	0
E. *coli* O157:H7	0	0	0	0	0	1	1
Legionella	0	0	0	0	0	0	0
N. *fowleri*	0	0	0	0	0	0	0
Norovirus	0	0	0	0	0	20	20
Salmonella	1	0	0	0	0	5	6
Scombroid	0	0	0	0	0	1	1
Shigella	0	0	0	0	0	0	0
Staphylococcus	0	0	0	0	0	1	1
Unknown	2	1	0	0	1	2	6
V. *vulnificus*	0	0	0	0	0	7	7
Total	3	3	0	0	1	52	59

TABLE 30: SURVIVAL FACTORS BY ETIOLOGIC AGENT FOR CASES IN FOODBORNE OUTBREAKS REPORTED IN FLORIDA (N=715), 2009

Pathogen	S1	S2	S3	S4	S5	N/A	Total
B. *cereus*	0	0	0	0	0	12	12
C. *perfringens*	0	42	0	0	0	4	50
Chemical	0	0	0	0	0	0	0
Ciguatera	0	0	0	0	0	41	41
Cryptosporidium	0	0	0	0	0	0	0
E. *coli* O157:H7	0	0	0	0	0	42	42
Legionella	0	0	0	0	0	0	0
N. *fowleri*	0	0	0	0	0	0	0
Norovirus	0	0	0	0	0	328	331
Salmonella	8	0	0	0	0	27	49
Scombroid	0	0	0	0	0	7	7
Shigella	0	0	0	0	0	0	13
Staphylococcus	0	0	0	0	0	2	2
Unknown	68	27	0	0	27	9	161
V. *vulnificus*	0	0	0	0	0	7	7
Total	76	69	0	0	27	479	651

FOODBORNE PREPARATION FACTORS FOR OUTBREAKS

TABLE 31: METHOD OF PREPARATION FACTOR: NUMBER OF FOODBORNE OUTBREAKS (N=65) AND CASES ASSOCIATED WITH FOODBORNE OUTBREAKS (N=715), FLORIDA, 2009

Method of Preparation	# of Outbreaks	# of Cases
1 - Prepared in the home	11	118
2 - Ready to eat food: No manual preparation, No cook step	3	49
3 - Ready to eat food: Manual preparation, No cook step	19	208
4 - Cook and Serve Foods: Immediate service	11	107
5 - Cook and hot hold prior to service	5	58
6 - Advance preparation: Cook, cool, serve	6	38
7 - Advance preparation: Cook, cool, reheat, serve	2	39
8 - Advance preparation: Cook, cool, reheat, hot hold, serve	1	13
9 - Advance preparation: Cook-chill and Reduced oxygen Packaging (ROP)	0	0
10 - Other	1	6
11 - Unknown	6	79

TABLE 32: METHOD OF PREPARATION FACTOR: PERCENT TOTAL FOODBORNE OUTBREAKS (N=65) AND OUTBREAK-RELATED CASES (N=715), FLORIDA, 2009

Method of Preparation	% of Outbreaks	% of Cases
1 - Prepared in the home	16.92%	16.50%
2 - Ready to eat food: No manual preparation, No cook step	4.62%	6.85%
3 - Ready to eat food: Manual preparation, No cook step	29.23%	29.09%
4 - Cook and Serve Foods: Immediate service	16.92%	14.97%
5 - Cook and hot hold prior to service	7.69%	8.11%
6 - Advance preparation: Cook, cool, serve	9.23%	5.31%
7 - Advance preparation: Cook, cool, reheat, serve	3.08%	5.45%
8 - Advance preparation: Cook, cool, reheat, hot hold, serve	1.54%	1.82%
9 - Advance preparation: Cook-chill and Reduced oxygen Packaging (ROP)	0.00%	0.00%
10 - Other	1.54%	0.84%
11 - Unknown	9.23%	11.05%

TABLE 33: METHOD OF PREPARATION FACTORS BY ETIOLOGIC AGENT FOR FOODBORNE OUTBREAKS REPORTED IN FLORIDA (N=65), 2009

Pathogen	Prep1	Prep2	Prep3	Prep4	Prep5	Prep6	Prep7	Prep8	Prep9	Other	Unknown	Total
B. *cereus*	0	0	0	2	1	1	0	0	0	0	0	4
C. *perfringens*	1	0	0	2	0	0	1	0	0	0	0	4
Chemical	0	0	0	0	0	0	0	0	0	0	0	0
Ciguatera	7	0	0	3	0	0	0	0	0	0	0	10
Cryptosporidium	0	0	0	0	0	0	0	0	0	0	0	0
E. *coli* O157:H7	0	0	0	1	0	0	0	0	0	0	0	1
Legionella	0	0	0	0	0	0	0	0	0	0	0	0
N. *fowleri*	0	0	0	0	0	0	0	0	0	0	0	0
Norovirus	1	3	11	1	1	2	0	0	0	0	2	21
Salmonella	1	0	0	1	2	2	0	0	0	0	1	7
Scombroid	0	0	1	0	0	0	0	0	0	0	0	1
Shigella	0	0	0	0	0	0	0	0	0	0	1	1
Staphylococcus	0	0	0	0	0	1	0	0	0	0	0	1
Unknown	1	0	0	1	1	0	1	1	0	0	2	7
V. *vulnificus*	0	0	7	0	0	0	0	0	0	0	0	7
Total	11	3	19	11	5	6	2	1	0	0	6	64

TABLE 34: METHOD OF PREPARATION FACTORS BY ETIOLOGIC AGENT FOR CASES IN FOODBORNE OUTBREAKS REPORTED IN FLORIDA, (N=715), 2009

Pathogen	Prep1	Prep2	Prep3	Prep4	Prep5	Prep6	Prep7	Prep8	Prep9	Other	Unknown	Total
B. *cereus*	0	0	0	8	2	2	0	0	0	0	0	12
C. *perfringens*	30	0	0	8	0	0	12	0	0	0	0	50
Chemical	0	0	0	0	0	0	0	0	0	0	0	0
Ciguatera	28	0	0	13	0	0	0	0	0	0	0	41
Cryptosporidium	0	0	0	0	0	0	0	0	0	0	0	0
E. *coli* O157:H7	0	0	0	42	0	0	0	0	0	0	0	42
Legionella	0	0	0	0	0	0	0	0	0	0	0	0
N. *fowleri*	0	0	0	0	0	0	0	0	0	0	0	0
Norovirus	12	49	194	17	5	18	0	0	0	0	36	331
Salmonella	7	0	0	8	4	16	0	0	0	0	14	49
Scombroid	0	0	7	0	0	0	0	0	0	0	0	7
Shigella	0	0	0	0	0	0	0	0	0	0	13	13
Staphylococcus	0	0	0	0	0	2	0	0	0	0	0	2
Unknown	41	0	0	11	47	0	27	13	0	0	16	155
V. *vulnificus*	0	0	7	0	0	0	0	0	0	0	0	7
Total	118	49	208	107	58	38	39	13	0	0	79	709