Surveillance for Foodborne Disease Outbreaks United States, 2017: Annual Report

Centers for Disease Control and Prevention
National Center for Emerging and Zoonotic Infectious Diseases

Acknowledgements

We would like to thank local, state, and territorial health department officials and CDC staff for conducting the investigations and submitting the outbreak reports that made this summary possible.

Suggested Citation

Report compiled by

Daniel Dewey-Mattia, Hannah Kisselburgh, Karunya Manikonda, Rachel Silver, Sanjana Subramhanya, Preethi Sundararaman, Hilary Whitham, and Samuel Crowe

Centers for Disease Control and Prevention

National Center for Emerging and Zoonotic Infectious Diseases
Division of Foodborne, Waterborne, and Environmental Diseases
Enteric Diseases Epidemiology Branch
1600 Clifton Road, Mail Stop H24-9, Atlanta, GA 30329-4027
Telephone: 404.639.2206
E-mail: NORS-Foodborne@cdc.gov
Web: http://www.cdc.gov/foodsafety/fdoss/

Surveillance for Foodborne Disease Outbreaks United States

2017 Annual Report

Contents

Highlights

- In 2017, 841 foodborne disease outbreaks were reported, resulting in 14,481 illnesses, 827 hospitalizations, 20 deaths, and 14 food product recalls.

- Norovirus was the most common cause of confirmed, single-etiology outbreaks, accounting for 140 (35%) outbreaks and 4,092 (46%) illnesses. *Salmonella* was the next most common cause, accounting for 113 (29%) outbreaks and 3,007 (34%) illnesses, followed by Shiga toxin-producing *Escherichia coli,* which caused 19 (5%) outbreaks and 513 (6%) illnesses, and *Clostridium perfringens,* which caused 19 (5%) outbreaks and 478 (5%) illnesses.

- Mollusks (41 outbreaks), fish (37), and chicken (23) were the most common single food categories implicated. The most outbreak-associated illnesses were from turkey (609 illnesses), fruits (521), and chicken (487).

- As reported in previous years, restaurants (489 outbreaks, 64% of outbreaks for which a single location of preparation was reported), specifically restaurants with sit-down dining (366, 48%), were the most commonly reported locations of food preparation associated with outbreaks.

Background

Known pathogens are estimated to cause 9.4 million illnesses each year in the United States.[1] Although relatively few of these illnesses occur in the setting of a recognized outbreak, data collected during outbreak investigations provide insight into the pathogens and foods that cause illness. Public health officials, regulatory agencies, and the food industry can use these data to inform efforts to prevent foodborne illness.

Methods

An outbreak of foodborne disease is defined *as the occurrence of two or more cases of a similar illness resulting from ingestion of a common food.* CDC conducts surveillance for foodborne disease outbreaks in the United States through the Foodborne Disease Outbreak Surveillance System. Public health agencies in all 50 states, Washington, D.C., and U.S. territories submit reports of outbreaks investigated by their agencies using a web-based platform, the National Outbreak Reporting System (http://www.cdc.gov/nors/). This annual summary includes foodborne disease outbreaks reported by February 6, 2019, in which the first illness onset occurred in 2017.

Agencies use a standard form (https://www.cdc.gov/nors/downloads/form-52-13.pdf) to report foodborne disease outbreaks. Data requested for each outbreak include the reporting state; date of first illness onset; number of illnesses, hospitalizations, and deaths; etiology; implicated food(s) and ingredient(s); locations of food preparation; and factors contributing to food contamination (see appendix). Patients who were hospitalized as a result of becoming ill during an outbreak and deaths that occurred among ill persons during an outbreak were attributed to that outbreak.

The form also allows for reporting the reason(s) a particular food is suspected as the source; five choices are provided (http://www.cdc.gov/nors/downloads/guidance.pdf). All foods implicated were included in analyses, regardless of the reasons suspected. Implicated foods were classified into 1 of 24 single food categories if a single contaminated ingredient was identified or if all ingredients belonged to that category.[2,3] Outbreaks attributed to foods that could not be assigned to one of these categories, or for which the report contained insufficient information for category assignment, were not attributed to a category.

Reported etiologies were grouped as bacterial, chemical or toxin, parasitic, or viral. Etiologic agents were classified as confirmed if predefined criteria were met;[4] otherwise, they were labeled suspected. In some outbreaks, the etiologic agent was not identified. If multiple agents were reported in an outbreak and at least two of them met the confirmation criteria, the outbreak was categorized as a confirmed multiple etiology outbreak. If multiple agents were reported but only one of them met the criteria, it was categorized as a suspected multiple etiology outbreak.

Multistate outbreaks are defined as outbreaks in which exposure to the implicated food occurred in more than one state or territory. Implicated foods

in multistate outbreaks were classified as confirmed or suspected based on epidemiologic, traceback, and laboratory evidence. A food was considered the confirmed source of a multistate outbreak if two types of evidence were obtained; a food was considered suspected if only one type of evidence was available.

