

Section 5

Summary of Foodborne Disease Outbreaks

Description

Foodborne disease surveillance, investigation, and reporting are essential public health activities. Globalization of the food supply, changes in eating habits and behaviors, and newly emerging pathogens and vehicles of transmission 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 conduct foodborne and waterborne disease surveillance, investigation, and reporting functions for the state with the intent to better detect and investigate related diseases, complaints, and outbreaks. This assists public health officials, the medical community, and the food industry in acquiring the knowledge and public health practices to prevent morbidity and mortality from contaminated food and water supplies throughout the harvesting, processing, distribution, and human consumption continuum.

Foodborne disease outbreaks, as defined by the Florida Department of Health's (FDOH) 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, or time association between these people along with ingestion of a common food. A single case of suspected botulism, mushroom poisoning, ciguatera, paralytic shellfish poisoning, or 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

FDOH identified 51 foodborne disease outbreaks with 407 associated cases in 2011 (Table 1).

Table 1. Summary of Reported Foodborne Disease Outbreaks, Florida 2002-2011

Year	Number of outbreaks	Number of cases	Number of outbreaks per 100,000 population	Number of cases per 100,000 population	Average cases per outbreak
2002	237	1,443	1.4	8.6	6.1
2003	185	1,564	1.1	9.1	8.5
2004	173	1,911	1	10.9	11.1
2005	128	1,944	0.7	10.8	15.2
2006	142	1,141	0.8	6.2	8
2007	122	852	0.7	4.6	7
2008	96	1,218	0.5	6.5	12.7
2009	65	715	0.4	3.8	11
2010	64	805	0.3	4.3	12.6
2011	51	407	0.3	2.2	8

Trends

Over the last ten years in Florida, 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 (Figures 1 and 2).

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Figure 1. Total Number of Reported Foodborne Disease Outbreaks, Florida, 2002-2011

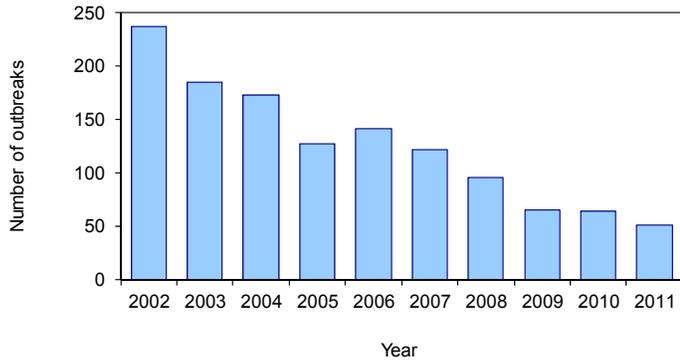
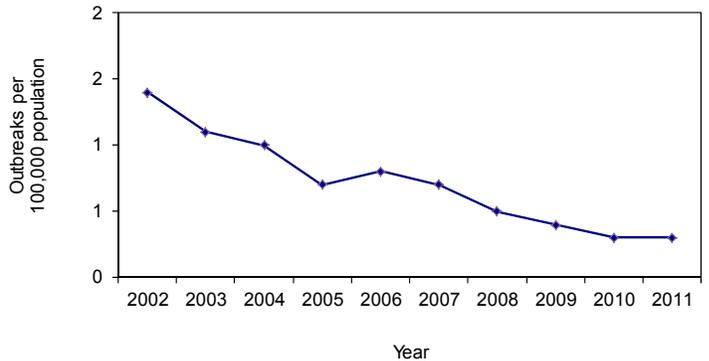


Figure 2. Number of Reported Foodborne Disease Outbreaks per 100,000 Population, Florida, 2002-2011



Over the last ten 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, 2002-2011

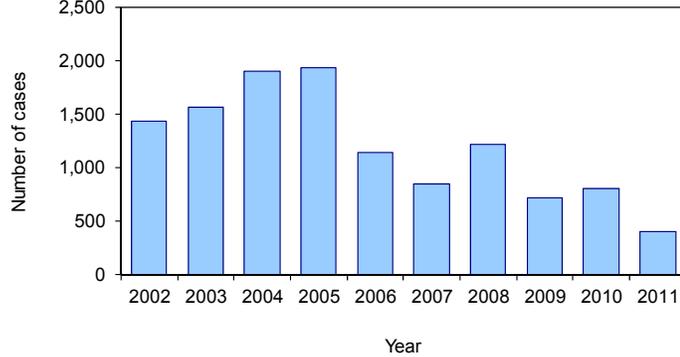
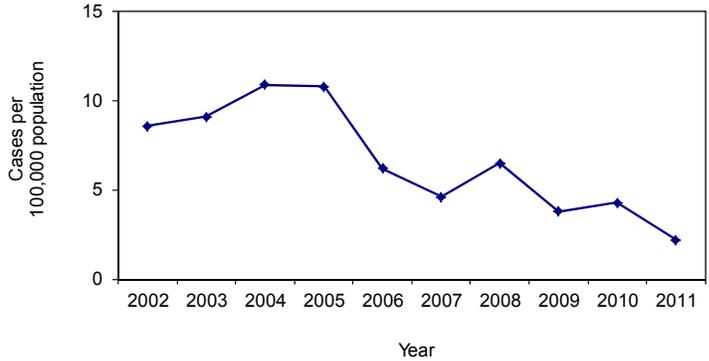


