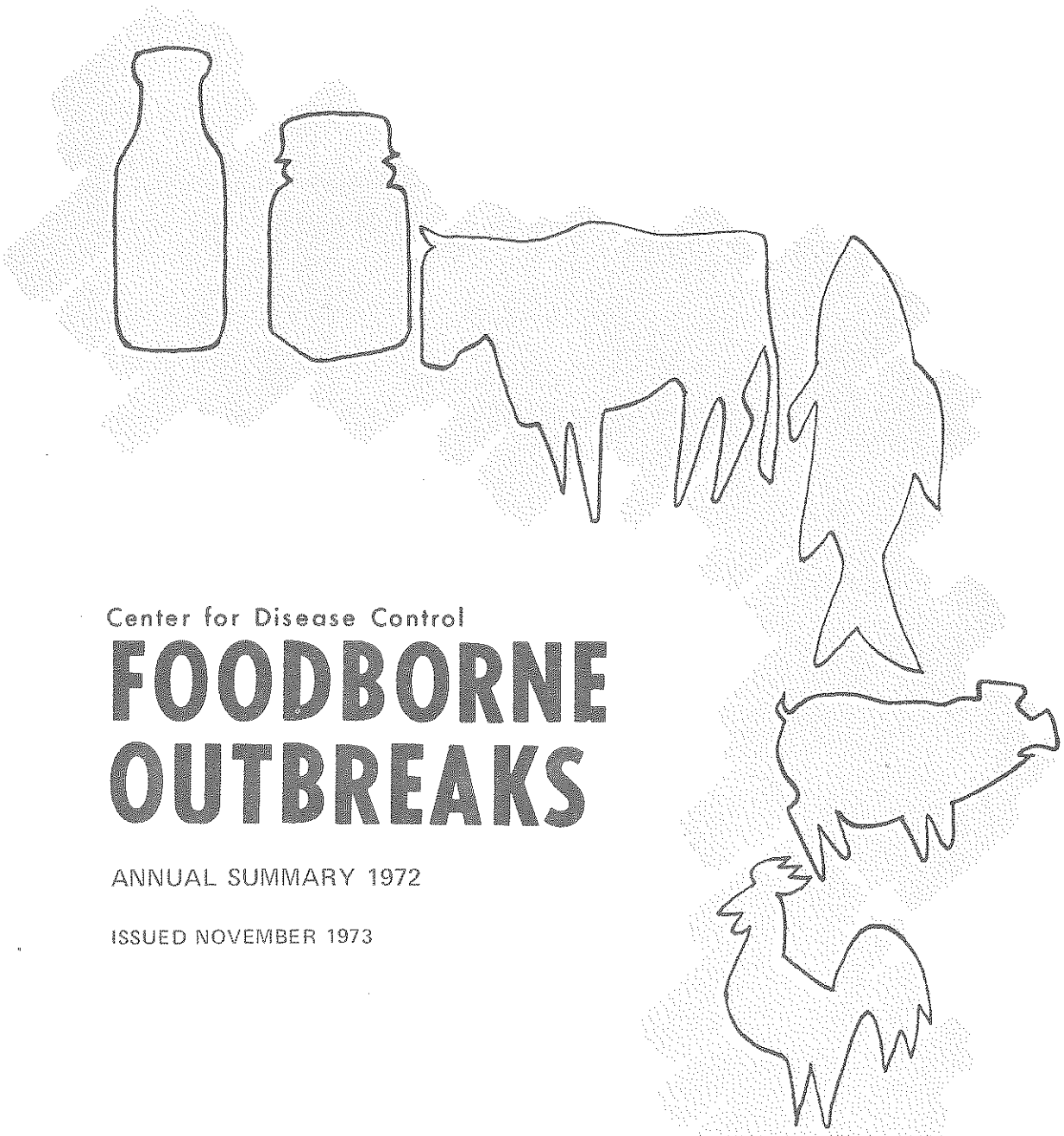

Center for Disease Control

# FOODBORNE OUTBREAKS

ANNUAL SUMMARY 1972

ISSUED NOVEMBER 1973

U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE / PUBLIC HEALTH SERVICE

# PREFACE

Summarized in this report is information received from state and city health departments, Food and Drug Administration, and other pertinent sources. Much of the information is preliminary. It is intended primarily for the use of those with responsibility for disease control activities. Anyone desiring to quote this report should contact the Enteric Diseases Section for confirmation and interpretation.

Contributions to the Status Report are most welcome. Please address to the:

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# 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 infant 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 of sound public health action. Beginning in 1923, the Public Health Service published summaries of outbreaks of gastrointestinal illness attributed to milk. In 1938 reports of outbreaks caused by all foods were added to these summaries. These early surveillance efforts led to the enactment of important public health measures which have had a profound influence in decreasing the incidence of enteric diseases, particularly those transmitted by milk and water.

From 1951 through 1960, reported outbreaks of foodborne illness were reviewed and published annually in Public Health Reports by the National Office of Vital Statistics. In 1961, responsibility for reporting was transferred to the Communicable Disease Center (CDC). From 1961 to 1966, the publishing of annual reviews was discontinued, but pertinent statistics and detailed individual investigations were reported in the Morbidity and Mortality Weekly Report (MMWR).

The present system of surveillance of food-and waterborne diseases began in 1966 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 food-and waterborne outbreaks. In this report data from foodborne disease outbreaks reported to CDC in 1972 and from waterborne outbreaks reported in 1971 and 1972 are summarized.

Food-and waterborne 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 the 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 30-50% of foodborne disease outbreaks reported to CDC in each of the last 5 years. The appreciation in England of Clostridium perfringens as an important foodborne pathogen and an awareness in Japan of the role of Vibrio parahaemolyticus in foodborne illness 15 years before the importance of either organism as a foodborne pathogen was realized in the United States emphasize the need for proper clinical documentation and laboratory analysis in the investigation of foodborne outbreaks. The importance of some foodborne pathogens, e.g., Bacillus cereus and enteropathogenic Escherichia coli still needs to be defined. The etiologic agent(s) responsible for "sewage poisoning," the most commonly reported cause of waterborne outbreaks, also awaits elaboration.

3. Administrative Guidance: The collection of data from outbreak investigations allows for assessment of trends in causative agents and food vehicles and focuses on common errors in food and water handling. By compiling the data into 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 become apprised of the factors involved in food and waterborne outbreaks. With respect to food and water protection, comprehensive surveillance should result in a clearer appreciation of priorities, 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 illnesses.

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 the laboratory evidence for specific etiologic agents is obtained and fulfills specified criteria (see page 30 for criteria).
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 periods--less than 1 hour (likely chemical), 1-6 hours (likely staph), 6-12 hours (likely C. perfringens) and greater than 12 hours (other infectious agents).

### B. Source of Data

Participants in foodborne disease surveillance include the general public and local, state, and federal agencies which have responsibility for public health and food protection. Figure 1 depicts various lines of notification between these participants. Complaints of illness originate with the general public (e.g. consumer, physicians, hospitals, food services and processing industries) and are then reported to health departments or regulatory agencies. Most epidemiologic investigations are carried out by local health department personnel (epidemiologists, sanitarians, public health nurses, etc) and are subsequently reported to state health departments. State agencies concerned with food safety frequently participate in the initial investigation of the outbreak and offer laboratory support. Utilizing the standard CDC reporting form (see page 16) a summary of the outbreak is sent to CDC.

Two federal regulatory agencies which have the major responsibilities for food protection, the Food and Drug Administration (FDA) and the U.S. Department of Agriculture (USDA), participate actively in the CDC surveillance program. They report to CDC and to state and local health authorities episodes of foodborne illness which they receive. CDC and state and local health authorities in turn report to FDA or USDA any foodborne disease outbreaks which involve commercial products. Both agencies assist in epidemiologic and laboratory investigations.

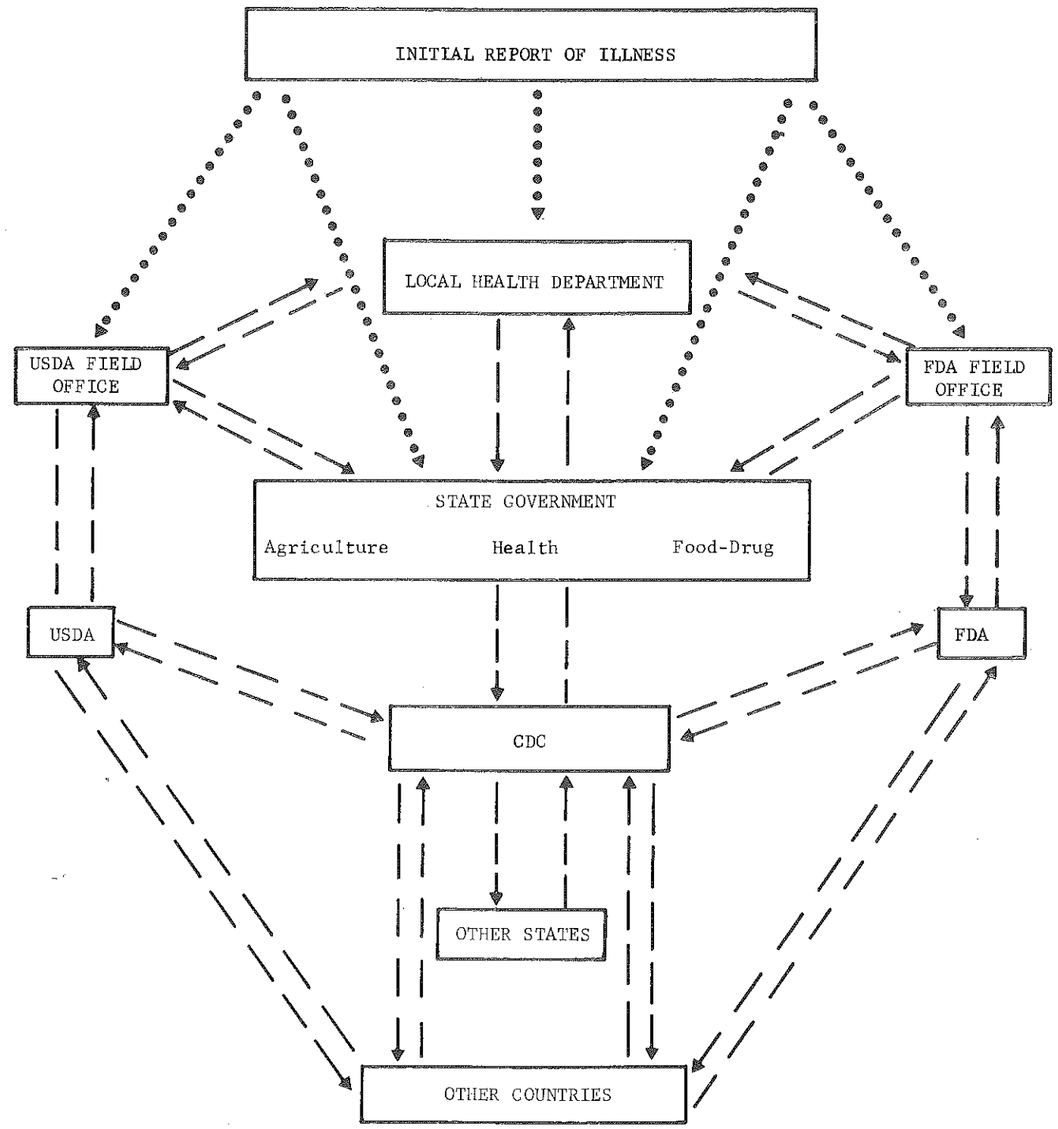
This notification system is ideal and variations often occur. If an outbreak is large or if multiple local jurisdictions are involved, a local health department may ask for immediate assistance in its investigation from its state health department. If an outbreak involves illness in persons from more than 1 state, CDC should be notified during the investigation of the outbreak and may provide epidemiologic assistance. CDC also renders assistance in large intrastate outbreaks when requested.

