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**Surveillance for
Foodborne-Disease Outbreaks —
United States, 1993–1997**

U.S. DEPARTMENT OF HEALTH & HUMAN SERVICES
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Reports Published in *CDC Surveillance Summaries* Since January 1, 1990

Subject	Responsible CIO/Agency*	Most Recent Report
Abortion	NCCDPHP	1999; Vol. 48, No. SS-4
Aging		
Health Risks	NCCDPHP	1999; Vol. 48, No. SS-8
Health-Care Services	NCCDPHP/NIP	1999; Vol. 48, No. SS-8
Health-Related Quality of Life	NCEH/NCCDPHP	1999; Vol. 48, No. SS-8
Injuries and Violence	NCIPC/NCCDPHP	1999; Vol. 48, No. SS-8
Morbidity and Mortality	NCHS/NCCDPHP	1999; Vol. 48, No. SS-8
AIDS/HIV		
AIDS-Defining Opportunistic Illnesses	NCHSTP/NCID	1999; Vol. 48, No. SS-2
Among Black and Hispanic Children and Women of Childbearing Age	NCEHIC	1990; Vol. 39, No. SS-3
Asthma	NCEH	1998; Vol. 47, No. SS-1
Behavioral Risk Factors	NCCDPHP	1997; Vol. 46, No. SS-3
Birth Defects		
Birth Defects Monitoring Program (see also Malformations)	NCEH	1993; Vol. 42, No. SS-1
Contribution of Birth Defects to Infant Mortality Among Minority Groups	NCEHIC	1990; Vol. 39, No. SS-3
Breast and Cervical Cancer	NCCDPHP	1999; Vol. 48, No. SS-5
Cardiovascular Disease	EPO/NCCDPHP	1998; Vol. 47, No. SS-5
Chancroid	NCPS	1992; Vol. 41, No. SS-3
Chlamydia	NCPS	1993; Vol. 42, No. SS-3
Cholera	NCID	1992; Vol. 41, No. SS-1
Chronic Fatigue Syndrome	NCID	1997; Vol. 46, No. SS-2
Contraception Practices	NCCDPHP	1992; Vol. 41, No. SS-4
Cytomegalovirus Disease, Congenital	NCID	1992; Vol. 41, No. SS-2
Dengue	NCID	1994; Vol. 43, No. SS-2
Developmental Disabilities	NCEH	1996; Vol. 45, No. SS-2
Diabetes Mellitus	NCCDPHP	1993; Vol. 42, No. SS-2
Dracunculiasis	NCID	1992; Vol. 41, No. SS-1
Ectopic Pregnancy	NCCDPHP	1993; Vol. 42, No. SS-6
Elderly, Hospitalizations Among <i>Escherichia coli</i> O157	NCCDPHP	1991; Vol. 40, No. SS-1
NCID	NCID	1991; Vol. 40, No. SS-1
Evacuation Camps	EPO	1992; Vol. 41, No. SS-4
Family Planning Services at Title X Clinics	NCCDPHP	1995; Vol. 44, No. SS-2
Food Safety	NCID	1998; Vol. 47, No. SS-4
Foodborne-Disease Outbreaks	NCID	2000; Vol. 49, No. SS-1
Gonorrhea and Syphilis, Teenagers	NCPS	1993; Vol. 42, No. SS-3
Hazardous Substances Emergency Events	ATSDR	1994; Vol. 43, No. SS-2
Health Surveillance Systems	IHPO	1992; Vol. 41, No. SS-4

***Abbreviations**

ATSDR	Agency for Toxic Substances and Disease Registry
CIO	Centers/Institute/Offices
EPO	Epidemiology Program Office
IHPO	International Health Program Office
NCCDPHP	National Center for Chronic Disease Prevention and Health Promotion
NCEH	National Center for Environmental Health
NCEHIC	National Center for Environmental Health and Injury Control
NCHSTP	National Center for HIV, STD, and TB Prevention
NCID	National Center for Infectious Diseases
NCIPC	National Center for Injury Prevention and Control
NCPS	National Center for Prevention Services
NIOSH	National Institute for Occupational Safety and Health
NIP	National Immunization Program

Reports Published in *CDC Surveillance Summaries* Since January 1, 1990 — Continued

Subject	Responsible CIO/Agency*	Most Recent Report
Homicide	NCEHIC	1992; Vol. 41, No. SS-3
Hysterectomy	NCCDPHP	1997; Vol. 46, No. SS-4
Infant Mortality (see also National Infant Mortality; Birth Defects; Postneonatal Mortality)	NCEHIC	1990; Vol. 39, No. SS-3
Influenza	NCID	1997; Vol. 46, No. SS-1
Injury		
Head and Neck	NCIPC	1993; Vol. 42, No. SS-5
In Developing Countries	NCEHIC	1992; Vol. 41, No. SS-1
Lead Poisoning, Childhood	NCEHIC	1990; Vol. 39, No. SS-4
Low Birth Weight	NCCDPHP	1990; Vol. 39, No. SS-3
Malaria	NCID	1999; Vol. 48, No. SS-1
Measles	NCPS	1992; Vol. 41, No. SS-6
Meningococcal Disease	NCID	1993; Vol. 42, No. SS-2
Mumps	NIP	1995; Vol. 44, No. SS-3
<i>Neisseria gonorrhoeae</i> , Antimicrobial Resistance in	NCPS	1993; Vol. 42, No. SS-3
Neural Tube Defects	NCEH	1995; Vol. 44, No. SS-4
Occupational Injuries/Disease		
Asthma	NIOSH	1999; Vol. 48, No. SS-3
Silicosis	NIOSH	1997; Vol. 46, No. SS-1
Parasites, Intestinal	NCID	1991; Vol. 40, No. SS-4
Pediatric Nutrition	NCCDPHP	1992; Vol. 41, No. SS-7
Pertussis	NCPS	1992; Vol. 41, No. SS-8
Poliomyelitis	NCPS	1992; Vol. 41, No. SS-1
Postneonatal Mortality	NCCDPHP	1998; Vol. 47, No. SS-2
Pregnancy		
Pregnancy Nutrition	NCCDPHP	1992; Vol. 41, No. SS-7
Pregnancy-Related Mortality	NCCDPHP	1997; Vol. 46, No. SS-4
Pregnancy Risk Assessment Monitoring System (PRAMS)	NCCDPHP	1999; Vol. 48, No. SS-5
Pregnancy, Teenage	NCCDPHP	1993; Vol. 42, No. SS-6
Racial/Ethnic Minority Groups	Various	1990; Vol. 39, No. SS-3
Respiratory Disease	NCEHIC	1992; Vol. 41, No. SS-4
Rotavirus	NCID	1992; Vol. 41, No. SS-3
School Health Education Profiles	NCCDPHP	1998; Vol. 47, No. SS-4
Sexually Transmitted Diseases in Italy	NCPS	1992; Vol. 41, No. SS-1
Smoking	NCCDPHP	1990; Vol. 39, No. SS-3
Smoking-Attributable Mortality	NCCDPHP	1994; Vol. 43, No. SS-1
Tobacco-Control Laws, State	NCCDPHP	1999; Vol. 48, No. SS-3
Tobacco-Use Behaviors	NCCDPHP	1994; Vol. 43, No. SS-3
Spina Bifida	NCEH	1996; Vol. 45, No. SS-2
Streptococcal Disease (Group B)	NCID	1992; Vol. 41, No. SS-6
Syphilis, Congenital	NCPS	1993; Vol. 42, No. SS-6
Syphilis, Primary and Secondary	NCPS	1993; Vol. 42, No. SS-3
Tetanus	NIP	1998; Vol. 47, No. SS-2
Trichinosis	NCID	1991; Vol. 40, No. SS-3
Tuberculosis	NCPS	1991; Vol. 40, No. SS-3
Waterborne-Disease Outbreaks	NCID	1998; Vol. 47, No. SS-5
Years of Potential Life Lost	EPO	1992; Vol. 41, No. SS-6
Youth Risk Behaviors	NCCDPHP	1998; Vol. 47, No. SS-3
College Students	NCCDPHP	1997; Vol. 46, No. SS-6
National Alternative High Schools	NCCDPHP	1999; Vol. 48, No. SS-7

Surveillance for Foodborne-Disease Outbreaks — United States, 1993–1997

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Abstract

Problem/Condition: Since 1973, CDC has maintained a collaborative surveillance program for collection and periodic reporting of data on the occurrence and causes of foodborne-disease outbreaks (FBDOs) in the United States.

Reporting Period Covered: This summary reviews data from January 1993 through December 1997.

Description of System: The Foodborne-Disease Outbreak Surveillance System reviews data concerning FBDOs, defined as the occurrence of two or more cases of a similar illness resulting from the ingestion of a common food. State and local public health departments have primary responsibility for identifying and investigating FBDOs. State, local, and territorial health departments use a standard form to report these outbreaks to CDC.

Results: During 1993–1997, a total of 2,751 outbreaks of foodborne disease were reported (489 in 1993, 653 in 1994, 628 in 1995, 477 in 1996, and 504 in 1997). These outbreaks caused a reported 86,058 persons to become ill. Among outbreaks for which the etiology was determined, bacterial pathogens caused the largest percentage of outbreaks (75%) and the largest percentage of cases (86%). *Salmonella* serotype Enteritidis accounted for the largest number of outbreaks, cases, and deaths; most of these outbreaks were attributed to eating eggs. Chemical agents caused 17% of outbreaks and 1% of cases; viruses, 6% of outbreaks and 8% of cases; and parasites, 2% of outbreaks and 5% of cases.

Interpretation: The annual number of FBDOs reported to CDC did not change substantially during this period or from previous years. During this reporting period, *S. Enteritidis* continued to be a major cause of illness and death. In addition, multistate outbreaks caused by contaminated produce and outbreaks caused by *Escherichia coli* O157:H7 remained prominent.

Actions Taken: Current methods to detect FBDOs are improving, and several changes to improve the ease and timeliness of reporting FBDO data are occurring (e.g., a revised form to simplify FBDO reporting by state health departments and electronic reporting methods). State and local health departments continue to investigate and report FBDOs as part of efforts to better understand and define the epidemiology of foodborne disease in the United States. At the regional and national levels, surveillance data provide an indication of the etiologic agents, vehicles of transmission, and contributing factors associated with FBDOs and help direct public health actions to reduce illness and death caused by FBDOs.

INTRODUCTION

The reporting of foodborne and waterborne diseases in the United States began >60 years ago when state and territorial health officers, concerned about the high morbidity and mortality caused by typhoid fever and infantile diarrhea, recommended that cases of "enteric fever" be investigated and reported. The purpose of investigating and reporting these cases was to obtain information regarding the role of food, milk, and water in outbreaks of intestinal illness as the basis for public health action. Beginning in 1925, the Public Health Service published summaries of outbreaks of gastrointestinal illness attributed to milk (1). In 1938, it added summaries of outbreaks caused by all foods. These early surveillance efforts led to the enactment of important public health measures (e.g., the Pasteurized Milk Ordinance) that led to decreased incidence of enteric diseases, particularly those transmitted by milk and water (2).

From 1951 through 1960, the National Office of Vital Statistics reviewed reports of outbreaks of foodborne illness and published annual summaries in *Public Health Reports*. In 1961, CDC — then the Communicable Disease Center — assumed responsibility for publishing reports concerning foodborne illness. During 1961–1965, CDC stopped publishing annual reviews but reported pertinent statistics and detailed individual investigations in the *MMWR*.

The present system of surveillance for foodborne and waterborne diseases began in 1966 when reports of enteric-disease outbreaks attributed to microbial or chemical contamination of food or water were incorporated into an annual summary. Since 1966, the quality of investigative reports has improved greatly, with more active participation by state and federal epidemiologists in outbreak investigations. Outbreaks of waterborne diseases and foodborne diseases have been reported in separate annual summaries since 1978 because of increased interest and activity in surveillance for waterborne diseases. Previous summaries of data reported to the Foodborne-Disease Outbreak Surveillance System were published for 1983–1987 (3) and 1988–1992 (4). Surveillance has served three purposes:

- **Disease prevention and control.** The investigation of foodborne-disease outbreaks leads to prevention and control measures in the food industry. Public health officials identify critical control points in the path from farm to table that can be monitored to reduce contamination by foodborne pathogens. Changes at all levels of food production — including the farm, slaughterhouse, and production plant — have contributed to a cleaner food supply.
- **Knowledge of disease causation.** Outbreak investigations are a critical means of identifying new and emerging pathogens as well as maintaining awareness about ongoing problems. However, the pathogen is not identified in many outbreaks because of delayed or incomplete laboratory investigation, inadequate laboratory capacity, or inability to recognize a pathogen as a cause of foodborne disease. Prompt and thorough investigations of foodborne outbreaks aid in the timely identification of etiologic agents and lead to appropriate prevention and control measures.
- **Administrative guidance.** By analyzing several years of data on foodborne-disease outbreaks, epidemiologists can monitor trends over time in the prevalence of outbreaks caused by specific etiologic agents, food vehicles, and common errors in food handling. This information provides the basis for regulatory and other changes to improve food safety.

The objective of this report is to summarize epidemiologic data on foodborne-disease outbreaks (FBDOs) reported to CDC from 1993 through 1997.

METHODS

Sources of Data for the Foodborne-Disease Outbreak Surveillance System

Agencies use a standard form (CDC Form 52.13, Investigation of a Foodborne Outbreak) to report FBDOs to CDC. A revised form became effective October 1999; this report summarizes data collected with the old form (Appendix A). Most reports are submitted by state, local, and territorial health departments; however, they also can be submitted by federal agencies and other sources. CDC reviews data on the forms to determine whether a specific food vehicle and etiologic agent have been confirmed for an outbreak (Appendix B). In some instances, questions concerning etiology are referred back to the reporting agencies.

Definition of Terms

An FBDO is defined as the occurrence of two or more cases of a similar illness resulting from the ingestion of a common food.* Laboratory or clinical guidelines for confirming an FBDO outbreak vary for bacterial, chemical, parasitic, and viral agents (Appendix B, Table B). Outbreaks of unknown etiology are divided into four subgroups according to incubation period of the illness: <1 hour (probable chemical poisoning); 1–7 hours (probable *Staphylococcus aureus* or *Bacillus cereus* food poisoning); 8–14 hours (other agents); and ≥ 15 hours (other agents).

Limitations of the Surveillance System

Several types of outbreaks are excluded from the Foodborne-Disease Outbreak Surveillance System such as outbreaks that occur on cruise ships (these are summarized and published periodically in scientific publications) (5); outbreaks in which the food was eaten outside the United States, even if the illness occurred within the United States; and outbreaks that are traced to water intended for drinking (these are reported to the Waterborne-Disease Outbreak Reporting System). A second limitation is the classification of food vehicles in the surveillance system. Food vehicles can be classified as individual food items (e.g., milk or eggs) or as food categories (e.g., ice cream or multiple vehicles). Therefore, the number of outbreaks attributed to a particular food item might fall under several food vehicle categories. For example, homemade ice cream containing milk and eggs is listed under "ice cream" rather than "milk" or "eggs." The category "Mexican-style food" includes vehicles containing beef, cheese, lettuce, and other ingredients. However, only one food vehicle is identified for each outbreak on the basis of the available epidemiologic and laboratory data. A third limitation is that FBDOs are not included in the surveillance system if the route of transmission from the contaminated food to the infected persons is indirect. For example, in 1988, chitterlings

*Before 1992, three exceptions existed to this definition; only one case of botulism, marine-toxin intoxication, or chemical intoxication was required to constitute an FBDO if the etiology was confirmed. The definition was changed in 1992 to require two or more cases to constitute an outbreak.

(pig intestines) were the ultimate source of a cluster of *Yersinia enterocolitica* infections among several infants; however, this outbreak was not included because the infants did not eat the chitterlings (6). A fourth limitation is that no standard criteria exist for classifying a death as being FBDO-related. This determination is made by the reporting agency.

How Data Are Presented

In this report, 1993–1997 data on foodborne-disease outbreaks are presented as follows:

- Outbreaks, by state, for each of the 5 years (Figures 1–5).
- Outbreaks, cases, and deaths, by etiology, for the 5-year period (Table 1) and for each of the 5 years (Tables 2–6).
- Outbreaks, by etiology and month of occurrence, for each of the 5 years (Tables 7–11).
- Outbreaks, by etiology and place where food was eaten, for each of the 5 years (Tables 12–16).
- Outbreaks, cases, and deaths, by vehicle of transmission, for each of the 5 years (Tables 17–21).
- Outbreaks, by etiology and vehicle of transmission, for each of the 5 years (Tables 22–26).
- Outbreaks, by etiology and contributing factors, for each of the 5 years (Tables 27–31).

RESULTS

From 1993 through 1997, 878 (32%) of the 2,751 outbreaks reported to CDC had a known etiology; these outbreaks accounted for 50,788 (59%) of 86,058 infections (Table 1). Of the 878 outbreaks with a known etiology, 75% (86% of infections) were caused by bacterial pathogens, 17% (1% of infections) by chemical agents, 6% (8% of infections) by viruses, and 2% (5% of infections) by parasites. In most (68%) outbreaks, the etiology was not determined. The incubation period was reported for 1,406 (75%) of the 1,873 outbreaks that had an unknown etiology; in 44 (3%) outbreaks, the incubation period was <1 hour; in 428 (30%) outbreaks, 1–7 hours; in 285 (20%) outbreaks, 8–14 hours; and in 649 outbreaks (46%), ≥15 hours.

Local investigators may report factors they believe contributed to the outbreak. For each of the years from 1993 through 1997, the most commonly reported food-preparation practice that contributed to foodborne disease was improper holding temperature; the second most commonly reported practice was inadequate cooking of food (Tables 27–31). Food obtained from an unsafe source was the least commonly reported factor for the 5 years combined. In most outbreaks caused by bacterial pathogens, the food was stored at improper holding temperatures.

The annual number of outbreaks reported during 1993–1997 ranged from 477 to 653 (Tables 2–6). These numbers are comparable with those in previous years (3,4). During this period, multistate outbreaks caused by ground beef contaminated with *Escherichia*

coli O157:H7 (7,8) and fresh produce contaminated with *Salmonella* or *E. coli* O157:H7 (9) were frequently reported (Tables 22–26). A massive outbreak of *Salmonella* serotype Enteritidis infections was linked to commercially distributed ice cream made from a liquid premix that had been transported in tanker trucks used previously to haul liquid raw eggs (10). Unexpected vehicles of transmission (e.g., alfalfa sprouts [11], apple cider [12], and orange juice [13]) were also reported. Several outbreaks involved imported food items.

Salmonella caused 357 (55%) of the 655 bacterial FBDOs with a known etiology during 1993–1997; 55% of these 357 outbreaks were caused by *S. Enteritidis*. *S. Enteritidis* was the most frequently reported cause of FBDOs, accounting for 7% of all outbreaks and 22% of outbreaks for which an etiology was determined. *S. Enteritidis* also resulted in more deaths than any other pathogen; of the 10 persons who died as a result of *S. Enteritidis*, four (40%) were residents of nursing homes.

