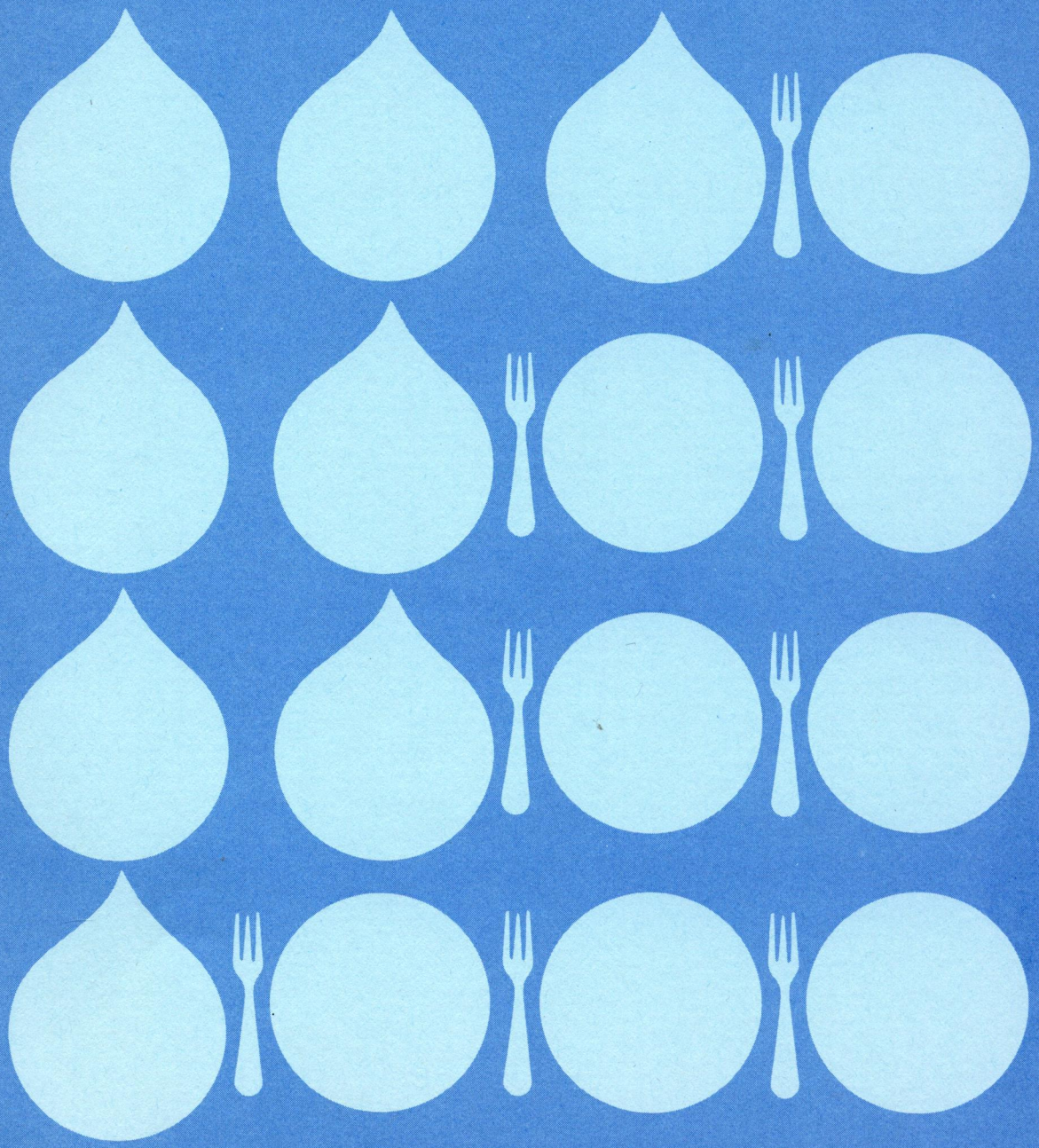
Center for Disease Control

Foodborne and Waterborne Disease Outbreaks

Annual Summary 1975
Issued September 1976

U.S. Department of Health, Education, and Welfare
Public Health Service



PREFACE

This report summarizes information received from state and local health departments, the Food and Drug Administration, the U.S. Department of Agriculture, and other pertinent sources. The information is preliminary and is intended primarily for use by those with responsibility for disease control activities. Anyone desiring to quote this report should contact the Enteric Diseases Branch for confirmation and further interpretation.

Contributions to the report are most welcome. Please address them to:

Center for Disease Control
ATTN: Bureau of Epidemiology
Bacterial Diseases Division
Enteric Diseases Branch
Atlanta, Georgia 30333

SUGGESTED CITATION

Center for Disease Control: Foodborne and Waterborne Disease Outbreaks Annual Summary 1975. Issued September 1976

Center for Disease Control.....David J. Sencer, M.D., Director

Bureau of Epidemiology.....Philip S. Brachman, M.D., Director

Bacterial Diseases Division.....John V. Bennett, M.D., Director

Enteric Diseases Branch.....Eugene J. Gangarosa, M.D., Chief and Deputy Director, Bacterial Diseases Division

Foodborne and Waterborne Disease Outbreaks Surveillance Activity.....Robert E. Black, M.D.
Roscoe C. Cox, B.A.

Statistical Services Branch.....Stanley M. Martin, M.S., Chief
Robert A. Pollard, M.A.

Epidemiologic Investigations Laboratory Branch.....George K. Morris, Ph.D., Chief

Enteric Diseases Laboratory Section.....Joy G. Wells, M.S., Chief

Bureau of Laboratories.....Roslyn Q. Robinson, Ph.D., Director

Bacteriology Division.....Albert Balows, Ph.D., Director

Enterobacteriology Branch.....V. R. Dowell, Jr., Ph.D., Chief

Clinical Bacteriology Branch.....P. B. Smith, Ph.D., Chief

Bacterial Immunology Branch.....John C. Feeley, Ph.D., Chief

TABLE OF CONTENTS

HEW Publication No. (CDC) 76-8185

ACKNOWLEDGEMENTS: We acknowledge Marcus A. Horwitz, M.D., former Foodborne and Waterborne Disease Outbreaks Surveillance Officer, for his assistance in collecting and evaluating foodborne and waterborne disease outbreak data.

We acknowledge the important role played by Richard Swanson, B.S., and Dan Brand, B.S., of the Field Investigations Branch, Food and Drug Administration and John Prucha, D.V.M., and L. W. Schnurrenberger, D.V.M., of the Animal and Plant Health Inspection Service, U.S. Department of Agriculture, in alerting the Enteric Diseases Branch to foodborne disease outbreaks which come to their attention.

We also acknowledge the invaluable assistance of Gunther F. Craun, M.S., Water Quality Division, Health Effects Research Laboratory, Environmental Protection Agency, in collecting and reviewing waterborne disease outbreak data.

I. INTRODUCTION

The reporting of foodborne and waterborne diseases in the United States began about 50 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. Their purpose was to obtain information about the role of food, milk, and water in outbreaks of intestinal illness as the basis for sound public health action. Beginning in 1923, the United States Public Health Service published summaries of outbreaks of gastrointestinal illness attributed to milk. In 1938, it added summaries of outbreaks caused by all foods. These early surveillance efforts led to the enactment of important public health measures which had a profound influence in decreasing the incidence of enteric diseases, particularly those transmitted by milk and water.

From 1951 through 1960, the National Office of Vital Statistics reviewed reports of outbreaks of foodborne illness and published summaries of them annually in Public Health Reports. In 1961, the Center for Disease Control (CDC), then the Communicable Disease Center, assumed responsibility for publishing reports on foodborne illness. For the period 1961-66, CDC discontinued publication of annual reviews, but reported pertinent statistics and detailed individual investigations in the Morbidity and Mortality Weekly Report (MMWR).

In 1966, the present system of surveillance of foodborne and waterborne diseases began with the incorporation of all reports of enteric disease outbreaks attributed to microbial or chemical contamination of food or liquid vehicles into an annual summary. Since 1966, the quality of investigative reports has improved primarily as a result of more active participation by state and federal agencies in the investigation of foodborne and waterborne outbreaks. In this report, data from foodborne and waterborne disease outbreaks reported to CDC in 1975 are summarized.

Foodborne and waterborne disease surveillance has traditionally served 3 objectives:

1. Disease Control: Early identification and removal of contaminated products from the commercial market, correction of faulty food preparation practices in food service establishments and in the home, and identification and appropriate treatment of human carriers of foodborne pathogens are the fundamental control measures resulting from surveillance of foodborne disease. Identification of contaminated water sources and adequate purification of these sources are the primary control measures in the surveillance of waterborne disease outbreaks. Rapid reporting and thorough investigation of outbreaks are important for prevention of subsequent outbreaks.

2. Knowledge of Disease Causation: The responsible pathogen has not been identified in 30 to 60% of foodborne disease outbreaks reported to CDC in each of the last 5 years. In many of these outbreaks, pathogens known to cause foodborne illness may not have been identified because of late or incomplete laboratory investigation. In others, the responsible pathogen may have escaped detection even when a thorough laboratory investigation was carried out because the pathogen is not yet appreciated as a cause of foodborne disease or because it cannot yet be identified by available laboratory techniques. These pathogens might be identified and suitable measures to control diseases caused by them might be instituted as a result of thorough clinical, epidemiologic and laboratory investigations. Pathogens suspected of being but not yet determined to be etiologic agents in foodborne disease include Group D streptococcus, Yersinia enterocoliticus, Citrobacter, Enterobacter, Klebsiella, Pseudomonas, and the presumably viral agents of acute infectious non-bacterial gastroenteritis. Other pathogens such as Escherichia coli and Bacillus cereus are known causes of foodborne illness, but the extent and importance of their role have

not as yet been determined. The etiologic agent(s) responsible for the majority of waterborne outbreaks also awaits identification. In waterborne disease, as in foodborne disease, the roles of a variety of viral and bacterial agents, e.g. Yersinia enterocolitica, remain to be clarified.

3. Administrative Guidance: The collection of data from outbreak investigations permits assessment of trends in etiologic agents and food vehicles and focuses on common errors in food and water handling. By compiling the data in an annual summary, it is hoped that local and state health departments and others involved in the implementation of food and water protection programs will be kept informed of the factors involved in food and waterborne disease outbreaks. Comprehensive surveillance should result in a clearer appreciation of priorities in food and water protection, institution of better training programs, and more rational planning.

II. FOODBORNE DISEASE OUTBREAKS

A. Definition of Outbreak

For the purpose of this report a foodborne disease outbreak is defined as an incident in which

1. 2 or more persons experience a similar illness, usually gastrointestinal, after ingestion of a common food, and
2. epidemiologic analysis implicates the food as the source of the illness.

There are a few exceptions; 1 case of botulism or chemical poisoning constitutes an outbreak.

In this report outbreaks have been divided into 2 categories:

1. Laboratory confirmed--Outbreaks in which laboratory evidence of a specific etiologic agent is obtained and specified criteria are met (see Section G).
2. Undetermined etiology--Outbreaks in which epidemiologic evidence implicates a food source, but adequate laboratory confirmation is not obtained. These outbreaks are subdivided into 4 subgroups by incubation period of the illnesses--less than 1 hour (probable chemical, 1 to 7 hours (probable staph), 8 to 14 hours (probable Clostridium perfringens), and greater than 14 hours (other infectious agents).

B. Source of Data

The general public and local, state, and federal agencies which have responsibility for public health and food protection participate in foodborne disease surveillance. Consumers, physicians, hospital personnel, and persons involved with food service or processing report complaints of illness to the health departments or regulatory agencies. Local health department personnel (epidemiologists, sanitarians, public health nurses, etc.) carry out most epidemiologic investigations of these reports and make their findings available to state health departments. State agencies concerned with food safety frequently participate in the initial investigation of the outbreak and offer laboratory support. Occasionally, on special request, CDC participates in an investigation, particularly if the outbreak is large or involves products that move in interstate commerce. State or other officials eventually summarize the findings of the investigation on the standard CDC reporting form (see Section F) and send to CDC.

The 2 federal regulatory agencies which have major responsibilities for food protection, the Food and Drug Administration (FDA) and Department of Agriculture (USDA) report episodes of foodborne illness to CDC and to state and local health authorities. CDC and state and local health authorities, in turn, report to FDA or USDA any foodborne disease outbreaks which might involve commercial products. The U.S. Armed Forces also report outbreaks directly to CDC.

By special arrangement, pharmaceutical companies immediately report all requests for botulinal antitoxin to CDC. This is sometimes the first communication of a botulism outbreak to public health authorities, although physicians are urged to promptly report all suspect botulism cases. In botulism outbreaks, CDC works closely with physicians, state and local health authorities, and FDA or USDA representatives to provide diagnostic and therapeutic consultation and to rapidly identify the responsible food or foods.

For 1975 other sources of foodborne disease data were the Morbidity and Mortality Weekly Report, the Salmonella Surveillance Activity, and the Trichinosis Surveillance Activity.

C. Interpretation of Data

The limitations on the quantity and quality of data in this report must be appreciated in order to avoid misinterpretation. The number of outbreaks of foodborne disease reported by this surveillance system clearly represents a minute fraction of the total number that occur. The likelihood of an outbreak coming to the attention of health authorities varies considerably from one locale to the next depending largely upon consumer awareness and physician interest.

Interstate outbreaks, large intrastate outbreaks, and outbreaks of serious illness such as botulism or mushroom poisoning with species containing amanita toxin are more likely to come to the attention of health authorities, including CDC. The quality of the investigation conducted by state or local health department varies considerably according to the department's interest in foodborne disease outbreaks and its investigative and laboratory capabilities. The likelihood that the findings of the investigation will be reported depends upon a state's commitment to foodborne disease surveillance.

Just as this report should not be the basis of firm conclusions about the absolute incidence of foodborne disease, it should not be used to draw conclusions about the relative incidence of foodborne disease of various etiologies (Table 2). For example, foodborne diseases characterized by short incubation periods such as most outbreaks of chemical etiology or outbreaks caused by staphylococcus are more likely to be recognized as common-source foodborne disease outbreaks than those diseases with longer incubation periods. The common source aspect of a foodborne outbreak of hepatitis A which typically has an incubation period of several weeks would be particularly likely to escape detection. Outbreaks of serious disease such as botulism or mushroom poisoning with species of mushrooms containing amanita toxin are probably more likely to be reported than less serious illnesses but, because of their rarity, they may be less likely to be recognized and diagnosed. Outbreaks of C. perfringens are recognized readily but confirmed with difficulty because of problems involved in the transport and culturing of anaerobic specimens. Outbreaks of B. cereus and E. coli are probably less likely to be confirmed because these organisms are less often considered clinically, epidemiologically, and in the laboratory.

The number of reported outbreaks of some etiologies may depend upon the interest of a particular health department or individual. For example, the great increase in the number of reported outbreaks of ciguatera in 1974 probably reflected greater interest in the surveillance of this disease in the states in which they occur. If a microbiologist becomes interested in looking for C. perfringens, he is likely to confirm more outbreaks of this etiology.

While the relative proportions of reported outbreaks attributed to most etiologies fluctuate minimally from year to year, it is worth noting that a few outbreaks involving very large numbers of persons may vastly alter the relative proportions of cases attributed to various etiologies (Tables 2 and 3).

Information on the number of deaths associated with outbreaks was unreported in 30% of the outbreaks. In many of the others, complete information was lacking. Particularly when death is not immediate, foodborne disease may not be appreciated as contributing to the demise of an elderly or debilitated person unable to withstand otherwise minor physical stresses. These limitations on the data must be appreciated in interpreting Table 4.

In outbreaks of unknown etiology, the accuracy of reported information is always suspect. In these outbreaks, when the epidemiology incriminating a particular food item was very weak, the food item was listed as unknown in this report (Table 6). Information on the place of acquisition in these outbreaks was judged reliable and recorded (Table 7). However, information on the place where food was mishandled in these outbreaks was generally judged unreliable; in many of them, the place of mishandling was listed as unknown (Table 8). Only in outbreaks in which a specific etiology was very much suspected, although unconfirmed in the laboratory, and in which

the information on mishandling was consistent with the suspected etiology was a known place of mishandling designated.

The implications of a food-processing establishment mishandling food are great both to the public health and the establishment concerned. Consequently, the outbreaks attributed to mishandling at these establishments are thoroughly investigated and reported data carefully scrutinized. For these reasons, data obtained in these investigations is considered highly reliable (Tables 8 and 9).

Much is known about contributing factors in foodborne disease. Thus in most outbreaks of botulism and trichinosis, the food is usually inadequently cooked. In most of the outbreaks of bacterial etiology other than botulism and in outbreaks of scombroid (in which bacterial growth is responsible for toxin production), the food is usually stored at improper holding temperatures. In outbreaks of ciguatera, puffer fish poisoning, mushroom poisoning, and paralytic and neurotoxic shellfish poisoning, the food is obtained from an unsafe source, almost by definition. The investigators of foodborne disease outbreaks are usually aware of these contributing factors and consequently seek and find the appropriate factors. Sometimes, however, investigators report factors which are not known to be contributing to outbreaks of the type of etiology confirmed. In such cases the factors are considered in light of the evidence presented; if they are totally unsubstantiated, they are rejected. These considerations must be borne in the mind in interpreting Table 10.

There is no reason to doubt the accuracy of the data on month of occurrence of outbreaks presented in Table 11.

D. Analysis of Data

In 1975 there were 497 outbreaks of foodborne disease involving 18,260 cases. This is the largest number of outbreaks reported in a single year to the CDC Foodborne Disease Surveillance Activity (Figure 1). An etiology was confirmed in 38% (191) of the outbreaks--similar to the percentage of confirmed outbreaks in 1974 (44%) and in 1973 (41%).

Of the 497 outbreaks, state, local, or territorial health departments reported 465 (94%). The Trichinosis Surveillance Activity reported 13 (2.6%), the USDA or FDA reported 10 (2.0%), private physicians reported 2 (0.4%), U.S. Armed Forces reported 3 (0.6%), Salmonella Surveillance Activity reported 1 (0.2%), and MMWR was the source of information on 1 (0.2%).

Outbreaks were reported from 43 states, New York City, and Guam (Figure 2 and Table 1). No outbreaks were reported from 7 states, the District of Columbia, Puerto Rico, the Virgin Islands, and the Canal Zone. Two outbreaks involved more than 1 state. The 3 state health departments reporting the most outbreaks were Washington, California, and Florida. Florida, Louisiana, Minnesota, and Tennessee reported substantially more outbreaks in 1975 than in 1974 and 1973. The large number of outbreaks reported from these states undoubtedly reflects the interest of the respective state health departments in foodborne disease surveillance. The 120 outbreaks in New York City represents a 60-fold increase from 1974, probably reflecting increased reporting.

Of the 191 confirmed outbreaks, the etiology was bacterial in 123 (64%), chemical in 43 (23%), parasitic in 22 (12%), and viral in 3 (1.6%) (Table 2). While outbreaks of bacterial etiology accounted for only 64% of the outbreaks, they accounted for 92% of the cases. The bulk of the cases of bacterial etiology were caused by staphylococcus. The numbers of salmonella and C. perfringens outbreaks in 1975 were similar to 1974, however, the lack of large outbreaks resulted in a reduction in the number of cases caused by each etiology (Table 3). The 14 outbreaks and 19 cases of botulism were both less than in 1974, when the largest number of botulism outbreaks since 1935 was reported. The number of T. spiralis outbreaks (20) and cases (193) were both increased over the 2 previous years.

