Hepatitis A	Ohio	9	10-11			ice cream	(D)	school
Hepatitis A	Ohio	7	10-?	+		unknown	(B)	restaurant
UNKNOWN								
	Alabama	602	5-15		+ +	multiple vehicles	(B)	school cafeteria
	Arizona	6	5-20			unknown	(D)	restaurant
	Arkansas	41	1-6			unknown	(D)	nursing home
	Arkansas	78	12-6			turkey & dressing	(D)	restaurant
	Arkansas	18	12-14			turkey	(D)	restaurant
	California	5	1-31			unknown	(B)	restaurant
	California	8	2-18			unknown	(D)	home
	California	58	4-16			roast beef with gravy	(B)	camp
	California	146	4-?			turkey	(B)	prison
	California	550	6-13			unknown	(B)	restaurant
	California	13	8-20			meat loaf	(B)	nursing home
	California	9	9-2			unknown	(D)	home
	California	2	9-13			unknown	(B)	restaurant
	California	3	9-15			Mexican food (tacos)	(D)	church
	California	5	9-16			unknown	(B)	restaurant
	California	45	9-17			creamed turkey	(B)	nursing home

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

Etiology	State	Number of Cases	Date of Onset	Lab Data			Vehicle	Location Where Food Mishandled* And Eaten
				Patient	Vehicle	Food-handler		
	California	3	11-18				unknown	(D) restaurant
	California	3	12-10				unknown	(D) restaurant
	California	48	12-19				unknown	(D) restaurant
	Colorado	2	10-10		+		unknown	(D) restaurant
	Colorado	2	11-11				unknown	(D) home
	Colorado	6	?				unknown	(D) state fair
	Connecticut	12	6-27				codfish stew	(B) camp
	Connecticut	12	11-3				unknown	(B) dinner theater
	District of Columbia	150	1-3				unknown	(B) foreign embassy
	District of Columbia	3	4-10				baked flounder, crab	(D) restaurant
	Florida	23	6-13				unknown	(B) school
	Florida	28	12-19				unknown	(D) restaurant
	Georgia	4	2-5		+		barbecued chicken	(B) Home
	Georgia	18	7-9				unknown	(D) hospital cafeteria
	Georgia	20	11-2				unknown	(D) restaurant
	Georgia	9	12-1				roasted oysters	(D) picnic
	Hawaii	21	8-21				unknown	(D) home

Idaho	26	12-7				turkey, salad	(C) home
Illinois	8	6-16	+	+	+	unknown	(D) restaurant
Illinois	8	9-17				sausage	(D) food stand
Illinois	?	9-17				unknown	(D) bazaar
Illinois	4	9-21				beef crepe	(D) restaurant
Illinois	6	10-30				beef	(D) unknown
Illinois	16	12-21	+	+		ham	(C) factory
Iowa	308	?				roast beef	(D) banquet
Kansas	8	7-4				unknown	(D) picnic
Kentucky	35	9-?				ham	(D) wedding reception
Maryland	4	9-29				iced tea	(A) unknown
Maryland	30	11-22				unknown	(D) conference hall
Massachusetts	16	1-22				unknown	(D) restaurant
Michigan	5	5-15				unknown	(D) home
Michigan	9	7-9				unknown	(D) restaurant
Michigan	33	7-27				potato salad	(D) picnic
Michigan	2	11-4				pizza	(D) home
Minnesota	20	2-18				unknown	(D) unknown
Minnesota	24	5-16				unknown	(D) restaurant
Minnesota	17	5-16				unknown	(D) restaurant

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

Etiology	State	Number of Cases	Date of Onset	Lab Data			Vehicle	Location Where Food Mishandled* And Eaten
				Patient	Vehicle	Food-handler		
	Minnesota	32	5-27				unknown	(D) home
	Minnesota	127	7-21				turkey salad sandwiches	(D) church
	Minnesota	5	7-28				unknown	(D) home
	Minnesota	19	8-18				unknown	(D) restaurant
	Minnesota	2	9-2				unknown	(D) home
	Minnesota	11	10-3				unknown	(D) restaurant
	Minnesota	256	10-15				unknown	(D) school
	Minnesota	2	10-27				tartar sauce	(B) restaurant
	Minnesota	33	?				beef and noodles	(D) unknown
	Mississippi	15	3-6				unknown	(D) conference
	Missouri	2	1-7				shrimp	(D) home
	Missouri	4	1-12				unknown	(D) restaurant
	Nebraska	33	5-5				unknown	(D) home
	Nebraska	6	5-16				chocolate frosted rolls	(B) bakery
	Nebraska	3	5-19				green beans	(D) home
	Nebraska	56	6-3				unknown	(D) sports hall
	Nebraska	3	7-24				unknown	(D) home
	New Hampshire	339	2-18				chopped ham	(D) church
	New Hampshire	18	2-19				unknown	(D) school

New Hampshire	6	6-24			unknown	(D) restaurant
New Jersey	14	4-4	+		unknown	(D) restaurant
New Jersey	230	6-24			roast beef	(B) club meeting room
New Jersey	13	10-9			turkey & gravy	(D) office
New York	6	1-9			pork & beans	(D) home
New York	135	3-24			roast beef	(B) restaurant
New York	20	4-20			cream puff & eclair	(B) church
New York	20	4-20			unknown	(D) home
New York	9	5-12		+	turkey & gravy	(D) unknown
New York	16	5-16			unknown	(D) USAF hospital
New York	24	5-18			unknown	(D) restaurant
New York	4	5-21			unknown	(D) cafeteria
New York	5	6-4			unknown	(D) home
New York	21	6-6			steak, gravy	(D) restaurant
New York	50	6-15			unknown	(D) restaurant
New York	29	6-17			potato salad	(C) home
New York	10	7-22			clams	(C) home
New York	9	7-30			frankfurters	(D) picnic
New York	224	9-15			potato salad	(C) home

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

Etiology	State	Number of Cases	Date of Onset	Lab Data: Patient	Lab Data: Vehicle	Lab Data: Food-handler	Vehicle	Location Where Food Mishandled* And Eaten
	New York	3	10-6				unknown	(D) restaurant
	New York	14	10-28				ham	(D) home
	New York	18	10-29				meatballs	(D) restaurant
	New York	40	12-16				veal	(D) school
	North Carolina	14	1-10				unknown	(D) restaurant
	North Carolina	35	3-?				unknown	(D) circus
	North Carolina	180	4-23				garden salad	(B) college cafeteria
	North Carolina	(40) chytaye	12-12				milk	(D) school cafeteria
	Ohio	3	1-28				hot dogs	(D) unknown
	Ohio	25	5-19				multiple vehicles	(D) college sorority house
	Ohio	98	6-1	+	+		roast beef	(B) restaurant
	Ohio	10	7-6				Mexican food (tacos)	(D) restaurant
	Ohio	2	8-5		+		potato salad	(B) home
	Ohio	9	8-?				canned food	(C) home
	Ohio	56	10-17				unknown	(D) factory
	Ohio	2	10-?				shredded wheat	(D) home
	Ohio	42	12-8				unknown	(D) church

