

Summary of Foodborne Diseases

Section 3

1996-2005 Overview

Foodborne Disease Outbreaks

Description

Foodborne disease investigation and surveillance are essential public health activities. Globalization of the food supply, changes in individuals eating habits and behaviors, and newly emerging pathogens has increased the risk of contracting foodborne diseases. The Centers for Disease Control and Prevention (CDC) estimates foodborne diseases account for approximately 76 million illnesses, 325,000 hospitalizations, and 5,000 deaths per year in the U.S.. However, only an estimated 14 million illnesses, 60,000 hospitalizations, and 1,800 deaths are accounted for by confirmed pathogens. Florida has had a unique program in place since 1994 to oversee food and waterborne disease surveillance and investigation for the state, with the intent to better capture and investigate food and waterborne diseases, complaints, and outbreaks, as well as to increase knowledge and prevent illness with regard to this important public health issue.

Foodborne disease outbreaks as defined by the Florida Department of Health Food and Waterborne Disease Program are incidents in which two or more people have the same disease, have similar symptoms, or excrete the same pathogens; and there is a time, place, and/or person association between these people. A single case of suspected botulism, mushroom poisoning, ciguatera or paralytic shellfish poisoning, other rare disease, or a case of a disease that can be definitely related to ingestion of a food, is considered as an incident of foodborne illness, and warrants further investigation.

The Florida Department of Health has criteria established for suspected and confirmed foodborne disease outbreaks. A suspected foodborne outbreak is one for which the sum of the epidemiological evidence is not strong enough to consider it a confirmed outbreak. A confirmed foodborne outbreak is an outbreak that has been thoroughly investigated, and the results include strong epidemiological association of a food item or meal with illness. A thorough investigation is documented by diligent case finding, interviewing of ill cases and well individuals, collecting clinical and food lab samples, where appropriate and available, confirmation of lab samples, where possible, field investigation of the establishment(s) concerned, and statistical analysis of the information collected during the investigation. The summary report of all of the information collected in an investigation in a confirmed outbreak will indicate a strong association with a particular food and/or etiologic agent, and a group of two or more people, or single incidents as described above.

Overview

From 1996 through 2005, Florida had 2,581 reported foodborne disease outbreaks with a total of 20,008 associated cases. The annual number of reported foodborne disease outbreaks and cases ranged from 128 to 425 and 1,450 to 3,251, respectively. The annual average number of cases per outbreak ranged from 5.37 to 15.19. The annual proportion of reported foodborne disease outbreaks and cases ranged from 0.71 per 100,000 to 2.83 per 100,000 and 8.65 per 100,000 to 21.23 per 100,000, respectively (Table 1).

Table 1. Summary of Foodborne Disease Outbreaks, Florida 1996-2005

Year	# Outbreaks	# Cases	Proportion of Outbreaks per 100,000 Population	Proportion of Cases per 100,000 Population	Cases per Outbreak
1996	299	2215	2.03	15.07	7.41
1997	425	2692	2.83	17.93	6.33
1998	300	3251	1.96	21.23	10.84
1999	273	1465	1.74	9.34	5.37
2000	269	1569	1.67	9.76	5.83
2001	288	1922	1.75	11.71	6.67
2002	240	1450	1.43	8.65	6.04
2003	185	1563	1.08	9.11	8.45
2004	174	1937	0.99	11.00	11.13
2005	128	1944	0.71	10.79	15.19

Foodborne disease outbreaks in Florida are classified by outbreaks status (confirmed or suspected) as well as by pathogen status (confirmed, suspected, or unknown). Among the 2,581 reported foodborne disease outbreaks, 548 (21.23%) were determined to be confirmed foodborne disease outbreaks, accounting for 11,222 (56.09%) of the 20,008 reported cases. Of the total reported outbreaks, 1,286 (49.83%) had a suspected and/or confirmed etiology accounting for 12,918 (64.56%) of the total cases. Of the total reported outbreaks, 1,295 (50.17%) had unknown etiologies accounting for 7,090 (35.44%) of the total cases (Table 2).

