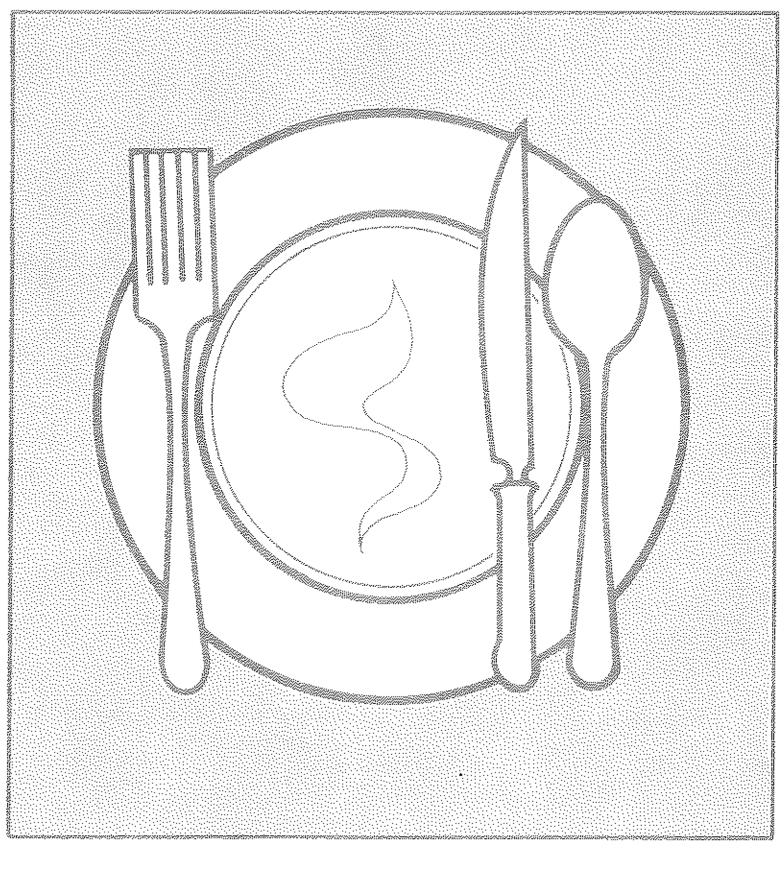
ANNUAL SUMMARY 1980

ISSUED FEBRUARY 1983

CENTERS FOR DISEASE CONTROL

FOODBORNE DISEASE

SURVEILLANCE



U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES • 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 private physicians. 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:

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TABLE OF CONTENTS

I. SUMMARY

In 1980 there were 612 outbreaks (13,791 cases) of foodborne disease reported to the Centers for Disease Control. In 36% of the outbreaks, the etiology was confirmed. Bacterial pathogens accounted for 136 outbreaks (6,891 cases). The most frequently isolated bacterial pathogen was *Salmonella* (39 outbreaks), followed by *Staphylococcus aureus* (24 outbreaks), and *Clostridium perfringens* (25 outbreaks). Chemical agents were responsible for 61 outbreaks (635 cases), with scombroid poisoning the most common chemical etiology. Food was eaten in a restaurant in 54% of outbreaks, and the most common contributing factor was improper holding temperature (75%).

II. INTRODUCTION

A. History

The reporting of foodborne and waterborne diseases in the United States began over half a century ago when state and territorial health officers, concerned about the high morbidity and mortality caused by typhoid fever and infantile diarrhea, recommended that cases of enteric fever be investigated and reported. The purpose 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 U.S. 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 Centers 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 water 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 disease outbreaks. Due to increasing interest and activity in waterborne disease surveillance, foodborne and waterborne disease outbreaks have been reported in separate annual summaries since 1978. This report summarizes data from foodborne disease outbreaks reported to CDC for 1980.

B. Objectives

Foodborne disease surveillance has traditionally served 3 objectives:

1. Disease Prevention and 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 prevention and control measures resulting from surveillance of foodborne disease.

2. Knowledge of Disease Causation: The responsible pathogen was not identified in over 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 may not have been appreciated as a cause of foodborne disease or because the pathogen could not be identified by available laboratory techniques. It is probable that when more thorough clinical, epidemiologic, and laboratory investigations are employed, many of these pathogens can be identified, and suitable measures for prevention and control can be instituted.

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 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 protection programs will be kept informed of the factors involved in foodborne disease outbreaks. Comprehensive surveillance would result in a clearer appreciation of priorities in food protection, institution of better training programs, and more effective utilization of available resources.

III. 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.

1. Laboratory confirmed--Outbreaks in which laboratory evidence of a specific etiologic agent is obtained, and specified criteria are met (see Section F).

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 poisoning), 1 to 7 hours (probable *Staphylococcus* food poisoning), 8 to 14 hours (probable *C. perfringens*), and greater than 14 hours (other infectious or toxic agents).

B. Source of Data

Outbreaks are reported to CDC on a standard reporting form (Section B). Reports come most frequently from state and local health departments; reports may also be received from federal agencies such as the Food and Drug Administration (FDA), U.S. Department of Agriculture (USDA), the U.S. Armed Forces, and occasionally from private physicians. Forms are reviewed at CDC to determine if a specific etiology for the outbreak can be confirmed and, in some instances, questions about an etiologic agent may be referred back to the reporting agency. Data are otherwise accepted as reported on the forms.

C. Interpretation of Data

The limitations on the quantity and quality of data presented here must be appreciated in order to avoid misinterpretation. The number of outbreaks of foodborne disease reported by this surveillance system clearly represents only a small fraction of the total number that occur. The likelihood of an outbreak coming to the attention of health authorities varies considerably depending on consumer and physician awareness, interest, and motivation to report the incident; for example, large outbreaks, interstate outbreaks, restaurant-associated outbreaks, and outbreaks involving serious illness, hospitalizations, or deaths are more likely to come to

the attention of health authorities than cases of mild illness following a family cookout.

The quality of the data presented here depends upon the commitment given to foodborne surveillance by the state or local health departments. The department's interest in foodborne disease and its investigative and laboratory capabilities are central determinants of the quality of the investigation. Furthermore, the likelihood that the findings of the investigation will be reported varies from one locality to another. This report then should not be the basis of firm conclusions about the absolute incidence of foodborne disease, and it should not be used to draw conclusions about the relative incidence of foodborne diseases of various etiologies. For example, foodborne diseases characterized by short incubation periods, such as those of chemical etiology or outbreaks caused by staphylococcal enterotoxin, are more likely to be recognized as common-source foodborne disease outbreaks than those diseases with longer incubation periods, such as hepatitis A, wherein the common-source nature of the cases may be hard to ascertain. Outbreaks involving *Bacillus cereus*, *Escherichia coli*, *Vibrio parahaemolyticus*, *Yersinia enterocolitica*, or *Campylobacter jejuni* are less likely to be confirmed because these organisms are often not considered in clinical, epidemiologic, and laboratory investigations. Pathogens which generally cause mild illness will be under-represented, while those causing serious illness, such as *Clostridium botulinum*, are more likely to be identified. Similarly, restaurant- or commercial product-associated outbreaks have a higher likelihood of being reported.

D. Analysis of Data

In 1980 there were 612 reports of outbreaks (13,791 cases). These reports were received from 45 states, as well as from Guam, Palau, Micronesia, the Northern Mariana Islands, and the Marshalls (see Figure 1 for a breakdown by state). New York reported the largest number of outbreaks with 175 (135 were reported from New York City); the next largest number of outbreaks was from Washington (57), followed by Hawaii (39). In 1 outbreak cases were reported from multiple states. The total number of outbreaks and cases over the last decade is shown in Figure 2.