Ohio	53	12-28		unknown	(D) restaurant
Oklahoma	68	4-10		ice cream	(D) school
Oklahoma	4	10-10		salmon patties	(D) home
Oregon	59	2-2		unknown	(D) school
Oregon	3	1-8		unknown	(D) home
Oregon	50	2-15		unknown	(D) church
Oregon	6	8-?		commercial beef stew	(D) multiple places
Pennsylvania	4	1-3		peanut butter	(D) home
Pennsylvania	2	1-6	+	unknown	(D) restaurant
Pennsylvania	2	1-6		unknown	(D) restaurant
Pennsylvania	4	1-11		unknown	(D) restaurant
Pennsylvania	6	1-14	+	ham	(C) home
Pennsylvania	9	1-21		chicken, gravy & stuffing	(D) home
Pennsylvania	5	1-21		unknown	(D) home
Pennsylvania	2	1-22		unknown	(D) home
Pennsylvania	15	1-28		unknown	(D) restaurant
Pennsylvania	83	2-2		unknown	(B) bar-mitzvah reception
Pennsylvania	2	2-12		macaroni & cheese	(D) home
Pennsylvania	3	2-18		sauerkraut	(D) home

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

Etiology	State	Number of Cases	Date of Onset	Lab Data			Vehicle	Location Where Food Mishandled* And Eaten
				Patient	Vehicle	Food-handler		
	Pennsylvania	4	3-8				chocolate candy	(D) home
	Pennsylvania	9	3-9				ham	(D) home
	Pennsylvania	9	3-11				ham	(D) home
	Pennsylvania	2	3-11				Boston Cream pie	(D) home
	Pennsylvania	12	3-24		+		unknown	(D) home
	Pennsylvania	48	3-30				unknown	(D) wedding reception
	Pennsylvania	32	3-31				unknown	(D) catering hall
	Pennsylvania	8	4-4				unknown	(D) school
	Pennsylvania	4	4-4				macaroons	(D) school
	Pennsylvania	2	4-10				turkey stuffing	(D) home
	Pennsylvania	2	4-10				unknown	(D) restaurant
	Pennsylvania	7	4-14				potato salad	(D) picnic
	Pennsylvania	2	4-15				Kulbassi	(D) home
	Pennsylvania	2	4-17				mackeral	(D) home
	Pennsylvania	4	4-18				blueberry cheese-cake, ice cream	(D) home
	Pennsylvania	2	4-22				hot dogs	(D) delicatessen
	Pennsylvania	2	5-8				fish	(D) home
	Pennsylvania	5	5-13				coffee cake	(D) home
	Pennsylvania	2	5-13				unknown	(D) restaurant

Pennsylvania	14	5-15		unknown	(D) country club
Pennsylvania	5	5-20	+	ham	(C) home
Pennsylvania	7	6-7		unknown	(D) restaurant
Pennsylvania	174	6-16		unknown	(D) prison rest home
Pennsylvania	3	6-18	+	cream cheese pie	(B) restaurant
Pennsylvania	2	6-27		apple sauce	(D) restaurant
Pennsylvania	13	6-27		unknown	(D) restaurant
Pennsylvania	3	7-14		unknown	(D) home
Pennsylvania	4	7-15	+	corned beef	(B) home
Pennsylvania	4	7-15		lasagna	(B) restaurant
Pennsylvania	5	8-4		potato salad	(D) home
Pennsylvania	3	8-5		multiple vehicles	(D) home
Pennsylvania	18	8-5		tuna fish sandwich	(D) bus trip
Pennsylvania	14	8-6		unknown	(D) restaurant
Pennsylvania	2	8-16		fried rice	(D) restaurant
Pennsylvania	40	8-25	+	unknown	(D) private club hall
Pennsylvania	70	9-14	+	multiple vehicles	(D) grange hall
Pennsylvania	2	9-18		unknown	(D) restaurant
Pennsylvania	3	10-13		lobster	(D) home

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

Etiology	State	Number of Cases	Date of Onset	Patient	Vehicle	Food-handler	Vehicle	Location Where Food Mishandled* And Eaten
	Pennsylvania	4	10-20		+		lamb shish-kabob	(D) home
	Pennsylvania	3	10-28				pizza	(D) restaurant
	Pennsylvania	3	10-31				chicken	(D) home
	Pennsylvania	5	11-1				vegetable soup	(D) home
	Pennsylvania	2	11-4				unknown	(D) home
	Pennsylvania	2	11-4				greenbean & mush-room casserole	(D) home
	Pennsylvania	2	11-6				baked hoagie	(D) restaurant
	Pennsylvania	2	11-11		+		unknown	(B) restaurant
	Pennsylvania	6	11-11				unknown	(D) home
	Pennsylvania	2	11-13				chicken	(D) home
	Pennsylvania	10	11-24				unknown	(D) home
	Pennsylvania	2	11-25				clam chowder	(D) home
	Pennsylvania	3	11-25				unknown	(D) restaurant
	Pennsylvania	2	12-10				baked hoagie	(D) restaurant
	Pennsylvania	3	12-10				pizza	(D) restaurant
	Pennsylvania	5	12-17				beef stroganoff	(D) home
	Pennsylvania	4	12-26				hamburger	(D) restaurant
	Pennsylvania	33	12-29				unknown	(D) club

South Carolina	4	1-17			unknown	(D) unknown
South Carolina	3	11-18			ham	(D) restaurant
South Carolina	2	11-29			unknown	(D) home
South Carolina	4	12-7			unknown	(D) home
South Dakota	7	5-21			Mexican food	(B) restaurant
South Dakota	2	6-16			sloppy joes	(D) church
South Dakota	10	8-6			spaghetti & meatballs	(B) restaurant
Tennessee	45	7-12			lettuce	(B) restaurant
Tennessee	38	11-27			unknown	(D) factory
Texas	34	7-3			hamburger	(B) restaurant
Utah	9	3-10			unknown	(D) home
Utah	3	11-3			clam dip	(D) picnic
Utah	400	11-8			unknown	(B) school
Virginia	23	1-4		+	unknown	(D) restaurant
Virginia	21	3-?			unknown	(D) school
Washington	2	1-9			Chinese food	(D) restaurant
Washington	4	1-12			bean soup	(D) home
Washington	70	1-17			rice-pineapple salad	(D) restaurant
Washington	2	1-22	+	+	Mexican food	(D) restaurant
Washington	3	2-23			Chinese food	(D) restaurant