Population-based outbreak reporting rates were calculated for each state using U.S. Census Bureau estimates of the 2017 state populations (http://www.census.gov/popest). Multistate outbreaks were included in state population-based outbreak reporting rates by assigning one outbreak to each state that reported a case in the outbreak.

Findings

During 2017, 841 foodborne disease outbreaks were reported (Table 1), resulting in 14,481 illnesses, 827 hospitalizations, and 20 deaths. Outbreaks were reported by public health officials from 50 states, Washington, D.C., and Puerto Rico (Figure). The median reporting rate per million population was 3.98 outbreaks; rates ranged from 0.60 in Puerto Rico to 14.01 in Hawaii.

Etiologic Agents

A single etiologic agent was confirmed in 395 (47%) outbreaks (Table 1), resulting in 8,954 (62%) illnesses. Bacteria caused the most outbreaks (198 outbreaks, 50%), followed by viruses (148, 37%), chemicals (38, 10%), and parasites (11, 3%). Norovirus was the most common cause of confirmed, single-etiology outbreaks, accounting for 140 (35%) outbreaks and 4,092 (46%) illnesses. *Salmonella* was the next most common cause, accounting for 113 (29%) outbreaks and 3,007 (34%) illnesses. Among the 112 confirmed *Salmonella* outbreaks with a serotype reported, Enteritidis was the most common (27 outbreaks, 24%), followed by Typhimurium (14, 13%), Newport (10, 9%), Heidelberg (7, 6%), Braenderup (6, 5%), and Javiana (6, 5%). Shiga toxin-producing *Escherichia coli* (STEC) caused 19 confirmed, single-etiology outbreaks, of which 9 (47%) were caused by serogroup O157. Of the 8,954 outbreak-associated illnesses caused by a single confirmed etiologic agent, 719 (8%) resulted in hospitalization (Table 1). Among confirmed,

single-etiology outbreaks, *Salmonella* caused the most outbreak-associated hospitalizations (472 hospitalizations, 66%), followed by STEC (111, 15%) and norovirus (40, 6%). Outbreaks caused by *Listeria monocytogenes* resulted in the highest percentage of ill persons hospitalized (97%), followed by *Clostridium botulinum* (94%), *Vibrio vulnificus* (50%), and hepatitis A virus (HAV) (40%). Among the 20 deaths reported, 14 (70%) were attributed to bacterial etiologies (*Salmonella* [8], *Listeria monocytogenes* [3], *Clostridium botulinum* [2], and STEC [1]). Four deaths were attributed to norovirus, 1 to HAV, and 1 occurred in an outbreak with multiple etiologies.

Food Categories Implicated

A food source was reported for 360 (43%) outbreaks. In 218 (61%) of these outbreaks, the food could be classified into a single category (Table 2a). The categories most commonly implicated were mollusks (41 outbreaks, 19%), fish (37, 17%), chicken (23, 11%), and beef (19, 9%). The most outbreak-associated illnesses were from turkey (609 illnesses), fruits (521), chicken (487), and pork (376).

Etiologic Agents and Food Category Pairs

The pathogen-food category pairs responsible for most outbreaks with a single confirmed etiologic agent were scombroid toxin (histamine) in fish (17 outbreaks), ciguatoxin in fish (13), and *Salmonella* in chicken (11) (Table 2b). The pathogen-food category pairs responsible for the most illnesses in outbreaks with a single confirmed etiologic agent were *Salmonella* in turkey (580 illnesses), *Salmonella* in fruits (421), and *Salmonella* in chicken (299). The pathogen-food category pairs responsible for the most hospitalizations in outbreaks with a single confirmed etiologic agent were *Salmonella* in fruits (124 hospitalizations), *Salmonella* in "other" foods (54 hospitalizations in a single outbreak that implicated kratom powder), and *Salmonella* in vegetable row crops (35). Deaths were reported for the following pathogen-food category pairs: *Salmonella* in fruits (2 deaths), STEC in vegetable row crops, *Salmonella* in eggs, *Salmonella* in pork, and *Clostridium botulinum* in herbs (1 each).

Location of Food Preparation

Among the 761 outbreaks and 12,502 illnesses with a reported single location where food was prepared, 489 outbreaks (64%) and 5,533 associated illnesses (44%) were attributed to foods prepared in a restaurant (Table 3). Among these outbreaks, sit-down dining restaurants were the type of facility most commonly reported (366 outbreaks, 48%).

Recalls

Fourteen outbreaks resulted in product recalls. The foods recalled following outbreaks in a single state were oysters (2 outbreaks), ground beef, herbal tea, and salad mix (1 each). Alfalfa sprouts, dried coconut, frozen shredded coconut, kratom powder, papaya, ready-to-eat pork products, shell eggs, soy butter, and tuna loin (1 outbreak each) were recalled in multistate outbreaks.