In suspect botulism cases, physicians and health authorities are urged to promptly notify CDC. In such instances CDC works in close cooperation with physicians, state and local health authorities, and FDA or USDA representatives to provide diagnostic and therapeutic consultation and to rapidly identify responsible foods and remove them from further public consumption.



FIGURE 1

FOODBORNE DISEASE SURVEILLANCE SYSTEM, UNITED STATES



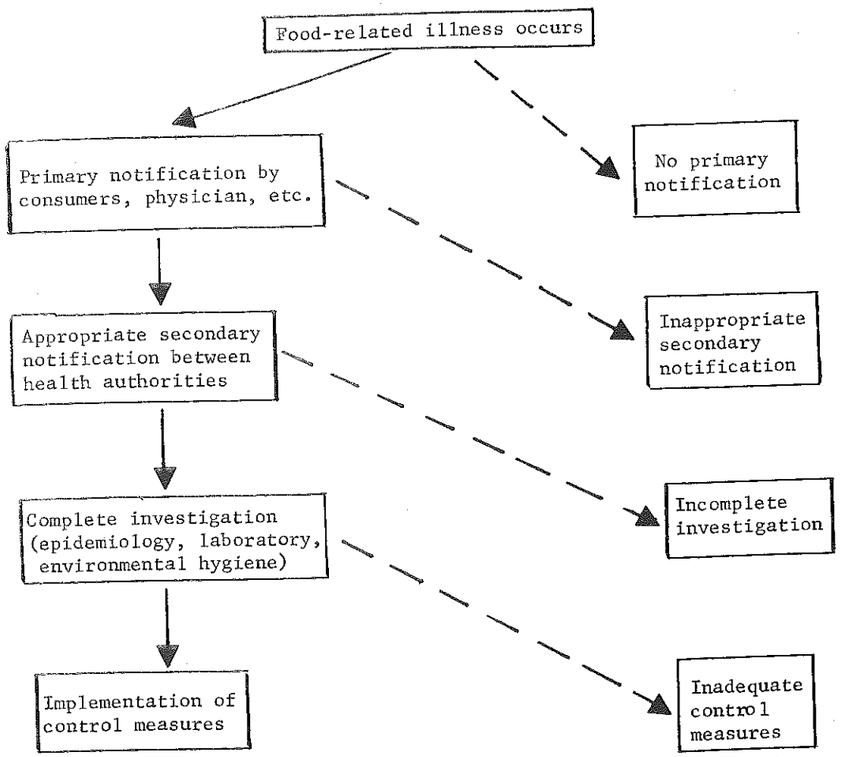
Occasionally outbreaks are reported to CDC through communications to the MMWR or by reports from the U.S. Armed Forces, pharmaceutical companies (notably botulism), and university medical centers. Reports to other CDC surveillance systems, including those for hepatitis, brucellosis, and trichinosis also provide information about foodborne outbreaks.

C. Interpretation of Data

As in the past, the variation in quality of foodborne disease investigation and reporting among state and local health departments places limitations on the data presented in this report. The success of outbreak investigations is dependent on a series of operational steps depicted in Figure 2. A number of factors, including consumer awareness, physician interest, and health department budgetary constraints and investigative capabilities vary considerably.

Figure 2

Contingencies of Successful Foodborne Disease Surveillance



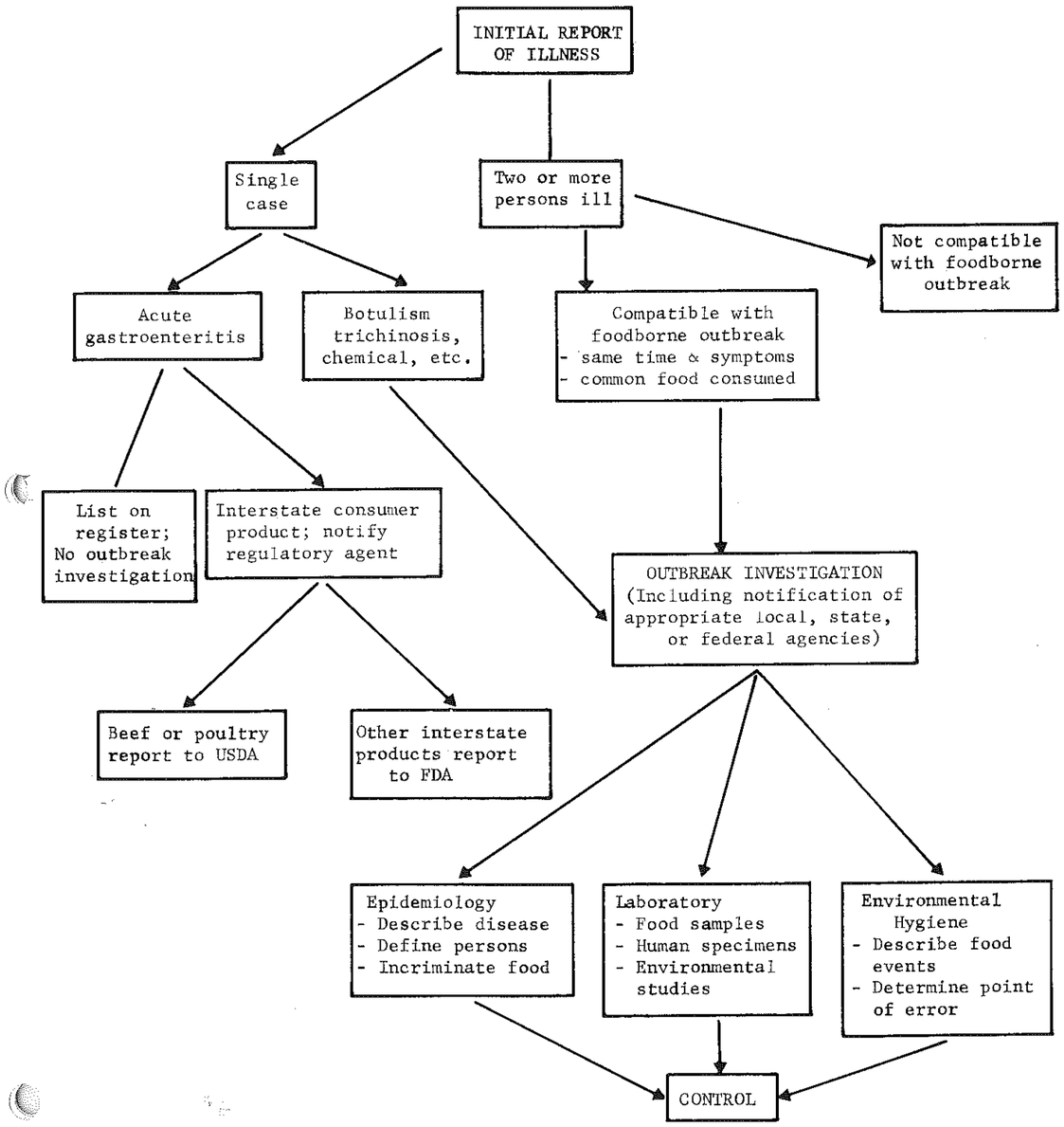

These data, based upon a variety of reporting systems, must be used carefully as they present only a selected part of a public health problem, the true dimension of which is unknown.

A recommended set of guidelines for use in the investigation of foodborne disease is provided in Figure 3. A comprehensive and uniform approach for the handling of such illness and for the collection and laboratory analysis of human and food specimens is imperative for good foodborne disease surveillance.



FIGURE 3

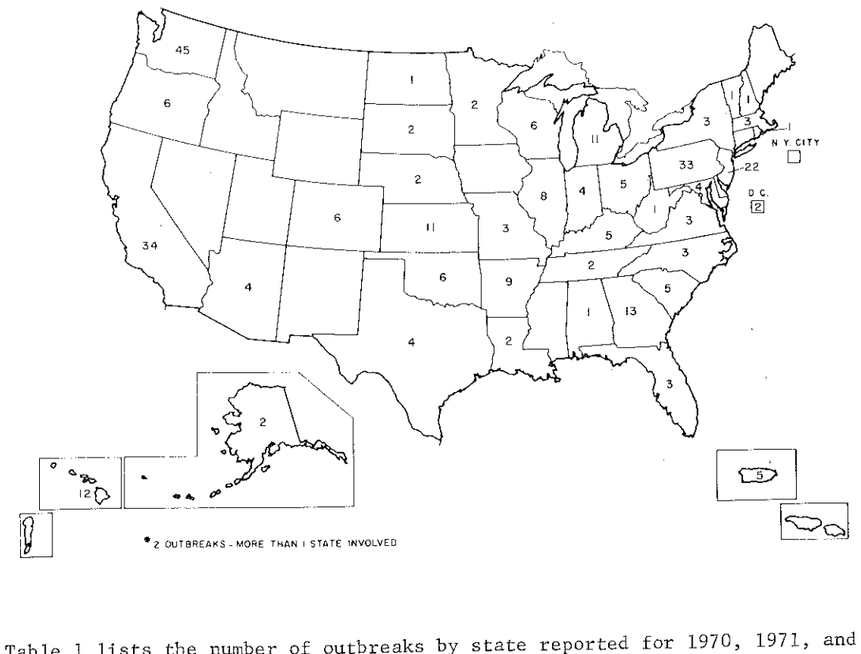
A SCHEME FOR THE HANDLING OF FOODBORNE DISEASE COMPLAINTS BY STATE AND LOCAL HEALTH DEPARTMENTS



D. The Data

Figure 4 shows the geographic distribution of the 301 foodborne outbreaks reported by states in 1972; 12 states did not report any outbreaks. Of the 301 outbreaks, 286 (95%) emanated from state, local, or territorial health departments, 9 (3%) were reported by the FDA, USDA, or U.S. Armed Forces, and 6 (2%) were reported through the MMWR.