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

Etiology	State	Number of Cases	Date of Onset	Lab Data			Vehicle	Location Where Food Mishandled* And Eaten
				Patient	Vehicle	Food-handler		
	Washington	2	3-11				beef stew	(B) restaurant
	Washington	4	3-31				beef meat loaf	(D) restaurant
	Washington	2	4-13				clam chowder	(D) restaurant
	Washington	2	4-17				unknown	(D) restaurant
	Washington	5	4-22				chicken	(D) home
	Washington	45	4-25				beef	(D) restaurant
	Washington	13	5-27				unknown	(D) restaurant
	Washington	13	5-?				ham	(C) home
	Washington	9	6-8	+			beans	(D) home
	Washington	4	6-15				unknown	(D) home
	Washington	4	6-19				unknown	(D) home
	Washington	5	7-5				unknown	(D) home
	Washington	4	7-16				ham sandwich	(D) restaurant
	Washington	7	7-21				ground beef	(D) restaurant
	Washington	2	8-5				Chinese food	(D) home
	Washington	2	8-12				Mexican food (beef taco)	(D) restaurant
	Washington	2	8-18		+		home-canned salmon	(C) home

Washington	2	8-19		unknown	(D) home
Washington	3	8-19		unknown	(D) home
Washington	3	9-2		clam chowder	(D) restaurant
Washington	2	9-18		Mexican food (beef tamale)	(D) restaurant
Washington	31	9-19		roast beef	(D) restaurant
Washington	3	9-19		unknown	(D) home
Washington	2	9-24		Chinese food	(D) restaurant
Washington	40	10-5		unknown	(D) school field trip
Washington	2	10-22		unknown	(D) restaurant
Washington	7	10-27		gravy	(D) restaurant
Washington	33	11-1		unknown	(D) nursing home
Washington	3	11-2		unknown	(D) restaurant
Washington	3	11-4		Mexican food (beef enchilada)	(D) restaurant
Washington	10	11-17		unknown	(D) fraternal lodge
Washington	5	11-18		oyster stew	(D) home
Washington	4	11-26	+	unknown	(D) home
Washington	6	12-18		unknown	(D) restaurant
West Virginia	3	1-8		unknown	(D) home

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

Etiology	State	Number of Cases	Date of Onset	Lab Data			Vehicle	Location Where Food Mishandled* And Eaten
				Patient	Vehicle	Food-handler		
	West Virginia	3	6-13		+		milk	(D) unknown
	West Virginia	6	7-18				unknown	(D) picnic
	West Virginia	56	7-27				unknown	(D) church
	West Virginia	3	10-16				unknown	(D) restaurant
	West Virginia	9	12-13				beef	(C) home
	Wisconsin	46	5-6				creamed chicken	(B) institution for mentally retarded
	Wisconsin	20	5-13				beef stew	(B) railroad camp
	Wisconsin	46	5-26				beef and gravy	(B) institution for mentally retarded
	Wisconsin	10	8-22				chicken a la king	(B) camp
	Wisconsin	83	11-6				lasagna	(B) school
	Wisconsin	4	12-12				sausage	(D) home
	Guam	2	3-29		+		fish burger	(B) restaurant
	Guam	4	6-22		+		unknown	(C) home
	Guam	18	9-2				unknown	(D) home
	Puerto Rico	2	9-23				unknown	(D) unknown
	Arizona, New Mexico	57	5-?				tuna salad sandwich	(D) motel
	Pennsylvania, Connecticut	18	10-5				unknown	(D) restaurant

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

H. Guidelines for Confirmation of Foodborne Disease Outbreak

	Clinical Syndrome	Laboratory and/or Epidemiologic Criteria
BACTERIAL		
1. *Bacillus cereus*	a) incubation period 1-16 hrs. b) gastrointestinal syndrome	a) isolation of $\geq 10^5$ organisms per gram in epidemiologically incriminated food OR b) isolation of organism from stools of ill person
2. Brucella	a) clinical syndrome compatible with brucellosis	a) 4x ↑ in titer OR b) positive blood culture
3. *Clostridium botulinum*	a) clinical syndrome compatible with botulism (see CDC Botulism Manual)	a) detection of botulinal toxin in human sera, feces, or food OR b) isolation of *C. botulinum* organism from epidemiologically incriminated food or stools OR c) food epidemiologically incriminated
4. *Clostridium perfringens*	a) incubation period 8-22 hrs b) lower intestinal syndrome--majority of cases with diarrhea but little vomiting or fever	a) organisms of same serotype in epidemiologically incriminated food and stool of ill individuals OR b) isolation of organisms with same serotype in stool of most ill individuals and not in stool of controls OR c) $\geq 10^5$ organisms per gram in epidemiologically incriminated food provided specimen properly handled
5. *Escherichia coli*	a) incubation period 6-36 hrs b) gastrointestinal syndrome--majority of cases with diarrhea	a) demonstration of organisms of same serotype in epidemiologically incriminated food and stool of ill individuals and not in stool of controls OR b) isolation of $\geq 10^5$ per gram organisms of same serotype in implicated food OR c) isolation of organism of same serotype from stool of most ill individuals. If possible, organisms should

	Clinical Syndrome	Laboratory and/or Epidemiologic Criteria
		be tested for enterotoxigenicity and invasiveness by special laboratory techniques
6. Salmonella	a) incubation period 6-48 hrs b) gastrointestinal syndrome--majority of cases with diarrhea	a) isolation of salmonella organism from epidemiologically implicated food OR b) isolation of salmonella organism from stools of ill individuals
7. Shigella	a) incubation period 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 per gram in epidemiologically implicated food
9. Group A streptococcus	a) febrile URI syndrome	a) isolation of organisms with same M and T type from implicated food OR b) isolation of organisms with same M and T type from throats of ill individuals
10. Vibrio cholerae	a) incubation period 5 hrs to 3 days b) gastrointestinal syndrome--majority of cases with diarrhea and without fever	a) isolation of V. cholerae from epidemiologically incriminated food OR b) isolation of organisms from stools or vomitus of ill individuals OR c) significant rise in vibriocidal, bacterial