Table 2. Total Number and Percentage of Reported Foodborne Outbreaks and Cases by Pathogen Status

	# Outbreaks	# Cases	% Outbreaks	% Cases
Suspected Outbreaks	2,033	8,786	78.77%	43.91%
Confirmed Pathogens	62	293	2.40%	1.46%
Suspected Pathogens	759	4,158	29.41%	20.78%
Unknown Pathogens	1212	4,335	46.96%	21.67%
Confirmed Outbreaks	548	11,222	21.23%	56.09%
Confirmed Pathogens	340	6,340	13.17%	31.69%
Suspected Pathogens	125	2,127	4.84%	10.63%
Unknown Pathogens	83	2,755	3.22%	13.77%

Trends

There is a general decreasing trend in the total number of reported foodborne disease outbreaks and number of reported foodborne disease outbreaks per 100,000 population in Florida between 1996 and 2005 (Figures 1 and 2).

Figure 1.
Total Number of Reported Foodborne Outbreaks, Florida 1996-2005

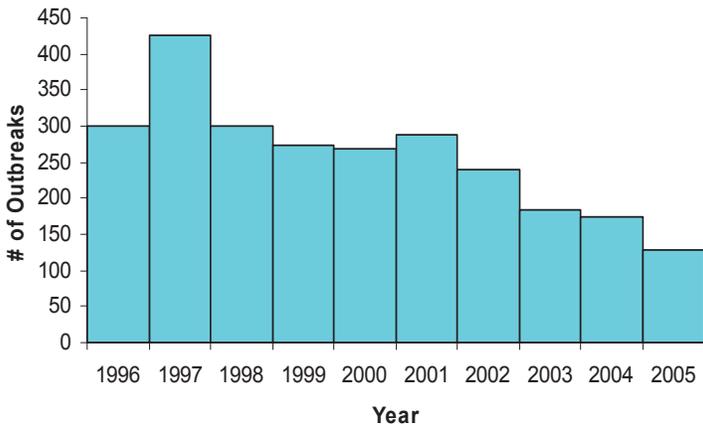
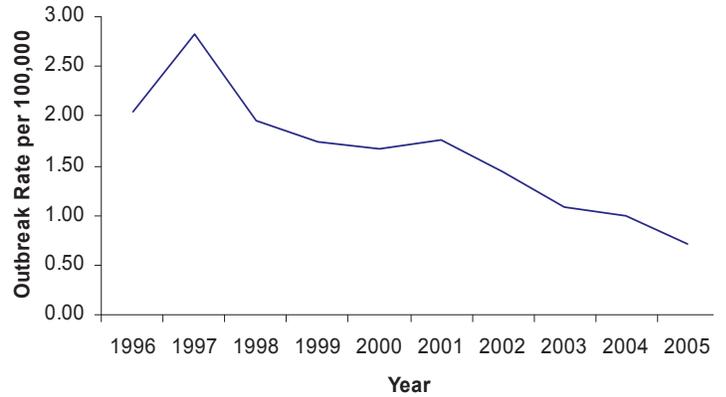


Figure 2.
Number of Reported Foodborne Disease Outbreaks per 100,000 population Florida, 1996-2005



The total number of reported foodborne illness cases, and the number of reported foodborne illness cases per 100,000 population in Florida between 1996 and 2005, have fluctuated over the 10-year period (Figure 3). It appears that the total number of reported foodborne illness cases has been gradually increasing since 2002 despite the negative trend in the total number of reported foodborne disease outbreaks during the same time period. However, when population is taken into account, the number of reported foodborne illness cases per 100,000 population has been fluctuating around ~10 cases per 100,000 population per year since 1999 (Figure 4).

Figure 3.
Total Number of Reported Foodborne Disease Outbreak Cases, Florida 1996-2005

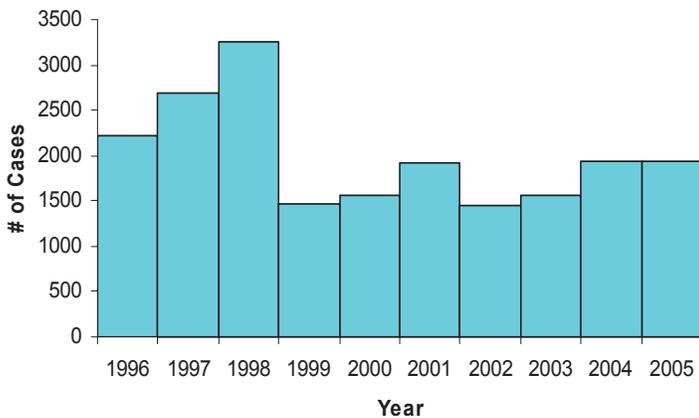
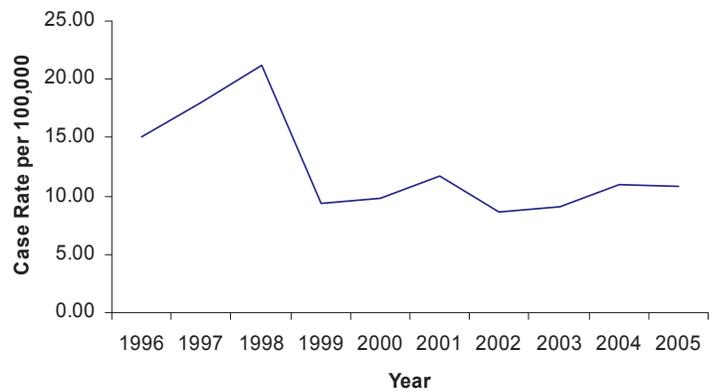


