

Section 3

Foodborne Disease Outbreaks

Description

Foodborne disease investigation and surveillance are essential public health activities. Globalization of the food supply, changes in eating habits and behaviors, and newly emerging pathogens have impacted the risk of contracting foodborne diseases. The Centers for Disease Control and Prevention (CDC) estimates foodborne diseases from unspecified agents account for approximately 38.4 million illnesses, 71,878 hospitalizations, and 1,686 deaths per year in the U.S. An additional estimated 9.4 million illnesses, 55,961 hospitalizations, and 1,351 deaths are accounted for by confirmed foodborne 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 definitively linked to ingestion of a food, is considered an incident of foodborne illness and warrants further investigation.

Overview

In 2010, Florida reported 64 foodborne disease outbreaks with 805 associated cases. (Table 1).

Table 1. Summary of Foodborne Disease Outbreaks, Florida, 2000-2009

Year	Number of Outbreaks	Number of Cases	Proportion of Outbreaks per 100,000 Population	Proportion of Cases per 100,000 Population	Average Cases per Outbreak
2001	290	1,921	1.77	11.70	6.62
2002	237	1,443	1.41	8.60	6.09
2003	185	1,564	1.08	9.11	8.45
2004	173	1,911	0.98	10.85	11.05
2005	128	1,944	0.71	10.79	15.19
2006	142	1,141	0.77	6.19	8.04
2007	122	852	0.65	4.55	6.98
2008	96	1,218	0.51	6.45	12.69
2009	65	715	0.35	3.80	11.00
2010	64	805	0.34	4.28	12.58

Trends

Over the last 10 years there has been 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 (Figures 1 and 2).

Figure 1. Total Number of Reported Foodborne Disease Outbreaks, Florida, 2001-2010

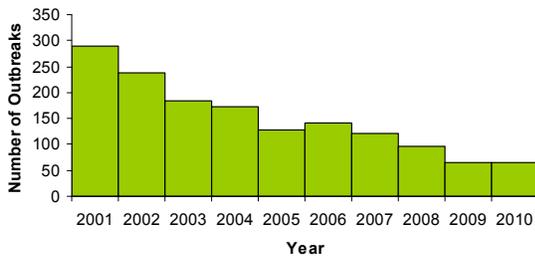
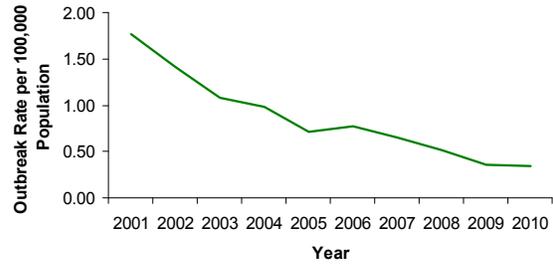


Figure 2. Number of Reported Foodborne Disease Outbreaks per 100,000 Population, Florida, 2001-2010



Over the last 10 years, the number of reported foodborne illness cases and the incidence per 100,000 population has declined (Figures 3 and 4).

Figure 3. Total Number of Reported Foodborne Disease Outbreak-Related Cases, Florida, 2001-2010

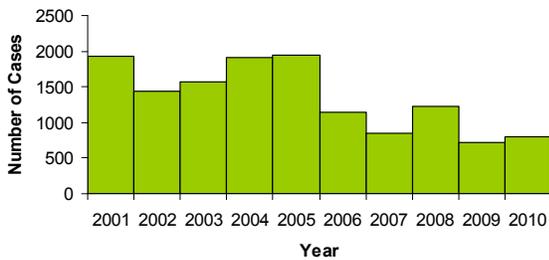
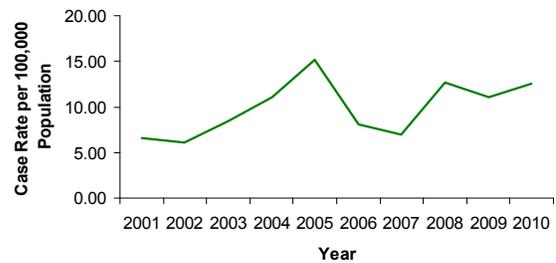


Figure 4. Average Number of Reported Foodborne Outbreak-Related Cases per 100,000 Population, Florida, 2001-2010



Seasonality

There was no seasonality trend in reported outbreaks. March had the highest number of outbreaks (N=10) and May the lowest (N=1) (Figure 5). Similarly there was no trend in the number of outbreak related cases reported monthly with the highest number of cases (N=130) reported in November (Figure 6).