	Clinical Syndrome	Laboratory and/or Epidemiologic Criteria
		agglutinating, or antitoxin antibodies in acute and early convalescent sera, or significant fall in vibriocidal antibodies in early and late convalescent sera in persons not recently immunized.
11. Vibrio parahaemolyticus	a) incubation period 12-24 hrs b) gastrointestinal syndrome--majority of cases with diarrhea	a) isolation of $\geq 10^5$ organisms from epidemiologically implicated food (usually seafood) OR b) isolation of Kanagawa-positive organisms of same serotype from stool of ill individuals
12. Others	a) clinical data appraised in individual circumstances	a) laboratory data appraised in individual circumstances
CHEMICAL		
1. Heavy metals Antimony Cadmium Copper Iron Tin Zinc, etc	a) incubation period 3 min to 3 hrs (rarely longer) b) clinical syndrome compatible with heavy metal poisoning--usually gastrointestinal syndrome and often metallic taste	a) demonstration of high concentration of metallic ion in epidemiologically incriminated food or beverage
2. Ichthyosarcotoxin		
Ciguatoxin	a) incubation period 30 min to 30 hrs b) clinical syndrome compatible with ciguatera--usually initial gastrointestinal symptoms followed by dry mouth, paraesthesias of lips, tongue, throat or extremities. A sensation of looseness and pain in the teeth and a pardoxical temperature sensation are characteristic	a) demonstration of ciguatoxin in epidemiologically incriminated fish OR b) Ciguatera-associated fish epidemiologically incriminated
Puffer fish (tetrodotoxin)	a) incubation period 10 min to 4 hrs b) clinical syndrome compatible with puffer fish poisoning--paraesthesias of lips, tongue, face or extremities often followed by numbness, loss of	a) demonstration of tetrodotoxin in fish OR b) puffer fish epidemiologically incriminated

	Clinical Syndrome	Laboratory and/or Epidemiologic Criteria
	proprioception or a "floating" sensation	
Scombrotoxin	a) incubation period 5 min to 2 hrs b) clinical syndrome compatible with scombroid fish poisoning often including flushing, headache, dizziness, burning of mouth and throat, upper and lower gastrointestinal symptoms, urticaria and generalized pruritus	a) demonstration of elevated histamine levels in epidemiologically incriminated fish OR b) fish of order Scombrodei or fish associated with scombroid poisoning (e.g. mahi-mahi) epidemiologically incriminated
3. Monosodium glutamate	a) incubation period 5-30 min b) clinical syndrome compatible with monosodium glutamate intoxication--often including burning sensations in chest, neck, abdomen or extremities, sensations of lightness and pressure over face, or a heavy feeling in the chest	a) history of large amounts (usually > 1.5 grams) of MSG having been added to epidemiologically incriminated food
4. Mushroom poison		
Group containing ibotenic acid and muscimol	a) incubation period 30 min to 12 hrs b) clinical syndrome compatible with mushroom poisoning by this group--often including confusion, delirium, visual disturbances	a) demonstration of toxic chemical in epidemiologically incriminated mushrooms OR b) epidemiologically incriminated mushrooms identified as a toxic type
Group containing amatoxins and phallotoxins, or gyromitrin	a) incubation period 6-24 hrs b) characteristic clinical syndrome compatible with mushroom poisoning by this group--upper and lower gastrointestinal symptoms followed by hepatic and/or renal failure	a) demonstration of toxic chemical in epidemiologically incriminated mushrooms OR b) epidemiologically incriminated mushrooms identified as a toxic type
Groups containing muscarine, psilocybin and psilocin, gastrointestinal irritants, disulfiram-like coupounds	a) chararacteristic incubation period b) clinical syndrome compatible with mushroom poisoning by these groups	a) demonstration of toxic chemical in epidemiologically incriminated mushrooms OR b) epidemiologically incriminated mushroom identified as toxic type

	Clinical Syndrome	Laboratory and/or Epidemiologic Criteria
5. Paralytic and Neurotoxic shellfish poison	a) incubation period 10 min to 1 hr b) clinical syndrome compatible with paralytic shellfish poisoning--often including paraesthesias of lips, mouth or face and often upper and lower gastrointestinal symptoms	a) detection of toxin in epidemiologically incriminated mollusks OR b) detection of large numbers of shellfish poisoning-associated species of dinoflagellates in water from which epidemiologically incriminated mollusks gathered
6. Other chemicals	a) clinical data appraised in individual circumstances	a) laboratory data appraised in individual circumstances
PARASITIC AND VIRAL		
1. Trichinella spiralis	a) 2 or more cases b) incubation period 3-28 days c) clinical syndrome compatible with trichinosis--often including fever, high eosinophil count, orbital edema, myalgia	a) muscle biopsy from ill individual OR b) serological tests OR c) demonstration of larvae in incriminated food
2. Hepatitis A	a) incubation period 10-50 days b) clinical syndrome compatible with hepatitis--usually including jaundice, GI symptoms, dark urine	a) liver function tests compatible with hepatitis in affected persons who consumed the epidemiologically incriminated food
3. Others	a) clinical evidence appraised in individual circumstances	a) laboratory evidence appraised in individual circumstances

III. WATERBORNE DISEASE OUTBREAKS, 1974

This report summarizes data on waterborne disease outbreaks reported to CDC in 1974.

A. Definition of Outbreak

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

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

B. Sources of Data

Waterborne disease outbreaks are reported to CDC by state health departments. No standard reporting form is used but one has recently been devised and is presently being field tested in 8 states (see Section F). In addition, the Water Supply Research Laboratory, Environmental Protection Agency (EPA), contacts all state water supply agencies to obtain information about additional outbreaks. Personnel from CDC and EPA work together in the evaluation and investigation of waterborne disease outbreaks. When requested by a state health department, CDC and EPA can offer epidemiologic assistance and provide expertise in the engineering and environmental aspects of water purification. Data obtained on outbreaks are reviewed and summarized by representatives from CDC and EPA. A line listing of reported waterborne disease outbreaks in 1974 is included (see Section G).

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

C. Interpretation of Data

Data included in this summary of waterborne disease outbreaks have limitations similar to those outlined in the foodborne disease summary and must be interpreted with caution since they represent only a small part of a larger public health problem. These data are helpful in revealing the various etiologies of waterborne disease, the seasonal occurrence of outbreaks, and the deficiencies in water systems that most frequently result in outbreaks. As in the past, the pathogen(s) responsible for many outbreaks in 1974 remains unknown. It is hoped that advances in laboratory techniques and standardization of reporting of waterborne disease outbreaks will augment our knowledge of waterborne pathogens and the factors responsible for waterborne disease outbreaks.