Fig.1 OUTBREAKS OF FOODBORNE DISEASE REPORTED TO THE CENTERS FOR DISEASE CONTROL, BY STATE, 1980

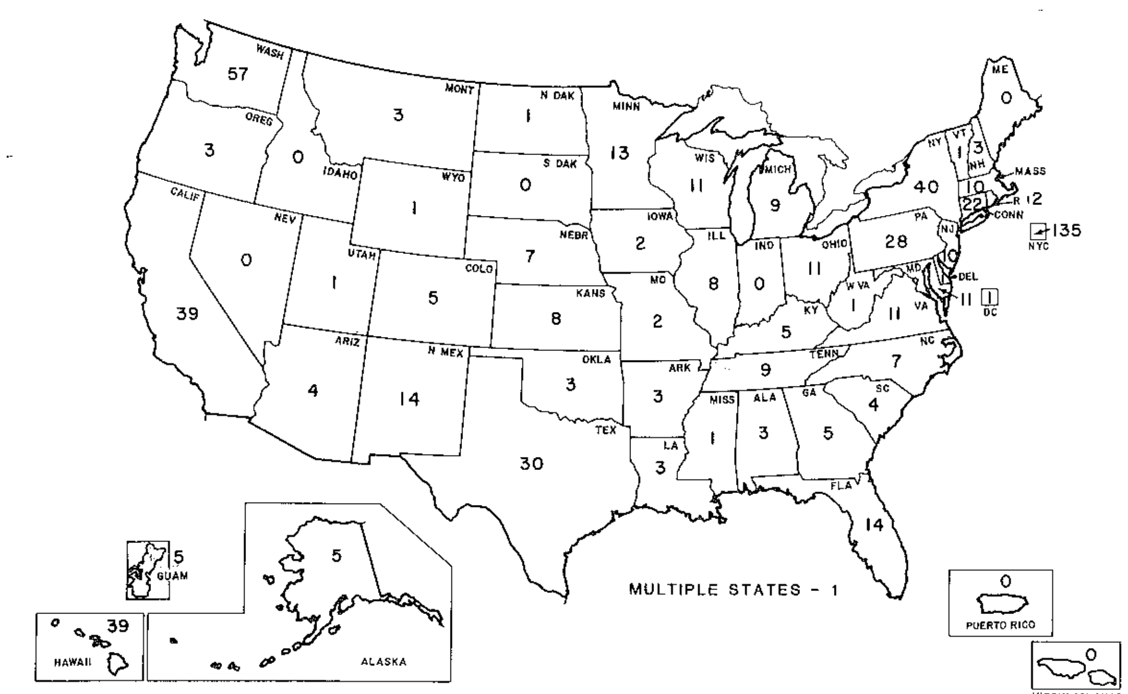
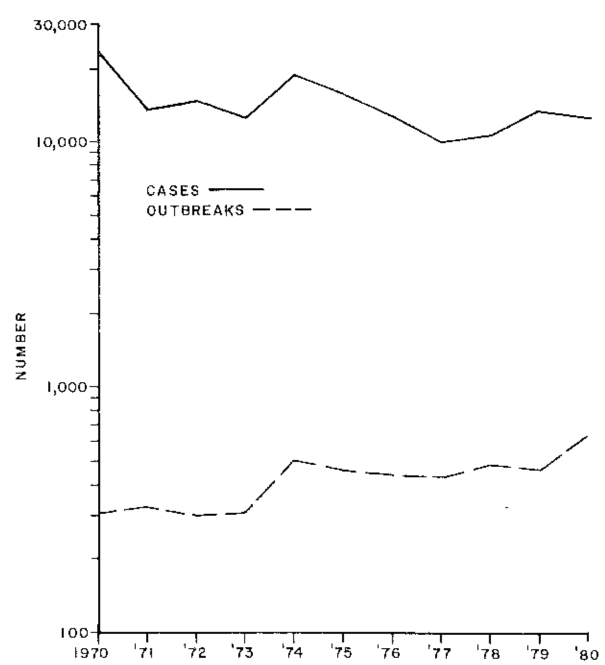


Fig. 2 NUMBER OF CASES AND OUTBREAKS OF FOODBORNE DISEASE REPORTED TO THE CENTERS FOR DISEASE CONTROL, 1970—1980



In 221 outbreaks (7,721 cases) an etiology was confirmed (Table 1). Bacterial pathogens accounted for 62% of confirmed outbreaks and 89% of cases. As in the past, Salmonella was the pathogen most frequently responsible for outbreaks followed by S. aureus. C. perfringens is being recognized more frequently as a pathogen, and in 1980 was responsible for 1,463 cases in 25 outbreaks.

Chemical etiologies accounted for 30% of the total confirmed outbreaks, but only 8% of the cases. Although ciguatera (fish poisoning) in the past 2 years has been the most common etiology, this year scombrotoxin was more common, accounting for 29 outbreaks and 153 cases. Of the parasitic pathogens reported, Trichnella spiralis accounted for 5 outbreaks and 41 cases. An outbreak of diphyliobothriasis was attributed to ingestion of inadequately cooked salmon in California. Viral pathogens were implicated in 12 outbreaks and 140 cases; 116 of these cases were proven to be hepatitis A. The breakdown of outbreaks by etiologic category for the period 1976-1980 is shown in Table 2.

There were 24 deaths associated with foodborne diseases in 1980: C. botulinum (3), Salmonella (5), S. aureus (1), Campylobacter (1), paralytic shellfish poisoning (1), other chemical etiology (1), trichinosis (1), and undetermined etiology (11).

No pathogen was identified in 391 outbreaks (6,070 cases) reported in 1980. The extent of the investigation in these outbreaks varied from instances when only minimal laboratory work was performed to other instances in which extensive investigation failed to reveal a pathogen. Incubation periods, however, are known for illnesses in 345 of these outbreaks. In 14 outbreaks the incubation period was reported as <1 hour; in 172 outbreaks the incubation period ranged from 1 to 7 hours; in 86 outbreaks the incubation period was 8 to 14 hours; while in 73 outbreaks the incubation period was $\geq$15 hours. Eleven deaths were reported in association with outbreaks of unknown etiology.

A number of different vehicles were implicated in the 1980 outbreaks (Table 3). The most common vehicle was turkey, accounting for 18 outbreaks; the most common pathogen associated with turkey was Salmonella (7 outbreaks). Outbreaks involving beef were most commonly associated with C. perfringens (9 of 17 outbreaks), while outbreaks involving pork products were most commonly caused by S. aureus (4 of 13 outbreaks). Most outbreaks associated with fish were due to either ciguatera or scombroid, and those associated with shellfish were due to either paralytic shellfish poisoning (4) or Vibrio parahaemolyticus (1). Amberjack accounted for 1 of the 13 ciguatera outbreaks, while mahi-mahi (dolphin) was the most common vehicle in scombroid poisoning. No vehicle was identified in 28 of the 221 outbreaks of known etiology; 10 of these outbreaks involved Salmonella (26% of all Salmonella outbreaks). As might be expected, in 343 of the 391 outbreaks of unknown etiology, no vehicle of transmission was identified.

Three hundred thirty-two outbreaks were restaurant-associated, compared with 116 outbreaks associated with foods eaten at home (Table 4). Both Salmonella and Staphylococcus outbreaks were more commonly restaurant-associated (16 of 39 for Salmonella and 10 of 27 for Staphylococcus) than outbreaks caused by other organisms.

All C. botulinum outbreaks were associated with home-prepared foods. As in the past, outbreaks attributed to scombroid tended to occur in restaurants, while outbreaks attributed to ciguatera tended to occur at home. Generally outbreaks of foodborne illness occurred most frequently in the spring and summer (Table 5); Salmonella-associated outbreaks occurred more frequently in the summer (18 of 39). In 206 outbreaks the reporting agency specified a factor or factors which they felt contributed to the outbreak (Table 6). The most common factor in bacterial outbreaks was improper holding temperature, which was cited in 184 (75%) of 247 outbreaks.

E. Comments

There are limitations in the quantity and quality of the data presented in this report. The variability in reporting can be seen by looking at the distribution of outbreaks by state. A few states, such as New York, Washington, and Hawaii, reported a disproportionately large number of outbreaks. For example, New York state has a population of 17 million, compared with 22 million in California; nonetheless, New York reported 175 outbreaks in 1980 compared with 29 from California. Similarly, the state of Washington reported 57 outbreaks while the entire group of midwestern states reported 77 outbreaks, and Alabama (with a population virtually identical to that of the State of Washington) reported only 3. While it is possible that states such as New York and Washington have an increased rate of foodborne disease, it is more likely that these differences simply represent differences in reporting. The same variability in reporting can be seen when looking at outbreaks by pathogen. The data for 1980, for example, included 10 hepatitis and 14 botulism outbreaks. Such numbers can only be explained by more complete reporting for botulism than for hepatitis.

The number of outbreaks of foodborne disease reported to CDC each year over the last decade has risen slightly, probably because of increased reporting by state and local health departments. The distribution of cases by etiology has remained relatively constant. Etiologies typically have been confirmed in 40% or less of outbreaks. In the 1980 outbreaks when the etiologies were confirmed, bacterial pathogens, as in the past, accounted for approximately two-thirds of outbreaks, with chemical etiologies accounting for an additional 25%-30%.

Many factors contribute to foodborne disease. In the United States the 5 most common factors, in order of frequency of occurrence, include: 1) inadequate cooling of food, 2) lapse of a day or more between preparing and serving, 3) infected persons handling foods which are not subsequently heat-processed, 4) inadequate time and/or temperature during heating of foods, and 5) insufficiently high temperature during storage of hot foods. In outbreaks of botulism or trichinosis, the food is usually inadequately cooked. In most of the outbreaks with a 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, paralytic shellfish poisoning, and mushroom poisoning, the food is unsafe, and illness is not in any sense related to improper handling or preparation.

Pathogens such as Campylobacter jejuni, V. parahaemolyticus, non-01 V. cholerae, and other Vibrio species cause foodborne illness, but are rarely reported. The large number of outbreaks in which no pathogen is identified serve as a challenge to improve investigative skills so that known pathogens can be identified more frequently and so that new and as yet unidentified pathogens may be recognized.