Figure 4.
Number of Reported Foodborne Disease Outbreak Cases per 100,000, Florida 1996-2005



Seasonality

Occurrence of reported foodborne illness outbreaks in Florida between 1996 and 2005 were most frequent from March to May (Figure 5).

Agent

Foodborne disease outbreaks caused by bacterial pathogens accounted for most (31%) of the total reported foodborne disease outbreaks with a known etiology (Figure 6), while foodborne disease outbreaks caused by viral pathogens accounted for the most reported cases (31%) with a known etiology

(Figure 7). Pathogen type was unknown for 51% of the total reported foodborne disease outbreaks, and 35% of the total reported cases.

Figure 5.
Total Number of Reported Foodborne Disease Outbreaks by Month, Florida 1996-2005

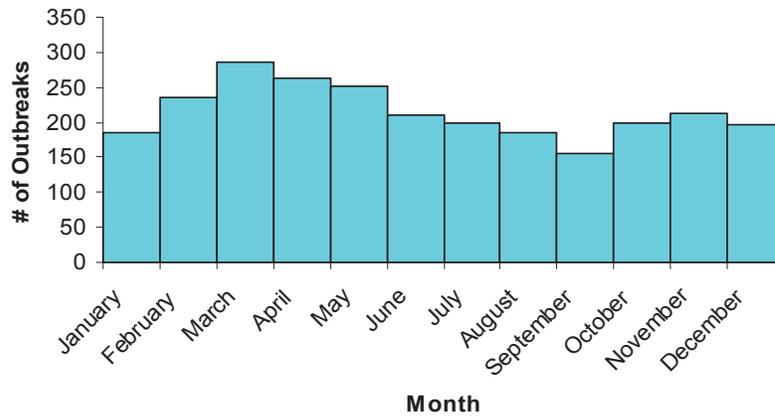


Figure 6.
Percentage of Reported Foodborne Disease by Pathogen Type, Florida 1996-2005

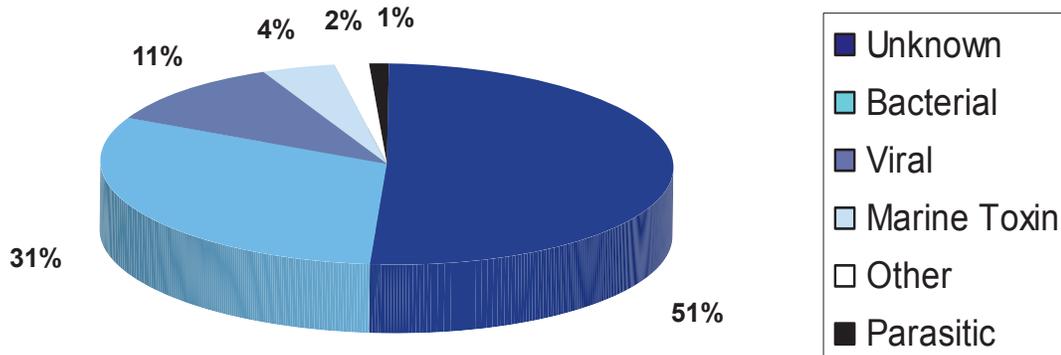
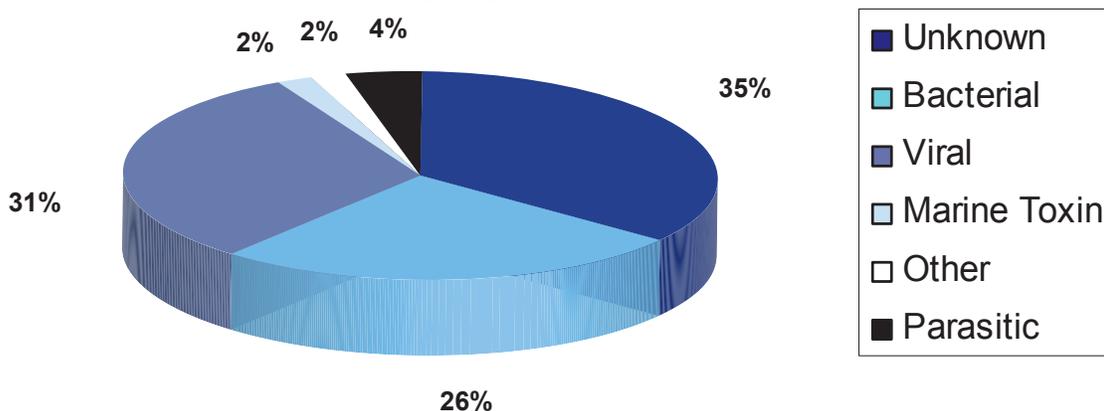