DISCUSSION

Foodborne–Disease Outbreaks During 1993–1997

As in previous years, bacterial pathogens caused most outbreaks and infections with a known etiology (3,4). However, 68% of reported FBDOs were of unknown etiology, a finding that highlights the need for improved epidemiologic and laboratory investigations. Approximately 50% of these outbreaks had an incubation period of ≥ 15 hours, indicating that many were of viral etiology. Viruses (e.g., Norwalk and Norwalk-like viruses) are probably a much more important cause of foodborne disease outbreaks than is currently recognized. Although local and state public health laboratories have often lacked the resources and expertise to diagnose viral pathogens, methods to diagnose these agents are now increasingly available in some state laboratories. Thus, outbreaks of viral etiology might be more likely to be identified and reported in the future.

Of the FBDOs with a known etiology, multistate outbreaks caused by contaminated produce and outbreaks caused by *E. coli* O157:H7 remained prominent. *S. Enteritidis* continued to be a major cause of illness and death. Approximately 40% of persons who died as a result of *S. Enteritidis* were residents of nursing homes — a finding that reflects the seriousness of *S. Enteritidis* infections in elderly persons, many of whom might be immunocompromised. Persons can decrease their risk for egg-associated infections caused by *S. Enteritidis* by not eating raw or undercooked eggs. Nursing homes, hospitals, and commercial kitchens should use pasteurized egg products for all recipes requiring pooled or lightly cooked eggs (14).

Several outbreaks reported during 1993–1997 involved imported food items. This finding demonstrates the role of food production and distribution in FBDOs.

Interpretation of Data from the Foodborne-Disease Outbreak Surveillance System

Foodborne diseases cause an estimated 76 million illnesses and 5,000 deaths in the United States each year (15). Although foodborne diseases are common, only a fraction of these illnesses are routinely reported to CDC because a complex chain of events must occur before a foodborne infection is reported; a break at any point in the chain

will result in a case not being reported. In addition, most reported foodborne illnesses are sporadic in nature; only a small number are identified as being part of an outbreak and thus are reported through the Foodborne-Disease Outbreak Surveillance System. For example, *Salmonella* infection causes an estimated 1.4 million foodborne illnesses annually (15). However, from 1993 through 1997, a total of 189,304 *Salmonella* infections (approximately 38,000 annually) were reported through the National *Salmonella* Surveillance System (16–20), which is a passive, laboratory-based system. In contrast, during the same period, 357 recognized outbreaks of *Salmonella* infection resulting in 32,610 illnesses were reported through the Foodborne-Disease Outbreak Surveillance System. Thus, the system greatly underestimates the burden of foodborne disease.

Moreover, the number of outbreaks summarized in this report represents a small proportion of the outbreaks that actually occurred during the period under surveillance. Most outbreaks are never recognized, and those that are recognized frequently go unreported. The likelihood that an outbreak is brought to the attention of public health authorities depends on many factors, including consumer and physician awareness, interest, and motivation to report the incident as well as the resources and disease-surveillance activities of state and local public health and environmental agencies. Outbreaks that are most likely to be brought to the attention of public health authorities include those that are large, interstate, or restaurant-associated or that can cause serious illness, hospitalization, or death. Therefore, this report should not be used to draw conclusions about the absolute or relative incidence of foodborne-disease outbreaks related to specific causes. For example, foodborne diseases characterized by short incubation periods (e.g., those caused by a chemical agent or staphylococcal enterotoxin) are more likely to be recognized as common-source FBDOs than are diseases with longer incubation periods (e.g., hepatitis A). Outbreaks involving less commonly identified pathogens (e.g., *B. cereus*, enterotoxigenic *E. coli*, or *Giardia lamblia*) are less likely to have a confirmed etiology because these organisms are not always considered in clinical, epidemiologic, and laboratory investigations of FBDOs.

FUTURE DIRECTIONS

Current methods to detect FBDOs are improving. For example, two new tools that enhance detection of FBDOs are the *Salmonella* Outbreak Detection Algorithm (SODA) and PulseNet. SODA applies a statistical algorithm to data reported through CDC's National *Salmonella* Surveillance System to identify significant increases over a historical baseline for any given serotype (21). This technology, now employed at state health departments, can be used to help identify clusters or outbreaks. PulseNet is a national network of public health laboratories that perform pulsed-field gel electrophoresis (PFGE) on bacteria that might be foodborne (22). The network permits rapid comparison of PFGE patterns through an electronic database at CDC; closely related PFGE patterns suggest a common source. PulseNet is helpful in epidemiologic investigations, particularly those that involve many states.

Several changes to improve the ease and timeliness of reporting are occurring. In October 1999, CDC issued a revised FBDO reporting form to simplify reporting by state health departments. In addition, electronic reporting methods such as fax, e-mail, and the Internet are being increasingly used to make reporting more timely.

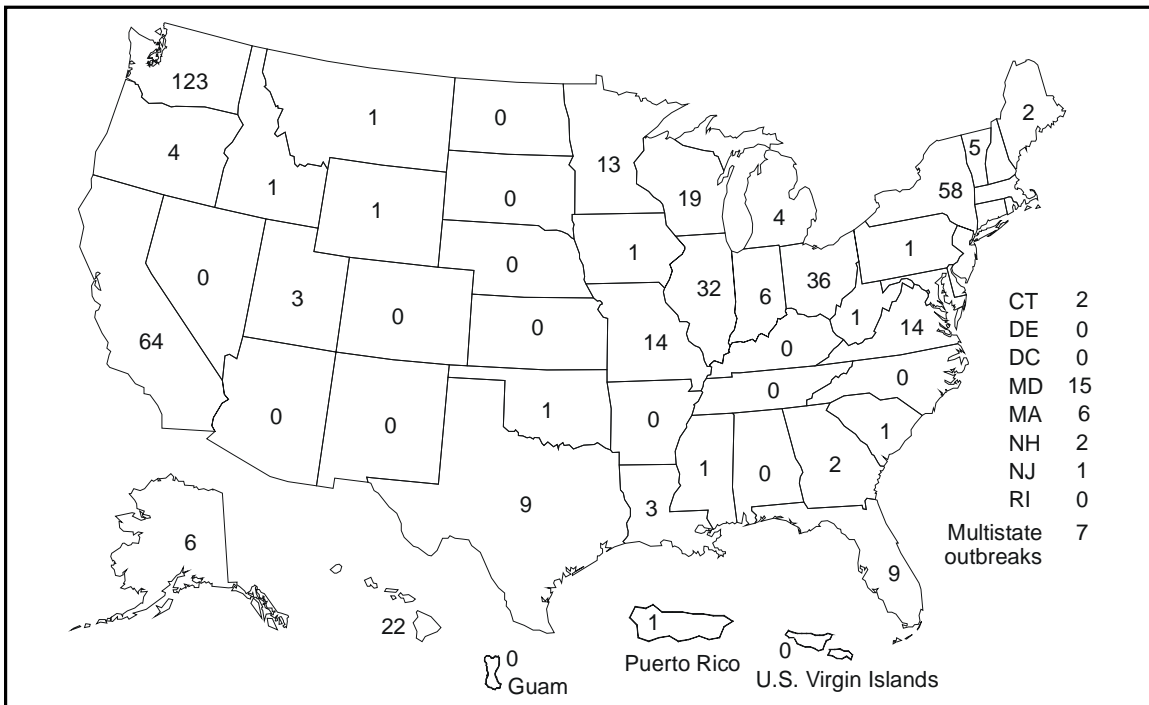
The investigation and reporting of FBDOs by state and local health departments are important steps in efforts to better understand and define the epidemiology of

foodborne disease in the United States. At the regional and national levels, surveillance data provide an indication of the etiologic agents, vehicles of transmission, and contributing factors associated with FBDOs and help direct public health actions.

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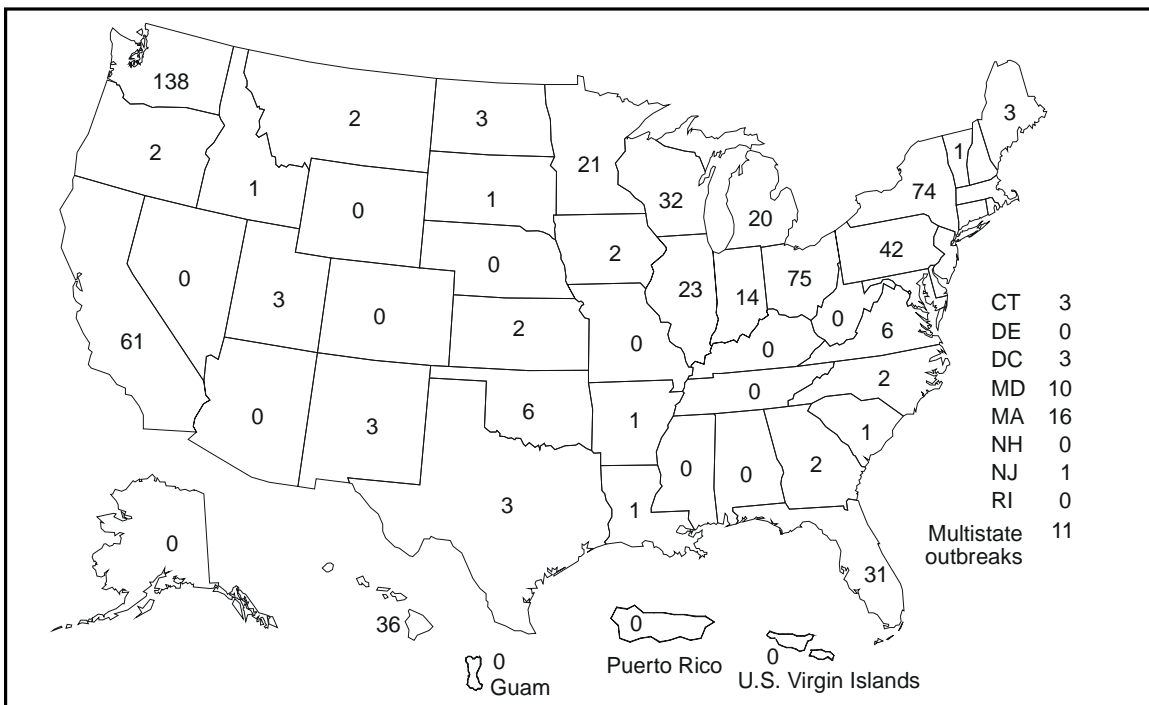
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FIGURE 1. Number of reported foodborne-disease outbreaks, by state — United States,* 1993



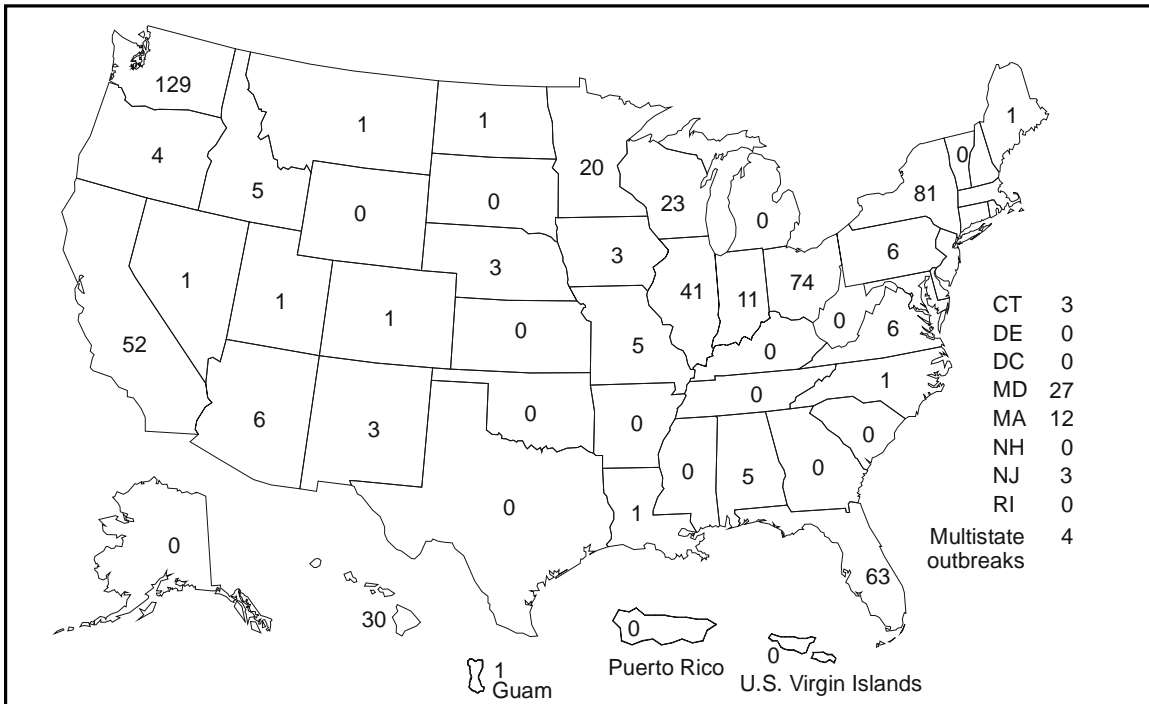
* Includes Guam, Puerto Rico, and the U.S. Virgin Islands.

FIGURE 2. Number of reported foodborne-disease outbreaks, by state — United States,* 1994



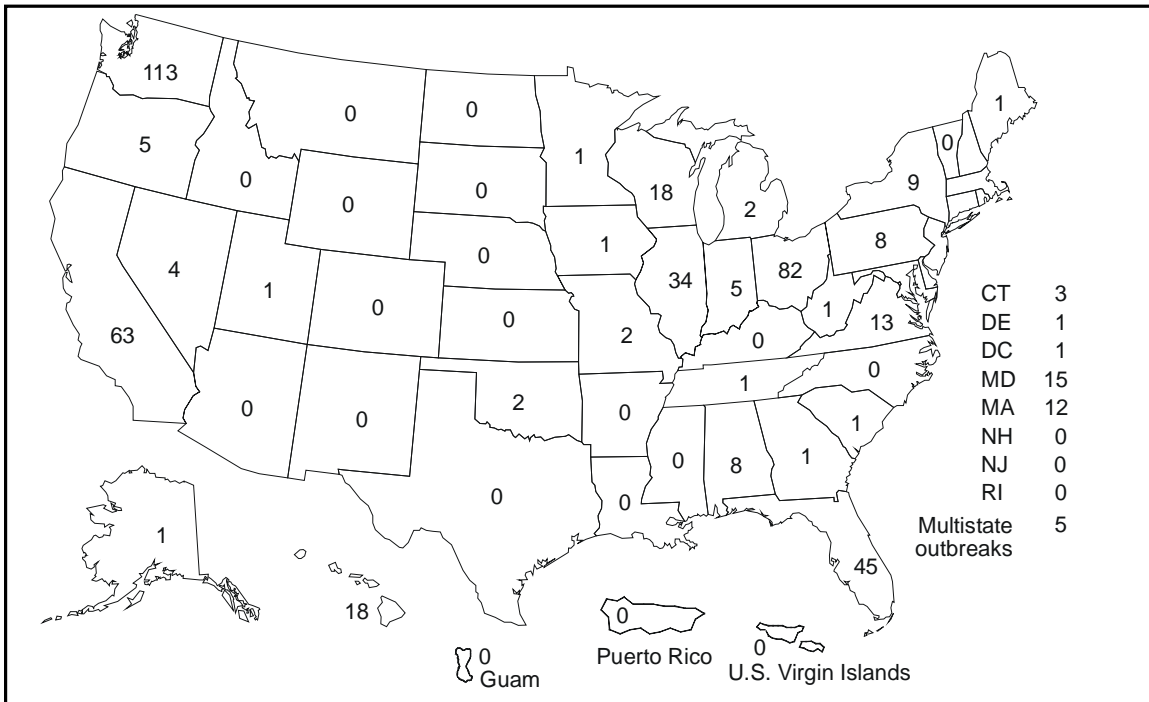
* Includes Guam, Puerto Rico, and the U.S. Virgin Islands.

FIGURE 3. Number of reported foodborne-disease outbreaks, by state — United States,* 1995



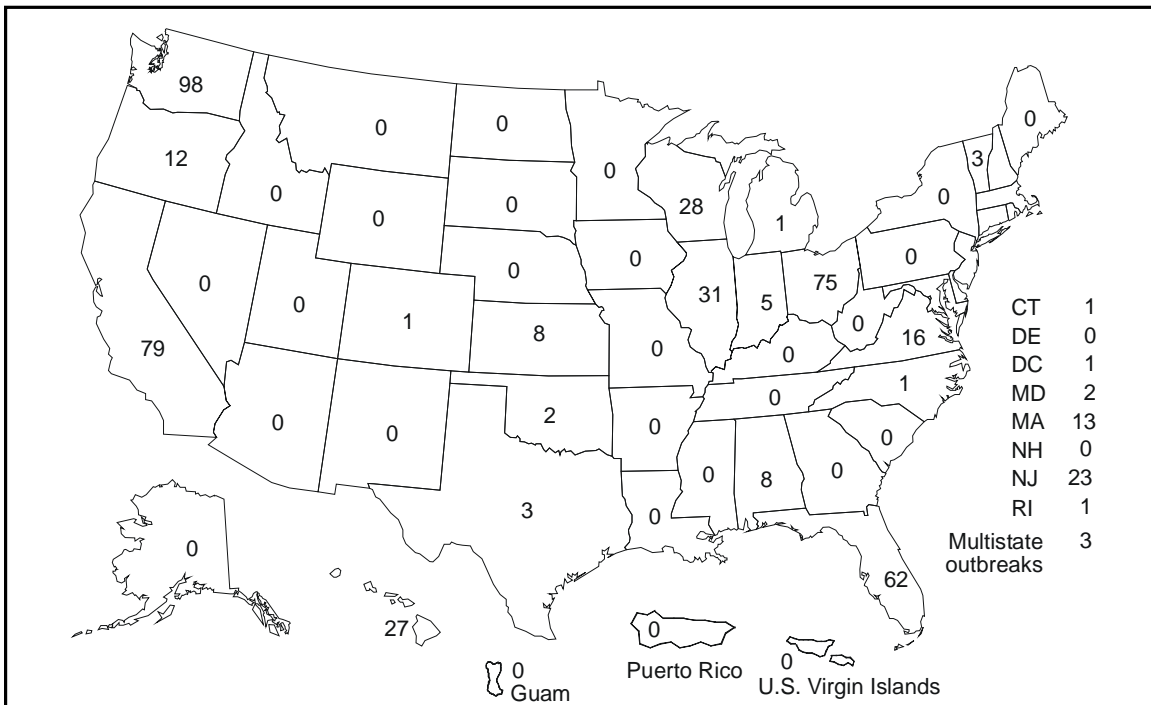
* Includes Guam, Puerto Rico, and the U.S. Virgin Islands.

FIGURE 4. Number of reported foodborne-disease outbreaks, by state — United States,* 1996



* Includes Guam, Puerto Rico, and the U.S. Virgin Islands.

FIGURE 5. Number of reported foodborne-disease outbreaks, by state — United States,* 1997



* Includes Guam, Puerto Rico, and the U.S. Virgin Islands.