Figure 5. Total Number of Reported Foodborne Disease Outbreaks by Month, Florida, 2010

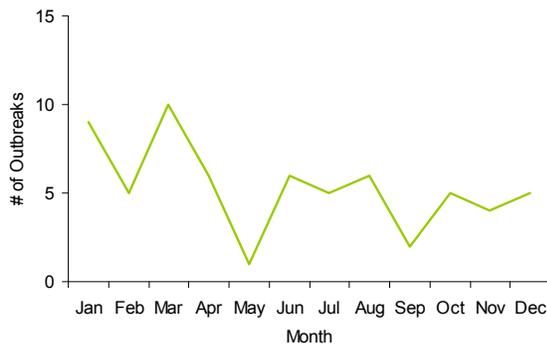
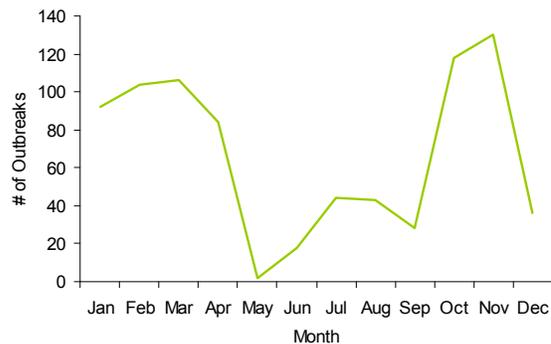


Figure 6. Total Number of Reported Foodborne Disease Outbreak-Related Cases by Month, Florida, 2010



Etiology

Foodborne disease outbreaks caused by bacterial (46.9%) and viral pathogens (39.1%) accounted for most of the total reported foodborne disease outbreaks with a known etiology. Foodborne disease outbreaks caused by bacterial pathogens also accounted for the most reported cases (51.3%). Pathogen type was unknown for 9.4% of the reported foodborne disease outbreaks accounting for 6.8% of the reported outbreak-related cases (Table 2).

Among foodborne disease outbreaks with a suspected and/or confirmed etiology, Norovirus was the most frequently reported etiology for 2010 accounting for 25 (39.1%) outbreaks followed by *Salmonella* and *Vibrio vulnificus*, each accounting for 5 (7.8%) outbreaks. Norovirus also accounted for the highest number of confirmed and probable outbreak-related cases with 325 (40.4%) cases followed by *Bacillus cereus*, which accounted for 158 (15.3%) cases (Table 2).

Table 2. Number and Frequency of Foodborne Outbreaks and Cases by Etiology, Florida, 2010

Pathogen	Outbreaks		Cases	
	Number	Percent	Number	Percent
Unknown				
Total Unknown	6	9.38%	55	6.83%
Bacterial				
<i>B. cereus</i>	9	14.06%	158	19.63%
<i>C. perfringens</i>	3	4.69%	123	15.28%
<i>Campylobacter</i> sp.	1	1.56%	19	2.36%
<i>Salmonella</i> sp.	5	7.81%	76	9.44%
<i>Shigella</i> sp.	1	1.56%	16	1.99%
<i>Staphylococcus</i> sp.	3	4.69%	10	1.24%
<i>V. parahaemolyticus</i>	2	3.13%	4	0.50%
<i>V. vulnificus</i>	5	7.81%	5	0.62%
Total Bacterial	25	38.46%	175	24.14%
Viral				
Norovirus	25	39.06%	325	40.37%
Total Viral	25	39.06%	325	40.37%
Marine Toxin				
Ciguatera	1	1.56%	4	0.50%
Ichthyootoxic Poisoning	1	1.56%	2	0.25%
Scombroid	2	3.13%	8	0.99%
Total Marine Toxin	4	6.25%	14	1.74%
Total				
Total	64		805	

Implicated Food Vehicles

Multiple items and multiple ingredients were the most frequently reported general vehicles contributing to foodborne disease outbreaks in Florida for 2010 (Table 3).

Table 3. Foodborne Illness Outbreaks and Cases by General Vehicle, Florida, 2010

General Vehicle	Outbreaks		Cases	
	Number	Percent	Number	Percent
Multiple Items*	23	35.94%	278	34.53%
Fish	6	9.38%	25	3.11%
Multiple Ingredients**	19	29.69%	194	24.10%
Produce-Vegetable	3	4.69%	48	5.96%
Shellfish-Molluscan	6	9.38%	7	0.87%
Poultry	1	1.56%	95	11.80%
Rice	2	3.13%	105	13.04%
Pizza	1	1.56%	7	0.87%
Pork	2	3.13%	5	0.62%
Ice	1	1.56%	41	5.09%
Total	64		805	

*Multiple Items 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.).

