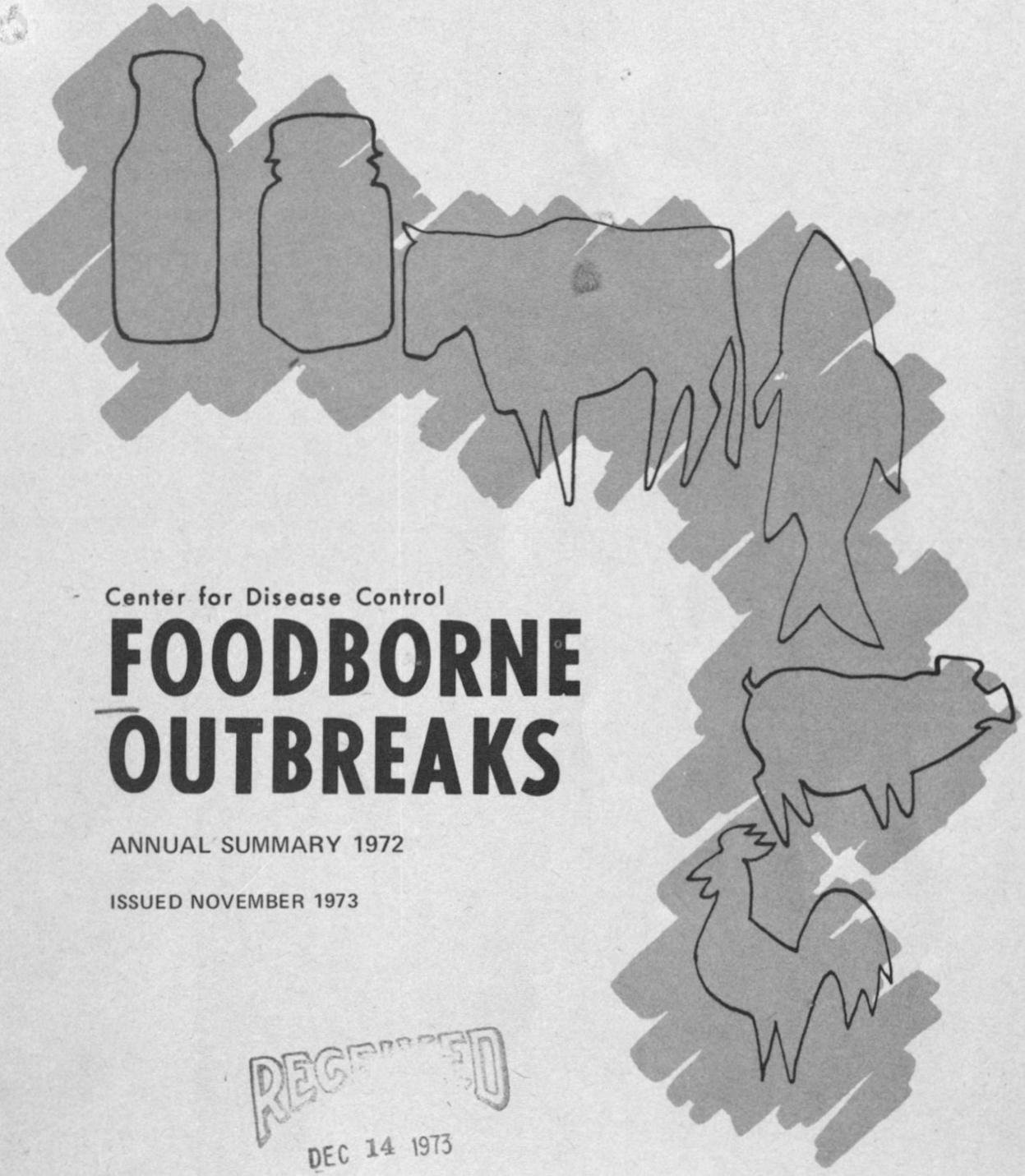

Center for Disease Control

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.