Table 1
Confirmed Foodborne Disease Outbreaks, Cases, and Deaths, by Etiology,
United States, 1980

Etiology	Outbreaks No.	Outbreaks %	Cases No.	Cases %	Deaths No.
BACTERIAL					
B. cereus	9	(4.1)	187	(2.4)	-
Brucella	0	(0.0)	0	(0.0)	-
C. botulinum	14	(6.3)	18	(0.2)	3
C. perfringens	25	(11.3)	1,463	(18.9)	-
Campylobacter	5	(2.3)	162	(2.1)	1
E. coli	1	(0.5)	500	(6.5)	-
Salmonella	39	(17.6)	2,381	(30.8)	5
Shigella	11	(5.0)	1,184	(15.3)	-
Staphylococcus aureus	27	(12.2)	944	(12.2)	1
V. parahaemolyticus	4	(1.8)	12	(0.2)	-
Other	1	(0.5)	40	(0.5)	-
Total	136	(61.5)	6,891	(89.3)	10
CHEMICAL					
Heavy metals	1	(0.5)	5	(0.1)	
Ciguatoxin	15	(6.8)	52	(0.7)	
Scombrotoxin	29	(13.1)	153	(2.0)	
Paralytic	5	(2.3)	116	(1.5)	1
Other	16	(7.2)	309	(4.0)	1
Total	66	(29.9)	635	(8.2)	2
PARASITIC					
T. spiralis	5	(2.3)	41	(0.5)	1
Other	2	(0.9)	14	(0.2)	-
Total	7	(3.2)	55	(0.7)	1
VIRAL					
Hepatitis A	10	(4.5)	116	(1.5)	-
Other	2	(0.9)	24	(0.3)	-
Total	12	(5.4)	140	(1.8)	-
CONFIRMED TOTAL	221	(100.0)	7,721	(100.0)	13

Table 2
Confirmed Foodborne Disease Outbreaks, by Etiology,
United States, 1976-1980

Etiology	1976 No.	1976 (%)	1977 No.	1977 (%)	1978 No.	1978 (%)	1979 No.	1979 (%)	1980 No.	1980 (%)
BACTERIAL										
A. hinshawii	-		1	(0.6)	-		-		-	
B. cereus	2	(1.5)	-		6	(3.9)	-		9	(4.1)
Brucella	-		-		-		2	(1.3)	-	
Campylobacter jejuni	-		-		-		-		5	(2.3)
C. botulinum	23	(17.6)	20	(12.7)	12	(7.8)	7	(4.0)	14	(6.3)
C. perfringens	6	(4.6)	6	(3.8)	9	(5.9)	20	(11.6)	25	(11.3)
E. cloacae	-		-		-		1	(0.6)	-	
E. coli	-		-		1	(0.7)	-		1	(0.5)
Salmonella	28	(21.4)	41	(26.1)	45	(29.3)	44	(25.5)	39	(17.7)
Shigella	6	(4.6)	5	(3.2)	4	(2.6)	7	(4.0)	11	(5.0)
Staphylococcus aureus	26	(19.8)	25	(15.9)	23	(14.9)	34	(19.7)	27	(12.2)
Streptococcus Group D	-		-		1	(0.7)	-		-	
Streptococcus Group G	-		-		-		1	(0.6)	-	
V. cholerae 01	-		-		1	(0.7)	-		-	
V. cholerae (non-01)	-		1	(0.6)	-		1	(0.6)	-	
V. parahaemolyticus	-		2	(1.3)	2	(1.3)	2	(1.3)	4	(1.8)
Y. enterocolitica	1	(0.8)	-		-		-		-	
Other	-		-		1	(0.7)	-		1	(0.5)
Total	92	(70.2)	101	(64.2)	105	(68.5)	119	(69.2)	136	(61.7)
CHEMICAL										
Heavy metals	6	(4.6)	8	(5.1)	1	(0.7)	1	(0.6)	1	(0.5)
Ciguatoxin	6	(4.6)	3	(1.9)	19	(12.3)	18	(10.4)	15	(6.8)
Paralytic shellfish	4	(3.1)	-		4	(2.6)	-		5	(2.2)
Scombrotoxin	2	(1.5)	13	(8.3)	7	(4.5)	12	(7.0)	29	(13.0)
Monosodium glutamate	2	(1.5)	2	(1.3)	-		-		-	
Mushroom poisoning	1	(0.8)	5	(3.2)	1	(0.6)	1	(0.6)	-	
Other	7	(5.3)	6	(3.8)	5	(3.2)	4	(2.3)	16	(7.2)
Total	28	(21.4)	37	(23.6)	37	(23.9)	36	(20.9)	66	(29.7)
PARASITIC										
Anisakidae	-		1	(0.6)	-		-		-	
T. spiralis	8	(6.1)	14	(8.9)	7	(4.5)	11	(6.4)	5	(2.3)
Other	-		-		-		-		2	(0.9)
Total	8	(6.1)	15	(9.5)	7	(4.5)	11	(6.4)	7	(3.2)
VIRAL										
Hepatitis A	2	(1.5)	4	(2.5)	5	(3.2)	5	(2.9)	10	(4.5)
Echo, type 4	1	(0.8)	-		-		-		-	
Other	-		-		-		1	(0.6)	2	(0.9)
Total	3	(2.3)	4	(2.5)	5	(3.2)	6	(3.5)	12	(5.4)
CONFIRMED TOTAL	131	(100.0)	157	(100.0)	154	(100.0)	172	(100.0)	221	(100.0)

Table 3
Foodborne Outbreaks by Specific Etiology and Vehicle of Transmission,
United States, 1980

Etiology	Beef	Veal	Lamb	Ham	Pork	Sau-sage	Chick-en	Tur-key	Other Meat	Shell Fish	Tuna	Amber Jack	Mahi-Mahi	Other Fish	Eggs
BACTERIAL															
B. cereus	1	-	-	-	-	-	-	1	-	-	-	-	-	-	-
Brucella	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Campylobacter jejuni	-	-	-	-	-	-	-	1	1	-	-	-	-	-	-
C. botulinum	-	-	-	-	-	-	-	-	2	-	-	-	-	1	-
C. perfringens	9	-	-	1	1	-	-	3	2	-	-	-	-	-	-
E. coli	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Salmonella	4	-	-	1	1	-	-	7	-	-	-	-	-	-	1
Shigella	-	-	-	-	-	-	-	-	1	-	1	-	-	1	-
Staphylococcus aureus	-	-	1	3	1	1	2	3	2	-	-	-	-	-	-
V. parahaemolyticus	-	-	-	-	-	-	-	-	-	4	-	-	-	-	-
Other	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-
Total	14	-	1	5	3	1	2	15	8	5	1	-	-	2	1
CHEMICAL															
Heavy metals	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ciguatoxin	-	-	-	-	-	-	-	-	-	-	-	1	-	13	-
Scombrotoxin	-	-	-	-	-	-	-	-	-	-	3	-	21	5	-
Paralytic	-	-	-	-	-	-	-	-	-	5	-	-	-	-	-
Other	-	-	-	-	-	1	-	-	-	-	-	-	-	2	-
Total	-	-	-	-	-	1	-	-	-	5	3	1	21	20	-
PARASITIC															
T. spiralis	-	-	-	-	2	2	-	-	1	-	-	-	-	-	-
Other	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-
Total	-	-	-	-	2	2	-	-	1	-	-	-	-	2	-
VIRAL															
Hepatitis A	-	-	-	-	-	-	-	-	-	1	1	-	-	-	-
Other	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total	-	-	-	-	-	-	-	-	-	1	1	-	-	-	-
CONFIRMED TOTAL	14	-	1	5	5	4	2	15	9	11	5	1	21	24	1
UNKNOWN	3	1	-	3	-	1	3	3	1	6	-	-	-	2	-
TOTAL	17	1	1	8	5	5	5	18	10	17	5	1	21	26	1

Table 3 (Cont'd)
Foodborne Disease Outbreaks by Specific Etiology and Vehicle of Transmission,
United States, 1980