*Fig. 4* FOODBORNE OUTBREAKS, 1972*




*2 OUTBREAKS - MORE THAN 1 STATE INVOLVED

Table 1 lists the number of outbreaks by state reported for 1970, 1971, and 1972. The 4 health departments contributing the most reports for 1972 were Washington State (15%), California (11%), Pennsylvania (11%), and New Jersey (7%). Compared with 1971, a substantial increase in reported outbreaks was apparent in 1972 in Arkansas, Kansas, New Jersey, and Pennsylvania, while decreases occurred in New York City, South Carolina, and Washington State.

There were 14,559 cases of foodborne illness reported in the 301 outbreaks; laboratory confirmation was obtained for 136 (45%) of these outbreaks and in 5,992 cases (42%). Table 2 records the number and percent of the confirmed outbreaks and cases by etiology. Bacterial pathogens accounted for 70% of confirmed outbreaks and 96% of cases.

Despite the implementation of strict criteria for laboratory confirmation in 1972, 45% of outbreaks were confirmed in 1972, compared with 29% in 1971. In Table 3 the 1971 and 1972 data for confirmed outbreaks and cases are compared. The overall frequency of confirmed outbreaks of bacterial etiology was higher in 1972 than 1971; the number of cases with bacterial etiology remained essentially the same. In both years, salmonella and Staphylococcus aureus were responsible for over 50% of confirmed outbreaks. There was a notable increase in outbreaks related to consumption of chemical substances, from 14% in 1971 to 21% in 1972. Reported outbreaks attributed to C. perfringens, salmonella, and staphylococcus involved more cases in 1972



than in 1971 while there was a corresponding decrease in cases of foodborne shigellosis. More cases in 1972 were confirmed compared with 1971. In all reported outbreaks there were 14,559 cases reported in 1972 compared with 13,453 cases in 1971.

Table 1

Outbreaks of Foodborne Illness by Location, 1970--1972*

| State | 1970 | 1971 | 1972 | State | 1970 | 1971 | 1972 |
|---|---|---|---|---|---|---|---|
| Alabama | 0 | 2 | 1 | Missouri | 3 | 2 | 3 |
| Alaska | 2 | 5 | 2 | Montana | 1 | 2 | 0 |
| Arizona | 2 | 1 | 4 | Nebraska | 2 | 3 | 2 |
| Arkansas | 2 | 3 | 9 | Nevada | 1 | 1 | 0 |
| California | 26 | 31 | 34 | New Hampshire | 1 | 2 | 1 |
| Colorado | 1 | 1 | 6 | New Jersey | 8 | 14 | 22 |
| Connecticut | 3 | 2 | 0 | New Mexico | 5 | 9 | 0 |
| Delaware | 1 | 2 | 0 | New York City | 43 | 16 | 0 |
| District of Columbia | 0 | 1 | 2 | New York State | 6 | 9 | 3 |
| Florida | 8 | 5 | 3 | North Carolina | 5 | 2 | 3 |
| Georgia | 12 | 11 | 13 | North Dakota | 1 | 1 | 1 |
| Hawaii | 3 | 10 | 12 | Ohio | 2 | 8 | 5 |
| Idaho | 4 | 3 | 0 | Oklahoma | 2 | 6 | 6 |
| Illinois | 7 | 5 | 8 | Oregon | 3 | 0 | 6 |
| Indiana | 3 | 1 | 4 | Pennsylvania | 13 | 14 | 33 |
| Iowa | 1 | 4 | 0 | Puerto Rico | 3 | 4 | 5 |
| Kansas | 2 | 4 | 11 | Rhode Island | 1 | 1 | 1 |
| Kentucky | 2 | 3 | 5 | South Carolina | 4 | 15 | 5 |
| Louisiana | 7 | 3 | 2 | South Dakota | 0 | 1 | 2 |
| Maine | 0 | 1 | 0 | Tennessee | 8 | 3 | 2 |
| Maryland | 4 | 6 | 4 | Texas | 1 | 3 | 4 |
| Massachusetts | 3 | 2 | 3 | Utah | 3 | 4 | 0 |
| Michigan | 3 | 14 | 11 | Vermont | 0 | 1 | 1 |
| Minnesota | 11 | 6 | 2 | Virginia | 6 | 2 | 3 |
| Mississippi | 0 | 1 | 0 | Washington | 68 | 57 | 45 |
| Other | | | | West Virginia | 2 | 0 | 1 |
| Virgin Islands | 1 | 0 | 0 | Wisconsin | 4 | 8 | 6 |
| Guam and Trust | | | | Wyoming | 0 | 0 | 0 |
| Territories | 1 | 2 | 1 | Others | 0 | 3 | 2 |
| Canal Zone | 0 | 0 | 2 | | | | |

1970 total 305
1971 total 320
1972 total 301

* Annual Summaries, 1970 - 1972
**Others include 2 unknown and 3 multiple state outbreaks

Table 2a

Confirmed Foodborne Outbreaks by Bacterial Etiology, 1972

| | Outbreaks | | Cases | |
|---|---|---|---|---|
| | # | % | # | % |
| C. botulinum | 4 | 2.9 | 24 | 0.4 |
| C. perfringens | 9 | 6.6 | 973 | 16.2 |
| Salmonella | 36 | 26.5 | 1880 | 31.4 |
| Shigella | 3 | 2.2 | 86 | 1.4 |
| Staphylococcus | 34 | 25.0 | 1948 | 32.5 |
| Group A streptococcus | 1 | 0.7 | 35 | 0.6 |
| Group D streptococcus | 1 | 0.7 | 50 | 0.8 |
| V. parahaemolyticus | 6 | 4.4 | 701 | 11.7 |
| Alkalescens dispar | 1 | 0.7 | 39 | 0.7 |
| Subtotal | 95 | 69.7 | 5736 | 95.7 |

Table 2b

Confirmed Foodborne Outbreaks by Nonbacterial Etiology, 1972

| | Outbreaks | | Cases | |
|---|---|---|---|---|
| | # | % | # | % |
| PARASITIC | | | | |
| Trichinella spiralis | 8 | 5.9 | 20 | 0.3 |
| VIRAL | | | | |
| Infectious hepatitis | 5 | 3.7 | 90 | 1.5 |
| CHEMICAL | | | | |
| Chinese restaurant syndrome (MSG) | 1 | 0.7 | 3 | 0.1 |
| Mushroom poisoning | 9 | 6.6 | 21 | 0.4 |
| Fish toxin | 9 | 6.6 | 82 | 1.4 |
| Heavy metal | 3 | 2.2 | 8 | 0.1 |
| Other chemical | 6 | 4.4 | 32 | 0.5 |
| Total | 136 | 99.8 | 5992 | 100.0 |



Table 3a

Confirmed Foodborne Outbreaks and Cases by Bacterial Etiology, 1971-1972

| | 1971 | | | | 1972 | | | |
|---|---|---|---|---|---|---|---|---|
| | Outbreaks | | Cases | | Outbreaks | | Cases | |
| | # | % | # | % | # | % | # | % |
| B. cereus | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 |
| C. botulinum | 6 | 6.4 | 15 | 0.4 | 4 | 2.9 | 24 | 0.4 |
| C. perfringens | 3 | 3.2 | 106 | 2.7 | 9 | 6.6 | 973 | 16.2 |
| E. coli | 1 | 1.1 | 387 | 9.7 | 0 | 0.0 | 0 | 0.0 |
| Salmonella | 28 | 29.8 | 729 | 18.3 | 36 | 26.5 | 1,880 | 31.4 |
| Shigella | 6 | 6.4 | 806 | 20.3 | 3 | 2.2 | 86 | 1.4 |
| Staphylococcus | 26 | 27.7 | 930 | 23.4 | 34 | 25.0 | 1,948 | 32.5 |
| Group A streptococcus | 1 | 1.1 | 498 | 12.5 | 1 | 0.7 | 35 | 0.6 |
| Group D streptococcus | 0 | 0.0 | 0 | 0.0 | 1 | 0.7 | 50 | 0.8 |
| V. parahaemolyticus | 3 | 3.2 | 370 | 9.3 | 6 | 4.4 | 701 | 11.7 |
| Alkalescens dispar | 0 | 0.0 | 0 | 0.0 | 1 | 0.7 | 39 | 0.7 |
| Subtotal | 74 | 78.7 | 3,841 | 96.6 | 95 | 69.9 | 5,736 | 95.7 |

Table 3b

Confirmed Foodborne Outbreaks and Cases by Nonbacterial Etiology, 1971-1972

| | 1971 | | | | 1972 | | | |
|---|---|---|---|---|---|---|---|---|
| | Outbreaks | | Cases | | Outbreaks | | Cases | |
| | # | % | # | % | # | % | # | % |
| PARASITIC | | | | | | | | |
| Trichinella spiralis | 4 | 4.3 | 18 | 0.5 | 8 | 5.9 | 20 | 0.3 |
| VIRAL | | | | | | | | |
| Infectious hepatitis | 3 | 3.2 | 10 | 0.3 | 5 | 3.7 | 90 | 1.5 |
| CHEMICAL | | | | | | | | |
| Chinese restaurant syndrome (MSG) | 0 | 0.0 | 0 | 0.0 | 1 | 0.7 | 3 | 0.1 |
| Mushroom poisoning | 0 | 0.0 | 0 | 0.0 | 9 | 6.6 | 21 | 0.4 |
| Fish toxin | 2 | 2.1 | 7 | 0.2 | 9 | 6.6 | 82 | 1.4 |
| Heavy metal | 4 | 4.3 | 19 | 0.5 | 3 | 2.2 | 8 | 0.1 |
| Other chemical | 7 | 7.4 | 83 | 2.1 | 6 | 4.4 | 32 | 0.5 |
| Total | 94 | 100.0 | 3,978 | 100.2 | 136 | 100.0 | 5,992 | 100.0 |

Fourteen deaths were reported in outbreaks in 1972: C. botulinum was responsible for 4, C. perfringens 1, salmonella 4, T. spiralis 1, and mushroom poisoning 4.

Table 4 lists the outbreaks of undetermined etiology by mean incubation periods. If an assumption is made that outbreaks with incubation period of 1 to 7 hours are primarily staphylococcal and those 8 to 14 hours are due mostly to C. perfringens, then both these etiologies were responsible for substantially more outbreaks than is suggested by the data in Table 2. That few outbreaks of C. perfringens are confirmed is related in part to the problems involved in the handling and culturing of specimens anaerobically.

