

Foodborne and Waterborne Disease Outbreaks — United States, 1971–2012

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Preface

CDC collects data on foodborne and waterborne disease outbreaks reported by all U.S. states and territories through the Foodborne Disease Outbreak Surveillance System (FDOSS) and the Waterborne Disease and Outbreak Surveillance System (WBDOSS), respectively. These two systems are the primary source of national data describing the number of illnesses, hospitalizations, and deaths; etiologic agents; water source or implicated foods; settings of exposure; and other factors associated with recognized foodborne and waterborne disease outbreaks in the United States. This report summarizes data on foodborne disease outbreaks reported during 1973–2012 and waterborne disease outbreaks reported during 1971–2012. This report is a part of the first-ever *Summary of Notifiable Noninfectious Conditions and Disease Outbreaks*, which encompasses various surveillance years but is being published in 2015 (1). The *Summary of Notifiable Noninfectious Conditions and Disease Outbreaks* appears in the same volume of *MMWR* as the annual *Summary of Notifiable Infectious Diseases* (2).

a paper-based system, FDOSS became web-based in 1998. In 2009, the system was transitioned to an enhanced reporting platform, the National Outbreak Reporting System (NORS), which also collects information on waterborne disease outbreaks and enteric disease outbreaks with modes of transmission other than food, including person-to-person contact, animal contact, and environmental contamination. Information about NORS is available at <http://www.cdc.gov/nors>.

Foodborne disease outbreak surveillance data highlight the etiologic agents, foods, and settings involved most often in outbreaks and can help to identify food commodities and preparation settings in which interventions might be most effective. Surveillance for foodborne disease outbreaks provides insight into the effectiveness of regulations and control measures, helps identify new and emerging pathogens, provides information regarding the food preparation and consumption settings where outbreaks occur, informs prevention and control measures in the food industry by identifying points of contamination, and can be used to describe trends in foodborne disease outbreaks over time.

Background

Foodborne Disease Outbreak Surveillance

Foodborne diseases cause an estimated 48 million illnesses each year in the United States, including 9.4 million caused by known pathogens (3,4). Only a minority of foodborne illnesses, hospitalizations, and deaths occur as part of recognized outbreaks (5). However, information gathered from foodborne disease outbreak surveillance provides valuable insights into the agents that cause foodborne illness, types of implicated foods and ingredients, and settings in which transmission occurs.

Foodborne disease outbreaks have been nationally notifiable since 2010; however, reports of foodborne disease outbreaks have been collected by CDC through FDOSS since 1973. Initially

Waterborne Disease Outbreak Surveillance

Despite advances in water management and sanitation, waterborne disease and outbreaks continue to occur in the United States. CDC collects data on waterborne disease outbreaks associated with drinking water, recreational water, and other water exposures through WBDOSS. Waterborne disease outbreaks have been nationally notifiable since 2010; however, reports of waterborne disease outbreaks have been collected by CDC since 1971. Initially utilizing a paper-based reporting process, the system transitioned to web-based reporting with the launch of NORS in 2009.

CDC uses waterborne disease outbreak surveillance data to identify the types of etiologic agents, settings, recreational water venues, and drinking water systems associated with waterborne disease outbreaks; inform regulations and public awareness activities to promote healthy swimming and safe drinking water; and establish public health priorities to improve prevention efforts, guidelines, and regulations at the local, state, and federal levels.

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Data Sources

Foodborne Disease Outbreak Surveillance

State, local, and territorial health departments use a standard form (CDC form 52.13, available at http://www.cdc.gov/nors/pdf/NORS_CDC_5213.pdf) to report foodborne disease outbreaks to CDC. Data requested for each outbreak include reporting state; date of first illness onset; the number of illnesses, hospitalizations, and deaths; the etiology; the implicated food vehicle; the setting of food preparation and consumption; and contributing factors. Multistate outbreaks (i.e., those in which exposure to the implicated food occurred in more than one state) typically are reported to the system by CDC.