Etiology	Milk	Cheese	Egg Nog	Ice Cream	Other Dairy	Baked Foods	Fruits & Veg-etable	Potato Salad	Poultry, Fish, Egg Salad	Other Salad	Chi-nese Food	Mex-ican Food	Non-Dairy Bev	Multi-ple Foods	Other Foods	Un-known	Total
BACTERIAL																	
B. cereus	-	-	-	-	-	-	-	-	-	-	-	2	-	-	-	1	5
Brucella	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Campylobacter jejuni	1	-	-	-	-	1	-	-	-	-	-	-	-	-	-	1	5
C. botulinum	-	-	-	-	-	-	9	-	-	-	-	-	-	-	2	-	14
C. perfringens	-	-	-	-	-	1	1	-	-	-	-	3	-	1	1	2	25
E. coli	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	1
Salmonella	1	-	1	1	1	1	1	1	1	1	1	1	-	1	3	10	39
Shigella	-	-	-	-	-	-	-	4	-	-	-	-	-	-	-	4	11
Staphylococcus aureus	-	-	-	-	-	3	-	3	1	-	-	-	-	5	-	2	27
V. parahaemolyticus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4
Other	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
Total	2	-	1	1	1	6	11	8	2	1	1	7	-	7	6	20	132
CHEMICAL																	
Heavy metals	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	1
Ciguatoxin	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	15
Scombrotoxin	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	29
Paralytic	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5
Other	-	-	-	1	-	1	2	-	-	-	-	-	1	1	4	1	14
Total	-	-	-	1	-	1	2	-	-	-	-	-	2	1	4	2	64
PARASITIC																	
T. spiralis	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5
Other	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2
Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	7
VIRAL																	
Hepatitis A	-	1	-	-	-	-	-	-	-	-	-	-	-	2	-	5	10
Other	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	1	2
Total	-	1	-	-	-	-	1	-	-	-	-	-	-	2	-	6	12
CONFIRMED TOTAL	2	1	1	2	1	7	14	8	2	1	1	7	2	10	10	28	215
UNKNOWN	-	2	-	-	-	2	1	5	-	3	2	3	-	4	2	343	390
TOTAL	2	3	1	2	1	9	15	13	2	4	3	10	2	14	12	371	605

Table 4
Foodborne Disease Outbreaks, by Specific Etiology and Place Where Food Was Eaten, United States, 1980

Etiology	Home	Restaurant	School	Picnic	Church	Camp	Other or Unknown	Total
BACTERIAL								
B. cereus	1	6	-	-	-	-	2	9
Campylobacter jejuni	2	-	-	-	-	1	2	5
C. botulinum	14	-	-	-	-	-	-	14
C. perfringens	1	13	2	1	2	1	5	25
E. coli	-	1	-	-	-	-	-	1
Salmonella	5	16	4	-	3	2	9	39
Shigella	1	3	-	2	-	1	4	11
Staphylococcus aureus	3	10	2	1	2	-	9	27
V. parahaemolyticus	3	1	-	-	-	-	-	4
Other	-	-	-	1	-	-	-	1
Total	30	50	8	5	7	5	31	136
CHEMICAL								
Heavy metals	-	-	-	-	1	-	-	1
Ciguatoxin	14	-	-	-	-	-	1	15
Scombrotoxin	4	18	-	-	-	-	7	29
Paralytic	2	1	-	-	-	-	2	5
Other	4	5	-	-	1	1	5	16
Total	24	24	-	-	2	1	15	66
PARASITIC								
T. spiralis	3	-	-	-	-	-	2	5
Other	1	-	-	-	-	-	1	2
Total	4	-	-	-	-	-	3	7
VIRAL								
Hepatitis A	1	6	-	-	-	-	3	10
Other	1	-	-	-	-	-	1	2
Total	2	6	-	-	-	-	4	12
CONFIRMED TOTAL	60	80	8	5	9	6	53	221
UNKNOWN	56	252	15	4	7	4	53	391
TOTAL	116	332	23	9	16	10	106	612

Table 5
Foodborne Disease Outbreaks by Specific Etiology and Month of Occurrence, United States, 1980

Etiology	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Unknown	Total
BACTERIAL														
B. cereus	-	-	2	-	-	2	2	1	-	-	1	1	-	9
Brucella	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Campylobacter jejuni	-	-	-	-	-	1	-	-	2	-	-	1	1	5
C. botulinum	-	2	1	-	-	5	1	2	-	1	-	2	-	14
C. perfringens	-	-	3	4	3	1	2	1	1	4	4	2	-	25
E. coli	-	-	1	-	-	-	-	-	-	-	-	-	-	1
Salmonella	1	1	3	2	2	6	3	9	6	2	1	3	-	39
Shigella	-	1	-	-	3	1	0	2	4	-	-	-	-	11
Staphylococcus aureus	-	-	-	4	2	3	4	7	2	4	-	1	-	27
V. parahaemolyticus	-	-	-	1	-	-	1	1	-	1	-	-	-	4
Other	-	-	-	-	-	-	-	-	-	-	1	-	-	1
Total	1	4	10	11	10	19	13	23	15	12	7	10	1	136
CHEMICAL														
Heavy metals	1	-	-	-	-	-	-	-	-	-	-	-	-	1
Ciguatoxin	-	-	2	3	1	1	1	3	3	-	1	-	-	15
Paralytic shellfish	-	-	-	-	-	-	2	2	-	1	-	-	-	5
Scombrotoxin	-	2	5	5	2	2	4	4	1	1	2	1	-	29
Other	1	1	-	2	2	1	2	2	2	1	1	1	-	16
Total	2	3	7	10	5	4	9	11	6	3	4	2	-	66
PARASITIC														
T. spiralis	1	1	-	1	-	-	1	-	-	-	-	1	-	5
Other	-	-	-	-	-	-	-	-	2	-	-	-	-	2
Total	1	1	-	1	-	-	1	-	2	-	-	1	-	7
VIRAL														
Hepatitis A	2	1	2	-	-	1	1	-	1	-	2	-	-	10
Other	-	-	-	-	1	-	-	-	-	-	-	-	1	2
Total	2	1	2	-	1	1	1	-	1	-	2	-	1	12
CONFIRMED TOTAL	6	9	19	22	16	24	24	34	24	15	13	13	2	221
UNKNOWN	35	18	37	45	48	37	29	42	18	26	28	28	-	391
TOTAL	41	27	56	67	64	61	53	76	42	41	41	41	2	612

Table 6
Foodborne Disease Outbreaks by Etiology and Contributing Factors,
United States, 1980

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								
B. cereus	9	7	7	2	2	-	-	-
Brucella	-	-	-	-	-	-	-	-
Campylobacter jejuni	5	1	1	-	1	-	1	-
C. botulinum	14	1	-	-	-	-	-	1
C. perfringens	25	21	19	6	1	2	3	1
E. coli	1	-	-	-	-	-	-	-
Salmonella	39	27	20	14	9	2	10	5
Shigella	11	9	5	-	-	-	6	1
Staphylococcus aureus	27	20	19	1	3	-	8	-
V. parahaemolyticus	4	3	1	3	-	-	-	-
Other	1	-	-	-	-	-	-	-
Total	136	89	72	26	16	4	28	8
CHEMICAL								
Heavy metals	1	-	-	-	-	-	-	-
Ciguatoxin	15	-	-	-	-	-	-	-
Paralytic shellfish	5	1	-	-	-	1	-	1
Scombrotoxin	29	14	13	-	-	-	-	1
Other	16	7	1	1	-	3	-	3
Total	66	22	14	1	-	4	-	5
PARASITIC								
T. spiralis	5	2	1	-	-	1	-	-
Other	2	-	-	-	-	-	-	-
Total	7	2	1	-	-	1	-	-
VIRAL								
Hepatitis A	10	2	-	-	-	1	1	-
Other	2	-	-	-	-	-	-	-
Total	12	2	-	-	-	1	1	-
CONFIRMED TOTAL	221	115	87	27	16	10	29	13
UNKNOWN	391	132	97	14	31	13	51	7
TOTAL	612	247	184	41	47	23	80	20

F. Guidelines for Confirmation of Foodborne Disease Outbreak

BACTERIAL	Clinical Syndrome	Laboratory, clinical, and/or epidemiologic criteria for confirmation
1. Bacillus cereus	Vomiting toxin: a) incubation period 1-6 hrs. b) vomiting, some cases with diarrhea Diarrheal toxin: a) incubation period 6-24 hrs. b) diarrhea, abdominal cramps, some cases with vomiting	a) isolation of $\geq 10^5$ organisms per gram in epidemiologically incriminated food OR b) isolation of organism from stools of ill persons and not in stools of controls
2. Brucella	a) incubation period several days to several months b) clinical syndrome compatible with brucellosis	a) 4-fold increase in titer OR b) positive blood culture
3. Campylobacter jejuni	a) incubation period 2-10 days, usually 4-7 b) gastrointestinal syndrome--abdominal pain, often severe; bloody diarrhea common	Isolation of organisms from stool/blood of ill individuals
4. 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 stools OR c) clinical syndrome in persons known to have consumed same food as other individuals with laboratory-proven cases
5. 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
6. 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 from stool of most ill individuals, organisms of the same serotype which have been shown to be enterotoxigenic or invasive by laboratory techniques