Table 4

Outbreaks of Unknown Etiology, by Incubation Period

| Incubation period | Number of outbreaks |
|---|---|
| <1 hr | 0 |
| 1-7 hr | 80 |
| 8-14 hr | 45 |
| >15 hr | 25 |
| unknown | 15 |
| Total | 165 |

Table 5 lists vehicles of transmission by specific etiology. The most commonly incriminated vehicles were pork and pork products (15%), beef (14%), fish, including seafood (10%), and poultry (10%). In 54 outbreaks (18%) the vehicle was unknown. Staphylococcal intoxication was most often associated with pork and pork products; salmonella outbreaks were caused by a variety of food vehicles.

Table 6 lists the place where the outbreaks occurred. Approximately two-thirds of the outbreaks occurred in restaurants (34%) or in homes (30%). Ten percent of outbreaks took place in schools; all of these outbreaks where the etiology was known were attributed to a bacterial pathogen. Outbreaks in restaurants accounted for 38% of all cases of foodborne disease, while outbreaks in homes accounted for 7% and in schools 25%.

In Table 7 the place is described where the food which accounted for the outbreak was improperly handled. The heading "Food Processing Establishment" refers to the location where a food is prepared for market. The heading "Food Service Establishment" refers to a location where food is prepared for public consumption, i.e., restaurants, cafeterias, caterers, institutions. In 1972 food service establishments were responsible for the mishandling of food in 44% of all outbreaks and in 66% of outbreaks in which the place of mishandling was reported. The homemaker was responsible for 30% of outbreaks in which the place of mishandling was reported while industry was responsible for only 4%. In 33% of outbreaks the place of improper handling was not determined. A majority of the staphylococcal and V. parahaemolyticus outbreaks and all the C. perfringens outbreaks were attributed to mishandling in food service establishments.

Table 8 lists the factors contributing to foodborne outbreaks by etiology. Although this information was provided for only 62% of the outbreaks, it is evident from the available data that improper storage or holding temperature was the major factor responsible for outbreaks of C. perfringens, salmonella, and staphylococcal illness. Inadequate cooking was important in V. parahaemolyticus and salmonella outbreaks, while contaminated equipment and poor personal hygiene of food handlers were contributing factors in salmonella and staphylococcal outbreaks.

Table 9 lists the monthly incidence of outbreaks by etiology. Outbreaks were assigned to a month according to date of onset of the first case. Outbreaks were distributed equally throughout the year except for a slight decline in January. Salmonella and staphylococcal outbreaks were most common between April and September.



Table 5

Foodborne Illness Outbreaks by Vehicle of Infection and Specific Etiology, 1972

| | Beef** | Pork* | Poultry | Shellfish | Other fish | Eggs | Milk | Other dairy | Bakery products | Fruits & vegetables | Mexican food | Chinese food | Multiple vehicles | Other | Unknown | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| BACTERIAL | | | | | | | | | | | | | | | | |
| C. botulinum | | | | | | | | | | 3 | | | | | 1 | 4 |
| C. perfringens | 2 | | 4 | | | | | | | | | | | 3 | | 9 |
| Salmonella | 6 | 3 | 3 | 1 | 1 | 1 | | 5 | 2 | | | | 3 | 6 | 5 | 36 |
| Shigella | | | | | | | | | | 1 | | | | | 2 | 3 |
| Staphylococcus | 4 | 15 | 3 | | 1 | 1 | | | 3 | 1 | 1 | | 2 | 2 | 1 | 34 |
| Group A streptococcus | | | | | 1 | | | | | | | | | | | 1 |
| Group D streptococcus | | 1 | | | | | | | | | | | | | | 1 |
| V. parahaemolyticus | | | | 6 | | | | | | | | | | | | 6 |
| Alkalescens dispar | | | | | | | | | | | | | | 1 | | 1 |
| PARASITIC | | | | | | | | | | | | | | | | |
| Trichinella spiralis | | 8 | | | | | | | | | | | | | | 8 |
| VIRAL | | | | | | | | | | | | | | | | |
| Infectious hepatitis | | | | | | | | | | | | | | 2 | 3 | 5 |
| CHEMICAL | | | | | | | | | | | | | | | | |
| Chinese restaurant syndrome (MSG) | | | | | | | | | | | | | 1 | | | 1 |
| Mushroom poisoning | | | | | | | | | | 9 | | | | | | 9 |
| Fish toxin | | | | 2 | 7 | | | | | | | | | | | 9 |
| Heavy metal | | | | | | | 1 | | | | | | | 2 | | 3 |
| Other chemicals | | 1 | | | | | | | 1 | 3 | | | | 1 | | 6 |
| Unknown | 29 | 17 | 19 | 5 | 7 | 2 | | 1 | 5 | 5 | 12 | 4 | 5 | 12 | 42 | 165 |
| Total | 41 | 45 | 29 | 14 | 17 | 4 | 1 | 6 | 11 | 22 | 13 | 5 | 10 | 29 | 54 | 301 |

* Includes frankfurters, salami, ham
**Includes liver

Table 6

Foodborne Disease Outbreaks by Place of Acquisition and Specific Etiology, 1972

| | Restaurant | Home | Picnic | School | Church | Camp | Other * | Total |
|---|---|---|---|---|---|---|---|---|
| BACTERIAL | | | | | | | | |
| C. botulinum | 1 | 3 | | | | | | 4 |
| C. perfringens | 1 | 1 | | 6 | | | 1 | 9 |
| Salmonella | 9 | 9 | 3 | 5 | 1 | 1 | 8 | 36 |
| Shigella | 1 | | | 1 | | 1 | | 3 |
| Staphylococcus | 13 | 10 | 2 | 2 | | | 7 | 34 |
| Group A streptococcus | | | | 1 | | | | 1 |
| Group D streptococcus | | | | | | | 1 | 1 |
| V. parahaemolyticus | | 3 | 3 | | | | | 6 |
| Alkalescens dispar | 1 | | | | | | | 1 |
| PARASITIC | | | | | | | | |
| Trichinella spiralis | | 8 | | | | | | 8 |
| VIRAL | | | | | | | | |
| Infectious hepatitis | 2 | 1 | | | 1 | | 1 | 5 |
| CHEMICAL | | | | | | | | |
| Chinese restaurant syndrome (MSG) | 1 | | | | | | | 1 |
| Mushroom poisoning | | 8 | | | | | 1 | 9 |
| Fish toxin | 4 | 4 | | | | | 1 | 9 |
| Heavy metal | 2 | 1 | | | | | | 3 |
| Other chemicals | 2 | 3 | | | | | 1 | 6 |
| Unknown | 65 | 39 | 5 | 6 | 3 | 3 | 34 | 165 |
| Total 1972 | 102 | 91 | 13 | 31 | 5 | 5 | 55 | 301 |
| Total 1971 | 96 | 123 | 12 | 22 | 10 | 1 | 56 | 320 |

*Includes 19 unknown



Table 7

Foodborne Disease Outbreaks by Place Where Food Was Mishandled and Specific Etiology, 1972

| | Food processing establishments | Food service establishments | Homes | Unknown-Unspecified | Total |
|---|---|---|---|---|---|
| BACTERIAL | | | | | |
| C. botulinum | 1 | | 3 | | 4 |
| C. perfringens | | 6 | | 3 | 9 |
| Salmonella | 2 | 16 | 9 | 9 | 36 |
| Shigella | | 1 | | 2 | 3 |
| Staphylococcus | | 23 | 6 | 5 | 34 |
| Group A streptococcus | | | | 1 | 1 |
| Group D streptococcus | 1 | | | | 1 |
| V. parahaemolyticus | | 5 | 1 | | 6 |
| Alkalescens dispar | | 1 | | | 1 |
| PARASITIC | | | | | |
| Trichinella spiralis | | | 8 | | 8 |
| VIRAL | | | | | |
| Infectious hepatitis | | 2 | 2 | 1 | 5 |
| CHEMICAL | | | | | |
| Chinese restaurant syndrome (MSG) | | 1 | | | 1 |
| Mushroom poisoning | | | 8 | 1 | 9 |
| Fish toxin | 3 | 2 | | 4 | 9 |
| Heavy metal | | 2 | 1 | | 3 |
| Other chemicals | 2 | 3 | | 1 | 6 |
| Unknown | | 70 | 22 | 73 | 165 |
| Total 1972 | 9 | 132 | 60 | 100 | 301 |
| Total 1971 | 27 | 114 | 56 | 123 | 320 |

Table 8

Foodborne Disease Outbreaks by Contributing Factors and Etiology*

| Etiology | Number of reported outbreaks | Number of outbreaks in which factors reported | Improper holding temperature | Inadequate cooking | Contaminated equipment | Poor personal hygiene | Other |
|---|---|---|---|---|---|---|---|
| C. botulinum | 4 | 2 | | 2 | | | |
| C. perfringens | 9 | 6 | 6 | 1 | 1 | | |
| Salmonella | 36 | 23 | 15 | 7 | 8 | 11 | 4 |
| Shigella | 3 | 2 | | | | 1 | 1 |
| Staphylococcus | 34 | 29 | 26 | | 8 | 13 | 1 |
| Group A streptococcus | 1 | 0 | | | | | |
| Group D streptococcus | 1 | 0 | | | | | |
| V. parahaemolyticus | 6 | 6 | 2 | 4 | 2 | | |
| Alkalescens dispar | 1 | 1 | | | | 1 | 1 |
| PARASITIC | | | | | | | |
| Trichinella spiralis | 8 | 8 | | 8 | | | |
| VIRAL | | | | | | | |
| Infectious hepatitis | 5 | 4 | | | | 4 | |
| CHEMICAL | | | | | | | |
| Chinese restaurant syndrome (MSG) | 1 | 0 | | | | | 1 |
| Mushroom poisoning | 9 | 9 | | | | | 9 |
| Fish toxin | 9 | 5 | 2 | | | | 3 |
| Heavy metals | 3 | 3 | | | | | 3 |
| Other chemicals | 6 | 5 | | 2 | | | 3 |
| Unknown | 165 | 83 | 66 | 12 | 19 | 22 | 9 |
| Total | 301 | 186 | 117 | 36 | 38 | 52 | 35 |

* For many outbreaks more than 1 factor was responsible.