Multistate Outbreaks with First Identified Illness Onset during 2017

Thirty-two multistate outbreaks (4% of all outbreaks) were reported (Table 4), resulting in 1,118 illnesses (8% of illnesses), 327 hospitalizations (40% of hospitalizations), and four deaths (20% of deaths). These outbreaks involved a median of seven states (range: 2–41). Twenty outbreaks were caused by *Salmonella;* the most frequent serotypes were Newport (3 outbreaks) and Braenderup (2). Six multistate outbreaks were caused by STEC, four of which were due to serogroup O157. Five outbreaks were caused by *Listeria* and one was caused by *Vibrio parahaemolyticus.*

The food sources for multistate *Salmonella* outbreaks were coconut (3 outbreaks), papaya (3), chicken, eggs, kratom powder, melon, raw sushi, and sprouts. In addition, leafy greens, mango, Mexican-style cheese, papaya, romaine lettuce, and watermelon were suspected sources. A food was not identified for two outbreaks caused by *Salmonella*. The food sources for STEC outbreaks were leafy greens and soy butter. Flour, leafy greens, and spinach were suspected sources. One STEC outbreak did not have a food identified. One of the *Listeria* outbreak investigations implicated ready-to-eat pork products. Caramel apples and pasteurized cheese were suspected sources in Listeria outbreaks and two outbreaks did not have

a food identified. Raw oysters were the confirmed source in the outbreak of *Vibrio parahaemolyticus*.

Multistate Outbreaks Spanning Multiple Years

Fourteen multistate outbreaks investigated during 2017 were not included in the 2017 tally because the first outbreak-associated illness occurred before 2017. Ten were caused by *Salmonella;* the implicated foods were chicken, ground beef, and papaya; all had the first illness onset in 2016. Chicken was the suspected source in one outbreak and no food was identified in six outbreaks; the first illnesses began in 2016 except for 2 outbreaks with no food identified (first illnesses onset in 2015). The remaining four outbreaks were caused by *Listeria*. The confirmed source in one outbreak was artisanal soft cheese (first illness onset in 2016); hummus (2013), queso fresco (2014), and smoked fish (2014) were the suspected sources of the others.

Limitations

The findings in this report have at least four limitations. First, only a small proportion of foodborne illnesses that occur each year are identified as being associated with outbreaks. The extent to which the distribution of food vehicles and locations of preparation implicated in outbreaks reflect the same vehicles and locations as sporadic foodborne illnesses is unknown. Second, many outbreaks had an unknown etiology, an unknown food vehicle, or both, and conclusions drawn from outbreaks with a confirmed etiology or food vehicle might not apply to other outbreaks. Third, CDC's outbreak surveillance system is dynamic. Agencies can submit new reports and change or delete reports as new information becomes available. Therefore, the results of this analysis might differ from those in other reports. Finally, pathogens that are not known to cause illness sometimes are reported as a confirmed or suspected etiology.

References

1. Scallan E, Hoekstra RM, Angulo FJ, et al. Foodborne illness acquired in the United States—major pathogens. Emerging Infectious Diseases 2011; 17(1): 7–15.
2. Interagency Food Safety Analytics Collaboration (IFSAC): Completed Projects. Available at: http://www.cdc.gov/foodsafety/ifsac/projects/completed.html. Accessed February 6, 2019.
3. Richardson LC, Bazaco MC, Chen Parker C, et al. An updated scheme for categorizing foods implicated in foodborne disease outbreaks: a tri-agency collaboration. Foodborne Pathogens and Disease 2017; 14(12): 701–710.
4. CDC. Guide to confirming a diagnosis in foodborne disease. Available at: http://www.cdc.gov/foodsafety/outbreaks/investigating-outbreaks/confirming_diagnosis.html. Accessed February 6, 2019