No outbreaks (2 or more persons) of foodborne brucellosis were reported in 1975. However, 24 single cases of brucellosis were attributed to the ingestion of unpasteurized dairy products. Eight cases were traced to milk produced in the United States, and 16 were attributed to foreign dairy products consumed outside the United States. The foreign dairy products included cow's and goat's milk and goat's milk cheese.

Table 5 lists the outbreaks of undetermined etiology by median incubation periods. If one assumes that most outbreaks in which the median incubation period was less than 1 hour were of chemical etiology, that those in which the median incubation period was 1-7 hours were of staphylococcal etiology, and that those in which the median incubation period was 8-14 hours were caused by C. perfringens, then these agents were responsible for substantially more outbreaks than suggested in Table 2.

The vehicles of transmission were identified in 378 (76%) of the outbreaks (Table 6); multiple vehicles were involved in 43 (8.9%). Of the 335 outbreaks in which a single vehicle was identified, meats or poultry were incriminated in 147 (44%), fish or shellfish in 51 (15%), dairy products in 18 (5%), fruits or vegetables in 12 (4%), salads including chicken, turkey, potato, and egg in 29 (9%), mushrooms in 5 (2%), Chinese food in 22 (7%), Mexican food in 15 (5%), non-dairy beverages in 11 (3%) and other foods in 25 (7%). Of the meat vehicles beef and ham were most frequently incriminated. Of the fish vehicles grouper and tuna were most frequently responsible.

In 1975 as in the past, C. botulinum outbreaks most frequently involved home canned vegetables, C. perfringens outbreaks usually involved beef, and staphylococcus outbreaks most often involved meat, particularly ham. Salmonella outbreaks were caused by many different vehicles including meat, poultry, dairy products, and salads. Vibrio parahaemolyticus outbreaks involved fish or shellfish. The outbreaks of heavy metal poisoning all involved non-dairy beverages. Of the 19 ciguatera outbreaks, grouper accounted for 10, snapper for 3, po'ou for 2, kingfish for 2, and amberjack for 2. Of the 6 scombroid outbreaks, 3 involved tuna fish. T. spiralis outbreaks involved pork, sausage or ground beef.

In three-fourths of the outbreaks, the food was eaten at home (28%), in a restaurant (39%) or in a school (6%) (Table 7). In 11 of the 14 outbreaks of botulism, the food was eaten at home. Most chemical outbreaks occurred in the home, including 16 of 19 from ciguatoxin, all 4 mushroom outbreaks, and 4 of 6 outbreaks from other chemicals. Outbreaks caused by parasites usually occurred at home, but hepatitis outbreaks occurred at food service establishments.

The place where the mishandling of the food responsible for an outbreak occurred was specified in 275 outbreaks (Table 8). Of these, food service establishments were specified as responsible for the mishandling of food in 73%, homes in 22%, and food processing establishments in 5%. Food service establishments are locations where food is prepared for public consumption, i.e., restaurants, cafeterias, caterers, hospitals, industrial plants, etc. Food processing establishments are locations where a food is prepared for market. The distribution of places held responsible for mishandling of food in 1975 paralleled that of the 2 previous years. As in 1974 and 1973, the majority of outbreaks caused by C. perfringens, salmonella, and staphylococcus, in which a place of food mishandling was specified, were attributed to mishandling of food in food service establishments. In reported outbreaks of heavy metal poisoning, scombroid fish poisoning, and monosodium glutamate intoxication, places other than homes were found responsible for the foodhandling errors. In outbreaks of mushroom poisoning, incriminated foods were obtained by private individuals, rather than commercial sources, and eaten in homes. Since there is no practical way to distinguish fish containing ciguatoxin from fish which do not, and the presence of the toxin is not influenced substantially by the way the fish is handled or cooked, a place of food mishandling was not specified in outbreaks of ciguatera poisoning. In most reported outbreaks of trichinosis, the foodhandling error occurred in the home while in most reported outbreaks of hepatitis, it occurred away from home.

Of the 13 outbreaks attributed to mishandling of food in food processing establishments, 5 were due to bacteria, 4 to T. spiralis and 3 to chemicals (Table 9).

In 277 (56%) of the 497 outbreaks, including 127 (66%) of the 191 confirmed outbreaks, a contributing factor was reported and accepted in processing data (Table 10). The data reflected patterns of disease causation seen in previous years. In reported outbreaks of botulism, trichinosis, anisakiasis, and fish tapeworm infection, the most frequent error was inadequate cooking of the food. The outbreaks of trichinosis attributed to ground beef probably resulted from the addition of pork to the beef with subsequent inadequate cooking. Improper holding temperatures most frequently

contributed to reported outbreaks of C. perfringens, salmonella, staphylococcus, and scombroid fish poisoning. Storage of beverages in metal containers or in contact with tubing of a type which allowed metallic ions to dissolve in the beverage was the most important contributing factor in the outbreaks of heavy metal poisonings. In outbreaks of ciguatera mushroom poisoning, the food was unsafe to begin with. In the outbreaks of chemical poisoning caused by miscellaneous chemicals, the food was obtained from an unsafe source. In the 3 outbreaks of hepatitis a person suspected of having active hepatitis was involved in foodhandling.

The date of onset of an outbreak was designated as the date of onset of the first case (Table 11). Outbreaks as a whole were distributed more or less equally throughout the year. Outbreaks of botulism tended to occur most frequently in the fall, probably because that is when foods home-processed in the late spring and summer are eaten. Outbreaks caused by salmonella and staphylococcus tended to occur more frequently in the summer months probably because the warm temperatures encourage bacterial growth in unrefrigerated foods. Outbreaks of mushroom poisoning tended to occur in the spring and fall.

Fig. 1 FOODBORNE DISEASE OUTBREAKS AND CASES REPORTED TO CENTER FOR DISEASE CONTROL, 1966-1975

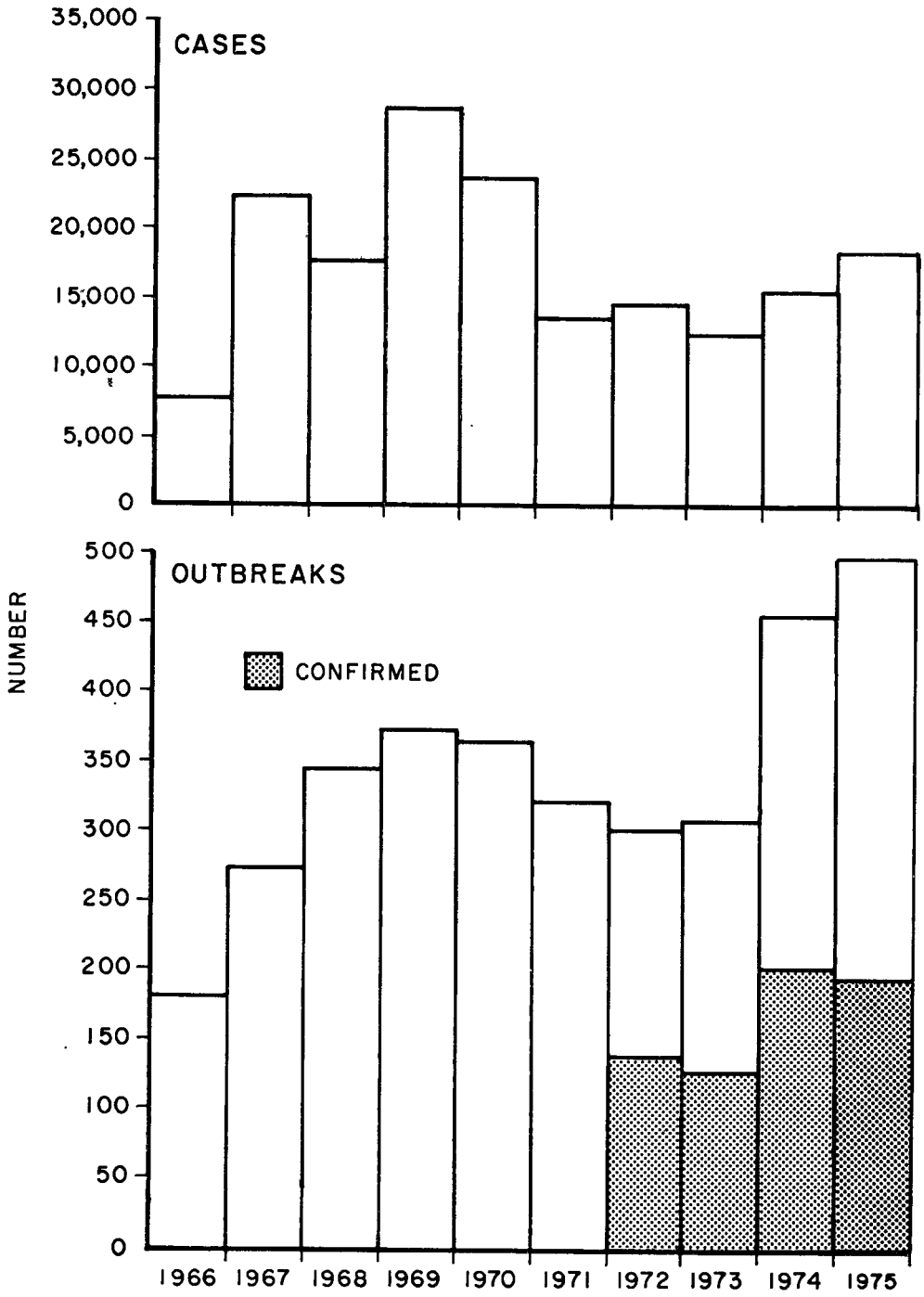


Fig. 2 REPORTED FOODBORNE DISEASE OUTBREAKS, 1975

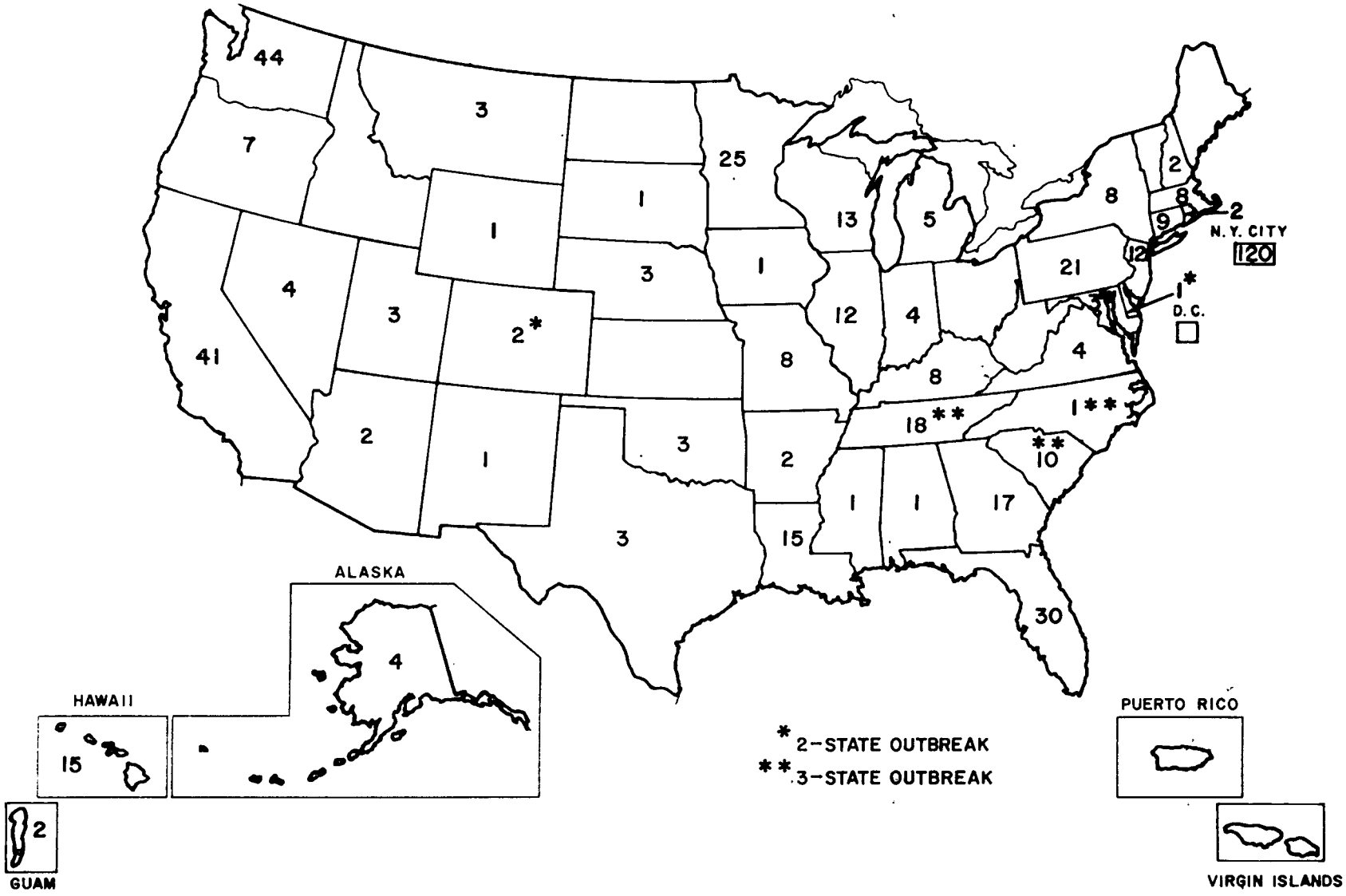


Table 1

Foodborne Disease Outbreaks, by Location, 1973-1975

State	1973	1974	1975	State	1973	1974	1975
Alabama	0	4	1	Missouri	1	5	8
Alaska	3	5	4	Montana	1	0	3
Arizona	7	5	2	Nebraska	3	5	3
Arkansas	3	4	2	Nevada	0	1	4
California	39	32	41	New Hampshire	4	6	2
Colorado	4	6	1	New Jersey	9	10	12
Connecticut	1	4	9	New Mexico	1	0	1
Delaware	0	0	1	New York City	3	2	120
District of Columbia	0	2	0	New York State	1	22	8
Florida	2	15	30	North Carolina	3	4	0
Georgia	8	11	17	North Dakota	1	0	0
Hawaii	7	27	15	Ohio	2	20	0
Idaho	2	3	0	Oklahoma	1	3	3
Illinois	9	15	12	Oregon	13	8	7
Indiana	1	3	4	Pennsylvania	42	86	21
Iowa	0	4	1	Puerto Rico	2	1	0
Kansas	0	1	0	Rhode Island	1	2	2
Kentucky	2	1	8	South Carolina	3	7	9
Louisiana	3	5	15	South Dakota	0	5	1
Maine	1	0	0	Tennessee	8	6	17
Maryland	3	3	2	Texas	10	5	3
Massachusetts	2	1	8	Utah	12	7	3
Michigan	10	7	5	Vermont	2	2	0
Minnesota	8	14	25	Virginia	3	3	4
Mississippi	1	2	1	Washington	55	49	44
Other				West Virginia	5	6	0
Virgin Islands	0	0	0	Wisconsin	0	8	13
Guam and Trust Territories	0	4	2	Wyoming	0	0	1
Canal Zone	0	0	0	Multiple	5	5	2*,**

*Colorado, Maryland
**North Carolina, South Carolina, Tennessee

1973 total 307
1974 total 456
1975 total 497

Table 2

Confirmed Foodborne Disease Outbreaks and Cases by Etiology, 1975

	Outbreaks		Cases	
BACTERIAL	#	%	#	%
A. hinshawii	1	0.5	15	0.2
B. cereus	3	1.6	45	0.6
C. botulinum	14	7.3	19	0.3
C. perfringens	16	8.4	419	5.7
Salmonella	38	19.9	1573	21.3
Shigella	3	1.6	413	5.6
Staphylococcus	45	23.6	4067	55.1
Suspect Group D Streptococcus	1	0.5	50	0.7
V. parahaemolyticus	2	1.0	222	3.0
CHEMICAL				
Heavy metal	4	2.1	50	0.7
Ciguatoxin	19	9.9	70	0.9
Scombrotoxin	6	3.1	16	0.2
Monosodium glutamate	3	1.6	9	0.1
Mushroom poison	5	2.6	5	0.07
Other Chemicals	6	3.1	38	0.5
PARASITIC				
T. spiralis	20	10.5	193	2.6
Anisakidae	1	0.5	1	0.01
D. latum	1	0.5	1	0.01
VIRAL				
Hepatitis A	3	1.6	173	2.3
Total Known Etiology	191	99.9	7379	99.9

Table 3

Confirmed Foodborne Disease Outbreaks and Cases
1973--1975

	No. of Outbreaks (No. of Cases)		
	1973	1974	1975
BACTERIAL			
A. hinshawii	0(0)	0(0)	1(15)
B. cereus	1(2)	1(11)	3(45)
Brucella	1(4)	0(0)	0(0)
C. botulinum	10(31)	21(32)	14(19)
C. perfringens	9(1,424)	15(863)	16(419)
Salmonella	33(2,462)	35(5,499)	38(1,573)
Shigella	8(1,388)	3(212)	3(413)
Staphylococcus	20(1,272)	43(1,565)	45(4,067)
Group A. Streptococcus	1(250)	1(325)	0(0)
V. cholerae	0(0)	1(6)	0(0)
V. parahaemolyticus	1(2)	0(0)	2(222)
Suspect Group D Streptococcus	0(0)	2(38)	1(50)
CHEMICAL			
Heavy metals	0(0)	4(28)	4(50)
Ciguatoxin	0(0)	26(148)	19(70)
Puffer fish tetrodotoxin	0(0)	1(2)	0(0)
Scombrotoxin	12(326)	10(26)	6(16)
Monosodium glutamate	2(6)	2(4)	3(9)
Mushroom poison	9(41)	6(9)	5(5)
Paralytic shellfish poison	1(3)	1(4)	0(0)
Neurotoxic shellfish poison	1(4)	1(1)	0(0)
Miscellaneous chemicals	3(12)	6(19)	6(38)
PARASITIC			
T. spiralis	10(59)	14(58)	20(193)
T. gondii	0(0)	1(4)	0(0)
Anisakidae	0(0)	1(1)	1(1)
D. latum	0(0)	0(0)	1(1)
VIRAL			
Hepatitis A	5(425)	6(282)	3(173)

Table 4

Deaths Associated with Foodborne Outbreaks, 1973-75

	1973	1974	1975
C. botulinum	4	7	2
C. perfringens	1	1	1
Salmonella	7	1	2
V. cholerae	0	1	0
Mushroom poison	1	0	2
Organic chemicals	0	2	0
T. spiralis	1	0	1
Hepatitis A	0	1	0
Unknown	1	1	2
Total	15	14	10

Table 5

Foodborne Disease Outbreaks of Unknown Etiology by Incubation Period, 1975

Incubation Period	Number of Outbreaks	Percent of Total Outbreaks
<1 hour	12	3.9
1-7 hours	134	43.8
8-14 hours	73	23.8
>15 hours	38	12.4
Unknown	49	16.0
Total	306	99.9

Table 6

Foodborne Disease Outbreaks, by Vehicle of Transmission and Specific Etiology, 1975