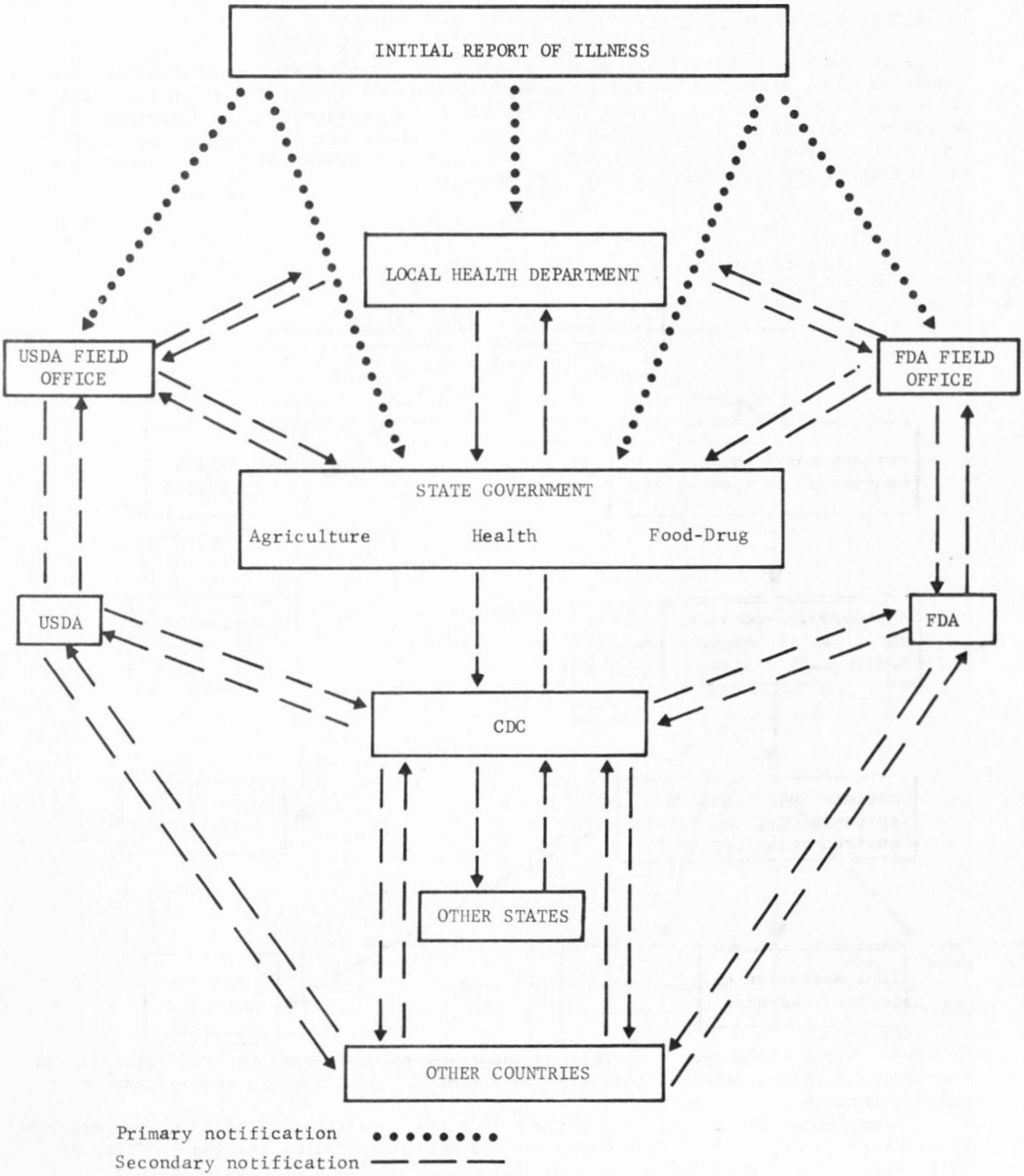
Two federal regulatory agencies which have the major responsibilities for food protection, the Food and Drug Administration (FDA) and the U.S. Department of Agriculture (USDA), participate actively in the CDC surveillance program. They report to CDC and to state and local health authorities episodes 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 physic 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



