

Summary of Foodborne Diseases

Section 3

2006 and 2007 Summary

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Description

Foodborne disease investigation and surveillance are essential public health activities. Globalization of the food supply, changes in individual 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's 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 person, place, and/or time association between these people along with ingestion of a common food. 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

In 2006 and 2007, Florida reported 260 foodborne disease outbreaks with a total of 1,969 associated cases (Table 1).

Table 1. Summary of Foodborne Disease Outbreaks, Florida 1998-2007

Year	# Outbreaks	# Cases	Proportion of Outbreaks per 100, 000 population	Proportion of Cases per 100, 000 population	Cases per Outbreak
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
2006	143	1142	0.78	6.19	7.99
2007	117	827	0.62	4.41	7.07

Foodborne disease outbreaks in Florida are classified by outbreak status (confirmed or suspected) as well as by pathogen status (confirmed, suspected, or unknown). Among the 260 reported foodborne disease outbreaks in 2006 and 2007, 73 (28.08%) were determined to be confirmed foodborne disease outbreaks, accounting for 1056 (53.63%) of the 1,969 reported cases. Of the total reported outbreaks, 149 (57.31%) had a suspected and/or confirmed etiology, accounting for 1,428 (72.52%) of the total cases. Of the total reported outbreaks, 111 (42.69%) had unknown etiologies, accounting for 541 (27.48%) of the total cases (Table 2).

Table 2. Total Number and Percentage of Reported Foodborne Outbreaks and Cases by Pathogen Status,,Florida 2006-2007

	# Outbreaks	# Cases	% Outbreaks	% Cases
Suspected Outbreaks	187	913	71.92%	46.37%
Confirmed Pathogens	10	168	3.85%	8.53%
Suspected Pathogens	72	317	27.69%	16.10%
Unknown Pathogens	105	428	40.38%	21.74%
Confirmed Outbreaks	73	1056	28.08%	53.63%
Confirmed Pathogens	57	813	21.92%	41.29%
Suspected Pathogens	10	130	3.85%	6.60%
Unknown Pathogens	6	113	2.31%	5.74%

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 over the last 10 years (Figures 1 & 2).

Figure 1. Total Number of Reported Foodborne Disease Outbreaks, Florida, 1998-2007

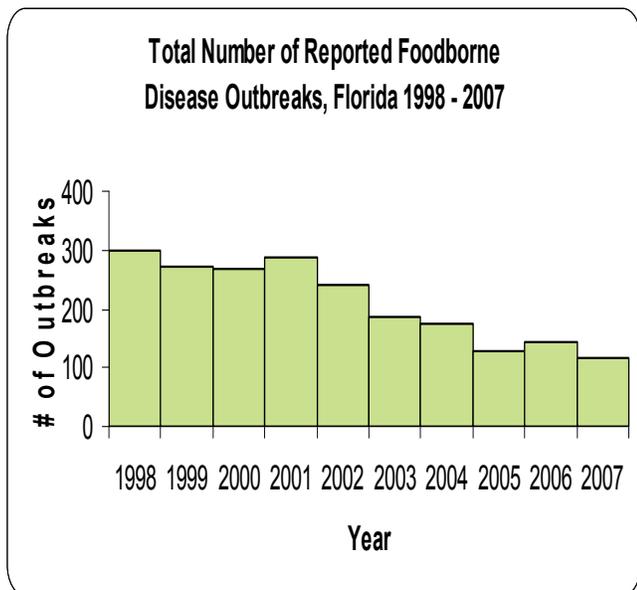
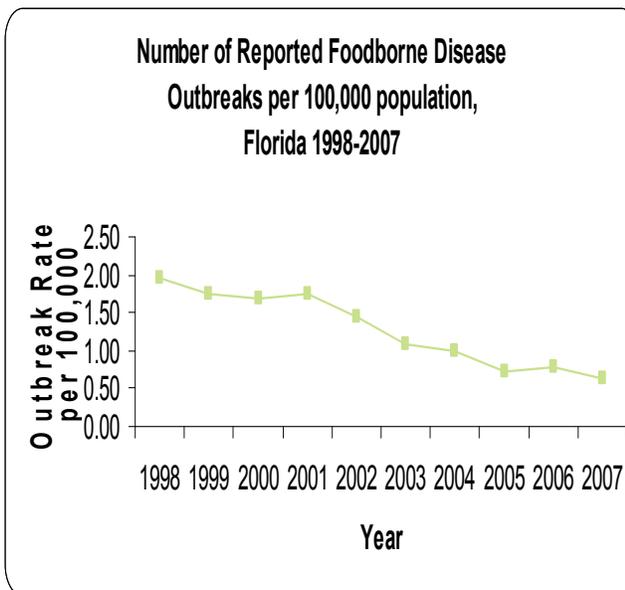