Figure: Rate of reported foodborne disease outbreaks per one million population* and number of outbreaks,[†] by state[‡] and confirmed and suspected etiology[§] — Foodborne Disease Outbreak Surveillance System, United States, 2017.
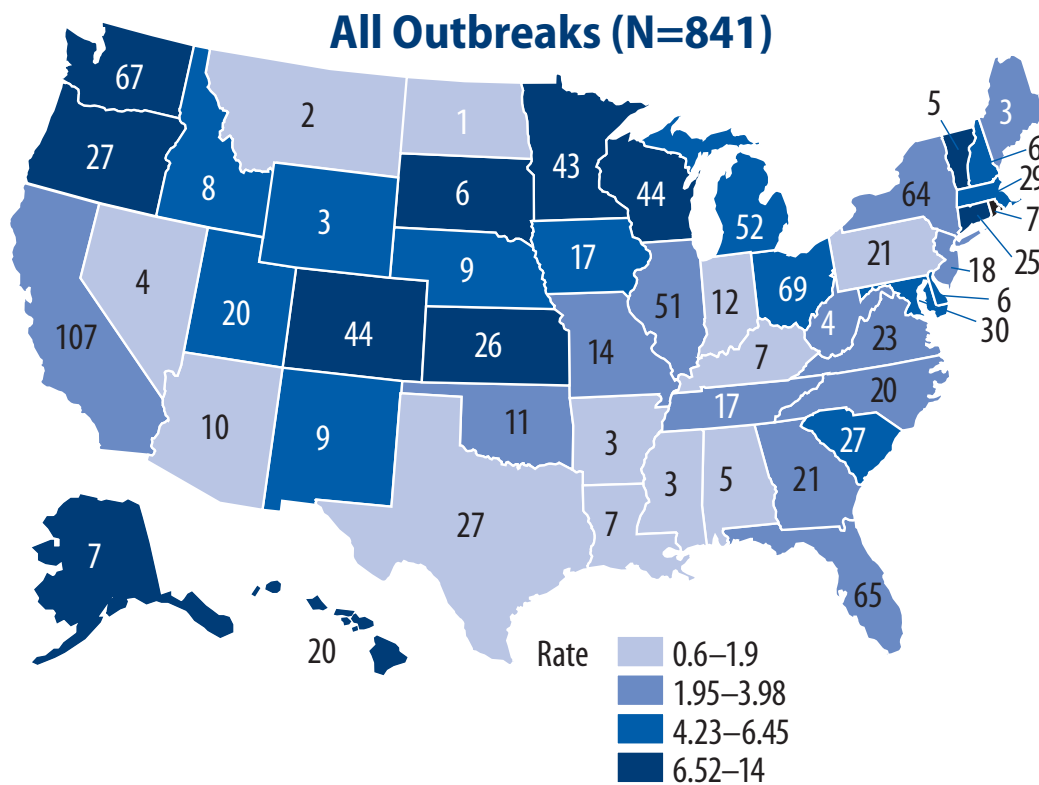
Note: Full data table for map at https://www.cdc.gov/fdoss/files/All-Outbreaks-2017.csv

Confirmed Bacterial (N=198)

Rate
0.34–1.07
1.1–1.54
1.56–2.93
3.03–8.02

Confirmed Viral (N=148)

Rate
No reports
0.08–0.38
0.39–0.58
0.65–0.95
1.03–2.79

Suspected Bacterial (N=73)

Rate
No reports
0.03–0.16
0.17–0.34
0.36–0.80
0.86–2.16

Suspected Viral (N=177)

Rate
No reports
0.1–0.38
0.44–0.61
0.64–0.89
0.94–3.38
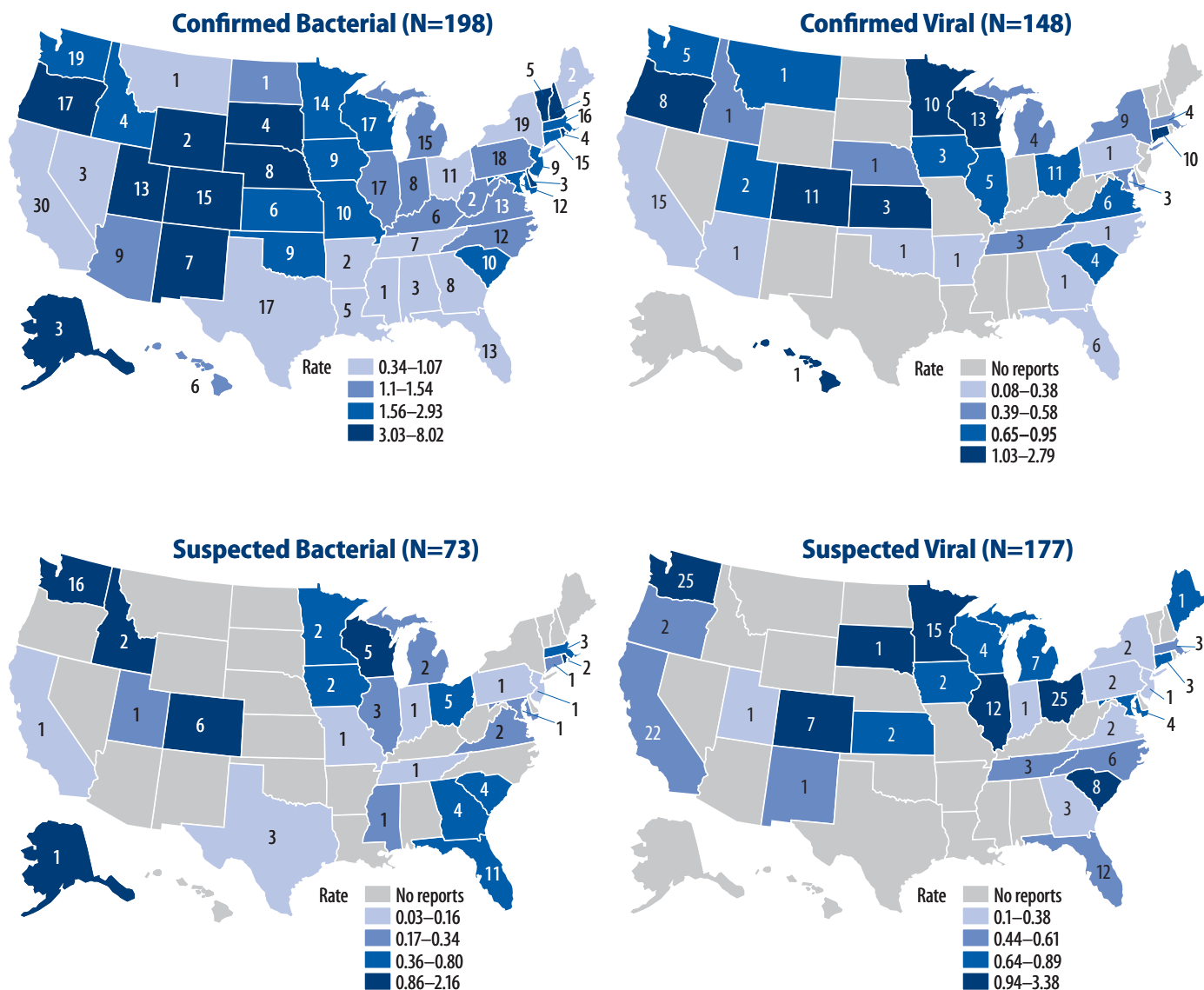
Note: Data table for confirmed bacterial map at https://www.cdc.gov/fdoss/files/Confirmed-Bacterial-2017.csv