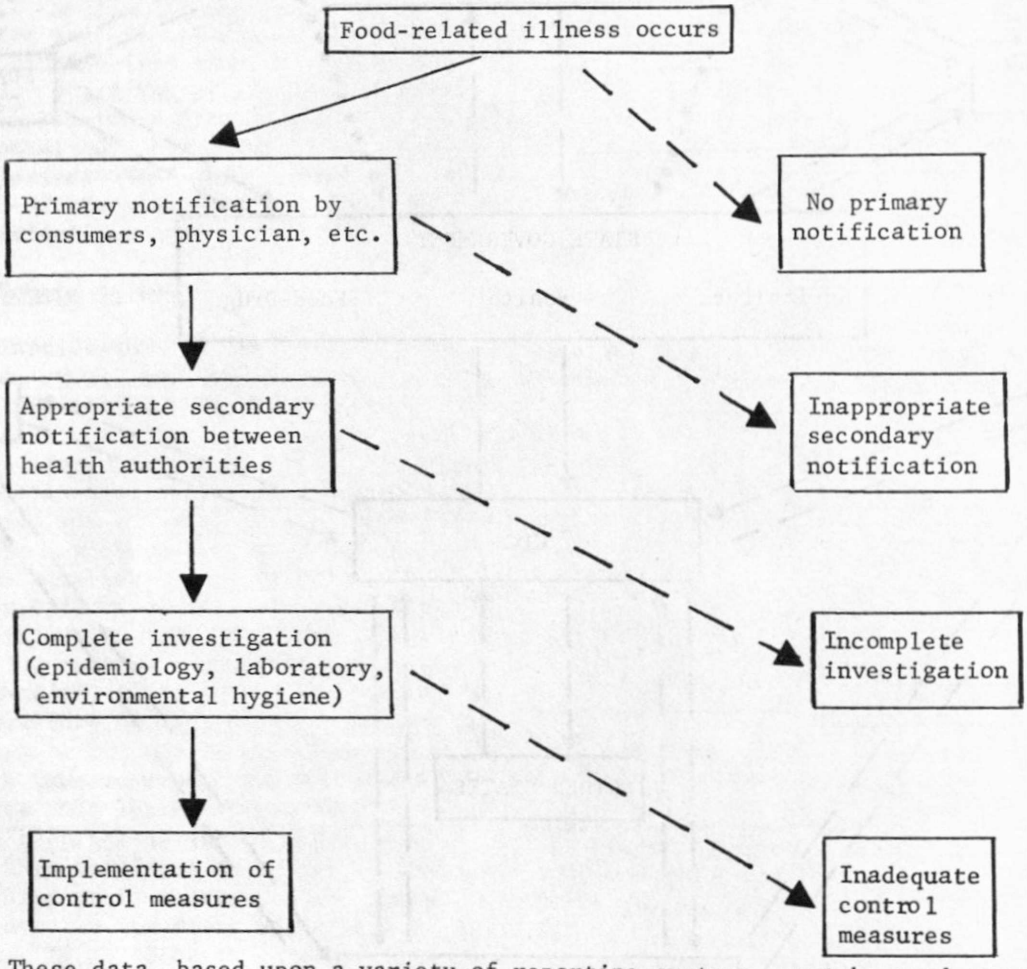
Occasionally outbreaks are reported to CDC through communications to the MMWR or by reports from the U.S. Armed Forces, pharmaceutical companies (notably botulism), and university medical centers. Reports to other CDC surveillance systems, including those for hepatitis, brucellosis, and trichinosis also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