	Clinical Syndrome	Laboratory, clinical, and/or epidemiologic criteria for confirmation
7. 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
8. Shigella	a) incubation period 12-50 hours 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
9. Staphylococcus aureus	a) incubation period 30 min.-8 hours (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; isolation from epidemiologically implicated food and/or skin or nose of food handler is supportive evidence OR c) isolation of $\geq 10^5$ organisms per gram in epidemiologically implicated food
10. Streptococcus Group A	a) incubation period 1-4 days b) febrile URI snydrome	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
11. Vibrio cholerae 01	a) incubation period 1-5 days b) gastrointestinal syndrome--majority of cases with diarrhea and without fever	a) isolation of toxigenic V. cholerae 01 from epidemiologically incriminated food OR b) isolation of organisms from stools or vomitus of ill individuals 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
Vibrio cholerae Non-01	a) incubation period up to 3 days b) gastrointestinal syndrome--majority of cases with diarrhea	a) isolation of non-01 V. cholerae of same serotype from stools of ill persons; isolation from epidemiologically implicated food is supportive evidence
12. Vibrio parahaemolyticus	a) incubation period 4-30 hrs. b) gastrointestinal syndrome--majority of cases with diarrhea	a) isolation of $\geq 10^5$ organisms from epidemiologically implicated food (usually seafood) OR

	Clinical Syndrome	Laboratory, clinical, and/or epidemiologic criteria for confirmation
		b) isolation of Kanagawa-positive organisms from stool of ill individuals
13. Others	clinical data appraised in individual circumstances	laboratory data appraised in individual circumstances
CHEMICAL		
1. Heavy metals Antimony Cadmium Copper Iron Tin	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 1-48 hrs. (usually 2-8 hrs.) b) usually gastrointestinal symptoms followed by neurologic manifestations, including paresthesia of lips, tongue, throat or extremities, and reversal of hot and cold sensation	a) demonstration of ciguatoxin in epidemiologically incriminated fish OR b) clinical syndrome in person(s) who have eaten a type of fish previously associated with ciguatera fish poisoning (e.g., snapper, grouper)
Puffer fish (tetrodotoxin)	a) incubation period 10 min. to 3 hrs. (usually 10-45 min.) b) paresthesia of lips, tongue, face or extremities often followed by numbness, loss of proprioception or a "floating" sensation	a) demonstration of tetrodotoxin in fish OR b) puffer fish epidemiologically incriminated
Scombrotoxin	a) incubation period 1 min. to 3 hours (usually less than 1 hour) b) 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) clinical syndrome in person(s) known to have eaten a fish of order Scombrodei or type of fish previously associated with scombroid poisoning (e.g., mahi-mahi)
3. Monosodium glutamate	a) incubation period 3 min. to 2 hours (usually less than 1 hour) b) 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.)	a) demonstration of toxic chemical in epidemiologically incriminated mushrooms OR

	Clinical Syndrome	Laboratory, clinical, and/or epidemiologic criteria for confirmation
	b) clinical syndrome compatible w/mushroom poisoning by this group--often including confusion, delirium, visual disturbances	b) epidemiologically incriminated mushrooms identified as a toxic type
Group containing amanitotoxins 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 incriminated mushroom identified as toxic type
5. Paralytic or neurotoxic shellfish poison	a) incubation period 30 min. to 3 hours b) paresthesias of lips, mouth or face, and extremities; weakness, including respiratory difficulty in most severe cases; upper and lower gastrointestinal symptoms in some cases	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 chemical	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

FORM APPROVED
OMB NO. 0920--0004

G. 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 AND HUMAN SERVICES
PUBLIC HEALTH SERVICE
CENTERS FOR DISEASE CONTROL
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 ____________ Suspected ☐ 1 (79)
Chemical ____________ Confirmed ☐ 2
Other ____________ Unknown ☐ 3

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

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: Enteric Diseases Branch
Bacterial Diseases Division
Center for Infectious Diseases
Centers for Disease Control
Atlanta, Georgia 30333

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

CDC 4.245 (BACK)
1-74

H. LINE LISTING OF FOODBORNE DISEASE OUTBREAKS, 1980

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								
BACILLUS CEREUS								
	Michigan	7	7/29		+		Fried rice	Restaurant
	New York	118	8/30	+	+		Beef	Restaurant
	New York	4	11/11	+	+		Unknown	Other
	Pennsylvania	8	3/21	+	+		Mexican food	Restaurant
	Tennessee	31	12/15		+		Turkey	Other
	Washington	4	6/11	+	+		Fried rice	Restaurant
	Washington	5	6/20		+		Fried rice	Home
	Wyoming	2	7/29		+		Fried rice	Delicatessen
CAMPYLOBACTER								
	California	11	9/99	+			Turkey	Home
	California	10	99/99	+			Other/Not spec meat	Other
	Connecticut	41	6/27	+		+	Other/Not spec bake	Camp
	Minnesota	9	9/99	+			Unknown	Other
	Oregon	91	12/22	+			Milk	Home
CLOSTRIDIUM BOTULINUM								
	Alaska	1	6/99	+			Other not specified	Home
	Alaska	1	8/99	+	+		Other fish	Home
	California	1	2/99		+		Other/Not spec meat	Home
	California	2	6/99				Other vegetables	Home
	California	1	12/99				Other vegetables	Home
	Colorado	1	7/99	+			Peppers	Home
	Kentucky	1	10/99		+		Other vegetables	Home
	Michigan	2	6/99		+		Soups	Home
	North Carolina	1	2/99	+	+		Other vegetables	Home
	Oregon	1	6/99		+		Other vegetables	Home
	Washington	1	6/99		+		Other vegetables	Home
	Washington	1	12/09	+	+		Other vegetables	Home
	Wisconsin	2	8/99		+		Other/not spec meat	Home
	New York City	2	3/99		+		Other vegetables	Home
CLOSTRIDIUM PERFRINGENS								
	Arizona	63	10/01		+		Other, not specified	Church
	California	6	5/18		+		Beef	Other
	California	2	7/16	+			Unknown	Other
	California	6	8/99		+		Unknown	Restaurant
	Connecticut	36	9/24	+		+	Beef	Other
	Connecticut	43	10/23	+	+		Ham	School
	Connecticut	30	11/27	+	+	+	Turkey	Restaurant
	Florida	69	12/17		+	+	Turkey	Church
	Georgia	55	3/08	+			Other/not spec meat	Picnic
	Hawaii	4	11/02		+		Beef	Home
	Montana	20	11/27		+		Multiple vehicles	Restaurant
	New York	102	5/15	+	+		Other/not spec meat	School
	New York	500	10/18	+			Other vegetables	Other
	New York	7	11/28	+	+		Turkey	Restaurant
	South Carolina	208	4/19		+		Beef	Camp
	South Carolina	160	4/99		+		Beef	Other
	Tennessee	62	4/99				Pork	Restaurant
	Virginia	22	5/11	+	+		Beef	Restaurant
	Washington	2	3/17	+			Mexican food	Restaurant
	Washington	4	6/22		+		Beef	Restaurant
	Washington	3	7/20	+			Beef	Restaurant
	Washington	5	10/21	+	+		Mexican Food	Restaurant
	Washington	2	12/11	+			Mexican Food	Restaurant
	Wisconsin	49	4/13	+			Unknown	Restaurant
	New York City	3	3/19		+		Beef	Restaurant
ENTEROBACTER								
E. coli	Wisconsin	500	3/26	+			Mexican food	Restaurant