	Beef	Lamb	Ham	Pork	Sausage	Chicken	Turkey	Other Meat	Shellfish	Other Fish	Milk	Ice Cream	Other Dairy Products	Baked Foods	Fruits and Vegetables	Potato Salad	Poultry, Fish, Egg Salad	Other Salads	Mushrooms	Chinese Food	Mexican Food	Non-Dairy Beverages	Multiple Vehicles	Other Foods	Unknown	Total
BACTERIAL																										
A. hinshawii	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	1
B. cereus	1	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	1	-	-	-	-	-	3
C. botulinum	-	-	-	-	-	1	-	1	-	1	-	-	-	-	8	-	-	-	-	-	-	-	-	-	3	14
C. perfringens	10	-	-	1	-	1	1	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	1	1	-	16
Salmonella	4	-	1	2	-	1	2	2	-	-	1	3	-	2	-	1	1	1	-	-	1	1	5	-	10	38
Shigella	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	2	3
Staphylococcus	2	-	16	2	-	-	1	2	-	2	-	-	-	1	-	1	6	1	-	-	1	-	8	1	1	45
Suspect Group D streptococcus	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
V. parahaemolyticus	-	-	-	-	-	-	-	-	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2
CHEMICAL																										
Heavy metal	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4	-	-	-	4
Ciguatoxin	-	-	-	-	-	-	-	-	-	19	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	19
Scombrotoxin	-	-	-	-	-	-	-	-	-	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6
Monosodium glutamate	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-	1	-	-	3
Mushroom poison	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5	-	-	-	-	-	-	5
Other chemicals	-	-	-	-	-	-	-	-	-	-	-	-	-	2	1	-	-	-	-	-	-	2	1	-	-	6
PARASITIC																										
T. spiralis	5	-	-	1	8	-	-	3	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	2	20
Anisakidae	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
D. latum	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
VIRAL																										
Hepatitis A	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	2	-	-	3
UNKNOWN	31	1	6	5	3	11	9	12	8	10	3	1	9	5	2	1	9	7	-	18	13	4	25	12	101	306
TOTAL	54	1	23	11	11	14	13	20	9	42	4	5	9	11	12	4	16	9	5	22	15	11	43	14	119	497

Table 7

Foodborne Disease Outbreaks, by Place of Acquisition and Specific Etiology, 1975

	Home	Restaurant	School	Picnic	Church	Camp	Other or Unknown	Total
BACTERIAL								
A. hinshawii	1	-	-	-	-	-	-	1
B. cereus	1	1	-	-	-	-	1	3
C. botulinum	11	-	-	-	-	-	3	14
C. perfringens	4	9	-	1	-	-	2	16
Salmonella	12	7	1	2	5	2	9	38
Shigella	-	1	-	1	-	1	-	3
Staphylococcus	12	8	6	2	4	1	12	45
Suspect Group D Streptococcus	-	-	1	-	-	-	-	1
V. parahaemolyticus	-	-	-	1	-	-	1	2
CHEMICAL								
Heavy metal	-	1	2	-	-	-	1	4
Ciguatoxin	16	2	-	-	-	-	1	19
Scombrotoxin	1	4	-	-	-	-	1	6
Monosodium glutamate	-	3	-	-	-	-	-	3
Mushroom poison	4	-	-	-	-	-	1	5
Other chemicals	4	2	-	-	-	-	-	6
PARASITIC								
T. spiralis	11	3	-	-	-	-	6	20
Anisakidae	1	-	-	-	-	-	-	1
D. latum	1	-	-	-	-	-	-	1
VIRAL								
Hepatitis A	-	2	-	-	-	-	1	3
UNKNOWN	58	153	19	5	7	1	63	306
Total 1975	137	196	29	12	16	5	102	497
Total 1974	187	128	23	16	18	6	78	456
Total 1973	119	98	16	12	6	4	52	307

Table 8

Foodborne Disease Outbreaks, by Place Where Food Was Mishandled, and Specific Etiology, 1975

	Food Processing Establishments	Food Service Establishments	Homes	Unknown-Unspecified	Total
BACTERIAL					
A. hinshawii	-	-	1	-	1
B. cereus	-	1	1	1	3
C. botulinum	1	-	10	3	14
C. perfringens	-	13	3	-	16
Salmonella	2	16	12	8	38
Shigella	-	3	-	-	3
Staphylococcus	2	28	7	8	45
Suspect Group D Streptococcus	-	1	-	-	1
V. parahaemolyticus	-	2	-	-	2
CHEMICAL					
Heavy metal	-	4	-	-	4
Ciguatoxin	-	-	-	19	19
Scombrotoxin	1	2	-	3	6
Monosodium glutamate	-	3	-	-	3
Mushroom poison	-	-	4	1	5
Other chemicals	2	1	-	3	6
PARASITIC					
T. spiralis	4	2	6	8	20
Anisakidae	-	-	1		1
D. latum	-	-	-	1	1
VIRAL					
Hepatitis A	-	3	-	-	3
UNKNOWN	1	122	16	167	306
Total 1975	13	201	61	222	497
Total 1974	16	90	77	273	456
Total 1973	15	109	69	114	307

Table 9

Foodborne Disease Outbreaks Caused by Mishandling of Food
in Food-Processing Establishments
1975

Etiology	Vehicle	Number of Cases
C. botulinum type E	Mullet	1
Salmonella singapore	Roast beef sandwiches	13
Salmonella saint paul	Precooked roast beef	54
Staphylococcus Enterotoxin A	Salami	8
Staphylococcus Enterotoxin A	Lobster bisque	2
Scrombrotoxin	Tuna	1
Sodium nitrite	Multiple foods	19
Sodium chloride	Cookies	2
T. spiralis	Sausage	8
T. spiralis	Ground beef	4
T. spiralis	Ground beef	2
T. spiralis	Ground beef	2
Unknown	Raw Milk	7

Total	1975	13 outbreaks	123 cases
	1974	16 outbreaks	1,704 cases
	1973	15 outbreaks	736 cases

Table 10

Foodborne Disease Outbreaks, by Contributing Factors, and Etiology, 1975

Etiology	Number of Reported Outbreaks	Number of Outbreaks In Which Factors Reported	Improper Holding Temperatures	Inadequate Cooking	Contaminated Equipment	Food From Unsafe Source	Poor Personal Hygiene	Other
BACTERIAL								
A. hinshawii	1	1	-	-	-	1	-	-
B. cereus	3	3	3	-	-	-	-	1
C. botulinum	14	11	-	11	-	-	-	-
C. perfringens	16	11	11	3	1	-	2	1
Salmonella	38	28	22	11	9	3	10	1
Shigella	3	2	-	-	1	-	2	-
Staphylococcus	45	39	39	6	7	-	18	2
Suspect Group D Streptococcus	1	1	1	1	-	-	-	-
V. parahaemolyticus	2	1	1	1	-	-	-	-
CHEMICAL								
Heavy metal	4	4	-	-	3	-	-	-
Ciguatoxin	19	-	-	-	-	-	-	-
Scombrotoxin	6	1	1	-	-	-	-	-
Monosodium glutamate	3	1	-	-	-	-	-	1
Mushroom poison	5	3	-	-	-	3	-	-
Other chemicals	6	3	1	1	-	-	-	1
PARASITIC								
T. spiralis	20	14	-	14	-	2	-	-
Anisakidae	1	-	-	-	-	-	-	-
D. latum	1	1	-	1	-	-	-	-
VIRAL								
Hepatitis A	3	3	-	-	1	-	3	-
UNKNOWN	306	150	135	38	40	5	58	7
Total 1975	497	277	214	87	62	14	93	14
Total 1974	456	219	131	45	31	50	41	9
Total 1973	307	177	109	43	34	24	42	10

Table 11

Foodborne Disease Outbreaks, by Month of Occurrence, and Specific Etiology, 1975

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
BACTERIAL													
A. hinshawii	-	-	-	-	-	1	-	-	-	-	-	-	1
B. cereus	-	-	-	-	-	-	1	-	2	-	-	-	3
C. botulinum	1	1	2	-	1	3	-	-	1	2	2	1	14
C. perfringens	1	-	4	-	2	-	-	-	2	3	1	3	15
Salmonella	2	1	2	1	5	5	9	6	3	1	1	2	38
Shigella	-	-	-	-	1	1	-	1	-	-	-	-	3
Staphylococcus	3	4	2	6	3	5	4	3	5	3	2	5	45
Suspect Group D Streptococcus	-	-	-	-	-	-	-	1	-	-	-	-	1
V. parahaemolyticus	-	-	-	-	-	-	1	-	-	-	1	-	2
CHEMICAL													
Heavy metal	-	-	-	-	-	1	1	1	1	-	-	-	4
Ciguatoxin	-	3	1	3	8	1	1	-	-	2	-	-	19
Scombrotoxin	-	2	-	-	2	-	2	-	-	-	-	-	6
Monosodium glutamate	-	1	-	-	-	-	1	-	-	-	1	-	3
Mushroom poison	-	-	-	-	1	-	-	-	1	3	-	-	5
Other chemicals	-	-	1	-	1	-	1	1	-	1	-	1	6
PARASITIC													
T. spiralis	4	2	1	-	1	1	1	-	1	3	2	4	20
Anisakidae	-	1	-	-	-	-	-	-	-	-	-	-	1
D. latum	-	-	-	-	-	-	-	-	-	1	-	-	1
VIRAL													
Hepatitis A	-	-	-	-	-	-	1	-	-	-	-	2	3
UNKNOWN	28	24	22	31	41	23	25	23	17	23	21	22	300*
Total 1975	39	39	35	41	66	41	48	36	33	42	31	40	491*
Total 1974	33	21	37	33	44	42	41	43	43	39	46	29	451
Total 1973	10	28	24	26	40	10	26	26	32	24	31	30	307

*Month of occurrence not known in 6 outbreaks of unknown etiology.

FORM APPROVED
OMB NO. 68-R557

E. INVESTIGATION OF A FOODBORNE OUTBREAK

1. Where did the outbreak occur?
State _____ (1,2) City or Town _____ County _____

2. Date of outbreak: (Date of onset 1st case)
_____ (3-8)

3. Indicate actual (a) or estimated (e) numbers:
Persons exposed _____ (9-11)
Persons ill _____ (12-14)
Hospitalized _____ (15-16)
Fatal cases _____ (17)

4. History of Exposed Persons:
No. histories obtained _____ (18-20)
No. persons with symptoms _____ (21-23)
Nausea _____ (24-26) Diarrhea _____ (33-35)
Vomiting _____ (27-29) Fever _____ (36-38)
Cramps _____ (30-32) Other, specify _____
_____ (39)

5. Incubation period (hours):
Shortest _____ (40-42) Longest _____ (43-45)
Approx. for majority _____ (46-48)

6. Duration of Illness (hours):
Shortest _____ (49-51) Longest _____ (52-54)
Approx. for majority _____ (55-57)

7. Food-specific attack rates: (58)

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

8. Vehicle responsible (food item incriminated by epidemiological evidence): (59,60) _____

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

(a) Food Industry (61)
- Raw ☐ 1
- Processed ☐ 2

Home Produced
- Raw ☐ 3
- Processed ☐ 4

(b) Vending Machine ☐ 1 (62)

(c) Not wrapped ☐ 1 (63)
- Ordinary Wrapping ☐ 2
- Canned ☐ 3
- Canned–Vacuum Sealed ☐ 4
- Other (specify) ☐ 5

(d) Room Temperature ☐ 1 (64)
- Refrigerated ☐ 2
- Frozen ☐ 3
- Heated ☐ 4

If a commercial product, indicate brand name and lot number
_____

10. Place of Preparation of Contaminated Item: (65)
- Restaurant ☐ 1
- Delicatessen ☐ 2
- Cafeteria ☐ 3
- Private Home ☐ 4
- Caterer ☐ 5

Institution:
- School ☐ 6
- Church ☐ 7
- Camp ☐ 8
- Other, specify ☐ 9

_____
_____

11. Place where eaten: (66)
- Restaurant ☐ 1
- Delicatessen ☐ 2
- Cafeteria ☐ 3
- Private Home ☐ 4
- Picnic ☐ 5

Institution:
- School ☐ 6
- Church ☐ 7
- Camp ☐ 8
- Other, specify ☐ 9

_____
_____

DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
PUBLIC HEALTH SERVICE
CENTER FOR DISEASE CONTROL
BUREAU OF EPIDEMIOLOGY
ATLANTA, GEORGIA 30333

CDC 4.245
1-74

LABORATORY FINDINGS (Include Negative Results)

12. Food specimens examined: (67)
Specify by "X" whether food examined was original (eaten at time of outbreak) or check-up (prepared in similar manner but not involved in outbreak)

Item	Orig.	Check up	Findings Qualitative	Findings Quantitative
Example: beef	X		C. perfringens, Hobbs type 10	$2X10^6$/gm

13. Environmental specimens examined: (68)

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

14. Specimens from patients examined (stool, vomitus, etc.): (69)

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

15. Specimens from food handlers (stool, lesions, etc.): (70)

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

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

	Yes	No
1. Improper storage or holding temperature	☐ 1	☐ 2 (71)
2. Inadequate cooking	☐ 1	☐ 2 (72)
3. Contaminated equipment or working surfaces	☐ 1	☐ 2 (73)
4. Food obtained from unsafe source	☐ 1	☐ 2 (74)
5. Poor personal hygiene of food handler	☐ 1	☐ 2 (75)
6. Other, specify	☐ 1	☐ 2 (76)

17. Etiology: (77, 78)
Pathogen
Chemical
Other

Suspected ☐ 1 (79)
Confirmed ☐ 2
Unknown ☐ 3

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

Name of reporting agency: (80)

Investigating official:

Date of investigation:

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

To improve national surveillance, please send a copy of this report to:
Center for Disease Control
Attn: Enteric Diseases Section, Bacterial Diseases Branch
Bureau of Epidemiology
Atlanta, Georgia 30333

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

CDC 4.245 (BACK)
1-74

F. LINE LISTING OF FOODBORNE DISEASE OUTBREAKS

1975

F. LINE LISTING OF FOODBORNE DISEASE OUTBREAKS, 1975

Etiology	State	Number of Cases	Date of Onset	Lab Data: Patient	Lab Data: Vehicle	Lab Data: Food-handler	Vehicle	Location Where Food Mishandled* And Eaten
BACTERIAL								
ARIZONA HINSHAWII								
A. hinshawii	Oklahoma	15	6-16	+	+		Ice cream	(C) picnic
BACILLUS CEREUS								
B. cereus	California	18	9-2		+		Fried rice	(B) restaurant
B. cereus	Wisconsin	2	7-28		+		Mashed potatoes	(C) home
B. cereus	Wisconsin	25	9-23	+			Beef	(D) labor hall
CLOSTRIDIUM BOTULINUM								
C. botulinum, type A	Alaska	3	3-3	+	+		Beaver tail	(C) home
C. botulinum, type A	California	2	6-8	+	+		Carrots	(C) home
C. botulinum, type unknown	California	1	10-22				Unknown	(D) unknown
C. botulinum, type A	California	1	11-8	+	+		Chicken pot pie	(C)**home
C. botulinum, type A	California	2	11-19	+	+		Peppers	(C) home
C. botulinum, type B	Florida	1	6-2	+			Cabbage	(C) home
C. botulinum, type B	New Jersey	1	5-21	+			Unknown	(D) unknown
C. botulinum, type E	New York	1	2-17		+		Mullet	(A) home
C. botulinum, type B	Illinois	1	9-26	+			Green beans	(C) home

C. botulinum, type A	Montana	1	12-5		+		Beets	(C) home
C. botulinum, type A	Oregon	1	10-29		+		Green beans	(C) home
C. botulinum, type A	Washington	2	3-20	+			Unknown	(D) unknown
C. botulinum, type A	Washington	1	6-13	+	+		Peppers	(C) home
C. botulinum, type A	Wyoming	1	1-10	+			Beans	(C) home
CLOSTRIDIUM PERFRINGENS								
C. perfringens	California	63	1-1		+		Roast beef, turkey	(C) home
C. perfringens	Colorado	4	9-2		+		Beef burrito	(B) restaurant
C. perfringens, Hobbs type 3	Connecticut	30	11-13	+			Meat loaf	(B) nursing home
C. perfringens, PS 74	Connecticut	43	12-15	+	+	+	Roast beef	(B) restaurant
C. perfringens, PS 38, PS 63	Hawaii	61	12-7	+	+		Roast beef	(B) restaurant
C. perfringens, Hobbs type 20	Illinois	55	3-15	+	+		Gefilte fish	(C) home
C. perfringens	Indiana	8	5-11		+		Chicken, gravy	(B) home
C. perfringens	Indiana	6	12-1		+		Turkey	(B) prison
C. perfringens	Montana	11	3-19		+		Roast beef	(B) restaurant
C. perfringens, Hobbs type 4	Tennessee	15	3-29	+	+		Barbecue pork	(B) home
C. perfringens, Hobbs type 8	Utah	43	10-22	+	+		Chili	(C) picnic
C. perfringens, PS 80	Washington	23	9-10	+	+		Roast beef	(B) restaurant

*(A)--Food processing establishment; (B)--Food service establishment; (C)--Home; (D)--Unknown
**Commercial product involved but food-handling error apparently occurred in home.