Only reports meeting the definition of a foodborne disease outbreak (i.e., the occurrence of two or more cases of a similar illness resulting from the ingestion of a common food) are included in this summary. Outbreaks that occurred on cruise ships and those involving food eaten outside the United States, even if the illness occurred in the United States, are not included in FDOSS.

Laboratory and clinical guidelines for confirming an etiology are specific to each bacterial, chemical/toxin, parasitic, and viral agent (http://www.cdc.gov/foodsafety/outbreaks/investigating-outbreaks/confirming_diagnosis.html). Suspected etiologies are those that do not meet the confirmation guidelines. The cause of an outbreak is categorized as “multiple etiologies” if more than one etiologic agent is reported.

Waterborne Disease Outbreak Surveillance

State, local, and territorial health departments use a standard form (CDC form 52.12, available at <http://www.cdc.gov/nors/forms.html#waterborne>) to report waterborne disease outbreaks to CDC. Data requested for each outbreak include reporting state; date of first illness onset; the number of illnesses, hospitalizations, and deaths; the etiology; the type of water exposure (e.g., recreational); the implicated venue or system, the setting of exposure; water quality indicators; and contributing factors.

Only reports meeting the definition of a waterborne disease outbreak (i.e., the occurrence of two or more cases of a similar illness resulting from exposure to a common water source) are included in this summary. WBD OSS includes reports of both gastrointestinal illness outbreaks and other illness outbreaks (e.g., legionellosis). Outbreaks that occurred on cruise ships and those in which the water exposure occurred outside the

United States, even if the illness occurred in the United States, are not included in WBD OSS.

Interpreting Data

Outbreaks represent only a small fraction of the number of foodborne and waterborne illnesses reported each year. Outbreaks caused by certain pathogens or vehicles might be more likely to be recognized or investigated. However, some illnesses reported as sporadic likely are not recognized as being part of a reported outbreak or are part of undetected outbreaks. In addition, all outbreak-related illnesses might not be identified during an investigation, smaller outbreaks might not come to the attention of public health authorities, and some outbreaks might not be investigated or reported to CDC. Reporting practices for foodborne and waterborne disease outbreaks also vary among states, which might have differing definitions of which events are reportable and unique laws related to disease outbreak reporting. For these reasons, variations in reporting rates by state might reflect variations in levels of effort and funding for foodborne and waterborne disease outbreak investigation rather than actual differences in reporting rates by state. Finally, NORS maintains a dynamic database; this analysis included data on March 27, 2015 for foodborne disease outbreaks and April 27, 2015 for waterborne disease outbreaks. Results might differ from those published earlier or later.

Methods for Identifying Foodborne and Waterborne Disease Outbreaks

Guidance for states and jurisdictions for reporting foodborne and waterborne disease outbreaks is provided by CDC (<http://www.cdc.gov/nors/forms.html>). As for all notifiable conditions, reporting to CDC is voluntary, and state and local laws, regulations, and practices vary. For example, CDC advises states to report outbreaks with cases in the same household; however, state or local jurisdictions might determine that these outbreaks do not require investigation or might deem them nonreportable at the state level.

Publication Criteria

Foodborne disease outbreaks are defined as two or more cases of a similar illness resulting from ingestion of a common food. Waterborne disease outbreaks are defined as two or more cases of a similar illness linked epidemiologically by time and location to exposure to water or water-associated chemicals volatilized into the air.

Highlights

Foodborne Disease Outbreaks

During 1973–2012, CDC received reports of 29,429 foodborne disease outbreaks with 729,020 outbreak-associated illnesses from 50 states, Puerto Rico, the District of Columbia, and freely associated states/territories. An average of 736 (range: 298–1404) outbreaks were reported each year (Figure 1). The average annual number of foodborne disease outbreaks reported to CDC during 1998–2012 was more than double the average annual number reported during 1973–1997, coinciding with the transition to an electronic reporting system.