D. Analysis of Data

In 1974, 28 waterborne disease outbreaks (see Section G) involving 8,413 cases were reported to CDC (Table 1). The largest was an outbreak of giardiasis that occurred in Rome, New York. It was also the largest outbreak of giardiasis that has occurred in the United States; an estimated 4,800 persons had symptomatic giardiasis. The outbreak was also noteworthy because, for the first time, a *Giardia lamblia* cyst was demonstrated in water and, also for the first time, the water was shown to be infective for laboratory animals.

Table 1

Waterborne Disease Outbreaks,
1971--1974

	1971	1972	1973	1974	Total
Outbreaks	18	29	24	28	99
Cases	5,179	1,638	1,720	8,413	16,950

The second, third, and fourth largest outbreaks in 1974 also involved over 500 persons each. The second largest outbreak was in Richmond Heights, Florida; it involved about 1,200 cases of an acute gastrointestinal illness, some, if not all, of which were caused by Shigella sonnei. The third largest outbreak occurred in Big Sky, Montana, and involved 615 cases of acute gastrointestinal illness; the etiology was not definitely determined, but Yersinia enterocolitica was suspected when it was isolated from a well water sample. The fourth largest outbreak involved an estimated 600 persons at a camp at Lake Como, Pennsylvania, and was caused by Shigella sonnei.

There were no reported deaths associated with waterborne disease outbreaks in 1974.

Figure 1 shows the geographic distribution of outbreaks by state. Nineteen states reported at least 1 outbreak.

Fig. 1 **WATERBORNE OUTBREAKS, 1974**

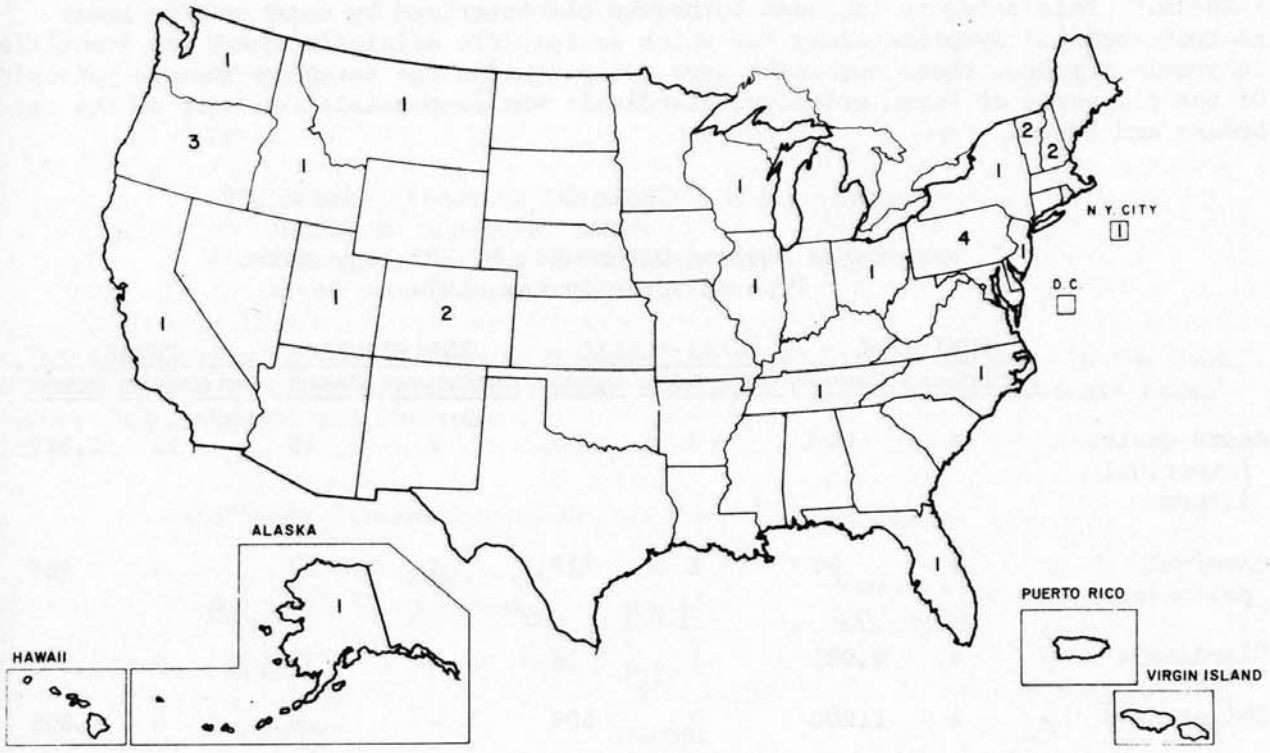


Figure 2 depicts the trend in reported waterborne disease outbreaks over the last 3 decades. During the last 3 years, there has been an increase in the annual average number of reported outbreaks. This increase probably represents in part a renewed interest in the reporting of disease outbreaks and in other surveillance activities.

Fig. 2 **AVERAGE ANNUAL NUMBER WATERBORNE DISEASE OUTBREAKS, 1938-1974**

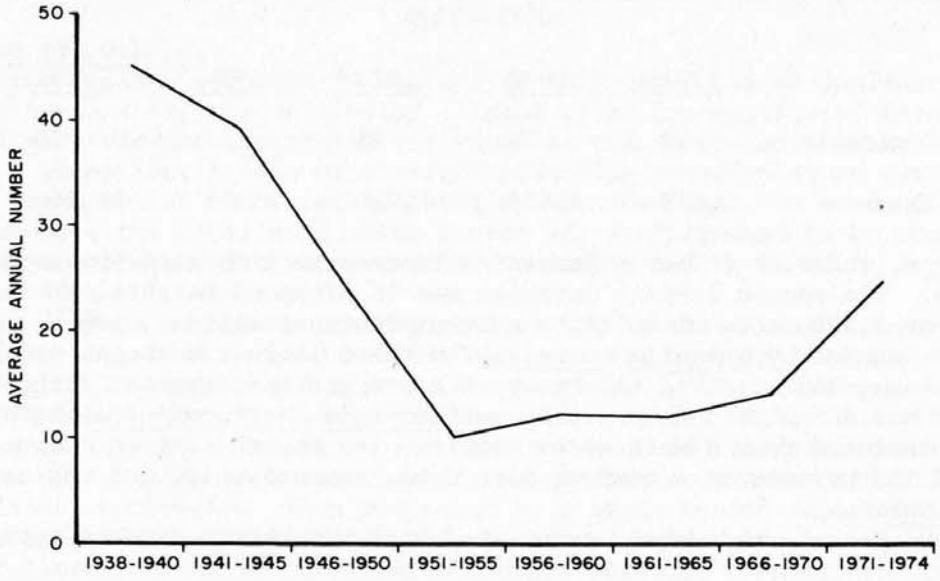


Table 2 shows the number of outbreaks and cases by etiology and type of water system. The category with the most outbreaks is designated "Acute gastrointestinal illness." This category includes outbreaks characterized by upper and/or lower gastrointestinal symptomatology for which no specific etiologic agent was identified. In previous years, these outbreaks were grouped under the category "sewage poisoning." Of the illnesses of known etiology, giardiasis was responsible for most of the outbreaks and cases.