Etiology	State	Number of Cases	Date of Onset	Lab Data			Vehicle	Location Where Food Mishandled* And Eaten
				Patient	Vehicle	Food-handler		
C. perfringens	Wisconsin	28	3-22	+	+		Roast beef	(B) restaurant
C. perfringens	Wisconsin	16	5-12		+		Roast beef	(B) restaurant
C. perfringens, PS 87	Wisconsin	11	10-21	+	+		Roast beef	(B) restaurant
C. perfringens	New York City	2	10-8		+		Corned beef	(B) restaurant
SALMONELLA								
S. newport	Arkansas	50	7-31	+	+		Lettuce	(B) nursing home
S. dublin	California	176	8-24	+			Unknown	(D) club
S. typhimurium	Connecticut	6	5-10	+		+	Baked goods	(B) school
S. newport	Connecticut	12	9-22	+		+	Unknown	(C) home
S. typhi	Florida	4	5-29	+			Snow cones	(B) concession stand
S. bredeney	Georgia	5	1-2	+	+		Barbeque pork	(B) restaurant
S. typhimurium	Georgia	11	3-17	+			Banana pudding	(C) home
S. typhimurium	Georgia	11	5-25	+			Barbeque sandwich	(B) church
S. infantis	Georgia	35	11-28	+	+		Turkey	(C) home
S. montevideo	Illinois	6	7-2	+	+	+	Ice cream	(C) home
S. newport	Indiana	11	7-14	+		+	Unknown	(D) nursing home
S. newport	Louisiana	47	7-12	+			Milk	(D) home
S. singapore	Louisiana	13	8-1	+	+	+	Beef sandwich	(A) home

S. typhimurium	Louisiana	168	8-16	+	+	+	Chicken salad	(C) wedding reception
S. typhi	Louisiana	5	10-6	+		+	Pies	(C) home
S. reading	Massachusetts	46	6-1	+			Unknown	(D) church
S. typhimurium	Michigan	37	3-30	+			Unknown	(B) social hall
S. java	Minnesota	16	6-1	+			Unknown	(B) camp
S. blockley	Minnesota	232	7-6	+	+	+	Potato salad	(B) picnic
S. thompson	Nevada	22	9-8	+		+	Beef, pork	(B) restaurant
S. typhimurium	New Hampshire	14	4-28	+			Roast beef	(B) restaurant
S. derby	New Jersey	7	5-11	+			Unknown	(B) church
S. litchfield	New Jersey	82	7-25	+	+		Spaghetti meat sauce	(B) camp
S. saint-paul	New Jersey	54	7-2	+	+		Roast beef	(A) multiple
S. muenchen	New Jersey	15	8-?	+		+	Unknown	(D) restaurant
S. reading	Rhode Island	60	6-3	+			Turkey	(C) home
S. bareilly	Tennessee	12	2-8	+	+	+	Barbeque pork	(B) home
S. typhimurium	Tennessee	5	7-10	+	+		Ice cream	(C) home
S. heidelberg	Tennessee	80	12-6	+		+	Roast beef, turkey	(B) church
S. typhi	Texas	19	6-?	+		+	Mexican food	(B) restaurant
S. enteriditis	Virginia	8	6-26		+		Ice cream	(C) home
S. saint-paul	Wisconsin	9	5-24	+			Unknown	(D) unknown
S. saint-paul	Wisconsin	205	7-26	+	+		Ham	(D) church

*(A)--Food processing establishment; (B)--Food service establishment; (C)--Home; (D)--Unknown

Etiology	State	Number of Cases	Date of Onset	Lab Data			Vehicle	Location Where Food Mishandled* And Eaten
				Patient	Vehicle	Food-handler		
S. typhimurium	New York City	7	1-14	+	+	+	Roast duck	(C) home
S. enteriditis	New York City	30	8-23	+	+		Chicken	(C) home
S., species unknown	New York City	2	9-28	+	+		Tomatoe sauce	(D) restaurant
S. typhi	New York City	16	12-6	+			Unknown	(B) restaurant
S. newport	Colorado, Maryland	35	8-?	+	+		Ground beef	(C) home
SHIGELLA								
S. sonnei	Montana	144	8-8	+			Unknown	(B) camp
S. sonnei	Oregon	150	5-13	+		+	Unknown	(B) restaurant
S. flexneri 2B	Texas	119	6-12	+		+	Potato salad	(B) picnic
STAPHYLOCOCCUS								
S. aureus	Alabama	23	12-19	+	+		Tuna casserole	(C) home
S. aureus, enterotoxin A	Alaska	12	11-18	+	+	+	Mashed potatoes	(D) military base
S. aureus, enterotoxin A	California	25	1-22		+		Turkey	(B) school
S. aureus	California	22	7-5		+	+	Lasagne	(B) camp
S. aureus	California	6	9-18		+	+	Mexican food	(B) military base
S. aureus	California	3	12-31		+	+	Ham	(B) restaurant
S. aureus, enterotoxin A	California	8	9-23		+		Salami	(A) delicatessen

S. aureus	Florida	2	1-20	+	+		Ham sandwich	(D) truck
S. aureus	Florida	12	3-22		+		Barbeque pork	(B) restaurant
S. aureus 53/77/84	Florida	126	11-12		+	+	Chicken salad	(D) church
S. aureus, enterotoxin A	Georgia	2	2-19		+		Ham	(C) home
S. aureus	Georgia	8	7-30		+		Barbeque sandwich	(B) restaurant
S. aureus, enterotoxin A	Georgia	81	8-14	+	+	+	Chicken salad	(B) restaurant
S. aureus, enterotoxin A	Georgia	7	10-8		+		Barbeque ham	(B) home
S. aureus, enterotoxin A	Georgia	4	12-22		+		Ham	(C) home
S. aureus	Hawaii	6	4-6		+		Beef	(C) home
S. aureus	Hawaii	6	5-11		+		Fish	(C) home
S. aureus, 84/42E/53/83A	Hawaii	6	10-20	+	+	+	Rice ball	(B) hotel
S. aureus, 29/47	Hawaii	2	12-14		+	+	Roast beef sandwich	(B) restaurant
S. aureus, 83A	Illinois	324	2-9		+	+	Turkey salad	(B) school
S. aureus	Louisiana	200	3-29		+		Shrimp salad	(B) cafeteria
S. aureus	Louisiana	35	4-26		+	+	Chicken salad	(C) home
S. aureus, 85	Louisiana	12	4-28		+	+	Jambalaya	(C) home
S. aureus	Louisiana	4	6-15	+	+		Ham	(D) home
S. aureus, enterotoxin A	Maryland	39	8-?		+		Chicken/rice casserole	(D) unknown

*(A)--Food processing establishment; (B)--Food service establishment; (C)--Home; (D)--Unknown

Etiology	State	Number of Cases	Date of Onset	Lab Data			Vehicle	Location Where Food Mishandled* And Eaten
				Patient	Vehicle	Food-handler		
S. aureus, enterotoxin A	Minnesota	336	6-22	+	+	+	Ham	(B) church
S. aureus	Minnesota	36	10-5		+	+	Chicken salad	(B) boy's home
S. aureus, 83A	Missouri	74	4-17	+	+		Potato salad	(B) school
S. aureus, 83A/85/+	Pennsylvania	83	4-26	+	+	+	Ham	(B) fire hall
S. aureus	Pennsylvania	4	6-14		+		Ham	(D) church
S. aureus	Pennsylvania	8	9-6	+	+	+	Ham, chicken	(B) picnic
S. aureus, enterotoxin A	South Carolina	2	4-25		+		Lobster bisque	(A) home
S. aureus, 83A/85/+	South Carolina	275	5-14		+		Barbeque pork	(B) school
S. aureus	South Carolina	40	9-1		+		Ham, sausage, chicken	(B) church
S. aureus	South Dakota	70	2-9		+	+	Ham	(B) school
S. aureus, 29/52/79	Tennessee	15	2-19		+	+	Ham	(B) restaurant
S. aureus	Tennessee	5	5-28		+		Ham	(B) cafeteria
S. aureus	Tennessee	3	6-17		+	+	Ham	(B) home
S. aureus, 187, enterotoxin A	Tennessee	30	7-22	+	+		Ham	(B) club
S. aureus, 52/80	Tennessee	5	7-22		+	+	Barbeque meat	(B) restaurant
S. aureus, 85	Tennessee	9	8-31	+	+		Salad dressing	(B) restaurant
S. aureus, 6/81/83A	Tennessee	100	12-18	+	+		Ham, desert	(B) school

S. aureus, 29/52/79/86	Wisconsin	2	1-2	+	+		Unknown	(D) home
S. aureus	New York City	3	9-24		+	+	Ham	(D) work
S. aureus 6/85/47/54/75/83A enterotoxin A	North Carolina, South Carolina, Tennessee	200	6-15	+	+	+	Ham	(B) picnic
STREPTOCOCCUS								
S. faecium	Georgia	50	8-28		+		Beef pot pie	(B) school
VIBRIO PARAHAEMOLYTICUS								
V. parahaemolyticus	Louisiana	100	7-26		+		Boiled shrimp	(B) picnic
V. parahaemolyticus	Guam	122	11-10	+			Octopus	(B) ship
CHEMICAL								
Copper	California	4	6-11		+		Soft drink	(B) restaurant
Copper	Louisiana	30	9-8		+		Orange drink	(B) school
Copper	New York City	2	7-10		+		Soft drink	(B) theater
Zinc	Rhode Island	14	8-6	+	+		Lemonade	(B) school
Ciguatoxin	California	9	7-16				Grouper	(D) home
Ciguatoxin	Florida	2	2-3				Grouper	(D) home
Ciguatoxin	Florida	3	2-14				Grouper	(D) home
Ciguatoxin	Florida	2	4-7				Red snapper	(D) home
Ciguatoxin	Florida	3	4-14				Grouper	(D) home
Ciguatoxin	Florida	14	4-29				Kingfish	(D) home
Ciguatoxin	Florida	3	5-4				Kingfish	(D) home

*(A)--Food processing establishment; (B)--Food service establishment; (C)--Home; (D)--Unknown

Etiology	State	Number of Cases	Date of Onset	Lab Data			Vehicle	Location Where Food Mishandled* And Eaten
				Patient	Vehicle	Food-handler		
Ciguatoxin	Florida	2	5-9				Amberjack	(D) home
Ciguatoxin	Florida	8	5-10				Red snapper	(D) restaurant
Ciguatoxin	Florida	2	5-10				Grouper	(D) home
Ciguatoxin	Florida	2	5-16				Grouper	(D) home
Ciguatoxin	Florida	3	5-16				Grouper	(D) home
Ciguatoxin	Florida	2	5-16				Grouper	(D) unknown
Ciguatoxin	Florida	1	5-17				Grouper	(D) home
Ciguatoxin	Florida	2	6-4				Grouper	(D) restaurant
Ciguatoxin	Hawaii	2	3-26				Po'ou fish (Cheilinús species)	(D) home
Ciguatoxin	Hawaii	1	4-30				Po'ou fish (Cheilinus species)	(D) home
Ciguatoxin	Hawaii	7	10-5		+		Amberjack	(D) home
Ciguatoxin	Hawaii	2	10-8		+		Snapper	(D) home
Scombrotoxin	Florida	2	2-?				Tuna	(B) restaurant
Scombrotoxin	Hawaii	4	2-3		+		Skipjack	(B) restaurant
Scombrotoxin	Michigan	1	7-25		+		Tuna	(A) unknown
Scombrotoxin	New York City	4	7-14		+		Tuna	(D) home
Scombroid-like fish poison	Washington	3	5-3		+		Mahi-Mahi	(D) restaurant

Scombroid-like fish poison	Washington	2	5-5		Mahi-Mahi	(D) restaurant
Monosodium glutamate	Washington	2	2-23		Soup, scallops	(B) restaurant
Monosodium glutamate	New York City	5	7-14	+	Chinese food	(B) restaurant
Monosodium glutamate	New York City	2	11-17	+	Chinese food	(B) restaurant
Mushroom poison	Minnesota	1	5-?		Morchella augusticeps	(C) home
Mushroom poison	Washington	1	9-28		Amanita muscaria	(D) unknown
Mushroom poison	Washington	1	10-24		Panaeolus	(C) home
Mushroom poison	New York City	1	10-16		Amanita phalloides	(C) home
Mushroom poison	New York City	1	10-31		Mushrooms	(C) home
Biphenyl	South Carolina	10	5-8	+	Bread	(D) home
Cyanide	California	1	10-22		Apricot kernals	(C) home
Phosphorus containing soap	Michigan	5	12-17		Alcoholic drinks	(B) restaurant
Sodium chloride	New York City	2	7-19	+	Cookies	(A) home
Sodium nitrite	California	19	3-19		Multiple foods	(A) home
Trisodium phosphate	New York	1	8-18		Coffee	(D) restaurant

*(A)--Food processing establishment; (B)--Food service establishment; (C)--Home; (D)--Unknown

Etiology	State	Number of Cases	Date of Onset	Lab Data			Vehicle	Location Where Food Mishandled* And Eaten
				Patient	Vehicle	Food-handler		
PARASITIC								
TRICHINELLA SPIRALIS								
T. spiralis	Alaska	28	10-?		+		Walrus meat	(C) home
T. spiralis	California	5	10-?	+	+		Bear meat	(C) home
T. spiralis	Connecticut	8	12-6	+			Sausage	(A) unknown
T. spiralis	Illinois	2	1-?	+			Unknown	(D) unknown
T. spiralis	Illinois	24	2-21	+	+		Sausage	(C) home
T. spiralis	Iowa	63	12-29	+	+		Pork-venison sausage	(C) home
T. spiralis	Massachusetts	14	11-23	+			Sausage	(D) unknown
T. spiralis	Massachusetts	2	12-15	+			Sausage	(D) unknown
T. spiralis	New Jersey	15	6-22	+			Ground beef	(D) restaurant
T. spiralis	New Jersey	4	7-12	+			Ground beef	(A) home
T. spiralis	New Jersey	2	10-2	+			Ground beef	(A) unknown
T. spiralis	New Jersey	3	11-15	+			Sausage	(C) home
T. spiralis	New Jersey	2	12-7	+			Chinese dumplings	(D) home
T. spiralis	New York	4	1-16	+			Sausage	(C) home
T. spiralis	New York	5	1-?	+			Sausage	(C) home
T. spiralis	New York	2	2-?	+			Ground beef	(A) home
T. spiralis	Pennsylvania	3	9-25				Ground beef	(B) restaurant

T. spiralis	Utah	2	3-13	+		Sausage	(D) home
T. spiralis	New York City	3	1-13	+		Pork	(B) restaurant
T. spiralis	New York City	2	5-?	+		Unknown	(D) unknown
ANISAKIDAE							
Phocanema genus	California	1	2-?	+		White sea bass	(D) home
CESTODES							
Diphyllobothrium latum	Minnesota	1	10-23	+		Northern pike	(C) home
VIRAL							
Hepatitis A	New York	34	12-9	+	+	Sandwiches, salad	(B) restaurant
Hepatitis A	Oklahoma	116	12-28			Glazed donuts	(B) delicatessen
Hepatitis A	Oregon	23	7-10	+	+	Sandwiches	(B) restaurant
UNKNOWN							
	Alaska	40	5-?			Unknown	(D) restaurant
	Arizona	10	5-28			Unknown	(D) restaurant
	Arizona	12	6-9			Unknown	(D) river raft trip
	Arkansas	34	4-7			Unknown	(D) nursing home
	California	5	4-10			Meat sauce	(B) cafeteria
	California	23	4-12			Meat balls	(B) restaurant
	California	2	4-16			Beef sandwich	(B) restaurant
	California	40	4-20			Unknown	(C) convention hall

*(A)--Food processing establishment; (B)--Food service establishment; (C)--Home; (D)--Unknown

Etiology	State	Number of Cases	Date of Onset	Lab Data			Vehicle	Location Where Food Mishandled* And Eaten
				Patient	Vehicle	Food-handler		
(UNKNOWN)	California	24	5-2		+		Ham sandwich	(D) fair grounds
	California	5	5-15				Beef burritos	(B) restaurant
	California	248	5-25		+		Ham, salad	(C) recreation hall
	California	44	5-31				Crab salad, chicken salad	(B) restaurant
	California	5	6-10				Unknown	(D) restaurant
	California	165	6-12				Unknown	(D) school
	California	85	6-14				Roast beef	(D) home
	California	215	6-16				Beef, fruit cocktail	(B) restaurant
	California	170	6-17				Braised beef	(B) restaurant
	California	40	7-27				Ham	(D) church
	California	80	8-12				Unknown	(D) home
	California	1788	9-13				Unknown	(B) restaurant
	California	22	9-14	+	+		Ham	(D) wedding reception
	California	8	9-23		+		Meat	(D) delicatessen
	California	7	10-1				Mexican food	(D) restaurant
	California	10	11-18				Unknown	(D) restaurant
	California	10	12-11		+	+	Ham	(B) restaurant
	California	11	12-26				Mexican food	(D) restaurant

California	16	12-?			Unknown	(D) restaurant
Connecticut	145	8-3			Unknown	(D) institution for retarded
Connecticut	50	9-8	+	+	Raw clams	(D) picnic
Connecticut	200	11-16			Potato salad	(D) picnic
Connecticut	22	12-?			Rice	(D) school
Delaware	100	10-22			Unknown	(B) school
Florida	3	2-21			Fish	(D) home
Florida	3	2-21			Fish	(D) home
Florida	19	4-12		+	Egg salad	(B) navy ship
Florida	5	4-22			Fish	(D) home
Florida	11	4-29			Unknown	(D) delicatessen
Florida	140	5-3			Roast beef	(B) convention hall
Florida	11	5-?			Unknown	(D) delicatessen
Florida	17	5-?			Cheese	(D) work
Florida	11	6-26			Unknown	(D) home
Florida	180	9-18			Chicken salad	(B) school
Georgia	6	2-2			Barbeque chicken	(B) restaurant
Georgia	235	2-13	+		Gravy	(B) school
Georgia	83	2-14			Steak, rice, gravy	(D) church

*(A)--Food processing establishment; (B)--Food service establishment; (C)--Home; (D)--Unknown

Etiology	State	Cases	Onset	Lab Data			Vehicle	Location Where Food Mishandled* And Eaten
				Patient	Vehicle	Food-handler		
(UNKNOWN)	Georgia	3	3-24				Turkey	(B) restaurant
	Georgia	21	5-6		+		Ham	(B) day care center
	Georgia	27	6-17	+	+	+	Barbeque meat	(B) restaurant
	Georgia	30	11-13				Chicken noodles	(B) day care center
	Hawaii	314	7-5				Chinese food	(B) restaurant
	Hawaii	81	7-5				Chicken gizzard, beef curry	(D) restaurant
	Hawaii	4	7-28		+		Chinese food	(B) restaurant
	Hawaii	2	8-12		+		Chicken	(B) home
	Hawaii	57	12-15				Roast beef	(B) restaurant
	Illinois	76	1-26		+		Chicken	(D) church
	Illinois	27	4-19				Roast beef	(D) restaurant
	Illinois	2	5-22	+	+		Ham	(D) home
	Illinois	450	6-4		+		Chicken	(D) restaurant
	Illinois	16	9-3				Beef	(D) restaurant
	Illinois	3	10-27				Mexican food	(D) restaurant
	Indiana	57	8-1				Unknown	(D) school
	Kentucky	100	2-4				Roast beef	(D) unknown
	Kentucky	750	2-15				Beef	(B) prison

Kentucky	5	5-5				Unknown	(D) unknown
Kentucky	8	10-27				Unknown	(D) unknown
Kentucky	2	11-6				Unknown	(D) unknown
Kentucky	188	11-?		+		Turkey	(D) school
Kentucky	4	12-1	+			Unknown	(D) unknown
Kentucky	13	12-17				Turkey	(D) unknown
Louisiana	40	5-25		+		Crayfish	(C) home
Louisiana	2000	6-22				Roast beef	(B) prison
Louisiana	30	10-9		+		Unknown	(D) unknown
Louisiana	9	12-26				Turkey	(C) home
Louisiana	50	?				Chicken salad	(D) school
Maryland	25	5-?				Roast beef	(D) home
Massachusetts	140	8-19		+		Chicken salad	(D) nursing home
Massachusetts	21	10-4			+	Unknown	(B) sorority
Massachusetts	152	12-5				Salad dressing	(B) hotel
Massachusetts	6	?	+			Cole slaw	(D) restaurant
Massachusetts	60	?	+			Unknown	(D) hotel
Michigan	3	3-30		+		Eggs	(C) home
Michigan	13	6-4		+		Chicken salad	(B) restaurant
Minnesota	21	1-6				Unknown	(D) nursing home
Minnesota	3	1-14				Unknown	(B) restaurant

*(A)--Food processing establishment; (B)--Food service establishment; (C)--Home; (D)--Unknown