Table 9

Foodborne Disease Outbreaks by Month of Occurrence and Specific Etiology, 1972

| | 1972 | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Unk. | Total |
| BACTERIA. | | | | | | | | | | | | | | |
| C. botulinum | | | | 1 | | | 1 | | | | 1 | 1 | | 4 |
| C. perfringens | | 3 | 2 | | 1 | | | 1 | | 1 | 1 | | | 9 |
| Salmonella | 1 | 1 | 1 | 5 | 3 | 1 | 4 | 9 | 4 | 4 | 3 | | | 36 |
| Shigella | | | 1 | 1 | | 1 | | | | | | | | 3 |
| Staphylococcus | | 3 | 2 | 3 | 6 | 2 | 3 | 6 | 6 | 1 | | 2 | | 34 |
| Group A streptococcus | | | | 1 | | | | | | | | | | 1 |
| Group D streptococcus | | | | | | | | | | | | 1 | | 1 |
| V. parahaemolyticus | | | | | | 1 | 1 | 1 | | 3 | | | | 6 |
| Alkalescens dispar | | | | | | | | 1 | | | | | | 1 |
| PARASITIC | | | | | | | | | | | | | | |
| Trichinella spiralis | | 1 | 3 | 1 | 1 | 1 | | | | 1 | | | | 8 |
| VIRAL | | | | | | | | | | | | | | |
| Infectious hepatitis | | 1 | | | | 1 | | 2 | | | | 1 | | 5 |
| CHEMICAL | | | | | | | | | | | | | | |
| Chinese restaurant syndrome (MSG) | | | | | | | | 1 | | | | | | 1 |
| Mushroom poisoning | 1 | | | | 1 | | | | 1 | 1 | 4 | 1 | | 9 |
| Fish toxin | | | | | 1 | | 2 | | 3 | 1 | 2 | | | 9 |
| Heavy metal | | | 1 | | | | | 1 | | | | 1 | | 3 |
| Other chemicals | | 1 | | | 2 | | 1 | 1 | | 1 | | | | 6 |
| Unknown | 8 | 8 | 18 | 21 | 19 | 10 | 11 | 10 | 15 | 13 | 18 | 13 | 1 | 165 |
| Total 1972 | 10 | 18 | 28 | 33 | 34 | 17 | 23 | 33 | 29 | 26 | 29 | 20 | 1 | 301 |
| Total 1971 | 23 | 21 | 27 | 21 | 32 | 31 | 40 | 35 | 15 | 18 | 24 | 19 | 14 | 320 |

FORM APPROVED
OMB NO. 68-R0557

## 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 |
| | | | | | | | | |
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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
12-73

(Over)



### 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 |
| | | | | |
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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 |
| | | |
| | | |
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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, BE
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)
12-73

F. Foodborne Disease Outbreaks, 1972

| Etiology | Onset | Reported From | Vehicle |
|---|---|---|---|
| BACTERIAL | | | |
| CLOSTRIDIUM BOTULINUM | | | |
| C. botulinum, type A | 7-28 | California | unknown |
| C. botulinum, type A | 11-? | Colorado | peppers |
| C. botulinum, type unknown | 4-27 | Ohio | peppers |
| C. botulinum, type unknown | 12-29 | Oklahoma | vegetables |
| CLOSTRIDIUM PERFRINGENS | | | |
| C. perfringens | 3-8 | California | turkey |
| C. perfringens, PS 78 | 5-11 | Colorado | meat sauce |
| C. perfringens, PS 1 | 2-1 | Georgia | chicken |
| C. perfringens | 2-17 | Georgia | gravy |
| C. perfringens | 2-20 | Illinois | beef |
| C. perfringens | 8-? | Maryland | roast beef |
| C. perfringens | 10-4 | Maryland | chicken casserole |
| C. perfringens, PS 87 | 11-16 | Minnesota | turkey |
| C. perfringens | 3-21 | Washington | meat sauce |
| SALMONELLA | | | |
| S. san-diego | 10-27 | Alaska | turkey |
| S. agona | 4-? | Arkansas | cole slaw |
| S. montevideo | 7-6 | Arkansas | ice cream |
| Salmonella paratyphi B | 2-25 | California | unknown |
| S. enteritidis | 4-25 | California | ham |
| S. typhimurium | 8-15 | California | chicken |
| S. typhimurium | 1-27 | Georgia | unknown |
| S. infantis | 5-12 | Georgia | shrimp salad |



| Etiology | Onset | Reported from | Vehicle |
|---|---|---|---|
| S. oranienburg | 4-? | Hawaii | beef |
| S. newport | 9-2 | Hawaii | multiple vehicles |
| S. derby | 10-22 | Hawaii | roast beef |
| S. infantis | 8-10 | Illinois | bread dressing |
| S. enteritidis | 9-2 | Illinois | unknown |
| S. newport | 3-26 | Kansas | boiled salmon |
| S. infantis | 8-18 | Kansas | ice cream |
| S. infantis | 9-13 | Kansas | chicken |
| S. chester | 7-24 | Kentucky | unknown |
| S. anatum | 11-14 | Louisiana | pork |
| S. java | 4-13 | New Jersey | unknown |
| S. typhimurium | 5-5 | New Jersey | coke |
| S. chester | 9-5 | New Jersey | roast beef |
| S. anatum | 10-11 | New Jersey | head cheese |
| S. kottbus | 6-14 | New York | potato salad |
| S. newport | 8-14 | North Carolina | deviled eggs |
| S. blockley | 10-22 | Oklahoma | gravy |
| S. enteritidis | 7-22 | Pennsylvania | multiple vehicles |
| S. braenderup | 8-10 | Pennsylvania | ice cream |
| S. thompson | 8-26 | Pennsylvania | coconut cream pie |
| S. minnesota | 8-? | Texas | beverage |
| S. newport and S. derby | 11-4 | Texas | multiple vehicles |
| S. typhimurium | 7-9 | Virginia | ice cream |
| S. typhimurium | 11-8 | Washington | custard |
| Salmonella group B | 5-? | West Virginia | fat back |
| S. typhimurium | 8-? | Wisconsin | raw beef |
| S. typhimurium | 8-? | Wisconsin | raw beef |
| S. typhimurium | 4-? | Michigan, Minnesota, Wisconsin | raw beef |

| Etiology | Onset | Reported from | Vehicle |
|---|---|---|---|
| SHIGELLA | | | |
| S. sonnei | 6-26 | California | unknown |
| S. sonnei | 4-18 | Kansas | strawberries |
| S. sonnei | 3-26 | Washington | unknown |
| STAPHYLOCOCCUS | | | |
| S. aureus 86+* type A** | 8-16 | Arkansas | pie |
| S. aureus 29/52a/79/54/75/ 86+ type A | 9-8 | Arkansas | pie |
| S. aureus | 12-20 | Arkansas | ham |
| S. aureus | 4-4 | California | ham |
| S. aureus | 5-22 | California | ham |
| S. aureus | 4-2 | Florida | cake |
| S. aureus type A | 4-19 | Georgia | ham |
| S. aureus | 5-5 | Georgia | eggs |
| S. aureus type A | 7-19 | Georgia | Mexican food |
| S. aureus 29/52/80 | 2-? | Hawaii | lau lau (pork) |
| S. aureus 53/85A/85 | 3-8 | Hawaii | ham |
| S. aureus 83A/85/55 | 9-3 | Hawaii | chicken |
| S. aureus 6/47/53/54/77/83A/ 84/85 | 9-29 | Hawaii | unknown |
| S. aureus | 6-26 | Illinois | lima beans |
| S. aureus | 8-29 | Indiana | ham |
| S. aureus | 9-21 | Indiana | multiple vehicles |
| S. aureus type A 53/75/85 | 5-30 | Kentucky | ham |
| S. aureus | 8-18 | Minnesota | multiple vehicles |
| S. aureus 6/47/54/D11 | 7-12 | Missouri | ham |
| S. aureus | 2-10 | New Jersey | turkey |
| S. aureus | 3-31 | New Jersey | Kielbasa |
| S. aureus | 8-6 | New Jersey | roast beef |
| S. aureus | 10-5 | New Jersey | roast beef |
| S. aureus | 8-19 | North Dakota | turkey salad |

* Phage type
** Enterotoxin type



| Etiology | Onset | Reported from | Vehicle |
|---|---|---|---|
| S. aureus 83A/85/86/D11 | 8-27 | Oregon | ham |
| S. aureus | 9-27 | Oregon | ham |
| S. aureus | 9-9 | Pennsylvania | chopped liver |
| S. aureus | 5-29 | South Carolina | ham |
| S. aureus | 5-22 | Wisconsin | ham |
| S. aureus type B | 5-24 | Wisconsin | potato salad |
| S. aureus type B | 7-9 | Wisconsin | beef |
| S. aureus phage non typable | 2-8 | Guam | fish |
| S. aureus | 6-14 | Puerto Rico | ham |
| S. aureus | 12-15 | Puerto Rico | polpo |
| STREPTOCOCCUS | | | |
| Group A streptococcus | 4-16 | Indiana | cod fish |
| Group D streptococcus | 12-5 | Texas | frankfurters |
| VIBRIO PARAHAEMOLYTICUS | | | |
| V. parahaemolyticus | 6-24 | Hawaii | crab |
| V. parahaemolyticus | 8-26 | Louisiana | shrimp |
| V. parahaemolyticus | 7-5 | Maryland | crabs |
| V. parahaemolyticus | 10-4 | Massachusetts | lobster salad |
| V. parahaemolyticus | 10-10 | Massachusetts | lobster salad |
| V. parahaemolyticus | 10-7 | New Jersey | shrimp |
| ALKALESCENS DISPAR | | | |
| Alkalescens dispar | 8-12 | California | salad dressing |
| PARASITIC | | | |
| TRICHINELLA SPIRALIS | | | |
| T. spiralis | 3-2 | Illinois | pork |
| T. spiralis | 3-12 | Illinois | pork |
| T. spiralis | 4-? | Illinois | pork |

| Etiology | Onset | Reported from | Vehicle |
|---|---|---|---|
| T. spiralis | 5-11 | Missouri | pork |
| T. spiralis | 2-14 | New Jersey | pork |
| T. spiralis | 3-1 | New Jersey | pork |
| T. spiralis | 6-? | New Jersey | pork |
| T. spiralis | 10-30 | New Jersey | pork |
| VIRAL | | | |
| Infectious hepatitis | 8-15 | Colorado | unknown |
| Infectious hepatitis | 8-26 | Georgia | cole slaw |
| Infectious hepatitis | 2-? | Hawaii | unknown |
| Infectious hepatitis | 6-11 | North Carolina | unknown |
| Infectious hepatitis | 12-? | Ohio | salad |
| CHEMICAL | | | |
| Monosodium glutamate | 8-14 | Washington | Chinese food |
| Mushroom poisoning | 1-? | California | Amanita phalloides |
| Mushroom poisoning | 5-10 | California | mushrooms |
| Mushroom poisoning | 10-22 | California | mushrooms |
| Mushroom poisoning | 11-6 | California | Amanita phalloides |
| Mushroom poisoning | 11-6 | California | Amanita phalloides |
| Mushroom poisoning | 11-13 | California | Amanita pantherina |
| Mushroom poisoning | 11-22 | California | Amanita phalloides |
| Mushroom poisoning | 12-4 | California | Amanita species |
| Mushroom poisoning | 9-29 | Ohio | Amanita virosa |
| Ciguatera fish toxin | 7-6 | Alabama | barracuda |
| Scombroid fish toxin | 5-16 | California | pork fish |
| Scombroid fish toxin | 9-3 | California | albacore |
| Scombroid-like fish toxin | 11-24 | Hawaii | dolphin |
| Scombroid fish toxin | 9-? | Maryland | saltwater fish |



