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SUPERIOR COURT OF CALIFORNIA
COUNTY OF SAN BENITO

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SARAH BERTINE
BY: ______ DEPUTY

IN THE SUPERIOR COURT OF SAN BENITO COUNTY

STATE OF CALIFORNIA

ORGANIC PASTURES DAIRY COMPANY, LLC, and CLARAVALE FARM, INC., Plaintiffs, v. STATE OF CALIFORNIA and A.G. KAWAMURA, Secretary of California Department of Food and Agriculture, Defendants.	Case No. CU-07-00204 **COMPLAINT FOR DECLARATORY JUDGMENT AND INJUNCTIVE RELIEF**

Now comes Plaintiffs, Organic Pastures Dairy Company, LLC and Claravale Farms, Inc., by and through counsel, and pursuant to Cal Code Civ Proc § 1060 hereby files this complaint for declaratory judgment and injunctive relief.

GENERAL ALLEGATIONS

The Parties

1. Plaintiff Organic Pastures Dairy Company, LLC ("OPDC") is a limited liability company organized under the laws of the State of California with its principle place of business at 7221 South Jameson, Fresno, CA 93706.

2. OPDC is engaged in the business of agriculture and is the owner and operator of a dairy farm and creamery operations located at 7221 South Jameson, Fresno, CA 93706. (Fresno County).

3. OPDC has a permit to sell raw milk, milk that has not been pasteurized, to the ultimate consumer that was issued by the California Department of Food and Agriculture ("CDFA") in January 2002.

4. OPDC produces raw milk at its farm, bottles it, and distributes it throughout the State of California to retail outlets and to private consumers.

5. OPDC's gross sales from its raw milk products total at least $5 million dollars.

6. Plaintiff Claravale Farms, Inc. ("Claravale") is a corporation organized under the laws of the State of California with its principle place of business at 33320 Panoche Road, Paicines, CA 95043. (San Benito County).

7. Claravale is engaged in the business of agriculture and is the owner and operator of a dairy farm located at 33320 Panoche Road, Paicines, CA 95043.

8. Claravale has a permit to sell raw milk to the ultimate consumer that was issued by CDFA.

9. Claravale produces raw milk at its farm, bottles it, and distributes it throughout the State of California to retail outlets and to private consumers.

10. Claravale's gross sales from its raw milk products total at least $800,000.

11. OPDC and Claravale are the only two entities permitted in the State of California to sell raw milk to the ultimate consumer.

12. Defendant the State of California ("the State") is the sovereign of the State, is the government of its citizens, and enacts laws in accordance with the Constitution of the State of California.

13. Defendant A.G. Kawamura is the Secretary of CDFA, the agency responsible for regulating agricultural affairs in the State of California.

14. According to its website, the goals of CDFA are the following: (1) ensure that only safe and quality food reaches the consumer. (2) protect against invasion of exotic pests and diseases. (3) promote California agriculture and food products both at home and abroad. (4) ensure an equitable and orderly marketplace for California's agricultural products. (5) build coalitions supporting the state's agricultural infrastructure to meet evolving industry needs.

Jurisdiction and Venue

15. This action is brought pursuant to Cal Code Civ Proc Sec. 1060.

16. Venue is proper in this Court pursuant to Cal Code Civ Proc Sec. 392.

Milk Production

17. Dairy cows produce milk.

18. OPDC utilizes both Holsteins and Jersey cows and Claravale utilizes Jersey cows in the production of their milk and cream.

19. The size of OPDC's herd ranges around 300 cows (plus dry cows and heifers and bulls) while the size of Claravale's herd (plus dry cows and heifers and bulls) is 55 cows.

20. The lactating cycle of a mature bovine female cow is anywhere from 285 to 300 days. A mature bovine female cow will usually produce milk for about 10 months throughout the year.

21. During the time when a female cow is not producing milk she is said to be "dry."

22. There is a period when a dry cow will resume producing milk again after she calves. This period is called "freshening." When a female cow freshens she gives birth to a new born calf and starts to produce milk.

23 When cows are milked, they are brought into a milking parlor, cleaned, and attached to a milking machine. The milk from the cow is conveyed by the milking machine to a stainless steel bulk tank where the milk is chilled and stored.

24. The milk stored in the bulk tank is then transferred and pumped to a bottling machine. At OPDC and Claravale the milk is bottled by a mechanical device called a bottle filler. In other states milk is sometimes allowed to be bottled by and capped by hand straight from the bulk tank. Hand bottling is not permitted in California.

25. There is no milking of cows between the bulk tank and the bottling operation and there are no cows in the area where the bottling occurs.

26. Cream floats to the top of milk and is separated from the milk by a cream separator, and both OPDC and Claravale produce cream at their farms.

27. OPDC is certified organic and uses intensive rotational grazing. Claravale uses an all natural system but does not graze its cows.

28. Neither OPDC nor Claravale uses synthetic antibiotics or growth hormones in its production practices.

Milk sanitation and testing

29. According to the CDFA, coliforms are "a group of bacteria commonly found in the environment, including soil, surface water, vegetation and the intestinal tracts of warm-blooded animals." See Attachement A.

30. According to the CDFA, "[s]ince most coliform bacteria are not harmful, the finding of coliforms in milk does not necessarily mean that a disease causing, or pathogenic, form of the bacteria is present." See Attachment A.

31. According to the CDFA, a coliform standard serves as an "indicator of cleanliness and sanitation." See Attachment B.

32. The only coliforms that cause illness when consumed in raw milk are specific, identifiable strains of E. *coli*, *salmonella* and *campylobacter*.

33. According to the Centers for Disease Control and Prevention, from 1998 to 2002, pathogens like E. *coli*, *salmonella* and *campylobacter* were found in many common raw foods, for example beef, poultry, eggs, pork, finfish, shellfish and vegetables. See Attachment C, Tables 9 – 13.

34. Both OPDC and Claravale maintain sanitary conditions at their milking stations to protect against contaminating their milk with pathogenic organisms.

35. To ensure that the milk they produce is free from these pathogens, both OPDC and Claravale test their milk for the presence of E. *coli*, *salmonella* and *campylobacter*.

36. The testing procedure used by OPDC includes on farm testing using SDI systems several times per week to detect E. *coli* O157:H7.

37. OPDC has been testing its raw milk for pathogens at the bulk tank since at least 2002. During that time, at least 4000 samples have been collected. At no time since 2002 has OPDC ever detected any pathogens in its raw milk.

38. The FDA, CDFA and the Fresno County Health departments have also tested for pathogens at OPDC and have never found any pathogens in any OPDC products or creamery environmental tests.

39. The testing procedure used by Claravale includes testing by CDFA twice per month. At no time in the last 11 years have any pathogens ever been detected in Claravale raw dairy products.

40. Claravale has been testing its raw milk for pathogens at the bulk tank since at least 1927. During that time, hundreds of samples have been collected. At no time since 1927 has Claravale ever detected any pathogens in its raw milk.

41. The milk and cream produced by OPDC and Claravale are fresh from the cow, are living organisms, and are not pasteurized.

42. Raw milk and cream that is not pasteurized contains many beneficial organisms, enzymes and bacteria, for example, Lactoperoxidase, Lactoferrin, Polysaccharides, Antibodies, B-lymphocytes, Macrophages, Neutrophils, T-lymphocytes, Lysosyme, Oligosaccharides, Bifidus factor and Fibronectin.

43. These organisms are killed, changed or modified by the pasteurization process and are not active or present in pasteurized milk or cream.

44. Assembly Bill 1735 was read for the first time in the Assembly on March 15, 2007 and was placed on the Consent Calendar. See Attachment D.

45. AB 1735 passed the Committee on Agriculture on April 26, 2007 and was placed on the Consent Calendar.

46. AB 1735 passed the Assembly on May 17, 2007 and was referred to the California Senate to be placed on the Consent Calendar.

47. AB 1735 passed the Senate on August 30, 2007 and was enrolled and presented to the Governor on September 6, 2007.

48. The Governor signed AB 1735 into law on October 8, 2007 and it was Chaptered by the Secretary of State on that same day.

49. At no time during AB 1735's history were either of the Plaintiffs invited to participate in or informed about the legislative process.

50. AB1735 provides, in part, as follows:

SEC. 2. Section 35781 of the Food and Agricultural Code is amended to read:

35781. (a) Except as otherwise provided in this article, market milk shall not contain any of the following:

(1) More than 15,000 bacteria per milliliter *or more than 10 coliform bacteria per milliliter* if to be sold as raw milk to the consumer. (Emphasis added).

(2) More than 50,000 bacteria per milliliter if to be sold as raw milk for pasteurization or more than 750 bacteria per milliliter after having been subjected to laboratory pasteurization which has a time-temperature equivalent to that required in Section 34001 before pasteurization.

(3) More than 15,000 bacteria per milliliter or more than 10 coliform bacteria per milliliter at time of delivery to the consumer, if pasteurized.

(4) More than 750 coliform bacteria per milliliter in raw milk for pasteurization. *Samples shall be taken while the milk is on the premises of the producer.* (Emphasis added).

COUNT ONE

DENIAL OF DUE PROCESS

51. Paragraphs numbers 1 through 50 are incorporated into this Count as if rewritten herein.

52. Plaintiffs have to comply with AB 1735 or face enforcement action in the form of administrative, civil or criminal sanctions.

53. It is not technically possible nor economically feasible for Plaintiffs to meet the 10 coliform limit at the bottle.

54. The presence of coliform in milk or any food item is not an indicator that a pathogen is present in the milk or food item.

55. There is no rational nexus between (1) the presence or absence of coliform in either milk or a food item and (2) the presence or absence of a pathogen in that milk or food item.

56. Using coliform as the standard of measurement in raw milk to be sold to consumers does not protect human health.

57. Coliform counts have never been used in California as a standard for grade A raw milk intended for human consumption.

58. The proper "food safety standard of measurement" should be sampling for the presence of pathogens, e.g., E. *coli*, *salmonella* and *campylobacter*.

59. The legislative history behind AB 1735 states as follows: "Each of the provisions in this bill is necessary for the state's milk safety and inspection laws to be consistent

with federal interstate milk shipment guidelines." (Hearing of April 25, 2007). See Attachment E.

60. However, federal law prohibits the interstate shipment of raw milk for human consumption.

61. For example, 21 C.F.R. 131.110(a), promulgated under the federal Food, Drug and Cosmetic Act, provides, in part, that milk that "is in final package form for beverage use shall have been pasteurized or ultrapasteurized."

62. 21 C.F.R. 1240.61(a), also promulgated under the federal Food, Drug and Cosmetic Act, provides, in part, that "[n]o person shall cause to be delivered into interstate commerce or shall sell, otherwise distribute, or hold for sale or other distribution after shipment in interstate commerce any milk or milk product in final package form for direct human consumption unless the product has been pasteurized or is made from dairy ingredients (milk or milk products) that have all been pasteurized."

63. Although Federal law prohibits the interstate shipment of milk, it does not regulate the intra-state shipment of milk and milk products.

64. If AB 1735 were consistent with federal interstate milk shipping guidelines it would prohibit the consumption of raw milk within the State.

65. However, AB 1735 authorizes the consumption of raw milk and thus is unnecessary in order "to be consistent with federal interstate milk shipment guidelines."

66. AB 1735 is unconstitutional because it is not rationally related to a legitimate governmental interest.

67. AB 1735 violates the Due Process clauses of both the United States and California constitutions.

COUNT TWO

DENIAL OF EQUAL PROTECTION

68. Paragraphs numbers 1 through 67 are incorporated into this Count as if rewritten herein.

69. Plaintiffs have to comply with AB 1735 or face enforcement action in the form of administrative, civil or criminal sanctions.

70. It is not technically possible nor economically feasible for Plaintiffs to meet the 10 coliform limit at the finished product bottle.

71. There are no standards in place for other food providers, for example, beef, poultry, pork, eggs, vegetables, bakers, or fin or shell fish, to comply with a coliform limit in the food stuffs they produce.

72. There is no statute or administrative regulation in California that requires providers of food, other than dairy producers, to comply with a coliform limit in the food stuffs they produce.

73. Plaintiffs produce raw milk, a product that is different from pasteurized milk, yet Plaintiffs are subjected to the same coliform standard that is required for pasteurized milk.

74. AB 1735's effect, therefore, is to target raw milk producers because they do not pasteurize their milk.

75. Cal Food & Agr Code § 35811 provides, in part, that "[m]arket cream shall conform to all of the standards which are set for market milk of the same grade" except that "the maximum bacterial count for pasteurized market cream shall be 20,000 per gram."

76. Section 2 of AB 1735 provides, in part, that "Section 35781 of the Food and Agricultural Code is amended to read:

> 35781. (a) Except as otherwise provided in this article, market milk shall not contain any of the following:
>
> (1) More than 15,000 bacteria per milliliter or more than 10 coliform bacteria per milliliter if to be sold as raw milk to the consumer."

77. Consequently, AB 1735 imposes a limit of 15,000 bacteria for raw milk cream, yet pasteurized cream producers, pursuant to Cal Food & Agr Code § 35811, are allowed a higher bacteria count of 20,000 per gram.

78. AB 1735 does not operate fairly and uniformly against all food producers who are similarly situated.

79. AB 1735 applies the same coliform standard to dairy producers, whether or not they produce the same product.

80. AB 1735 applies a different bacteria count standard to raw milk cream producers than it does for pasteurized milk cream producers.

81. AB 1735 discriminates against Plaintiffs.

82. AB 1735 is unconstitutional because it denies Plaintiffs equal protection under the laws.

83. AB 1735 violates the Equal Protection clauses of both the United States and California constitutions.

COUNT THREE

REGULATORY TAKING WITHOUT JUST COMPENSATION

84. Paragraphs numbers 1 through 83 are incorporated into this Count as if rewritten herein.

85. Plaintiffs have to comply with AB 1735 or face enforcement action in the form of administrative, civil or criminal sanctions.

86. It is not technically possible nor economically feasible for Plaintiffs to meet the 10 coliform limit at the bottle.

87. Because they are not able to meet the requirements of AB 1735, Plaintiffs cannot operate their business and will suffer an adverse economic impact.

88. Plaintiffs' operation of their respective businesses constitutes a property interest that is protected by the United States and California constitutions.

89 Prior to enactment of AB 1735, Plaintiffs had a financial expectation that they would be able to operate their respective businesses.

90. AB 1735 is unconstitutional because it amounts to a regulatory taking without providing just compensation.

91. AB 1735 violates the Takings Clauses of both the United States and California constitutions.

PRAYER FOR RELIEF

WHEREFORE, Plaintiffs pray for the following relief:

A. The Court should issue a declaration that AB 1735 is unconstitutional because it is not rationally related to a legitimate government interest;

B. The Court should issue a declaration that AB 1735 is unconstitutional because it violates the due process clauses of both the United States and California constitutions;

C. The Court should issue a declaration that AB 1735 is unconstitutional because it violates the equal protection clauses of both the United States and California constitutions;

D. The Court should issue a declaration that AB 1735 is unconstitutional because it violates the takings clauses of both the United States and California constitutions;

E. Alternatively, if the Court does not find that AB 1735 violates the takings clauses of both the United States and California constitutions, the Court should award just compensation to Plaintiffs for the fair market value of their complete business operations;

F. The Court should issue a permanent injunction staying the effect of AB 1735 until it is repealed or held unconstitutional;

G. The Court should issue a permanent injunction enjoining any further enforcement of AB 1735 against Plaintiffs until it is repealed or held unconstitutional;

H. The Court should award both Plaintiffs their attorneys' fees and costs;

I. The Court should award such other relief as it deems appropriate.

Date: December 27, 2007

Respectfully submitted,

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Attorneys for Plaintiffs

Exhibit A

cdfa
CALIFORNIA DEPARTMENT OF FOOD & AGRICULTURE

New Coliform Standard for Milk Sold Raw to Consumers

October 2007

With the passing of (AB 1735) (Assembly Ag Committee), several milk product standards were updated to bring California requirements into greater conformity with national standards, as well as those of neighboring states. The changes take effect on January 1, 2008, and include the addition of maximum limits on the amount of coliform bacteria allowed in fluid milk sold raw to the consumer. The purpose of this fact sheet is to provide brief answers to questions regarding coliform bacteria in general, and what this new standard means with regard to the quality, safety and availability of raw milk within California.

What are coliforms?

Coliforms are a group of bacteria commonly found in the environment, including soil, surface water, vegetation and the intestinal tracts of warm-blooded animals. Detection of coliforms is used as a general indicator of sanitary conditions in dairy production and processing environments. Most coliforms do not cause disease, but a small percentage can cause illness in people, especially young children, the elderly, and those with weakened immune systems. One example of these toxin-producing bacteria, known as E. *coli* O157:H7, can cause serious food-borne illness, especially in children, including abdominal cramps, bloody diarrhea and acute kidney failure in severe cases.

How do coliforms get into milk?