Figure 4. Number of Reported Foodborne Outbreak-Related Cases per 100,000 Population, Florida, 2002-2011



Seasonality

There was no seasonal trend in reported outbreaks. July and April had the highest number of outbreaks (eight) and November the lowest (none) (Figure 5). Similarly, there was no trend in the number of outbreak-related cases reported monthly, with the highest number of cases (94) reported in May (Figure 6).

Figure 5. Total Number of Reported Foodborne Disease Outbreaks by Month, Florida, 2011

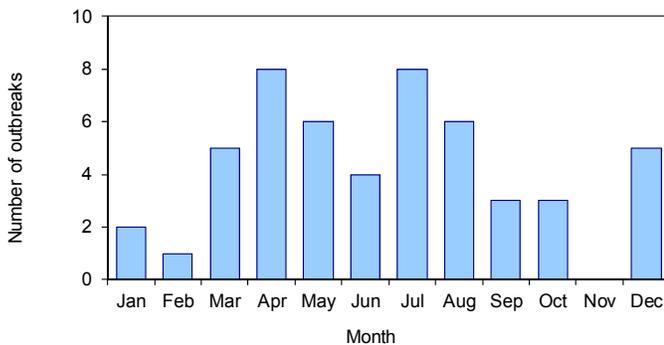
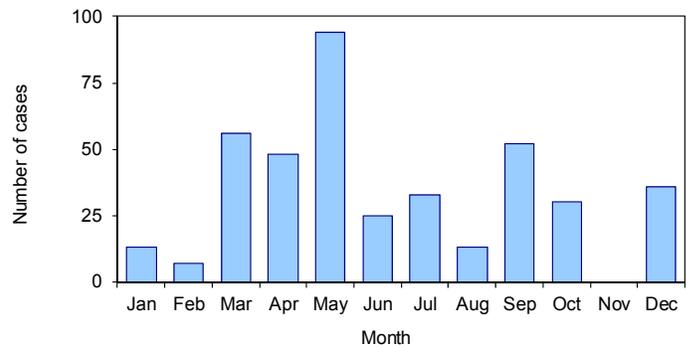


Figure 6. Total Number of Reported Foodborne Disease Outbreak-Related Cases by Month, Florida, 2011



Etiology

Foodborne disease outbreaks caused by bacteria (39.2%) and marine toxins (23.5%) accounted for most of the 2011 total reported foodborne disease outbreaks with a known etiology (Table 2). Viral pathogens (norovirus) contributed 19.6% of the outbreaks. Foodborne disease outbreaks caused by norovirus accounted for the most reported cases (50.1%). Bacterial pathogens accounted for 25.3% of reported outbreak cases while marine toxins accounted for 10.1% of cases. Pathogen type was unknown for 15.7% of the reported foodborne disease outbreaks accounting for 11.5% of the reported outbreak-related cases.

Among foodborne disease outbreaks with a suspected or confirmed etiology, *Vibrio vulnificus* was the most frequently reported etiology for 2011 accounting for 11 (21.6%) outbreaks followed by norovirus and ciguatera, accounting for ten (19.6%) and nine (17.7%) outbreaks respectively (Table 2).

Table 2. Frequency of Reported Foodborne Outbreaks and Cases by Confirmed or Suspected Etiology, Florida, 2011

Pathogen	Outbreaks	Cases
	Number (percent)	Number (percent)
Bacteria		
<i>Vibrio vulnificus</i>	11 (21.6)	11 (2.7)
<i>Salmonella</i>	3 (5.9)	40 (9.8)
<i>Clostridium perfringens</i>	3 (5.9)	33 (8.1)
<i>Bacillus cereus</i>	2 (3.9)	9 (2.2)
<i>Vibrio cholerae</i> 075	1 (2.0)	10 (2.5)
Total Bacteria	20 (39.2)	103 (25.3)
Viruses		
Norovirus	10 (19.6)	204 (50.1)
Total Viral	10 (19.6)	204 (50.1)
Marine Toxins		
Ciguatera	9 (17.7)	32 (7.9)
Scombroid	3 (5.9)	9 (2.2)
Total Marine Toxins	12 (23.5)	41 (10.1)
Parasites		
<i>Cyclospora</i>	1 (2.0)	12 (3.0)
Total Parasites	1 (2.0)	12 (3.0)
Unknown		
Total Unknown	8 (15.7)	47 (11.5)
Total	51 (100.0)	407 (100.0)

Implicated Food Vehicles

Fish, molluscan shellfish, and multiple items were the most frequently reported general vehicles contributing to foodborne disease outbreaks in Florida that occurred in 2011 (Table 3).