Table 2

Waterborne Disease Outbreaks, by Etiology and Type of Water System, 1974

	MUNICIPAL		SEMI-PUBLIC		INDIVIDUAL		TOTAL	
	Outbreaks	Cases	Outbreaks	Cases	Outbreaks	Cases	Outbreaks	Cases
Acute gastro-intestinal illness	4	440	5	847	2	25	11	1,312
Chemical poisoning	3	39	1	213	1	17	5	269
Giardiasis	4	4,930	1	18	2	39	7	4,987
Shigellosis	1	1,200	2	606	-	-	3	1,806
Salmonellosis (non-typhoid)	-	-	1	34	-	-	1	34
Typhoid	-	-	-	-	1	5	1	5
Total	12	6,609	10	1,718	6	86	28	8,413

Most outbreaks involved municipal (43%) and semi-public (36%) water systems and fewer involved individual water systems (21%). Outbreaks attributed to water from municipal systems affected an average of 551 (6609/12) persons compared with 172 (1718/10) persons in outbreaks attributed to water from semi-public systems, and 14 (86/6) persons in outbreaks attributed to water from individual systems. Of the 10 outbreaks associated with semi-public water supplies, 8 (80%) involved visitors to areas used mostly for recreational purposes, and 4 of the 8 occurred in July and August (Table 3).

Table 3

Waterborne Disease Outbreaks Involving Semi-Public Water Supplies, by Month and Population Affected, 1974

Month	Number of Outbreaks	Usual Population*	Visitors**
January	1		1
February			
March			
April	1		1
May			
June	1	1	
July	3	1	2
August	2		2
September			
October	1		1
November			
December	1	—	1
Total	10	2	8

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

The distribution of all outbreaks by month is shown in Table 4. As in the past, outbreaks tended to occur during the summer months; 18(64%) of the outbreaks began in June, July, August, and September.

Table 4

Waterborne Disease Outbreaks, by Month of Occurrence, 1974

Month	Number of Outbreaks	Month	Number of Outbreaks
January	2	July	4
February	1	August	6
March	1	September	4
April	1	October	1
May	0	November	2
June	4	December	2
	Total	28	

In Table 5, outbreaks and cases are classified by type of water system and the system deficiency responsible for the outbreak. In all the outbreaks which involved more than 20 persons, the cause of the system deficiency was untreated or inadequately treated water, i.e., 1 of the first 3 types of deficiencies listed in Table 5. These 3 types of deficiencies accounted for 99% of the total cases.

Table 5

Waterborne Disease Outbreaks, by Type of System and Cause of System Deficiency, 1974

	MUNICIPAL		SEMI-PUBLIC		INDIVIDUAL		TOTAL	
	Outbreaks	Cases	Outbreaks	Cases	Outbreaks	Cases	Outbreaks	Cases
Untreated surface water*	4	4,930	1	18	3	59	8	5,007
Untreated ground water	-	-	4	1,290	1	5	5	1,295
Treatment deficiencies**	3	1,609	4	404	-	-	7	2,013
Deficiencies in distribution system	4	58	-	-	-	-	4	58
Miscellaneous***	1	12	1	6	2	22	4	40
TOTAL	12	6,609	10	1,718	6	86	28	8,413

*Includes 3 municipal outbreaks of giardiasis in which surface water was treated with chlorination but not filtered.
**Includes outbreaks in systems using a known contaminated source for which chlorination is required at all times to ensure potability.
***Includes 1 outbreak of shigellosis (Ohio) in which illness was associated with drinking from a water fountain, 1 outbreak of acute gastrointestinal illness (Pennsylvania) traced to ice cubes from a commercial ice vending machine, 1 outbreak of giardiasis (Tennessee) in which the water source was on underground cistern, and 1 outbreak of phenol poisoning (Wisconsin) in which the water was obtained from accidentally contaminated wells.

E. Waterborne Outbreaks on Cruise Ships or Abroad

Waterborne outbreaks involving passengers on cruise ships or travelers to foreign countries, and outbreaks associated with water that is not used for drinking are not included in this report's tabulations. Nevertheless, they represent important aspects of waterborne disease and those outbreaks involving the traveling public constitute a continuing public health problem. The following reports of 3 such outbreaks are taken verbatim from Morbidity and Mortality Weekly Report.

Salmonellosis on a Caribbean Cruise Ship
(MMWR 23(39):333, 1974)

On August 13, 1974, representatives of the Royal Caribbean Cruise Line reported to CDC's Miami Quarantine Station the occurrence of 118 cases of gastrointestinal illness in passengers and crew aboard the M/S Sun Viking which sailed from Miami at 5:30 p.m. on August 3 on a 2-week Caribbean cruise. Two passengers had been hospitalized in San Juan, Puerto Rico, the first port-of-call, on August 6. Stool cultures obtained in San Juan from these 2 individuals and from a pastry man aboard

the ship who had also experienced diarrhea had grown salmonella group D organisms. Two of these 3 isolates were later sent to CDC and identified as Salmonella enteritidis.

A questionnaire survey of passengers and crew was conducted on August 15 and 16, at which time there were 787 passengers and 319 crew members aboard. Questionnaires were returned by 751 (95%) passengers and 298 crew members (93%). A case of gastrointestinal illness in passengers was defined as the occurrence of loose or watery bowel movements alone, abdominal cramps and 1 other gastrointestinal symptom, or abdominal cramps and either fever or headache. Because the investigators and some crew members could not communicate in any common language, a case of illness in a crew member was defined simply as the occurrence of diarrhea.