Coliform bacteria are normally shed in the feces of healthy livestock, including dairy cattle. Thus, poor herd hygiene, contaminated water, unsanitary milking practices, and improperly washed and maintained equipment can all lead to elevated coliform counts in raw milk at the dairy farm. Even though cows with coliform mastistis (an inflammation of the udder) can in some instances influence coliform counts, the milking of cows with wet and manure-soiled udders and inadequately cleaned milking equipment, are the most common ways for coliform bacteria to enter milk on-farm

Coliforms in milk: What does it mean?

Most coliforms originate from the intestines of warm-blooded animals, including people. Since most coliform bacteria are not harmful, the finding of coliforms in milk does not necessarily mean that a disease causing, or pathogenic, form of the bacteria is present. However, elevated coliform counts in milk and dairy products suggest unsanitary conditions exist during production, processing or packaging. In the dairy farm setting, a coliform count is a useful indicator of the extent of fecal bacteria in the milk, and is a recognized index of the level of sanitation at a facility. The use of coliform counts as an indicator of sanitation has been a common tool in public health protection for many years. For example, the presence of coliforms is used as one signal that environmental contamination of drinking water supply systems has occurred. In dairy products, the process of pasteurization easily kills coliform bacteria. Therefore, the finding of coliforms in pasteurized products indicates some level of contamination has occurred after pasteurization during product manufacturing or packaging. For milk sold raw, where no intervening pasteurization step is utilized, coliform counts reflect sanitation practices throughout milk handling, from the cow to final bottling. In addition to food safety and public health concerns, coliforms, along with other bacteria, may produce off flavors in milk and reduce shelf life of dairy products.

Since most food-borne pathogens originate from fecal contamination, including *E Coli*, *Salmonella* and *Campylobacter*, it is essential that strict sanitary practices be followed to minimize the risk to people consuming raw milk products

What level of coliforms is allowed in raw milk?

The new standard sets a maximum amount of coliform bacteria at no more than 10 bacteria per milliliter (mL) in milk sold raw to the consumer, the same limit required for pasteurized milk. This level is consistent with both national and international public health and food safety requirements as reflected in standards set for pasteurized dairy products by the U.S. Food and Drug Administration, the United States Department of Agriculture (USDA), the Canadian Food Inspection Service, and the European Economic Community (EEC). It is also the same standard currently used for raw milk sold for direct consumption in several western states, including Nevada, Arizona, Utah, Idaho, and Washington

Is this coliform standard achievable in milk that is not pasteurized?

Yes. Coliform counts of ≤ 10 bacteria per milliliter (mL) can be routinely achieved in raw farm milk, with utilization of sound cleaning and sanitation practices. On average, about 25% of regulatory bulk milk samples collected during the year from dairy farms inspected by the Department have coliform counts at or below this level, even though virtually all of this milk is ultimately pasteurized at a milk products plant. This agrees with national data collected by USDA's National Animal Health Monitoring System, and published in the Journal of Dairy Science in 2004 (*J. Dairy Sci. 87:2822*). This study gathered data from 21 states (including California) and represented 81% of dairy herds across the country. Although coliforms were detected in 95% of samples, approximately 20% were between 0 and 10 colony-forming units per mL.

Will this standard reduce the availability of packaged raw milk in California?

Consistent use of proper milking procedures, and effective cleaning and sanitation practices will allow for the continued production of raw milk that meets minimum bacterial standards. The California Food and Agricultural Code calls for the restriction of products that fail to meet bacterial standards in three of the last five regulatory samples. The Department collects these samples approximately once per month. Producers are informed when elevated bacterial counts are found, and official notices are written when specific products violate standards in two of the last four samples. These procedures provide ample warning to producers, and allow for cleaning, sanitation or equipment problems to be addressed before restriction of a product takes place. The Department's Dairy Foods Specialists routinely assist facilities with identifying and correcting problem areas. As always, prevention of problems through regular adherence to sound milk handling and sanitation practices is the best way to avoid violation of bacterial standards. Some common and effective practices to control coliform counts in raw milk include:

- Properly managing manure, bedding, housing and pastures to prevent cows from arriving overly dirty at the milking parlor
- Washing the udders and teats of cows, and ensuring they are clean and dry prior to milking
- Ensuring the hands of milkers are clean and dry
- Use of an appropriate commercially available pre-milking teat sanitizer to further reduce the amount of bacteria contacting milking equipment.
- Milking any cows with infected udders last, and ensuring such milk is properly excluded from milk intended for consumption.
- Ensuring all equipment throughout the entire milking system is properly cleaned and sanitized after each milking
- Ensuring detergents and sanitizers are used at effective concentrations, and that adequate amounts and temperatures of hot water are utilized.
- Establishing and adhering to a maintenance schedule for milking equipment to ensure proper operation and to replace worn out inflations, hoses, gaskets and other parts that can harbor coliform bacteria
- Providing sufficient refrigeration to ensure milk is properly cooled and stored at 45 degrees or below
- Ensuring the milk products plant where the raw milk is handled and finally packaged for the consumer is also properly constructed, clean and sanitary. Bottles of raw market milk must be mechanically capped to avoid contamination from workers' hands

All of these procedures are well-recognized and proven means to help control the bacterial quality of milk, including coliforms. Without the added protective step of pasteurization, cleanliness and sanitation are of increased importance to producing raw milk of safe and suitable quality for the consumer.

For additional information, you may contact the Milk and Dairy Food Safety Branch at (916) 654-0773

Exhibit B

cdfa CALIFORNIA DEPARTMENT OF FOOD & AGRICULTURE

A. G. Kawamura, Secretary

November 16, 2007

Mr. Mark McAfee
Organic Pastures Dairy Company
7221 S. Jameson Ave
Fresno, CA 93706-9386

Dear Mr. McAfee:

The Department has reviewed the proposal and materials you've provided concerning AB 1735 passed by the California legislature. After careful consideration of this issue, including consultation with the Department of Public Health, we remain in full support of this legislation. It is our conclusion that addition of a coliform standard provides more protection to those who choose to consume raw milk by serving as a clear and enforceable indicator of cleanliness and sanitation. This is especially important at facilities where pasteurization is not used to prevent exposure to harmful pathogens.

The Department will enforce the new standard effective January 1, 2008 as required by law. However, we will carefully monitor coliform results from raw milk dairies in relation to their compliance with all other regulatory measures of sanitation to determine if any future changes to this standard should be considered.

Sincerely,

Eric Stein
Deputy Secretary of Legislation

cc: Dr. Mark B. Horton, Director and State Public Health Officer, CA Dept of Public Health

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Exhibit C

MMWR

Surveillance Summaries

November 10, 2006 / 55(SS10);1-34

Surveillance for Foodborne-Disease Outbreaks --- United States, 1998--2002

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John Painter, DVM
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Division of Foodborne, Bacterial, and Mycotic Diseases National Center for Zoonotic, Vector-Borne, and Enteric Diseases (proposed)

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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: 1998--2002.

Description of System: The Foodborne Disease Outbreak Surveillance System reviews data on 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. In 1998, CDC implemented enhanced surveillance for FBDOs by increasing communication with state, local, and territorial health departments and revising the outbreak report form. Since 2001, reports of FBDOs are submitted through a web application on the Internet called the electronic Foodborne Outbreak Reporting System (eFORS).

Results: During 1998--2002, a total of 6,647 outbreaks of foodborne disease were reported (1,314 in 1998, 1,343 in 1999, 1,417 in 2000, 1,243 in 2001, and 1,330 in 2002). These outbreaks caused a reported 128,370 persons to become ill. Among 2,167 (33%) outbreaks for which the etiology was determined, bacterial pathogens caused the largest percentage of outbreaks (55%) and the largest percentage of cases (55%). Among bacterial pathogens, *Salmonella* serotype Enteritidis accounted for the largest number of outbreaks and outbreak-related cases; *Listeria monocytogenes* accounted for the majority of deaths of any pathogen. Viral pathogens, predominantly norovirus, caused 33% of outbreaks and 41% of cases; the proportion of outbreaks attributed to viral agents increased from 16% in 1998 to 42% in 2002. Chemical agents caused 10% of outbreaks and 2% of cases, and parasites caused 1% of outbreaks and 1% of cases.

Interpretation: Following implementation of measures to enhance outbreak surveillance, the annual number of FBDOs reported to CDC increased during this period compared with previous years. Viral pathogens accounted for an increased proportion of outbreaks each year during this reporting period and a higher proportion of outbreaks of known etiology during this reporting period than preceding reporting periods, probably reflecting the increased availability of improved viral diagnostic tests. *S. Enteritidis* continued to be a major cause of illness and *L. monocytogenes* was a major cause of death. In addition, multistate outbreaks caused by contaminated produce and outbreaks caused by *Escherichia coli* O157:H7 remained prominent.

Public Health Actions: Methods to detect FBDOs are improving, and several changes to improve the ease and timeliness of reporting FBDO data have been implemented (e.g., a revised form to simplify FBDO reporting by state health departments and improved 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 approximately 80 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 about the role of food, milk, and water in outbreaks of intestinal illness as the basis for public health action. Beginning in 1925, the U.S. Public Health Service (PHS) published summaries of outbreaks of gastrointestinal illness attributed to milk (*1*). In 1938, PHS 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 resulted in decreased incidence of enteric diseases, particularly those transmitted by milk and water (*2*).

During 1951--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 assumed responsibility for publishing reports about foodborne illness. During 1961--1965, CDC stopped publishing annual reviews but reported pertinent statistics and detailed individual investigations in *MMWR*.

The current system of surveillance for outbreaks of 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*), 1988--1992 (*4*), and 1993--1997 (*5*). Outbreak 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 (e.g., farm, slaughterhouse, and production plant) have contributed to less contamination in the food supply. Summarizing these investigations illustrates the burden of the outbreaks and the efforts needed to control them.
- **Knowledge of disease causation.** Outbreak investigations are a critical means of identifying new and emerging pathogens and 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. Summarizing the results provides an index of the relative importance and impact of specific pathogens.
- **Administrative guidance.** By analyzing several years of data on foodborne disease outbreaks, public health authorities can monitor trends over time in the prevalence of outbreaks caused by specific etiologic agents, the food that is the vehicle for the agent, and common errors in food handling. This information provides the basis for regulatory and other changes to improve food safety. Analysis of specific subsets of outbreaks can illustrate the challenges associated with specific pathogens, food vehicles, and settings and has helped define

linkages between specific pathogens and foods.

This report summarizes epidemiologic data on FBDOs reported to CDC during 1998--2002.

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. In 1998, CDC increased communication with state, local, and territorial health departments to enhance surveillance for FBDOs, including formal confirmation procedures to finalize reports from each state each year. This led to a substantial increase in the number of reports, resulting in a surveillance discontinuity during 1997--1998. A revised form became effective in 1999. The revised form expanded the range of food items, places, and contributing factors that could be reported. In 2001, state, local, and territorial health departments began submitting reports through a web-based version of this form. This web-based outbreak surveillance system is called the Electronic Foodborne Outbreak Reporting System (eFORS). This report summarizes data collected with both the paper and web-based forms (Appendix A). The majority of reports are submitted by state, local, and territorial health departments; however, they also can be submitted by federal agencies and other sources. Reporting officials use published criteria to determine whether a specific etiologic agent has been confirmed for an outbreak (Appendix B) and submit reasons that reported food vehicles were implicated. Implicated food vehicles for all reasons are included in this report.

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 food in common. Laboratory or clinical guidelines for confirming an etiology of a FBDO outbreak vary for bacterial, chemical, parasitic, and viral agents (Appendix B). An outbreak in which more than one etiologic agent was confirmed is categorized as attributable to multiple etiologies. Food vehicles identified in outbreak investigations that can be classified into a single commodity are classified into one of 12 major food commodity categories. Some reported food vehicles cannot be categorized in a single commodity category and are listed as unclassifiable. Outbreaks in which more than one implicated food is reported or the implicated food contains ingredients from multiple commodities are classified as attributable to complex food vehicles.

Exclusions from and Limitations of the Surveillance System

The findings in this report are subject to at least four limitations. First, 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) (*6*); 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). In addition, FBDOs are excluded from the surveillance system if the route of transmission from the contaminated food to the infected persons is indirect. For example, in 1988, chitterlings (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 (*7*). Similarly, outbreaks that occur as result of direct contact with animals are excluded.

Second, for many reports, information on certain aspects of the outbreak, such as the etiology, the implicated food vehicle, or the factors that might have contributed to the outbreak, is missing or incomplete. The category of "unknown etiology" is broad. Outbreaks with some etiologic information might not meet guidelines for confirmation and are presented in this report as "unknown etiology." Clinical and descriptive epidemiologic information that suggests etiologic categories for outbreaks of unknown etiology have not been used in this report (*8*).

Third, food vehicles are reported by investigating agencies as individual food items in varying levels of details (e.g., milk, 2% milk, pasteurized 2% milk). A particular reported food item with multiple ingredients could be classified under several food commodity categories; however, in this surveillance summary, the reported food item for each outbreak is classified under only one food commodity category. Food items that cannot be classified under one food commodity category are counted as unclassifiable. As a result, the reported number of outbreaks attributed to one food vehicle category might not include all outbreaks attributable to a particular food ingredient in that food.

Finally, 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, 1998--2002 data on foodborne-disease outbreaks are presented as follows:

- Reported outbreak reports, by years, 1993--2002 (Figure 1).
- Outbreaks, by state, for each of the 5 years (Figures 2--6).
- Outbreaks, cases, and deaths, by etiology, for the 5-year period combined (Table 1).
- Outbreaks, cases, and deaths, by etiology, for each of the 5 years (Tables 2--6).

- Outbreaks, by etiology and month of occurrence, for the 5-year period combined (Table 7).
- Outbreaks, by etiology and place where food was eaten, for the 5-year period combined (Table 8).
- Outbreaks, cases, and deaths, by vehicle of transmission, for each of the 5 years (Tables 9--13).
- Outbreaks, by etiology and vehicle of transmission, for each of the 5 years (Tables 14--18).
- Outbreaks, by etiology and contributing factors, for the 5-year period combined (Table 19).

Results

During 1998--2002, the annual number of reported outbreaks ranged from 1,243 to 1,417 (Tables 2--6). The average annual number of outbreaks reported during this period (1,329) was substantially greater than the average annual number of outbreaks reported during 1993--1997 (550) (Figure 1). The average number of cases per outbreak during 1998--2002 (19) was lower than the average number of cases per outbreak during 1993--1997 (31). During 1998--2002, a total of 2,167 (33%) of the 6,647 outbreaks reported to CDC had a known etiology; these outbreaks accounted for 68,981 (54%) of 128,370 illnesses (Table 1). Of the 2,167 outbreaks with a known etiology, 55% (55% of illnesses) were caused by bacterial pathogens, 33% (41% of illnesses) by viruses, 10% (2% of illnesses) by chemical agents, and 1% (1% of illnesses) by parasites. The proportion of outbreaks with known etiology attributable to viruses increased from 16% in 1998 to 42% in 2002. In the majority (67%) of outbreaks, the etiology was not determined. However, the proportion of outbreaks for which an etiology was determined increased during the reporting period, from 28% in 1998 to 37% in 2002.

Local investigators might report factors they believe contributed to the outbreak. These factors are grouped into those that investigators believed led to contamination of the food, those that allowed proliferation of the pathogen in the food, and those that contributed to survival of the pathogen in the food. During 1998--2002, at least one contributing factor was reported in 3,072 (46%) outbreaks. The most commonly reported contamination factor that contributed to FBDOs was "bare-handed contact by handler/worker/preparer" (Table 19). For outbreaks caused by bacterial pathogens "raw product/ingredient contaminated by pathogens from animal or environment" was the most commonly reported contamination factor. The most commonly reported proliferation factor was "allowing foods to remain at room or warm outdoor temperature for several hours"; the most common survivability factor was "insufficient time and/or temperature during initial cooking/heat processing."

In the majority of foodborne outbreaks during this period, food was eaten outside the home (Table 8). Restaurants were the most commonly reported place where food was eaten. Many outbreaks caused by *Salmonella* or norovirus occurred at a school or nursing home. In outbreaks caused by ciguatoxin and *L. monocytogenes*, food was more commonly reported to have been eaten at a private home.

During this period, notable outbreaks were reported that were caused by ground beef contaminated with *E. coli* O157:H7 (9) and fresh produce contaminated with *Salmonella, E. coli* O157:H7, *Cyclospora cayetanensis*, or hepatitis A (Tables 14--18). Multidrug-resistant strains of *Salmonella* caused outbreaks linked to unpasteurized milk and ground beef. A large multistate outbreak of listeriosis caused by contaminated deli meat led to one of the largest food recalls in the United States (*10*). Scombrotoxin (fish-derived histaminic agent) caused the majority of outbreaks attributable to a chemical etiology. The majority of these outbreaks was associated with tuna, although several were associated with nonscombroidae fish, including 10 outbreaks associated with escolar. Unexpected vehicles of transmission (e.g., dry cereal [*11*], parsley [*12*], and mangoes [*13*]) also were reported.