Figure 2. Number of Reported Foodborne Disease Outbreaks per 100,000 population Florida, 1998-2007



The total number of reported foodborne illness cases and the number of reported foodborne illness cases per 100,000 population in Florida has fluctuated over the last 10 years (Figure 3). There appears to be a decreasing trend in the number of reported foodborne disease outbreak cases and number of reported foodborne disease outbreak cases per 100,000 population for 2006 and 2007. (Figure 4).

Figure 3. Total Number of Reported Foodborne Disease Outbreak Cases Florida, 1998-2007

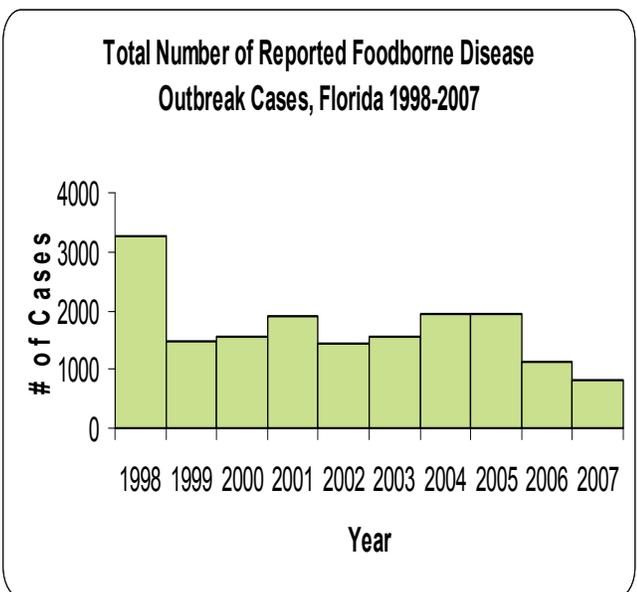
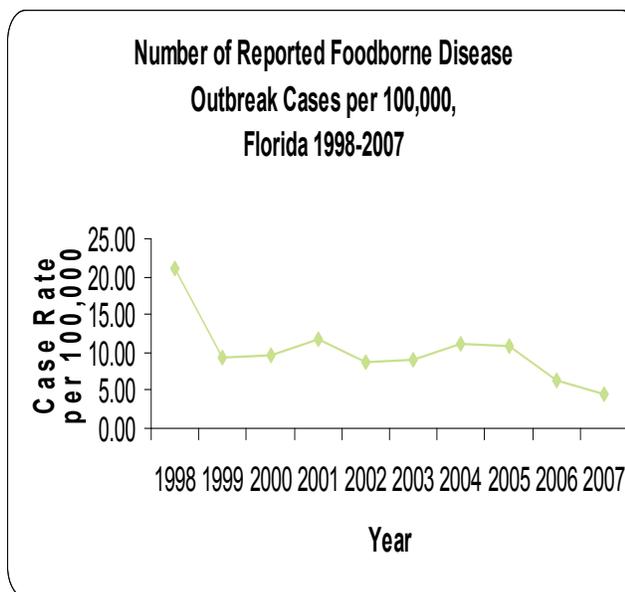


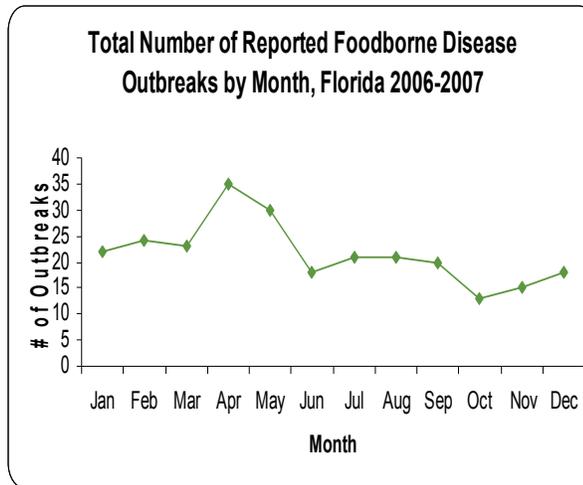
Figure 4. Number of Reported Foodborne Outbreak Cases per 100,000 population Florida, 1998-2007



Seasonality

Occurrence of reported foodborne disease outbreaks in Florida for 2006 and 2007 were most frequent during the spring months of April and May (Figure 5).