Of the 695 passengers who embarked in Miami and returned questionnaires, 274 (39%) became ill. In contrast, only 3 of the 54 passengers (6%) who boarded the ship in Venezuela on August 12 had any gastrointestinal illness. The difference was significant ($X^2 = 23.23$, $p < .001$). Forty-one of 298 crew members (14%) had diarrhea between August 3 and 15. The attack rate for crew was significantly lower than for passengers ($X^2 = 52.74$, $p < .001$). Ten passengers were hospitalized aboard ship; 9 of them were treated with intravenous fluids, and none received antibiotics. Two of these 10 passengers were subsequently hospitalized ashore. No deaths occurred.

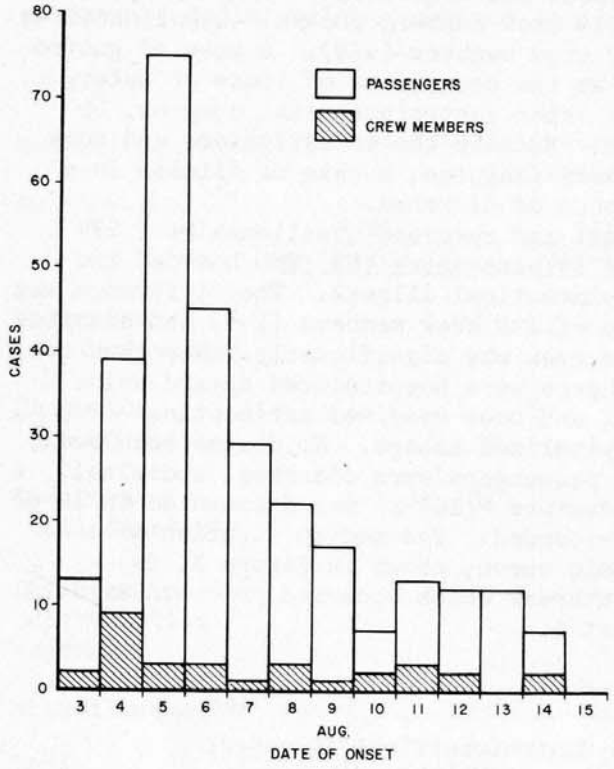
Symptoms most frequently reported by ill passengers were diarrhea, abdominal cramps, and headache (Table 6). Fever (temperature > 100°F) was documented in 18 of the 23 passengers on whom temperatures were recorded. The median duration of illness in passengers was 4 days. The epidemic curve, shown in Figure 3, is compatible with an explosive common-source outbreak which occurred prior to arrival at the first port-of-call, San Juan, on August 6.

Table 6

Symptoms of Passengers with Gastrointestinal Illness

Symptom	Number Responding	Respondents with Symptom	
		Number	Percent
Diarrhea	274	256	93
Abdominal cramps	271	206	76
Headache	273	171	63
Chills	273	143	52
Nausea	271	142	52
Fever	264	126	48
Vomiting	272	71	26
Tenesmus	271	46	17
Blood in stool	273	14	5

Fig. 3 GASTROINTESTINAL ILLNESS BY DATE OF ONSET, M/S SUN VIKING, AUGUST 3-15, 1974



S. enteritidis was isolated from rectal cultures obtained from 50 of 71 ill passengers (70%) and 23 of 42 non-ill passengers (55%) who boarded the ship in Miami. Rectal cultures from 6 of 22 ill (27%) and 6 of 47 (13%) non-ill crew members were also positive for S. enteritidis. Foodhandlers were no more likely to have positive cultures than other crew members. In addition, Salmonella javiana was isolated from 1 passenger and 1 crew member, and Salmonella eimsbuettel was isolated from 1 crew member. Eighty-three environmental swabs and 23 food specimens were negative for salmonella organisms.

Epidemiologic investigation revealed that passenger cases did not cluster in any part of the ship. Eating at the midnight buffet on either the first or second night of the cruise was not associated with illness. Because adequate food consumption histories could not be obtained on the ship's return to Miami, a random sample of ill culture-positive passengers and 18 of 19 culture-negative passengers who did not experience gastrointestinal illness during the cruise were interviewed by telephone after the cruise to determine the risk of illness associated with eating certain foods served during the first 2 days of the cruise. None of the food items could be significantly statistically associated with illness.

Attack rates did not differ significantly between crew members who ate food from the passenger galley and those who ate food prepared in the crew galley. An inspection of the passenger and crew galleys revealed in general an adequate sanitary environment. However, several refrigerators had elevated temperatures of 48-58°F. Some counter tops, mixing utensils, and knives were not clean. In addition, raw chicken was stored in a refrigerator that also held cooked meats.

Attack rates could not be significantly statistically correlated with the amount of water or of beverages containing ice consumed by passengers or crew during the cruise.

Potable water is disinfected aboard the ship by ultraviolet light. In addition, prior to and at the time of the outbreak, water in the potable-water tanks was routinely batch chlorinated each week; batch chlorination was performed during the cruise on August 7 and 14. Water cultures from "raw" (not yet treated on board) and potable-water tanks and the distribution system revealed no coliform contamination. However, 1 of 5 water samples obtained from the potable-water distribution system on August 16 grew S. enteritidis. The positive sample was obtained from the water tap in the sink in the chief engineer's bathroom, which was located at the furthest peripheral point in the potable water distribution system. The steward responsible for cleaning the cabin had experienced diarrhea, which began on August 4 and lasted 3 days. A rectal culture obtained from this steward on August 16 yielded S. enteritidis. Subsequent investigation revealed no evidence of cross-connections between the potable water and sewage systems.

Control measures consisted of disinfecting the galleys and all raw and potable water tanks, initiating the practice of batch chlorinating the raw water

tanks at the time of bunkering and monitoring the free residual chlorine in the potable water distribution system daily. In addition, elevated refrigerator temperatures were lowered to the recommended 45°F, and company personnel were advised to store raw and cooked meats in separate refrigerators. Culture-positive foodhandlers were removed from duty until 3 consecutive negative cultures were obtained.

On 2 subsequent 2-week cruises, 4 and 1 cases of diarrhea, respectively, were reported in passengers and crew. This incidence is well within expected rates for 2-week Caribbean cruises (1).

(Reported by the Epidemiologic Services Laboratory Branch and the Enteric Diseases Branch, Bacterial Diseases Division, and the Quarantine Division, Bureau of Epidemiology, CDC; and 2 EIS Officers.)

Editorial Note

The explosive common-source outbreak occurred aboard ship before it arrived at the first port-of-call. Epidemiologic investigation failed to clearly implicate either food or water. The isolation of S. enteritidis from a single rectal swab taken from 55% of 42 non-ill passengers cultured 11 days after the peak of the outbreak suggests that the majority of non-ill passengers may have also been exposed to a contaminated vehicle. The significance of the single isolation of S. enteritidis from water is unclear.