Data table for confirmed viral map at https://www.cdc.gov/fdoss/files/Confirmed-Viral-2017.csv

Data table for suspected bacterial map at https://www.cdc.gov/fdoss/files/Suspected-Bacterial-2017.csv

Data table for suspected viral map at https://www.cdc.gov/fdoss/files/Suspected-Viral-2017.csv

*Cut points for outbreak rate categories determined using quartiles. Legend differs for each map.

†Reported outbreaks in each state. Puerto Rico reported two outbreaks and Washington, D.C., reported three outbreaks (not shown).

‡Includes 32 multistate outbreaks (i.e., outbreaks in which exposure occurred in more than one state) assigned as an outbreak to each state involved. Multistate outbreaks involved a median of six states (range: 2–41).

§Guidelines for reporting agencies are to consider an etiology confirmed if it meets confirmation criteria (https://www.cdc.gov/foodsafety/outbreaks/investigating-outbreaks/confirming_diagnosis.html); otherwise, it is considered suspected. Agents that are not listed in confirmation criteria or that are not known to cause illness are sometimes reported as confirmed or suspected etiologies.

Table 1: Foodborne disease outbreaks, outbreak-associated illnesses, and hospitalizations, by etiology (confirmed or suspected)*—Foodborne Disease Outbreak Surveillance System, United States, 2017.