During 1998--2002, norovirus caused 657 (30%) of the 2,167 FBDOs with a known etiology and 39% of all outbreak-related cases in these outbreaks. *S.* Enteritidis, the most frequently reported bacterial cause of FBDOs, caused 204 outbreaks, accounting for 9% of outbreaks for which an etiology was determined. Eggs caused more *S.* Enteritidis outbreaks than any other food vehicle. *L. monocytogenes* resulted in 38 outbreak-related deaths among 256 cases, more deaths, and a higher case-fatality rate (15%) than any other pathogen.

Discussion

Foodborne-Disease Outbreaks, 1998--2002

The annual number of FBDOs reported to CDC increased during this period compared with previous years, following implementation of measures to enhance outbreak surveillance (*3*--*5*). Certain observations suggest that the increase in outbreak reports probably represents the effect of enhanced surveillance rather than a true increase in the occurrence of FBDOs. First, after a marked increase during 1997--1998 with implementation of enhanced surveillance, the number of reported outbreaks remained within a relatively narrow range. Second, the number of cases of foodborne infections identified through routine surveillance, of which outbreak cases are a part, decreased or remained stable during this period (*14*). Finally, the average size of reported outbreaks during 1998--2002 was smaller than the average size of outbreaks during 1993--1997, indicating that a substantial portion of the increase in reported outbreaks might be caused by smaller outbreaks that were not reported in previous years. Because of this increased reporting, comparisons of the number of reported FBDOs attributable to a specific etiology or vehicle of transmission between this period and previous reporting periods are difficult to make. Comparisons of the proportion of FBDOs related to specific causes are less likely to be influenced by the effect of enhanced surveillance but should be made with caution.

As in previous years, bacterial pathogens caused the majority of outbreaks and infections among outbreaks with a known etiology (3--5). Viral pathogens accounted for a much greater proportion of outbreaks and infections than in previous years, probably because of the increased availability of methods to diagnose viral agents. Although 67% of reported FBDOs during 1998--2002 were of unknown etiology, the proportion of outbreaks of unknown etiology decreased during 1998--2002. Much of this decrease is attributed to increased norovirus diagnostic capacity in state health department laboratories (*15*) and improved strategies to obtain diagnostic specimens (*16*). With continued improvements in epidemiologic and laboratory investigations, the proportion of outbreaks of unknown etiology might decrease further.

Of FBDOs with a known etiology, multistate outbreaks caused by contaminated produce and outbreaks caused by *E. coli* O157:H7 remained prominent. Investigation of several multistate outbreaks attributed to *L. monocytogenes*, detected by linking information from molecular subtyping of isolates from several states, led to recalls of implicated products (*10,17,18*). Although *S.* Enteritidis continued to be a major cause of illness and death, it caused a much smaller proportion of outbreaks for which an etiology was known than in the past. The decrease in outbreaks attributed to *S.* Enteritidis parallels the decrease in *S.* Enteritidis infections reported to the National *Salmonella* Surveillance System and might reflect the role of Egg Quality Assurance Programs and other public health interventions in reducing the incidence of *S.* Enteritidis infection (*19*). 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 (*20*).

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 (*21*). 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, the majority of reported foodborne illnesses are sporadic; only a small number are identified as being part of an outbreak and reported through the Foodborne Disease Outbreak Surveillance System. For example, *Salmonella* infection causes an estimated 1.4 million foodborne illnesses annually (*22*). However, during 1998--2002, a total of 164,044 *Salmonella* infections (approximately 32,000 annually) were reported through the National *Salmonella* Surveillance System (*23--27*), which is a passive, public health laboratory-based system. During the same period, 585 recognized outbreaks of *Salmonella* infection resulting in 16,821 illnesses were reported through the Foodborne Disease Outbreak

Surveillance System, not all of which were necessarily culture-confirmed. Therefore, the system represents only a fraction of the burden of foodborne disease.

The number of outbreaks summarized in this report represents a small proportion of the outbreaks that actually occurred during the surveillance period. Some outbreaks are never recognized, and those that are recognized frequently go unreported. The likelihood that public health authorities are alerted about an outbreak depends on many factors, including its size and the severity of illnesses; consumer and physician awareness, interest, and motivation to report the incident; and 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. The degree of underreporting might vary by etiology; therefore, this report provides limited information 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., *Bacillus cereus*, enterotoxigenic *E. coli*, or *Giardia intestinalis*) are less likely to have a confirmed etiology because these organisms are not always considered in clinical, epidemiologic, and laboratory investigations of FBDOs.

The objective of this report is to present simple analyses of the data on outbreaks of foodborne disease reported during 1998--2002. These data will continue to be analyzed in detail, along with other relevant data, to answer specific questions of public health importance, and findings will be published in the scientific literature. Specifically, a more detailed analysis of outbreak data to estimate the attribution of illness to specific food commodities would take into account the burden of illness attributed to specific etiologies and the attributable portion of those illnesses caused by particular food commodities. The simple frequencies of outbreaks caused by certain food commodities presented here do not, by themselves, provide a good measure of the burden of illness associated with one food commodity compared with another.

Future Directions

Methods to detect FBDOs continue to improve. For example, two tools that have enhanced detection of FBDOs are the Statistical Outbreak Detection Algorithm (SODA) and the National Molecular Subtyping Network for Foodborne Disease Surveillance (PulseNet). SODA applies a statistical algorithm to data reported through CDC's National *Salmonella, Shigella,* and *E. coli* Surveillance Systems to identify substantial increases over a historical baseline for any given serotype (*28*). This technology 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) analysis on bacteria that might be foodborne (*29*). PulseNet was initiated in four states in 1996 and reached full participation of all 50 states and several large cities by 2001. This network permits rapid comparison of PFGE patterns through an electronic database at CDC; closely related PFGE patterns suggest a common source. PulseNet has helped in the detection and investigation of outbreaks, particularly those that involve multiple states. An assessment of the impact of introducing PulseNet PFGE subtyping in one state indicated that it increased the number of detected outbreaks of *E. coli* O157:H7 by 40% (*30*).

Several changes have improved the ease and timeliness of reporting. In October 1999, CDC issued a revised FBDO reporting form to simplify reporting by state health departments. In addition, eFORS was implemented in 2001 to help improve the timeliness of foodborne disease outbreak reporting. Upcoming versions of eFORS will include an automated search algorithm for more ready access to foodborne outbreak surveillance data. An annual listing of foodborne disease outbreaks reported to CDC is available at http://www.cdc.gov/foodborneoutbreaks/outbreak_data.htm.

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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Table 1

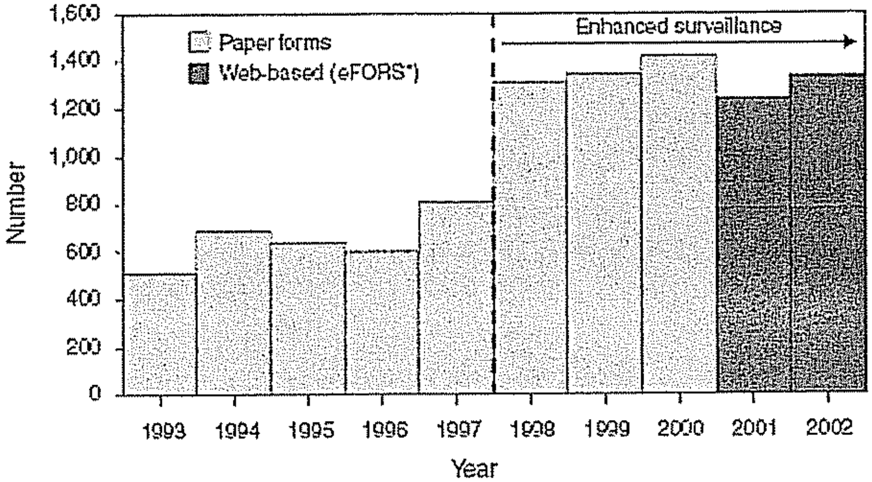
TABLE 1. Number of reported foodborne-disease outbreaks, cases, and deaths, by etiology — United States, 1998-2002	Outbreaks		Cases		Deaths	
Etiology	No.	(%)	No.	(%)	No.	(%)
Bacterial						
Bacillus cereus	37	(0.6)	571	(0.4)	0	(0.0)
Brucella	1	(0.0)	4	(0.0)	0	(0.0)
Campylobacter	61	(0.9)	1,440	(1.1)	0	(0.0)
Clostridium botulinum	12	(0.2)	52	(0.0)	1	(1.1)
Clostridium perfringens	190	(2.0)	6,724	(5.2)	4	(4.5)
*Escherichia coli**	140	(2.1)	4,854	(3.8)	4	(4.5)
Listeria monocytogenes	11	(0.2)	256	(0.2)	38	(43.2)
Salmonella	585	(8.8)	16,821	(13.1)	20	(22.7)
Shigella	67	(1.0)	3,577	(2.9)	1	(1.1)
Staphylococcus aureus	101	(1.5)	2,766	(2.2)	2	(2.3)
Streptococcus	1	(0.0)	4	(0.0)	0	(0.0)
Vibrio cholerae†	3	(0.0)	12	(0.0)	0	(0.0)
Vibrio parahemolyticus	25	(0.4)	613	(0.5)	0	(0.0)
Vibrio, other	1	(0.0)	2	(0.0)	0	(0.0)
Yersinia enterocolitica	8	(0.1)	87	(0.1)	0	(0.0)
Other bacterial	1	(0.0)	4	(0.0)	0	(0.0)
Total bacterial	1,184	(17.8)	37,887	(29.5)	70	(79.5)
Chemical						
Ciguatoxin	84	(1.3)	315	(0.2)	1	(1.1)
Heavy metals	2	(0.0)	23	(0.0)	0	(0.0)
Mushroom toxin	2	(0.0)	6	(0.0)	0	(0.0)
Scombrotoxin	118	(1.8)	463	(0.4)	0	(0.0)
Shellfish toxin	5	(0.1)	36	(0.0)	0	(0.0)
Other chemical	10	(0.2)	297	(0.2)	0	(0.0)
Total chemical	221	(3.3)	1,140	(0.9)	1	(1.1)
Parasitic						
Anisakis	1	(0.0)	14	(0.0)	0	(0.0)
Cryptosporidium parvum	4	(0.1)	139	(0.1)	0	(0.0)
Cyclospora cayetanensis	9	(0.1)	325	(0.3)	0	(0.0)
Giardia intestinalis	3	(0.0)	119	(0.1)	0	(0.0)
Trichinella spiralis	6	(0.1)	33	(0.0)	0	(0.0)
Total parasitic	23	(0.3)	630	(0.5)	0	(0.0)
Viral						
Astrovirus	1	(0.0)	14	(0.0)	0	(0.0)
Hepatitis A	50	(0.8)	981	(0.8)	4	(4.5)
Norovirus	657	(9.9)	27,171	(21.2)	1	(1.1)
Rotavirus	1	(0.0)	108	(0.1)	0	(0.0)
Total viral	709	(10.7)	28,274	(22.0)	5	(5.7)
Multiple etiologies	30	(0.5)	1,050	(0.8)	0	(0.0)
Confirmed etiology	2,167	(32.6)	68,981	(53.7)	76	(86.4)
Unknown etiology	4,480	(67.4)	59,389	(46.2)	12	(13.6)
Total 1998–2002	6,647	(100.0)	128,370	(100.0)	88	(100.0)

* Enterohemorrhagic (132 outbreaks), Enterotoxigenic (7), Enteroaggregative (1)
† Serotype O1 (1 outbreak), Serotype non-O1, non-O139 (1), serotype unspecified (1)

Return to top.

Figure 1

FIGURE 1. Number of reported foodborne-disease outbreaks, 1993–2002



* Electronic Foodborne Outbreak Reporting System.

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Table 2

TABLE 2. Number of reported foodborne-disease outbreaks, cases, and deaths, by etiology — United States, 1998	Outbreaks		Cases		Deaths	
Etiology	No.	(%)	No.	(%)	No.	(%)
Bacterial						
Bacillus cereus	10	(0.8)	213	(0.8)	0	(0.0)
Brucella	0	(0.0)	0	(0.0)	0	(0.0)
Campylobacter	12	(0.9)	483	(1.8)	0	(0.0)
Clostridium botulinum	3	(0.2)	8	(0.0)	0	(0.0)
Clostridium perfringens	24	(1.8)	1,328	(4.9)	0	(0.0)
Escherichia coli	32	(2.4)	1,613	(5.9)	0	(0.0)
Listeria monocytogenes	2	(0.2)	105	(0.4)	21	(65.6)
Salmonella	125	(9.5)	2,731	(10.0)	6	(18.8)
Shigella	17	(1.3)	1,266	(4.6)	0	(0.0)
Staphylococcus aureus	15	(1.1)	615	(2.3)	0	(0.0)
Streptococcus	1	(0.1)	4	(0.0)	0	(0.0)
Vibrio cholerae	1	(0.1)	6	(0.0)	0	(0.0)
Vibrio parahemolyticus	13	(1.0)	532	(2.0)	0	(0.0)
Vibrio, other	1	(0.1)	2	(0.0)	0	(0.0)
Yersinia enterocolitica	1	(0.1)	9	(0.0)	0	(0.0)
Other bacterial	1	(0.1)	4	(0.0)	0	(0.0)
Total bacterial	258	(19.6)	8,919	(32.7)	27	(84.4)
Chemical						
Ciguatoxin	16	(1.2)	73	(0.3)	0	(0.0)
Heavy metals	0	(0.0)	0	(0.0)	0	(0.0)
Mushroom toxin	1	(0.1)	2	(0.0)	0	(0.0)
Scombrotoxin	27	(2.1)	124	(0.5)	0	(0.0)
Shellfish toxin	1	(0.1)	6	(0.0)	0	(0.0)
Other chemical	3	(0.2)	124	(0.5)	0	(0.0)
Total chemical	48	(3.7)	329	(1.2)	0	(0.0)
Parasitic						
Anisakis	0	(0.0)	0	(0.0)	0	(0.0)
Cryptosporidium parvum	1	(0.1)	88	(0.3)	0	(0.0)
Cyclospora cayetanensis	1	(0.1)	17	(0.1)	0	(0.0)
Giardia intestinalis	1	(0.1)	3	(0.0)	0	(0.0)
Trichinella spiralis	0	(0.0)	0	(0.0)	0	(0.0)
Total parasitic	4	(0.3)	116	(0.4)	0	(0.0)
Viral						
Astrovirus	0	(0.0)	0	(0.0)	0	(0.0)
Hepatitis A	13	(1.0)	293	(1.1)	1	(3.1)
Norovirus	47	(3.6)	2,563	(9.4)	0	(0.0)
Rotavirus	0	(0.0)	0	(0.0)	0	(0.0)
Total viral	60	(4.6)	2,856	(10.5)	1	(3.1)
Multiple etiologies	2	(0.2)	31	(0.1)	0	(0.0)
Confirmed etiology	372	(28.3)	12,251	(44.9)	28	(87.5)
Unknown etiology	942	(71.7)	15,007	(55.1)	4	(12.5)
Total 1998	1,314	(100.0)	27,258	(100.0)	32	(100.0)

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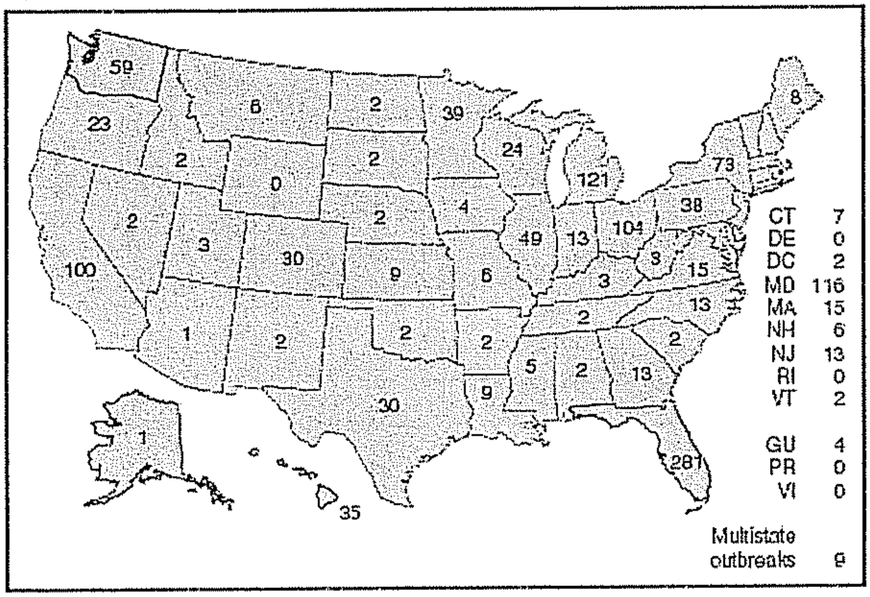
Figure 2

FIGURE 2. Number of reported foodborne-disease outbreaks, by state — United States,* 1998