TABLE 1. Number of reported foodborne-disease outbreaks, cases, and deaths, by etiology — United States,* 1993–1997†

Etiology	Outbreaks		Cases		Deaths	
	No.	(%)	No.	(%)	No.	(%)
Bacterial						
<i>Bacillus cereus</i>	14	(0.5)	691	(0.8)	0	(0.0)
<i>Brucella</i>	1	(0.0)	19	(0.0)	0	(0.0)
<i>Campylobacter</i>	25	(0.9)	539	(0.6)	1	(3.4)
<i>Clostridium botulinum</i>	13	(0.5)	56	(0.1)	1	(3.4)
<i>Clostridium perfringens</i>	57	(2.1)	2,772	(3.2)	0	(0.0)
<i>Escherichia coli</i>	84	(3.1)	3,260	(3.8)	8	(27.6)
<i>Listeria monocytogenes</i>	3	(0.1)	100	(0.1)	2	(6.9)
<i>Salmonella</i>	357	(13.0)	32,610	(37.9)	13	(44.8)
<i>Shigella</i>	43	(1.6)	1,555	(1.8)	0	(0.0)
<i>Staphylococcus aureus</i>	42	(1.5)	1,413	(1.6)	1	(3.4)
<i>Streptococcus</i> , group A	1	(0.0)	122	(0.1)	0	(0.0)
<i>Streptococcus</i> , other	1	(0.0)	6	(0.0)	0	(0.0)
<i>Vibrio cholerae</i>	1	(0.0)	2	(0.0)	0	(0.0)
<i>Vibrio parahaemolyticus</i>	5	(0.2)	40	(0.0)	0	(0.0)
<i>Yersinia enterocolitica</i>	2	(0.1)	27	(0.0)	1	(3.4)
Other bacterial	6	(0.2)	609	(0.7)	1	(3.4)
Total bacterial	655	(23.8)	43,821	(50.9)	28	(96.6)
Chemical						
Ciguatoxin	60	(2.2)	205	(0.2)	0	(0.0)
Heavy metals	4	(0.1)	17	(0.0)	0	(0.0)
Monosodium glutamate	1	(0.0)	2	(0.0)	0	(0.0)
Mushroom poisoning	7	(0.3)	21	(0.0)	0	(0.0)
Scombrototoxin	69	(2.5)	297	(0.3)	0	(0.0)
Shellfish	1	(0.0)	3	(0.0)	0	(0.0)
Other chemical	6	(0.2)	31	(0.0)	0	(0.0)
Total chemical	148	(5.4)	576	(0.7)	0	(0.0)
Parasitic						
<i>Giardia lamblia</i>	4	(0.1)	45	(0.1)	0	(0.0)
<i>Trichinella spiralis</i>	2	(0.1)	19	(0.0)	0	(0.0)
Other parasitic	13	(0.5)	2,261	(2.6)	0	(0.0)
Total parasitic	19	(0.7)	2,325	(2.7)	0	(0.0)
Viral						
Hepatitis A	23	(0.8)	729	(0.8)	0	(0.0)
Norwalk	9	(0.3)	1,233	(1.4)	0	(0.0)
Other viral	24	(0.9)	2,104	(2.4)	0	(0.0)
Total viral	56	(2.0)	4,066	(4.7)	0	(0.0)
Confirmed etiology	878	(31.9)	50,788	(59.0)	28	(96.6)
Unknown etiology	1,873	(68.1)	35,270	(41.0)	1	(3.4)
Total 1993–1997	2,751	(100.0)	86,058	(100.0)	29	(100.0)

*Includes Guam, Puerto Rico, and the U.S. Virgin Islands.

†Totals might vary by <1% from summed components because of rounding.

TABLE 2. Number of reported foodborne-disease outbreaks, cases, and deaths, by etiology — United States,* 1993†

Etiology	Outbreaks		Cases		Deaths	
	No.	(%)	No.	(%)	No.	(%)
Bacterial						
<i>Bacillus cereus</i>	4	(0.8)	188	(1.1)	0	(0.0)
<i>Campylobacter</i>	6	(1.2)	110	(0.6)	0	(0.0)
<i>Clostridium botulinum</i>	5	(1.0)	17	(0.1)	1	(11.1)
<i>Clostridium perfringens</i>	15	(3.1)	534	(3.1)	0	(0.0)
<i>Escherichia coli</i>	15	(3.1)	1,340	(7.7)	5	(55.6)
<i>Salmonella</i>	68	(13.9)	7,122	(40.8)	1	(11.1)
<i>Shigella</i>	9	(1.8)	338	(1.9)	0	(0.0)
<i>Staphylococcus aureus</i>	7	(1.4)	355	(2.0)	1	(11.1)
<i>Streptococcus, other</i>	1	(0.2)	6	(0.0)	0	(0.0)
<i>Vibrio parahaemolyticus</i>	1	(0.2)	4	(0.0)	0	(0.0)
Other bacterial	4	(0.8)	388	(2.2)	1	(11.1)
Total bacterial	135	(27.6)	10,402	(59.5)	9	(100.0)
Chemical						
Ciguatoxin	13	(2.7)	44	(0.3)	0	(0.0)
Heavy metals	1	(0.2)	6	(0.0)	0	(0.0)
Mushroom poisoning	1	(0.2)	2	(0.0)	0	(0.0)
Scombrototoxin	5	(1.0)	21	(0.1)	0	(0.0)
Other chemical	1	(0.2)	2	(0.0)	0	(0.0)
Total chemical	21	(4.3)	75	(0.4)	0	(0.0)
Parasitic						
<i>Trichinella spiralis</i>	1	(0.2)	10	(0.1)	0	(0.0)
Other parasitic	1	(0.2)	6	(0.0)	0	(0.0)
Total parasitic	2	(0.4)	16	(0.1)	0	(0.0)
Viral						
Hepatitis A	5	(1.0)	81	(0.5)	0	(0.0)
Norwalk	1	(0.2)	45	(0.3)	0	(0.0)
Other viral	4	(0.8)	631	(3.6)	0	(0.0)
Total viral	10	(2.0)	757	(4.3)	0	(0.0)
Confirmed etiology	168	(34.4)	11,250	(64.4)	9	(100.0)
Unknown etiology	321	(65.6)	6,227	(35.6)	0	(0.0)
Total 1993	489	(100.0)	17,477	(100.0)	9	(100.0)

*Includes Guam, Puerto Rico, and the U.S. Virgin Islands.

†Totals might vary by <1% from summed components because of rounding.

TABLE 3. Number of reported foodborne-disease outbreaks, cases, and deaths, by etiology — United States,* 1994†

Etiology	Outbreaks		Cases		Deaths	
	No.	(%)	No.	(%)	No.	(%)
Bacterial						
<i>Bacillus cereus</i>	3	(0.5)	19	(0.1)	0	(0.0)
<i>Campylobacter</i>	6	(0.9)	97	(0.6)	0	(0.0)
<i>Clostridium botulinum</i>	3	(0.5)	27	(0.2)	0	(0.0)
<i>Clostridium perfringens</i>	12	(1.8)	517	(3.2)	0	(0.0)
<i>Escherichia coli</i>	25	(3.8)	902	(5.6)	0	(0.0)
<i>Listeria monocytogenes</i>	3	(0.5)	100	(0.6)	2	(66.7)
<i>Salmonella</i>	70	(10.7)	2,858	(17.6)	1	(33.3)
<i>Shigella</i>	11	(1.7)	534	(3.3)	0	(0.0)
<i>Staphylococcus aureus</i>	13	(2.0)	421	(2.6)	0	(0.0)
<i>Vibrio cholerae</i>	1	(0.2)	2	(0.0)	0	(0.0)
<i>Yersinia enterocolitica</i>	1	(0.2)	10	(0.0)	0	(0.0)
Total bacterial	148	(22.7)	5,487	(33.8)	3	(100.0)
Chemical						
Ciguatoxin	11	(1.7)	54	(0.3)	0	(0.0)
Heavy metals	2	(0.3)	8	(0.0)	0	(0.0)
Monosodium glutamate	1	(0.2)	2	(0.0)	0	(0.0)
Scombrototoxin	21	(3.2)	83	(0.5)	0	(0.0)
Other chemical	2	(0.3)	14	(0.1)	0	(0.0)
Total chemical	37	(5.7)	161	(1.0)	0	(0.0)
Parasitic						
<i>Giardia lamblia</i>	2	(0.3)	22	(0.1)	0	(0.0)
Viral						
Hepatitis A	6	(0.9)	310	(1.9)	0	(0.0)
Norwalk	1	(0.2)	34	(0.2)	0	(0.0)
Other viral	3	(0.5)	268	(1.7)	0	(0.0)
Total viral	10	(1.6)	612	(3.8)	0	(0.0)
Confirmed etiology	197	(30.2)	6,282	(38.7)	3	(100.0)
Unknown etiology	456	(69.8)	9,952	(61.3)	0	(0.0)
Total 1994	653	(100.0)	16,234	(100.0)	3	(100.0)

*Includes Guam, Puerto Rico, and the U.S. Virgin Islands.

†Totals might vary by <1% from summed components because of rounding.

TABLE 4. Number of reported foodborne-disease outbreaks, cases, and deaths, by etiology — United States,* 1995†

Etiology	Outbreaks		Cases		Deaths	
	No.	(%)	No.	(%)	No.	(%)
Bacterial						
<i>Bacillus cereus</i>	2	(0.3)	24	(0.1)	0	(0.0)
<i>Campylobacter</i>	6	(1.0)	127	(0.7)	0	(0.0)
<i>Clostridium botulinum</i>	2	(0.3)	6	(0.0)	0	(0.0)
<i>Clostridium perfringens</i>	14	(2.2)	455	(2.6)	0	(0.0)
<i>Escherichia coli</i>	25	(4.0)	393	(2.2)	1	(9.1)
<i>Salmonella</i>	90	(14.3)	8,449	(47.5)	9	(81.8)
<i>Shigella</i>	7	(1.1)	259	(1.5)	0	(0.0)
<i>Staphylococcus aureus</i>	6	(1.0)	66	(0.4)	0	(0.0)
<i>Yersina enterocolitica</i>	1	(0.2)	17	(0.1)	1	(9.1)
Other bacterial	2	(0.3)	221	(1.2)	0	(0.0)
Total bacterial	155	(24.7)	10,017	(56.3)	11	(100.0)
Chemical						
Ciguatoxin	10	(1.6)	27	(0.2)	0	(0.0)
Heavy metals	1	(0.2)	3	(0.0)	0	(0.0)
Scombrototoxin	16	(2.5)	91	(0.5)	0	(0.0)
Other chemical	2	(0.3)	12	(0.1)	0	(0.0)
Total chemical	29	(4.6)	133	(0.7)	0	(0.0)
Parasitic						
<i>Trichinella spiralis</i>	1	(0.2)	9	(0.1)	0	(0.0)
Viral						
Hepatitis A	4	(0.6)	38	(0.2)	0	(0.0)
Norwalk	4	(0.6)	433	(2.4)	0	(0.0)
Other viral	1	(0.2)	41	(0.2)	0	(0.0)
Total viral	9	(1.4)	512	(2.9)	0	(0.0)
Confirmed etiology	194	(30.9)	10,671	(59.9)	11	(100.0)
Unknown etiology	434	(69.1)	7,129	(40.1)	0	(0.0)
Total 1995	628	(100.0)	17,800	(100.0)	11	(100.0)

*Includes Guam, Puerto Rico, and the U.S. Virgin Islands.

†Totals might vary by <1% from summed components because of rounding.

TABLE 5. Number of reported foodborne-disease outbreaks, cases, and deaths, by etiology — United States,* 1996†

Etiology	Outbreaks		Cases		Deaths	
	No.	(%)	No.	(%)	No.	(%)
Bacterial						
<i>Bacillus cereus</i>	1	(0.2)	22	(0.1)	0	(0.0)
<i>Brucella</i>	1	(0.2)	19	(0.1)	0	(0.0)
<i>Campylobacter</i>	5	(1.0)	101	(0.4)	0	(0.0)
<i>Clostridium botulinum</i>	2	(0.4)	4	(0.0)	0	(0.0)
<i>Clostridium perfringens</i>	10	(2.1)	1,011	(4.5)	0	(0.0)
<i>Escherichia coli</i>	11	(2.3)	325	(1.4)	1	(25.0)
<i>Salmonella</i>	69	(14.5)	12,450	(55.1)	2	(50.0)
<i>Shigella</i>	6	(1.3)	109	(0.5)	0	(0.0)
<i>Staphylococcus aureus</i>	7	(1.5)	178	(0.8)	0	(0.0)
Total bacterial	112	(23.5)	14,219	(62.9)	3	(75.0)
Chemical						
Ciguatoxin	9	(1.9)	32	(0.1)	0	(0.0)
Mushroom poisoning	3	(0.6)	10	(0.0)	0	(0.0)
Scombrototoxin	12	(2.5)	37	(0.2)	0	(0.0)
Shellfish	1	(0.2)	3	(0.0)	0	(0.0)
Other chemical	1	(0.2)	3	(0.0)	0	(0.0)
Total chemical	26	(5.5)	85	(0.4)	0	(0.0)
Parasitic						
<i>Giardia lamblia</i>	1	(0.2)	6	(0.0)	0	(0.0)
Other parasitic	2	(0.4)	1,582	(7.0)	0	(0.0)
Total parasitic	3	(0.6)	1,588	(7.0)	0	(0.0)
Viral						
Hepatitis A	5	(1.0)	126	(0.6)	0	(0.0)
Norwalk	3	(0.6)	721	(3.2)	0	(0.0)
Other viral	2	(0.4)	573	(2.5)	0	(0.0)
Total viral	10	(2.1)	1,420	(6.3)	0	(0.0)
Confirmed etiology	151	(31.7)	17,312	(76.6)	3	(75.0)
Unknown etiology	326	(68.3)	5,295	(23.4)	1	(25.0)
Total 1996	477	(100.0)	22,607	(100.0)	4	(100.0)

*Includes Guam, Puerto Rico, and the U.S. Virgin Islands.

†Totals might vary by <1% from summed components because of rounding.

TABLE 6. Number of reported foodborne-disease outbreaks, cases, and deaths, by etiology — United States,* 1997†

Etiology	Outbreaks		Cases		Deaths	
	No.	(%)	No.	(%)	No.	(%)
Bacterial						
<i>Bacillus cereus</i>	4	(0.8)	438	(3.7)	0	(0.0)
<i>Campylobacter</i>	2	(0.4)	104	(0.9)	1	(50.0)
<i>Clostridium botulinum</i>	1	(0.2)	2	(0.0)	0	(0.0)
<i>Clostridium perfringens</i>	6	(1.2)	255	(2.1)	0	(0.0)
<i>Escherichia coli</i>	8	(1.6)	300	(2.5)	1	(50.0)
<i>Salmonella</i>	60	(11.9)	1,731	(14.5)	0	(0.0)
<i>Shigella</i>	10	(2.0)	315	(2.6)	0	(0.0)
<i>Staphylococcus aureus</i>	9	(1.8)	393	(3.3)	0	(0.0)
<i>Streptococcus, group A</i>	1	(0.2)	122	(1.0)	0	(0.0)
<i>Vibrio parahaemolyticus</i>	4	(0.8)	36	(0.3)	0	(0.0)
Total bacterial	105	(20.8)	3,696	(31.0)	2	(100.0)
Chemical						
Ciguatoxin	17	(3.4)	48	(0.4)	0	(0.0)
Mushroom poisoning	3	(0.6)	9	(0.1)	0	(0.0)
Scombrototoxin	15	(3.0)	65	(0.5)	0	(0.0)
Total chemical	35	(6.9)	122	(1.0)	0	(0.0)
Parasitic						
<i>Giardia lamblia</i>	1	(0.2)	17	(0.1)	0	(0.0)
Other parasitic	10	(2.0)	673	(5.6)	0	(0.0)
Total parasitic	11	(2.2)	690	(5.8)	0	(0.0)
Viral						
Hepatitis A	3	(0.6)	174	(1.5)	0	(0.0)
Other viral	14	(2.8)	591	(4.9)	0	(0.0)
Total viral	17	(3.4)	765	(6.4)	0	(0.0)
Confirmed etiology	168	(33.3)	5,273	(44.2)	2	(100.0)
Unknown etiology	336	(66.7)	6,667	(55.8)	0	(0.0)
Total 1997	504	(100.0)	11,940	(100.0)	2	(100.0)

*Includes Guam, Puerto Rico, and the U.S. Virgin Islands.

†Totals might vary by <1% from summed components because of rounding.

TABLE 7. Number of reported foodborne-disease outbreaks, by etiology and month of occurrence — United States,* 1993

Etiology	Month of occurrence												Total
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Bacterial													
<i>Bacillus cereus</i>	—	—	—	1	—	—	2	1	—	—	—	—	4
<i>Campylobacter</i>	—	—	—	—	—	—	—	1	2	1	2	—	6
<i>Clostridium botulinum</i>	—	—	—	—	1	—	1	—	1	1	1	—	5
<i>Clostridium perfringens</i>	—	1	4	3	—	1	1	1	—	2	1	1	15
<i>Escherichia coli</i>	1	—	2	2	—	—	4	1	3	1	1	—	15
<i>Salmonella</i>	5	4	7	4	7	4	8	3	15	5	4	2	68
<i>Shigella</i>	1	—	—	2	1	1	—	1	3	—	—	—	9
<i>Staphylococcus aureus</i>	1	—	1	—	1	2	—	—	1	—	1	—	7
<i>Streptococcus, other</i>	—	—	—	—	—	—	1	—	—	—	—	—	1
<i>Vibrio parahaemolyticus</i>	—	—	—	—	1	—	—	—	—	—	—	—	1
Other bacterial	—	—	1	1	—	—	1	1	—	—	—	—	4
Total bacterial	8	5	15	13	11	8	18	9	25	10	10	3	135
Chemical													
Ciguatoxin	—	1	—	1	3	1	1	3	2	—	1	—	13
Heavy metals	—	—	1	—	—	—	—	—	—	—	—	—	1
Mushroom poisoning	—	—	—	—	—	—	—	—	1	—	—	—	1
Scombrototoxin	—	2	—	—	—	—	2	—	1	—	—	—	5
Other chemical	—	—	—	—	1	—	—	—	—	—	—	—	1
Total chemical	—	3	1	1	4	1	3	3	4	—	1	—	21
Parasitic													
<i>Trichinella spiralis</i>	—	—	—	—	—	—	—	—	—	1	—	—	1
Other parasitic	—	—	—	1	—	—	—	—	—	—	—	—	1
Total parasitic	—	—	—	1	—	—	—	—	—	1	—	—	2
Viral													
Hepatitis A	—	1	—	—	—	—	1	1	—	—	2	—	5
Norwalk	—	—	—	—	—	—	—	—	—	—	1	—	1
Other viral	1	—	—	—	—	—	—	—	—	—	2	1	4
Total viral	1	1	—	—	—	—	1	1	—	—	5	1	10
Confirmed etiology	9	9	16	15	15	9	22	13	29	11	16	4	168
Unknown etiology	20	13	28	27	39	33	26	23	22	22	30	38	321
Total 1993	29	22	44	42	54	42	48	36	51	33	46	42	489

*Includes Guam, Puerto Rico, and the U.S. Virgin Islands.