Etiology	State	Number of Cases	Date of Onset	Lab Data			Vehicle	Location Where Food Mishandled* And Eaten
				Patient	Vehicle	Food-handler		
(UNKNOWN)	Minnesota	4	1-14				Unknown	(B) restaurant
	Minnesota	200	1-22				Unknown	(D) restaurant
	Minnesota	2	1-24				Unknown	(B) restaurant
	Minnesota	2	2-18				Pork sausage	(D) home
	Minnesota	4	3-22				Unknown	(D) restaurant
	Minnesota	2	3-25				Unknown	(D) restaurant
	Minnesota	3	4-6				Chicken	(B) restaurant
	Minnesota	2	4-13				Unknown	(D) restaurant
	Minnesota	2	4-26				Unknown	(B) home
	Minnesota	4	5-31				Unknown	(D) home
	Minnesota	23	6-19				Unknown	(D) picnic
	Minnesota	50	7-23				Unknown	(D) picnic
	Minnesota	2	8-24				Unknown	(D) restaurant
	Minnesota	8	9-10				Unknown	(D) home
	Minnesota	169	10-9		+		Salads	(B) school
	Minnesota	2	10-9				Sausage	(D) home
	Minnesota	30	11-15				Apple pie	(D) school
	Mississippi	9	1-16				Spaghetti and meat sauce	(B) canteen
	Missouri	15	5-1				Unknown	(D) nursing home

Missouri	3	8-1				Unknown	(D) home
Missouri	65	9-24				Unknown	(D) school
Missouri	5	10-7		+	+	Ham sand-wiches	(D) restaurant
Missouri	51	11-19				Unknown	(D) school
Missouri	17	12-15				Unknown	(D) restaurant
Missouri	5	?				Unknown	(D) picnic
Nebraska	16	3-15				Unknown	(D) restaurant
Nebraska	97	5-15				Mexican food	(B) school
Nebraska	8	11-16				Mexican food	(D) home
Nevada	3	1-12		+		Corn dogs	(D) restaurant
Nevada	3	1-29		+		Ham and cheese omelette	(B) restaurant
Nevada	17	9-18		+		Mexican food	(B) restaurant
New Hampshire	40	7-1	+		+	Unknown	(B) restaurant
New Jersey	5	3-?				Turkey pie	(D) home
New Jersey	75	6-7				Roast beef	(D) church
New Mexico	30	4-10	+		+	Mexican food	(B) restaurant
New York	212	1-20		+		Roast beef	(B) restaurant
New York	89	5-4				Roast beef and gravy	(B) school
Oklahoma	3	1-28		+		Turkey	(D) home
Oregon	5	2-25		+		Unknown	(B) restaurant

*(A)--Food processing establishment; (B)--Food service establishment; (C)--Home; (D)--Unknown

Etiology	State	Number of Cases	Date of Onset	Lab Data			Vehicle	Location Where Food Mishandled* And Eaten
				Patient	Vehicle	Food-handler		
(UNKNOWN)	Oregon	3	6-16				Cheese	(D) home
	Oregon	7	7-21				Unknown	(D) home
	Oregon	3	7-26				Chicken	(B) street sale
	Pennsylvania	3	1-15				Unknown	(D) home
	Pennsylvania	2	1-17				Unknown	(D) restaurant
	Pennsylvania	129	1-19	+			Roast beef sandwich	(D) nursing home
	Pennsylvania	33	1-26				Unknown	(D) restaurant
	Pennsylvania	90	2-24				Unknown	(D) unknown
	Pennsylvania	2	4-18				Prune juice	(D) home
	Pennsylvania	60	4-19				Unknown	(D) unknown
	Pennsylvania	3	5-5	+			Chinese food	(B) home
	Pennsylvania	6	5-11		+	+	Ham	(B) home
	Pennsylvania	77	5-11				Unknown	(D) fire hall
	Pennsylvania	3	5-11				Ground beef	(D) restaurant
	Pennsylvania	3	6-4				Lettuce	(D) home
	Pennsylvania	60	6-15				Unknown	(D) hospital
	Pennsylvania	27	8-3				Roast beef, chicken	(B) raceway
	Pennsylvania	6	8-31				Unknown	(B) restaurant
	Pennsylvania	2	9-9	+	+		Chicken salad	(B) restaurant

Pennsylvania	3	12-15				Bologna	(D) home
South Carolina	7	1-2				Flounder	(D) restaurant
South Carolina	3	2-16				Unknown	(D) restaurant
South Carolina	3	2-18				Unknown	(D) restaurant
South Carolina	33	4-25				Salad	(D) restaurant
South Carolina	4	6-15				Unknown	(D) restaurant
Tennessee	7	4-2	+			Barbeque pork	(B) restaurant
Tennessee	4	5-1				Barbeque meat	(B) restaurant
Tennessee	2	7-14				Chili	(D) restaurant
Tennessee	123	7-22				Turkey	(B) hospital
Tennessee	3	7-22		+	+	Barbeque meat	(B) unknown
Tennessee	124	7-22				Turkey, dressing	(B) hospital
Texas	28	11-2				Salad dressing	(B) school
Utah	90	9-19		+		Macaroni tuna salad	(C) community center
Virginia	64	1-29				Tuna salad	(B) military base
Virginia	60	7-20		+		Unknown	(D) camp
Virginia	22	8-13		+	+	Salad, ham	(B) restaurant
Washington	2	2-1				Chinese food	(B) restaurant
Washington	3	2-4				Spanish omelette	(B) restaurant
Washington	13	2-10		+		Swiss steak	(B) restaurant

*(A)--Food processing establishment; (B)--Food service establishment; (C)--Home; (D)--Unknown

Etiology	State	Number of Cases	Date of Onset	Lab Data			Vehicle	Location Where Food Mishandled* And Eaten
				Patient	Vehicle	Food-handler		
(UNKNOWN)	Washington	4	2-14				Mexican food	(B) restaurant
	Washington	2	3-12				Beef crepe	(B) restaurant
	Washington	3	3-25	+			Mexican food	(B) restaurant
	Washington	4	3-28				Bologna	(D) home
	Washington	3	4-3				Unknown	(D) restaurant
	Washington	14	4-19				Hors d'oeuvres	(D) restaurant
	Washington	2	4-23				Lettuce, spinach	(B) restaurant
	Washington	10	5-2				Clam chowder	(C) home
	Washington	4	5-3				Boysenberry pie	(D) restaurant
	Washington	2	5-3				Cheese	(D) restaurant
	Washington	33	5-16		+		Unknown	(D) restaurant
	Washington	6	5-18				Chinese food	(B) restaurant
	Washington	7	5-30				Raw milk	(A) home
	Washington	21	7-15	+	+		Mexican food	(B) restaurant
	Washington	5	7-15				Crab	(C) home
	Washington	2	7-16				Hollandaise sauce	(B) restaurant
	Washington	5	7-17				Barbeque chicken	(B) home
	Washington	3	7-18				Mexican food	(B) restaurant

Washington	2	8-15			Cheese crepe	(D) restaurant
Washington	336	8-16			Roast pig, chicken	(D) church
Washington	4	8-20	+		Sandwich meat	(D) home
Washington	2	8-22	+		Chinese food	(B) restaurant
Washington	3	8-31			Grape slush	(D) restaurant
Washington	6	9-9			Cheese crepe	(D) restaurant
Washington	29	10-18			Unknown	(D) meeting hall
Washington	2	10-22			Turkey and dressing	(C) home
Washington	2	10-27	+		Smoked salmon	(C) home
Washington	2	11-4			Barbeque sauce	(D) home
Washington	4	11-17			Roast beef	(D) restaurant
Washington	3	11-23			Mexican food	(D) restaurant
Washington	11	11-29			Turkey	(D) restaurant
Washington	9	12-12			Chinese food	(D) restaurant
Washington	2	12-31			Cheese crepe	(D) restaurant
Wisconsin	55	2-23			Chicken, cole slaw	(B) restaurant
Wisconsin	26	3-6			Turkey	(D) school
Wisconsin	36	4-20			Unknown	(D) restaurant
Wisconsin	19	7-16		+	Unknown	(D) restaurant
Wisconsin	20	9-13	+		Buffalo burger	(D) park

*(A)--Food processing establishment; (B)--Food service establishment; (C)--Home; (D)--Unknown

Etiology	State	Number of Cases	Date of Onset	Lab Data			Vehicle	Location Where Food Mishandled* And Eaten
				Patient	Vehicle	Food-handler		
(UNKNOWN)	Guam	13	8-8				Pancit	(C) party
	New York City	2	1-1		+		Tuna	(D) home
	New York City	2	1-2				Sausage	(D) home
	New York City	2	1-3		+		Chinese food	(D) home
	New York City	2	1-3				Chinese food	(D) restaurant
	New York City	3	1-13				Fried chicken	(D) home
	New York City	4	1-15		+		Unknown	(D) restaurant
	New York City	5	1-17		+		Cole slaw	(B) restaurant
	New York City	3	1-17		+		Unknown	(D) office
	New York City	2	1-18		+		Unknown	(B) restaurant
	New York City	5	1-28		+		Unknown	(D) restaurant
	New York City	5	1-30		+		Unknown	(D) restaurant
	New York City	4	2-2				Unknown	(D) home
	New York City	2	2-5		+		Chinese food	(D) restaurant
	New York City	2	2-13		+		Unknown	(D) unknown
	New York City	2	2-16				Chinese food	(D) restaurant
	New York City	2	2-18		+		Unknown	(B) restaurant
	New York City	5	2-25		+		Fish	(B) restaurant
	New York City	3	2-26		+		Quiche	(B) restaurant
	New York City	2	3-5		+		Roast beef	(B) home
	New York City	90	3-6				Chicken	(D) church

New York City	15	3-10	+	Unknown	(B) restaurant
New York City	15	3-11	+	Beef stew	(B) school
New York City	3	3-12	+	Shish kebab	(B) restaurant
New York City	5	3-13	+	Tuna salad	(B) restaurant
New York City	3	3-22	+	Shrimp	(B) restaurant
New York City	4	3-23	+	Unknown	(B) restaurant
New York City	7	3-24	+	Unknown	(C) home
New York City	2	3-27	+	Eggs	(B) restaurant
New York City	2	3-27		Fried clams	(B) restaurant
New York City	3	3-28	+	Ice cream	(D) home
New York City	3	3-29	+	Chicken	(B) restaurant
New York City	4	4-1		Lasagna	(D) restaurant
New York City	3	4-3		Pizza	(D) car
New York City	7	4-6		Unknown	(D) home
New York City	2	4-11	+	Chicken	(B) restaurant
New York City	2	4-14	+	Unknown	(B) restaurant
New York City	16	4-15		Beef	(B) work
New York City	3	4-16	+	Unknown	(B) restaurant
New York City	2	4-23	+	Shrimp	(B) restaurant
New York City	3	4-26	+	Shish kebab	(B) restaurant
New York City	4	5-1		Unknown	(D) restaurant
New York City	5	5-2	+	Chicken	(B) restaurant

*(A)--Food processing establishment; (B)--Food service establishment; (C)--Home; (D)--Unknown

Etiology	State	Number of Cases	Date of Onset	Lab Data			Vehicle	Location Where Food Mishandled* And Eaten
				Patient	Vehicle	Food-handler		
(UNKNOWN)	New York City	2	5-2		+		Breaded chicken	(C) home
	New York City	69	5-5	+	+		Pot roast	(B) prison
	New York City	20	5-6		+		Milk	(B) school
	New York City	7	5-10		+		Unknown	(C) home
	New York City	3	5-11		+		Pork	(B) restaurant
	New York City	5	5-12		+		Ham	(B) office
	New York City	3	5-14		+		Milk	(B) home
	New York City	40	5-18		+		Gravy	(B) nursing home
	New York City	24	5-29		+		Unknown	(D) school
	New York City	4	5-31		+		Chinese food	(B) restaurant
	New York City	2	6-2		+		Unknown	(B) restaurant
	New York City	5	6-6		+		Cake	(D) home
	New York City	8	6-10		+		Shrimp	(B) restaurant
	New York City	3	6-18		+		Ham	(B) restaurant
	New York City	2	6-24		+		Chinese food	(D) restaurant
	New York City	7	6-25		+		Unknown	(C) home
	New York City	27	7-2	+			Unknown	(D) nursing home
	New York City	3	7-19		+		Unknown	(B) restaurant
	New York City	4	7-21		+		Soft drink	(B) cafeteria

New York City	3	7-22	+	Chinese food	(B) restaurant
New York City	3	7-24	+	Chinese food	(B) restaurant
New York City	5	7-25	+	Tuna casserole	(B) restaurant
New York City	2	8-1		Soup	(B) office
New York City	2	8-14	+	Beef	(B) restaurant
New York City	2	8-17	+	Beef	(B) restaurant
New York City	2	8-23	+	Unknown	(B) restaurant
New York City	2	8-26	+	Unknown	(B) restaurant
New York City	4	8-27	+	Unknown	(B) restaurant
New York City	2	8-29		Snow cone	(B) delicatessen
New York City	2	9-14	+	Roast beef	(B) restaurant
New York City	2	9-24	+	Unknown	(D) restaurant
New York City	36	9-29	+	Unknown	(B) nursing home
New York City	4	9-30	+	Chinese food	(D) restaurant
New York City	2	10-2		Cookies	(D) home
New York City	2	10-4	+	Chinese food	(D) restaurant
New York City	2	10-6	+	Mussles, crabs	(D) home
New York City	4	10-10		Potted meat	(D) home
New York City	3	10-10	+	Unknown	(D) restaurant
New York City	5	10-12	+	Unknown	(D) restaurant
New York City	2	10-13	+	Crabs	(D) restaurant

*(A)--Food processing establishment; (B)--Food service establishment; (C)--Home; (D)--Unknown

Etiology	State	Number of Cases	Date of Onset	Lab Data			Vehicle	Location Where Food Mishandled* And Eaten
				Patient	Vehicle	Food-handler		
(UNKNOWN)	New York City	4	10-14		+		Unknown	(D) restaurant
	New York City	3	10-18		+		Chinese food	(D) restaurant
	New York City	2	10-23		+		Turkey sandwich	(D) restaurant
	New York City	2	10-27				Tuna sandwich	(D) restaurant
	New York City	3	11-3		+		Ice cream, cake	(D) restaurant
	New York City	3	11-18		+		Unknown	(B) restaurant
	New York City	3	11-18		+		Tuna	(C) home
	New York City	30	11-18				Unknown	(D) day care center
	New York City	2	11-22		+		Roast beef	(D) unknown
	New York City	2	11-26		+		Beef	(B) restaurant
	New York City	5	11-27		+		Turkey	(B) restaurant
	New York City	4	11-30		+		Unknown	(D) restaurant
	New York City	2	12-5		+		Salad	(B) restaurant
	New York City	2	12-5				Lamb curry	(B) restaurant
	New York City	3	12-8		+		Shrimp salad	(D) restaurant
	New York City	2	12-10		+		Unknown	(D) home
	New York City	2	12-11		+		Unknown	(D) restaurant
	New York City	15	12-17		+		Coffee	(D) home

New York City	2	12-26	+	Beef	(D) restaurant
New York City	3	12-26	+	Sauslaki	(D) restaurant
New York City	5	12-30	+	Beef	(D) restaurant
New York City	15	?	+	Roast beef	(D) church
New York City	5	?	+	Unknown	(D) youth center

*(A)--Food processing establishment; (B)--Food service establishment; (C)--Home; (D)--Unknown

G. Guidelines for Confirmation of Foodborne Disease Outbreak

	Clinical Syndrome	Laboratory and/or Epidemiologic Criteria
BACTERIAL		
1. Bacillus cereus	a) incubation period 2-16 hrs. b) gastrointestinal syndrome	a) isolation of $\geq 10^5$ organisms per gram in epidemiologically incriminated food OR b) isolation of organism from stools of ill person
2. Brucella	a) incubation period several days to several months b) clinical syndrome compatible with brucellosis	a) 4x ↑ in titer OR b) positive blood culture
3. Clostridium botulinum	a) incubation 2 hours - 8 days usually 12-48 hours) b) clinical syndrome compatible with botulism (see CDC Botulism Manual)	a) detection of botulinal toxin in human sera, feces, or food OR b) isolation of C. botulinum organism from epidemiologically incriminated food or stools OR c) food epidemiologically incriminated
4. Clostridium perfringens	a) incubation period 9-15 hrs b) lower intestinal syndrome--majority of cases with diarrhea but little vomiting or fever	a) organisms of same serotype in epidemiologically incriminated food and stool of ill individuals OR b) isolation of organisms with same serotype in stool of most ill individuals and not in stool of controls OR c) $\geq 10^5$ organisms per gram in epidemiologically incriminated food provided specimen properly handled
5. Escherichia coli	a) incubation period 6-36 hrs b) gastrointestinal syndrome--majority of cases with diarrhea	a) demonstration of organisms of same serotype in epidemiologically incriminated food and stool of ill individuals and not in stool of controls OR b) isolation of $\geq 10^5$ per gram organisms of same serotype in implicated food OR c) isolation of organism of same serotype from stool of

	Clinical Syndrome	Laboratory and/or Epidemiologic Criteria
		most ill individuals and, if possible, organisms should be tested for enterotoxigenicity and invasiveness by special laboratory techniques
6. Salmonella	a) incubation period 6-48 hrs b) gastrointestinal syndrome--majority of cases with diarrhea	a) isolation of salmonella organism from epidemiologically implicated food OR b) isolation of salmonella organism from stools of ill individuals
7. Shigella	a) incubation period 12-50 hrs b) gastrointestinal syndrome--majority of cases with diarrhea	a) isolation of shigella organism from epidemiologically implicated food OR b) isolation of shigella organism from stools of ill individuals
8. Staphylococcus aureus	a) incubation period 30 min - 8 hrs (usually 2-4 hrs) b) gastrointestinal syndrome--majority of cases with vomiting	a) detection of enterotoxin in epidemiologically implicated food OR b) organisms with same phage type in stools or vomitus of ill individuals and, when possible, implicated food and/or skin or nose of food handler OR c) isolation of = 10^5 organisms per gram in epidemiologically implicated food
9. Group A streptococcus	a) incubation period 1-4 days b) febrile URI syndrome	a) isolation of organisms with same M and T type from implicated food OR b) isolation of organisms with same M and T type from throats of ill individuals
10. Vibrio cholerae	a) incubation period 1-3 days b) gastrointestinal syndrome--majority of cases with diarrhea and without fever	a) isolation of V. cholerae from epidemiologically incriminated food OR b) isolation of organisms from stools or vomitus of ill individuals

	Clinical Syndrome	Epidemiologic Criteria
		OR c) significant rise in vibriocidal, bacterial agglutinating, or antitoxin antibodies in acute and early convalescent sera, or significant fall in vibriocidal antibodies in early and late convalescent sera in persons not recently immunized
11. Vibrio parahaemolyticus	a) incubation period 15-24 hrs b) gastrointestinal syndrome--majority of cases with diarrhea	a) isolation of $\geq 10^5$ organisms from epidemiologically implicated food (usually seafood) OR b) isolation of Kanagawa-positive organisms of same serotype from stool of ill individuals
12. Others	clinical data appraised in individual circumstances	laboratory data appraised in individual circumstances
CHEMICAL		
1. Heavy metals Antimony Cadmium Copper Iron Tin Zinc, etc	a) incubation period 5 min to 8 hrs (usually less than 1 hr) b) clinical syndrome compatible with heavy metal poisoning--usually gastrointestinal syndrome and often metallic taste	demonstration of high concentration of metallic ion in epidemiologically incriminated food or beverage
2. Ichthyosarcotoxin		
Ciguatoxin	a) incubation period 1-36 hrs (usually 2-8 hrs) b) clinical syndrome compatible with ciguatera--usually initial gastrointestinal symptoms followed by dry mouth, paraesthesias of lips, tongue, throat or extremities. A sensation of looseness and pain in the teeth and a pardoxical temperature sensation are characteristic	a) demonstration of ciguatoxin in epidemiologically incriminated fish OR b) Ciguatera-associated fish epidemiologically incriminated
Puffer fish (tetrodotoxin)	a) incubation period 10 min to 3 hrs (usually 10-45 min) b) clinical syndrome compatible	a) demonstration of tetrodotoxin in fish OR b) puffer fish epidemiologi-