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

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Table 3

TABLE 3. Number of reported foodborne-disease outbreaks, cases, and deaths, by etiology — United States, 1999

Etiology	Outbreaks No.	Outbreaks (%)	Cases No.	Cases (%)	Deaths No.	Deaths (%)
Bacterial						
Bacillus cereus	7	(0.5)	194	(0.8)	0	(0.0)
Brucella	0	(0.0)	0	(0.0)	0	(0.0)
Campylobacter	5	(0.4)	85	(0.3)	0	(0.0)
Clostridium botulinum	1	(0.1)	3	(0.0)	0	(0.0)
Clostridium perfringens	22	(1.6)	1,166	(4.7)	1	(10.0)
Escherichia coli	28	(2.1)	842	(3.4)	0	(0.0)
Listeria monocytogenes	5	(0.4)	28	(0.1)	2	(20.0)
Salmonella	111	(8.3)	3,453	(13.9)	2	(20.0)
Shigella	14	(1.0)	221	(0.9)	0	(0.0)
Staphylococcus aureus	19	(1.4)	353	(1.4)	0	(0.0)
Streptococcus	0	(0.0)	0	(0.0)	0	(0.0)
Vibrio cholerae	1	(0.1)	2	(0.0)	0	(0.0)
Vibrio parahemolyticus	3	(0.2)	14	(0.1)	0	(0.0)
Vibrio, other	0	(0.0)	0	(0.0)	0	(0.0)
Yersinia enterocolitica	1	(0.1)	32	(0.1)	0	(0.0)
Other bacterial	0	(0.0)	0	(0.0)	0	(0.0)
Total bacterial	**217**	**(16.2)**	**6,403**	**(25.7)**	**5**	**(50.0)**
Chemical						
Ciguatoxin	12	(0.9)	47	(0.2)	1	(10.0)
Heavy metals	1	(0.1)	2	(0.0)	0	(0.0)
Mushroom toxin	0	(0.0)	0	(0.0)	0	(0.0)
Scombrotoxin	21	(1.6)	67	(0.3)	0	(0.0)
Shellfish toxin	0	(0.0)	0	(0.0)	0	(0.0)
Other chemical	1	(0.1)	2	(0.0)	0	(0.0)
Total chemical	**35**	**(2.6)**	**118**	**(0.5)**	**1**	**(10.0)**
Parasitic						
Anisakis	1	(0.1)	14	(0.1)	0	(0.0)
Cryptosporidium parvum	0	(0.0)	0	(0.0)	0	(0.0)
Cyclospora cayetanensis	2	(0.1)	153	(0.6)	0	(0.0)
Giardia intestinalis	0	(0.0)	0	(0.0)	0	(0.0)
Trichinella spiralis	0	(0.0)	0	(0.0)	0	(0.0)
Total parasitic	**3**	**(0.2)**	**167**	**(0.7)**	**0**	**(0.0)**
Viral						
Astrovirus	0	(0.0)	0	(0.0)	0	(0.0)
Hepatitis A	12	(0.9)	387	(1.6)	0	(0.0)
Norovirus	98	(7.3)	4,745	(19.1)	1	(10.0)
Rotavirus	0	(0.0)	0	(0.0)	0	(0.0)
Total viral	**110**	**(8.2)**	**5,132**	**(20.6)**	**1**	**(10.0)**
Multiple etiologies	5	(0.4)	267	(1.1)	0	(0.0)
Confirmed etiology	370	(27.6)	12,087	(48.6)	7	(70.0)
Unknown etiology	973	(72.4)	12,807	(51.4)	3	(30.0)
Total 1999	1,343	(100.0)	24,894	(100.0)	10	(100.0)

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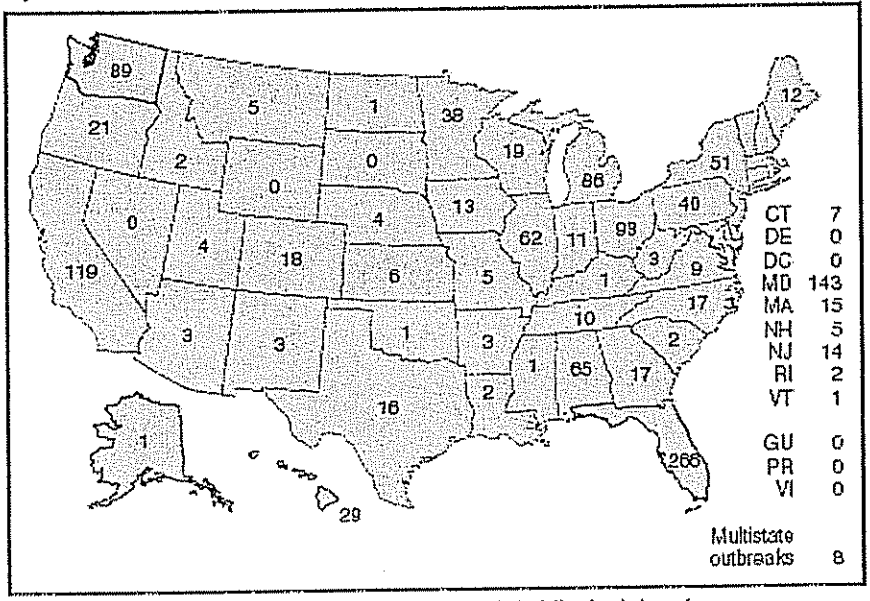
Figure 3

FIGURE 3. Number of reported foodborne-disease outbreaks, by state — United States,* 1999



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

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Table 4

TABLE 4. Number of reported foodborne-disease outbreaks, cases, and deaths, by etiology — United States, 2000

Etiology	Outbreaks No.	Outbreaks (%)	Cases No.	Cases (%)	Deaths No.	Deaths (%)
Bacterial						
Bacillus cereus	8	(0.6)	61	(0.2)	0	(0.0)
Brucella	0	(0.0)	0	(0.0)	0	(0.0)
Campylobacter	15	(1.1)	205	(0.8)	0	(0.0)
Clostridium botulinum	2	(0.1)	5	(0.0)	1	(4.8)
Clostridium perfringens	22	(1.6)	791	(3.0)	0	(0.0)
Escherichia coli	32	(2.3)	1,392	(5.3)	2	(9.5)
Listeria monocytogenes	2	(0.1)	41	(0.2)	7	(33.3)
Salmonella	127	(9.0)	2,850	(10.9)	2	(9.5)
Shigella	12	(0.8)	856	(3.3)	1	(4.8)
Staphylococcus aureus	23	(1.6)	657	(2.5)	2	(9.5)
Streptococcus	0	(0.0)	0	(0.0)	0	(0.0)
Vibrio cholerae	0	(0.0)	0	(0.0)	0	(0.0)
Vibrio parahemolyticus	4	(0.3)	37	(0.1)	0	(0.0)
Vibrio, other	0	(0.0)	0	(0.0)	0	(0.0)
Yersinia enterocolitica	0	(0.0)	0	(0.0)	0	(0.0)
Other bacterial	0	(0.0)	0	(0.0)	0	(0.0)
Total bacterial	**247**	**(17.4)**	**6,905**	**(26.4)**	**15**	**(71.4)**
Chemical						
Ciguatoxin	12	(0.8)	46	(0.2)	0	(0.0)
Heavy metals	1	(0.1)	21	(0.1)	0	(0.0)
Mushroom toxin	0	(0.0)	0	(0.0)	0	(0.0)
Scombrotoxin	20	(1.4)	81	(0.3)	0	(0.0)
Shellfish toxin	3	(0.2)	9	(0.0)	0	(0.0)
Other chemical	2	(0.1)	36	(0.1)	0	(0.0)
Total chemical	**38**	**(2.7)**	**193**	**(0.7)**	**0**	**(0.0)**
Parasitic						
Anisakis	0	(0.0)	0	(0.0)	0	(0.0)
Cryptosporidium parvum	1	(0.1)	8	(0.0)	0	(0.0)
Cyclospora cayetanensis	2	(0.1)	73	(0.3)	0	(0.0)
Giardia intestinalis	1	(0.1)	82	(0.3)	0	(0.0)
Trichinella spiralis	2	(0.1)	6	(0.0)	0	(0.0)
Total parasitic	**6**	**(0.4)**	**169**	**(0.6)**	**0**	**(0.0)**
Viral						
Astrovirus	0	(0.0)	0	(0.0)	0	(0.0)
Hepatitis A	12	(0.8)	135	(0.5)	1	(4.8)
Norovirus	163	(11.5)	6,969	(26.7)	0	(0.0)
Rotavirus	1	(0.1)	108	(0.4)	0	(0.0)
Total viral	**176**	**(12.4)**	**7,212**	**(27.6)**	**1**	**(4.8)**
Multiple etiologies	3	(0.2)	22	(0.1)	0	(0.0)
Confirmed etiology	470	(33.2)	14,501	(55.5)	16	(76.2)
Unknown etiology	947	(66.8)	11,621	(44.5)	5	(23.8)
Total 2000	1,417	(100.0)	26,122	(100.0)	21	(100.0)

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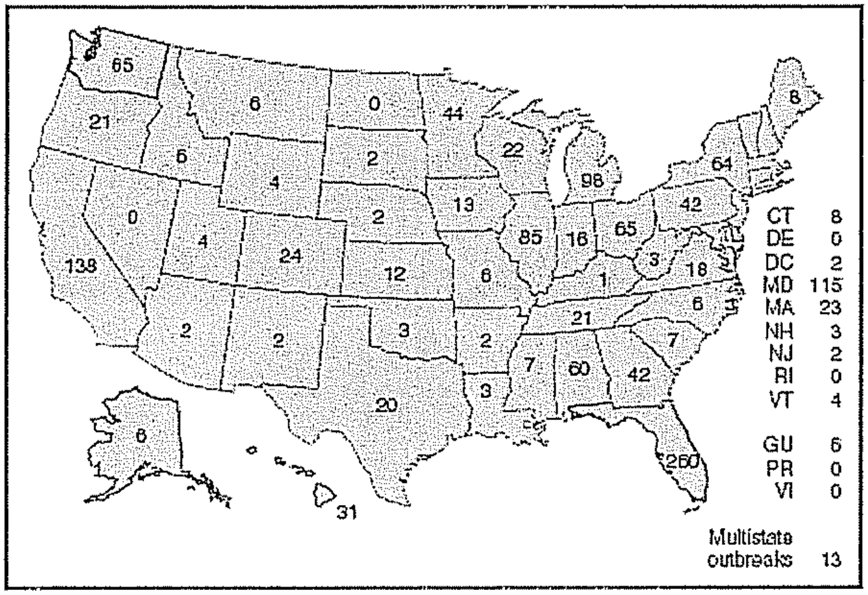
Figure 4

FIGURE 4. Number of reported foodborne-disease outbreaks, by state — United States,* 2000



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

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Table 5

TABLE 5. Number of reported foodborne-disease outbreaks, cases, and deaths, by etiology — United States, 2001	Outbreaks		Cases		Deaths	
Etiology	No.	(%)	No.	(%)	No.	(%)
Bacterial						
Bacillus cereus	5	(0.4)	61	(0.2)	0	(0.0)
Brucella	1	(0.1)	4	(0.0)	0	(0.0)
Campylobacter	16	(1.3)	317	(1.3)	0	(0.0)
Clostridium botulinum	3	(0.2)	22	(0.1)	0	(0.0)
Clostridium perfringens	31	(2.5)	1,232	(4.9)	3	(27.3)
Escherichia coli	22	(1.8)	521	(2.1)	0	(0.0)
Listeria monocytogenes	1	(0.1)	28	(0.1)	0	(0.0)
Salmonella	111	(8.9)	3,141	(12.5)	7	(63.6)
Shigella	15	(1.2)	1,006	(4.0)	0	(0.0)
Staphylococcus aureus	23	(1.9)	645	(2.6)	0	(0.0)
Streptococcus	0	(0.0)	0	(0.0)	0	(0.0)
Vibrio cholerae	1	(0.1)	4	(0.0)	0	(0.0)
Vibrio parahemolyticus	3	(0.2)	19	(0.1)	0	(0.0)
Vibrio, other	0	(0.0)	0	(0.0)	0	(0.0)
Yersinia enterocolitica	3	(0.2)	33	(0.1)	0	(0.0)
Other bacterial	0	(0.0)	0	(0.0)	0	(0.0)
Total bacterial	235	(18.9)	7,034	(28.0)	10	(90.9)
Chemical						
Ciguatoxin	24	(1.9)	81	(0.3)	0	(0.0)
Heavy metals	0	(0.0)	0	(0.0)	0	(0.0)
Mushroom toxin	0	(0.0)	0	(0.0)	0	(0.0)
Scombrotoxin	29	(2.3)	132	(0.5)	0	(0.0)
Shellfish toxin	0	(0.0)	0	(0.0)	0	(0.0)
Other chemical	1	(0.1)	15	(0.1)	0	(0.0)
Total chemical	54	(4.3)	228	(0.9)	0	(0.0)
Parasitic						
Anisakis	0	(0.0)	0	(0.0)	0	(0.0)
Cryptosporidium parvum	0	(0.0)	0	(0.0)	0	(0.0)
Cyclospora cayetanensis	2	(0.2)	42	(0.2)	0	(0.0)
Giardia intestinalis	1	(0.1)	34	(0.1)	0	(0.0)
Trichinella spiralis	2	(0.2)	14	(0.1)	0	(0.0)
Total parasitic	5	(0.4)	90	(0.4)	0	(0.0)
Viral						
Astrovirus	0	(0.0)	0	(0.0)	0	(0.0)
Hepatitis A	6	(0.5)	116	(0.5)	1	(9.1)
Norovirus	150	(12.1)	6,335	(25.2)	0	(0.0)
Rotavirus	0	(0.0)	0	(0.0)	0	(0.0)
Total viral	156	(12.6)	6,451	(25.7)	1	(9.1)
Multiple etiologies	9	(0.7)	190	(0.8)	0	(0.0)
Confirmed etiology	459	(36.9)	13,993	(55.7)	11	(100.0)
Unknown etiology	784	(63.1)	11,137	(44.3)	0	(0.0)
Total 2001	1,243	(100.0)	25,130	(100.0)	11	(100.0)

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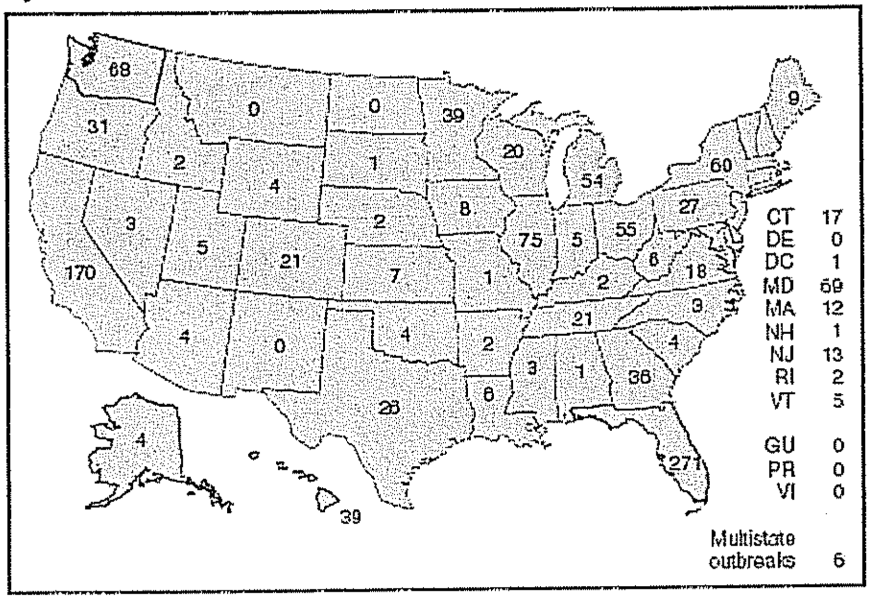
Figure 5

FIGURE 5. Number of reported foodborne-disease outbreaks, by state — United States,* 2001