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
SALMONELLA								
S. enteritidis	Colorado	50	8/99	+		+	Multi vehicles	Other
S. typhimurium	Colorado	36	9/99				Unknown	Other
S. thomasville	Connecticut	29	8/03	+	+		Turkey	Other
S. typhimurium	Connecticut	10	9/27	+		+	Unknown	School
S. montevideo	Connecticut	85	10/06	+	+	+	Unknown	Other
S. bredeney	Georgia	55	12/19	+	+		Ham	Home
S. agona	Hawaii	31	12/07	+			Chinese food	Restaurant
S. enteritidis	Illinois	6	9/02	+			Non-specified salads,sauce	Restaurant
S. infantis	Iowa	21	6/12	+			Ice cream	Church
S. typhimurium	Iowa	10	9/02	+			Potato salad	Home
S. enteritidis	Massachusetts	165	8/10	+		+	Other, not specified	Restaurant
S. enteritidis	Massachusetts	27	8/24	+		+	Other, not specified	Cafeteria
S. enteritidis	Massachusetts	58	8/27	+		+	Eggs	Restaurant
S. agona	Massachusetts	38	8/30	+	+	+	Beef	Restaurant
S. javiana	Michigan	52	8/02	+	+		Turkey	Other
S. glastrup	Minnesota	30	6/29	+			Unknown	Church
S. typhimurium	Montana	60	6/25	+	+		Other or not specified dairy	Unknown
S. enteritidis	New Hampshire	46	7/14	+	+	+	Unknown	Other
S. enteritidis	New Hampshire	11	7/31	+	+		Egg nog	Camp
S. enteritidis	New York	60	6/19	+			Other or not specified bake	Home
S. sp	New York	26	7/07	+		+	Pork	Restaurant
S. enteritidis	Oklahoma	29	8/08		+		Chicken salad	Church
S. enteritidis	Pennsylvania	9	2/24	+			Other, not specified	Other
S. typhimurium	Pennsylvania	75	3/22	+	+		Turkey	Restaurant
S. newport	South Carolina	285	9/17	+			Turkey	School
S. sp	Tennessee	200	4/12	+			Beef	Other
S. enteritidis	Tennessee	303	4/99	+	+	+	Beef	School
S. sp	Texas	2	3/27		+		Beef	Restaurant
S. typhi	Texas	16	8/05	+	+	+	Other vegetables	Camp
S. heidelberg	Texas	104	12/06	+		+	Unknown	Restaurant
S. derby	Vermont	8	6/24	+	+		Milk	Home
S. typhimurium	Virginia	137	5/01	+		+	Unknown	School
S. hadar	Virginia	76	11/27	+	+	+	Turkey	Restaurant
S. enteritidis	Washington	3	5/24	+			Mexican food	Restaurant
S. enteritidis	Washington	46	9/07	+	+	+	Turkey	Restaurant
S. enteritidis	Washington	135	10/07	+	+	+	Turkey	Restaurant
S. montevideo	Wisconsin	25	1/01	+		+	Unknown	Restaurant
S. montevideo	Wisconsin	11	3/14	+		+	Unknown	Restaurant
S. oranienburg	Wisconsin	11	6/01	+			Unknown	Home
SHIGELLA								
S. flexneri	Alabama	15	9/28	+		+	Other or not specified meat	Home
S. sonnei	Arkansas	39	8/07	+			Tuna	Other
S. sonnei	Arkansas	164	9/03	+		+	Potato salad	Camp
S. flexneri 4A	Massachusetts	800	9/22	+		+	Potato salad	Picnic
S. flexneri	Minnesota	24	5/09	+			Potato salad	Other
S. sonnei	New York	3	5/22	+			Unknown	Delicatessen
S. sonnei	Pennsylvania	20	2/22	+		+	Potato salad	Other
S. sonnei	Pennsylvania	47	8/09	+		+	Unknown	Other
S. sonnei	Virginia	38	9/08	+		+	Unknown	Restaurant
S. sonnei	Washington	8	6/01	+		+	Other fish	Restaurant
S. flexneri	Multiple states	26	5/06	+			Unknown	Picnic
STAPHYLOCOCCUS AUREUS								
	Georgia	5	9/12	+	+		Multi-vehicles	Other
	Hawaii	3	10/09		+		Custard desserts	Home
	Kansas	155	10/01		+	+	Turkey	School
	Kentucky	7	4/26		+		Unknown	Delicatessen
	Kentucky	35	7/06		+		Lamb	Picnic
	Massachusetts	29	7/19	+	+		Potato salad	Other
	Mississippi	94	7/24		+		Multi-vehicles	Other
	Nebraska	15	8/10		+		Turkey	Restaurant

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
STAPHYLOCOCCUS AUREUS (Cont'd)	New Jersey	11	6/06		+		Other or not specified meat	Home
	New York	18	4/05		+	+	Potato salad	Cafeteria
	New York	3	6/09		+		Other or not specified bake	Restaurant
	New York	142	8/17		+		Other or not specified meat	Other
	North Carolina	60	8/10	+	+		Multi vehicles	School
	Pennsylvania	11	6/07	+			Unknown	Other
	Pennsylvania	2	8/20	+	+		Chicken	Restaurant
	Pennsylvania	54	10/15		+		Custard desserts	Other
	Pennsylvania	2	12/08		+		Chicken salad	Restaurant
	Tennessee	27	8/28	+	+	+	Pork	Restaurant
	Tennessee	17	9/26	+	+		Multi vehicles	Home
	Utah	8	7/11		+		Sausage	Restaurant
	Virginia	90	8/16		+	+	Ham	Other
	Virginia	21	10/19		+		Turkey	Church
	Washington	9	4/16	+	+	+	Ham	Restaurant
	Washington	3	4/19	+			Chicken	Restaurant
	West Virginia	17	5/20	+	+	+	Potato salad	Other
	Wisconsin	17	5/03	+	+		Ham	Church
	New York City	89	8/12		+	+	Multi vehicles	Other
VIBRIOS PARAHAEMOLYTICUS								
	Arizona	4	10/24	+			Shellfish	Home
	Florida	2	4/08		+		Shellfish	Restaurant
	Guam	3	7/29	+			Shellfish	Home
	Guam	3	8/16	+			Shellfish	Home
Other bacterial	North Carolina	40	11/22	+	+		Shellfish	Picnic
PARASITIC								
TRICHINELLA SPIRALIS								
	Alaska	8	12/20		+		Other/Not spec meat	Home
	Illinois	3	1/25	+			Sausage	Home
	Louisiana	9	2/99	+			Pork	Other
	Louisiana	15	4/99	+			Sausage	Other
	New York	6	7/14	+	+		Pork	Home
Other parasitic	California	4	9/11	+			Other/Fish	Other
Other parasitic	California	10	9/02	+			Other/Fish	Home
VIRAL (HEPATITIS)								
	California	12	7/06	+		+	Unknown	Restaurant
	Colorado	6	9/99	+		+	Tuna	Home
	Illinois	3	11/19	+			Shellfish	Restaurant
	Massachusetts	30	1/02	+		+	Multi vehicles	Cafeteria
	North Carolina	20	6/16	+		+	Unknown	Restaurant
	Oklahoma	8	1/10	+		+	Cheese	Other
	Virginia	12	2/14			+	Unknown	Other
	Virginia	10	3/99	+		+	Multi vehicles	Other
	Washington	9	11/18	+			Unknown	Restaurant
	Wisconsin	6	3/18	+		+	Unknown	Restaurant
Other viral	Arizona	19	5/10	+		+	Other vegetables	Other
Other viral	Florida	5	99/99	+			Unknown	Home
CHEMICAL								
Paralytic shellfish	Alaska	2	8/25		+		Shellfish	Home
Paralytic shellfish	California	58	7/18				Shellfish	Other
Paralytic shellfish	California	36	7/19				Shellfish	Other
Paralytic shellfish	Massachusetts	15	8/30		+		Shellfish	Home
Paralytic shellfish	Tennessee	5	10/19				Shellfish	Restaurant

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
Scombrotoxin	California	1	3/30				Mahi-Mahi	Other
Scombrotoxin	California	2	5/15	+	+		Mahi-Mahi	Restaurant
Scombrotoxin	California	2	6/28		+		Mahi-Mahi	Restaurant
Scombrotoxin	California	8	7/03				Other fish	Other
Scombrotoxin	Florida	20	12/13		+		Tuna	Other
Scombrotoxin	Hawaii	2	2/12				Other fish	Home
Scombrotoxin	Hawaii	3	2/15		+		Mahi-Mahi	Home
Scombrotoxin	Hawaii	1	3/20		+		Mahi-Mahi	Restaurant
Scombrotoxin	Hawaii	3	3/27		+		Mahi-Mahi	Other
Scombrotoxin	Hawaii	1	4/19				Mahi-Mahi	Other
Scombrotoxin	Hawaii	1	5/15				Tuna	Restaurant
Scombrotoxin	Hawaii	1	6/23				Mahi-Mahi	Restaurant
Scombrotoxin	Hawaii	1	7/09		+		Mahi-Mahi	Restaurant
Scombrotoxin	Hawaii	2	7/10				Mahi-Mahi	Restaurant
Scombrotoxin	Hawaii	5	7/25				Mahi-Mahi	Other
Scombrotoxin	Hawaii	1	8/05				Mahi-Mahi	Restaurant
Scombrotoxin	Hawaii	1	8/26		+		Mahi-Mahi	Restaurant
Scombrotoxin	Hawaii	2	10/05		+		Mahi-Mahi	Restaurant
Scombrotoxin	Hawaii	19	11/14				Mahi-Mahi	Cafeteria
Scombrotoxin	Illinois	30	3/19		+		Mahi-Mahi	Other
Scombrotoxin	Illinois	3	4/02				Mahi-Mahi	Restaurant
Scombrotoxin	Illinois	2	4/03				Mahi-Mahi	Restaurant
Scombrotoxin	Michigan	2	3/24		+		Mahi-Mahi	Restaurant
Scombrotoxin	Michigan	21	4/02		+		Mahi-Mahi	Other
Scombrotoxin	Michigan	2	4/03		+		Mahi-Mahi	Restaurant
Scombrotoxin	New Jersey	3	8/08		+		Other Fish	Home
Scombrotoxin	New Jersey	2	11/11		+		Tuna	Home
Scombrotoxin	New York	10	9/25		+		Other fish	Restaurant
Scombrotoxin	Pennsylvania	2	8/26				Other fish	Restaurant
Ciguatoxin	Hawaii	4	3/02		+		Other fish	Home
Ciguatoxin	Hawaii	1	3/25		+		Other fish	Home
Ciguatoxin	Hawaii	2	4/20		+		Other fish	Home
Ciguatoxin	Hawaii	2	4/27		+		Unknown	Home
Ciguatoxin	Hawaii	2	4/99		+		Other fish	Home
Ciguatoxin	Hawaii	5	5/18		+		Other fish	Home
Ciguatoxin	Hawaii	4	6/25		+		Other fish	Home
Ciguatoxin	Hawaii	2	7/28				Other fish	Home
Ciguatoxin	Hawaii	4	8/06		+		Other fish	Home
Ciguatoxin	Hawaii	3	8/17		+		Other fish	Home
Ciguatoxin	Hawaii	13	8/24		+		Amberjack	Other
Ciguatoxin	Hawaii	1	9/01		+		Other fish	Home
Ciguatoxin	Hawaii	4	9/10		+		Other fish	Home
Ciguatoxin	Hawaii	3	9/30		+		Other fish	Home
Ciguatoxin	Hawaii	2	11/16		+		Other fish	Home
Metal	Washington	5	1/31		+		Non-dairy beverages	Church
Other chemical	Connecticut	16	1/23				Other fish	Restaurant
Other chemical	Connecticut	2	10/07		+		Other fish	Restaurant
Other chemical	Florida	17	4/30		+		Non-dairy beverages	Restaurant
Other chemical	Illinois	18	12/17		+		Other/not specified bake	Other
Other chemical	Minnesota	3	2/15		+		Ice cream	Restaurant
Other chemical	Minnesota	19	6/06	+	+		Sausage	Home
Other chemical	Minnesota	169	8/29				Multi vehicles	Other
Other chemical	Minnesota	2	9/15				Carbonated drink	Restaurant
Other chemical	New Jersey	16	7/11		+		Other, not specified	Church
Other chemical	New Jersey	25	7/11		+		Other vegetables	Camp
Other chemical	New Jersey	6	9/20				Other vegetables	Home
Other chemical	Ohio	2	5/23	+	+		Other, not specified	Home
Other chemical	South Carolina	9	11/20		+		Soups	Other
Other chemical	Washington	2	4/30				Unknown	Other
Other chemical	Washington	2	5/02		+		Other, not specified	Home
Other chemical	New York City	1	8/03		+		Carbonated drink	Other