| Etiology | Onset | Reported from | Vehicle |
|---|---|---|---|
| Scombroid fish toxin | 7-22 | Vermont | tuna fish |
| Scombroid-like fish toxin | 10-13 | Washington | mahi mahi |
| Paralytic shellfish poison | 11-21 | Washington | clams |
| Paralytic shellfish poison | 9-? | Maine, New Hampshire, Massachusetts | shellfish |
| copper | 3-7 | New Jersey | Coca Cola |
| iron | 12-17 | New York | milk formula |
| copper | 8-7 | Washington | slurpy cola |
| sodium hydroxide | 5-4 | California | pretzels |
| hydrocyanic acid | 7-20 | California | apricot kernals |
| nitrite | 10-? | California | pigs feet |
| polk weed | 5-12 | Oklahoma | polk salad |
| LSD-like drug | 8-3 | Washington | mushroom |
| wax | 2-14 | California | beverage |
| UNKNOWN | 8-14 | Alaska | unknown |
| | 4-8 | Arizona | unknown |
| | 5-28 | Arizona | unknown |
| | 5-31 | Arizona | unknown |
| | 10-10 | Arizona | beef stew |
| | 2-22 | Arkansas | tuna fish |
| | 4-1 | Arkansas | unknown |
| | 9-17 | Arkansas | turkey |
| | 12-? | Arkansas | Treet |
| | 3-20 | California | unknown |
| | 3-31 | California | ham |
| | 4-16 | California | unknown |
| | 5-? | California | Mexican food |
| | 7-? | California | Mexican food |

| Etiology | Onset | Reported from | Vehicle |
|---|---|---|---|
| | 9-16 | California | unknown |
| | 9-23 | California | Mexican food |
| | 11-4 | California | ham |
| | 12-8 | California | beef |
| | 12-9 | California | potato salad |
| | 12-29 | California | Mexican food |
| | 3-7 | Colorado | Mexican food |
| | 5-3 | Colorado | roast beef |
| | 10-31 | Colorado | tuna salad |
| | 5-5 | Washington, D.C. | roast beef |
| | 5-? | Washington, D.C. | ravini |
| | 8-? | Florida | crab |
| | 12-15 | Florida | ham |
| | 2-28 | Georgia | unknown |
| | 5-28 | Georgia | unknown |
| | 12-12 | Georgia | unknown |
| | 12-18 | Georgia | roast beef |
| | 12-20 | Georgia | unknown |
| | 10-25 | Hawaii | unknown |
| | 10-31 | Hawaii | Ohagi (rice) |
| | 3-5 | Illinois | cold cuts |
| | 6-28 | Indiana | spaghetti/meat sauce |
| | 3-11 | Kansas | Mexican food |
| | 4-6 | Kansas | unknown |
| | 4-17 | Kansas | corned beef |
| | 7-10 | Kansas | unknown |
| | 9-16 | Kansas | unknown |
| | 11-4 | Kansas | multiple vehicles |



| Etiology | Onset | Reported from | Vehicle |
|---|---|---|---|
| | 11-5 | Kansas | unknown |
| | 3-8 | Kentucky | turkey |
| | 5-8 | Kentucky | unknown |
| | 7-22 | Kentucky | potato salad |
| | 10-28 | Massachusetts | turkey |
| | 3-28 | Michigan | hot dogs |
| | 4-5 | Michigan | egg salad |
| | 4-11 | Michigan | Swiss steak |
| | 5-14 | Michigan | unknown |
| | 6-15 | Michigan | ham |
| | 7-17 | Michigan | filet mignon |
| | 7-26 | Michigan | chicken |
| | 9-27 | Michigan | beef |
| | 11-10 | Michigan | unknown |
| | 11-24 | Michigan | turkey |
| | ? | Michigan | sloppy joes |
| | 11-4 | Missouri | unknown |
| | 1-23 | Nebraska | beef |
| | 9-? | Nebraska | pickles |
| | 1-13 | New Hampshire | roast beef |
| | 1-30 | New Jersey | unknown |
| | 3-5 | New Jersey | roast beef |
| | 3-11 | New Jersey | chicken |
| | 4-6 | New Jersey | stuffed shrimp |
| | 5-13 | New Jersey | shellfish |
| | 9-28 | New Jersey | turkey |
| | 10-29 | New Jersey | chicken |
| | 11-30 | New Jersey | chicken |

| Etiology | Onset | Reported from | Vehicle |
|---|---|---|---|
| | 4-1 | New York | fried rice |
| | 2-27 | North Carolina | Mexican food |
| | 4-2 | Ohio | ham |
| | 5-16 | Ohio | unknown |
| | 3-20 | Oklahoma | Mexican food |
| | 8-18 | Oklahoma | roast beef |
| | 12-15 | Oklahoma | turkey |
| | 9-21 | Oregon | unknown |
| | 11-6 | Oregon | Mexican food |
| | 11-26 | Oregon | unknown |
| | 12-3 | Oregon | fish |
| | 1-17 | Pennsylvania | soup |
| | 1-29 | Pennsylvania | ham |
| | 2-2 | Pennsylvania | pepperoni |
| | 3-7 | Pennsylvania | cream sickles |
| | 3-8 | Pennsylvania | beef |
| | 4-1 | Pennsylvania | fish |
| | 4-2 | Pennsylvania | eggs |
| | 4-3 | Pennsylvania | ham |
| | 4-4 | Pennsylvania | hoagie |
| | 4-15 | Pennsylvania | caesar salad |
| | 4-17 | Pennsylvania | hot dogs |
| | 4-24 | Pennsylvania | chicken |
| | 4-28 | Pennsylvania | cheeseburger |
| | 5-8 | Pennsylvania | mayonnaise |
| | 5-20 | Pennsylvania | multiple vehicles |
| | 5-? | Pennsylvania | chicken |
| | 6-2 | Pennsylvania | chicken |



| Etiology | Onset | Reported from | Vehicle |
|---|---|---|---|
| | 6-18 | Pennsylvania | hamburger |
| | 7-19 | Pennsylvania | turkey salad |
| | 7-27 | Pennsylvania | corn |
| | 8-12 | Pennsylvania | chicken salad |
| | 8-27 | Pennsylvania | waffles |
| | 8-28 | Pennsylvania | hot dogs |
| | 9-30 | Pennsylvania | ham |
| | 10-7 | Pennsylvania | roast beef |
| | 10-22 | Pennsylvania | potato salad |
| | 10-28 | Pennsylvania | potato salad |
| | 11-6 | Pennsylvania | unknown |
| | 11-20 | Pennsylvania | salami |
| | 3-29 | Rhode Island | unknown |
| | 5-13 | South Carolina | unknown |
| | 9-3 | South Carolina | barbecued meat |
| | 9-7 | South Carolina | soup |
| | 9-13 | South Carolina | unknown |
| | 9-13 | South Dakota | pizza |
| | 11-21 | South Dakota | unknown |
| | 1-11 | Tennessee | turkey |
| | 12-3 | Tennessee | spinach |
| | 10-30 | Texas | unknown |
| | 5-19 | Virginia | gravy |
| | 8-29 | Virginia | ham |
| | 1-3 | Washington | hamburger |
| | 1-24 | Washington | multiple vehicles |
| | 2-6 | Washington | Chinese food |
| | 2-9 | Washington | beef stew |
| | 2-13 | Washington | string beans |

| Etiology | Onset | Reported from | Vehicle |
|---|---|---|---|
| | 2-15 | Washington | frankfurters |
| | 3-10 | Washington | steak |
| | 3-17 | Washington | Mexican food |
| | 3-25 | Washington | unknown |
| | 3-28 | Washington | unknown |
| | 4-7 | Washington | Mexican food |
| | 4-22 | Washington | chicken |
| | 5-15 | Washington | unknown |
| | 5-20 | Washington | lobster |
| | 5-23 | Washington | hamburger |
| | 6-1 | Washington | unknown |
| | 6-4 | Washington | unknown |
| | 6-9 | Washington | shrimp |
| | 6-25 | Washington | beef |
| | 7-4 | Washington | unknown |
| | 7-10 | Washington | ham |
| | 7-11 | Washington | Chinese food |
| | 8-4 | Washington | pizza |
| | 8-5 | Washington | steak |
| | 8-11 | Washington | unknown |
| | 9-17 | Washington | meat |
| | 9-20 | Washington | turkey |
| | 10-4 | Washington | beef |
| | 10-12 | Washington | red snapper |
| | 10-21 | Washington | roast beef |
| | 11-1 | Washington | pizza |
| | 11-2 | Washington | beef strauganoff |
| | 11-8 | Washington | fried fish |



| Etiology | Onset | Reported from | Vehicle |
|---|---|---|---|
| | 11-24 | Washington | fried rice |
| | 11-27 | Washington | turkey |
| | 12-10 | Washington | Mexican food |
| | 12-30 | Washington | unknown |
| | 11-19 | Wisconsin | unknown |
| | 6-19 | Puerto Rico | pork |
| | 6-29 | Puerto Rico | unknown |
| | 7-5 | Puerto Rico | fish |
| | 3-24 | Canal Zone | unknown |
| | 4-7 | Canal Zone | potato salad |