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

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Table 6

TABLE 6. Number of reported foodborne-disease outbreaks, cases, and deaths, by etiology — United States, 2002	Outbreaks		Cases		Deaths	
Etiology	No.	(%)	No.	(%)	No.	(%)
Bacterial						
Bacillus cereus	7	(0.5)	42	(0.2)	0	(0.0)
Brucella	0	(0.0)	0	(0.0)	0	(0.0)
Campylobacter	13	(1.0)	350	(1.4)	0	(0.0)
Clostridium botulinum	3	(0.2)	14	(0.1)	0	(0.0)
Clostridium perfringens	31	(2.3)	2,207	(8.8)	0	(0.0)
Escherichia coli	26	(2.0)	485	(1.9)	2	(14.3)
Listeria monocytogenes	1	(0.1)	54	(0.2)	8	(57.1)
Salmonella	111	(8.3)	4,635	(18.6)	3	(21.4)
Shigella	9	(0.7)	318	(1.3)	0	(0.0)
Staphylococcus aureus	21	(1.6)	495	(2.0)	0	(0.0)
Streptococcus	0	(0.0)	0	(0.0)	0	(0.0)
Vibrio cholerae	0	(0.0)	0	(0.0)	0	(0.0)
Vibrio parahemolyticus	2	(0.2)	11	(0.0)	0	(0.0)
Vibrio, other	0	(0.0)	0	(0.0)	0	(0.0)
Yersinia enterocolitica	2	(0.2)	13	(0.1)	0	(0.0)
Other bacterial	0	(0.0)	0	(0.0)	0	(0.0)
Total bacterial	227	(17.1)	8,626	(34.6)	13	(92.9)
Chemical						
Ciguatoxin	20	(1.5)	68	(0.3)	0	(0.0)
Heavy metals	0	(0.0)	0	(0.0)	0	(0.0)
Mushroom toxin	1	(0.1)	4	(0.0)	0	(0.0)
Scombrotoxin	21	(1.6)	59	(0.2)	0	(0.0)
Shellfish toxin	1	(0.1)	21	(0.1)	0	(0.0)
Other chemical	3	(0.2)	120	(0.5)	0	(0.0)
Total chemical	46	(3.5)	272	(1.1)	0	(0.0)
Parasitic						
Anisakis	0	(0.0)	0	(0.0)	0	(0.0)
Cryptosporidium parvum	2	(0.2)	43	(0.2)	0	(0.0)
Cyclospora cayetanensis	2	(0.2)	40	(0.2)	0	(0.0)
Giardia intestinalis	0	(0.0)	0	(0.0)	0	(0.0)
Trichinella spiralis	1	(0.1)	5	(0.0)	0	(0.0)
Total parasitic	5	(0.4)	88	(0.4)	0	(0.0)
Viral						
Astrovirus	1	(0.1)	14	(0.1)	0	(0.0)
Hepatitis A	7	(0.5)	50	(0.2)	1	(7.1)
Norovirus	199	(15.0)	6,559	(26.3)	0	(0.0)
Rotavirus	0	(0.0)	0	(0.0)	0	(0.0)
Total viral	207	(15.6)	6,623	(26.5)	1	(7.1)
Multiple etiologies	11	(0.8)	540	(2.2)	0	(0.0)
Confirmed etiology	496	(37.3)	16,149	(64.7)	14	(100.0)
Unknown etiology	834	(62.7)	8,817	(35.3)	0	(0.0)
Total 2002	1,330	(100.0)	24,966	(100.0)	14	(100.0)

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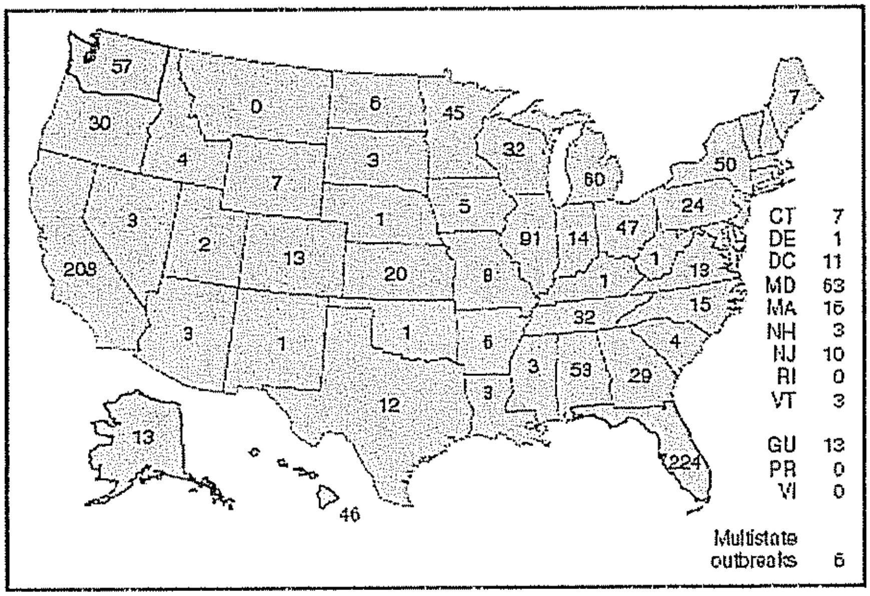
Figure 6

FIGURE 6. Number of reported foodborne-disease outbreaks, by state — United States,* 2002



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

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Table 7

TABLE 7. Number of reported foodborne-disease outbreaks, by etiology and month of occurrence — United States, 1998–2002

Etiology	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
	Month of occurrence												
Bacterial													
Bacillus cereus	3	3	2	5	5	7	4	3	1	1	1	2	37
Brucella	—	—	—	—	—	—	1	—	—	—	—	—	1
Campylobacter	4	5	5	4	7	13	3	9	4	1	5	1	61
Clostridium botulinum	3	—	—	1	—	1	3	1	1	1	—	1	12
Clostridium perfringens	3	9	6	17	14	8	6	11	8	13	15	18	130
Escherichia coli	—	1	3	8	19	18	24	21	15	19	10	2	140
Listeria monocytogenes	—	—	—	—	1	1	1	2	1	2	1	2	11
Salmonella	32	22	31	43	60	68	80	76	61	33	39	50	585
Shigella	8	3	2	5	4	11	3	6	11	6	5	3	67
Staphylococcus aureus	4	6	9	8	11	13	5	7	9	13	6	10	101
Streptococcus	—	—	1	—	—	—	—	—	—	—	—	—	1
Vibrio cholerae	1	—	—	—	—	1	—	—	1	—	—	—	3
Vibrio parahaemolyticus	1	—	1	2	2	8	5	5	1	—	—	—	25
Vibrio, other	—	—	—	—	—	—	—	—	—	—	1	—	1
Yersinia enterocolitica	2	1	—	—	—	—	—	—	1	—	3	1	8
Other bacterial	—	—	—	—	1	—	—	—	—	—	—	—	1
Total bacterial	61	50	60	93	114	169	137	141	114	89	86	70	1,184
Chemical													
Ciguatoxin	4	2	4	8	12	6	17	6	10	8	5	2	84
Heavy metals	—	—	—	1	—	—	—	—	—	—	—	1	2
Mushroom toxin	—	—	—	—	—	—	1	—	—	1	—	—	2
Scombrotoxin	7	6	5	14	11	12	11	12	10	12	7	11	118
Shellfish toxin	1	—	—	—	—	—	—	3	—	1	—	—	5
Other chemical	—	—	1	—	4	—	—	1	—	1	1	2	10
Total chemical	12	8	10	23	27	18	29	22	20	23	13	16	221
Parasitic													
Anisakis	—	1	—	—	—	—	—	—	—	—	—	—	1
Cryptosporidium parvum	—	—	—	1	—	—	—	—	2	1	—	—	4
Cyclospora cayetanensis	3	—	—	—	3	2	1	—	—	—	—	—	9
Giardia intestinalis	—	—	—	1	—	—	—	1	—	1	—	—	3
Trichinella spiralis	—	—	—	1	1	—	—	2	1	—	1	—	6
Total parasitic	3	1	0	3	4	2	1	3	3	2	1	0	23
Viral													
Astrovirus	1	—	—	—	—	—	—	—	—	—	—	—	1
Hepatitis A	4	2	9	4	—	5	3	3	4	10	2	4	50
Norovirus	46	51	64	60	70	49	43	42	28	47	66	91	657
Rotavirus	—	—	1	—	—	—	—	—	—	—	—	—	1
Total viral	51	53	74	64	70	54	46	45	32	57	68	95	709
Multiple etiologies	1	2	1	5	3	1	3	5	3	4	2	—	30
Confirmed etiology	128	114	145	188	218	244	216	216	172	175	170	181	2,167
Unknown etiology	329	355	422	425	462	394	349	334	267	316	377	450	4,480
Total 1998–2002	457	469	567	613	680	638	565	550	439	491	547	631	6,647

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Table 8

TABLE 8. Number of reported foodborne-disease outbreaks, by etiology and place where food was eaten* — United States, 1998–2002

	Place where food was eaten								
Etiology	Private residence	Restaurant or Delicatessen	Grocery	School	Daycare center	Workplace cafeteria	Picnic	Church	Camp
Bacterial									
Bacillus cereus	7	13	—	2	—	2	—	—	—
Brucella	1	—	—	—	—	—	—	—	—
Campylobacter	16	25	—	2	—	—	1	1	2
Clostridium botulinum	10	—	—	—	—	1	—	1	—
Clostridium perfringens	15	36	—	11	—	10	2	6	1
Escherichia coli	40	41	1	9	2	2	7	5	6
Listeria monocytogenes	9	2	2	—	—	—	—	—	—
Salmonella	169	271	2	21	5	7	12	20	9
Shigella	10	39	—	5	2	—	3	2	—
Staphylococcus aureus	20	26	1	10	2	8	4	9	3
Streptococcus	—	—	1	—	—	—	—	—	—
Vibrio cholerae	1	2	—	—	—	—	—	—	—
Vibrio parahaemolyticus	4	17	—	—	—	—	—	—	—
Vibrio, other	—	—	—	—	—	—	—	—	—
Yersinia enterocolitica	4	1	—	—	—	1	—	—	—
Other bacterial	—	—	—	—	—	—	—	—	—
Total bacterial	306	473	7	60	11	31	29	44	21
Chemical									
Ciguatoxin	73	7	—	—	—	—	1	—	2
Heavy metals	1	—	—	1	—	—	—	—	—
Mushroom toxin	2	—	—	—	—	—	—	—	—
Scombrotoxin	14	84	2	1	—	3	—	—	—
Shellfish toxin	4	—	—	—	—	—	—	—	—
Other chemical	2	3	—	2	—	1	—	—	—
Total chemical	96	94	2	4	—	4	1	0	2
Parasitic									
Anisakis	1	—	—	—	—	—	—	—	—
Cryptosporidium parvum	2	—	—	—	—	—	—	—	—
Cyclospora cayetanensis	2	2	—	—	—	—	—	—	—
Giardia intestinalis	1	1	—	—	—	—	—	—	—
Trichinella spiralis	3	—	—	—	—	—	1	—	1
Total parasitic	9	3	—	—	—	—	1	—	1
Viral									
Astrovirus	—	1	—	—	—	—	—	—	—
Hepatitis A	5	29	—	2	1	3	2	—	—
Norovirus	83	279	—	51	1	30	11	17	12
Rotavirus	—	—	—	1	—	—	—	—	—
Total viral	88	309	—	54	2	33	13	17	12
Multiple etiologies	7	8	1	2	1	—	2	—	1
Confirmed etiology	506	887	10	120	14	68	46	61	37
Unknown etiology	791	2,447	6	165	10	133	45	54	29
Total 1998–2002	1,297	3,334	16	265	24	201	91	115	66

* More than one place might be reported per outbreak.

TABLE 8. (*Continued*) Number of reported foodborne-disease outbreaks, by etiology and place where food was eaten* — United States, 1998–2002

Etiology	Place where food was eaten: Fair or festival	Hospital	Nursing home	Prison	Other	Known place	Unknown place	Total
Bacterial								
Bacillus cereus	—	—	—	—	8	33	4	37
Brucella	—	—	—	—	—	1	—	1
Campylobacter	1	—	—	1	13	57	4	61
Clostridium botulinum	—	—	—	—	—	11	1	12
Clostridium perfringens	—	4	—	10	33	125	5	130
Escherichia coli	3	—	1	7	20	127	13	140
Listeria monocytogenes	—	2	1	—	2	11	—	11
Salmonella	7	4	19	10	68	540	45	585
Shigella	—	—	—	—	4	64	3	67
Staphylococcus aureus	4	1	1	1	18	96	5	101
Streptococcus	—	—	—	—	—	1	—	1
Vibrio cholerae	—	—	—	—	—	3	—	3
Vibrio parahaemolyticus	—	—	—	—	2	23	2	25
Vibrio, other	—	—	—	—	—	—	1	1
Yersinia enterocolitica	—	—	—	—	1	7	1	8
Other bacterial	—	—	—	—	—	—	1	1
Total bacterial	15	11	22	29	160	1,099	85	1,184
Chemical								
Ciguatoxin	—	—	—	—	2	82	2	84
Heavy metals	—	—	—	—	—	2	—	2
Mushroom toxin	—	—	—	—	—	2	—	2
Scombrotoxin	—	1	1	—	8	113	5	118
Shellfish toxin	—	—	—	—	1	4	1	5
Other chemical	—	—	—	—	1	9	1	10
Total chemical	—	1	1	—	12	212	9	221
Parasitic								
Anisakis	—	—	—	—	—	1	—	1
Cryptosporidium parvum	—	—	—	—	2	4	—	4
Cyclospora cayetanensis	—	—	—	—	4	7	2	9
Giardia intestinalis	—	—	—	—	1	3	—	3
Trichinella spiralis	—	—	—	—	3	6	—	6
Total parasitic	—	—	—	—	10	21	2	23
Viral								
Astrovirus	—	—	—	—	—	1	—	1
Hepatitis A	—	—	—	—	4	42	8	50
Norovirus	5	7	21	6	148	636	21	657
Rotavirus	—	—	—	—	—	1	—	1
Total viral	5	7	21	6	152	680	29	709
Multiple etiologies	1	—	1	4	3	29	1	30
Confirmed etiology	21	19	45	39	346	2,041	126	2,167
Unknown etiology	23	32	23	20	576	4,222	258	4,480
Total 1998-2002	44	51	68	59	922	6,263	384	6,647

* More than one place might be reported per outbreak.

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Table 9

TABLE 9. Number of reported foodborne-disease outbreaks, cases, and deaths, by vehicle of transmission — United States, 1998

Vehicle of transmission	Outbreaks No.	Outbreaks (%)	Cases No.	Cases (%)	Deaths No.	Deaths (%)
Beef	26	(2.0)	805	(3.0)	0	(0.0)
Dairy	18	(1.4)	492	(1.8)	0	(0.0)
Eggs	7	(0.5)	49	(0.2)	0	(0.0)
Game	2	(0.2)	13	(0.0)	0	(0.0)
Pork	20	(2.2)	610	(2.2)	0	(0.0)
Poultry	62	(4.7)	876	(3.2)	0	(0.0)
Vegetables	27	(2.1)	1,299	(4.8)	2	(6.3)
Fruits and nuts	17	(1.3)	586	(2.1)	0	(0.0)
Grains	9	(0.7)	306	(1.1)	0	(0.0)
Oils and sugars	1	(0.1)	4	(0.0)	0	(0.0)
Finfish	69	(5.3)	493	(1.8)	0	(0.0)
Shellfish	39	(2.9)	880	(3.2)	0	(0.0)
Unclassifiable vehicle	41	(3.1)	632	(2.3)	2	(6.3)
Complex vehicle	432	(32.9)	10,851	(39.8)	23	(71.9)
Known vehicle	778	(59.2)	17,895	(65.7)	27	(84.4)
Unknown vehicle	536	(40.8)	9,363	(34.3)	5	(15.6)
Total 1998	1,314	(100.0)	27,258	(100.0)	32	(100.0)

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Table 10

TABLE 10. Number of reported foodborne-disease outbreaks, cases, and deaths, by vehicle of transmission — United States, 1999

Vehicle of transmission	Outbreaks No.	Outbreaks (%)	Cases No.	Cases (%)	Deaths No.	Deaths (%)
Beef	62	(4.6)	1,332	(5.4)	0	(0.0)
Dairy	15	(1.1)	199	(0.8)	0	(0.0)
Eggs	25	(1.9)	762	(3.1)	0	(0.0)
Game	0	(0.0)	0	(0.0)	0	(0.0)
Pork	26	(1.9)	559	(2.2)	0	(0.0)
Poultry	74	(5.5)	947	(3.8)	0	(0.0)
Vegetables	43	(3.2)	1,273	(5.1)	0	(0.0)
Fruits and nuts	19	(1.4)	629	(2.5)	0	(0.0)
Grains	19	(1.4)	139	(0.6)	0	(0.0)
Oils and sugars	5	(0.4)	135	(0.5)	0	(0.0)
Finfish	64	(4.8)	322	(1.3)	1	(10.0)
Shellfish	28	(2.1)	253	(1.0)	0	(0.0)
Unclassifiable vehicle	37	(2.8)	1,513	(6.1)	0	(0.0)
Complex vehicle	372	(27.7)	7,189	(28.9)	5	(50.0)
Known vehicle	789	(58.7)	15,252	(61.3)	6	(60.0)
Unknown vehicle	554	(41.3)	9,642	(38.7)	4	(40.0)
Total 1999	1,343	(100.0)	24,894	(100.0)	10	(100.0)

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Table 11

TABLE 11. Number of reported foodborne-disease outbreaks, cases, and deaths, by vehicle of transmission — United States, 2000