Table 3. Frequency of Reported Foodborne Illness Outbreaks and Cases by General Vehicle, Florida, 2011

Food vehicle	Outbreaks		Cases	
	Number	(percent)	Number	(percent)
Fish	13	(25.5)	45	(11.1)
Shellfish-mollusks	12	(23.5)	27	(6.6)
Multiple items*	11	(21.6)	142	(34.9)
Multiple ingredients**	4	(7.8)	19	(4.7)
Produce-vegetables	4	(7.8)	100	(24.6)
Rice	3	(5.9)	17	(4.2)
Unknown	2	(3.9)	50	(12.3)
Shellfish-crustaceans	1	(2.0)	1	(0.2)
Beverage	1	(2.0)	6	(1.5)
Total	51	(100.0)	407	(100.0)

*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.).

Contributing Factors

The top contributing factors associated with reported foodborne disease outbreaks in Florida for 2011 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, 2011

Contamination factors	Number of outbreaks	Number of cases
Toxic substance part of the tissue	12	41
Contaminated raw product - food was intended to be consumed after a kill step	2	13
Contaminated raw product - food was intended to be consumed raw or undercooked/under-processed	14	42
Cross-contamination of ingredients (cross contamination does not include ill food workers)	4	19
Bare-handed contact by a food handler/worker/preparer who is suspected to be infectious	4	136
Glove-hand contact by a food handler/worker/preparer who is suspected to be infectious	2	46
Other mode of contamination (excluding cross-contamination) by a food worker who is suspected to be infectious	3	63
Storage in contaminated environment	3	28
Other source of contamination	1	3
Proliferation factors	Number of outbreaks	Number of cases
Food preparation practices that support proliferation of pathogens (during food preparation)	2	7
No attempt was made to control temperature of implicated food or length of time food was out of temperature	1	3
Improper cold holding due to malfunctioning refrigeration equipment	1	6
Improper cold holding due to an improper procedure or protocol	4	16
Improper hot holding due to malfunctioning equipment	1	3
Improper hot holding due to improper procedure or protocol	2	24
Improper/slow cooling	1	22
Other situations that promoted or allowed microbial growth or toxin production	1	10
Proliferation/amplification factors not applicable	16	192
Survival factors	Number of outbreaks	Number of cases
Insufficient time and/or temperature control during initial cooking/heat processing	2	24
Other process failures that permit pathogen survival	1	6
Survival factors not applicable	24	184

Regulatory Agency

FDOH 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 provided in Table 5.

Table 5. Frequency of Reported Foodborne Disease Outbreaks and Cases by Agency with Regulatory Authority, Florida, 2011

Agency	Outbreaks	Cases
	Number (percent)	Number (percent)
Department of Business and Professional Regulation	32 (62.7)	320 (78.6)
Other	11 (21.6)	47 (11.5)
Department of Agriculture and Consumer Services	6 (11.8)	21 (5.2)
Department of Health	2 (3.9)	19 (4.7)
Total	51 (100.0)	407 (100.0)

Outbreak Location

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

Table 6. Foodborne Illness Outbreaks and Cases by Site, Florida, 2011

Agency	Outbreaks	Cases
	Number (percent)	Number (percent)
Restaurant	33 (64.7)	332 (81.6)
Home	10 (19.6)	32 (7.9)
Other	4 (7.8)	27 (6.6)
Grocery	3 (5.9)	9 (2.2)
Caterer	1 (2)	7 (1.7)
Total	51 (100)	407 (100)

FDOH is dedicated to the detection and investigation of foodborne-related diseases, complaints, and outbreaks. The scientific knowledge generated from these public health activities greatly assists the medical community, regulatory officials, public health officials, and the food industry to implement food safety policies and procedures to ensure a safe food supply for our citizens and visitors.

References

- Scallan E, Griffin PM, Angulo FJ, Tauxe RV, Hoekstra RM. 2011. Foodborne Illness Acquired in the United States—Unspecified Agents. *Emerging Infectious Diseases*, 17(1);16-22. Available at http://wwwnc.cdc.gov/eid/article/17/1/p2-1101_article.htm.
- Scallan E, Hoekstra RM, Angulo FJ, Tauxe RV, Widdowson M-A, Roy SL, Jones JL, Griffen PM. Foodborne Illness Acquired in the United States—Major Pathogens. *Emerging Infectious Diseases*, 17(1);7-15. Available at http://wwwnc.cdc.gov/eid/article/17/1/p1-1101_article.htm.