In 2012, a total of 804 single-state exposure outbreaks were reported with 13,320 illnesses by 49 states and Puerto Rico (Table, Figure 2). An additional 25 multistate outbreaks (i.e., outbreaks in which exposure to the implicated food occurred in more than one state) with 1,496 associated illnesses were also reported.

More detailed annual summaries describing the implicated foods, etiologic agents, settings, and points of contamination associated with foodborne disease outbreaks are published periodically by CDC. A summary of foodborne disease outbreaks in 2013, the most recent year for which data are available, is available at <http://www.cdc.gov/foodsafety/fdoss/data/annual-summaries/index.html>.

Waterborne Disease Outbreaks

During 1971–2012, CDC received reports of 1,901 waterborne disease outbreaks with 639,949 outbreak-associated illnesses from 50 states and six freely associated states/territories. An average of 45 waterborne outbreaks were reported each year (Figure 1).

In 2012, a total of 73 outbreaks causing at least 1,261 illnesses occurred in 27 states and one territory. No multistate outbreaks were reported (Table, Figure 3).

CDC publishes separate and more detailed summaries of waterborne disease outbreaks associated with recreational water and waterborne disease outbreaks associated with drinking water. These summaries are available at <http://www.cdc.gov/healthywater/surveillance/surveillance-reports.html>.

References

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2. CDC. Summary of notifiable infectious diseases—United States. *MMWR Morb Mortal Wkly Rep* 2013;62(53).
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4. Scallan E, Griffin PM, Angulo FJ, Tauxe RV, Hoekstra RM. Foodborne illness acquired in the United States—unspecified agents. *Emerg Infect Dis* 2011;17:16–22.
5. CDC. Preliminary FoodNet data on the incidence of infection with pathogens transmitted commonly through food—10 states, 2009. *MMWR Morb Mortal Wkly Rep* 2010;59:418–22.

FIGURE 1. Number of foodborne and waterborne disease outbreaks reported, by year — United States 1971–2012