Vehicle of transmission	Outbreaks No.	Outbreaks (%)	Cases No.	Cases (%)	Deaths No.	Deaths (%)
Beef	43	(3.0)	696	(2.7)	1	(4.8)
Dairy	22	(1.6)	300	(1.1)	0	(0.0)
Eggs	25	(1.8)	620	(2.4)	0	(0.0)
Game	0	(0.0)	0	(0.0)	0	(0.0)
Pork	27	(1.9)	610	(2.3)	0	(0.0)
Poultry	61	(4.3)	829	(3.2)	7	(33.3)
Vegetables	41	(2.9)	872	(3.3)	2	(9.5)
Fruits and nuts	21	(1.5)	1,527	(5.8)	1	(4.8)
Grains	28	(2.0)	434	(1.7)	0	(0.0)
Oils and sugars	1	(0.1)	27	(0.1)	0	(0.0)
Finfish	63	(4.4)	267	(1.0)	0	(0.0)
Shellfish	25	(1.8)	134	(0.5)	0	(0.0)
Unclassifiable vehicle	51	(3.6)	950	(3.6)	0	(0.0)
Complex vehicle	455	(32.1)	9,525	(36.5)	9	(42.9)
Known vehicle	863	(60.9)	16,800	(64.3)	20	(95.2)
Unknown vehicle	554	(39.1)	9,322	(35.7)	1	(4.8)
Total 2000	1,417	(100.0)	26,122	(100.0)	21	(100.0)

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Table 12

TABLE 12. Number of reported foodborne-disease outbreaks, cases, and deaths, by vehicle of transmission — United States, 2001

Vehicle of transmission	Outbreaks No.	Outbreaks (%)	Cases No.	Cases (%)	Deaths No.	Deaths (%)
Beef	33	(2.6)	525	(2.1)	1	(9.1)
Dairy	21	(1.7)	536	(2.1)	0	(0.0)
Eggs	12	(1.0)	465	(1.9)	0	(0.0)
Game	5	(0.4)	45	(0.2)	0	(0.0)
Pork	30	(2.4)	560	(2.2)	0	(0.0)
Poultry	73	(5.9)	1,010	(4.0)	0	(0.0)
Vegetables	37	(3.0)	1,997	(7.9)	0	(0.0)
Fruits and nuts	21	(1.7)	585	(2.3)	2	(18.2)
Grains	11	(0.9)	92	(0.4)	0	(0.0)
Oils and sugars	4	(0.3)	95	(0.4)	0	(0.0)
Finfish	75	(6.0)	330	(1.3)	0	(0.0)
Shellfish	33	(2.7)	291	(1.2)	0	(0.0)
Unclassifiable vehicle	51	(4.1)	1,182	(4.7)	1	(9.1)
Complex vehicle	384	(31.0)	8,112	(32.3)	1	(9.1)
Known vehicle	790	(63.6)	15,825	(63.0)	5	(45.5)
Unknown vehicle	453	(36.4)	9,305	(37.0)	6	(54.5)
Total 2001	1,243	(100.0)	25,130	(100.0)	11	(100.0)

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Table 13

TABLE 13. Number of reported foodborne-disease outbreaks, cases, and deaths, by vehicle of transmission — United States, 2002

Vehicle of transmission	Outbreaks No.	Outbreaks (%)	Cases No.	Cases (%)	Deaths No.	Deaths (%)
Beef	44	(3.3)	831	(3.3)	3	(21.4)
Dairy	16	(1.2)	704	(2.8)	0	(0.0)
Eggs	14	(1.1)	317	(1.3)	0	(0.0)
Game	3	(0.2)	33	(0.1)	0	(0.0)
Pork	26	(2.0)	350	(1.4)	0	(0.0)
Poultry	75	(5.6)	1325	(5.3)	8	(57.1)
Vegetables	44	(3.3)	1596	(6.4)	0	(0.0)
Fruits and nuts	9	(0.7)	169	(0.7)	0	(0.0)
Grains	14	(1.1)	177	(0.7)	0	(0.0)
Oils and sugars	1	(0.1)	4	(0.0)	0	(0.0)
Finfish	66	(5.0)	280	(1.1)	0	(0.0)
Shellfish	27	(2.0)	200	(0.8)	0	(0.0)
Unclassifiable vehicle	52	(3.9)	1049	(4.2)	0	(0.0)
Complex vehicle	436	(32.8)	9360	(37.5)	1	(7.1)
Known vehicle	827	(62.2)	16414	(65.7)	12	(85.7)
Unknown vehicle	503	(37.8)	8552	(34.3)	2	(14.3)
Total 2002	1330	(100.0)	24966	(100.0)	14	(100.0)

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Table 14

TABLE 14. Number of reported foodborne-disease outbreaks, by etiology and vehicle of transmission — United States, 1998

Etiology	Vehicle of transmission: Beef	Dairy	Eggs	Game	Pork	Poultry	Vegetables	Fruits and nuts	Grains
Bacterial									
Bacillus cereus	—	—	—	—	—	—	—	—	—
Brucella	—	—	—	—	—	—	—	—	—
Campylobacter	—	2	—	—	—	1	1	—	—
Clostridium botulinum	—	—	—	—	—	—	—	—	—
Clostridium perfringens	4	—	—	—	3	2	—	—	—
Escherichia coli	1	2	—	—	—	—	2	1	—
Listeria monocytogenes	—	—	—	—	—	—	—	—	—
Salmonella	—	3	3	1	2	6	3	1	2
Shigella	—	—	—	—	—	1	1	—	—
Staphylococcus aureus	1	—	—	—	2	1	—	—	—
Streptococcus	—	—	—	—	—	1	—	—	—
Vibrio cholerae	—	—	—	—	—	—	—	—	—
Vibrio parahaemolyticus	—	—	—	—	—	1	—	—	—
Vibrio, other	—	—	—	—	—	—	—	—	—
Yersinia enterocolitica	—	—	—	—	—	—	—	—	—
Other bacterial	—	—	—	—	—	—	—	—	—
Total bacterial	6	7	3	1	7	13	7	2	2
Chemical									
Ciguatoxin	—	—	—	—	—	—	—	—	—
Heavy metals	—	—	—	—	—	—	—	—	—
Mushroom toxin	—	—	—	—	—	—	1	—	—
Scombrotoxin	—	—	—	—	—	—	—	—	—
Shellfish toxin	—	—	—	—	—	—	—	—	—
Other chemical	—	—	—	—	—	—	1	—	—
Total chemical	—	—	—	—	—	—	2	—	—
Parasitic									
Anisakis	—	—	—	—	—	—	—	—	—
Cryptosporidium parvum	—	—	—	—	—	—	—	—	—
Cyclospora cayetanensis	—	—	—	—	—	—	—	—	—
Giardia intestinalis	—	—	—	—	—	—	—	—	—
Trichinella spiralis	—	—	—	1	—	—	—	—	—
Total parasitic	—	—	—	1	—	—	—	—	—
Viral									
Astrovirus	—	—	—	—	—	—	—	—	—
Hepatitis A	—	—	—	—	—	—	—	2	—
Norovirus	—	1	—	—	1	—	1	2	—
Rotavirus	—	—	—	—	—	—	—	—	—
Total viral	—	1	—	—	1	—	1	4	—
Multiple etiologies	—	—	—	—	—	—	—	—	—
Confirmed etiology	6	8	3	2	8	13	10	6	2
Unknown etiology	20	10	4	—	21	49	17	11	7
Total 1998	26	18	7	2	29	62	27	17	9

TABLE 14. *(Continued)* Number of reported foodborne-disease outbreaks, by etiology and vehicle of transmission — United States, 1998

Etiology	Vehicle of transmission							
	Oils and sugars	Finfish	Shellfish	Unclassifiable vehicle	Complex vehicle	Known vehicle	Unknown vehicle	Total
Bacterial								
Bacillus cereus	—	—	1	—	7	8	2	10
Brucella	—	—	—	—	—	—	—	—
Campylobacter	—	—	1	—	2	7	5	12
Clostridium botulinum	—	2	—	—	1	3	—	3
Clostridium perfringens	—	—	—	—	12	21	3	24
Escherichia coli	—	—	—	—	12	18	14	32
Listeria monocytogenes	—	—	—	—	2	2	—	2
Salmonella	—	1	1	4	35	62	63	125
Shigella	—	1	—	—	4	7	10	17
Staphylococcus aureus	—	—	—	—	9	13	2	15
Streptococcus	—	—	—	—	—	1	—	1
Vibrio cholerae	—	—	1	—	—	1	—	1
Vibrio parahaemolyticus	—	—	11	—	—	12	1	13
Vibrio, other	—	—	1	—	—	1	—	1
Yersinia enterocolitica	—	—	—	—	1	1	—	1
Other bacterial	—	—	—	—	1	1	—	1
Total bacterial	—	4	16	4	86	158	100	258
Chemical								
Ciguatoxin	—	16	—	—	—	16	—	16
Heavy metals	—	—	—	—	—	—	—	—
Mushroom toxin	—	—	—	—	—	1	—	1
Scombrotoxin	—	27	—	—	—	27	—	27
Shellfish toxin	—	—	1	—	—	1	—	1
Other chemical	—	1	—	—	1	3	—	3
Total chemical	—	44	1	—	1	48	—	48
Parasitic								
Anisakis	—	—	—	—	—	—	—	—
Cryptosporidium parvum	—	—	—	—	—	—	1	—
Cyclospora cayetanensis	—	—	—	—	—	—	1	—
Giardia intestinalis	—	—	—	—	1	1	—	—
Trichinella spiralis	—	—	—	—	—	1	—	1
Total parasitic	—	—	—	—	1	2	2	1
Viral								
Astrovirus	—	—	—	—	—	—	—	—
Hepatitis A	—	—	—	—	—	2	11	13
Norovirus	—	—	1	3	17	25	21	47
Rotavirus	—	—	—	—	—	—	—	—
Total viral	—	—	1	3	17	28	32	60
Multiple etiologies	—	—	—	—	1	1	1	2
Confirmed etiology	—	48	18	6	107	237	135	372
Unknown etiology	1	21	20	35	325	541	401	942
Total 1998	1	69	38	41	432	778	536	1,314

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Table 15

TABLE 15. Number of reported foodborne-disease outbreaks, by etiology and vehicle of transmission — United States, 1999

	Vehicle of transmission								
Etiology	Beef	Dairy	Eggs	Game	Pork	Poultry	Vegetables	Fruits and nuts	Grains
Bacterial									
Bacillus cereus	—	—	—	—	—	—	—	—	3
Brucella	—	—	—	—	—	—	—	—	—
Campylobacter	—	1	—	—	—	1	—	—	—
Clostridium botulinum	—	—	—	—	—	—	—	—	—
Clostridium perfringens	4	—	1	—	—	3	1	—	—
Escherichia coli	12	—	—	—	—	—	5	—	—
Listeria monocytogenes	1	—	—	—	—	—	—	—	—
Salmonella	3	2	19	—	3	15	7	5	—
Shigella	—	—	1	—	—	—	—	—	—
Staphylococcus aureus	2	—	—	—	6	—	1	—	—
Streptococcus	—	—	—	—	—	—	—	—	—
Vibrio cholerae	—	—	—	—	—	—	—	—	—
Vibrio parahaemolyticus	—	—	—	—	—	—	—	—	—
Vibrio, other	—	—	—	—	—	—	—	—	—
Yersinia enterocolitica	—	—	—	—	1	—	—	—	—
Other bacterial	—	—	—	—	—	—	—	—	—
Total bacterial	22	3	21	0	10	19	14	5	3
Chemical									
Ciguatoxin	—	—	—	—	—	—	—	—	—
Heavy metals	—	—	—	—	—	—	—	—	—
Mushroom toxin	—	—	—	—	—	—	—	—	—
Scombrotoxin	—	—	—	—	—	—	—	—	—
Shellfish toxin	—	—	—	—	—	—	—	—	—
Other chemical	—	—	—	—	—	—	—	—	—
Total chemical	—	—	—	—	—	—	—	—	—
Parasitic									
Anisakis	—	—	—	—	—	—	—	—	—
Cryptosporidium parvum	—	—	—	—	—	—	—	—	—
Cyclospora cayetanensis	—	—	—	—	—	—	1	1	—
Giardia intestinalis	—	—	—	—	—	—	—	—	—
Trichinella spiralis	—	—	—	—	—	—	—	—	—
Total parasitic	—	—	—	—	—	—	1	1	—
Viral									
Astrovirus	—	—	—	—	—	—	—	—	—
Hepatitis A	—	—	—	—	—	—	—	—	—
Norovirus	5	2	—	—	1	2	3	5	—
Rotavirus	—	—	—	—	—	—	—	—	—
Total viral	5	2	—	—	1	2	3	5	—
Multiple etiologies	—	—	—	—	—	1	—	—	1
Confirmed etiology	27	5	21	—	11	22	18	11	4
Unknown etiology	35	10	4	—	15	52	25	8	15
Total 1999	62	15	25	—	26	74	43	19	19

TABLE 15. (*Continued*) Number of reported foodborne-disease outbreaks, by etiology and vehicle of transmission — United States, 1999

	Vehicle of transmission							
Etiology	Oils and sugars	Finfish	Shellfish	Unclassifiable vehicle	Complex vehicle	Known vehicle	Unknown vehicle	Total
Bacterial								
Bacillus cereus	—	—	—	—	5	6	1	7
Brucella	—	—	—	—	—	—	—	—
Campylobacter	—	—	—	—	—	2	3	5
Clostridium botulinum	—	—	—	—	1	1	—	1
Clostridium perfringens	—	—	—	—	12	21	1	22
Escherichia coli	—	—	—	1	3	21	7	28
Listeria monocytogenes	—	—	—	—	3	4	1	5
Salmonella	—	—	—	1	21	76	35	111
Shigella	—	—	—	—	7	8	6	14
Staphylococcus aureus	—	—	—	—	7	16	3	19
Streptococcus	—	—	—	—	—	—	—	—
Vibrio cholerae	—	—	1	—	—	1	—	1
Vibrio parahaemolyticus	—	—	3	—	—	3	—	3
Vibrio, other	—	—	—	—	—	—	—	—
Yersinia enterocolitica	—	—	—	—	—	1	—	1
Other bacterial	—	—	—	—	—	—	—	—
Total bacterial	—	—	4	2	57	160	57	217
Chemical								
Ciguatoxin	—	12	—	—	—	12	—	12
Heavy metals	—	—	—	—	1	1	—	1
Mushroom toxin	—	—	—	—	—	—	—	—
Scombrotoxin	—	20	—	—	1	21	—	21
Shellfish toxin	—	—	—	—	—	—	—	—
Other chemical	1	—	—	—	—	1	—	1
Total chemical	1	32	—	—	2	35	—	35
Parasitic								
Anisakis	—	1	—	—	—	1	—	1
Cryptosporidium parvum	—	—	—	—	—	—	—	—
Cyclospora cayetanensis	—	—	—	—	—	2	—	2
Giardia intestinalis	—	—	—	—	—	—	—	—
Trichinella spiralis	—	—	—	—	—	—	—	—
Total parasitic	—	1	—	—	—	3	—	3
Viral								
Astrovirus	—	—	—	—	—	—	—	—
Hepatitis A	—	—	—	1	5	6	6	12
Norovirus	1	—	2	3	29	53	45	98
Rotavirus	—	—	—	—	—	—	—	—
Total viral	1	—	2	4	34	59	51	110
Multiple etiologies	—	—	—	1	—	3	2	5
Confirmed etiology	2	33	6	7	93	260	110	370
Unknown etiology	3	31	22	30	279	529	444	973
Total 1999	5	64	28	37	372	789	554	1,343

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Table 16

TABLE 16. Number of reported foodborne-disease outbreaks, by etiology and vehicle of transmission — United States, 2000

	Vehicle of transmission								
Etiology	Beef	Dairy	Eggs	Game	Pork	Poultry	Vegetables	Fruits and nuts	Grains
Bacterial									
Bacillus cereus	—	—	—	—	—	—	—	—	2
Brucella	—	—	—	—	—	—	—	—	—
Campylobacter	—	10	—	—	—	—	1	—	—
Clostridium botulinum	—	—	—	—	—	—	2	—	—
Clostridium perfringens	3	—	—	—	2	4	—	—	1
Escherichia coli	11	—	—	—	—	2	1	2	—
Listeria monocytogenes	—	1	—	—	—	1	—	—	—
Salmonella	1	—	19	—	4	12	4	3	—
Shigella	—	—	—	—	1	—	—	—	—
Staphylococcus aureus	2	—	—	—	3	2	1	—	1
Streptococcus	—	—	—	—	—	—	—	—	—
Vibrio cholerae	—	—	—	—	—	—	—	—	—
Vibrio parahaemolyticus	—	—	—	—	—	—	—	—	—
Vibrio, other	—	—	—	—	—	—	—	—	—
Yersinia enterocolitica	—	—	—	—	—	—	—	—	—
Other bacterial	—	—	—	—	—	—	—	—	—
Total bacterial	17	11	19	—	10	21	9	5	4
Chemical									
Ciguatoxin	—	—	—	—	—	—	—	—	—
Heavy metals	—	—	—	—	—	—	—	1	—
Mushroom toxin	—	—	—	—	—	—	—	—	—
Scombrotoxin	—	—	—	—	—	—	—	—	—
Shellfish toxin	—	—	—	—	—	—	—	—	—
Other chemical	—	—	—	—	—	—	—	—	—
Total chemical	—	—	—	—	—	—	—	1	—
Parasitic									
Anisakis	—	—	—	—	—	—	—	—	—
Cryptosporidium parvum	—	—	—	—	—	—	—	—	—
Cyclospora cayetanensis	—	—	—	—	—	—	—	1	—
Giardia intestinalis	—	—	—	—	—	—	—	—	—
Trichinella spiralis	—	—	—	—	—	—	—	—	—
Total parasitic	—	—	—	—	—	—	—	1	—
Viral									
Astrovirus	—	—	—	—	—	—	—	—	—
Hepatitis A	—	—	—	—	—	—	1	1	—
Norovirus	1	—	—	—	2	1	8	6	—
Rotavirus	—	—	—	—	—	—	—	—	—
Total viral	1	—	—	—	2	1	9	7	—
Multiple etiologies	—	—	—	—	1	—	—	—	2
Confirmed etiology	18	11	19	—	13	22	18	14	6
Unknown etiology	25	11	6	—	14	39	23	7	22
Total 2000	43	22	25	—	27	61	41	21	28