TABLE 8. Number of reported foodborne-disease outbreaks, by etiology and month of occurrence — United States,* 1994

Etiology	Month of occurrence												Total
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Bacterial													
<i>Bacillus cereus</i>	—	—	—	—	1	—	—	1	1	—	—	—	3
<i>Campylobacter</i>	—	—	—	—	—	3	1	1	—	—	1	—	6
<i>Clostridium botulinum</i>	—	—	—	1	—	1	—	1	—	—	—	—	3
<i>Clostridium perfringens</i>	1	—	1	1	—	4	—	—	—	1	1	3	12
<i>Escherichia coli</i>	1	2	—	1	1	7	4	—	5	1	3	—	25
<i>Listeria monocytogenes</i>	—	—	—	—	—	1	—	—	—	2	—	—	3
<i>Salmonella</i>	1	—	1	4	8	6	11	13	6	9	6	5	70
<i>Shigella</i>	—	—	2	—	—	4	2	—	—	—	3	—	11
<i>Staphylococcus aureus</i>	—	—	—	—	2	3	—	2	1	—	2	3	13
<i>Vibrio cholera</i>	—	—	—	—	—	—	—	—	—	—	—	1	1
<i>Yersinia enterocolitica</i>	—	—	—	—	—	—	—	—	—	1	—	—	1
Total bacterial	3	2	4	7	12	29	18	18	13	14	16	12	148
Chemical													
Ciguatoxin	—	—	—	1	4	3	—	2	—	1	—	—	11
Heavy metals	—	—	—	—	—	—	—	1	—	—	—	1	2
Monosodium glutamate	—	—	—	—	1	—	—	—	—	—	—	—	1
Scombrototoxin	2	2	1	1	2	—	—	3	3	4	2	1	21
Other chemical	—	—	2	—	—	—	—	—	—	—	—	—	2
Total chemical	2	2	3	2	7	3	—	6	3	5	2	2	37
Parasitic													
<i>Giardia lamblia</i>	—	—	—	—	—	—	2	—	—	—	—	—	2
Viral													
Hepatitis A	—	—	—	1	1	1	—	1	1	1	—	—	6
Norwalk	—	1	—	—	—	—	—	—	—	—	—	—	1
Other viral	—	1	—	—	—	—	—	—	—	—	—	2	3
Total viral	—	2	—	1	1	1	—	1	1	1	—	2	10
Confirmed etiology	5	6	7	10	20	33	20	25	17	20	18	16	197
Unknown etiology	17	32	33	46	55	33	35	34	31	38	36	66	456
Total 1994	22	38	40	56	75	66	55	59	48	58	54	82	653

*Includes Guam, Puerto Rico, and the U.S. Virgin Islands.

TABLE 9. Number of reported foodborne-disease outbreaks, by etiology and month of occurrence — United States,* 1995

Etiology	Month of occurrence												Total
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Bacterial													
<i>Bacillus cereus</i>	—	—	—	—	—	—	—	1	—	1	—	—	2
<i>Campylobacter</i>	—	—	—	—	—	1	2	—	1	2	—	—	6
<i>Clostridium botulinum</i>	—	—	—	—	—	—	—	1	1	—	—	—	2
<i>Clostridium perfringens</i>	1	1	1	2	2	—	—	—	1	1	4	1	14
<i>Escherichia coli</i>	—	—	—	1	2	4	6	4	2	2	3	1	25
<i>Salmonella</i>	7	3	4	6	7	9	12	19	9	8	3	3	90
<i>Shigella</i>	1	1	2	2	—	—	1	—	—	—	—	—	7
<i>Staphylococcus aureus</i>	—	—	—	—	—	—	2	—	—	2	—	2	6
<i>Yersinia enterocolitica</i>	—	—	—	—	—	—	—	—	—	—	1	—	1
Other bacterial	—	—	—	—	1	—	—	1	—	—	—	—	2
Total bacterial	9	5	7	11	12	14	23	26	14	16	11	7	155
Chemical													
Ciguatoxin	1	—	2	—	—	1	1	2	2	—	—	1	10
Heavy metals	—	—	—	—	—	—	—	—	1	—	—	—	1
Scombrototoxin	1	1	2	1	2	—	1	1	1	2	4	—	16
Other chemical	—	—	—	—	—	—	1	—	—	—	—	1	2
Total chemical	2	1	4	1	2	1	3	3	4	2	4	2	29
Parasitic													
<i>Trichinella spiralis</i>	1	—	—	—	—	—	—	—	—	—	—	—	1
Viral													
Hepatitis A	—	—	—	1	1	—	—	—	1	1	—	—	4
Norwalk	1	—	—	1	—	—	—	—	1	—	—	1	4
Other viral	—	—	—	1	—	—	—	—	—	—	—	—	1
Total viral	1	—	—	3	1	—	—	—	2	1	—	1	9
Confirmed etiology	13	6	11	15	15	15	26	29	20	19	15	10	194
Unknown etiology	34	30	41	44	49	36	36	30	18	34	45	37	434
Total 1995	47	36	52	59	64	51	62	59	38	53	60	47	628

*Includes Guam, Puerto Rico, and the U.S. Virgin Islands.

TABLE 10. Number of reported foodborne-disease outbreaks, by etiology and month of occurrence — United States,* 1996

Etiology	Month of occurrence												Total
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Bacterial													
<i>Bacillus cereus</i>	—	—	1	—	—	—	—	—	—	—	—	—	1
<i>Brucella</i>	—	—	—	—	—	—	—	—	—	—	1	—	1
<i>Campylobacter</i>	—	—	1	—	—	2	—	1	—	—	1	—	5
<i>Clostridium botulinum</i>	—	—	—	—	1	1	—	—	—	—	—	—	2
<i>Clostridium perfringens</i>	—	1	—	2	1	—	1	—	—	—	3	2	10
<i>Escherichia coli</i>	—	—	—	—	3	3	—	—	2	3	—	—	11
<i>Salmonella</i>	3	4	4	2	5	12	12	10	4	4	4	5	69
<i>Shigella</i>	1	—	—	—	2	—	1	2	—	—	—	—	6
<i>Staphylococcus aureus</i>	—	2	—	—	—	—	—	1	1	2	1	—	7
Total bacterial	4	7	6	4	12	18	14	14	7	9	10	7	112
Chemical													
Ciguatoxin	—	3	—	1	1	—	1	1	1	1	—	—	9
Mushroom poisoning	—	1	—	—	—	—	—	—	—	—	—	2	3
Scombotoxin	1	1	—	1	—	1	1	3	1	2	—	1	12
Shellfish	—	—	—	—	—	—	—	1	—	—	—	—	1
Other chemical	—	—	—	1	—	—	—	—	—	—	—	—	1
Total chemical	1	5	—	3	1	1	2	5	2	3	—	3	26
Parasitic													
<i>Giardia lamblia</i>	—	—	—	—	—	—	—	—	1	—	—	—	1
Other parasitic	—	—	—	—	1	—	—	—	1	—	—	—	2
Total parasitic	—	—	—	—	1	—	—	—	2	—	—	—	3
Viral													
Hepatitis A	2	—	—	—	—	—	—	—	—	—	3	—	5
Norwalk	—	1	2	—	—	—	—	—	—	—	—	—	3
Other viral	—	—	—	—	1	—	—	—	—	—	—	1	2
Total viral	2	1	2	—	1	—	—	—	—	—	3	1	10
Confirmed etiology	7	13	8	7	15	19	16	19	11	12	13	11	151
Unknown etiology	27	21	27	33	36	37	27	29	24	14	30	21	326
Total 1996	34	34	35	40	51	56	43	48	35	26	43	32	477

*Includes Guam, Puerto Rico, and the U.S. Virgin Islands.

TABLE 11. Number of reported foodborne-disease outbreaks, by etiology and month of occurrence — United States,* 1997

Etiology	Month of occurrence												Total
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Bacterial													
<i>Bacillus cereus</i>	—	—	1	—	—	—	—	—	1	—	—	2	4
<i>Campylobacter</i>	—	—	1	—	—	—	—	1	—	—	—	—	2
<i>Clostridium botulinum</i>	—	1	—	—	—	—	—	—	—	—	—	—	1
<i>Clostridium perfringens</i>	1	—	1	3	—	1	—	—	—	—	—	—	6
<i>Escherichia coli</i>	—	—	1	2	—	4	—	—	—	—	—	1	8
<i>Salmonella</i>	5	5	3	2	5	6	5	10	6	2	11	—	60
<i>Shigella</i>	—	—	—	1	—	—	1	3	2	—	2	1	10
<i>Staphylococcus aureus</i>	—	—	—	—	1	—	—	3	2	—	2	1	9
<i>Streptococcus, group A</i>	—	—	—	—	—	—	—	—	—	1	—	—	1
<i>Vibrio parahaemolyticus</i>	—	—	—	—	—	—	1	1	2	—	—	—	4
Total bacterial	6	6	7	8	6	11	7	18	13	3	15	5	105
Chemical													
Ciguatoxin	2	1	—	—	2	1	1	1	6	—	3	—	17
Mushroom poisoning	1	—	—	—	—	—	—	1	—	—	1	—	3
Scombrototoxin	—	—	1	—	3	3	—	1	3	2	—	2	15
Total chemical	3	1	1	—	5	4	1	3	9	2	4	2	35
Parasitic													
<i>Giardia lamblia</i>	—	—	1	—	—	—	—	—	—	—	—	—	1
Other parasitic	—	—	1	2	4	—	1	—	—	1	—	1	10
Total parasitic	—	—	2	2	4	—	1	—	—	1	—	1	11
Viral													
Hepatitis A	—	—	1	—	—	1	1	—	—	—	—	—	3
Other viral	3	1	2	1	—	1	2	—	—	1	2	1	14
Total viral	3	1	3	1	—	2	3	—	—	1	2	1	17
Confirmed etiology	12	8	13	11	15	17	12	21	22	7	21	9	168
Unknown etiology	29	23	37	38	33	32	16	30	14	31	26	27	336
Total 1997	41	31	50	49	48	49	28	51	36	38	47	36	504

* Includes Guam, Puerto Rico, and the U.S. Virgin Islands.

TABLE 12. Number of reported foodborne-disease outbreaks, by etiology and place where food was eaten — United States,* 1993

Etiology	Place where food was eaten							Known place	Unknown place	Total
	Private residence	Delicatessen, cafeteria, or restaurant	School	Picnic	Church	Camp	Other			
Bacterial										
<i>Bacillus cereus</i>	—	1	—	—	—	—	3	4	—	4
<i>Campylobacter</i>	—	4	—	—	—	—	2	6	—	6
<i>Clostridium botulinum</i>	4	—	—	—	—	—	—	4	1	5
<i>Clostridium perfringens</i>	2	6	—	1	1	—	5	15	—	15
<i>Escherichia coli</i>	1	4	—	1	1	—	8	15	—	15
<i>Salmonella</i>	9	26	2	—	4	2	24	67	1	68
<i>Shigella</i>	2	4	—	—	—	—	3	9	—	9
<i>Staphylococcus aureus</i>	—	1	2	—	—	—	4	7	—	7
<i>Streptococcus, other</i>	1	—	—	—	—	—	—	1	—	1
<i>Vibrio parahaemolyticus</i>	—	—	—	—	—	—	—	—	1	1
Other bacterial	1	2	—	—	—	—	1	4	—	4
Total bacterial	20	48	4	2	6	2	50	132	3	135
Chemical										
Ciguatoxin	11	1	—	—	—	—	—	12	1	13
Heavy metals	—	—	—	—	—	—	1	1	—	1
Mushroom poisoning	1	—	—	—	—	—	—	1	—	1
Scombrototoxin	1	4	—	—	—	—	—	5	—	5
Other chemical	—	1	—	—	—	—	—	1	—	1
Total chemical	13	6	—	—	—	—	1	20	1	21
Parasitic										
<i>Trichinella spiralis</i>	—	—	—	—	—	—	1	1	—	1
Other parasitic	1	—	—	—	—	—	—	1	—	1
Total parasitic	1	—	—	—	—	—	1	2	—	2
Viral										
Hepatitis A	—	2	—	1	—	—	2	5	—	5
Norwalk	—	—	—	—	—	—	1	1	—	1
Other viral	—	—	1	—	—	—	3	4	—	4
Total viral	—	2	1	1	—	—	6	10	—	10
Confirmed etiology	34	56	5	3	6	2	58	164	4	168
Unknown etiology	53	168	9	7	8	3	68	316	5	321
Total 1993	87	224	14	10	14	5	126	480	9	489

* Includes Guam, Puerto Rico, and the U.S. Virgin Islands.

TABLE 13. Number of reported foodborne-disease outbreaks, by etiology and place where food was eaten — United States,* 1994

Etiology	Place where food was eaten							Known place	Unknown place	Total
	Private residence	Delicatessen, cafeteria, or restaurant	School	Picnic	Church	Camp	Other			
Bacterial										
<i>Bacillus cereus</i>	—	1	—	—	—	—	2	3	—	3
<i>Campylobacter</i>	1	3	1	1	—	—	—	6	—	6
<i>Clostridium botulinum</i>	1	1	—	—	—	—	1	2	—	3
<i>Clostridium perfringens</i>	—	4	2	1	—	—	5	12	—	12
<i>Escherichia coli</i>	8	2	1	—	—	2	9	22	3	25
<i>Listeria monocytogenes</i>	—	—	—	—	—	—	2	2	1	3
<i>Salmonella</i>	8	26	2	—	4	2	26	68	2	70
<i>Shigella</i>	3	4	2	—	—	—	2	11	—	11
<i>Staphylococcus aureus</i>	2	3	1	—	—	—	7	13	—	13
<i>Vibrio cholera</i>	1	—	—	—	—	—	—	1	—	1
<i>Yersinia enterocolitica</i>	1	—	—	—	—	—	—	1	—	1
Total bacterial	25	44	9	2	4	4	54	141	6	148
Chemical										
Ciguatoxin	8	2	—	—	1	—	—	11	—	11
Heavy metals	1	—	—	—	—	—	1	2	—	2
Monosodium glutamate	—	1	—	—	—	—	—	1	—	1
Scombrototoxin	6	11	—	—	—	—	4	21	—	21
Other chemical	1	—	—	—	—	—	1	2	—	2
Total chemical	16	14	—	—	1	—	6	37	—	37
Parasitic										
<i>Giardia lamblia</i>	1	1	—	—	—	—	—	2	—	2
Viral										
Hepatitis A	—	2	—	—	—	—	4	6	—	6
Norwalk	1	—	—	—	—	—	—	1	—	1
Other viral	1	—	—	—	—	—	2	3	—	3
Total viral	2	2	—	—	—	—	6	10	—	10
Confirmed etiology	44	61	9	2	5	4	66	191	6	197
Unknown etiology	86	198	20	5	9	4	119	441	15	456
Total 1994	130	259	29	7	14	8	185	632	21	653

* Includes Guam, Puerto Rico, and the U.S. Virgin Islands.

TABLE 14. Number of reported foodborne-disease outbreaks, by etiology and place where food was eaten — United States,* 1995

Etiology	Place where food was eaten							Known place	Unknown place	Total
	Private residence	Delicatessen, cafeteria, or restaurant	School	Picnic	Church	Camp	Other			
Bacterial										
<i>Bacillus cereus</i>	1	1	—	—	—	—	—	2	—	2
<i>Campylobacter</i>	2	—	—	—	1	1	2	6	—	6
<i>Clostridium botulinum</i>	2	—	—	—	—	—	—	2	—	2
<i>Clostridium perfringens</i>	1	8	—	—	1	—	4	14	—	14
<i>Escherichia coli</i>	8	3	—	—	4	3	6	24	1	25
<i>Salmonella</i>	21	35	—	1	2	—	29	88	2	90
<i>Shigella</i>	—	4	—	—	1	—	2	7	—	7
<i>Staphylococcus aureus</i>	1	2	1	—	—	—	2	6	—	6
<i>Yersinia enterocolitica</i>	1	—	—	—	—	—	—	1	—	1
Other bacterial	—	—	—	—	—	—	2	2	—	2
Total bacterial	37	53	1	1	9	4	47	152	3	155
Chemical										
Ciguatoxin	10	—	—	—	—	—	—	10	—	10
Heavy metals	—	1	—	—	—	—	—	1	—	1
Scombrototoxin	5	9	—	—	—	—	2	16	—	16
Other chemical	—	1	—	—	—	—	1	2	—	2
Total chemical	15	11	—	—	—	—	3	29	—	29
Parasitic										
<i>Trichinella spiralis</i>	1	—	—	—	—	—	—	1	—	1
Viral										
Hepatitis A	1	2	—	—	—	—	1	4	—	4
Norwalk	—	—	—	—	—	—	3	3	1	4
Other viral	—	—	—	—	—	—	1	1	—	1
Total viral	1	2	—	—	—	—	5	8	1	9
Confirmed etiology	54	66	1	1	9	4	55	190	4	194
Unknown etiology	93	222	7	2	7	6	74	411	23	434
Total 1995	147	288	8	3	16	10	129	600	27	628

* Includes Guam, Puerto Rico, and the U.S. Virgin Islands.

TABLE 15. Number of reported foodborne-disease outbreaks, by etiology and place where food was eaten — United States,* 1996

Etiology	Place where food was eaten							Known place	Unknown place	Total
	Private residence	Delicatessen, cafeteria, or restaurant	School	Picnic	Church	Camp	Other			
Bacterial										
<i>Bacillus cereus</i>	—	—	1	—	—	—	—	1	—	1
<i>Brucella</i>	—	—	—	—	—	—	1	1	—	1
<i>Campylobacter</i>	—	2	1	—	1	—	1	5	—	5
<i>Clostridium botulinum</i>	2	—	—	—	—	—	—	2	—	2
<i>Clostridium perfringens</i>	—	3	3	—	—	—	4	10	—	10
<i>Escherichia coli</i>	3	3	—	1	—	—	2	9	2	11
<i>Salmonella</i>	11	26	4	4	3	—	17	65	4	69
<i>Shigella</i>	—	4	—	—	—	—	2	6	—	6
<i>Staphylococcus aureus</i>	2	1	3	—	—	—	1	7	—	7
Total bacterial	18	39	12	5	4	—	28	106	6	112
Chemical										
Ciguatoxin	8	—	—	—	—	1	—	9	—	9
Mushroom poisoning	2	—	—	—	—	—	1	3	—	3
Scombrototoxin	2	8	—	—	—	—	2	12	—	12
Shellfish	1	—	—	—	—	—	—	1	—	1
Other chemical	—	—	—	—	—	—	1	1	—	1
Total chemical	13	8	—	—	—	1	4	26	—	26
Parasitic										
<i>Giardia lamblia</i>	—	—	—	—	—	—	1	1	—	1
Other parasitic	—	—	—	—	—	—	1	1	1	2
Total parasitic	—	—	—	—	—	—	2	2	1	3
Viral										
Hepatitis A	1	1	—	—	—	—	2	4	1	5
Norwalk	—	1	—	—	—	—	2	3	—	3
Other viral	—	—	—	—	—	—	2	2	—	2
Total viral	1	2	—	—	—	—	6	9	1	10
Confirmed etiology	32	49	12	5	4	1	40	143	8	151
Unknown etiology	76	149	11	3	5	2	69	315	11	326
Total 1996	108	198	23	8	9	3	109	458	19	477

*Includes Guam, Puerto Rico, and the U.S. Virgin Islands.