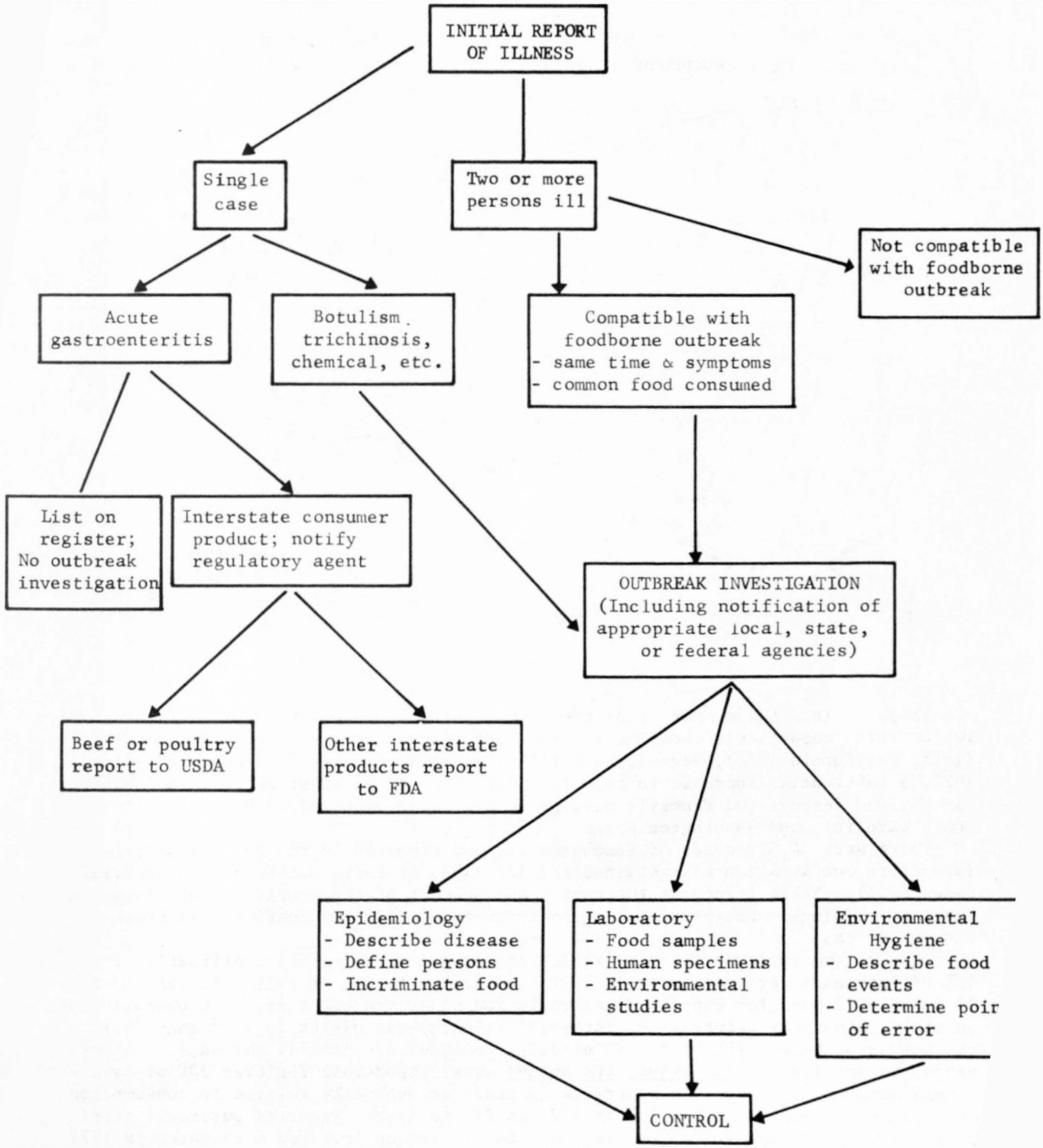


These data, based upon a variety of reporting systems, must be used carefully as they present only a selected part of a public health problem, the true dimension of which is unknown.