UNKNOWN

A line listing of outbreaks of unknown etiology may be obtained by writing to the Enteric Diseases Branch, Bacterial Diseases Division, Center for Infectious Diseases, Centers for Disease Control, Atlanta, Georgia 30333.

I. Selected Foodborne Outbreak Articles, 1980, Taken From Morbidity and Mortality Weekly Report

Scombroid Poisoning - New Jersey (MMWR 1980;29(9):106-107)

On October 4 and 5, 1979, 35 cases of scrombroid fish poisoning occurred at 2 Catholic monasteries in New Jersey among nuns who shared tuna fish from a common, non-commercial source.

Illness was first reported on October 4. Following a dinner of broiled tuna fish, 2 sisters from 1 of the monasteries were hospitalized for explosive vomiting and diarrhea. All 23 nuns who ate the fish became ill, while 4 who did not eat the fish experienced no symptoms ($p=.0006$. Fisher's exact test 2-tailed). An unusual bitter or peppery taste was noted immediately by 7 (30%). Onset of symptoms occurred a mean of 39 minutes after eating the fish (range of 5 minutes to 2 hours). Symptoms included facial flushing (82.6%), diarrhea (73.9%), headache (69.6%), erythema other than facial (56.5%), palpitations (43.5%), nausea (43.5%), dizziness (43.5%), prostration (43.5%), chills (39.1%), unusual thirst (30.4%), itching (30.4%), blurred vision (26.1%), cramps (21.7%), and vomiting (17.4%). Conjunctival injection, reported as a common acute occurrence, could not be quantitated. Duration of the major symptom complex was under 6 hours, although weakness and fatigue persisted for 24 hours. The 2 hospitalized patients, ages 65 and 66, were treated with antihistamines, fluid, and electrolyte replacement over a 24-hour observation period and then released.

The incriminated fish was a gift from a second monastery, which had received a total of 9 "fresh", yellow-fin tuna from a non-commercial fisherman on August 28. Nuns at this monastery had donated 1 fish to their sister convent and had dined on the remaining 8 tuna 5 times. Twice they had experienced the typical scrombroid symptom complex, but they attributed it to improper cooking. Just before the New Jersey State Department of Health investigators arrived on October 5, the nuns had prepared frozen tuna steaks. They had boiled them for 1 hour in an attempt to eliminate the cause of the illness. Mild nausea, flushing or dizziness occurred within minutes in 12 of 20 (60%) nuns who ate the fish. All recovered within 3 hours. Analysis of the tuna fish for free base histamine was conducted by the Food and Drug Administration's Brooklyn Laboratory by the fluorimetric method and yielded results of 370 mb/100 g.

On August 27, 6 amateur sportsmen caught 28 yellow-fin tuna, weighing 45-105 pounds apiece, off the New Jersey coast. Because of the unusually large catch, only some of the uncleaned fish could be chilled in ice boxes. The rest were left covered on the deck and periodically hosed with seawater. On shore the catch was divided, and 6 of the uncleaned fish were subsequently refrigerated, but not frozen, at the home of the brother of 1 of the nuns. The next day, 5 of these fish plus 4 others were transported without refrigeration to the monastery. The sixth uncleaned fish subsequently spoiled and was discarded. All of the other fish were eaten by persons who did not become ill.

Editorial Note: Scombroid fish poisoning is a continuing problem in the United States: 32 outbreaks involving 207 individuals were reported to CDC between 1975 and 1979. The disease takes its name from the family Scombridae (tuna and related species) because of the frequent association of fish in this family with illness. The fish most commonly implicated as the cause of illness for the last 5 years, however, has been mahi mahi (dolphin), which has accounted for 13 (40%) of fish-associated outbreaks reported.

Scombroid poisoning results from the ingestion of heat-stable toxins produced by bacterial action on dark meat fish (1,2). High levels of histamine in the fish correlate with occurrence of illness; disease usually results when concentrations exceed 20 mg/100 g. The disease is preventable if the fish is properly handled, particularly if it is refrigerated early and adequately.

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Trichinosis - Louisiana
(MMWR 1980;29(26):309-10)

Louisiana recently reported an outbreak of trichinosis involving 15 persons. One patient died. This is the first reported death from trichinosis in Louisiana in at least 40 years.

The index patient was a 50-year old female from Evangeline Parish who had onset of intermittent diarrhea and nausea in late April 1980. On May 13, headache, photophobia, myalgias, and periorbital edema developed. Her condition worsened, and she was admitted to a local hospital on May 19 with a temperature of 103.2 F (39.5 C). Her white blood cell (WBC) count varied between 12,800/mm^3 and 30,300/mm^3, with 10%-16% eosinophils. She was treated with dexamethasone for 10 days for a possible allergic reaction and improved. On June 2, she began having seizures and labored respiration, and she was airlifted to New Orleans for emergency treatment. The next day, after she had been medically stabilized, a quadriceps-muscle biopsy was performed; the specimen was found to be positive for *Trichinella spiralis*. Computer-assisted tomography (CAT) scans of the head on June 6 and 9 revealed enlarged areas of hemorrhage in the right parietal region.

The patient was placed on steroids. She initially showed some improvement, but then her condition worsened and, on June 12, she died. At autopsy, massive cerebral edema was found secondary to bilateral cortical vein and dural sinus thromboses. The hemorrhage discovered on the CAT scan was also confirmed. A bentonite-flocculation test for *Trichinella* performed on June 2 was subsequently reported as positive at a dilution of 1:20. Interviews with family members indicated that the patient prepared and ate pork sausage frequently, but there was no definite history of ingestion of raw sausage.

An investigation begun by the Louisiana State Department of Health and Human Resources on June 2 revealed that 15 persons in Evangeline and Jefferson Davis Parishes had had an illness that fit the clinical syndrome of trichinosis. Ten of the 15 patients gave a definite history of eating raw smoked sausage. These patients included 6 males and 9 females, who ranged in age from 19 to 50 years (mean, 35.3 years). The dates of onset ranged from late April to May 22; incubation periods varied from 4 to 20 days. Ten of the 15 patients were hospitalized. One other patient had a muscle biopsy that was positive for *T. spiralis*.

Editorial note: This is the third outbreak of trichinosis in southwestern Louisiana in the last 16 months. In the period February-March 1979, there was an outbreak involving 20 cases in Allen and Calcasieu parishes, and in February and March 1980, 9 cases occurred in Acadia Parish. All the outbreaks were related to the consumption of raw or partially cooked pork products.

Trichinella larvae are killed by heating pork to at least 137 F (58.3 C). Because the smoking process often does not heat meat to this temperature, all smoked pork products should be cooked before they are eaten. In making sausage at home, tasting even small bits of the raw sausage to assure an adequate mixture of spices can be a risk.