## G. Guidelines for Confirmation of Foodborne Outbreak

| | Clinical Syndrome | Laboratory Criteria |
|---|---|---|
| 1. *B. cereus* | a) incubation period 1-16 hrs<br>b) gastrointestinal syndrome | a) isolation of $\geq 10^5$ organisms in epidemiologically incriminated food<br>OR b) isolation of organism in stools of ill person |
| 2. Brucella | a) clinical picture compatible with brucellosis | a) 4x ↑ in titer positive blood |
| 3. *C. botulinum* | a) clinical syndrome compatible with botulism (see CDC Botulism Manual) | a) food epidemiologically incriminated<br>OR b) detection of botulinal toxin in human sera, feces, or food<br>OR c) isolation of *C. botulinum* organism from food |
| 4. *C. perfringens* | a) incubation period 8-22 hr<br>b) lower intestinal syndrome-(majority of cases with diarrhea with little vomiting or fever) | a) organisms of same serotype in epidemiologically incriminated food and stool of ill individuals<br>OR b) isolation of organisms with same serotype in stool of most ill individuals<br>OR c) $\geq 10^5$ organisms in epidemiologically incriminated food provided specimen properly handled |
| 5. *E. coli* | a) incubation period 6-36 hrs<br>b) gastrointestinal syndrome-majority of cases with diarrhea | a) organisms of same serotype in epidemiologically incriminated food and stool of ill individuals and absent from controls<br>OR b) isolation of $\geq 10^5$ organisms in implicated food<br>OR c) isolation of organism of same serotype from stool of most ill individuals found to give positive ileal-loop test or Sereny test |



| | | |
|---|---|---|
| 6. Salmonella | a) incubation period 6-48 hrs<br>b) gastrointestinal syndrome-majority of cases with diarrhea | a) isolation of salmonella organism from epidemiologically implicated food<br>OR b) isolation of salmonella organism from stools of ill individuals |
| 7. Shigella | a) incubation period 7-66 hrs<br>b) gastrointestinal syndrome-majority of cases with diarrhea | a) isolation of shigella organism from epidemiologically implicated food<br>OR b) isolation of shigella organism from stools of ill individuals |
| 8. *Staphylococcus aureus* | a) incubation period 1-7 hrs<br>b) gastrointestinal syndrome-majority of cases with vomiting | a) detection of enterotoxin in epidemiologically implicated food<br>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<br>OR c) isolation of $\geq 10^5$ organisms in epidemiologically implicated food |
| 9. Group A streptococcus | a) febrile URI syndrome | a) isolation of organisms from implicated food<br>OR b) isolation of organisms from throats of ill individuals |
| 10. *Vibrio parahaemolyticus* | a) incubation period 12-24 hrs<br>b) gastroinetestinal syndrome-majority of cases with diarrhea | a) isolation of organism from epidemiologically implicated food (usually seafood)<br>OR b) isolation of organism from stool of ill individuals |

| | | | |
|---|---|---|---|
| 11. | Trichinella spiralis | a) incubation period 3-28 days<br>b) classical systemic syndrome-myalgias, fever (100%), high eosinophile count | a) muscle biopsy from ill individual OR b) serological tests |
| 12. | Viral hepatitis<br><br>(only type A) | a) incubation period 10-50 days<br>b) clinical syndrome-jaundice, GI symptoms, dark urine | a) Liver function tests compatible with hepatitis in affected persons |
| 13. | Chemical | a) clinical picture for chemical (most often, short incubation period with vomiting as common symptom) | a) demonstration of chemical in food and/or ill individuals (if test available) |
| 14. | Other potential<br><br>pathogens:<br><br>Group D streptococcus, Yersinia enterocolitica, etc. | | a) lab evidence appraised in individual circumstances |

*We recognize that these criteria are arbitrarily designed and that as new laboratory methods are devised and new etiologic agents identified these criteria may be altered.



## III. WATERBORNE DISEASE OUTBREAKS, 1971-1972

This report summarizes information about waterborne disease outbreaks reported to CDC during 1971 and 1972.

### 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, usually gastrointestinal, after consumption of contaminated water, and (2) epidemiologic evidence implicates the water as the source of the illness. 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. Source of Data

Reports of waterborne disease outbreaks are reported to CDC by written communications from state health departments. No standard reporting form is used but one is presently being devised. In addition, the Water Supply Research Laboratory, Environmental Protection Agency (EPA), contacts by mail all state water supply agencies to obtain information about additional outbreaks. Officials from CDC and EPA work closely in the evaluation and investigation of waterborne disease outbreaks. When requested by state health department, CDC and EPA can offer epidemiologic assistance and provide expertise in the engineering and environmental aspects of water purification. Data from all outbreaks are reviewed and summarized by representatives from CDC and EPA. A line listing of reported outbreaks in 1971 and 1972 is included (see page 38).

In this report municipal systems refer to public or investor owned water supplies that serve large and 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 are also found in areas without municipal systems but are developed and maintained for use by several residences (e.g. subdivisions) or by industries, camps, parks, resorts, institutions, and hotels, locations where the general public is likely to have access to drinking water.

### C. Interpretation of Data

The data included in this summary of waterborne disease outbreaks have limitations similar to that presented in the foodborne disease summary and thus must be used carefully since they represent only a small part of a larger public health problem. These data are helpful in revealing the more important etiologies of waterborne disease, the seasonal occurrence of outbreaks, and the errors in water handling that most frequently result in waterborne disease outbreaks. As in the past, the pathogen(s) responsible for some outbreaks remains unknown. Advances in laboratory techniques and standardization of reporting of waterborne disease outbreaks will hopefully augment our knowledge about waterborne pathogens and the factors responsible for waterborne disease outbreaks.

### D. Data

There were 47 waterborne disease outbreaks involving 6,817 cases reported to CDC in 1971 and 1972 (Table 1). Of the 47 outbreaks, 21 (45%) were reported to CDC by the EPA. The largest outbreak, involving 3,500 cases, occurred in Pico Rivera, California, in July and August 1971

Table 1

Waterborne Outbreaks
1971-1972

| | 1971 | 1972 | Totals |
|---|---|---|---|
| Outbreaks | 18 | 29 | 47 |
| Cases | 5,179 | 1,638 | 6,817 |

Figure 1 shows the geographic distribution of these outbreaks by state. Thirty (60%) states reported at least 1 outbreak.

*Fig. 1* WATERBORNE OUTBREAKS, 1971-1972

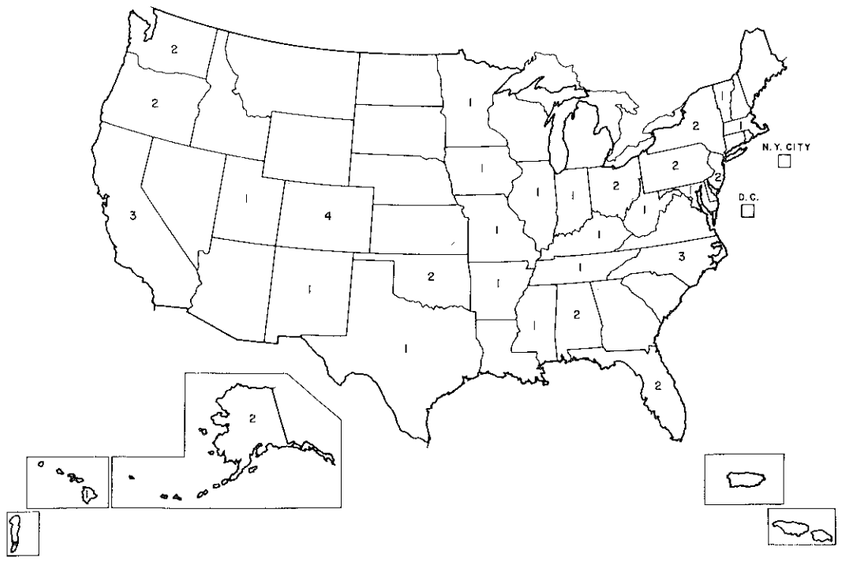


Figure 2 depicts the trend in reported waterborne disease outbreaks over the last 3 decades. In 1971 and 1972 there was an increase in the annual average number of reported outbreaks. This increase probably represents in part a renewed interest in the reporting of disease outbreaks and in other surveillance activities.

FIGURE 2

AVERAGE ANNUAL NUMBER
WATERBORNE OUTBREAKS 1938-1972

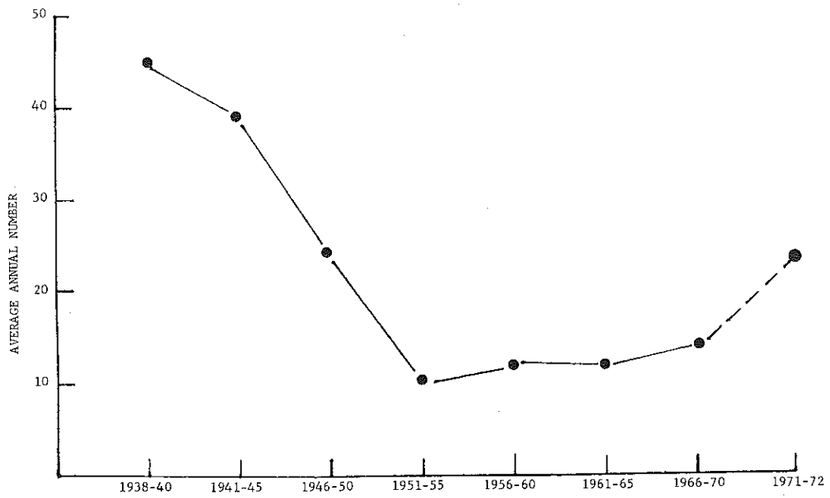




Table 2 records the number of outbreaks and cases by etiology and type of water system. Twenty-two (47%) outbreaks with 5,615 (82%) cases are grouped under the category of gastroenteritis. These include outbreaks characterized by nausea, vomiting, diarrhea, and fever for which no specific etiologic agent could be identified. Illness described as "sewage poisoning" is included in this category. Infectious hepatitis (23%) and S. sonnei (13%) were the most commonly identified etiologies of outbreaks.

The data in Table 2 indicate that outbreaks most commonly involved semi-public systems (59%) compared with municipal (30%) and individual (11%) water systems. However, outbreaks attributed to water from municipal systems affected an average of 310 persons (4,333/14) compared with 88 (2,465/28) persons in outbreaks caused by water from semi-public systems, and 4 (19/5) persons in outbreaks attributed to water from individual systems. Although semi-public systems were responsible for 60% of reported outbreaks, municipal systems caused almost 2 out of 3 reported cases.

Table 2

Waterborne Disease Outbreaks, by Etiology and Type of Water System

| | Municipal | | Semi-Public | | Individual | | Total | |
|---|---|---|---|---|---|---|---|---|
| | Outbreaks | Cases | Outbreaks | Cases | Outbreaks | Cases | | |
| Gastroenteritis | 8 | 4,025 | 14 | 1,590 | - | - | 22 | 5,615 |
| Infectious hepatitis | 4 | 80 | 4 | 175 | 3 | 11 | 11 | 266 |
| S. sonnei | 1 | 187 | 5 | 427 | - | - | 6 | 614 |
| Giardiasis | - | - | 3 | 112 | - | - | 3 | 112 |
| Chemical poisoning | 1 | 41 | 2 | 161 | - | - | 3 | 202 |
| Salmonellosis | - | - | - | - | 1 | 3 | 1 | 3 |
| Typhoid | - | - | - | - | 1 | 5 | 1 | 5 |
| Total | 14 | 4,333 | 28 | 2,465 | 5 | 19 | 47 | 6,817 |

The distribution of all outbreaks by month is seen in Table 3. A seasonal variation is apparent with 32 (70%) of 46 outbreaks occurring between May and September.

Table 3

Waterborne Disease Outbreaks by Monthly Distribution, 1971-1972

| Month | Number of outbreaks | Month | Number of outbreaks |
|---|---|---|---|
| January | 0 | July | 6 |
| February | 0 | August | 5 |
| March | 2 | September | 6 |
| April | 3 | October | 1 |
| May | 8 | November | 7 |
| June | 7 | December | 1 |
| | Total 46* | | |

*1 unknown month

Additional analysis of the 33 outbreaks associated with the semi-public and individual water supplies (Table 4) indicates that 24 (73%) of them occurred in visitors to areas used mostly for recreational purposes and that 21 (88%) of the 24 occurred in spring and summer.