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*

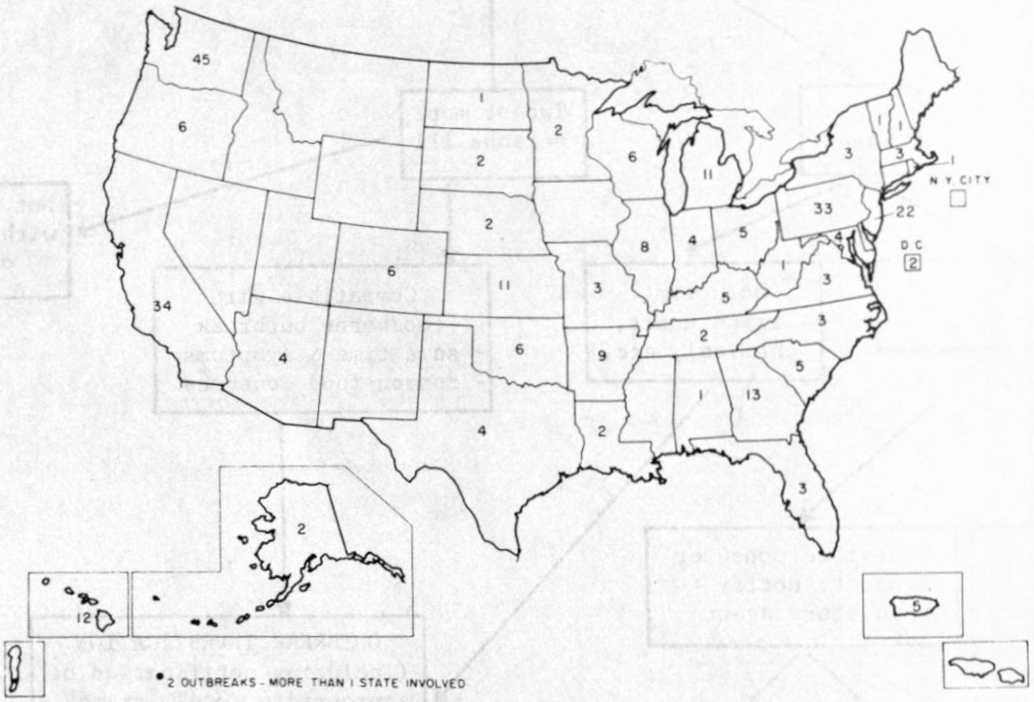


Table 1 lists the number of outbreaks by state reported for 1970, 1971, and 1972. The 4 health departments contributing the most reports for 1972 were Washington State (15%), California (11%), Pennsylvania (11%), and New Jersey (7%). Compared with 1971, a substantial increase in reported outbreaks was 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 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 repo outbreaks there were 14,559 cases reported in 1972 compared with 13,453 cases in

Table 1

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

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

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

Table 3b

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

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

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, 197

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

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
C. botulinum	4	2		2		
C. perfringens	9	6	6	1	1	
Salmonella	36	23	15	7	8	11
Shigella	3	2				1
Staphylococcus	34	29	26		8	13
Group A streptococcus	1	0				
Group D streptococcus	1	0				
V. parahaemolyticus	6	6	2	4	2	
Alkalescens dispar	1	1				1
PARASITIC						
Trichinella spiralis	8	8		8		
VIRAL						
Infectious hepatitis	5	4				4
CHEMICAL						
Chinese restaurant syndrome (MSG)	1	0				
Mushroom poisoning	9	9				
Fish toxin	9	5	2			
Heavy metals	3	3				
Other chemicals	6	5		2		
Unknown	165	83	66	12	19	22
Total	301	186	117	36	38	52

* 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
RIA.														
tulinum				1			1				1	1		4
rfringens		3	2		1			1		1	1			9
nella	1	1	1	5	3	1	4	9	4	4	3			36
lla			1	1		1								3
ylococcus		3	2	3	6	2	3	6	6	1		2		34
A streptococcus				1										1
D streptococcus												1		1
D streptococcus														
streptococcus						1	1	1		3				6
escens disparcus														
escens dispar								1						1
ITIC														
inella spiralis		1	3	1	1	1				1				8
tious hepatitis		1				1		2				1		5
tious														
tfons														
se re														
se re														
se restaurant														
come (MSG)								1						1
room poisoning	1				1				1	1	4	1		9
toxin					1		2		3	1	2			9
metal			1					1				1		3
chemicals		1			2		1	1		1				6
own	8	8	18	21	19	10	11	10	15	13	18	13	1	165
l 1972	10	18	28	33	34	17	23	33	29	26	29	20	1	301
l 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

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

13. Environmental specimens examined: (68)

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

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

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

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

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

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

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

17. Etiology: (77, 78)

Pathogen _____

Chemical _____

Other _____

Suspected ☐ 1 (79)

Confirmed ☐ 2

Unknown ☐ 3

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

Name of reporting agency: (80)

Investigating official:

Date of investigation:

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

To improve national surveillance, please send a copy of this report to:

Center for Disease Control
Attn: Enteric Diseases Section, Bacterial Diseases Branch, 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	
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 casserol
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	
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	
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 phalloide
Mushroom poisoning	5-10	California	mushrooms
Mushroom poisoning	10-22	California	mushrooms
Mushroom poisoning	11-6	California	Amanita
Mushroom poisoning	11-6	California	Amanita
Mushroom poisoning	11-13	California	Amanita pantherin
Mushroom poisoning	11-22	California	Amanita
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	
			tuna fish
			tuna fish
			tuna fish
			tuna fish
			tuna fish
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	
	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	
	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	
	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 vehicle
	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
	11-24
	11-27
	12-10
	12-30
	11-19
	6-19
	6-29
	7-5
	3-24
	4-7

Reported from	fried rice
Washington	fried rice
Washington	turkey
Washington	Mexican food
Washington	unknown
Wisconsin	unknown
Puerto Rico	pork
Puerto Rico	unknown
Puerto Rico	fish
Canal Zone	unknown
Canal Zone	potato salad

	Clinical Syndrome		Laboratory Crite
1. *B. cereus*	a) incubation period 1-16 hrs b) gastrointestinal syndrome		a) isolation of organisms in epi ologically incri ted food
		OR	b) isolation of ganism in stools 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 epidemic cally incriminat
		OR	b) detection of linal toxin in h sera, feces, or
		OR	c) isolation of *botulinum* organi from food
4. *C. perfringens*	a) incubation period 8-22 hr b) lower intestinal syndrome-(majority of cases with diarrhea with little vomiting or fever)		a) organisms of serotype in epic logically incrim ed food and stoo ill individuals
		OR	b) isolation of organisms with s serotype in stoo most ill indivic
		OR	c) $\geq 10^5$ organis in epidemiologic incriminated foo provided specime properly handle
5. *E. coli*	a) incubation period 6-36 hrs b) gastrointestinal syndrome-majority of cases with diarrhea		a) organisms of serotype in epic ologically incri ted food and sto of ill individua and absent from controls
		OR	b) isolation of organisms in imp cated food
		OR	c) isolation of organism of same serotype from st of most ill indi duals found to g positive ileal- test or Sereny t

6.	Salmonella	a) incubation period 6-48 hrs b) gastrointestinal syndrome-majority of cases with diarrhea	a) isolation of salmonella organism from epidemiologically implicated food OR b) isolation of salmonella organism from stools of ill individuals
7.	Shigella	a) incubation period 7-66 hrs b) gastrointestinal syndrome-majority of cases with diarrhea	a) isolation of shigella organism from epidemiologically implicated food OR b) isolation of shigella organism from stools of ill individuals
8.	Staphylococcus aureus	a) incubation period 1-7 hrs b) gastrointestinal syndrome-majority of cases with vomiting	a) detection of enterotoxin in epidemiologically implicated food OR b) organisms with same phage type in stools or vomitus of ill individuals and, when possible, implicated food and/or skin or nose of food handler OR c) isolation of $\geq 10^5$ organisms in epidemiologically implicated food
9.	Group A streptococcus	a) febrile URI syndrome	a) isolation of organisms from implicated food OR b) isolation of organisms from throats of ill individuals
10.	Vibrio parahaemolyticus	a) incubation period 12-24 hrs b) gastroinetestinal syndrome-majority of cases with diarrhea	a) isolation of organism from epidemiologically implicated food (usually seafood) OR b) isolation of organism from stool of ill individuals

11.	*Trichinella spiralis*	a) incubation period 3-28 days b) classical systemic syndrome-myalgias, fever (100%), high eosinophile count	a) muscle from ill OR b) serolo tests
12.	Viral hepatitis (only type A)	a) incubation period 10-50 days 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 chemical in food and/or ill individuals (if test available)
14.	Other potential pathogens: 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