	Clinical Syndrome	Laboratory and/or Epidemiologic Criteria
	with puffer fish poisoning--paraesthesias of lips, tongue, face or extremities often followed by numbness, loss of proprioception or a "floating" sensation	cally incriminated
Scombrotoxin	a) incubation period 1 min to 3 hrs (usually less than 1 hr) b) clinical syndrome compatible with scombroid fish poisoning often including flushing, headache, dizziness, burning of mouth and throat, upper and lower gastrointestinal symptoms, urticaria and generalized pruritus	a) demonstration of elevated histamine levels in epidemiologically incriminated fish OR b) fish of order Scombrodei or fish associated with scombroid poisoning (e.g. mahi-mahi) epidemiologically incriminated
3. Monosodium glutamate	a) incubation period 3 min to 2 hours (usually less than 1 hr) b) clinical syndrome compatible with monosodium glutamate intoxication--often including burning sensations in chest, neck, abdomen or extremities, sensations of lightness and pressure over face, or a heavy feeling in the chest	history of large amounts (usually $\geq$ 1.5 grams) of MSG having been added to epidemiologically incriminated food
4. Mushroom poison		
Group containing ibotenic acid and muscimol	a) incubation period 1-12 hrs (usually less than 4 hrs) b) clinical syndrome compatible with mushroom poisoning by this group--often including confusion, delirium, visual disturbances	a) demonstration of toxic chemical in epidemiologically incriminated mushrooms OR b) epidemiologically incriminated mushrooms identified as a toxic type
Group containing amatoxins and phallotoxins, or gyromitrin	a) incubation period 5-18 hrs b) characteristic clinical syndrome compatible with mushroom poisoning by this group--upper and lower gastrointestinal symptoms followed by hepatic and/or renal failure	a) demonstration of toxic chemical in epidemiologically incriminated mushrooms OR b) epidemiologically incriminated mushrooms identified as a toxic type
Groups containing muscarine, psilocybin and psilocin, gastrointestinal irritants, disulfiram-like compounds	a) characteristic incubation period b) clinical syndrome compatible with mushroom poisoning by these groups	a) demonstration of toxic chemical in epidemiologically incriminated mushrooms OR b) epidemiologically

	Clinical Syndrome	Laboratory and/or Epidemiologic Criteria
		incriminated mushroom identified as toxic type
5. Paralytic and Neurotoxic shellfish poison	a) incubation period 30 min to 3 hrs b) clinical syndrome compatible with paralytic shellfish poisoning--often including paraesthesias of lips, mouth or face and often upper and lower gastrointestinal symptoms	a) detection of toxin in epidemiologically incriminated mollusks OR b) detection of large numbers of shellfish poisoning-associated species of dinoflagellates in water from which epidemiologically incriminated mollusks gathered
6. Other chemicals	clinical data appraised in individual circumstances	laboratory data appraised in individual circumstances
PARASITIC AND VIRAL		
1. Trichinella spiralis	a) incubation period 3-30 days b) clinical syndrome compatible with trichinosis--often including fever, high eosinophil count, orbital edema, myalgia	a) muscle biopsy from ill individual OR b) serological tests OR c) demonstration of larvae in incriminated food
2. Hepatitis A	a) incubation period 10-45 days b) clinical syndrome compatible with hepatitis--usually including jaundice, GI symptoms, dark urine	liver function tests compatible with hepatitis in affected persons who consumed the epidemiologically incriminated food
3. Others	clinical evidence appraised in individual circumstances	laboratory evidence appraised in individual circumstances

III. WATERBORNE DISEASE OUTBREAKS, 1975

This report summarizes data on waterborne disease outbreaks reported to CDC in 1975.

A. Definition of Outbreak

A waterborne disease outbreak is defined in this report as an incident in which (1) 2 or more persons experience similar illness after consumption of water, and (2) epidemiologic evidence implicates the water as the source of illness.

There is 1 exception; 1 case of chemical poisoning constitutes an outbreak if the water is demonstrated to be contaminated by the chemical. In most of the reported outbreaks, the implicated water source was demonstrated to be contaminated; only outbreaks associated with water used for drinking are included.

B. Sources of Data

Waterborne disease outbreaks are reported to CDC by state health departments. No standard reporting form is used but one has recently been devised and is presently being field tested in 8 states (see Section E). In addition, the Water Supply Research Laboratory, Environmental Protection Agency (EPA), contacts all state water supply agencies to obtain information about additional outbreaks. Personnel from CDC and EPA work together in the evaluation and investigation of waterborne disease outbreaks. When requested by a state health department, CDC and EPA can offer epidemiologic assistance and provide expertise in the engineering and environmental aspects of water purification. Data obtained on outbreaks are reviewed and summarized by representatives from CDC and EPA. A line listing of reported waterborne disease outbreaks in 1975 is included (see Section F).

In this report municipal systems are public or investor owned water supplies that may serve either large or small communities. Individual water systems, generally wells or springs, are used exclusively by single residences in areas that are without municipal systems. Semi-public water systems, also found in areas without municipal systems, are developed and maintained for use by several residences (e.g. subdivisions), industries, camps, parks, resorts, institutions, hotels, and other establishments at which the general public is likely to have access to drinking water.

C. Interpretation of Data

Data included in this summary of waterborne disease outbreaks have limitations similar to those outlined in the foodborne disease summary and must be interpreted with caution since they represent only a small part of a larger public health problem. These data are helpful in revealing the various etiologies of waterborne diseases, the seasonal occurrence of outbreaks, and the defieicncies in water systems that most frequently result in outbreaks. As in the past the pathogen(s) responsible for many outbreaks in 1975 remains unknown. It is hoped that advances in laboratory techniques and standardization of reporting of waterborne disease outbreaks will augment our knowledge of waterborne pathogens and the factors responsible for waterborne disease outbreaks.

D. Analysis of Data

In 1975, 24 waterborne disease outbreaks involving 10,879 cases were reported to CDC (Table 1). No etiologic agent was found for the 2 largest outbreaks: 1 in Sewickley, Pennsylvania, and 1 in Sellersburg, Indiana. The third largest outbreak, involving over 1,000 persons, occurred at Crater Lake National Park, Oregon. Toxigenic *Escherichia coli*, serotype 06:H16, was isolated from ill park residents and from the park's water supply.

Table 1

Waterborne Disease Outbreaks, 1972--1975

	1972	1973	1974	1975	Total
Outbreaks	29	24	28	24	105
Cases	1,638	1,720	8,413	10,879	22,650

Figure 1 shows the geographic distributions of outbreaks by state. Fourteen states and Puerto Rico reported at least 1 outbreak.

Figure 2 depicts the trend in reported waterborne disease outbreaks over the last 3 decades. Although the number of outbreaks reported in 1975 was less than in 1974, the number of cases has continued to increase (Table 1).

Table 2 shows the number of outbreaks and cases by etiology and type of water system. The category with the most outbreaks is designated "Acute gastrointestinal illness." This category includes outbreaks characterized by upper and/or lower gastrointestinal symptomatology for which no specific etiologic agent was identified. In previous years, these outbreaks were grouped under the category "sewage poisoning." The 3 chemical outbreaks were due to fuel oil, herbicide, and ethyl acrylate. One outbreak each was caused by G. lamblia, S. sonnei, enterotoxigenic E. coli, and hepatitis A. There were no reported deaths associated with waterborne disease outbreaks in 1975.

Most outbreaks involved semi-public (67%) and municipal (25%) water systems, and fewer involved individual (8%) systems. Outbreaks attributed to water from municipal systems affected an average of 1,218 persons compared with 221 persons in outbreaks involving semi-public systems and 13 persons in outbreaks associated with individual water systems. Of the 16 outbreaks associated with semi-public water supplies, 11 (69%) involved visitors to areas used mostly for recreational purposes.

Fig. 1 WATERBORNE OUTBREAKS, 1975

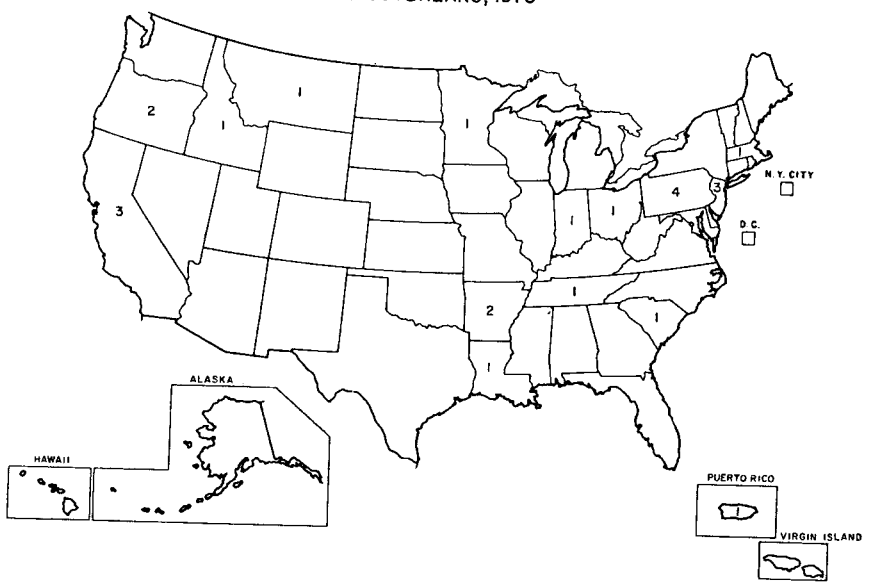
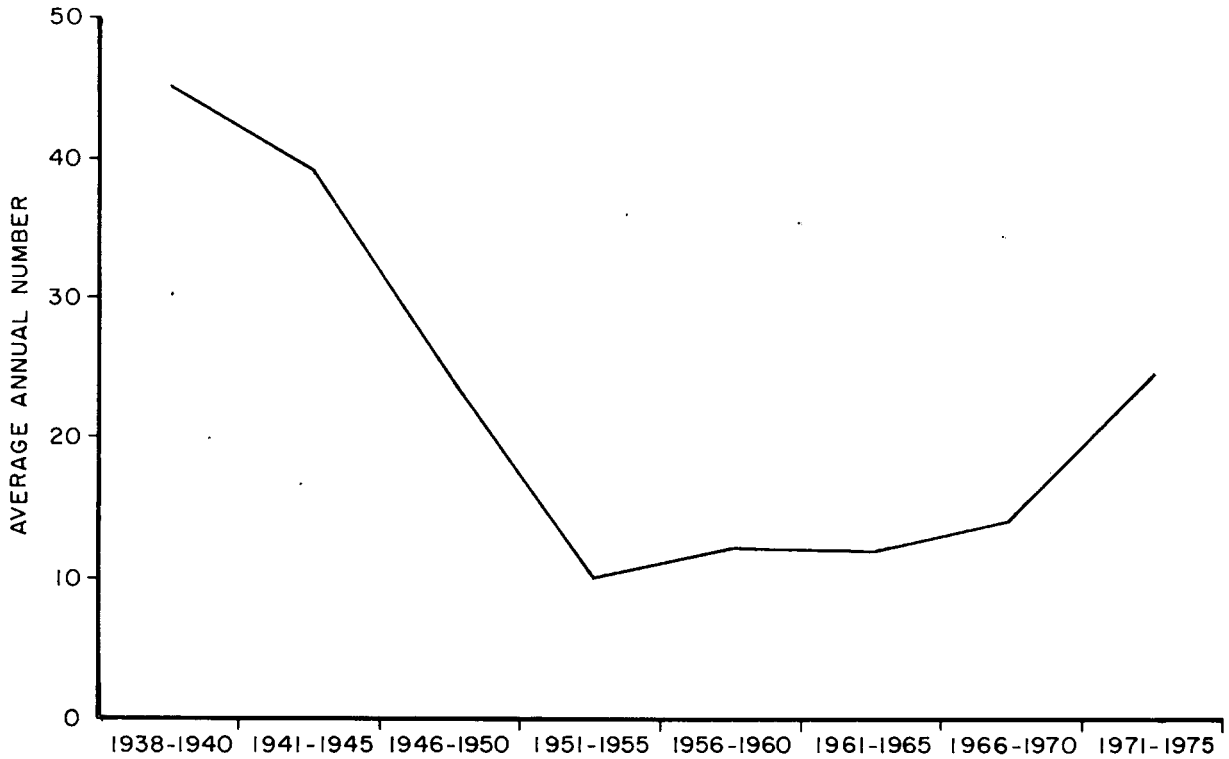


Table 2

Waterborne Disease Outbreaks, by Etiology and Type of Water System, 1975

	MUNICIPAL		SEMI-PUBLIC		INDIVIDUAL		TOTAL	
	Outbreaks	Cases	Outbreaks	Cases	Outbreaks	Cases	Outbreaks	Cases
Acute gastro-intestinal illness	4	7,300	13	2,460	-	-	17	9,760
Chemical poisoning	2	11	1	26	-	-	3	37
Giardiasis	-	-	-	-	1	9	1	9
Shigellosis	-	-	1	56	-	-	1	56
Enterotoxigenic E. coli	-	-	1	1,000	-	-	1	1,000
Hepatitis	-	-	-	-	1	17	1	17
Total	6	7,311	16	3,542	2	26	24	10,879

Fig. 2 AVERAGE ANNUAL NUMBER WATERBORNE DISEASE OUTBREAKS, 1938 - 1975



In Table 3, outbreaks and cases are classified by type of water system and the system deficiency responsible for the outbreak. Treatment deficiencies were responsible for the most outbreaks, however, deficiencies in the distribution systems of 5 municipal water supplies were responsible for the highest number of cases.

Table 3

Waterborne Disease Outbreaks, by Type of System, and Cause of System Deficiency, 1975

	MUNICIPAL		SEMI-PUBLIC		INDIVIDUAL		TOTAL	
	Outbreaks	Cases	Outbreaks	Cases	Outbreaks	Cases	Outbreaks	Cases
Untreated surface water	-	-	1	7	2	26	3	33
Untreated ground water	-	-	5	774	-	-	5	774
Treatment deficiencies	-	-	8	2,695	-	-	8	2,695
Deficiencies in distribution system	5	6,961	-	-	-	-	5	6,961
Miscellaneous	1	350	2	66	-	-	3	416
TOTAL	6	7,311	16	3,542	2	26	24	10,879

The distribution of all outbreaks by month is shown in Table 4. As in the past, outbreaks tended to occur in the spring and summer; 17 (71%) of the outbreaks began in May, June, July, August, and September. All 11 outbreaks in recreational areas occurred in the spring and summer months, May to September (Table 5).

Table 4

Waterborne Disease Outbreaks, by Month of Occurrence, 1975

Month	Number of Outbreaks	Month	Number of Outbreaks
January	1	July	3
February	1	August	4
March	1	September	2
April	2	October	2
May	2	November	0
June	6	December	0
	Total 24		

Table 5

Waterborne Disease Outbreaks Involving Semi-Public Water Supplies, by Month and Population Affected, 1975

Month	Number of Outbreaks	Usual Population*	Visitors**
January	1	1	-
February	-	-	-
March	-	-	-
April	-	-	-
May	2	1	1
June	5	1	4
July	3	-	3
August	3	1	2
September	1	-	1
October	1	1	-
November	-	-	-
December	-	-	-
TOTAL	16	5	11

*Outbreaks affecting individuals using the water supply on a regular basis

**Outbreaks affecting individuals not using the water supply on a regular basis

In addition to outbreaks due to consumption of water, 2 outbreaks of leptospirosis were attributed to swimming in contaminated surface water. Seven children in Tennessee developed infection with Leptospira interrogans serotype grippotyphosa after swimming in a small local stream. Two persons in Louisiana became infected with leptospires of the serotype icterohaemorrhagiae after bathing in a man-made lake.

DEPARTMENT OF
HEALTH, EDUCATION, AND WELFARE
PUBLIC HEALTH SERVICE
CENTER FOR DISEASE CONTROL
BUREAU OF EPIDEMIOLOGY
ATLANTA, GEORGIA 30333

E. INVESTIGATION OF A WATERBORNE OUTBREAK

Pretest

1. Where did the outbreak occur?

State _____ (1-2) City or Town _____ County _____

2. Date of outbreak: (Date of onset of 1st case)

_____ (3-8)

3. Indicate actual (a) or estimated (e) numbers:

Persons exposed _____ (9-11)
Persons ill _____ (12-14)
Hospitalized _____ (15-16)
Fatal cases _____ (17)

4. History of exposed persons:

No. histories obtained _____ (18-20)
No. persons with symptoms _____ (21-23)
Nausea _____ (24-26) Diarrhea _____ (33-35)
Vomiting _____ (27-29) Fever _____ (36-38)
Cramps _____ (30-32)
Other, specify (39) _____

5. Incubation period (hours):

Shortest _____ (40-42) Longest _____ (43-45)
Median _____ (46-48)

6. Duration of illness (hours):

Shortest _____ (49-51) Longest _____ (52-54)
Median _____ (55-57)

7. Epidemiologic data (e.g., attack rates [number ill/number exposed] for persons who did or did not eat or drink specific food items or water, attack rate by quantity of water consumed, anecdotal information) * (58)

ITEMS SERVED	NUMBER OF PERSONS WHO ATE OR DRANK SPECIFIED FOOD OR WATER				NUMBER WHO DID NOT EAT OR DRINK SPECIFIED FOOD OR WATER			
	ILL	NOT ILL	TOTAL	PERCENT ILL	ILL	NOT ILL	TOTAL	PERCENT ILL

8. Vehicle responsible (item incriminated by epidemiologic evidence): (59-60) _____

9. Water supply characteristics

(A) Type of water supply** (61)

- ☐ Municipal or community supply (Name _____)
- ☐ Individual household supply
- ☐ Semi-public water supply
  - ☐ Institution, school, church
  - ☐ Camp, recreational area
  - ☐ Other, _____
- ☐ Bottled water

(B) Water source *(check all applicable):* (62-65)

- ☐ Well
- ☐ Spring
- ☐ Lake, pond
- ☐ River, stream

(C) Treatment provided *(circle treatment of each source checked in B):*

a b c d a. no treatment
a b c d b. disinfection only
a b c d c. purification plant — coagulation, settling, filtration, disinfection *(circle those applicable)*
a b c d d. other _____

10. Point where contamination occurred: (66)

☐ Raw water source ☐ Treatment plant ☐ Distribution system

*See HSM 4.245 (NCDC) Investigation of a Foodborne Outbreak, Item 7.

Municipal or community water supplies are public or investor owned utilities. **Individual water supplies are wells or springs used by single residences. **Semipublic** water systems are individual-type water supplies serving a group of residences or locations where the general public is likely to have access to drinking water. These locations include schools, camps, parks, resorts, hotels, industries, institutions, subdivisions, trailer parks, etc., that do not obtain water from a municipal water system but have developed and maintain their own water supply.