Table 4

Waterborne Outbreaks in Semi-public and Individual Water Supplies by Month and Population

| | Number of outbreaks | (1) Usual population | (2) Schools | (3) Visitors* |
|---|---|---|---|---|
| January | 0 | | | |
| February | 0 | | | |
| March | 1 | | | 1 |
| April | 2 | | | 3 |
| May | 7* | 3 | | 5 |
| June | 5* | 1 | 1 | 4 |
| July | 3 | | | 3 |
| August | 4 | 1 | | 3 |
| September | 4 | 1 | | 3 |
| October | 1 | | 1 | |
| November | 4 | 2 | 1 | 1 |
| December | 1 | | | 1 |
| Total | 33 | 8 | 3 | 24 |

(1) Outbreaks among individuals normally using water supply
(2) Outbreaks in schools or institutions
(3) Outbreaks among individuals who do not use supplies on regular basis, e.g., travelers, campers, restaurant patrons, etc.

* One outbreak in May and one in June involved visitors and usual population.

Table 5 classifies outbreaks and cases by type of water system and cause of outbreak. Untreated ground or surface water (49%) and treatment deficiencies (30%), including inadequate chlorination and breakdown in chlorination equipment, were the factors most often associated with outbreaks. In municipal systems deficiencies in the distribution system were also responsible for causing outbreaks. Treatment deficiencies were responsible for most of the cases involving municipal system (mostly 1 outbreak), while untreated ground water was responsible for most cases in semi-public systems.



Table 5

Waterborne Outbreaks by Type of System and Cause of System Deficiency
1971 - 1972

| | Municipal | | Semi-Public | | Individual | | Total | |
|---|---|---|---|---|---|---|---|---|
| | Outbreaks | Cases | Outbreaks | Cases | Outbreaks | Cases | Outbreaks | Cases |
| Untreated surface water | 1 | 400 | 1 | 84 | 1 | 3 | 3 | 487 |
| Untreated ground water | 3 | 62 | 13 | 1621 | 4 | 16 | 20 | 1699 |
| Treatment deficiencies* | 4 | 3613 | 10 | 479 | 0 | 0 | 14 | 4092 |
| Deficiences in the distribution system | 5 | 255 | 0 | 0 | 0 | 0 | 5 | 255 |
| Miscellaneous** | 1 | 3 | 4 | 281 | 0 | 0 | 5 | 284 |
| Total | 14 | 4333 | 28 | 2465 | 5 | 19 | 47 | 6817 |

* Includes outbreaks in systems using a known contaminated source for which chlorination is required at all times to insure potability.

** Includes use of water not intended for drinking or outbreaks where date insufficient to define problem with water handling.

## E. WATERBORNE DISEASE OUTBREAKS 1971-1972

| City--County | Month-Year | Disease or Organism | Cases |
|---|---|---|---|
| **ALABAMA** | | | |
| Colbert County | Oct-Nov 72 | infectious hepatitis | 50 |
| Jefferson County | Aug-Sep 72 | infectious hepatitis | 9 |
| **ALASKA** | | | |
| Anchorage | Nov 71 | *S. sonnei* | 89 |
| Cordova | Mar 72 | gastroenteritis | 400 |
| **ARKANSAS** | | | |
| Wickes, Polk County | Jun-Sep 71 | infectious hepatitis | 98 |
| **CALIFORNIA** | | | |
| Pico Rivera | Jul-Aug 71 | gastroenteritis | 3,500 |
| Ski Lodge | Dec 71<br>Jan 72 | gastroenteritis<br>(sewage poisoning) | 84 |
| Lake Comanche | May-Jun 72 | gastroenteritis<br>(sewage poisoning) | 26+ |
| **COLORADO** | | | |
| Boulder County | Apr 72 | gastroenteritis | 142 |
| Boulder County | May 72 | *Giardia lamblia* | 28 |
| Winter Park | May 72 | *Giardia lamblia* | 24 |
| Rocky Ridge Basin | Apr 72 | gastroenteritis | 25 |
| **FLORIDA** | | | |
| Nokomis | May 72 | gastroenteritis | 40 |
| Mascotte | Nov 72 | chemical poisoning | 41 |
| **HAWAII** | | | |
| Molokai | Sep 72 | *S. sonnei* | 61 |



| City--County | Month-Year | Disease or Organism | Cases |
|---|---|---|---|
| **ILLINOIS** | | | |
| Grafton | May 72 | gastroenteritis | 90 |
| **INDIANA** | | | |
| Washington County | Apr 72 | *S. sonnei* | 2 |
| **IOWA** | | | |
| Stockport | Nov 72 | *S. sonnei* | 208 |
| **KENTUCKY** | | | |
| Greenbo Lake State Park | Jul 71 | gastroenteritis | 68 |
| **MARYLAND** | | | |
| Cecil County | Jun 72 | gastroenteritis<br>(sewage poisoning) | 88 |
| **MASSACHUSETTS** | | | |
| Medford | Jun 72 | gastroenteritis | 3 |
| **MINNESOTA** | | | |
| Perham | May-Jun 72 | chemical poisoning | 11 |
| **MISSISSIPPI** | | | |
| Bay St. Louis | Jul 71 | *S. sonnei* | 187 |
| **MISSOURI** | | | |
| Pacific | 71 | gastroenteritis | 2 |
| **NEW JERSEY** | | | |
| Vernon | Jul-Aug 71 | infectious hepatitis | 22 |
| Warren County | Aug 71 | *S. sonnei* | 67 |
| **NEW MEXICO** | | | |
| Roswell | Aug 71 | gastroenteritis | 10 |

| City--County | Month-Year | Disease or Organism | Cases |
|---|---|---|---|
| NEW YORK | | | |
| Upstate New York | Nov 71 | gastroenteritis | 500-1,000 |
| Upstate New York | Mar 72 | gastroenteritis | 21 |
| NORTH CAROLINA | | | |
| Camp LeJeune | Sep-Nov 71 | gastroenteritis | 38 |
| Gaston County | Sep 71-May 72 | infectious hepatitis | 2 |
| Asheboro | Aug 72 | gastroenteritis (sewage poisoning) | 9+ |
| OHIO | | | |
| Shelby County | May 72 | infectious hepatitis | 9 |
| Summit County | Jul-Sep 72 | infectious hepatitis | 12 |
| OKLAHOMA | | | |
| Locust Grove | Nov-Dec 71 | infectious hepatitis | 50 |
| Oklahoma City | Aug 71 | infectious hepatitis | 6 |
| OREGON | | | |
| Restaurant, motel, service station | Jun 71 | gastroenteritis | 200+ |
| Troy | May-Jun 72 | gastroenteritis | 37 |
| PENNSYLVANIA | | | |
| School | Jun 72 | chemical poisoning | 150 |
| Neffs | Jul 72 | infectious hepatitis | 5 |
| TENNESSEE | | | |
| Franklin | Sep 72 | gastroenteritis | 19 |
| TEXAS | | | |
| St. Lawrence | Nov 71 | infectious hepatitis | 3 |
| UTAH | | | |
| San Juan | Sep 72 | giardiasis | 60 |



| City--County | Month-Year | Disease or Organism | Cases |
|---|---|---|---|
| VERMONT | | | |
| Bradfort | Jun 71 | gastroenteritis | 3 |
| WASHINGTON | | | |
| Yakima | Jun-Jul 72 | typhoid | 5 |
| Roslyn | Sep 72 | salmonellosis | 3 |
| WEST VIRGINIA | | | |
| Chelyon, Kanawha County | Nov 72 | gastroenteritis | 60+ |

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## VI. ARTICLES IN MMWR ON FOODBORNE AND WATERBORNE DISEASES DURING 1972

### Bacillus cereus

*Possible B. cereus Infection - Wisconsin 22(2):14

### Brucellosis

**Brucellosis - Illinois 21(22):186
**Brucellosis - United States, 1971 21(46):393

### C. botulinum

**Botulism - California 21(13):106
Possible Botulism - Northwestern Ohio 21(24):205
* Foodborne Botulism - United States, 1971-1972 22(7):62
* Probable Botulism - Oklahoma 22(8):71

### C. perfringens

C. perfringens - Washington 21(19):163
* C. perfringens Gastroenteritis - Washington 22(1):3

### Salmonella

S. montevideo - Arkansas 21(38):327
S. montevideo in a Commercial Dietary Supplement - Texas 21(42):338
S. typhimurium - Minnesota, Wisconsin, Michigan 21(48):411
* Foodborne S. newport Outbreak - Texas 22(2):13
* S. agona - Arkansas 22(4):29
* Head Cheese Associated Salmonellosis - New Jersey 22(5):43

### Staphylococcus

Staphylococcal Food Poisoning - New York 21(17):146
Staphylococcal Food Poisoning - Tennessee 21(20):169
Presumptive Staphylococcal Food Poisoning - Arkansas 21(31):262
Staphylococcal Food Poisoning - Kentucky 21(31):263
Staphylococcal Food Poisoning - Oregon 21(38):332
Staphylococcal Food Poisoning - Wisconsin 21(49):422

### Vibrio parahaemolyticus

V. parahaemolyticus Gastroenteritis - United Kingdom 21(12):99
V. parahaemolyticus Gastroenteritis - Maryland 21(29):245
Presumed V. parahaemolyticus Gastroenteritis - Hawaii 21(33):282
V. parahaemolyticus - Louisiana 21(40):341
V. parahaemolyticus - New Jersey 21(50):430

### Trichinella spiralis

**Trichinosis - United States 21(1):1
Trichinosis - Missouri 21(28):329
**Trichinosis - United States, 1971 21(32):273

### Hepatitis

**Shellfish-Associated Hepatitis - Massachusetts 21(2):20
* Common Source Outbreak of Hepatitis A 22(10):86

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Probable Ciguatera Poisoning - Alabama 21(37):313
Paralytic Shellfish Poisoning Associated with Red Tide - New England 21(38):324 and 21(39):340
* Possible Scombroid Fish Poisoning - California 22(2):14

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Amanita Virosa Mushroom Poisoning - Ohio 21(42):359
Sodium Nitrite Poisoning - Thailand 21(48):416

Waterborne Disease

**Gastroenteritis - Alaska (S. sonnei) 21(6):49
**Gastroenteritis - New York 21(14):115
Gastroenteritis - Illinois 21(23):198
Typhoid Fever - Alabama 21(32):280
Hepatitis - Alabama 21(31):439

Gastroenteritis

**Gastroenteritis - Florida 21(1):6
Monkey Associated Gastroenteritis - Washington 21(35):299

* Information reported in 1973 that pertains to data in 1972
**Information reported in 1972 that pertains to data in 1971



## 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.

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