TABLE 16. (*Continued*) Number of reported foodborne-disease outbreaks, by etiology and vehicle of transmission — United States, 2000

Etiology	Vehicle of transmission: Oils and sugars	Finfish	Shellfish	Unclassifiable vehicle	Complex vehicle	Known vehicle	Unknown vehicle	Total
Bacterial								
Bacillus cereus	—	1	—	—	3	6	2	8
Brucella	—	—	—	—	—	—	—	—
Campylobacter	—	—	—	—	—	11	4	15
Clostridium botulinum	—	—	—	—	—	2	—	2
Clostridium perfringens	—	—	—	1	9	20	2	22
Escherichia coli	—	—	—	2	4	22	10	32
Listeria monocytogenes	—	—	—	—	—	2	—	2
Salmonella	—	2	—	4	37	86	41	127
Shigella	—	—	—	2	6	9	3	12
Staphylococcus aureus	—	—	—	1	9	19	4	23
Streptococcus	—	—	—	—	—	—	—	—
Vibrio cholerae	—	—	—	—	—	—	—	—
Vibrio parahaemolyticus	—	—	3	—	1	4	—	4
Vibrio, other	—	—	—	—	—	—	—	—
Yersinia enterocolitica	—	—	—	—	—	—	—	—
Other bacterial	—	—	—	—	—	—	—	—
Total bacterial	—	3	3	10	69	181	66	247
Chemical								
Ciguatoxin	—	12	—	—	—	12	—	12
Heavy metals	—	—	—	—	—	1	—	1
Mushroom toxin	—	—	—	—	—	—	—	—
Scombrotoxin	—	20	—	—	—	20	—	20
Shellfish toxin	—	—	3	—	—	3	—	3
Other chemical	—	—	—	—	2	2	—	2
Total chemical	—	32	3	—	2	38	—	38
Parasitic								
Anisakis	—	—	—	—	—	—	—	—
Cryptosporidium parvum	—	—	—	—	1	1	—	1
Cyclospora cayetanensis	—	—	—	—	1	2	—	2
Giardia intestinalis	—	—	—	1	—	1	—	1
Trichinella spiralis	—	—	—	—	2	2	—	2
Total parasitic	—	—	—	1	4	6	—	6
Viral								
Astrovirus	—	—	—	—	—	—	—	—
Hepatitis A	—	—	1	1	5	9	3	12
Norovirus	—	1	2	4	49	74	89	163
Rotavirus	—	—	—	1	—	1	—	1
Total viral	—	1	3	6	54	84	92	176
Multiple etiologies	—	—	—	—	—	3	—	3
Confirmed etiology	—	36	9	17	129	312	158	470
Unknown etiology	1	27	16	34	326	551	396	947
Total 2000	1	63	25	51	455	863	554	1,417

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Table 17

TABLE 17. Number of reported foodborne-disease outbreaks, by etiology and vehicle of transmission — United States, 2001

Etiology	Vehicle of transmission								
	Beef	Dairy	Eggs	Game	Pork	Poultry	Vegetables	Fruits and nuts	Grains
Bacterial									
Bacillus cereus	—	—	—	—	—	—	1	—	—
Brucella	—	1	—	—	—	—	—	—	—
Campylobacter	—	2	—	1	—	2	—	1	—
Clostridium botulinum	—	—	—	1	—	—	—	—	—
Clostridium perfringens	10	—	—	—	—	4	1	—	—
Escherichia coli	—	1	—	—	—	—	1	1	—
Listeria monocytogenes	—	—	—	—	—	1	—	—	—
Salmonella	1	4	10	—	5	9	3	6	—
Shigella	1	—	—	—	—	1	2	—	—
Staphylococcus aureus	—	—	—	—	6	2	—	—	—
Streptococcus	—	—	—	—	—	—	—	—	—
Vibrio cholerae	—	—	—	—	—	—	—	—	—
Vibrio parahaemolyticus	—	—	—	—	—	—	—	—	—
Vibrio, other	—	—	—	—	—	—	—	—	—
Yersinia enterocolitica	—	—	—	—	2	—	—	—	—
Other bacterial	—	—	—	—	—	—	—	—	—
Total bacterial	12	8	10	2	13	19	8	8	—
Chemical									
Ciguatoxin	—	—	—	—	—	—	—	—	—
Heavy metals	—	—	—	—	—	—	—	—	—
Mushroom toxin	—	—	—	—	—	—	—	—	—
Scombrotoxin	—	—	—	—	—	—	—	—	—
Shellfish toxin	—	—	—	—	—	—	—	—	—
Other chemical	—	—	—	1	—	—	—	—	—
Total chemical	—	—	—	1	—	—	—	—	—
Parasitic									
Anisakis									
Cryptosporidium parvum	—	—	—	—	—	—	—	—	—
Cyclospora cayetanensis	—	—	—	—	—	—	1	—	—
Giardia intestinalis	—	—	—	—	—	—	—	—	—
Trichinella spiralis	—	—	—	1	—	—	—	—	—
Total parasitic	—	—	—	1	—	—	1	—	—
Viral									
Astrovirus	—	—	—	—	—	—	—	—	—
Hepatitis A	—	1	—	—	—	—	1	—	—
Norovirus	—	2	—	1	1	3	7	5	1
Rotavirus	—	—	—	—	—	—	—	—	—
Total viral	—	3	—	1	1	3	8	5	1
Multiple etiologies	1	—	—	—	1	1	—	—	—
Confirmed etiology	13	11	10	5	15	23	17	13	1
Unknown etiology	20	10	2	—	15	50	20	8	10
Total 2001	33	21	12	5	30	73	37	21	11

TABLE 17. (*Continued*) Number of reported foodborne-disease outbreaks, by etiology and vehicle of transmission — United States, 2001

	Vehicle of transmission							
Etiology	Oils and sugars	Finfish	Shellfish	Unclassifiable vehicle	Complex vehicle	Known vehicle	Unknown vehicle	Total
Bacterial								
Bacillus cereus	—	—	—	—	4	5	—	5
Brucella	—	—	—	—	—	1	—	1
Campylobacter	—	—	—	—	5	11	5	16
Clostridium botulinum	—	1	—	—	1	3	—	3
Clostridium perfringens	—	—	—	—	11	26	5	31
Escherichia coli	—	—	—	1	6	10	12	22
Listeria monocytogenes	—	—	—	—	—	1	—	1
Salmonella	—	—	1	8	30	77	34	111
Shigella	—	—	2	—	4	10	5	15
Staphylococcus aureus	—	—	—	—	14	22	1	23
Streptococcus	—	—	—	—	—	—	—	—
Vibrio cholerae	—	—	1	—	—	1	—	1
Vibrio parahaemolyticus	—	—	1	—	2	3	—	3
Vibrio, other	—	—	—	—	—	—	—	—
Yersinia enterocolitica	—	—	—	—	—	2	1	3
Other bacterial	—	—	—	—	—	—	—	—
Total bacterial	—	1	5	9	77	172	63	235
Chemical								
Ciguatoxin	—	24	—	—	—	24	—	24
Heavy metals	—	—	—	—	—	—	—	—
Mushroom toxin	—	—	—	—	—	—	—	—
Scombrotoxin	—	29	—	—	—	29	—	29
Shellfish toxin	—	—	—	—	—	—	—	—
Other chemical	—	—	—	—	—	1	—	1
Total chemical	—	53	—	—	—	54	—	54
Parasitic								
Anisakis								
Cryptosporidium parvum	—	—	—	—	—	—	—	—
Cyclospora cayetanensis	—	—	—	—	—	1	1	2
Giardia intestinalis	—	—	—	—	—	—	1	1
Trichinella spiralis	—	—	—	—	1	2	—	2
Total parasitic	—	—	—	—	1	3	2	5
Viral								
Astrovirus	—	—	—	—	—	—	—	—
Hepatitis A	—	—	—	2	—	4	2	6
Norovirus	1	1	8	10	40	80	70	150
Rotavirus	—	—	—	—	—	—	—	—
Total viral	1	1	8	12	40	84	72	156
Multiple etiologies	—	—	—	—	4	7	2	9
Confirmed etiology	1	55	13	21	122	321	139	460
Unknown etiology	3	20	20	30	262	470	314	784
Total 2001	4	75	33	51	384	791	453	1,243

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Table 18

TABLE 18. Number of reported foodborne-disease outbreaks, by etiology and vehicle of transmission — United States, 2002

Etiology	Vehicle of transmission								
	Beef	Dairy	Eggs	Game	Pork	Poultry	Vegetables	Fruits and nuts	Grains
Bacterial									
Bacillus cereus	—	—	—	—	—	2	—	—	1
Brucella	—	—	—	—	—	—	—	—	—
Campylobacter	—	4	—	—	—	2	1	—	—
Clostridium botulinum	—	—	—	—	—	—	—	—	—
Clostridium perfringens	8	—	1	—	2	5	—	—	—
Escherichia coli	6	—	—	—	—	—	3	—	1
Listeria monocytogenes	—	—	—	—	—	1	—	—	—
Salmonella	4	2	6	2	3	8	8	3	1
Shigella	—	—	—	—	—	—	1	—	—
Staphylococcus aureus	1	—	—	—	4	2	—	—	—
Streptococcus	—	—	—	—	—	—	—	—	—
Vibrio cholerae	—	—	—	—	—	—	—	—	—
Vibrio parahaemolyticus	—	—	—	—	—	—	—	—	—
Vibrio, other	—	—	—	—	—	—	—	—	—
Yersinia enterocolitica	—	—	—	—	1	—	—	—	—
Other bacterial	—	—	—	—	—	—	—	—	—
Total bacterial	19	6	7	2	10	20	13	3	3
Chemical									
Ciguatoxin	—	—	—	—	—	—	—	—	—
Heavy metals	—	—	—	—	—	—	—	—	—
Mushroom toxin	—	—	—	—	—	—	1	—	—
Scombrotoxin	—	—	—	—	—	—	—	—	—
Shellfish toxin	—	—	—	—	—	—	—	—	—
Other chemical	—	1	—	—	—	1	—	—	—
Total chemical	—	1	—	—	—	1	1	—	—
Parasitic									
Anisakis	—	—	—	—	—	—	—	—	—
Cryptosporidium parvum	—	—	—	—	—	—	—	—	—
Cyclospora cayetanensis	—	—	—	—	—	—	—	1	—
Giardia intestinalis	—	—	—	—	—	—	—	—	—
Trichinella spiralis	—	—	—	1	—	—	—	—	—
Total parasitic	—	—	—	1	—	—	—	1	—
Viral									
Astrovirus	—	—	—	—	—	—	—	—	—
Hepatitis A	—	—	—	—	—	—	—	—	—
Norovirus	4	2	—	—	—	2	11	1	—
Rotavirus	—	—	—	—	—	—	—	—	—
Total viral	4	2	—	—	—	2	11	1	—
Multiple etiologies	1	—	—	—	1	—	—	—	—
Confirmed etiology	24	9	7	3	11	23	25	5	3
Unknown etiology	20	7	7	—	15	52	19	4	11
Total 2002	44	16	14	3	26	75	44	9	14

TABLE 18. (*Continued*) Number of reported foodborne-disease outbreaks, by etiology and vehicle of transmission — United States, 2002

Etiology	Oils and sugars	Finfish	Shellfish	Unclassifiable vehicle	Complex vehicle	Known vehicle	Unknown vehicle	Total
	Vehicle of transmission							
Bacterial								
Bacillus cereus	—	—	—	—	4	7	—	7
Brucella	—	—	—	—	—	—	—	—
Campylobacter	—	—	—	—	4	11	2	13
Clostridium botulinum	—	2	—	—	1	3	—	3
Clostridium perfringens	—	—	—	—	13	22	2	31
Escherichia coli	—	—	—	2	7	20	6	25
Listeria monocytogenes	—	—	—	—	—	1	—	1
Salmonella	—	1	—	3	34	75	36	111
Shigella	—	—	—	—	2	3	6	9
Staphylococcus aureus	—	—	—	—	13	20	1	21
Streptococcus	—	—	—	—	—	—	—	—
Vibrio cholerae	—	—	—	—	—	—	—	—
Vibrio parahaemolyticus	—	—	2	—	—	2	—	2
Vibrio, other	—	—	—	—	—	—	—	—
Yersinia enterocolitica	—	—	—	1	—	2	1	3
Other bacterial	—	—	—	—	—	—	—	—
Total bacterial	—	3	2	7	78	173	54	227
Chemical								
Ciguatoxin	—	20	—	—	—	20	—	20
Heavy metals	—	—	—	—	—	—	—	—
Mushroom toxin	—	—	—	—	—	1	—	1
Scombrotoxin	—	21	—	—	—	21	—	21
Shellfish toxin	—	1	—	—	—	1	—	1
Other chemical	—	—	—	1	—	3	—	3
Total chemical	—	42	—	1	—	45	—	46
Parasitic								
Anisakis	—	—	—	—	—	—	—	—
Cryptosporidium parvum	—	—	—	—	—	—	2	2
Cyclospora cayetanensis	—	—	—	—	1	2	—	2
Giardia intestinalis	—	—	—	—	—	—	—	—
Trichinella spiralis	—	—	—	—	—	1	—	1
Total parasitic	—	—	—	—	1	3	2	5
Viral								
Astrovirus	—	—	—	—	—	—	1	1
Hepatitis A	—	—	—	—	1	1	6	7
Norovirus	—	—	2	10	62	94	105	199
Rotavirus	—	—	—	—	—	—	—	—
Total viral	—	—	2	10	63	95	112	207
Multiple etiologies	—	—	—	—	5	7	4	11
Confirmed etiology	—	45	4	18	147	324	172	496
Unknown etiology	1	21	23	34	289	503	331	834
Total 2002	1	66	27	52	436	827	503	1,330

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Table 19

TABLE 19. Number of reported foodborne-disease outbreaks, by etiology and contributing factors*,† — United States, 1998–2002

	Contamination factors								
Etiology	C1	C2	C3	C4	C5	C6	C7	C8	C9
Bacterial									
Bacillus cereus	—	—	—	—	—	3	—	—	—
Brucella	—	—	—	—	—	1	—	—	—
Campylobacter	—	—	—	—	—	18	7	—	10
Clostridium botulinum	—	—	—	—	—	5	1	—	—
Clostridium perfringens	—	—	—	—	—	14	1	—	5
Escherichia coli	—	1	—	—	—	33	4	1	14
Listeria monocytogenes	—	—	—	—	—	1	1	—	—
Salmonella	1	—	—	—	4	97	42	3	85
Shigella	—	—	—	—	—	1	—	—	1
Staphylococcus aureus	—	—	—	—	—	—	—	—	1
Streptococcus	—	—	—	—	—	—	—	—	—
Vibrio cholerae	—	—	—	—	—	—	1	1	—
Vibrio parahaemolyticus	1	—	—	—	—	7	4	2	2
Vibrio, other	—	—	—	—	—	—	—	—	—
Yersinia enterocolitica	—	—	—	—	—	—	—	—	2
Other bacterial	—	—	—	—	—	—	—	—	—
Total bacterial	2	1	—	—	4	180	61	7	120
Chemical									
Ciguatoxin	54	—	—	—	—	—	—	4	—
Heavy metals	—	—	1	—	—	1	—	—	—
Mushroom toxin	1	—	—	—	—	—	—	—	—
Scombrotoxin	43	—	—	—	—	1	1	—	1
Shellfish toxin	4	—	—	—	—	—	—	—	—
Other chemical	—	—	5	—	—	—	—	—	—
Total chemical	102	—	6	—	—	2	1	4	1
Parasitic									
Anisakis	—	—	—	—	—	—	—	—	—
Cryptosporidium parvum	—	—	—	—	—	1	1	—	—
Cyclospora cayetanensis	—	—	—	—	—	5	3	—	—
Giardia intestinalis	—	—	—	—	—	—	—	—	—
Trichinella spiralis	—	—	—	—	—	1	3	—	—
Total parasitic	—	—	—	—	—	7	7	—	—
Viral									
Astrovirus	—	—	—	—	—	—	—	—	—
Hepatitis A	—	—	—	—	1	—	1	—	1
Norovirus	—	—	—	—	1	21	18	3	9
Rotavirus	—	—	—	—	—	—	—	—	—
Total viral	—	—	—	—	2	21	19	3	10
Multiple etiologies	—	—	—	—	—	2	3	1	—
Confirmed etiology	104	1	6	—	6	212	91	15	131
Unknown etiology	42	1	20	3	7	133	38	10	251
Total 1998–2002	146	2	26	3	13	345	129	25	382

* More than one contributing factor might be reported per outbreak.
† See Appendix A for description of each factor.