Figure 7.
Percentage of Reported Foodborne Disease Outbreaks Outbreak Cases by Pathogen Type, Florida 1996-2005



Among foodborne disease outbreaks with a suspected and/or confirmed etiology, *Staphylococcus aureus* was the most frequently reported etiology for outbreaks in Florida between 1996 and 2005 ac-

counting for 264 (10.23%) outbreaks followed closely by Norovirus, which accounted for 257 (9.96%) outbreaks. Norovirus accounted for the highest number of cases associated with reported foodborne disease outbreaks with 5,644 (28.21%) cases followed by Salmonella which accounted for 1,741 (8.71%) cases. Since Florida is a coastal state, it should be mentioned that marine toxins accounted for 115 (4.46%) and 406 (2.03%) of the total number of reported outbreaks and cases in Florida between 1996 and 2005. The number and percentage of foodborne disease outbreaks and cases by etiology for the 10-year period 1996-2005 is summarized in Table 3.

Table 3. Number and Frequency of Foodborne Outbreaks and Cases by Etiology, Florida 1996-2005

Pathogen	Outbreaks		Cases	
	#	%	#	%
Unknown				
Total Unknown	1305	50.56%	7118	35.58%
Bacterial				
<i>B. cereus</i>	110	4.26%	599	2.99%
<i>C. botulinum</i>	4	0.15%	6	0.03%
<i>C. perfringens</i>	89	3.45%	1023	5.11%
<i>Campylobacter</i>	14	0.54%	59	0.29%
<i>E. coli</i> O157:H7	11	0.43%	60	0.30%
<i>E.coli-enterohemorrhagic</i>	1	0.04%	21	0.10%
<i>Listeria</i>	1	0.04%	24	0.12%
<i>Salmonella</i>	155	6.01%	1741	8.70%
<i>Shigella</i>	22	0.85%	137	0.68%
<i>Staphylococcus</i>	264	10.23%	1009	5.04%
Typhoid Fever	1	0.04%	16	0.08%
<i>Vibrio parahaemolyticus</i>	35	1.36%	315	1.57%
<i>Vibrio vulnificus</i>	86	3.33%	86	0.43%
<i>Vibrio</i> sp.	5	0.19%	10	0.05%
<i>Yersinia enterocolitica</i>	1	0.04%	2	0.01%
Total Bacterial	799	30.96%	5108	25.53%
Viral				
Hepatitis A	12	0.46%	144	0.72%
Viral-Non-Norwalk	13	0.50%	340	1.70%
Norovirus	257	9.96%	5644	28.21%
Total Viral	282	10.93%	6128	30.63%
Marine Toxin				
Ciguatera	57	2.21%	216	1.08%
NSP	5	0.19%	12	0.06%
Saxitoxin (PSP)	5	0.19%	28	0.14%
Scombroid	48	1.86%	150	0.75%
Total Marine Toxin	115	4.46%	406	2.03%
Other				
Mercury Poisoning	1	0.04%	2	0.01%
Chemical	46	1.78%	255	1.27%
Other	15	0.58%	92	0.46%
Copper	1	0.04%	2	0.01%
Total Other	63	2.44%	351	1.75%
Parasitic				
<i>Cryptosporidium</i>	1	0.04%	37	0.18%
<i>Cyclospora</i>	15	0.58%	852	4.26%
<i>Giardia</i>	1	0.04%	8	0.04%
Total Parasitic	17	0.66%	897	4.48%
Total				
Total	2581	100.00%	20008	100.00%

Implicated Food Vehicles

Multiple items (22.08%) and multiple ingredients (16.97%) were the most frequently reported general vehicles contributing to foodborne disease outbreaks and cases in Florida between 1996 and 2005 (Table 4).