Figure 5. Total Number of Reported Foodborne Disease Outbreaks by Month, Florida 2006-2007



Agent

Foodborne disease outbreaks caused by bacterial pathogens accounted for the highest proportion of the reported foodborne disease outbreaks with a known etiology and accounted for 24.62% of foodborne disease outbreaks overall (Figure 6). This is in contrast to foodborne disease outbreaks caused by viral pathogens which accounted for the highest proportion of reported cases with a known etiology and accounted for 45.69% of all foodborne disease outbreak cases (Figure 7). Pathogen type was unknown for 42.69% of the total reported foodborne disease outbreaks and 27.48% of the total reported cases.

Figure 6. Percentage of Reported Foodborne Disease Outbreaks by Pathogen Type, Florida 2006-2007

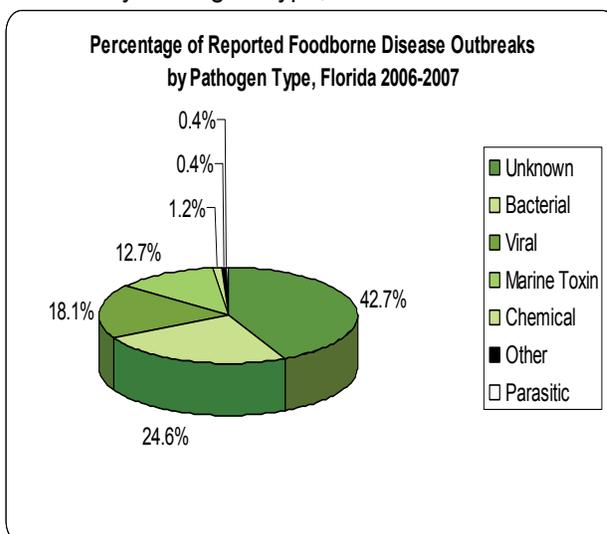
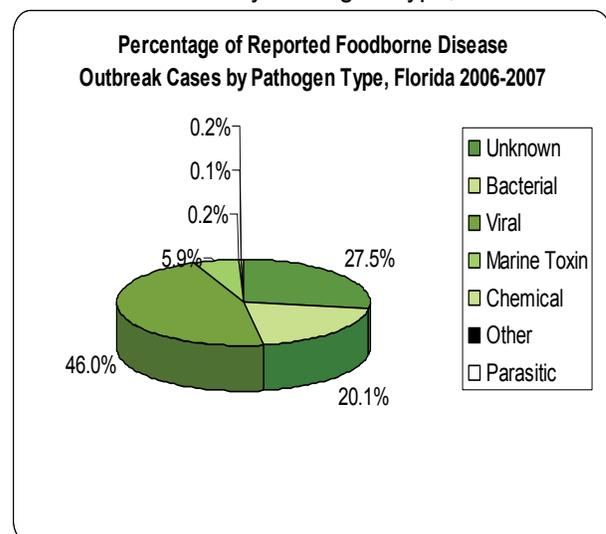


Figure 7. Percentage of Reported Foodborne Disease Outbreak Cases by Pathogen Type, Florida 2006-2007



The number and percentage of foodborne disease outbreaks and cases by etiology for 2006-2007 is summarized in Table 3. Among foodborne disease outbreaks with a suspected and/or confirmed etiology, Norovirus was the most frequently reported etiology for outbreaks in Florida for 2006 and 2007 accounting for 46 (16.69%) outbreaks followed by *Staphylococcus* and Ciguatera which accounted for 19 (7.31%) outbreaks each. Norovirus accounted for the highest number of cases associated with reported foodborne disease outbreaks with 902 (45.81%) cases followed by *Salmonella*, which accounted for 154 (7.82%) cases.

Table 3. Number and Frequency of Foodborne Outbreaks and Cases by Etiology, Florida 2006-2007