CDC 4.461
2-75

11. Water specimens examined: (67)

(Specify by "X" whether water examined was original (drunk at time of outbreak) or check-up (collected before or after outbreak occurred)

ITEM	ORIGINAL	CHECK UP	DATE	FINDINGS		BACTERIOLOGIC TECHNIQUE (e.g., fermentation tube, membrane filter)
				Quantitative	Qualitative	
Examples: Tap water	X		6/12/74	10 fecal coliforms per 100 ml.		
Raw water		X	6/2/74	23 total coliforms per 100 ml.		

12. Treatment records: *(Indicate method used to determine chlorine residual):*

Example: Chlorine residual — **One sample from treatment plant effluent on 6/11/74 — trace of free chlorine**

Three samples from distribution system on 6/12/74 — no residual found

13. Specimens from patients examined (stool, vomitus, etc.) (68)

SPECIMEN	NO. PERSONS	FINDINGS
Example: Stool	**11**	**8 *Salmonella typhi***
		3 negative

14. Unusual occurrence of events:

Example: Repair of water main 6/11/74; pit contaminated with sewage, no main disinfection. Turbid water reported by consumers 6/12/74.

15. Factors contributing to outbreak *(check all applicable):*

- ☐ Overflow of sewage
- ☐ Seepage of sewage
- ☐ Flooding, heavy rains
- ☐ Use of untreated water
- ☐ Use of supplementary source
- ☐ Water inadequately treated
- ☐ Interruption of disinfection
- ☐ Inadequate disinfection
- ☐ Deficiencies in other treatment processes
- ☐ Cross-connection
- ☐ Back-siphonage
- ☐ Contamination of mains during construction or repair
- ☐ Improper construction, location of well/spring
- ☐ Use of water not intended for drinking
- ☐ Contamination of storage facility
- ☐ Contamination through creviced limestone or fissured rock
- ☐ Other (specify) _____

16. Etiology: (69-70)

Pathogen _____

Chemical _____

Other _____

(71)

Suspected 1

Confirmed . . . . . 2 *(Circle one)*

Unknown 3

17. Remarks: *Briefly describe aspects of the investigation not covered above, such as unusual age or sex distribution; unusual circumstances leading to contamination of water; epidemic curve; control measures implemented; etc. (Attack additional page if necessary)*

Name of reporting agency: (72)

Investigating Official:

Date of investigation:

Note: Epidemic and Laboratory assistance for the investigation of a waterborne outbreak is available upon request by the State Health Department to the Center for Disease Control, Atlanta, Georgia 30333.

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

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

CDC 4.461 (Back)
2-75

F. LINE LISTING OF WATERBORNE DISEASE OUTBREAKS

F. Line Listing of Waterborne Disease Outbreaks, 1975

State	Month	Disease	Cases	Type of System	System Deficiency*
Arkansas	June	Acute gastrointestinal illness	500	Semi-public	3
Arkansas	August	Acute gastrointestinal illness	23	Semi-public	3
California	May	Acute gastrointestinal illness	80	Semi-public	3
California	June	Acute gastrointestinal illness	900	Semi-public	3
California	July	Acute gastrointestinal illness	19	Semi-public	3
Idaho	September	Giardiasis	9	Individual	1
Indiana	April	Acute gastrointestinal illness	1,400	Municipal	4
Louisiana	May	Fuel oil poisoning	26	Semi-public	5
Massachusetts	February	Hepatitis	17	Individual	1
Minnesota	June	Acute gastrointestinal illness	136	Semi-public	3
Montana	August	*Shigella sonnei*	56	Semi-public	2
New Jersey	January	Acute gastrointestinal illness	390	Semi-public	2
New Jersey	April	Acute gastrointestinal illness	350	Municipal	5
New Jersey	June	Lawn herbicide	4	Municipal	4
Ohio	June	Acute gastrointestinal illness	140	Semi-public	2

Oregon	June	Enterotoxigenic *Escherichia coli*	1,000	Semi-public	3
Oregon	September	Acute gastrointestinal illness	7	Semi-public	1
Pennsylvania	July	Acute gastrointestinal illness	88	Semi-public	2
Pennsylvania	August	Acute gastrointestinal illness	37	Semi-public	3
Pennsylvania	August	Acute gastrointestinal illness	5,000	Municipal	4
Pennsylvania	October	Acute gastrointestinal illness	100	Semi-public	2
Puerto Rico	March	Acute gastrointestinal illness	550	Municipal	4
South Carolina	October	Ethyl acrylate	7	Municipal	4
Tennessee	July	Acute gastrointestinal illness	40	Semi-public	5

*(1) Untreated surface water (2) Untreated ground water (3) Treatment deficiencies (4) Deficiencies in distribution system (5) Miscellaneous

IV. Outbreaks on Cruise Ships and Aircraft

This report summarizes data on outbreaks of gastrointestinal illness on cruise ships or aircraft that were reported to CDC in 1975.

A. Definition of Outbreak

Diarrheal illness on passenger vessels (vessels with 13 or more passengers) are reported by the Quarantine Stations to the Enteric Diseases Branch if (1) Three percent or more of passengers or crew are ill; (2) One or more passengers or crew members is ill and the vessel has been in a cholera-infected area within the previous 5 days; (3) There has been a death or hospitalization aboard the vessel in a person who had a diarrheal illness.

After such an incident is reported, the need for a full investigation is determined by the severity, timing, and magnitude of the problem. The outbreaks tabulated in this report (Table 1) are the incidents that have been fully investigated by CDC. These investigations usually included questionnaire surveys of passengers and crew, detailed evaluation of sanitation, and laboratory analysis of food, water, environmental, and patient specimens. The Quarantine Division evaluated 5 additional incidents with medical log reviews and environmental inspections only.

Table 1

Outbreaks of Gastrointestinal Illness on Cruise Ships, 1975

Vessel	Date	Port	Length Of Cruise (Days)	Number of Passengers	Percent of Passengers Ill	Etiology	Vehicle
A	February	Miami	7	742	42	Unknown	Unknown
B	February	Port Everglades	12	734	61	Vibrio parahaemolyticus	Shrimp
C	September	Miami	14	612	44	Unknown	Unknown
D	September	San Juan	7	559	31	Unknown	Unknown
E	November	Port Everglades	12	365	29	Unknown	Water
F	December	Honolulu	7	332	9	Unknown	Unknown
G	December	Los Angeles	52	62	43	Unknown	Unknown
H_1	December	Miami	4	836	Unknown	Escherichia coli 025	Unknown
H_2	January (76)	Miami	4	904	31		

B. Analysis of Data

In 1975 diarrhea outbreaks were investigated on 8 ships (Table 1) and 1 aircraft. Two successive voyages (H_1 and H_2) of 1 ship were involved in 1 outbreak. Seven of the 8 shipboard outbreaks were on Caribbean trips. The 1 outbreak on an aircraft took place after a stop in Alaska where the responsible food was prepared.

In most ship outbreaks neither the vehicle of transmission nor the etiology could be determined (Table 1). On vessel B Vibrio parahaemolyticus spread by contaminated shrimp caused the outbreak. On vessel H an enterotoxigenic Escherichia coli serotype 025 caused the outbreak; however, the vehicle was not determined. Staphylococcus aureus caused the aircraft outbreak.

Details of the V. parahaemolyticus outbreak were included in the 1974 Annual Summary. The following information on 2 ship outbreaks (vessels E and H) and the aircraft outbreak has been excerpted from the Morbidity and Mortality Weekly Report.

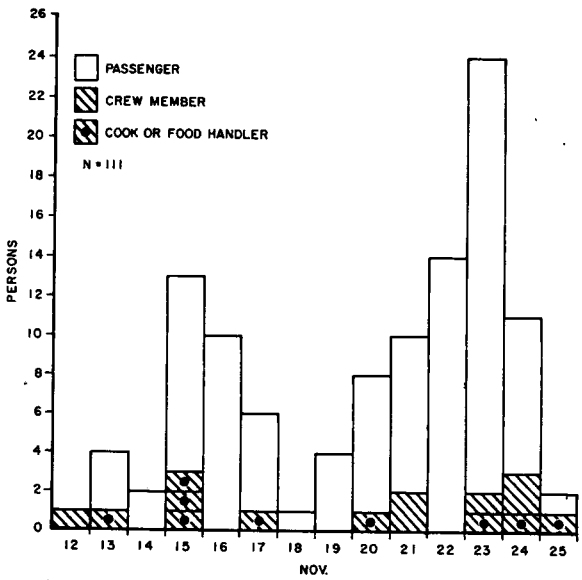
Diarrheal Illness Aboard a Cruise Ship
(MMWR 24(49):419, 1975)

On the November 13-25 cruise of Vessel E, 100 of 343 passengers (29.2%) and 16 of 256 crew members (6.3%) experienced a diarrheal illness. According to questionnaires

these 599 individuals answered at the completion of their journey, symptoms included abdominal cramps (49%), headache (35%), nausea (34%), vomiting (25%), and fever (17%). The median duration of illness was approximately 2 days. Twenty-nine percent of the ill passengers consulted the ship's medical staff, and 29% were confined to their cabins for at least 1 day because of illness.

One crew member became ill on November 12, the day before the cruise began. Three additional crew members and 9 passengers became ill before the ship's first stop on November 15 (Figure 1). Nine of the 16 crew members who developed diarrhea were food handlers; all but 1 of them continued to work in the kitchen while ill. The questionnaire, completed by 94% of the passengers, demonstrated a statistically significant association between illness and consumption of water aboard the ship (Table 2).

Fig. 1 ONSET OF ILLNESS AMONG PASSENGERS AND CREW, BY DATE, VESSEL E, NOVEMBER 1975



*DATE OF ONSET OF ILLNESS UNKNOWN FOR 4 PASSENGERS AND 1 CREW MEMBER

Cultures of rectal swabs obtained from ill and well passengers and crew on November 25 were negative for salmonellae, shigellae, and pathogenic vibrios. No coliform bacteria were found in samples from the ship's water distribution and storage system; however, the system had recently been chlorinated.

On October 20, 1975, the Center for Disease Control had conducted a routine sanitation inspection of the ship's facilities and found that the ship did not meet the minimum standards recommended by CDC. Multiple deficiencies were found in the potable water system. Among these were that: 1) the water was not chlorinated when it was pumped into the ship; 2) no free chlorine was detectable in the water distribution system; and 3) some potable water faucets were not adequately equipped to prevent back siphonage. The findings and recommendations of the inspection team were given to the ship's captain, the ship's agent, and the shipping company. On November 13, the day the cruise started on which the outbreak occurred, a follow-up inspection revealed that the deficiencies had not been corrected. The deficiencies were again called to the attention of the ship's captain.

Table 2

Association Between Illness and Average Daily Water Consumption Among Passengers, Vessel E, November 13-25, 1975

Glasses per Day	Ill*	Well	% Ill
0	7	41	14.6
≥1	91	164	35.7

Fishers 2-tail test p = .004

*Ill passengers were asked how much water they drank before the onset of illness.

A follow-up inspection conducted on December 6, 1975, before the Vessel E resumed its cruise schedule, revealed that the major deficiencies in the water system had been corrected, and the remaining items were being repaired.

Editorial Note

Epidemiologic investigation found an association between diarrheal illness and consumption of drinking water on board the ship. The multiple deficiencies in the water system noted on 2 previous inspections may have contributed to this outbreak.

Diarrheal Illness on a Cruise Ship Caused by Enterotoxigenic *Escherichia coli* (MMWR 25(29):229, 1976)

An outbreak of diarrheal illness occurred aboard Vessel H on 2 successive 4-day cruises from December 26, 1975, to January 2, 1976. A non-motile enterotoxigenic strain of *Escherichia coli* serotype 025 producing only heat-labile enterotoxin was isolated from passengers and crew on both cruises.

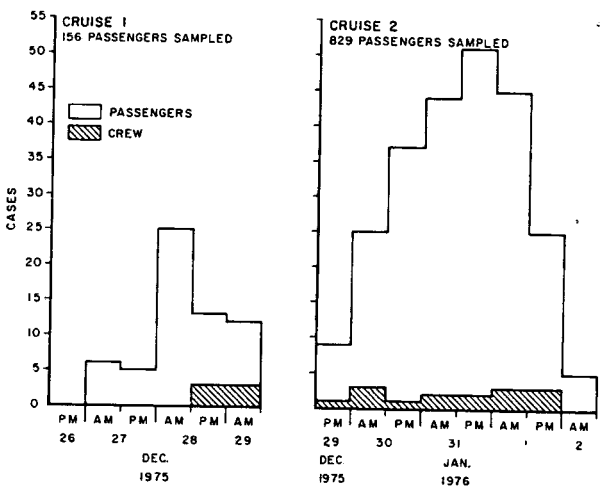
A limited survey of 156 (18%) of 863 passengers on voyage 1 and a more complete survey of 829 (92%) of 904 passengers on voyage 2 revealed that at least 64 passengers on voyage 1 and 259 (31%) passengers on voyage 2 had experienced a diarrheal illness during the voyage. Other symptoms experienced by the passengers included headache, nausea, vomiting, abdominal cramps, and fever (Table 3).

Table 3

Symptoms Associated with Diarrhea in Passengers on 2 Cruises, December 26, 1975 - January 2, 1976

Symptoms	Cruise 1 n=64	Cruise 2 n=259
Abdominal cramps	87%	83%
Nausea	81%	55%
Headache	60%	44%
Vomiting	39%	19%
Fever (subjective)	33%	25%

FIGURE 2. Diarrheal illness among passengers and crew, Vessel H*



*339 crew sampled

The median duration of illness on both cruises was 2 days; however, many passengers were still ill at the time of the surveys. Illnesses began as early as 12 hours after boarding and both outbreaks peaked in 36-48 hours (Figure 2).

Crew members were not surveyed on cruise 1; however, 4 members were treated for diarrhea by the ship's physician. Twenty-six (7.7%) of 339 crew members surveyed on cruise 2 reported diarrhea; 5 of the crew members handled food or beverages while ill.

Passengers on cruise 2 were asked about food and water consumption during the first 24 hours of the cruise. Analysis revealed an association between diarrhea and eating crabmeat cocktail ($p<.001$). Consumption of 1 or more glasses of water per day was also associated with illness ($p<.05$). On cruise 1, no association between ship's water or ice and illness could be demonstrated. An environmental survey revealed numerous deficiencies in food handling practices.

Non-motile enterotoxigenic Escherichia coli, serotype 025, producing heat-labile (LT) enterotoxin, was isolated from 29 (83%) of 35 ill passengers and 6 (40%) of 15 well passengers from the 2 voyages ($p<.01$). Two of 8 culture-positive passengers had a 4-fold rise in LT enterotoxin antibody titer when acute and convalescent sera were tested. Fourteen (88%) of 16 ill crew were infected with E. coli 025 compared with 1 (7%) of 14 well crew members ($p<.0001$).

Salmonella senftenberg was isolated from 2 passengers (who did not have E. coli 025) on cruise 1 and from liver pate and cooked lobster on the same cruise. Water, ice, environmental cultures, and food specimens were negative for E. coli.

To correct the deficiencies in food and drink handling practices, the line employed a sanitarian to institute and supervise proper food handling practices. Investigation also revealed that refrigeration on the vessel was deficient and that freshly distilled water was not being chlorinated, although the main water distribution system was adequately chlorinated. After refrigeration facilities were improved and an automatic chlorinator for the distillation system was installed, the vessel sailed on its next voyage on January 3. No outbreaks of diarrhea have been reported in subsequent cruises of the vessel.

Editorial Note

Enterotoxigenic Escherichia coli is a well documented cause of diarrheal illness; however, this is the first reported outbreak caused by E. coli producing only LT enterotoxin. The mode of transmission in this outbreak is unclear.

S. senftenberg possibly contributed to the outbreak on cruise 1. The most likely vehicle of transmission was contaminated food since the same organism was recovered from 2 food items that were eaten without additional cooking.

Outbreak of Staphylococcal Food Poisoning Aboard an Aircraft
(MMWR 24(7):57, 1975)

On February 2, 1975, 196 (57%) of 343 passengers and 1 of 20 crew members aboard a chartered commercial aircraft flying from Tokyo to Copenhagen, with an interim stop in Anchorage, developed a gastrointestinal illness characterized by diarrhea (88%), vomiting (82%), abdominal cramps (74%), and nausea (68%). The illness began occurring shortly before the plane landed in Copenhagen after an 8½ hour flight from Anchorage. One hundred forty-three (73%) of the ill passengers and the 1 crew member were hospitalized in Copenhagen. Approximately 30 passengers required intravenous fluids, but there were no deaths or serious sequelae.

A snack was served aboard the flight approximately 1 hour after the plane left Anchorage; breakfast was served approximately 5½ hours later, 1½-2 hours before the plane landed in Copenhagen. Four galleys were used to prepare food and all passengers received the same food.

Epidemiologic investigation revealed that 115 (86%) of 133 passengers sitting in the front of the plane and served food prepared in galleys 1 and 2 were ill, compared with 81 (39%) of 210 passengers sitting in the area served food prepared in galleys 3 and 4 ($p<.001$). Food specific attack rates demonstrated a statistically significant association between illness and consumption of ham at the breakfast meal (Table 4). The ham had been served on top of cheese omelettes. Cases occurred 30 minutes to 5½ hours after eating the breakfast meal with a mean of about 2.5 hours (Figure 3).

Except for the 1 crew member who ate ham, none of the crew aboard the aircraft, including the pilots, became ill. Since it was suppertime for the crew, which had boarded in Anchorage, they were served a steak dinner instead of the breakfast meal. Some of the crew ate the same snack as the passengers.

The snack and breakfast were prepared in Anchorage by a catering company owned by the airline. Three cooks were involved in the preparation of the ham and omelettes. Cooks No. 1 and No. 2 and assistant No. 1 worked from 11:00 a.m. to 1:30 p.m. on February 1. They first cracked and mixed 120 dozen eggs. Cook No. 2 then made 133 omelettes for use in galleys 1 and 2, and cook No. 1 placed ham slices on these omelettes. This ham had been sliced and fried the previous day by assistant No. 1 and refrigerated overnight. Cook No. 1 then made 72 omelettes for use in galleys 3 and 4, and cook No. 2 put ham slices on these omelettes.

Table 4

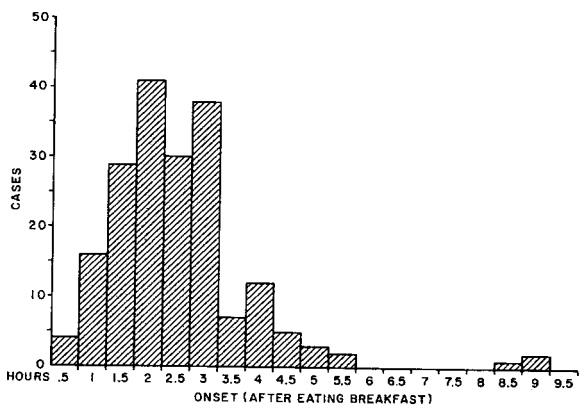
Food Specific Attack Rates

Food	Persons Eating Food			Persons Not Eating Food		
	Ill	Not Ill	Percent Ill	Ill	Not Ill	Percent Ill
Snack:						
Tuna	125	119	51	67	28	71
Roast	148	127	54	44	20	69
Chicken	127	120	51	65	27	71
Shrimp	163	128	56	29	19	60
Choc. Cake	115	104	53	77	43	64
Breakfast:						
Omelette	169	133	56	23	14	62
*Ham	190	139	58	2	8	20
Yogurt	147	98	60	45	49	49
Roll	166	135	55	26	12	68
Butter	137	130	51	55	17	76
Cheese	103	94	52	89	53	63

*Fisher's two-tail P = .023

Cook No. 3 and assistant No. 2 worked from 2:00 p.m. to 5:00 p.m. Cook No. 3 made omelettes for the remaining passengers served by galleys 3 and 4, and assistant No. 2 placed ham slices on these omelettes. The ham and omelettes were stored at room temperature during the 6 hours required for preparation. Following preparation, this food was placed for 14½ hours in a holding room where the temperature was measured at 10°C (50°F) before and after the outbreak. Beginning about 7:30 a.m. the next day, the snack and breakfast food were loaded onto the plane. The snack was refrigerated, but the breakfast food was stored at room temperature in the galley ovens until it was heated just prior to serving.