Etiology	No. Outbreaks				No. Illnesses				No. Hospitalizations			
	CE	SE	Total	%	CE	SE	Total	%	CE	SE	Total	%
Bacterial												
Salmonella†	113	9	122	19	3007	54	3061	25	472	6	478	64
Clostridium perfringens	19	22	41	6	478	365	843	7	0	1	1	0
Campylobacter‡	17	6	23	4	117	30	147	1	13	1	14	2
Escherichia coli, Shiga toxin-producing (STEC)§	19	2	21	3	513	8	521	4	111	2	113	15
Vibrio parahaemolyticus	9	8	17	3	37	33	70	1	4	0	4	1
Staphylococcus aureus	1	11	12	2	60	68	128	1	0	0	0	0
Bacillus cereus	3	8	11	2	123	218	341	3	1	1	2	0
Listeria monocytogenes	8	0	8	1	32	0	32	0	31	0	31	4
Clostridium botulinum	3	1	4	1	15	2	17	0	14	2	16	2
Shigella¶	4	0	4	1	54	0	54	0	10	0	10	1
Staphylococcus spp	0	2	2	0	0	13	13	0	0	0	0	0
Vibrio other	0	1	1	0	0	17	17	0	0	0	0	0
Bacillus spp	0	1	1	0	0	26	26	0	0	0	0	0
Vibrio vulnificus	0	1	1	0	0	2	2	0	0	1	1	0
Escherichia coli, Enterotoxigenic	1	0	1	0	41	0	41	0	0	0	0	0
Streptococcus, Group A	1	0	1	0	62	0	62	1	0	0	0	0
Other	0	1	1	0	0	5	5	0	0	0	0	0
Subtotal	198	73	271	42	4539	841	5380	45	656	14	670	90
Chemical and toxin												
Scombroid toxin/Histamine	17	0	17	3	58	0	58	0	1	0	1	0
Ciguatoxin	13	2	15	2	43	6	49	0	3	1	4	1
Mycotoxins	3	0	3	0	10	0	10	0	0	0	0	0
Paralytic shellfish poison	2	0	2	0	8	0	8	0	0	0	0	0
Neurotoxic shellfish poison	1	0	1	0	2	0	2	0	1	0	1	0
Other	2	0	2	0	29	0	29	0	0	0	0	0
Subtotal	38	2	40	6	150	6	156	1	5	1	6	1
Parasitic												
Cyclospora	6	1	7	1	89	10	99	1	3	1	4	1
Cryptosporidium	2	1	3	0	12	23	35	0	1	0	1	0
Giardia	1	0	1	0	7	0	7	0	0	0	0	0
Trichinella	1	0	1	0	5	0	5	0	0	0	0	0
Toxoplasma gondii	1	0	1	0	9	0	9	0	0	0	0	0
Subtotal	11	2	13	2	122	33	155	1	4	1	5	1
Viral												
Norovirus	140	176	316	49	4092	2248	6340	52	40	13	53	7
Hepatitis A virus	5	0	5	1	35	0	35	0	14	0	14	2
Sapovirus	3	0	3	0	16	0	16	0	0	0	0	0
Subtotal	0	1	1	0	0	2	2	0	0	0	0	0
Single etiology**	395	254	649	77	8954	3130	12084	83	719	29	748	90
Multiple etiologies confirmed or suspected††	6	19	25	3	357	502	859	6	53	11	64	8
Unknown etiology‡‡	0	0	167	20	0	0	1538	11	0	0	15	2
Total	**401**	**273**	**841**	**100**	**9311**	**3632**	**14481**	**100**	**772**	**40**	**827**	**100**

Abbreviations: Abbreviations: CE = confirmed etiology, SE = suspected etiology.

* Guidelines for reporting agencies are to consider an etiology confirmed if it meets confirmation criteria (https://www.cdc.gov/foodsafety/outbreaks/investigating-outbreaks/confirming_diagnosis.html); otherwise, it is considered suspected. Agents that are not listed in confirmation criteria or that are not known to cause illness are sometimes reported as confirmed or suspected etiologies.

† *Salmonella* serotypes causing more than five outbreaks were Enteritidis (28 outbreaks), Typhimurium (15), Newport (13), Heidelberg (7), and Braenderup (6), and Javiana (6).

‡ *Campylobacter jejuni* (14 outbreaks), *Campylobacter* multiple species (4), *Campylobacter* unknown species (3), and *Campylobacter coli* (2).

§ STEC serogroups O157 (9 outbreaks), O26 (4), multiple serogroups (3), O145 (1), O45 (1), O103 (1), O121 (1), and unknown serogroup (1).

¶ *Shigella flexneri* (3 outbreaks), *Shigella sonnei* (1).

** The denominator for the etiology percentages is the single etiology total. The denominator for the single etiology, multiple etiologies, and unknown etiology is the total. Because of rounding, numbers might not add up to the single etiology total or the total.

†† If at least two etiologies are confiemed in an outbreak, it is considered a confirmed multiple etiology outbreak; ottherwise it is considered a suspected multiple etiology outbreak.

‡‡ An etiologic agent was not confirmed or suspected based on clinical, laboratory, or epidemiologic information.

Table 2a: Foodborne disease outbreaks and outbreak-associated illnesses, by food category*—Foodborne Disease Outbreak Surveillance System, United States, 2017.

Food Category*	Outbreaks No.	Outbreaks %	Illnesses No.	Illnesses %	Hospitalizations No.	Hospitalizations %
Aquatic animals						
Crustaceans	6	3	37	1	1	0
Mollusks†	41	19	279	7	5	1
Fish	37	17	144	4	8	2
Other aquatic animals	2	1	8	0	2	1
Subtotal	86	39	468	12	16	4
Land animals						
Dairy‡	14	6	85	2	15	4
Eggs	5	2	81	2	20	5
Beef	19	9	329	9	15	4
Pork	13	6	376	10	20	5
Other meat (sheep, goat, etc.)	2	1	14	0	4	1
Chicken	23	11	487	13	21	5
Turkey	4	2	609	16	12	3
Other Poultry	2	1	6	0	1	0
Game	1	0	9	0	0	0
Subtotal	83	38	1996	53	108	27
Plants						
Fungi	3	1	10	0	0	0
Sprouts	1	0	62	2	3	1
Root and other underground vegetables§	1	0	2	0	1	0
Seeded vegetables¶	2	1	25	1	0	0
Herbs	2	1	20	1	4	1
Vegetable row crops**	11	5	351	9	71	18
Fruits††	16	7	521	14	129	32
Grains and beans‡‡	8	4	73	2	2	1
Nuts and seeds§§	1	0	32	1	12	3
Subtotal	45	25	1339	35		
Other	4	2	235	6	54	14
Food reported, attributed to a single food category¶	218	26	3795	26	400	48
Food reported, not attributed to a single food category	142	17	3908	27	141	17
No food reported	481	57	6778	47	286	35
Total¶	**841**	**100**	**14481**	**100**	**827**	**100**