**Multiple Ingredients 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, baked chicken and grilled shrimp, etc.).

Contributing Factors

The top contributing factors associated with reported foodborne disease outbreaks in Florida for 2010 are displayed in Table 4. There are three categories of contributing factors (contamination factor, proliferation factor, survival factor). Up to three contributing factors per category can be attributed in an outbreak; as such, the reported numbers may not match the actual number of reported outbreaks and cases.

Table 4. Most Commonly Reported Foodborne Contamination Factors, Florida, 2010

Contamination Factor	Number of Outbreaks	Number of Cases
C1 - Toxic substance part of the tissue	4	14
C6 - Contaminated raw product - food was intended to be consumed after a kill step	3	124
C7 - Contaminated raw product - food was intended to be consumed raw or undercooked / under-processed	8	42
C9 - Cross-contamination of ingredients (cross contamination does not include ill food workers)	6	88
C10 - Bare-handed contact by a food handler/worker/preparer who is suspected to be infectious	12	167
C11 - Glove-hand contact by a food handler/worker/preparer who is suspected to be infectious	5	44
C12 - Other mode of contamination (excluding cross-contamination) by a food worker who is suspected to be infectious	2	6
C13 - Foods contaminated by non-food handler/worker/preparer who is suspected to be infectious	4	46

C14 - Storage in contaminated environment	4	17
C15 - Other source of contamination	5	50
Proliferation Factor	Number of Outbreaks	Number of Cases
P1 - Food preparation practices that support proliferation of pathogens (during food preparation)	7	68
P2 - No attempt was made to control temperature of implicated food or length of time food was out of temperature	8	109
P3 - Improper adherence of approved plan to use Time as a Public Health Control	2	4
P4 - Improper cold holding due to malfunctioning refrigeration equipment	3	17
P5 - Improper cold holding due to an improper procedure or protocol	7	23
P7 - Improper hot holding due to improper procedure or protocol	9	72
P8 - Improper/slow cooling	5	115
Survival Factor	Number of Outbreaks	Number of Cases
S1 - Insufficient time and/or temperature control during initial cooking/heat processing	3	79
S2 - Insufficient time and/or temperature during reheating	2	39
S5 - Other process failures that permit pathogen survival	4	57

Regulatory Agency

The Florida Department of Health (DOH) investigates foodborne outbreaks in all public facilities regardless of the regulatory agency responsible for doing routine inspections and issuing permits and citations. Agencies which regulate facilities with foodborne outbreaks are given in Table 5.

Table 5. Foodborne Disease Outbreaks and Cases by Agency with Regulatory Authority, Florida, 2010

Agency	Outbreaks		Cases	
	Number	Percent	Number	Percent
Department of Business and Professional Regulation	41	64.06%	498	61.86%
Department of Health	7	10.94%	210	26.09%
Department of Agriculture and Consumer Services	9	14.06%	46	5.71%
Other	7	10.94%	51	6.34%
Total	64		805	

Outbreak Location

Most reported foodborne disease outbreaks and outbreak-related cases were restaurant-associated (Table 6).

Table 6. Foodborne Illness Outbreaks and Cases by Site, Florida, 2010

Site	Outbreaks		Cases	
	Number	Percent	Number	Percent
Restaurant	37	57.81%	352	43.73%
Home	7	10.94%	52	6.46%
Caterer	5	7.81%	142	17.64%
Grocery	4	6.25%	27	3.35%
Correctional Institution	2	3.13%	122	15.16%
Hospital	1	1.56%	17	2.11%
Other	8	12.50%	93	11.55%
Total	64		805	

References

Scallan E, Griffin PM, Angulo FJ, Tauxe RV, Hoekstra RM, “Foodborne Illness Acquired in the United States - Unspecified Agents,” *Emerg Infect Dis.*, 2011 Jan.

Scallan E, Hoekstra RM, Angulo FJ, Tauxe RV, Widdowson M-A, Roy SL, et al., “Foodborne Illness Acquired in the United States - Major Pathogens,” *Emerg Infect Dis.*, 2011 Jan.