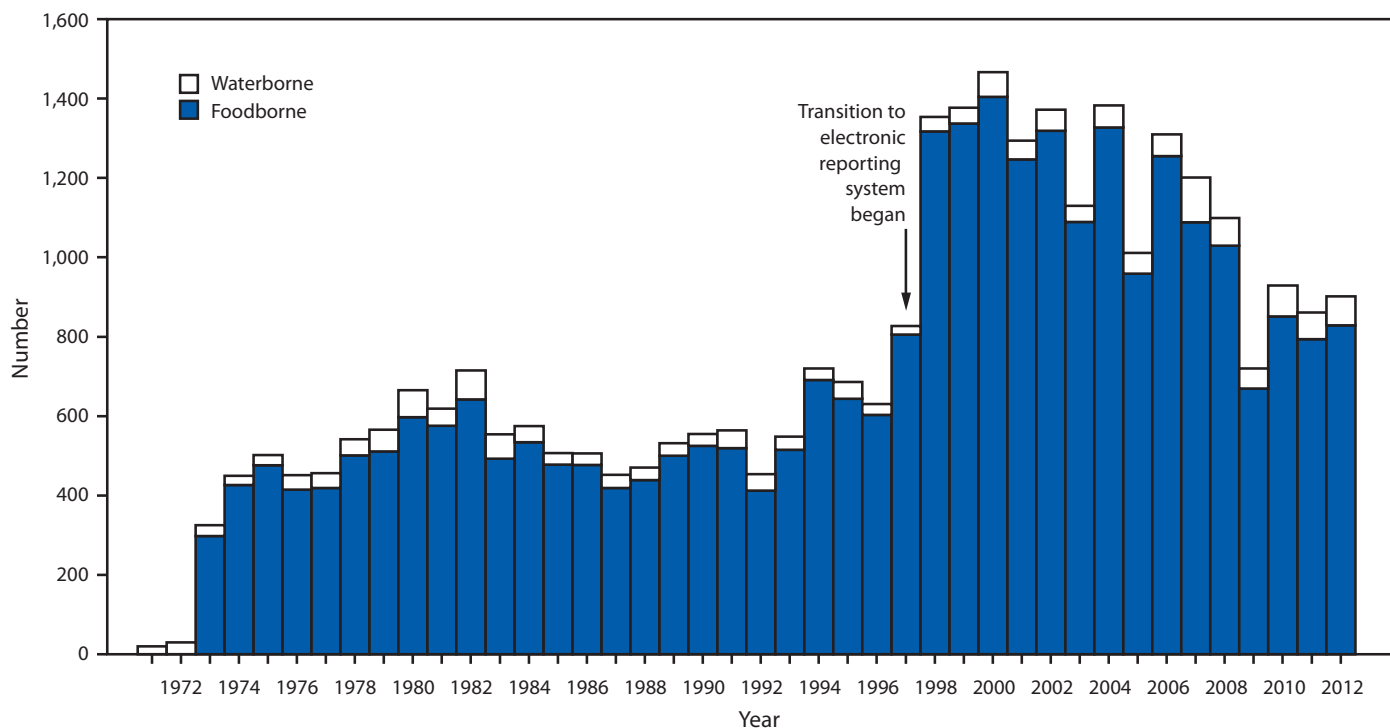


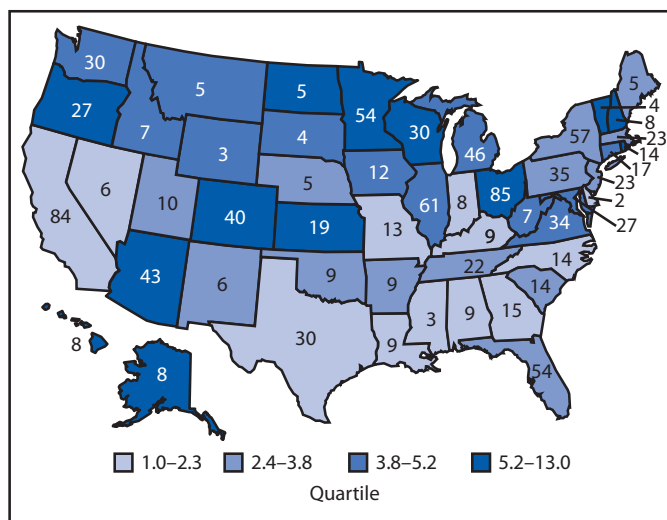
TABLE. Number of reported foodborne and waterborne disease outbreaks and outbreak-associated illnesses, by geographic division and area — United States, 2012