Since there are only approximately 100 cases of trichinosis reported each year in the United States, these 3 outbreaks represent a significant percentage of the entire number of cases reported over the last 16 months. The popularity of pork sausage in Louisiana, especially in the southwestern section, may account for the concentration of cases in that area. Physicians should be alert to the diagnosis of trichinosis in any patient who has muscle aches and pain, with fever, weakness, periorbital edema, or increased eosinophil count.

A definitive diagnosis can be made from a muscle biopsy, but acute and convalescent sera should be submitted to the local health department for serodiagnostic testing.

Plant Poisonings - New Jersey
(MMWR 1980;30(6):65-67)

In 2 separate episodes, within a 2 1/2-month period in 1980, 27 New Jersey residents were poisoned by eating wild plants. The poisonings were serious enough that 21 persons sought medical care; 4 were hospitalized.

Pokeweed poisoning - Passaic County: On July 11, an outbreak of gastrointestinal illness related to eating pokeweed leaves affected campers in a large day camp. Initial reports indicated that the outbreak was limited to a "nature group" whose members had sampled a salad made with this wild plant.

The group, comprising 52 campers and counselors, had been offered pokeweed salad prepared from young leaves picked, boiled, drained and reboiled that morning, a method that reputedly ensured the plant's edibility. Sixteen (31%) of the 51 interviewed met the case definition (vomiting accompanied by any 3 of the following on the day they ate the salad: nausea, diarrhea, stomach cramps, dizziness, and headache). Nine others who were not part of the nature group also had tasted the salad; 5 (56%) of these became ill.

Of the 21 ill campers, 18 (86%) experienced nausea, 18 (86%) stomach cramps, 17 (81%) vomiting, 11 (52%) headache, 10 (48%) dizziness, 8 (38%) burning in the stomach or mouth; and 6 (29%) diarrhea. Persons became ill 1/2 to 5 1/2 hours (mean 3 hours) after eating the pokeweed. Symptoms lasted 1 to 48 hours, with a mean of 24 hours. Eighteen persons were seen in local emergency rooms or physicians' offices. Four of these were hospitalized for 24 to 48 hours for protracted vomiting and dehydration.

Food-history analysis was done for all 60 persons. Salad was the only food item significantly associated with illness. Twenty (43%) of the 46 persons who ate pokeweed became ill compared with 1 (7%) of 14 who did not eat it (p=.01). Moreover, for those who ate the salad, illness was associated with eating at least 1 teaspoonful compared with less than 1 teaspoonful (p=.02). Vomitus analyzed for 7 persons was negative for *Staphylococcus aureus*.

Jimsonweed toxicosis - Mercer County: Six New Jersey teenagers became ill on September 20, shortly after consuming a combination of jimsonweed seeds and alcohol. The number of seed pods eaten ranged from 1/2 to 2. In addition, each teenager drank up to 1 quart of beer and approximately 1-2 oz of whiskey.

While symptoms, time of onset, and duration of illness were difficult to determine precisely because of the teenagers' disorientation, illness was characterized by hallucinations (all 6), dry mouth (6), thirst (5), blurred vision (5), flushed skin (4), inability to urinate (4), and slurred speech (4). The illness began approximately 1/2 to 1 3/4 hours after ingestion of the seeds and lasted 18 hours to 9 days. Blurred vision was the longest lasting symptom.

Three teenagers sought medical attention in a local emergency room between 8 and 18 hours after eating the seeds. In each case the diagnosis was "drug ingestion," and all 3 were sent home untreated to be observed by family members.

Editorial Note: Both pokeweed (Phytolacca americana) and jimsonweed (Datura stramonium) are ubiquitous, growing in cultivated fields, near roadsides, and in other undeveloped areas. Pokeweed may be found in any size up to 3 meters tall. Small, white, round flowers on long green, red, or purple stalks mature to distinctive purple-black, juicy berries (inkberries). There is disagreement about edible parts, season of edibility, and methods of preparation of pokeweed, also whether the plant should be eaten at all. Indeed, the camp counselor in the Passaic outbreak had been preparing and serving pokeweed salad for many years without apparent ill effects. There is general agreement that the root is the most toxic part and that toxin levels throughout the rest of the plant increase as the plant matures. The main toxic agent of pokeweed is phytolaccine, which has strong emetic properties (1-3).

Jimsonweed--also known as Jamestown weed, loco weed, and thorn apple, among other names--is a tall, multibranched, annual herb that grows to 1 1/2 meters in height. The leaves are broadly ovate, dark green above, and lighter beneath. The fruit is a prickly 4-celled capsule, containing large, pitted, dark-brown or black seeds. Both the leaves and the seeds are poisonous if ingested. During the autumn, when the pods open and seeds are abundant, reports of atropine-like poisoning in adolescents who have eaten these seeds are not uncommon (4). The poisonous substances contained in the entire plant, but concentrated in the seeds, are alkaloids: hyoscyamine, atropine, and hyoscine (scopolamine). The toxin is a stimulant and mydriatic with parasympathetic actions. It blocks motor, secretory, and inhibitory effects of acetylcholine on smooth muscle tissue and can also be a convulsant (1).

Many people who use herbs for tea, medicine, or food may be unaware of the possible toxic effect of the herbs they consume. Reports show that even some herbs purchased in retail stores have been toxic to consumers (5).

Because of a lack of scientific data on the safety of herbs the Food and Drug Administration is receiving increasing numbers of requests from consumers and physicians for information. Information such as botanical identity, amount and part of the plant that is edible, and maturity of the plant are often missing from published reports of human herbal poisonings. In addition, because of the difficulty in eliciting histories from intoxicated patients, symptoms resulting from ingestion of the herb may be inaccurately recorded. Furthermore, the pharmacologically active compounds of some herbs are unknown, and methods are currently unavailable for analyzing these compounds. Since the scientific literature on many wild herbs is limited, consumers need to be aware that there are risks involved in eating wild plants of undocumented safety.

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Salmonellosis Associated with Raw Milk - Montana
(MMWR 1980;30(18):211-12)

In the period June 25-August 3, 1980, an outbreak of enteritis caused by multiresistant Salmonella typhimurium occurred in 105 persons who drank raw milk

from a local dairy in Montana. Isolates from 77 patients were confirmed as Salmonella group B; 22 were serotyped as S. typhimurium. All of these isolates were resistant to tetracycline, ampicillin, kanamycin, streptomycin, sulfonamides, and cephalothin.

The median age for persons with confirmed cases was 14 years (range 3 weeks - 71 years). The following symptoms were noted: diarrhea (96%), fever (92%), abdominal pain (86%), headache (66%), chills (50%), nausea (49%), and vomiting (32%).

Raw milk was ingested in the 3 days before onset of illness by 59 of the 77 persons with confirmed cases. A matched-pair case-control study of 36 ill persons and neighborhood controls matched for age and sex showed a significant association ($p<0.001$, McNemar test) between drinking raw milk and being ill. A group of 19 children and 4 adults visited the dairy on July 2; each drank 2 oz. of raw milk. One child became ill with diarrhea 72 hours later. Two weeks after the visit, 6 of 13 members of this group (including the symptomatic child) were found to be excreting Salmonella.

The dairy produces about 3,000 gallons of raw milk each week. It is the least expensive milk on sale in the area and is sold only at the dairy. Multiresistant S. typhimurium was isolated from 2 of 6 unopened milk samples obtained in the period July 8-19. Extensive environmental culturing did not show how the milk had been contaminated. No salmonellae were isolated from fecal specimens from dairy cattle, from water and feed samples, from fecal specimens from dairy employees, or from swabs from milking machinery. The cattle feed did not contain antimicrobials, and no signs of mastitis among the milk cows were reported.

Editorial Note: The milk at this dairy caused a large outbreak of salmonellosis, although there were no obvious breaches in proper milking technique or dairy husbandry practice. Raw milk, even when strictly controlled or certified, may be contaminated with Salmonella (1). In Scotland, where 10% of the milk consumed is unpasteurized, 29 raw-milk-associated Salmonella outbreaks involving 2,428 persons were recognized in the period 1970-1979 (2). S. typhimurium was isolated in 19 (66%) of these milkborne outbreaks.

In the United States, S. typhimurium is the species most frequently isolated from cattle (43% of isolates), but unlike S. dublin, which is host specific to cattle, S. typhimurium has been isolated just as frequently from other domestic animals (3). In a random sample of S. typhimurium strains isolated in 19 states in the period 1979-1980, CDC investigators found that 52 of 308 (17%) were resistant to 1 or more antimicrobial agents. Another study showed that S. typhimurium was the species most frequently resistant to antimicrobials; it also showed that the most common antibiotic-resistance pattern for multiresistant salmonellae (20.4% of the isolates) was that seen in the outbreak reported here (4).

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