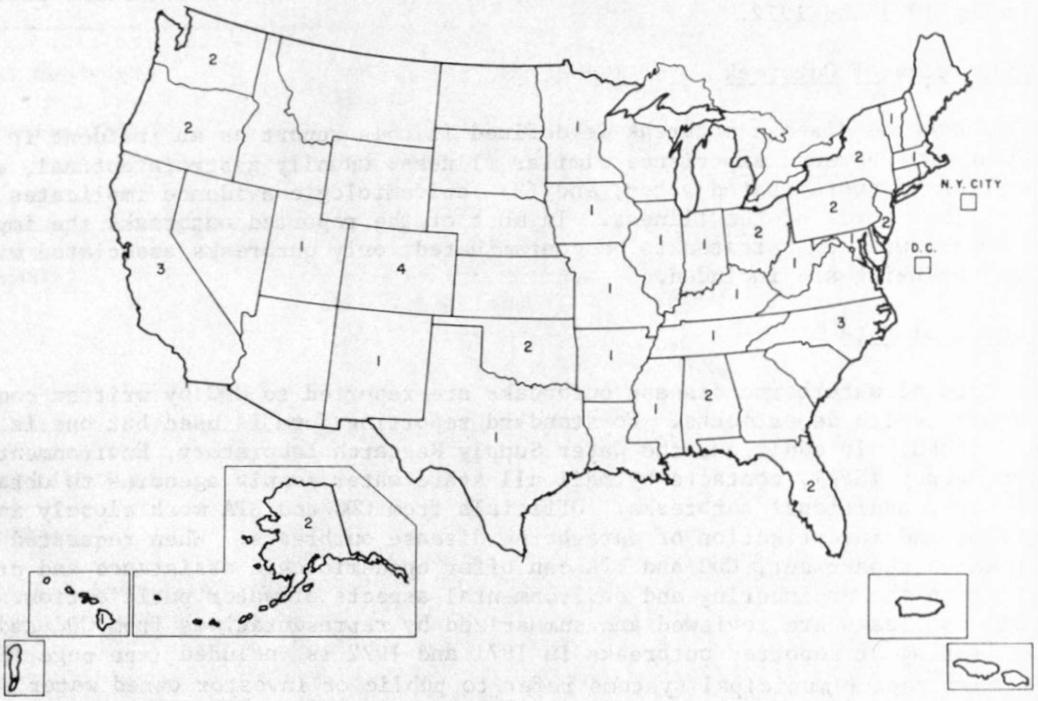


Figure 2 depicts the trend in reported waterborne disease outbreaks over the la 3 decades. In 1971 and 1972 there was an increase in the annual average number of reported outbreaks. This increase probably represents in part a renewed interest i the reporting of disease outbreaks and in other surveillance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