TABLE 16. Number of reported foodborne-disease outbreaks, by etiology and place where food was eaten — United States,* 1997

Etiology	Place where food was eaten							Known place	Unknown place	Total
	Private residence	Delicatessen, cafeteria, or restaurant	School	Picnic	Church	Camp	Other			
Bacterial										
<i>Bacillus cereus</i>	2	—	—	—	1	—	1	4	—	4
<i>Campylobacter</i>	—	—	—	—	—	—	1	1	1	2
<i>Clostridium botulinum</i>	1	—	—	—	—	—	—	1	—	1
<i>Clostridium perfringens</i>	—	2	—	—	—	—	4	6	—	6
<i>Escherichia coli</i>	—	2	—	—	—	—	5	7	1	8
<i>Salmonella</i>	18	24	2	1	3	1	10	59	1	60
<i>Shigella</i>	3	5	—	—	—	—	2	10	—	10
<i>Staphylococcus aureus</i>	2	—	2	1	—	—	4	9	—	9
<i>Streptococcus</i> , group A	—	—	1	—	—	—	—	1	—	1
<i>Vibrio parahaemolyticus</i>	1	2	—	—	—	—	1	4	—	4
Total bacterial	27	35	5	2	4	1	28	102	3	105
Chemical										
Ciguatoxin	13	3	—	—	—	—	1	17	—	17
Mushroom poisoning	—	1	—	—	—	—	1	2	1	3
Scombrototoxin	5	8	—	—	—	—	2	15	—	15
Total chemical	18	12	—	—	—	—	4	34	1	35
Parasitic										
<i>Giardia lamblia</i>	—	1	—	—	—	—	—	1	—	1
Other parasitic	—	2	—	—	—	—	8	10	—	10
Total parasitic	—	3	—	—	—	—	8	11	—	11
Viral										
Hepatitis A	1	1	1	—	—	—	—	3	—	3
Other viral	3	4	—	—	2	—	5	14	—	14
Total viral	4	5	1	—	2	—	5	17	—	17
Confirmed etiology	49	55	6	2	6	1	45	164	4	168
Unknown etiology	64	161	11	4	4	3	70	317	19	336
Total 1997	113	216	17	6	10	4	115	481	23	504

* Includes Guam, Puerto Rico, and the U.S. Virgin Islands.

TABLE 17. Number of reported foodborne-disease outbreaks, cases, and deaths, by vehicle of transmission — United States,* 1993†

Vehicle of transmission	Outbreaks		Cases		Deaths	
	No.	(%)	No.	(%)	No.	(%)
Beef	16	(3.3)	1,368	(7.8)	4	(44.4)
Pork	3	(0.6)	95	(0.5)	0	(0.0)
Chicken	5	(1.0)	157	(0.9)	0	(0.0)
Turkey	1	(0.2)	10	(0.1)	0	(0.0)
Other/unknown meat	3	(0.6)	167	(1.0)	1	(11.1)
Shellfish	7	(1.4)	657	(3.8)	0	(0.0)
Other fish	24	(4.9)	187	(1.1)	0	(0.0)
Milk	2	(0.4)	28	(0.2)	0	(0.0)
Cheese	2	(0.4)	20	(0.1)	1	(11.1)
Eggs	4	(0.8)	71	(0.4)	0	(0.0)
Ice cream	3	(0.6)	32	(0.2)	0	(0.0)
Other/unknown dairy	2	(0.4)	41	(0.2)	0	(0.0)
Baked foods	4	(0.8)	182	(1.0)	0	(0.0)
Fruits and vegetables	12	(2.5)	4,213	(24.1)	0	(0.0)
Mushrooms	1	(0.2)	2	(0.0)	0	(0.0)
Potato salad	1	(0.2)	24	(0.1)	0	(0.0)
Poultry, fish, and egg salads	4	(0.8)	287	(1.6)	0	(0.0)
Other salad	18	(3.7)	1,060	(6.1)	0	(0.0)
Chinese food	4	(0.8)	52	(0.3)	0	(0.0)
Mexican food	7	(1.4)	192	(1.1)	0	(0.0)
Carbonated drink	2	(0.4)	31	(0.2)	0	(0.0)
Multiple vehicles	51	(10.4)	3,363	(19.2)	1	(11.1)
Known vehicle	176	(36.0)	12,239	(70.0)	7	(77.8)
Unknown vehicle	313	(64.0)	5,238	(30.0)	2	(22.2)
Total 1993	489	(100.0)	17,477	(100.0)	9	(100.0)

*Includes Guam, Puerto Rico, and the U.S. Virgin Islands.

†Totals might vary by <1% from summed components because of rounding.

TABLE 18. Number of reported foodborne-disease outbreaks, cases, and deaths, by vehicle of transmission — United States,* 1994†

Vehicle of transmission	Outbreaks		Cases		Deaths	
	No.	(%)	No.	(%)	No.	(%)
Beef	22	(3.4)	871	(5.4)	0	(0.0)
Ham	4	(0.6)	119	(0.7)	0	(0.0)
Pork	3	(0.5)	56	(0.3)	0	(0.0)
Chicken	4	(0.6)	165	(1.0)	0	(0.0)
Turkey	12	(1.8)	418	(2.6)	0	(0.0)
Other/unknown meat	6	(0.9)	175	(1.1)	1	(33.3)
Shellfish	12	(1.8)	220	(1.4)	0	(0.0)
Other fish	35	(5.4)	150	(0.9)	0	(0.0)
Milk	3	(0.5)	105	(0.6)	0	(0.0)
Cheese	1	(0.2)	5	(0.0)	0	(0.0)
Eggs	3	(0.5)	36	(0.2)	0	(0.0)
Ice cream	5	(0.8)	919	(5.7)	0	(0.0)
Baked foods	12	(1.8)	328	(2.0)	0	(0.0)
Fruits and vegetables	17	(2.6)	1,311	(8.1)	0	(0.0)
Potato salad	8	(1.2)	266	(1.6)	2	(66.7)
Other salad	19	(2.9)	1,093	(6.7)	0	(0.0)
Chinese food	2	(0.3)	42	(0.3)	0	(0.0)
Mexican food	6	(0.9)	309	(1.9)	0	(0.0)
Carbonated drink	1	(0.2)	11	(0.1)	0	(0.0)
Nondairy beverage	5	(0.8)	101	(0.6)	0	(0.0)
Multiple vehicles	74	(11.3)	3,224	(19.9)	0	(0.0)
Known vehicle	254	(38.9)	9,924	(61.1)	3	(100.0)
Unknown vehicle	399	(61.1)	6,310	(38.9)	0	(0.0)
Total 1994	653	(100.0)	16,234	(100.0)	3	(100.0)

*Includes Guam, Puerto Rico, and the U.S. Virgin Islands.

†Totals might vary by <1% from summed components because of rounding.

TABLE 19. Number of reported foodborne-disease outbreaks, cases, and deaths, by vehicle of transmission — United States,* 1995†

Vehicle of transmission	Outbreaks		Cases		Deaths	
	No.	(%)	No.	(%)	No.	(%)
Beef	14	(2.2)	437	(2.5)	0	(0.0)
Pork	4	(0.6)	322	(1.8)	1	(9.1)
Sausage	1	(0.2)	12	(0.1)	0	(0.0)
Chicken	6	(1.0)	220	(1.2)	0	(0.0)
Turkey	3	(0.5)	46	(0.3)	0	(0.0)
Other/unknown meat	7	(1.1)	107	(0.6)	0	(0.0)
Shellfish	12	(1.9)	428	(2.4)	0	(0.0)
Other fish	31	(4.9)	146	(0.8)	0	(0.0)
Milk	1	(0.2)	3	(0.0)	0	(0.0)
Cheese	1	(0.2)	9	(0.1)	0	(0.0)
Eggs	6	(1.0)	103	(0.6)	3	(27.3)
Ice cream	1	(0.2)	60	(0.3)	0	(0.0)
Baked foods	9	(1.4)	193	(1.1)	0	(0.0)
Fruits and vegetables	9	(1.4)	4,307	(24.2)	0	(0.0)
Potato salad	1	(0.2)	11	(0.1)	0	(0.0)
Poultry, fish, and egg salads	4	(0.6)	162	(0.9)	0	(0.0)
Other salad	21	(3.3)	662	(3.7)	0	(0.0)
Chinese food	3	(0.5)	53	(0.3)	0	(0.0)
Mexican food	7	(1.1)	216	(1.2)	0	(0.0)
Carbonated drink	1	(0.2)	3	(0.0)	0	(0.0)
Nondairy beverage	6	(1.0)	302	(1.7)	0	(0.0)
Multiple vehicles	60	(9.6)	3,642	(20.5)	0	(0.0)
Known vehicle	208	(33.1)	11,444	(64.3)	4	(36.4)
Unknown vehicle	420	(66.9)	6,356	(35.7)	7	(63.6)
Total 1995	628	(100.0)	17,800	(100.0)	11	(100.0)

*Includes Guam, Puerto Rico, and the U.S. Virgin Islands.

†Totals might vary by <1% from summed components because of rounding.

TABLE 20. Number of reported foodborne-disease outbreaks, cases, and deaths, by vehicle of transmission — United States,* 1996†

Vehicle of transmission	Outbreaks		Cases		Deaths	
	No.	(%)	No.	(%)	No.	(%)
Beef	7	(1.5)	227	(1.0)	0	(0.0)
Ham	4	(0.8)	89	(0.4)	0	(0.0)
Pork	2	(0.4)	115	(0.5)	0	(0.0)
Chicken	6	(1.3)	315	(1.4)	0	(0.0)
Turkey	3	(0.6)	187	(0.8)	0	(0.0)
Other/unknown meat	1	(0.2)	59	(0.3)	0	(0.0)
Shellfish	5	(1.0)	514	(2.3)	0	(0.0)
Other fish	24	(5.0)	105	(0.5)	0	(0.0)
Milk	2	(0.4)	48	(0.2)	0	(0.0)
Eggs	3	(0.6)	66	(0.3)	0	(0.0)
Ice cream	6	(1.3)	183	(0.8)	0	(0.0)
Other/unknown dairy	2	(0.4)	31	(0.1)	0	(0.0)
Baked foods	6	(1.3)	81	(0.4)	0	(0.0)
Fruits and vegetables	13	(2.7)	1,807	(8.0)	1	(25.0)
Mushrooms	3	(0.6)	10	(0.0)	0	(0.0)
Potato salad	1	(0.2)	12	(0.1)	0	(0.0)
Poultry, fish, and egg salads	7	(1.5)	789	(3.5)	0	(0.0)
Other salad	18	(3.8)	628	(2.8)	0	(0.0)
Mexican food	3	(0.6)	196	(0.9)	0	(0.0)
Nondairy beverage	6	(1.3)	140	(0.6)	0	(0.0)
Multiple vehicles	38	(8.0)	12,692	(56.1)	0	(0.0)
Known vehicle	160	(33.5)	18,294	(80.9)	1	(25.0)
Unknown vehicle	317	(66.5)	4,313	(19.1)	3	(75.0)
Total 1996	477	(100.0)	22,607	(100.0)	4	(100.0)

*Includes Guam, Puerto Rico, and the U.S. Virgin Islands.

†Totals might vary by <1% from summed components because of rounding.

TABLE 21. Number of reported foodborne-disease outbreaks, cases, and deaths, by vehicle of transmission — United States,* 1997†

Vehicle of transmission	Outbreaks		Cases		Deaths	
	No.	(%)	No.	(%)	No.	(%)
Beef	7	(1.4)	302	(2.5)	0	(0.0)
Ham	4	(0.8)	85	(0.7)	0	(0.0)
Pork	2	(0.4)	50	(0.4)	0	(0.0)
Sausage	1	(0.2)	45	(0.4)	0	(0.0)
Chicken	9	(1.8)	256	(2.1)	0	(0.0)
Turkey	3	(0.6)	97	(0.8)	0	(0.0)
Other/unknown meat	5	(1.0)	137	(1.1)	0	(0.0)
Shellfish	11	(2.2)	49	(0.4)	0	(0.0)
Other fish	26	(5.2)	108	(0.9)	0	(0.0)
Milk	2	(0.4)	23	(0.2)	0	(0.0)
Eggs	3	(0.6)	91	(0.8)	0	(0.0)
Baked foods	4	(0.8)	69	(0.6)	0	(0.0)
Fruits and vegetables	15	(3.0)	719	(6.0)	1	(50.0)
Potato salad	3	(0.6)	242	(2.0)	0	(0.0)
Poultry, fish, and egg salads	1	(0.2)	143	(1.2)	0	(0.0)
Other salad	21	(4.2)	1,104	(9.2)	0	(0.0)
Chinese food	1	(0.2)	16	(0.1)	0	(0.0)
Mexican food	9	(1.8)	701	(5.9)	0	(0.0)
Nondairy beverage	3	(0.6)	63	(0.5)	0	(0.0)
Multiple vehicles	39	(7.7)	2,707	(22.7)	0	(0.0)
Known vehicle	169	(33.5)	7,007	(58.7)	1	(50.0)
Unknown vehicle	335	(66.5)	4,933	(41.3)	1	(50.0)
Total 1997	504	(100.0)	11,940	(100.0)	2	(100.0)

*Includes Guam, Puerto Rico, and the U.S. Virgin Islands.

†Totals might vary by <1% from summed components because of rounding.

TABLE 22. Number of reported foodborne-disease outbreaks, by etiology and vehicle of transmission — United States,* 1993

Etiology	Vehicle of transmission						
	Beef	Pork	Chicken	Turkey	Other/ unknown meat	Shellfish	Other fish
Bacterial							
<i>Bacillus cereus</i>	—	—	—	—	—	—	—
<i>Campylobacter</i>	—	—	—	—	—	—	—
<i>Clostridium botulinum</i>	—	—	—	—	—	—	1
<i>Clostridium perfringens</i>	5	—	—	—	—	—	—
<i>Escherichia coli</i>	5	—	—	—	—	—	—
<i>Salmonella</i>	—	1	1	—	—	1	—
<i>Shigella</i>	—	—	—	—	—	1	—
<i>Staphylococcus aureus</i>	1	—	—	—	—	—	—
<i>Streptococcus</i> , other	—	—	—	—	—	—	—
<i>Vibrio parahaemolyticus</i>	—	—	—	—	—	—	—
Other bacterial	2	—	—	—	1	—	—
Total bacterial	13	1	1	—	1	2	1
Chemical							
Ciguatoxin	—	—	—	—	—	—	13
Heavy metals	—	—	—	—	—	—	—
Mushroom poisoning	—	—	—	—	—	—	—
Scombrototoxin	—	—	—	—	—	—	5
Other chemical	—	—	—	—	—	—	—
Total chemical	—	—	—	—	—	—	18
Parasitic							
<i>Trichinella spiralis</i>	—	—	—	—	—	—	—
Other parasitic	—	—	—	—	—	—	—
Total parasitic	—	—	—	—	—	—	—
Viral							
Hepatitis A	—	—	—	—	—	—	—
Norwalk	—	—	—	—	—	1	—
Other viral	—	—	—	—	—	2	1
Total viral	—	—	—	—	—	3	1
Confirmed etiology	13	1	1	—	1	5	20
Unknown etiology	3	2	4	1	2	2	4
Total 1993	16	3	5	1	3	7	24

* Includes Guam, Puerto Rico, and the U.S. Virgin Islands.

TABLE 22. (Continued) Number of reported foodborne-disease outbreaks, by etiology and vehicle of transmission — United States,* 1993

Etiology	Vehicle of transmission										
	Milk	Cheese	Eggs	Ice cream	Other/ unknown dairy	Baked foods	Fruits and vegetables	Mushrooms	Potato salad	Poultry, fish, and egg salads	Other salad
Bacterial											
<i>Bacillus cereus</i>	—	—	—	—	—	—	—	—	—	1	—
<i>Campylobacter</i>	—	—	—	—	—	—	1	—	—	—	—
<i>Clostridium botulinum</i>	—	1	—	—	—	—	1	—	—	—	—
<i>Clostridium perfringens</i>	—	—	—	—	—	—	—	—	—	—	—
<i>Escherichia coli</i>	—	—	—	—	—	—	—	—	—	—	5
<i>Salmonella</i>	1	—	3	3	—	2	4	—	—	2	3
<i>Shigella</i>	—	—	—	—	1	—	—	—	—	—	1
<i>Staphylococcus aureus</i>	—	—	—	—	—	—	—	—	1	—	1
<i>Streptococcus</i> , other	—	—	—	—	—	—	—	—	—	—	—
<i>Vibrio parahaemolyticus</i>	—	—	—	—	—	—	—	—	—	—	—
Other bacterial	—	—	—	—	—	—	—	—	—	—	—
Total bacterial	1	1	3	3	1	2	6		1	3	10
Chemical											
Ciguatoxin	—	—	—	—	—	—	—	—	—	—	—
Heavy metals	—	—	—	—	—	—	—	—	—	—	—
Mushroom poisoning	—	—	—	—	—	—	—	1	—	—	—
Scombrototoxin	—	—	—	—	—	—	—	—	—	—	—
Other chemical	—	—	—	—	—	—	—	—	—	—	—
Total chemical	—	—	—	—	—	—	—	1	—	—	—
Parasitic											
<i>Trichinella spiralis</i>	—	—	—	—	—	—	—	—	—	—	—
Other parasitic	—	—	—	—	—	—	—	—	—	—	—
Total parasitic	—	—	—	—	—	—	—	—	—	—	—
Viral											
Hepatitis A	—	—	—	—	—	—	1	—	—	—	—
Norwalk	—	—	—	—	—	—	—	—	—	—	—
Other viral	—	—	—	—	—	—	—	—	—	—	—
Total viral	—	—	—	—	—	—	1	—	—	—	—
Confirmed etiology	1	1	3	3	1	2	7	1	1	3	10
Unknown etiology	1	1	1	—	1	2	5	—	—	1	8
Total 1993	2	2	4	3	2	4	12	1	1	4	18

* Includes Guam, Puerto Rico, and the U.S. Virgin Islands.

TABLE 22. (Continued) Number of reported foodborne-disease outbreaks, by etiology and vehicle of transmission — United States,* 1993

Etiology	Vehicle of transmission				Known vehicle	Unknown vehicle	Total
	Chinese food	Mexican food	Carbonated drink	Multiple vehicles			
Bacterial							
<i>Bacillus cereus</i>	2	1	—	—	4	—	4
<i>Campylobacter</i>	—	—	—	1	2	4	6
<i>Clostridium botulinum</i>	—	—	—	1	4	1	5
<i>Clostridium perfringens</i>	—	3	—	2	10	5	15
<i>Escherichia coli</i>	—	—	—	—	10	5	15
<i>Salmonella</i>	1	—	—	17	39	29	68
<i>Shigella</i>	—	1	—	—	4	5	9
<i>Staphylococcus aureus</i>	—	—	—	4	7	—	7
<i>Streptococcus</i> , other	—	—	—	—	—	1	1
<i>Vibrio parahaemolyticus</i>	—	—	—	—	—	1	1
Other bacterial	—	—	—	—	3	1	4
Total bacterial	3	5	—	25	83	52	135
Chemical							
Ciguatoxin	—	—	—	—	13	—	13
Heavy metals	—	—	—	1	1	—	1
Mushroom poisoning	—	—	—	—	1	—	1
Scombrototoxin	—	—	—	—	5	—	5
Other chemical	—	—	1	—	1	—	1
Total chemical	—	—	1	1	21	—	21
Parasitic							
<i>Trichinella spiralis</i>	—	—	—	—	—	1	1
Other parasitic	—	—	—	—	—	1	1
Total parasitic	—	—	—	—	—	2	2
Viral							
Hepatitis A	—	—	—	—	1	4	5
Norwalk	—	—	—	—	1	—	1
Other viral	—	—	—	1	4	—	4
Total viral	—	—	—	1	6	4	10
Confirmed etiology	3	5	1	27	110	58	168
Unknown etiology	1	2	1	24	66	255	321
Total 1993	4	7	2	51	176	313	489

*Includes Guam, Puerto Rico, and the U.S. Virgin Islands.