Fig. 3 FOODBORNE OUTBREAK ON AN AIRCRAFT, FEBRUARY 1975



Coagulase-positive Staphylococcus aureus lysed by group III phages 53 and 83a was isolated from an inflamed lesion on a finger on the right hand of Cook No. 1, from fecal and other specimens from 5 ill patients, from 3 leftover ham samples, and from 2 leftover omelette samples. S. aureus with the same phage pattern was also isolated from the wrist of cook No. 3 and the nose of assistant No. 2. S. aureus lysed by group 1 phages 29, 52, 80, 81, and 85 was isolated from 1 patient, from 1 of the omelette samples, and from the nose of cook No 2. Assistant No. 1 was negative for S. aureus. The antibiogram patterns of the 2 S. aureus phage types were different. At the U.S. Food and Drug Administration Laboratories the phage group III strain was found to produce type D enterotoxin, while the phage group I strain did not produce enterotoxin. Type D enterotoxin was isolated from leftover ham and omelette.

Editorial Note

This large foodborne outbreak resulted from ham that had been handled by a cook who had an inflamed finger lesion from which S. aureus was cultured. The ham was then held at room temperature for a sufficient amount of time to allow growth of S. aureus

and enterotoxin production. Staphylococcal enterotoxin is heat stable and not readily destroyed at ordinary cooking temperatures (1). S. aureus carriage may be found in up to 50% of foodhandlers and is especially high in persons with skin infections; however, this outbreak probably would not have occurred had the food been handled properly. Food served aboard aircraft should be refrigerated prior to heating and serving. Food handlers on the ground and crew members who work in aircraft galleys should be educated in proper foodhandling techniques and particularly in the risks involved in storing food at room temperature for prolonged periods.

This outbreak emphasizes the importance of serving pilots different food from that of the passengers and each other just before and during a flight.

Reference

1. Bergdoll MS: Enterotoxins: Microbial Toxins. Volume III: Bacterial Protein Toxins, Edited by Montie TC, Kadis S, Ajl SJ: New York and London, Academic Press, 1970, p 265

V. REFERENCES

GENERAL

1. Foodborne Infections and Intoxications, Riemann H (ed). Academic Press, NY, 1969
2. Food Research Institute: Annual Report for 1974, University of Wisconsin-Madison, Wisconsin
3. Bryan FL: Emerging foodborne diseases. I. Their surveillance and epidemiology. II. Factors that contribute to outbreaks and their control. J Milk Food Technol 35:618-625, 632-638, 1972
4. Craun GF, McCabe LJ: Review of the causes of waterborne disease outbreaks. J Am Water Work Assoc 65:74-84, 1973

BACTERIAL

Bacillus cereus

1. Goepfert JM, Spira WM, Kim HU: Bacillus cereus: Food poisoning organism. A review. J Milk Food Technol 35:213-227, 1972
2. Mortimer PR, McCann G: Food poisoning episodes associated with Bacillus cereus in fried rice. Lancet 1:1043-1045, 1974

Brucella

1. Spink WW: The Nature of Brucellosis. Minneapolis, Lund Press, Inc., 1956

Clostridium botulinum

1. Center for Disease Control: Botulism in the United States, 1899-1973. Handbook for Epidemiologists, Clinicians, and Laboratory Workers, CDC, Atlanta, June 1974, pp 7-11
2. Cherington M: Botulism. Ten-year experience. Arch Neurol 30:432-437, 1974
3. Koenig MG, Drutz DJ, Mushlin AI, et al: Type B botulism in man. Am J Med 42:208-219, 1967
4. Koenig MG, Spichard A, Cardella MA, et al: Clinical and laboratory observations of type E botulism in man. Medicine 43:517-545, 1964

Clostridium perfringens

1. Bryan FL: What the sanitarian should know about Clostridium foodborne illness. J Milk Food Technol 32:381-389, 1969
2. Lowenstein MS: Epidemiology of Clostridium perfringens food poisoning. N Engl J Med 286(19):1026-1027, 1972

Escherichia coli

1. Marier R, Wells JG, Swanson RC, Callahan W, Mehlman IJ: An outbreak of enteropathogenic Escherichia coli foodborne disease traced to imported French cheese. Lancet 2:1376-1378, 1973
2. Sack RB: Human diarrheal disease caused by enterotoxigenic Escherichia coli. Annual Review of Microbiology 29:333-353, 1975

Salmonella

1. Aserkoff B, Schroeder SA, Brachman PS: Salmonellosis in the United States--A five-year review. Am J Epidemiol 92:13-24, 1970

2. Bryan FL: What the sanitarian should know about salmonellae and staphylococci in non-dairy foods. II. Salmonellae. J Milk Food Technol 31:131-140, 1968

Shigella

1. Donadio JA, Gangarosa EJ: Foodborne shigellosis. J Infect Dis 119: 666-668, 1969

Staphylococcus

1. Bryan FL: What the sanitarian should know about salmonellae and staphylococci in non-dairy foods. I. Staphylococci. J Milk Food Technol 31:110-116, 1968

2. Merson MH: The epidemiology of staphylococcal foodborne disease. Proceedings of the Staphylococci in Foods Conference, Pennsylvania State University, University Park, Pennsylvania, 1973, pp 20-37

3. Minor TE, Marth EH: Staphylococcus aureus and staphylococcal food poisoning. J Milk Food Technol 34:21-29, 77-83, 227-241, 1972, 35:447-476, 1973

Group A Streptococcus

1. Hill HR, Zimmerman RA, Reid GVK, Wilson E, Kitton RM: Foodborne epidemic of streptococcal pharyngitis at the United States Air Force Academy. N Engl J Med 280:917-921, 1969

Vibrio cholerae

1. Finkelstein RA: Cholera. CRC Critical Reviews in Microbiology 2(4):553-623, 1973

2. Gangarosa EJ, Mosley WH: Epidemiology and surveillance of cholera: Cholera, edited by Barua D, Burrows W. Philadelphia, London, Toranto, WB Saunders Co., 1974, p 381

Vibrio parahaemolyticus

1. International Symposium on Vibrio parahaemolyticus, September 17-18, 1973, Fujino, Sakaguchi G, Sakazaki R, Takeday, (ed). Saikon Publishing Co., Ltd., Tokyo, Japan, 1974

2. Barker WH: Vibrio parahaemolyticus outbreaks in the United States. Lancet 1:551-554, 1974

CHEMICAL

Heavy Metal

Cadmium

1. Baker TD, Hafner WG: Cadmium poisoning from a refrigerator shelf used as an improvised barbecue grill. Public Health Rep 76:543-544, 1961

Copper

1. Hopper SH, Adams HS: Copper poisoning from vending machines. Public Health Rep 73:910-914, 1958

2. Semple AB, Parry WH, Phillips DE: Acute copper poisoning: An outbreak traced to contaminated water from a corroded geyser. Lancet 2:700-701, 1960

Tin

1. Barker WH, Runte V: Tomato juice-associated gastroenteritis, Washington and Oregon, 1969. Am J Epidemiol 96:219-226, 1972

Zinc

1. Brown MA, Thom JV, Orth GL, et al: Food poisoning involving zinc contamination. Arch Environ Health 8:657-660, 1964

Ichthyosarcotoxin

Ciguatoxin

1. Barkin RM: Ciguatera poisoning: A common-source outbreak. South Med J 67(1): 13-16, 1974
2. Halstead BW, Courville DA: Poisonous and venomous marine animals of the world. Vol 2 - Vertebrates. Washington, GPO, 1967, pp 63-330

Puffer Fish (tetrodotoxin)

1. Halstead BW, Courville DA: Poisonous and venomous marine animals of the world. Vol 2 - Vertebrates. Washington, GPO, 1967, pp 679-844
2. Torda TA, Sinclair E, Ulyatt DB: Puffer fish (tetrodotoxin) poisoning: Clinical record and suggested management. Med J Aust 1:599-602, 1973

Scombrotoxin

1. Halstead BW, Courville DA: Poisonous and venomous marine animals of the world. Vol 2 - Vertebrates. Washington, GPO, 1967, pp 639-668
2. Kimata M: The histamine problem: Fish as Food, edited by Borgstrom E, New York, Academic Press, 1961, pp 329-352
3. Merson MH, Baine WB, Gangarosa EJ, Swanson RC: Scombroid fish poisoning: Outbreak traced to commercially canned tuna fish. JAMA 228:1268-1269, 1974

Monosodium Glutamate

1. Schaumburg HH, Byck R, Gerstl R, Mashman JH: Monosodium L-glutamate: Its pharmacology and role in the Chinese restaurant syndrome. Science 163:826-828, 1969

Mushroom Poison

1. Wieland T, Wieland O: The toxic peptides of Amanita species. Vol 8 - Fungal Toxins: Microbial Toxins, edited by Kadis S, Ciegler A, Ajl SJ, New York and London, Academic Press, 1972, pp 249-280
2. Benedict RG: Mushroom toxins other than Amanita. Vol 8 - Fungal Toxins. In Microbial Toxins, edited by Kadis S, Ciegler A, Ajl SJ, New York and London, Academic Press, 1972, pp 281-320
3. Tyler VE: Poisonous mushrooms: Progress in Chemical Toxicology. Vol 1, edited by Stolman A, New York, Academic Press, 1963, pp 339-384

Paralytic and Neurotoxic Shellfish Poison

1. Music SI, Howell JT, Brumback CL: Red tide: Its public health implications. J Fla Med Assoc 60:27-29, 1973
2. Halstead BW, Courville DA: Poisonous and venemous marine animals. Vol 1 - Invertebrates. Washington, GPO, 1965, pp 157-240

PARASITIC

Anisakidae

1. Chitwood MD: Nematodes of medical significance found in market fish. Am J Trop Med Hyg 19:599-602, 1970

T. spiralis

1. Gould SE: Trichinosis in man and animals. Springfield, Ill., Charles C. Thomas, 1970

2. Zimmerman WJ, Steele JH, Kagan IG: Trichinosis in the U.S. population 1966-1970--prevalence and and epidemiologic factors. Health Services Rep 88:606-623, 1973

G. lamblia

1. Petersen H: Giardiasis (lambliasis). Scand J Gastroenterol 7 (Suppl 14): 1-44, 1972

2. Schultz MG: Giardiasis. JAMA 233(13):1383-1384, 1975

T. gondii

1. Kean BH, Kimball AC, Christensen WN: An epidemic of acute toxoplasmosis. JAMA 208:1002-1004, 1969

VIRAL

Hepatitis A

1. Cliver DO: Implications of foodborne infectious hepatitis. Public Health Rep. 81:159-165, 1966

2. Gravelle CR, Hornbeck CL, Maynard JE, et al: Hepatitis A: Report of a common-source outbreak with recovery of a possible etiologic agent. II. Laboratory studies. J Infect Dis 131:167-171, 1975

3. Leger RT, Boyer KM, Pattison CP, et al: Hepatitis A: Report of a common-source outbreak with recovery of a possible etiologic agent. I. Epidemiologic studies. J Infect Dis 131:163, 1975

VI. ARTICLES ON FOODBORNE AND WATERBORNE DISEASE OUTBREAKS, 1975, TAKEN FROM MORBIDITY AND MORTALITY WEEKLY REPORT

BACTERIAL

Bacillus cereus

Bacillus cereus Food Poisoning-Wisconsin 24(36):306

Clostridium botulinum

Botulism-Alaska 24(10):95
Botulism-Nevada 24(14):131
Botulism and improper home canning-California 24(27):236
Botulism in 1975-United States 25(9):75

Salmonella

Salmonellosis-Rhode Island and Massachusetts 24(33):284
Salmonella singapore-New Orleans 24(47):397
Salmonella newport-contamination of Hamburger-Colorado and Maryland 24(52):434
Typhoid Fever-Galveston County-Texas 24(52):443
A common-source outbreak of *Salmonella newport*-Louisiana 24(49):413
An interstate outbreak of typhoid associated with a New York City restaurant 25(2):10
Follow-up on an interstate outbreak of typhoid 25(3):23
Salmonella saint-paul in pre-cooked roasts of beef-New Jersey 25(5):34
Salmonella thompson-Nevada, Oregon, Washington State 25(12):99

Staphylococcus

Staphylococcal enterotoxin contamination of commercially-canned lobster bisque-United States 24(22):196
Staphylococcal food poisoning-Georgia 24(41):350
Staphylococcal food poisoning associated with Italian dry salami-California 24(44):374
Staphylococcal foodborne illness-Tennessee, North Carolina, South Carolina 25(7):49
Staphylococcal food poisoning-Florida 25(16):131

CHEMICAL

Biphenyl

Gastrointestinal illness due to biphenyl-contaminated bread-South Carolina 24(39):334

Ciguatoxin

Ciguatera poisoning-California 24(53):445

Cyanide

Cyanide poisoning from ingestion of apricot kernels-California 24(50):427

Copper

Chemical poisoning from an orange drink machine-Louisiana 25(6):42

STATE EPIDEMIOLOGISTS AND STATE LABORATORY DIRECTORS

The State Epidemiologists are the key to all disease surveillance activities. They are responsible for collecting, interpreting, and transmitting data and epidemiologic information from their individual States. Their contributions to this report are gratefully acknowledged. In addition, valuable contributions are made by State Laboratory Directors; we are indebted to them for their valuable support.

STATE	*STATE EPIDEMIOLOGIST*	*STATE LABORATORY DIRECTOR*
Alabama	Frederick S. Wolf, M.D.	Thomas S. Hosty, Ph.D.
Alaska	John P. Middaugh, M.D., Acting	Frank P. Pauls, Dr.P.H.
Arizona	Jon M. Counts, Dr. P. H., Acting	Jon M. Counts, Dr.P.H.
Arkansas	Paul P. White, M.D.	Robert T. Howell, Dr.P.H.
California	James Chin, M.D.	John M. Heslep, Ph.D.
Colorado	Thomas M. Vernon, Jr., M.D.	C. D. McGuire, Ph.D.
Connecticut	John N. Lewis, M.D.	William W. Ullmann, Ph.D.
Delaware	Ernest S. Tierkel, V.M.D.	Mahadeo P. Verma, Ph.D.
District of Columbia	Martin E. Levy, M.D.	Alton Shields, Dr.P.H.
Florida	Edward W. P. Smith, M.D., Acting	Nathan J. Schneider, Ph.D.
Georgia	John E. McCroan, Ph.D.	Earl E. Long, M.S.
Hawaii	Ned H. Wiebenga, M.D.	Albert I. Oda
Idaho	John A. Mather, M.D.	D. W. Brock, Dr.P.H.
Illinois	Byron J. Francis, M.D.	Richard Morrissey, M.P.H.
Indiana	Richard D. Telle, M.D.	Josephine Van Fleet, M.D.
Iowa	Laverne A. Wintermeyer, M.D.	W. J. Hausler, Jr., Ph.D.
Kansas	Don E. Wilcox, M.D.	Dwayne C. Morse, Dr.P.H.
Kentucky	Calixto Hernandez, M.D.	B. F. Brown, M.D.
Louisiana	Charles T. Caraway, D.V.M.	George H. Hauser, M.D.
Maine	George E. Sullivan, M.D.	Charles Okey, Ph.D.
Maryland	Kathleen H. Acree, M.D.C.M.	Robert L. Cavenaugh, M.D.
Massachusetts	Nicholas J. Fiumara, M.D.	Morton A. Madoff, M.D.
Michigan	Norman S. Hayner, M.D.	George R. Anderson, D.V.M.
Minnesota	John S. Andrews, M.D., Acting	Henry Bauer, Ph.D.
Mississippi	Durward L. Blakey, M.D.	R. H. Andrews, M.S.
Missouri	H. Denny Donnell, Jr., M.D.	Elmer Spurrier, Dr.P.H.
Montana	Martin D. Skinner, M.D.	David B. Lackman, Ph.D.
Nebraska	Paul A. Stoesz, M.D.	Henry McConnell, Dr.P.H.
Nevada	William M. Edwards, M.D.	Paul Fugazzotto, Ph.D.
New Hampshire	Vladas Kaupas, M.D.	Robert A. Miliner, Dr.P.H.
New Jersey	Ronald Altman, M.D.	Martin Goldfield, M.D.
New Mexico	Jonathan M. Mann, M.D., Acting	James H. Hottenroth
New York State	Andrew C. Fleck, M.D.	Donald J. Dean, D.V.M.
New York City	John S. Marr, M.D.	Paul S. May, Ph.D.
North Carolina	Martin P. Hines, D.V.M.	Mildred A. Kerbaugh
North Dakota	Kenneth Mosser	C. Patton Steele, B.S.
Ohio	Thomas J. Halpin, M.D.	Charles C. Croft, Sc.D.
Oklahoma	Patrick M. Morgan, D.V.M.	William R. Schmieding, Ph.D.
Oregon	John A. Googins, M.D.	William Murphey, Ph.D.
Pennsylvania	William E. Parkin, D.V.M., Acting	Vern Pidcoe, Dr.P.H.
Puerto Rico	Cesar Rosa Febles, M.D.	Jose L. Villamil
Rhode Island	Gerald A. Faich, M.D.	Raymond G. Lundgren, Ph.D.
South Carolina	Richard L. Parker, D.V.M.	Arthur F. DiSalvo, M.D.
South Dakota	James D. Corning, B.A., Acting	B. E. Diamond, M.S.
Tennessee	Alan R. Hinman, M.D.	M. Sam Sudman, Dr.P.H.
Texas	Charles R. Webb, M.D., Acting	Charles Sweet, Dr.P.H.
Utah	Taira Fukushima, M.D.	Russell S. Fraser, M.S.
Vermont	William N. Watson, M.D., Acting	Dymitry Pomar, D.V.M.
Virginia	Robert S. Jackson, M.D.	Frank W. Lambert, Ph.D.
Washington	Thieu L. Nghiem, M.D.	Jack Allard, Ph.D.
West Virginia	William L. Cooke, M.D.	John W. Brough, Dr.P.H.
Wisconsin	H. Grant Skinner, M.D.	S. L. Inhorn, M.D.
Wyoming	Herman S. Parish, M.D.	Donald T. Lee, Dr.P.H.

U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
PUBLIC HEALTH SERVICE
CENTER FOR DISEASE CONTROL
ATLANTA, GEORGIA 30333

OFFICIAL BUSINESS

POSTAGE AND FEES PAID
U.S. DEPARTMENT OF HEW
HEW 399

HEW Publication No. (CDC) 76-8185