* Interagency Food Safety Analytics Collaboration (IFSAC) food categorization scheme: http://www.cdc.gov/foodsafety/ifsac/projects/completed.html.

† Bivalve mollusks (40 outbreaks) and non-bivalve mollusks (1).

‡ Unpasteurized dairy products (11 outbreaks), pasteurization unknown (2), and pasteurized dairy products (1).

§ Tubers (1 outbreak).

¶ Legumes (1 outbreak) and solanaceous seeded vegetables (1).

** Leafy vegetables (11 outbreaks).

†† Tropical fruits (8 outbreaks), melons (4), small fruits (2), and fruits not further classified (2).

‡‡ Grains (4 outbreaks) and beans (4 outbreaks).

§§ Nuts (1 outbreak).

¶ The denominator for the food category percentages is the "food reported, attributed to a single food category" total. The denominator for the "food reported attributed to a single food category", "food reported, not attributed to a single food category", and "No food reported" is the total. Because of rounding, numbers might not add up to the "food reported, attributed to a single food category" total or the total.

Table 2b: Most common confirmed pathogen-food category pairs resulting in outbreaks, outbreak-associated illnesses, hospitalizations, and deaths—Foodborne Disease Outbreak Surveillance System, United States, 2017.

Top 5 pathogen-food category pairs resulting in outbreaks

Etiology	Food Category*	No. Outbreaks	No. Illnesses	No. Hospitalizations	No. Deaths
Scombroid toxin/Histamine	Fish	17	58	1	0
Ciguatoxin	Fish	13	43	3	0
Salmonella	Chicken	11	299	16	0
Salmonella	Fruits	10	421	124	2
Vibrio parahaemolyticus	Mollusks	7	26	3	0

Top 5 pathogen-food category pairs resulting in outbreak-associated illnesses

Etiology	Food Category*	No. Outbreaks	No. Illnesses	No. Hospitalizations	No. Deaths
Salmonella	Turkey	2	580	12	0
Salmonella	Fruits	10	421	124	2
Salmonella	Chicken	11	299	16	0
Salmonella	Other	1	199	54	0
Salmonella	Vegetable row crops	2	178	35	0

Top 5 pathogen-food category pairs resulting in outbreak-associated hospitalizations

Etiology	Food Category*	No. Outbreaks	No. Illnesses	No. Hospitalizations	No. Deaths
Salmonella	Fruits	10	421	124	2
Salmonella	Other	1	199	54	0
Salmonella	Vegetable row crops	2	178	35	0
Escherichia coli, Shiga toxin-producing (STEC)	Vegetable row crops	5	110	34	1
Salmonella	Eggs	5	81	20	1

Pathogen-food category pairs resulting in outbreak-associated deaths

Etiology	Food Category*	No. Outbreaks	No. Illnesses	No. Hospitalizations	No. Deaths
Salmonella	Fruits	10	421	124	2
Escherichia coli, Shiga toxin-producing (STEC)	Vegetable row crops	5	110	34	1
Salmonella	Eggs	5	81	20	1
Salmonella	Pork	5	55	13	1
Clostridium botulinum	Herbs	1	2	2	1

*Interagency Food Safety Analytics Collaboration (IFSAC) food categorization scheme: http://www.cdc.gov/foodsafety/ifsac/projects/completed.html.

Table 3: Foodborne disease outbreaks and outbreak-associated illnesses, by location of food preparation—Foodborne Disease Outbreak Surveillance System, United States, 2017.

Location	Outbreaks		Illnesses	
	No.	%	No.	%
Restaurant	489	64	5533	44
Sit-down dining	366	48	3773	30
Fast-food	60	8	559	4
Buffet	22	3	222	2
Other or unknown type	28	4	671	5
Multiple types	13	2	308	2
Catering or banquet facility	104	14	3584	29
Private home	74	10	989	8
Institutional location	24	3	1015	8
School	8	1	253	2
Prison or jail	12	2	724	6
Camp	2	0	31	0
Office or indoor workplace	2	0	7	0
Other location	16	2	434	3
Other commercial location	32	4	284	2
Grocery store	13	2	105	1
Fair, festival, or temporary mobile service	6	1	68	1
Farm or dairy	13	2	111	1
Hospital or nursing home	11	1	239	2
Nursing home	10	1	237	2
Hospital	1	0	2	0
Other private location	5	1	150	1
Place of worship	5	1	150	1
Hotel or motel	6	1	274	2
Single location*	761	90	12502	86
Multiple locations	47	6	1234	9
Unknown location	33	4	745	5
Total	**841**	**100**	**14481**	**100**

* The denominator for the location percentages is the single location total. The denominator for the single location, multiple locations, and unknown location is the total. Because of rounding, numbers might not add up to the single location total or the total.