Pathogen	Outbreaks		Cases	
	#	%	#	%
Unknown				
Total Unknown	111	42.69%	541	27.48%
Bacterial				
<i>Staphylococcus</i>	19	7.31%	117	5.94%
<i>B. cereus</i>	16	6.15%	86	4.37%
<i>V. vulnificus</i>	15	5.77%	15	0.76%
<i>Salmonella</i>	7	2.69%	154	7.82%
<i>C. perfringens</i>	4	1.54%	19	0.96%
<i>E. coli</i> O157:H7	2	0.77%	4	0.20%
<i>C. botulinum</i>	1	0.38%	1	0.05%
Total Bacterial	64	24.62%	396	20.11%
Viral				
Norovirus	46	17.69%	902	45.81%
Hepatitis A	1	0.38%	3	0.15%
Total Viral	47	18.08%	905	45.96%
Parasitic				
<i>Giardia</i>	1	0.38%	4	0.20%
Total Parasitic	1	0.38%	4	0.20%
Marine Toxin				
Ciguatera	19	7.31%	71	3.61%
Scombroid	10	3.85%	24	1.22%
Neurotoxic Shellfish Poisoning	3	1.15%	18	0.91%
Total Marine Toxin	32	12.31%	113	5.74%
Other				
Chemical	3	1.15%	4	0.20%
Gempylotoxin	1	0.38%	4	0.20%
MSG	1	0.38%	2	0.10%
Total Other	5	1.92%	10	0.51%
Total				
Total	260	100.00%	1969	100.00%

Implicated Food Vehicles

Multiple items (23.46%), fish (15.00%), and multiple ingredients (13.85%) were the most frequently reported general vehicles contributing to foodborne disease outbreaks and cases in Florida for 2006 and 2007 (Table 4).

Table 4. Reported Foodborne Illness Outbreaks and Cases by General Vehicle, Florida 2006-2007

	# Outbreaks	% Outbreaks	# Cases	% Cases
*Multiple Items	61	23.46%	635	32.25%
Fish	39	15.00%	126	6.40%
**Multiple Ingredients	36	13.85%	189	9.60%
Poultry	24	9.23%	168	8.53%
Shellfish-Molluscan	22	8.46%	51	2.59%
Unknown	16	6.15%	409	20.77%
Beef	13	5.00%	34	1.73%
Produce-Vegetable	11	4.23%	144	7.31%
Pork	8	3.08%	52	2.64%
Shellfish-Crustacean	7	2.69%	29	1.47%
Beverage	6	2.31%	38	1.93%
Pizza	6	2.31%	41	2.08%
Produce-Fruit	4	1.54%	11	0.56%
Dairy	2	0.77%	4	0.20%
Ice	2	0.77%	27	1.37%
Rice	2	0.77%	9	0.46%
Pasta	1	0.38%	2	0.10%
Total	260	100.00%	1969	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 (73.08%) and cases (46.11%) were associated with restaurants (Table 5).

Table 5. Reported foodborne Illness Outbreaks and Cases by Site Florida 2006-2007

Site	# Outbreaks	% Outbreaks	# Cases	% Cases
Restaurant	190	73.08%	908	46.11%
Home	30	11.54%	145	7.36%
Grocery	14	5.38%	82	4.16%
Caterer	9	3.46%	253	12.85%
Other	5	1.92%	131	6.65%
Prison	3	1.15%	138	7.01%
Lunch Truck	2	0.77%	12	0.61%
Bakery	1	0.38%	6	0.30%
Country Club	1	0.38%	3	0.15%
Hospital	1	0.38%	11	0.56%
Oyster Bar	1	0.38%	1	0.05%
School	1	0.38%	248	12.60%
Shrimp Festival	1	0.38%	30	1.52%
Unknown	1	0.38%	1	0.05%
Total	260	100.00%	1969	100.00%

Contributing Factors

The current systematic data collection regarding contributing factors associated with reported foodborne disease outbreaks began in 2000. The top contributing factors associated with reported foodborne disease outbreaks in Florida for 2006 and 2007 were associated with time/temperature abuse, poor personal hygiene, and cross contamination (Table 6).

Table 6. Most Common Reported Foodborne Contributing Factors, Florida 2006-2007

Contributing Factor	# Outbreaks	# Cases
Inadequate cold-holding temperatures**	70	256
Unknown	64	469
Bare-handed contact by handler/worker/preparer*	59	705
Inadequate cleaning of processing/preparation equipment/utensils*	55	342
Toxic substance*	32	113
Cross contamination from raw ingredient of animal origin*	30	143
Insufficient time and/or temperature during hot holding**	22	201
Contaminated raw product/ingredient*	20	38
Ingestion of raw products*	19	33
Infected person or carrier*	18	597

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

References

J.B. Bender, et al., "Foodborne disease in the 21st century: What challenges await us?" *Postgraduate Medicine*, Vol. 106, No. 2, 1999, pp. 106-119.

P.S. Mead, et al., "Food-related illness and death in the United States," *Emerging Infectious Diseases*, Vol. 5, No. 5, 1999, pp. 607-625.