Table 4. Foodborne Illness Outbreaks and Cases by General Vehicle, Florida 1996-2005

General Vehicle	# Outbreaks	% Outbreaks	# Cases	% Cases
*Multiple Items	570	22.08%	6440	32.19%
**Multiple Ingredients	438	16.97%	2741	13.70%
Poultry	335	12.98%	2053	10.26%
Beef	233	9.03%	989	4.94%
Fish	210	8.14%	733	3.66%
Shellfish-Molluscan	181	7.01%	641	3.20%
Unknown	96	3.72%	1538	7.69%
Other	97	3.76%	705	3.52%
Shellfish-Crustacean	97	3.76%	568	2.84%
Pork	85	3.29%	523	2.61%
Rice	66	2.56%	388	1.94%
Dairy	57	2.21%	248	1.24%
Vegetables	37	1.43%	532	2.66%
Fruit	30	1.16%	422	2.11%
Pizza	25	0.97%	90	0.45%
Ice	15	0.58%	233	1.16%
Pasta	6	0.23%	31	0.15%
Eggs	2	0.08%	541	2.70%
Produce-Vegetable	1	0.04%	592	2.96%
Total	2581	100.00%	20008	100.00%

*Multiple Items are food vehicles in which several foods are individually prepared or cooked and more than one food is suspected or confirmed to be contaminated (e.g. buffet, salad bar, chicken and shrimp, etc.).

**Multiple Ingredients are food vehicles in which several foods are combined during preparation or cooking and the entire food product is suspected or confirmed to be contaminated (e.g. casseroles, soups, sandwiches, salads, etc.).

Outbreak Location

Most of the reported foodborne disease outbreaks (78.96%) and cases (59.27%) were associated with restaurants (Table 5).

Table 5. Foodborne Illness Outbreaks and Cases by Site Florida 1996-2005

Site	# of Outbreaks	% Outbreaks	# Cases	% Cases
Restaurant	2038	78.96%	11859	59.27%
Grocery	150	5.81%	643	3.21%
Home	124	4.80%	794	3.97%
Other	97	3.76%	1679	8.39%
Caterer	83	3.22%	1910	9.55%
School	45	1.74%	1959	9.79%
Prison	18	0.70%	627	3.13%
Nursing Home	11	0.43%	352	1.76%
Picnic	8	0.31%	125	0.62%
Hospital	6	0.23%	54	0.27%
Bakery	1	0.04%	6	0.03%
Total	2581	100.00%	20008	100.00%

Contributing Factors

The current systematic data collection regarding contributing factors associated with reported foodborne disease outbreaks began in 2000. There were several outbreaks (407) for which no information was available. The top contributing factors associated with reported foodborne disease outbreaks in Florida from 2000 to 2005 were time/temperature abuse, poor personal hygiene, and cross contamination (Table 6).

Table 6. Most Common Reported Foodborne Contributing Factors, Florida 2000-2005

Contributing Factor	# Outbreaks	# Cases
Unknown/None Reported	407	3149
Inadequate cold-holding temperatures**	318	1559
Bare-handed contact by handler/worker/preparer*	270	2104
Cross contamination from raw ingredient of animal origin*	197	1240
Inadequate cleaning of processing/preparation equipment/utensils*	161	1232
Allowing foods to remain at room or warm outdoor temperature for several hours**	131	688
Slow cooling**	109	586
Raw product/ingredient contaminated by pathogens from animal or environment*	102	1231
Handling by an infected person or carrier of pathogen*	99	1964
Insufficient time and/or temperature during hot holding**	74	607
Other process failures that permit the agent to survive***	70	425

Note: There are 3 categories of contributing factors (contamination factor, proliferation factor, survival factor) and up to three contributing factors per category can be attributed in an outbreak; therefore, the reported numbers may not match the actual number of reported outbreaks and cases.

* Contamination Factor

** Proliferation/Amplification Factor

*** Survival Factor

References

Please view references for specific outbreaks in Section 4: Summary of Notable Outbreaks and Case Investigations, 1997-2006. Case Investigations, 1997-2006.