TABLE 23. Number of reported foodborne-disease outbreaks, by etiology and vehicle of transmission — United States,* 1994

Etiology	Vehicle of transmission							
	Beef	Ham	Pork	Chicken	Turkey	Other/ unknown meat	Shellfish	Other fish
Bacterial								
<i>Bacillus cereus</i>	—	—	—	—	—	—	—	—
<i>Campylobacter</i>	—	—	—	—	—	—	—	—
<i>Clostridium botulinum</i>	—	—	—	—	—	1	—	—
<i>Clostridium perfringens</i>	1	—	—	—	1	1	—	—
<i>Escherichia coli</i>	7	—	—	—	—	1	—	—
<i>Listeria monocytogenes</i>	—	—	—	—	—	—	—	—
<i>Salmonella</i>	7	—	1	—	4	2	—	—
<i>Shigella</i>	—	—	—	—	—	—	—	—
<i>Staphylococcus aureus</i>	—	4	—	—	2	—	—	—
<i>Vibrio cholera</i>	—	—	—	—	—	—	—	—
<i>Yersinia enterocoliticus</i>	—	—	1	—	—	—	—	—
Total bacterial	15	4	2	—	7	5	—	—
Chemical								
Ciguatoxin	—	—	—	—	—	—	—	11
Heavy metals	—	—	—	—	—	—	—	—
Monosodium glutamate	—	—	—	—	—	—	—	—
Scombrotxin	—	—	—	—	—	—	—	21
Other chemical	—	—	—	—	—	—	—	—
Total chemical	—	—	—	—	—	—	—	32
Parasitic								
<i>Giardia lamblia</i>	—	—	—	—	—	—	—	—
Viral								
Hepatitis A	—	—	—	—	—	—	—	—
Norwalk	—	—	—	—	—	—	1	—
Other viral	—	—	—	—	—	—	2	—
Total viral	—	—	—	—	—	—	3	—
Confirmed etiology	15	4	2	—	7	5	3	32
Unknown etiology	7	—	1	4	5	1	9	3
Total 1994	22	4	3	4	12	6	12	35

*Includes Guam, Puerto Rico, and the U.S. Virgin Islands.

TABLE 23. (Continued) Number of reported foodborne-disease outbreaks, by etiology and vehicle of transmission — United States,* 1994

Etiology	Vehicle of transmission							
	Milk	Cheese	Eggs	Ice cream	Baked foods	Fruits and vegetables	Potato salad	Other salad
<i>Bacillus cereus</i>	—	—	—	—	—	—	—	—
<i>Campylobacter</i>	—	—	—	—	—	1	—	—
<i>Clostridium botulinum</i>	—	—	—	—	—	1	—	—
<i>Clostridium perfringens</i>	—	—	—	—	—	—	—	—
<i>Escherichia coli</i>	2	—	—	—	—	1	1	1
<i>Listeria monocytogenes</i>	1	—	—	—	—	—	2	—
<i>Salmonella</i>	—	1	2	3	5	2	—	—
<i>Shigella</i>	—	—	—	—	1	2	—	1
<i>Staphylococcus aureus</i>	—	—	—	—	1	—	—	—
<i>Vibrio cholera</i>	—	—	—	—	—	—	—	—
<i>Yersinia enterocolitica</i>	—	—	—	—	—	—	—	—
Total bacterial	3	1	2	3	7	7	3	2
Chemical								
Ciguatoxin	—	—	—	—	—	—	—	—
Heavy metals	—	—	—	1	—	—	—	—
Monosodium glutamate	—	—	—	—	—	—	—	—
Scombrototoxin	—	—	—	—	—	—	—	—
Other chemical	—	—	—	—	—	—	—	—
Total chemical	—	—	—	1	—	—	—	—
Parasitic								
<i>Giardia lamblia</i>	—	—	—	—	—	—	—	—
Viral								
Hepatitis A	—	—	—	—	1	—	—	1
Norwalk	—	—	—	—	—	—	—	—
Other viral	—	—	—	—	—	1	—	—
Total viral	—	—	—	—	1	1	—	1
Confirmed etiology	3	1	2	4	8	8	3	3
Unknown etiology	—	—	1	1	4	9	5	16
Total 1994	3	1	3	5	12	17	8	19

*Includes Guam, Puerto Rico, and the U.S. Virgin Islands.

TABLE 23. (Continued) Number of reported foodborne-disease outbreaks, by etiology and vehicle of transmission — United States,* 1994

Etiology	Vehicle of transmission				Multiple vehicles	Known vehicle	Unknown vehicle	Total
	Chinese food	Mexican food	Carbonated drink	Nondairy beverage				
Bacterial								
<i>Bacillus cereus</i>	1	—	—	1	—	2	1	3
<i>Campylobacter</i>	—	—	—	—	—	1	5	6
<i>Clostridium botulinum</i>	—	—	—	—	1	3	—	3
<i>Clostridium perfringens</i>	—	1	—	—	5	9	3	12
<i>Escherichia coli</i>	—	—	—	—	1	14	11	25
<i>Listeria monocytogenes</i>	—	—	—	—	—	3	—	3
<i>Salmonella</i>	—	—	—	—	13	40	30	70
<i>Shigella</i>	—	—	—	—	2	6	5	11
<i>Staphylococcus aureus</i>	—	2	—	—	3	12	1	13
<i>Vibrio cholera</i>	—	—	—	—	—	—	1	1
<i>Yersinia enterocolitica</i>	—	—	—	—	—	1	—	1
Total bacterial	1	3	—	1	25	91	57	148
Chemical								
Ciguatoxin	—	—	—	—	—	11	—	11
Heavy metals	—	—	—	1	—	2	—	2
Monosodium glutamate	—	—	—	—	—	—	1	1
Scombrototoxin	—	—	—	—	—	21	—	21
Other chemical	—	—	—	2	—	2	—	2
Total chemical	—	—	—	3	—	36	1	37
Parasitic								
<i>Giardia lamblia</i>	—	—	—	—	—	—	2	2
Viral								
Hepatitis A	—	—	—	—	—	2	4	6
Norwalk	—	—	—	—	—	1	—	1
Other viral	—	—	—	—	—	3	—	3
Total viral	—	—	—	—	—	6	4	10
Confirmed etiology	1	3	—	4	25	133	64	197
Unknown etiology	1	3	1	1	49	121	335	456
Total 1994	2	6	1	5	74	254	399	653

*Includes Guam, Puerto Rico, and the U.S. Virgin Islands.

TABLE 24. Number of reported foodborne-disease outbreaks, by etiology and vehicle of transmission — United States,* 1995

Etiology	Vehicle of transmission							Other fish
	Beef	Pork	Sausage	Chicken	Turkey	Other/ unknown meat	Shellfish	
Bacterial								
<i>Bacillus cereus</i>	—	—	—	—	—	—	—	—
<i>Campylobacter</i>	—	1	—	—	—	—	—	—
<i>Clostridium botulinum</i>	—	—	—	—	—	1	—	—
<i>Clostridium perfringens</i>	2	1	—	—	—	1	1	—
<i>Escherichia coli</i>	8	—	—	—	—	1	—	—
<i>Salmonella</i>	4	1	—	2	—	2	—	—
<i>Shigella</i>	—	—	—	1	—	—	—	—
<i>Staphylococcus aureus</i>	—	—	—	—	2	—	—	—
<i>Yersinia enterocolitica</i>	—	1	—	—	—	—	—	—
Other bacterial	—	—	—	—	—	—	—	—
Total bacterial	14	4	—	3	2	5	1	—
Chemical								
Ciguatoxin	—	—	—	—	—	—	—	10
Heavy metals	—	—	—	—	—	—	—	—
Scombrototoxin	—	—	—	—	—	—	—	16
Other chemical	—	—	—	—	—	—	—	—
Total chemical	—	—	—	—	—	—	—	26
Parasitic								
<i>Trichinella spiralis</i>	—	—	—	—	—	1	—	—
Viral								
Hepatitis A	—	—	—	—	—	—	—	—
Norwalk	—	—	—	—	—	—	1	—
Other viral	—	—	—	—	—	—	—	—
Total viral	—	—	—	—	—	—	1	—
Confirmed etiology	14	4	—	3	2	6	2	26
Unknown etiology	—	—	1	3	1	1	10	5
Total 1995	14	4	1	6	3	7	12	31

* Includes Guam, Puerto Rico, and the U.S. Virgin Islands.

TABLE 24. (Continued) Number of reported foodborne-disease outbreaks, by etiology and vehicle of transmission — United States,* 1995

Etiology	Vehicle of transmission								
	Milk	Cheese	Eggs	Ice cream	Baked foods	Fruits and vegetables	Potato salad	Poultry, fish, and egg salads	Other salad
Bacterial									
<i>Bacillus cereus</i>	—	—	—	—	—	—	—	—	—
<i>Campylobacter</i>	—	—	—	—	—	—	—	1	—
<i>Clostridium botulinum</i>	—	—	—	—	—	1	—	—	—
<i>Clostridium perfringens</i>	—	1	—	—	—	—	—	—	—
<i>Escherichia coli</i>	—	—	—	—	—	2	—	—	2
<i>Salmonella</i>	1	—	6	—	2	3	1	—	5
<i>Shigella</i>	—	—	—	—	—	—	—	—	1
<i>Staphylococcus aureus</i>	—	—	—	—	1	1	—	—	—
<i>Yersinia enterocolitica</i>	—	—	—	—	—	—	—	—	—
Other bacterial	—	—	—	—	—	—	—	—	—
Total bacterial	1	1	6	—	3	7	1	1	8
Chemical									
Ciguatoxin	—	—	—	—	—	—	—	—	—
Heavy metals	—	—	—	—	—	—	—	—	—
Scombrototoxin	—	—	—	—	—	—	—	—	—
Other chemical	—	—	—	—	—	—	—	—	—
Total chemical	—	—	—	—	—	—	—	—	—
Parasitic									
<i>Trichinella spiralis</i>	—	—	—	—	—	—	—	—	—
Viral									
Hepatitis A	—	—	—	—	—	—	—	—	—
Norwalk	—	—	—	—	1	1	—	—	—
Other viral	—	—	—	—	—	—	—	—	—
Total viral	—	—	—	—	1	1	—	—	—
Confirmed etiology	1	1	6	—	4	8	1	1	8
Unknown etiology	—	—	—	1	5	1	—	3	13
Total 1995	1	1	6	1	9	9	1	4	21

* Includes Guam, Puerto Rico, and the U.S. Virgin Islands.

TABLE 24. (Continued) Number of reported foodborne-disease outbreaks, by etiology and vehicle of transmission — United States,* 1995

Etiology	Vehicle of transmission				Multiple vehicles	Known vehicle	Unknown vehicle	Total
	Chinese food	Mexican food	Carbonated drink	Nondairy beverage				
Bacterial								
<i>Bacillus cereus</i>	1	—	—	—	—	1	1	2
<i>Campylobacter</i>	—	—	—	—	2	4	2	6
<i>Clostridium botulinum</i>	—	—	—	—	—	2	—	2
<i>Clostridium perfringens</i>	—	1	—	—	4	11	3	14
<i>Escherichia coli</i>	—	—	—	1	1	15	10	25
<i>Salmonella</i>	—	1	—	2	14	44	46	90
<i>Shigella</i>	—	1	—	—	1	4	3	7
<i>Staphylococcus aureus</i>	—	—	—	—	1	5	1	6
<i>Yersinia enterocolitica</i>	—	—	—	—	—	1	—	1
Other bacterial	—	—	—	—	2	2	—	2
Total bacterial	1	3	—	3	25	89	66	155
Chemical								
Ciguatoxin	—	—	—	—	—	10	—	10
Heavy metals	—	—	1	—	—	1	—	1
Scombrototoxin	—	—	—	—	—	16	—	16
Other chemical	—	—	—	1	1	2	—	2
Total chemical	—	—	1	1	1	29	—	29
Parasitic								
<i>Trichinella spiralis</i>	—	—	—	—	—	1	—	1
Viral								
Hepatitis A	—	—	—	—	—	—	4	4
Norwalk	—	—	—	—	1	4	—	4
Other viral	—	—	—	—	—	—	1	1
Total viral	—	—	—	—	1	4	5	9
Confirmed etiology	1	3	1	4	27	123	71	194
Unknown etiology	2	4	—	2	33	85	349	434
Total 1995	3	7	1	6	60	208	420	628

* Includes Guam, Puerto Rico, and the U.S. Virgin Islands.

TABLE 25. Number of reported foodborne-disease outbreaks, by etiology and vehicle of transmission — United States,* 1996

Etiology	Vehicle of transmission							
	Beef	Ham	Pork	Chicken	Turkey	Other/ unknown meat	Shellfish	Other fish
Bacterial								
<i>Bacillus cereus</i>	—	—	—	—	—	—	—	—
<i>Brucella</i>	—	—	—	—	—	—	—	—
<i>Campylobacter</i>	—	—	—	—	—	—	—	—
<i>Clostridium botulinum</i>	—	—	—	—	—	—	—	—
<i>Clostridium perfringens</i>	2	—	—	—	1	—	—	—
<i>Escherichia coli</i>	—	—	—	—	—	—	—	—
<i>Salmonella</i>	1	1	1	1	1	—	—	—
<i>Shigella</i>	—	—	—	—	—	—	1	—
<i>Staphylococcus aureus</i>	3	—	1	—	—	—	—	—
Total bacterial	6	1	2	1	2	—	1	—
Chemical								
Ciguatoxin	—	—	—	—	—	—	—	9
Mushroom poisoning	—	—	—	—	—	—	—	—
Scombrototoxin	—	—	—	—	—	—	—	12
Shellfish	—	—	—	—	—	—	1	—
Other chemical	—	—	—	—	—	—	—	1
Total chemical	—	—	—	—	—	—	1	22
Parasitic								
<i>Giardia lamblia</i>	—	—	—	—	—	—	—	—
Other parasitic	—	—	—	—	—	—	—	—
Total parasitic	—	—	—	—	—	—	—	—
Viral								
Hepatitis A	—	—	—	—	—	—	—	—
Norwalk	—	—	—	—	—	—	1	—
Other viral	—	—	—	—	—	—	1	—
Total viral	—	—	—	—	—	—	2	—
Confirmed etiology	6	1	2	1	2	—	4	22
Unknown etiology	1	3	—	5	1	1	1	2
Total 1996	7	4	2	6	3	1	5	24

* Includes Guam, Puerto Rico, and the U.S. Virgin Islands.

TABLE 25. (Continued) Number of reported foodborne-disease outbreaks, by etiology and vehicle of transmission — United States,* 1996

Etiology	Vehicle of transmission									
	Milk	Eggs	Ice cream	Other/ unknown dairy	Baked foods	Fruits and vegetables	Mushrooms	Potato salad	Poultry, fish, and egg salads	Other salad
Bacterial										
<i>Bacillus cereus</i>	—	—	—	—	—	—	—	—	—	—
<i>Brucella</i>	—	—	—	—	—	—	—	—	—	—
<i>Campylobacter</i>	1	—	—	—	—	1	—	—	—	—
<i>Clostridium botulinum</i>	—	—	—	—	—	2	—	—	—	—
<i>Clostridium perfringens</i>	—	—	—	—	—	—	—	—	1	—
<i>Escherichia coli</i>	—	—	—	—	—	2	—	—	—	1
<i>Salmonella</i>	1	3	5	1	2	2	—	—	3	2
<i>Shigella</i>	—	—	—	—	—	—	—	—	—	—
<i>Staphylococcus aureus</i>	—	—	—	—	1	—	—	—	—	—
Total bacterial	2	3	5	1	3	7	—	—	4	3
Chemical										
Ciguatoxin	—	—	—	—	—	—	—	—	—	—
Mushroom poisoning	—	—	—	—	—	—	3	—	—	—
Scombrototoxin	—	—	—	—	—	—	—	—	—	—
Shellfish	—	—	—	—	—	—	—	—	—	—
Other chemical	—	—	—	—	—	—	—	—	—	—
Total chemical	—	—	—	—	—	—	3	—	—	—
Parasitic										
<i>Giardia lamblia</i>	—	—	1	—	—	—	—	—	—	—
Other parasitic	—	—	—	—	—	1	—	—	—	—
Total parasitic	—	—	1	—	—	1	—	—	—	—
Viral										
Hepatitis A	—	—	—	—	—	—	—	—	—	—
Norwalk	—	—	—	—	—	—	—	—	—	—
Other viral	—	—	—	—	—	—	—	—	—	—
Total viral	—	—	—	—	—	—	—	—	—	—
Confirmed etiology	2	3	6	1	3	8	3	—	4	3
Unknown etiology	—	—	—	1	3	5	—	1	3	15
Total 1996	2	3	6	2	6	13	3	1	7	18

* Includes Guam, Puerto Rico, and the U.S. Virgin Islands.

TABLE 25. (Continued) Number of reported foodborne-disease outbreaks, by etiology and vehicle of transmission — United States,* 1996

Etiology	Vehicle of transmission		Multiple vehicles	Known vehicle	Unknown vehicle	Total
	Mexican food	Nondairy beverage				
Bacterial						
<i>Bacillus cereus</i>	—	—	1	1	—	1
<i>Brucella</i>	—	—	—	—	1	1
<i>Campylobacter</i>	—	—	—	2	3	5
<i>Clostridium botulinum</i>	—	—	—	2	—	2
<i>Clostridium perfringens</i>	—	—	5	9	1	10
<i>Escherichia coli</i>	—	4	—	7	4	11
<i>Salmonella</i>	2	—	10	36	33	69
<i>Shigella</i>	—	—	1	2	4	6
<i>Staphylococcus aureus</i>	—	—	1	6	1	7
Total bacterial	2	4	18	65	47	112
Chemical						
Ciguatoxin	—	—	—	9	—	9
Mushroom poisoning	—	—	—	3	—	3
Scombrototoxin	—	—	—	12	—	12
Shellfish	—	—	—	1	—	1
Other chemical	—	—	—	1	—	1
Total chemical	—	—	—	26	—	26
Parasitic						
<i>Giardia lamblia</i>	—	—	—	1	—	1
Other parasitic	—	1	—	2	—	2
Total parasitic	—	1	—	3	—	3
Viral						
Hepatitis A	1	—	—	1	4	5
Norwalk	—	—	—	1	2	3
Other viral	—	—	—	1	1	2
Total viral	1	—	—	3	7	10
Confirmed etiology	3	5	18	97	54	151
Unknown etiology	—	1	20	63	263	326
Total 1996	3	6	38	160	317	477

* Includes Guam, Puerto Rico, and the U.S. Virgin Islands.