FIGURE 2

AVERAGE ANNUAL NUMBER
WATERBORNE OUTBREAKS 1938-1972

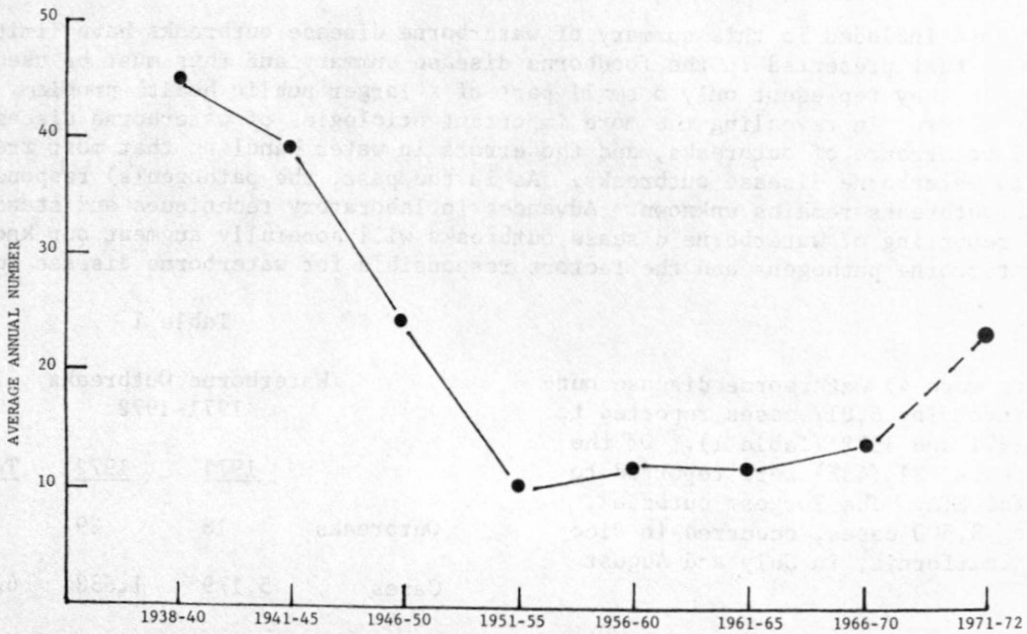


Table 2 records the number of outbreaks and cases by etiology and type of water system. Twenty-two (47%) outbreaks with 5,615 (82%) cases are grouped under the category of gastroenteritis. These include outbreaks characterized by nausea, vomiting, diarrhea, and fever for which no specific etiologic agent 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
ALABAMA		
Colbert County	Oct-Nov 72	infectious hepatitis
Jefferson County	Aug-Sep 72	infectious hepatitis
ALASKA		
Anchorage	Nov 71	*S. sonnei*
Cordova	Mar 72	gastroenteritis
ARKANSAS		
Wickes, Polk County	Jun-Sep 71	infectious hepatitis
CALIFORNIA		
Pico Rivera	Jul-Aug 71	gastroenteritis
Ski Lodge	Dec 71 Jan 72	gastroenteritis (sewage poisoning)
Lake Comanche	May-Jun 72	gastroenteritis (sewage poisoning)
COLORADO		
Boulder County	Apr 72	gastroenteritis
Boulder County	May 72	*Giardia lamblia*
Winter Park	May 72	*Giardia lamblia*
Rocky Ridge Basin	Apr 72	gastroenteritis
FLORIDA		
Nokomis	May 72	gastroenteritis
Mascotte	Nov 72	chemical poisoning
HAWAII		
Molokai	Sep 72	*S. sonnei*

City--County	Month-Year	Disease or Organism
ILLINOIS		
Grafton	May 72	gastroenteritis
INDIANA		
Washington County	Apr 72	*S. sonnei*
IOWA		
Stockport	Nov 72	*S. sonnei*
KENTUCKY		
Greenbo Lake State Park	Jul 71	gastroenteritis
MARYLAND		
Cecil County	Jun 72	gastroenteritis (sewage poisoning)
MASSACHUSETTS		
Medford	Jun 72	gastroenteritis
MINNESOTA		
Perham	May-Jun 72	chemical poisoning
MISSISSIPPI		
Bay St. Louis	Jul 71	*S. sonnei*
MISSOURI		
Pacific	71	gastroenteritis
NEW JERSEY		
Vernon	Jul-Aug 71	infectious hepatitis
Warren County	Aug 71	*S. sonnei*
NEW MEXICO		
Roswell	Aug 71	gastroenteritis

City--County	Month-Year	Disease or Organism
NEW YORK		
Upstate New York	Nov 71	gastroenteritis
Upstate New York	Mar 72	gastroenteritis
NORTH CAROLINA		
Camp LeJeune	Sep-Nov 71	gastroenteritis
Gaston County	Sep 71-May 72	infectious hepatitis
Asheboro	Aug 72	gastroenteritis (sewage poisoning)
OHIO		
Shelby County	May 72	infectious hepatitis
Summit County	Jul-Sep 72	infectious hepatitis
OKLAHOMA		
Locust Grove	Nov-Dec 71	infectious hepatitis
Oklahoma City	Aug 71	infectious hepatitis
OREGON		
Restaurant, motel, service station	Jun 71	gastroenteritis
Troy	May-Jun 72	gastroenteritis
PENNSYLVANIA		
School	Jun 72	chemical poisoning
Neffs	Jul 72	infectious hepatitis
TENNESSEE		
Franklin	Sep 72	gastroenteritis
TEXAS		
St. Lawrence	Nov 71	infectious hepatitis
UTAH		
San Juan	Sep 72	giardiasis

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

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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

Fish Poisoning

Probable Scombroid Fish Poisoning - Vermont 21(31):261
Probable Ciguatera Poisoning - Alabama 21(37):313
Paralytic Shellfish Poisoning Associated with Red Tide - New England 21(38):3 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

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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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