Division/Area	Foodborne		Waterborne		All	
	Outbreaks	Illnesses	Outbreaks	Illnesses	Outbreaks	Illnesses
United States	829	14,816	73	1,261	902	16,077
New England	45	523	2	59	47	582
Connecticut	13	157	1	24	14	181
Maine	2	16	—*	—	2	16
Massachusetts	15	226	—	—	15	226
New Hampshire	4	60	—	—	4	60
Rhode Island	10	53	—	—	10	53
Vermont	1	11	1	35	2	46
Mid Atlantic	81	1,236	11	99	92	1,335
New Jersey	16	190	—	—	16	190
New York	42	517	7	57	49	574
Pennsylvania	23	529	4	42	27	571
East North Central	170	3,106	21	499	191	3,605
Illinois	44	869	6	209	50	1078
Indiana	1	21	—	—	1	21
Michigan	31	880	4	48	35	928
Ohio	74	1,019	7	89	81	1,108
Wisconsin	20	317	4	153	24	470
West North Central	88	1,201	16	299	104	1,500
Iowa	8	50	2	99	10	149
Kansas	18	210	1	3	19	213
Minnesota	48	572	11	191	59	763
Missouri	5	78	1	3	6	81
Nebraska	2	73	—	—	2	73
North Dakota	5	112	1	3	6	115
South Dakota	2	106	—	—	2	106
South Atlantic	123	2,000	7	64	130	2,064
Delaware	1	5	—	—	1	5
District of Columbia†	—	—	—	—	—	—
Florida	49	760	2	5	51	765
Georgia	9	99	1	2	10	101
Maryland	20	183	1	3	21	186
North Carolina	7	364	1	47	8	411
South Carolina	11	210	1	2	12	212
Virginia	22	301	1	5	23	306
West Virginia	4	78	—	—	4	78
East South Central	23	403	—	—	23	403
Alabama	2	57	—	—	2	57
Kentucky	5	69	—	—	5	69
Mississippi†	—	—	—	—	—	—
Tennessee	16	277	—	—	16	277
West South Central	40	1,295	1	4	41	1,299
Arkansas	6	605	—	—	6	605
Louisiana	6	68	1	4	7	72
Oklahoma	6	97	—	—	6	97
Texas	22	525	—	—	22	525
Mountain	90	1,594	11	193	101	1,787
Arizona	37	504	1	3	38	507
Colorado	35	519	3	62	38	581
Idaho	4	38	4	95	8	133
Montana	2	57	—	—	2	57
Nevada	2	72	—	—	2	72
New Mexico	2	21	—	—	2	21
Utah	5	64	3	33	8	97
Wyoming	3	319	—	—	3	319
Pacific	130	1,831	3	26	133	1,857
Alaska	7	53	1	21	8	74
California	72	755	1	2	73	757
Hawaii	6	204	—	—	6	204
Oregon	24	342	—	—	24	342
Washington	21	477	1	3	22	480
Territory	14	131	1	18	15	149
Puerto Rico	14	131	1	18	15	149
Multistate	25	1,496	—	—	25	1,496

* No outbreaks reported.

† No foodborne or waterborne disease outbreaks reported.

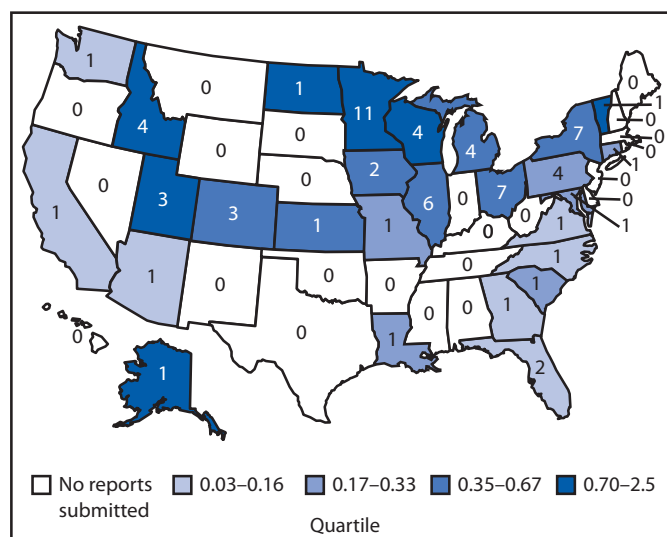
FIGURE 2. Rate* of reported foodborne disease outbreaks and number† of outbreaks, by state — Foodborne Disease Outbreak Surveillance System, United States, 2012



* Incidence of outbreaks per 1 million population based on the 2012 U.S. census estimates. Cutpoints for outbreak rate categories determined by using quartiles.

† N = 829 (includes 25 multistate outbreaks assigned as an outbreak to each state involved).

FIGURE 3. Rate* of reported waterborne disease outbreaks and number† of outbreaks by state — Waterborne Disease and Outbreak Surveillance System, United States, 2012



* Incidence of outbreaks per 1 million population based on the 2012 U.S. census estimates. Cutpoints for outbreak rate categories determined by using quartiles.

† N = 73.