TABLE 26. Number of reported foodborne-disease outbreaks, by etiology and vehicle of transmission — United States,* 1997

Etiology	Vehicle of transmission								
	Beef	Ham	Pork	Sausage	Chicken	Turkey	Other/ unknown meat	Shellfish	Other fish
Bacterial									
<i>Bacillus cereus</i>	—	—	1	—	1	—	1	—	—
<i>Campylobacter</i>	—	—	—	—	—	—	—	—	—
<i>Clostridium botulinum</i>	—	—	—	—	—	—	—	—	—
<i>Clostridium perfringens</i>	1	—	—	—	—	—	—	—	—
<i>Escherichia coli</i>	1	—	—	—	—	—	—	—	—
<i>Salmonella</i>	2	—	—	—	2	1	2	—	—
<i>Shigella</i>	—	—	—	—	—	—	—	—	—
<i>Staphylococcus aureus</i>	—	3	—	—	1	—	—	—	1
<i>Streptococcus</i> , group A	—	—	—	—	—	—	—	—	—
<i>Vibrio parahaemolyticus</i>	—	—	—	—	—	—	—	1	—
Total bacterial	4	3	1	—	4	1	3	1	1
Chemical									
Ciguatoxin	—	—	—	—	—	—	—	2	11
Mushroom poisoning	—	—	—	—	—	—	—	—	—
Scombrototoxin	—	—	—	—	—	—	—	2	12
Total chemical	—	—	—	—	—	—	—	4	23
Parasitic									
<i>Giardia lamblia</i>	—	—	—	—	—	—	—	—	—
Other parasitic	—	—	—	—	—	—	—	—	—
Total parasitic	—	—	—	—	—	—	—	—	—
Viral									
Hepatitis A	—	—	—	—	—	—	—	—	—
Other viral	—	—	—	—	1	—	—	2	—
Total viral	—	—	—	—	1	—	—	2	—
Confirmed etiology	4	3	1	—	5	1	3	7	24
Unknown etiology	3	1	1	1	4	2	2	4	2
Total 1997	7	4	2	1	9	3	5	11	26

*Includes Guam, Puerto Rico, and the U.S. Virgin Islands.

TABLE 26. (Continued) Number of reported foodborne-disease outbreaks, by etiology and vehicle of transmission — United States,* 1997

Etiology	Vehicle of transmission						
	Milk	Eggs	Baked foods	Fruits and vegetables	Potato salad	Poultry, fish, and egg salads	Other salad
Bacterial							
<i>Bacillus cereus</i>	—	—	—	—	—	—	—
<i>Campylobacter</i>	—	—	—	1	—	—	—
<i>Clostridium botulinum</i>	—	—	—	1	—	—	—
<i>Clostridium perfringens</i>	—	—	—	—	—	—	1
<i>Escherichia coli</i>	—	—	—	2	—	—	2
<i>Salmonella</i>	—	3	1	2	—	—	3
<i>Shigella</i>	—	—	—	—	1	—	1
<i>Staphylococcus aureus</i>	—	—	—	—	—	—	1
<i>Streptococcus</i> , group A	—	—	—	—	—	—	—
<i>Vibrio parahaemolyticus</i>	—	—	—	—	—	—	—
Total bacterial	—	3	1	6	1	—	8
Chemical							
Ciguatoxin	—	—	—	—	—	—	—
Mushroom poisoning	—	—	—	—	—	—	—
Scombrototoxin	—	—	—	—	—	—	—
Total chemical	—	—	—	—	—	—	—
Parasitic							
<i>Giardia lamblia</i>	—	—	—	—	—	—	—
Other parasitic	—	—	—	3	—	—	—
Total parasitic	—	—	—	3	—	—	—
Viral							
Hepatitis A	—	—	—	1	—	—	—
Other viral	—	—	—	—	—	—	1
Total viral	—	—	—	1	—	—	1
Confirmed etiology	—	3	1	10	1	—	9
Unknown etiology	2	—	3	5	2	1	12
Total 1997	2	3	4	15	3	1	21

*Includes Guam, Puerto Rico, and the U.S. Virgin Islands.

TABLE 26. (Continued) Number of reported foodborne-disease outbreaks, by etiology and vehicle of transmission — United States,* 1997

Etiology	Vehicle of transmission			Multiple vehicles	Known vehicle	Unknown vehicle	Total
	Chinese food	Mexican food	Nondairy beverage				
Bacterial							
<i>Bacillus cereus</i>	—	—	—	1	4	—	4
<i>Campylobacter</i>	—	—	—	—	1	1	2
<i>Clostridium botulinum</i>	—	—	—	—	1	—	1
<i>Clostridium perfringens</i>	—	1	—	2	5	1	6
<i>Escherichia coli</i>	—	1	—	—	6	2	8
<i>Salmonella</i>	—	2	—	7	25	35	60
<i>Shigella</i>	—	—	—	—	2	8	10
<i>Staphylococcus aureus</i>	—	—	—	2	8	1	9
<i>Streptococcus</i> , group A	—	—	—	1	1	—	1
<i>Vibrio parahaemolyticus</i>	1	—	—	1	3	1	4
Total bacterial	1	4	—	14	56	49	105
Chemical							
Ciguatoxin	—	—	—	—	13	4	17
Mushroom poisoning	—	—	—	—	—	3	3
Scombrototoxin	—	—	—	—	14	1	15
Total chemical	—	—	—	—	27	8	35
Parasitic							
<i>Giardia lamblia</i>	—	—	—	—	—	1	1
Other parasitic	—	—	—	2	5	5	10
Total parasitic	—	—	—	2	5	6	11
Viral							
Hepatitis A	—	—	—	—	1	2	3
Other viral	—	—	1	2	7	7	14
Total viral	—	—	1	2	8	9	17
Confirmed etiology	1	4	1	18	96	72	168
Unknown etiology	—	5	2	21	73	263	336
Total 1997	1	9	3	39	169	335	504

* Includes Guam, Puerto Rico, and the U.S. Virgin Islands.

TABLE 27. Number of reported foodborne-disease outbreaks, by etiology and contributing factors — United States,* 1993

Etiology	Contributing factors						Outbreaks in which factors reported	Total
	Improper holding temperatures	Inadequate cooking	Contaminated equipment	Food from unsafe source	Poor personal hygiene	Other		
Bacterial								
<i>Bacillus cereus</i>	3	1	1	—	—	1	4	4
<i>Campylobacter</i>	2	—	3	—	—	1	3	6
<i>Clostridium botulinum</i>	3	—	—	—	—	2	4	5
<i>Clostridium perfringens</i>	12	2	—	—	2	3	12	15
<i>Escherichia coli</i>	2	5	1	3	1	4	9	15
<i>Salmonella</i>	35	22	15	10	11	5	52	68
<i>Shigella</i>	—	—	—	—	5	—	5	9
<i>Staphylococcus aureus</i>	5	1	2	2	3	1	6	7
<i>Streptococcus</i> , other	1	—	—	—	—	—	1	1
<i>Vibrio parahaemolyticus</i>	—	—	—	—	—	—	—	1
Other bacterial	4	1	1	—	—	—	4	4
Total bacterial	67	32	23	15	22	17	100	135
Chemical								
Ciguatoxin	—	—	—	4	—	2	6	13
Heavy metals	—	—	—	—	—	—	—	1
Mushroom poisoning	—	—	—	1	—	—	1	1
Scombrototoxin	4	1	1	1	—	—	4	5
Other chemical	—	—	1	—	—	1	1	1
Total chemical	4	1	2	6	—	3	12	21
Parasitic								
<i>Trichinella spiralis</i>	—	—	—	—	—	—	—	1
Other parasitic	—	—	—	—	—	—	—	1
Total parasitic	—	—	—	—	—	—	—	2
Viral								
Hepatitis A	1	—	—	—	4	1	5	5
Norwalk	—	1	—	1	—	—	1	1
Other viral	1	1	1	2	1	—	4	4
Total viral	2	2	1	3	5	1	10	10
Confirmed etiology	73	35	26	24	27	21	122	168
Unknown etiology	135	24	54	9	55	46	187	321
Total 1993	208	59	80	33	82	67	309	489

*Includes Guam, Puerto Rico, and the U.S. Virgin Islands.

TABLE 28. Number of reported foodborne-disease outbreaks, by etiology and contributing factors — United States,* 1994

Etiology	Contributing factors						Outbreaks in which factors reported	Total
	Improper holding temperatures	Inadequate cooking	Contaminated equipment	Food from unsafe source	Poor personal hygiene	Other		
Bacterial								
<i>Bacillus cereus</i>	3	1	—	—	—	—	3	3
<i>Campylobacter</i>	3	1	5	—	5	3	6	6
<i>Clostridium botulinum</i>	2	—	—	1	—	—	3	3
<i>Clostridium perfringens</i>	11	1	1	—	—	2	11	12
<i>Escherichia coli</i>	2	3	4	4	1	3	12	25
<i>Listeria monocytogenes</i>	1	—	1	—	—	1	2	3
<i>Salmonella</i>	23	24	18	6	16	8	50	70
<i>Shigella</i>	—	—	—	2	5	—	7	11
<i>Staphylococcus aureus</i>	10	—	2	1	2	2	11	13
<i>Vibrio cholera</i>	—	—	—	—	—	—	0	1
<i>Yersinia enterocolitica</i>	—	—	1	—	1	—	1	1
Total bacterial	55	30	32	14	30	19	106	148
Chemical								
Ciguatoxin	1	—	—	5	—	1	6	11
Heavy metals	—	—	1	—	—	1	2	2
Monosodium glutamate	—	—	—	—	—	1	1	1
Scombrototoxin	12	—	—	5	—	1	15	21
Other chemical	—	—	—	2	—	—	2	2
Total chemical	13	—	1	12	—	4	26	37
Parasitic								
<i>Giardia lamblia</i>	—	—	—	—	—	—	0	2
Viral								
Hepatitis A	—	—	—	—	6	—	6	6
Norwalk	—	—	—	—	—	—	0	1
Other viral	—	2	—	1	1	—	3	3
Total viral	—	2	—	1	7	—	9	10
Confirmed etiology	68	32	33	27	37	23	141	197
Unknown etiology	149	28	66	15	87	42	237	456
Total 1994	217	60	99	42	124	65	378	653

* Includes Guam, Puerto Rico, and the U.S. Virgin Islands.

TABLE 29. Number of reported foodborne-disease outbreaks, by etiology and contributing factors — United States,* 1995

Etiology	Contributing factors						Outbreaks in which factors reported	Total
	Improper holding temperatures	Inadequate cooking	Contaminated equipment	Food from unsafe source	Poor personal hygiene	Other		
Bacterial								
<i>Bacillus cereus</i>	1	—	1	—	1	—	1	2
<i>Campylobacter</i>	2	3	1	1	1	1	4	6
<i>Clostridium botulinum</i>	—	—	—	1	—	—	1	2
<i>Clostridium perfringens</i>	12	4	3	—	3	2	12	14
<i>Escherichia coli</i>	3	8	2	1	2	4	11	25
<i>Salmonella</i>	40	26	18	11	16	17	66	90
<i>Shigella</i>	1	—	—	1	2	—	3	7
<i>Staphylococcus aureus</i>	5	1	1	—	3	—	5	6
<i>Yersinia enterocolitica</i>	—	—	1	—	—	—	1	1
Other bacterial	1	—	—	—	1	—	1	2
Total bacterial	65	42	27	15	29	24	105	155
Chemical								
Ciguatoxin	—	—	—	7	—	2	8	10
Heavy metals	—	—	—	—	—	1	1	1
Scombrototoxin	11	—	—	4	—	—	13	16
Other chemical	—	—	—	—	—	1	1	2
Total chemical	11	—	—	11	—	4	23	29
Parasitic								
<i>Trichinella spiralis</i>	—	1	—	—	—	—	1	1
Viral								
Hepatitis A	—	—	—	—	2	—	2	4
Norwalk	—	—	—	1	2	—	3	4
Other viral	—	—	—	—	—	—	0	1
Total viral	—	—	—	1	4	—	5	9
Confirmed etiology	76	43	27	27	33	28	134	194
Unknown etiology	134	20	48	8	61	34	211	434
Total 1995	210	63	75	35	94	62	345	628

* Includes Guam, Puerto Rico, and the U.S. Virgin Islands.

TABLE 30. Number of reported foodborne-disease outbreaks, by etiology and contributing factors — United States,* 1996

Etiology	Contributing factors						Outbreaks in which factors reported	Total
	Improper holding temperatures	Inadequate cooking	Contaminated equipment	Food from unsafe source	Poor personal hygiene	Other		
Bacterial								
<i>Bacillus cereus</i>	—	—	—	—	—	—	—	1
<i>Brucella</i>	—	—	—	—	—	—	—	1
<i>Campylobacter</i>	—	1	—	1	1	—	3	5
<i>Clostridium botulinum</i>	1	—	—	—	—	—	1	2
<i>Clostridium perfringens</i>	6	4	1	—	—	3	6	10
<i>Escherichia coli</i>	—	1	1	3	2	—	5	11
<i>Salmonella</i>	23	17	11	4	10	16	41	69
<i>Shigella</i>	—	1	—	—	3	—	3	6
<i>Staphylococcus aureus</i>	2	—	1	—	2	—	3	7
Total bacterial	32	24	14	8	18	19	62	112
Chemical								
Ciguatoxin	1	—	—	6	—	3	6	9
Mushroom poisoning	—	—	—	1	—	—	1	3
Scombrototoxin	7	1	—	1	—	—	8	12
Shellfish	—	—	—	1	—	1	1	1
Other chemical	—	—	—	—	—	—	—	1
Total chemical	8	1	—	9	—	4	16	26
Parasitic								
<i>Giardia lamblia</i>	—	—	—	—	1	1	1	1
Other parasitic	—	—	—	1	—	—	1	2
Total parasitic	—	—	—	1	1	1	2	3
Viral								
Hepatitis A	—	1	—	1	2	—	3	5
Norwalk	—	1	—	1	2	—	3	3
Other viral	—	—	—	1	—	—	1	2
Total viral	—	2	—	3	4	—	7	10
Confirmed etiology	40	27	14	21	23	24	87	151
Unknown etiology	109	17	46	3	67	21	173	326
Total 1996	149	44	60	24	90	45	260	477

*Includes Guam, Puerto Rico, and the U.S. Virgin Islands.

TABLE 31. Number of reported foodborne-disease outbreaks, by etiology and contributing factors — United States,* 1997

Etiology	Contributing factors						Outbreaks in which factors reported	Total
	Improper holding temperatures	Inadequate cooking	Contaminated equipment	Food from unsafe source	Poor personal hygiene	Other		
Bacterial								
<i>Bacillus cereus</i>	4	1	—	—	1	—	4	4
<i>Campylobacter</i>	—	—	2	—	1	—	2	2
<i>Clostridium botulinum</i>	—	1	—	1	—	—	1	1
<i>Clostridium perfringens</i>	5	2	—	—	—	1	5	6
<i>Escherichia coli</i>	1	2	—	—	—	—	2	8
<i>Salmonella</i>	32	23	16	2	17	7	46	60
<i>Shigella</i>	3	—	1	—	4	1	6	10
<i>Staphylococcus aureus</i>	3	1	—	1	2	1	5	9
<i>Streptococcus</i> , group A	1	—	—	—	1	—	1	1
<i>Vibrio parahaemolyticus</i>	1	1	1	1	—	—	2	4
Total bacterial	50	31	20	5	26	10	74	105
Chemical								
Ciguatoxin	—	—	—	3	—	8	9	17
Mushroom poisoning	—	—	—	1	—	1	2	3
Scombrototoxin	4	—	1	—	1	1	6	15
Total chemical	4	—	1	4	1	10	17	35
Parasitic								
<i>Giardia lamblia</i>	—	—	1	—	1	—	1	1
Other parasitic	—	—	—	3	—	2	4	10
Total parasitic	—	—	1	3	1	2	5	11
Viral								
Hepatitis A	—	—	—	—	1	—	1	3
Other viral	1	—	1	1	5	2	6	14
Total viral	1	—	1	1	6	2	7	17
Confirmed etiology	55	31	23	13	34	24	103	168
Unknown etiology	99	17	63	6	66	19	163	336
Total 1997	154	48	86	19	100	43	266	504

* Includes Guam, Puerto Rico, and the U.S. Virgin Islands.

Appendix A

CDC Form 52.13, Investigation of a Foodborne Outbreak*

DEPARTMENT OF HEALTH AND HUMAN SERVICES
PUBLIC HEALTH SERVICE
CENTERS FOR DISEASE CONTROL
ATLANTA, GEORGIA 30333

CDC USE ONLY
(1-4)

FORM APPROVED
OMB NO. 0920-0004

INVESTIGATION OF A FOODBORNE OUTBREAK

1. Where did the outbreak occur ?
State _____ (5-6) City or Town _____ County _____

2. Date of outbreak: (Date of onset 1st case)
MO / DA / YR _____ (7-12)

3. Indicate actual(a) or estimated (e) numbers:
Persons exposed _____ (13-17)
Persons ill _____ (18-22)
Hospitalized _____ (23-27)
Fatal case _____ (28-31)

4. History of Exposed Persons;
No. histories obtained _____ (32-35)
No. persons with symptoms _____ (36-39)
Nausea _____ (40-43) Diarrhea _____ (44-47)
Vomiting _____ (48-51) Fever _____ (52-55)
Cramps _____ (56-59) Other, specify _____ (60-79)

5. Incubation period (hours):
Shortest _____ Longest _____ (80-83) (84-87)
Approx. for majority _____ (88-91)

6. Duration of illness (hours):
Shortest _____ Longest _____ (92-95) (96-99)
Approx. for majority _____ (101-104)

7. Food - specific attack rates:

Food Items Served	Number of persons who ATE specified food				Number who did NOT eat specified food			
	Ill	Not Ill	Total	Percent Ill	Ill	Not Ill	Total	Percent Ill

8. Vehicle responsible (food item incriminated by epidemiological evidence): (105-106)

9. Manner in which incriminated food was marketed: (Check all Applicable)

Yes No		Yes No		
1 2		1 2		
(a) Food Industry		(c) Not Wrapped		(112)
Raw	<input type="checkbox"/> <input type="checkbox"/>	Ordinary Wrapping	<input type="checkbox"/> <input type="checkbox"/>	(113)
Processed	<input type="checkbox"/> <input type="checkbox"/>	Canned	<input type="checkbox"/> <input type="checkbox"/>	(114)
Home Produced		Canned - Vacuum Sealed	<input type="checkbox"/> <input type="checkbox"/>	(115)
Raw	<input type="checkbox"/> <input type="checkbox"/>	Other (specify)	<input type="checkbox"/> <input type="checkbox"/>	(116)
Processed	<input type="checkbox"/> <input type="checkbox"/>			(117-129)
(b) Vending Machine	<input type="checkbox"/> <input type="checkbox"/>	(d) Room Temperature	<input type="checkbox"/> <input type="checkbox"/>	(130)
	(111)	Refrigerator	<input type="checkbox"/> <input type="checkbox"/>	(131)
		Frozen	<input type="checkbox"/> <input type="checkbox"/>	(132)
		Heated	<input type="checkbox"/> <input type="checkbox"/>	(133)

If a commercial product, indicate brand name and lot number (134-150)

10. Place of Preparation of Contaminated Item: (151)

Restaurant	<input type="checkbox"/>	1
Delicatessen	<input type="checkbox"/>	2
Cafeteria	<input type="checkbox"/>	3
Private Home	<input type="checkbox"/>	4
Caterer	<input type="checkbox"/>	5
Institution:		
School	<input type="checkbox"/>	6
Church	<input type="checkbox"/>	7
Camp	<input type="checkbox"/>	8
Other, specify	<input type="checkbox"/>	9

(152-171)

11. Place where eaten: (172)

Restaurant	<input type="checkbox"/>	1
Delicatessen	<input type="checkbox"/>	2
Cafeteria	<input type="checkbox"/>	3
Private Home	<input type="checkbox"/>	4
Picnic	<input type="checkbox"/>	5
Institution:		
School	<input type="checkbox"/>	6
Church	<input type="checkbox"/>	7
Camp	<input type="checkbox"/>	8
Other, specify	<input type="checkbox"/>	9

(173-192)

This questionnaire is authorized by law (Public Health Service Act, 42 USC §241). Although response to the questions asked is voluntary, cooperation of the patient is necessary for the study and control of the disease. Public reporting burden for this collection of information is estimated to average 15 minutes per response. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden to PHS Reports Clearance Officer, Rm 721-H, Humphrey Bldg, 200 Independence Ave. SW, Washington, DC 20201; ATTN: PRA, and to the Office of Information and Regulatory Affairs, Office of Management and Budget, Washington, DC 20503.