Table 4: Multistate foodborne disease outbreaks, United States, 2017—Foodborne Disease Outbreak Surveillance System, United States, 2017.

Month of first illness onset	Etiology	No. illnesses	No. hospitalizations	No. deaths	No. states involved	Implicated food* Name	Confirmed	Recall
January	Shiga toxin-producing *E. coli* O157:H7	32	12	0	12	Soy butter	Yes	Yes
January	*Salmonella* serotypes Weltevreden, Thompson, Okatie, Heidelberg, I 4,[5],12:b:- var. L(+) tartrate +, and Javiana	199	54	0	41	Kratom powder	Yes	Yes
January	*Salmonella* serotypes I 4,[5],12:b:- var. L(+) tartrate + and Newport	29	6	0	7	Coconut	Yes	Yes
February	Shiga toxin-producing *E. coli* O121	7	2	0	6	Flour	No	No
March	*Salmonella* serotype Braenderup	55	18	0	7	Papaya	No	No
March	*Salmonella* serotype Enteritidis	151	31	0	36	Romaine lettuce	No	No
March	*Salmonella* serotype I 4,[5],12:i:-	6	4	0	4	Chicken	Yes	No
March	*Listeria monocytogenes*	8	8	1	6	No food reported	-	No
March	*Salmonella* serotype Chailey	14	2	0	7	Coconut	Yes	No
April	Shiga toxin-producing *E. coli* O157:H7	9	3	0	5	No food reported	-	No
April	*Salmonella* serotype Newport	14	3	0	6	Mexican style cheese	No	No
April	*Salmonella* serotype Paratyphi B var. L(+) tartrate +	35	5	0	7	Raw sushi	Yes	Yes
May	*Listeria monocytogenes*	6	6	0	5	Pasteurized cheese	No	No
May	*Salmonella* serotypes Senftenberg, Thompson, Kiambu, Gaminara, and Agona	213	68	1	22	Papaya	Yes	Yes
June	*Salmonella* serotype Montevideo	23	5	0	12	No food reported	-	No
June	*Salmonella* serotype Infantis	48	15	0	14	Mango	No	No
June	*Salmonella* serotype Newport	20	5	0	9	Watermelon	No	No
June	*Listeria monocytogenes*	4	4	0	4	Ready-to-eat pork products	Yes	Yes
July	*Salmonella* serotype Javiana	27	4	0	13	Leafy greens	No	No
July	*Salmonella* serotype Heidelberg	17	7	0	3	No food reported	-	No
July	*Vibrio parahaemolyticus*	3	0	0	2	Raw oysters	Yes	No
July	*Salmonella* serotype Urbana	7	4	0	3	Papaya	Yes	No
July	*Salmonella* serotypes Newport and Infantis	4	2	0	4	Papaya	Yes	No
August	*Listeria monocytogenes*	4	3	0	2	No food reported	-	No
August	Shiga toxin-producing *E. coli* O157:H7	68	18	0	3	Leafy greens	Yes	No
September	*Salmonella* serotype Typhimurium	14	3	0	9	Coconut	Yes	Yes
September	Shiga toxin-producing *E. coli* O26	8	3	0	3	Spinach	No	No
October	*Listeria monocytogenes*	3	3	0	3	Caramel apple	No	No
October	*Salmonella* serotype Newport	24	6	1	2	Melon	Yes	No
November	*Salmonella* serotype Braenderup	45	11	0	10	Egg	Yes	Yes
November	Shiga toxin-producing *E. coli* O157:H7	25	9	1	15	Leafy greens	No	No
December	*Salmonella* serotypes Cubana and Montevideo	62	3	0	20	Sprouts	Yes	Yes

* Implicated foods in multistate outbreaks are further classified as confirmed or suspected based on epidemiologic, traceback, and laboratory evidence. A food is consider the confirmed source if two types of evidence are obtained, while a food is considered suspected if only one type of evidence is available..

For more information, please contact:
Centers for Disease Control and Prevention
1600 Clifton Road NE, Atlanta, GA 30333
Telephone: 1-800-CDC-INFO (232-4636)/TTY: 1-888-232-6348
E-mail: cdcinfo@cdc.gov
Web: http://www.cdc.gov

CS308380-A