TABLE 19. (*Continued*) Number of reported foodborne-disease outbreaks, by etiology and contributing factors*† — United States, 1998–2002

	Contamination factors						
Etiology	C10	C11	C12	C13	C14	C15	Outbreaks in which contamination factor reported
Bacterial							
Bacillus cereus	1	1	1	3	2	—	10
Brucella	—	—	—	—	—	—	1
Campylobacter	5	2	1	13	3	3	39
Clostridium botulinum	—	—	—	1	—	1	7
Clostridium perfringens	8	2	2	12	6	11	41
Escherichia coli	12	1	6	8	3	3	60
Listeria monocytogenes	—	—	—	1	—	3	6
Salmonella	37	4	64	82	17	23	250
Shigella	12	3	16	5	2	3	25
Staphylococcus aureus	17	5	30	9	5	6	59
Streptococcus	—	—	1	—	—	—	1
Vibrio cholerae	—	—	—	—	—	—	2
Vibrio parahaemolyticus	2	1	1	4	1	—	14
Vibrio, other	—	—	—	—	—	—	—
Yersinia enterocolitica	—	—	—	2	—	—	4
Other bacterial	—	—	—	1	—	—	1
Total bacterial	94	19	122	142	39	53	521
Chemical							
Ciguatoxin	—	—	—	—	—	—	58
Heavy metals	—	—	—	—	—	—	2
Mushroom toxin	—	—	—	—	—	—	1
Scombrotoxin	—	1	—	1	2	9	55
Shellfish toxin	—	—	—	—	—	—	4
Other chemical	—	—	—	—	1	1	6
Total chemical	—	1	—	1	3	10	126
Parasitic	—	—	—	—	—	—	—
Anisakis	—	—	—	—	—	1	1
Cryptosporidium parvum	—	—	—	—	—	—	1
Cyclospora cayetanensis	—	—	—	—	—	1	6
Giardia intestinalis	1	—	2	1	1	—	2
Trichinella spiralis	—	—	—	—	—	—	4
Total parasitic	1	—	2	1	1	2	14
Viral							
Astrovirus	—	—	—	—	—	—	—
Hepatitis A	13	4	16	1	—	3	25
Norovirus	129	30	202	40	7	28	312
Rotavirus	—	—	—	—	—	—	—
Total viral	142	34	218	41	7	31	337
Multiple etiologies	2	1	7	6	2	4	14
Confirmed etiology	239	55	349	191	52	100	1,012
Unknown etiology	526	132	251	477	122	191	1,365
Total 1998–2002	765	187	600	668	174	291	2,377

* More than one contributing factor might be reported per outbreak.
† See Appendix A for description of each factor.

TABLE 19. (*Continued*) Number of reported foodborne-disease outbreaks, by etiology and contributing factors*,† — United States, 1998–2002

Etiology	Proliferation factors							
	P1	P2	P3	P4	P5	P6	P7	P8
Bacterial								
Bacillus cereus	16	1	4	4	—	3	—	—
Brucella	—	—	—	—	—	—	—	—
Campylobacter	6	1	4	—	—	1	—	—
Clostridium botulinum	7	—	—	1	—	—	3	—
Clostridium perfringens	53	50	20	27	—	39	—	—
Escherichia coli	12	2	7	3	—	6	—	—
Listeria monocytogenes	—	—	1	—	—	—	—	—
Salmonella	110	26	53	33	3	28	—	1
Shigella	3	1	5	1	—	—	—	—
Staphylococcus aureus	42	17	13	17	1	15	—	1
Streptococcus	—	—	—	—	—	1	—	—
Vibrio cholerae	—	—	—	—	—	—	—	—
Vibrio parahaemolyticus	5	—	—	2	—	—	—	—
Vibrio, other	—	—	—	—	—	—	—	—
Yersinia enterocolitica	—	—	—	—	—	—	—	—
Other bacterial	1	—	—	—	—	—	—	—
Total bacterial	255	98	107	88	4	93	3	2
Chemical								
Ciguatoxin	—	—	—	—	—	—	—	—
Heavy metals	—	—	—	—	—	—	—	—
Mushroom toxin	—	—	—	—	—	—	—	—
Scombrotoxin	21	—	18	1	—	—	—	—
Shellfish toxin	—	—	—	—	—	—	—	—
Other chemical	—	—	—	—	—	—	—	—
Total chemical	21	—	18	1	—	—	—	—
Parasitic								
Anisakis	—	—	—	—	—	—	—	—
Cryptosporidium parvum	—	—	—	—	—	—	—	—
Cyclospora cayetanensis	—	—	—	—	—	—	—	—
Giardia intestinalis	—	—	—	—	—	—	—	—
Trichinella spiralis	—	—	—	—	—	—	—	—
Total parasitic	—	—	—	—	—	—	—	—
Viral								
Astrovirus	—	—	—	—	—	—	—	—
Hepatitis A	—	—	—	—	—	—	—	—
Norovirus	17	4	8	3	—	6	1	—
Rotavirus	—	—	—	—	—	—	—	—
Total viral	17	4	8	3	—	6	1	—
Multiple etiologies	9	4	3	2	—	3	—	—
Confirmed etiology	296	102	136	93	4	100	4	2
Unknown etiology	599	224	432	159	15	219	1	—
Total 1998–2002	894	330	571	254	19	322	5	2

* More than one contributing factor might be reported per outbreak.
† See Appendix A for description of each factor.

TABLE 19. (*Continued*) Number of reported foodborne-disease outbreaks, by etiology and contributing factors*,† — United States, 1998–2002

	Proliferation factors				
Etiology	P9	P10	P11	P12	Outbreaks in which proliferation factor reported
Bacterial					
Bacillus cereus	—	—	—	—	21
Brucella	—	—	—	1	1
Campylobacter	—	—	1	4	14
Clostridium botulinum	—	1	—	1	11
Clostridium perfringens	4	—	—	5	103
Escherichia coli	—	—	—	3	24
Listeria monocytogenes	—	1	—	—	2
Salmonella	4	—	—	25	185
Shigella	—	—	—	3	10
Staphylococcus aureus	3	—	—	1	63
Streptococcus	—	—	—	—	1
Vibrio cholerae	—	—	—	—	—
Vibrio parahaemolyticus	—	—	—	—	6
Vibrio, other	—	—	—	—	—
Yersinia enterocolitica	—	—	—	1	1
Other bacterial	—	—	—	—	1
Total bacterial	11	2	1	44	444
Chemical					
Ciguatoxin	—	—	—	—	—
Heavy metals	—	—	—	—	—
Mushroom toxin	—	—	—	—	—
Scombrotoxin	—	—	—	3	31
Shellfish toxin	—	—	—	—	—
Other chemical	—	—	—	—	—
Total chemical	—	—	—	3	31
Parasitic					
Anisakis	—	—	—	—	—
Cryptosporidium parvum	—	—	—	—	—
Cyclospora cayetanensis	—	—	—	—	—
Giardia intestinalis	—	—	—	—	—
Trichinella spiralis	—	—	—	—	—
Total parasitic	—	—	—	—	—
Viral					
Astrovirus	—	—	—	—	—
Hepatitis A	—	—	—	1	1
Norovirus	—	—	—	1	28
Rotavirus	—	—	—	—	—
Total viral	—	—	—	2	29
Multiple etiologies	1	—	—	—	13
Confirmed etiology	11	2	1	50	511
Unknown etiology	41	—	4	40	1,133
Total 1998–2002	53	2	5	90	1,657

* More than one contributing factor might be reported per outbreak.
† See Appendix A for description of each factor.

TABLE 19. (*Continued*) Number of reported foodborne-disease outbreaks by etiology, and contributing factors*,† — United States, 1998–2002

Etiology	Survival factors S1	S2	S3	S4	S5	Outbreaks in which survival factor reported	Outbreaks in which any contributing factor reported	Total
Bacterial								
Bacillus cereus	—	3	—	—	1	4	24	37
Brucella	—	—	—	—	1	1	1	1
Campylobacter	15	—	—	1	6	21	39	61
Clostridium botulinum	5	1	2	—	4	10	12	12
Clostridium perfringens	33	41	—	5	4	61	102	130
Escherichia coli	20	2	—	3	4	27	69	140
Listeria monocytogenes	1	—	—	—	—	1	6	11
Salmonella	104	23	1	5	21	139	235	585
Shigella	—	—	—	—	4	4	27	67
Staphylococcus aureus	8	14	—	2	8	28	73	101
Streptococcus	—	—	—	—	—	—	1	1
Vibrio cholerae	—	—	—	—	—	—	2	3
Vibrio parahaemolyticus	3	—	—	—	1	4	15	25
Vibrio, other	—	—	—	—	—	—	—	1
Yersinia enterocolitica	—	—	—	—	1	1	4	8
Other bacterial	—	—	—	—	—	—	1	1
Total bacterial	189	84	3	16	55	301	695	1,184
Chemical								
Ciguatoxin	—	—	—	—	—	—	58	64
Heavy metals	—	—	—	—	—	—	2	2
Mushroom toxin	—	—	—	—	—	—	1	2
Scombrotoxin	1	—	—	—	2	4	74	118
Shellfish toxin	—	—	—	—	—	—	4	5
Other chemical	—	—	—	—	—	—	6	10
Total chemical	1	—	—	—	3	4	145	221
Parasitic								
Anisakis	—	—	—	—	—	—	1	1
Cryptosporidium parvum	—	—	—	—	—	—	1	4
Cyclospora cayetanensis	—	—	—	—	—	—	6	9
Giardia intestinalis	—	—	—	—	—	—	2	3
Trichinella spiralis	3	—	—	—	—	3	5	6
Total parasitic	3	—	—	—	—	3	15	23
Viral								
Astrovirus	—	—	—	—	—	—	—	1
Hepatitis A	—	—	—	—	—	—	25	50
Norovirus	5	4	—	—	10	18	319	657
Rotavirus	—	—	—	—	—	—	—	1
Total viral	5	4	—	—	10	18	344	709
Multiple etiologies	4	1	—	1	1	6	20	30
Confirmed etiology	198	88	3	16	69	327	1,238	2,167
Unknown etiology	171	151	2	16	74	369	1,834	4,480
Total 1998–2002	373	250	5	33	144	702	3,072	6,647

* More than one contributing factor might be reported per outbreak.

† See Appendix A for description of each factor.

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**Questions or messages regarding errors in formatting should be addressed to mmwrq@cdc.gov.

Date last reviewed: 10/26/2006

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Exhibit D

COMPLETE BILL HISTORY

BILL NUMBER : A.B. No. 1735
AUTHOR : Committee on Agriculture
TOPIC : Milk and dairy products: standards.

TYPE OF BILL :

Inactive
Non-Urgency
Non-Appropriations
Majority Vote Required
State-Mandated Local Program
Fiscal
Non-Tax Levy

BILL HISTORY
2007
Oct. 8 Chaptered by Secretary of State - Chapter 339, Statutes of 2007.
Oct. 8 Approved by the Governor.
Sept. 6 Enrolled and to the Governor at 6 p.m.
Aug. 30 In Assembly. To enrollment.
Aug. 30 Read third time, passed, and to Assembly. (Ayes 39. Noes 0. Page 2178.)
Aug. 21 Read second time. To third reading.
Aug. 20 From committee: Be placed on second reading file pursuant to Senate Rule 28.8.
July 12 From committee: Do pass, and re-refer to Com. on APPR. with recommendation: To Consent Calendar. Re-referred. (Ayes 10. Noes 0.) .
June 20 From committee: Do pass, and re-refer to Com. on HEALTH with recommendation: To Consent Calendar. Re-referred. (Ayes 5. Noes 0.) .
May 23 Referred to Coms. on AGRI. and HEALTH.
May 17 In Senate. Read first time. To Com. on RLS. for assignment.
May 17 Read third time, passed, and to Senate. (Ayes 73. Noes 0. Page 1538.)
May 14 Read second time. To Consent Calendar.
May 10 From committee: Do pass. To Consent Calendar. (May 9).
Apr. 26 From committee: Do pass, and re-refer to Com. on APPR. with recommendation: To Consent Calendar. Re-referred. (Ayes 8. Noes 0.) (April 25).
Apr. 17 Re-referred to Com. on AGRI.
Apr. 16 From committee chair, with author's amendments: Amend, and re-refer to Com. on AGRI. Read second time and amended.
Mar. 29 Referred to Com. on AGRI.
Mar. 15 Read first time. To print.

Exhibit E

Date of Hearing: April 25, 2007

ASSEMBLY COMMITTEE ON AGRICULTURE
Nicole Parra, Chair
AB 1735 (Agriculture) - As Amended: April 16, 2007

SUBJECT : Milk and dairy products: standards.

SUMMARY : Makes numerous technical changes to conform California statute to federal milk product guidelines.

EXISTING STATE LAW regulates the cooling times for, temperature of, and microbial standards for market milk and processed milk products, and provides that violations of these provisions constitutes a misdemeanor. All 50 states, the District of Columbia and U.S. Territories have similar inspection and testing programs for Grade-A milk and milk products in accordance with the federal Pasteurized Milk Ordinance. The states of Arizona, Nevada, Oregon, Utah and Washington have specific coliform standards for milk sold raw to consumers.

FISCAL EFFECT : Unknown

COMMENTS : California is a member of the National Conference on Interstate Milk Shipments, a nationally recognized non-profit organization that brings together regulators and the industry, in order to collaborate on policies aimed at making milk and milk products safe for consumers. As a member, the state is charged with ensuring compliance with federal guidelines. Each of the provisions in this bill is necessary for the state's milk safety and inspection laws to be consistent with federal interstate milk shipment guidelines.

AB 444 (Aguiar, Chapter 95 - Statutes of 1994) inadvertently repealed several sections of the Food and Agricultural Code, as an urgency measure, in order to bring provisions governing labeling standards for dairy products into compliance with the federal Nutrition Labeling and Education Act of 1990. The California Department of Food and Agriculture (CDFA) continued to enforce these microbial standards. In order to be consistent with updated federal guidelines, and to restore clear statutory authority for enforcement, it is necessary to reinstate microbial standards for certain dairy products, such as half-and-half, heavy cream, ice cream, light cream, nonfat dry milk, quiescently frozen confections, raw fluid milk, sherbet, sour cream, whipped cream, whipping cream and yogurt.

Within the past year, two outbreaks of Escheria Coli 0157:H7 in Washington and one in California have been linked to raw milk consumption. The absence of a coliform standard in bottled raw milk is a significant gap in current regulatory monitoring. This bill specifies coliform counts for raw milk intended for direct fluid consumption shall be the same as minimum coliform counts for pasteurized fluid milk. The absence of a coliform standard in bottled raw milk is a significant gap in current regulatory food safety monitoring.

Currently, California's minimum inspection score threshold for market milk (Grade-A) dairy farms is 85%, whereas, federal guidelines require a score of 90% or higher. Should dairy farms score less than 90% during a federal compliance rating, the fluid milk may not be sold across state lines for Grade-A purposes, nor used in California to manufacture Grade-A milk and dairy products, for shipment in interstate commerce. In such cases the diversion of milk to alternative non-Grade A uses may result in the milk handler receiving less profit compared to the milk's intended Grade-A purpose. For instance, a milk handler could purchase at the fluid milk price; however, if a rating of the dairy farm the handler purchases the milk from falls below the accepted federal score, the handler may only utilize the milk for manufactured product, such as cheese or ice cream. This bill brings dairy farms into compliance with federal inspection guidelines for fluid milk by raising the state's dairy farm inspection score requirement to that of the federal level.

State law requires that milk intended for fluid consumption be cooled to a specified temperature within five hours of the commencement of milking, whereas, federal requirements require cooling to occur within four hours of commencement. Additionally, allows the Secretary of CDFA to promulgate regulations to provide for the temporary deviation of these requirements in the event of an emergency, provided that the quality and safety of the product is not compromised. This bill conforms California standards to federal standards for fluid milk cooling and temperature guidelines during transit.

REGISTERED SUPPORT / OPPOSITION :

Support

None on file.

Opposition

None on file.

Analysis Prepared by : Dawn Clover / AGRI. / (916) 319-2084