CDC 52.13 REV. 8/88 (over)

* This is the form that was used to collect data in this report. A revised form became effective October 1999. To obtain additional copies of the revised form, contact CDC's Foodborne and Diarrheal Diseases Branch at (404) 639-2206.

LABORATORY FINDINGS (Include Negative Results)

12. Food specimens examined: (193)

Specify by "X" whether food examined was original (eaten at time of outbreak) or check-up (prepared in similar manner but not involved in outbreak).

Item	Orig.	Check up	Findings	
			Qualitative	Quantitative
Example: beef	X		C. perfringens Hobbs type 10	2 x 10 ⁶ /gm

13. Environmental specimens examined: (194)

Item	Findings
Example: meat grinder	C. perfringens, Hobbs Type 10

14. Specimens from patients examined (stool, vomitus, etc.): (195)

Item	No. Persons	Findings
Example: stool	11	C. perfringens, Hobbs Type 10

15. Specimens from food handlers (stool, lesions, etc.): (196)

Item	Findings
Example: lesion	C. perfringens, Hobbs Type 10

16. Factors contributing to outbreak (check all applicable):

- | | Yes | No | Unk. |
|---|----------------------------|----------------------------|--------------------------------|
| 1. Improper storage or holding temperature | <input type="checkbox"/> 1 | <input type="checkbox"/> 2 | <input type="checkbox"/> (197) |
| 2. Inadequate cooking | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> (198) |
| 3. Contaminated equipment or working surfaces | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> (199) |
| 4. Food obtained from unsafe source | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> (200) |
| 5. Poor personal hygiene of food handler | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> (201) |
| 6. Other, specify | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> (202) |

17. Etiology: (203-204)

- Pathogen _____ Suspected 1 (205)
- Chemical _____ Confirmed 2
- Other _____ Unknown 3

18. Remarks: Briefly describe aspects of the investigation not covered above, such as unusual age or sex distribution; unusual circumstances leading to contamination of food, water, epidemic curve; etc. (Attach additional page if necessary)

(206-225)

Name of reporting agency: (226) _____

Investigating official: _____ Date of Investigation: _____

NOTE: Epidemic and Laboratory Assistance for the investigation of a foodborne outbreak is available upon request by the State Health Department to the Centers for Disease control, Atlanta, Georgia 30333

To improve national surveillance, please send a copy of this report to: Enteric Diseases Branch, Bacterial Diseases Division, Center for Infectious Diseases, Centers for Disease Control, Atlanta, Georgia 30333

Submitted copies should include as much information as possible, but the completion of every item is not required.

Appendix B

Guidelines for Confirmation of Foodborne-Disease Outbreaks

A foodborne-disease outbreak (FBDO) is defined as an incident in which two or more persons experience a similar illness resulting from the ingestion of a common food.* The following table provides information about incubation periods, clinical syndromes, and criteria for confirming the etiology once an FBDO has been identified. The information on incubation periods and clinical syndromes is provided as a guideline and should not be included in the confirmation criteria. These guidelines might not include all etiologic agents and diagnostic tests.

FBDOs should be reported to the Foodborne and Diarrheal Diseases Branch at CDC on Form 52.13, Investigation of a Foodborne Outbreak, which was updated in October 1999. Provision of other documents describing the outbreak investigation also is encouraged. For information regarding collection of laboratory specimens and for additional information on viral agents, refer to other CDC publications (i.e., "Recommendations for Collection of Laboratory Specimens Associated with Outbreaks of Gastroenteritis," *MMWR* 1990;39[No. RR-14] and "Viral Agents of Gastroenteritis: Public Health Importance and Outbreak Management," *MMWR* 1990;39[No. RR-5]).

*Before 1992, three exceptions existed to this definition; only one case of botulism, marine-toxin intoxication, or chemical intoxication was required to constitute an FBDO if the etiology was confirmed. The definition was changed in 1992 to require two or more cases to constitute an outbreak.

Table B. Guidelines for confirmation of foodborne-disease outbreaks

Etiologic agent	Incubation period	Clinical syndrome	Confirmation
Bacterial			
1. <i>Bacillus cereus</i>			
a. Vomiting toxin	1–6 hrs	Vomiting; some patients with diarrhea; fever uncommon	Isolation of organism from stool of two or more ill persons and not from stool of control patients OR Isolation of 10 ⁵ organisms/g from epidemiologically implicated food, provided specimen is properly handled
b. Diarrheal toxin	6–24 hrs	Diarrhea, abdominal cramps, and vomiting in some patients; fever uncommon	Isolation of organism from stool of two or more ill persons and not from stool of control patients OR Isolation of 10 ⁵ organisms/g from epidemiologically implicated food, provided specimen is properly handled
2. <i>Brucella</i>	Several days to several mos; usually >30 days	Weakness, fever, headache, sweats, chills, arthralgia, weight loss, splenomegaly	Two or more ill persons and isolation of organism in culture of blood or bone marrow; greater than fourfold increase in standard agglutination titer (SAT) over several wks, or single SAT 1:160 in person who has compatible clinical symptoms and history of exposure
3. <i>Campylobacter jejuni/coli</i>	2–10 days; usually 2–5 days	Diarrhea (often bloody), abdominal pain, fever	Isolation of organism from clinical specimens from two or more ill persons OR Isolation of organism from epidemiologically implicated food

Table B. (Continued) Guidelines for confirmation of foodborne-disease outbreaks

Etiologic agent	Incubation period	Clinical syndrome	Confirmation
4. <i>Clostridium botulinum</i>	2 hrs–8 days; usually 12–48 hrs	Illness of variable severity; common symptoms are diplopia, blurred vision, and bulbar weakness; paralysis, which is usually descending and bilateral, might progress rapidly	Detection of botulinal toxin in serum, stool, gastric contents, or implicated food OR Isolation of organism from stool or intestine
5. <i>Clostridium perfringens</i>	6–24 hrs	Diarrhea, abdominal cramps; vomiting and fever uncommon	Isolation of 10 ⁵ organisms/g from stool of two or more ill persons, provided specimen is properly handled. OR Demonstration of enterotoxin in the stool of two or more ill persons OR Isolation of 10 ⁵ organisms/g from epidemiologically implicated food, provided specimen is properly handled
6. <i>Escherichia coli</i>			
a. Enterohemorrhagic (<i>E. coli</i> O157:H7 and others)	1–10 days; usually 3–4 days	Diarrhea (often bloody), abdominal cramps (often severe), little or no fever	Isolation of <i>E. coli</i> O157:H7 or other Shiga-like toxin-producing <i>E. coli</i> from clinical specimen from two or more ill persons OR Isolation of <i>E. coli</i> O157:H7 or other Shiga-like toxin-producing <i>E. coli</i> from epidemiologically implicated food
b. Enterotoxigenic (ETEC)	6–48 hrs	Diarrhea, abdominal cramps, nausea; vomiting and fever less common	Isolation of organism of same serotype, demonstrated to produce heat-stable (ST) and/or heat-labile (LT) enterotoxin, from stool of two or more ill persons
c. Enteropathogenic (EPEC)	Variable	Diarrhea, fever, abdominal cramps	Isolation of organism of same enteropathogenic serotype from stool of two or more ill persons

Table B. (Continued) Guidelines for confirmation of foodborne-disease outbreaks

Etiologic agent	Incubation period	Clinical syndrome	Confirmation
d. Enteroinvasive (EIEC)	Variable	Diarrhea (might be bloody), fever, abdominal cramps	Isolation of same enteroinvasive serotype from stool of two or more ill persons
7. <i>Listeria monocytogenes</i>			
a. Invasive disease	2–6 wks	Meningitis, neonatal sepsis, fever	Isolation of organism from normally sterile site
b. Diarrheal disease	Unknown	Diarrhea, abdominal cramps, fever	Isolation of organism of same serotype from stool of two or more ill persons exposed to food that is epidemiologically implicated or from which organism of same serotype has been isolated
8. Nontyphoidal <i>Salmonella</i>	6 hrs–10 days; usually 6–48 hrs	Diarrhea, often with fever and abdominal cramps	Isolation of organism of same serotype from clinical specimens from two or more ill persons OR Isolation of organism from epidemiologically implicated food
9. <i>Salmonella</i> Typhi	3–60 days; usually 7–14 days	Fever, anorexia, malaise, headache, and myalgia; sometimes diarrhea or constipation	Isolation of organism from clinical specimens from two or more ill persons OR Isolation of organism from epidemiologically implicated food
10. <i>Shigella</i> spp.	12 hrs–6 days; usually 2–4 days	Diarrhea (often bloody), often accompanied by fever and abdominal cramps	Isolation of organism of same serotype from clinical specimens from two or more ill persons OR Isolation of organism from epidemiologically implicated food

Table B. (Continued) Guidelines for confirmation of foodborne-disease outbreaks

Etiologic agent	Incubation period	Clinical syndrome	Confirmation
11. <i>Staphylococcus aureus</i>	30 min–8 hrs; usually 2–4 hrs	Vomiting, diarrhea	Isolation of organism of same phage type from stool or vomitus of two or more ill persons OR Detection of enterotoxin in epidemiologically implicated food OR Isolation of 10 ⁵ organisms/g from epidemiologically implicated food, provided specimen is properly handled
12. <i>Streptococcus</i> , group A	1–4 days	Fever, pharyngitis, scarlet fever, upper respiratory infection	Isolation of organism of same M- or T-type from throats of two or more ill persons OR Isolation of organism of same M- or T-type from epidemiologically implicated food
13. <i>Vibrio cholerae</i> a. O1 or O139	1–5 days	Watery diarrhea, often accompanied by vomiting	Isolation of toxigenic organism from stool or vomitus of two or more ill persons OR Significant rise in vibriocidal, bacterial-agglutinating, or antitoxin antibodies in acute- and early convalescent-phase sera among persons not recently immunized OR Isolation of toxigenic organism from epidemiologically implicated food
b. non-O1 and non-O139	1–5 days	Watery diarrhea	Isolation of organism of same serotype from stool of two or more ill persons

Table B. (Continued) Guidelines for confirmation of foodborne-disease outbreaks

Etiologic agent	Incubation period	Clinical syndrome	Confirmation
14. <i>Vibrio parahaemolyticus</i>	4–30 hrs	Diarrhea	Isolation of Kanagawa-positive organism from stool of two or more ill persons OR Isolation of 10 ⁵ Kanagawa-positive organisms/g from epidemiologically implicated food, provided specimen is properly handled
15. <i>Yersinia enterocolitica</i>	1–10 days; usually 4–6 days	Diarrhea, abdominal pain (often severe)	Isolation of organism from clinical specimen from two or more ill persons OR Isolation of pathogenic strain of organism from epidemiologically implicated food
Chemical			
1. Marine toxins			
a. Ciguatoxin	1–48 hrs; usually 2–8 hrs	Usually gastrointestinal symptoms followed by neurologic symptoms (including paresthesia of lips, tongue, throat, or extremities) and reversal of hot and cold sensation	Demonstration of ciguatoxin in epidemiologically implicated fish OR Clinical syndrome among persons who have eaten a type of fish previously associated with ciguatera fish poisoning (e.g., snapper, grouper, or barracuda)
b. Scombroid toxin (histamine)	1 min–3 hrs; usually <1 hr	Flushing, dizziness, burning of mouth and throat, headache, gastrointestinal symptoms, urticaria, and generalized pruritis	Demonstration of histamine in epidemiologically implicated fish OR Clinical syndrome among persons who have eaten a type of fish previously associated with histamine fish poisoning (e.g., mahi-mahi or fish of order Scomboidei)

Table B. (Continued) Guidelines for confirmation of foodborne-disease outbreaks

Etiologic agent	Incubation period	Clinical syndrome	Confirmation
c. Paralytic or neurotoxic shellfish	30 min–3 hrs	Paresthesia of lips, mouth or face, and extremities; intestinal symptoms or weakness, including respiratory difficulty	Detection of toxin in epidemiologically implicated food OR Detection of large numbers of shellfish-poisoning-associated species of dinoflagellates in water from which epidemiologically implicated mollusks are gathered
d. Puffer fish, tetrodotoxin	10 min–3 hrs; usually 10–45 min	Paresthesia of lips, tongue, face, or extremities, often following numbness; loss of proprioception or floating sensations	Demonstration of tetrodotoxin in epidemiologically implicated fish OR Clinical syndrome among persons who have eaten puffer fish
2. Heavy metals • Antimony • Cadmium • Copper • Iron • Tin • Zinc	5 min–8 hrs; usually <1 hr	Vomiting, often metallic taste	Demonstration of high concentration of metal in epidemiologically implicated food
3. Monosodium glutamate (MSG)	3 min–2 hrs; usually <1 hr	Burning sensation in chest, neck, abdomen, or extremities; sensation of lightness and pressure over face or heavy feeling in chest	Clinical syndrome among persons who have eaten food containing MSG (e.g., usually 1.5 g MSG)
4. Mushroom toxins a. Shorter-acting toxins • Muscimol • Muscarine • Psilocybin • <i>Coprinus atrentementaris</i> • Ibotenic acid	2 hrs	Usually vomiting and diarrhea, other symptoms differ with toxin • Confusion, visual disturbance • Salivation, diaphoresis • Hallucinations • Disulfiram-like reaction • Confusion, visual disturbance	Clinical syndrome among persons who have eaten mushroom identified as toxic type OR Demonstration of toxin in epidemiologically implicated mushroom or food containing mushroom

Table B. (Continued) Guidelines for confirmation of foodborne-disease outbreaks

Etiologic agent	Incubation period	Clinical syndrome	Confirmation
b. Longer-acting toxins (e.g., <i>Amanita</i> spp.)	6–24 hrs	Diarrhea and abdominal cramps for 24 hrs followed by hepatic and renal failure	Clinical syndrome among persons who have eaten mushroom identified as toxic type OR Demonstration of toxin in epidemiologically implicated mushroom or food containing mushrooms
Parasitic			
1. <i>Cryptosporidium parvum</i>	2–28 days; median: 7 days	Diarrhea, nausea, vomiting; fever	Demonstration of organism or antigen in stool or in small-bowel biopsy of two or more ill persons OR Demonstration of toxin in epidemiologically implicated food
2. <i>Cyclospora cayetanensis</i>	1–11 days; median: 7 days	Fatigue, protracted diarrhea, often relapsing	Demonstration of organism in stool of two or more ill persons
3. <i>Giardia lamblia</i>	3–25 days; median: 7 days	Diarrhea, gas, cramps, nausea, fatigue	Two or more ill persons and detection of antigen in stool or demonstration of organism in stool, duodenal contents, or small-bowel biopsy specimen
4. <i>Trichinella</i> spp.	1–2 days for intestinal phase; 2–4 wks for systemic phase	Fever, myalgia, periorbital edema, high eosinophil count	Two or more ill persons and positive serologic test or demonstration of larvae in muscle biopsy OR Demonstration of larvae in epidemiologically implicated meat

Table B. (Continued) Guidelines for confirmation of foodborne-disease outbreaks

Etiologic agent	Incubation period	Clinical syndrome	Confirmation
Viral			
1. Hepatitis A	15–50 days; median: 28 days	Jaundice, dark urine, fatigue, anorexia, nausea	Detection of immunoglobulin M anti-hepatitis A virus in serum from two or more persons who consumed epidemiologically implicated food
2. Norwalk family of viruses, small round-structured viruses (SRSV)	15–77 hrs; usually 24–48 hrs	Vomiting, cramps, diarrhea, headache	More than fourfold rise in antibody titer to Norwalk virus or Norwalk-like virus in acute and convalescent sera in most serum pairs
			OR
			Visualization of small, round-structured viruses that react with patient’s convalescent sera but not acute sera — by immune-electron microscopy (assays based on molecular diagnostics [e.g., polymerase-chain reaction, probes, or assays for antigen and antibodies from expressed antigen] are available in reference laboratories)
3. Astrovirus, calicivirus, others	15–77 hrs; usually 24–48 hrs	Vomiting, cramps, diarrhea, headache	Visualization of small, round-structured viruses that react with patient’s convalescent sera but not acute sera — by immune-electron microscopy (assays based on molecular diagnostics [e.g., polymerase-chain reaction, probes, or assays for antigen and antibodies from expressed antigen] are available in reference laboratories)

State and Territorial Epidemiologists and Laboratory Directors

State and Territorial Epidemiologists and Laboratory Directors are acknowledged for their contributions to *CDC Surveillance Summaries*. The epidemiologists and the laboratory directors listed below were in the positions shown as of November 1999.

State/Territory	Epidemiologist	Laboratory Director
Alabama	John P. Lofgren, MD	William J. Callan, PhD
Alaska	John P. Middaugh, MD	Gregg Herriford
Arizona	Lee A. Bland, MA, MPH (Acting)	Wes Press, MA (Acting)
Arkansas	Thomas C. McChesney, DVM	Michael G. Foreman
California	Duc J. Vugia, MD, MPH	Paul Kimsey, PhD
Colorado	Richard E. Hoffman, MD, MPH	Ronald L. Cada, DrPH
Connecticut	James L. Hadler, MD, MPH	Katherine Kelley, DrPH
Delaware	A. LeRoy Hathcock, PhD	Jane Getchall, PhD
District of Columbia	Martin E. Levy, MD, MPH	James B. Thomas, ScD
Florida	Richard S. Hopkins, MD, MSPH	Ming Chan, PhD (Acting)
Georgia	Kathleen E. Toomey, MD, MPH	Elizabeth A. Franko, DrPH
Hawaii	Paul V. Effler, MD, MPH	Vernon K. Miyamoto, PhD
Idaho	Christine G. Hahn, MD	Richard H. Hudson, PhD
Illinois	Shari L. Bornstein, MD, MPH	David F. Carpenter, PhD
Indiana	Robert Teclaw, DVM, PhD, MPH	David E. Nauth
Iowa	M. Patricia Quinlisk, MD, MPH	Mary J. R. Gilchrist, PhD
Kansas	Gianfranco Pezzino, MD, MPH	Roger H. Carlson, PhD
Kentucky	Glyn G. Caldwell, MD	Samuel Gregorio, DrPH (Acting)
Louisiana	Louise McFarland, DrPH	Henry B. Bradford, Jr, PhD
Maine	Kathleen F. Gensheimer, MD, MPH	John A. Krueger
Maryland	Jeffrey C. Roche, MD, MPH (Acting)	J. Mehsen Joseph, PhD
Massachusetts	Alfred DeMaria, Jr, MD	Ralph J. Timperi, MPH
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