Reference

1. Survey of the incidence of gastrointestinal illness in cruise ship passengers. Morbidity and Mortality Weekly Rep 23:65-66, 16 Feb 1974

Giardia Lamblia Infection in Travelers to the Soviet Union
(MMWR 23(9):78, 1974)

In July 1973, CDC was notified of 3 cases of Giardia lamblia infection in nurses who had recently returned from a tour of the Soviet Union. Subsequent investigation revealed that the nurses were members of 1 of 3 professional seminar tours sponsored by the American Association of Nurse-Anesthetists. The first 2 tour groups departed on May 6, 1973, and returned on May 15, while the third group traveled between May 13 and 23. Between September and December 1973, information was sought on the 399 tour participants concerning their age, sex, occupation, illness, symptoms, duration of illness, hotel lodging, food and water exposure, and health precautions. Nearly 80% of them (318) responded. Stool specimens were obtained from 136 (43%) of those who provided information. The group ranged in age from 18 to 76, and 282 were females. Illness during the tour or shortly after return from the Soviet Union was reported by 113 (36%) persons.

An individual was considered to have giardiasis if he had either 1) a positive stool examination or 2) a diarrheal illness lasting 1 week or longer. Using this definition, 70 (22%) of the 318 persons completing the questionnaire were diagnosed as having giardiasis. Of the 70 cases, 30 had positive stool examinations, and 18 did not submit a specimen. There was no difference in symptoms, duration of illness, and incubation period between ill cases diagnosed by positive stool examination and those diagnosed clinically. Eight individuals who had positive stools were asymptomatic. Diarrhea was the most common symptom followed by cramps, nausea, and weakness (Table 1). Fever occurred in only 10 cases. The mean duration of illness was 6.5 weeks (range--1 to 30 weeks), and the mean time period until the onset of illness since entering the Soviet Union was 14.7 days (range--1 to 43 days).

All members of the tour group visited both Moscow and Leningrad. Infection with G. lamblia was not related to ingestion of uncooked vegetables or ice cream or eating at a specific restaurant. However, a history of drinking tap water was more common among cases than non-cases. Only 2 of the 69 cases from whom information was obtained gave a history of not drinking tap water compared with 33 of 243 non-cases ($\chi^2 = 5.13$, $p > 0.05$).

(Reported by Mark Kaplan, M.D., Carol Singer, M.D., Infectious Disease Fellows, and Donald Armstrong, M.D., Chief, Infectious Disease Service, James Ewing Memorial Hospital, New York City; Pascal J. Imperato, M.D., Director, Bureau of Infectious Disease Control, New York City Department of Health; and the Parasitic Diseases and Veterinary Public Health Division, Bureau of Epidemiology, CDC.)

Editorial Note

This outbreak of G. lamblia infection among participants in tours to the Soviet Union is representative of other epidemics of giardiasis in travelers to the USSR reported to CDC since 1969. The first reports of epidemic giardiasis among travelers to the Soviet Union appeared in 1970 (1,2). Since then, reported outbreaks have occurred in American (3) and Swedish travelers (4,5).

G. lamblia is a flagellated protozoan of the small intestine. Clinical manifestations of Giardia infection can range from asymptomatic cyst passage to severe malabsorption syndrome. Illness usually begins toward the end of the trip or shortly after return home, and the mean duration of illness is 2-3 months. Prominent symptoms include diarrhea (often greasy and malodorous), abdominal cramps, fatigue, weight loss, flatulence, anorexia, and nausea. Treatment with metronidazole or quinacrine is highly effective in both symptomatic and asymptomatic infections.

Between 1969 and 1973, CDC received information on 1,419 persons who were members of 47 tour groups that had traveled to various cities in the Soviet Union. Among these persons, a case was defined as a person with a positive stool examination for G. lamblia or diarrhea lasting more than 1 week. There was no difference in symptoms, duration of illness, and incubation period between ill persons diagnosed by positive stool examination and those diagnosed clinically. An attack rate of 23% was found among these groups. Epidemiologic evidence implicated Leningrad as the site of infection ($X^2 = 51.14$, $p < 0.001$) and tap water as the probable vehicle of transmission ($X^2 = 7.13$, $p < 0.01$). Many patients after their return to the United States underwent unnecessary laboratory tests and suffered long delays before the diagnosis was made since many physicians did not include Giardia infection in their differential diagnosis of traveler's diarrhea.

Giardiasis should be considered in any person with a diarrheal illness lasting 1 week or longer who has recently traveled outside the United States. There is no known chemoprophylaxis for giardiasis. Although the ingestion of ice cream, unpeeled fruit, and inadequately cooked food are often associated with diarrheal disease in travelers, they were not associated with an increased risk of giardiasis in the studies reported here. Measures such as avoiding ingestion of tap water and of uncooked, unpeeled fruits and vegetables may be effective, although infection has been documented in persons who followed these precautions.

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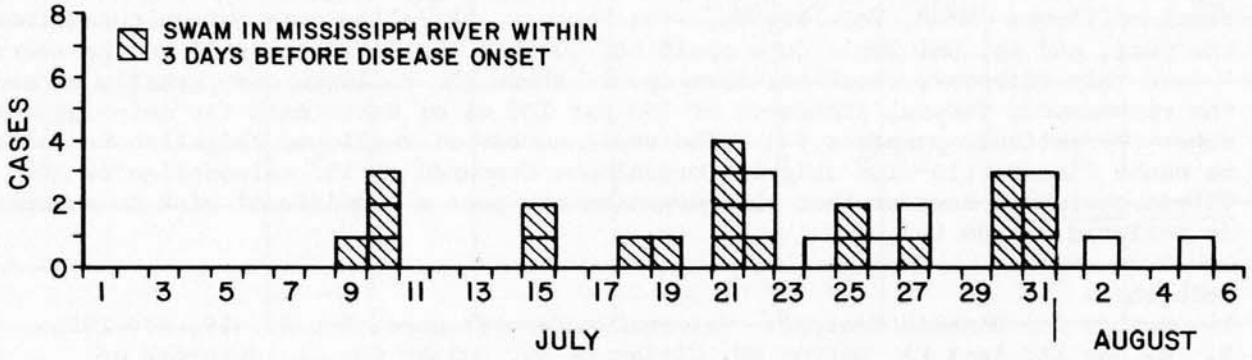
Shigellosis Associated with Swimming in the Mississippi River--Iowa
(MMWR 23(46):398, 1974)

Thirty-nine culture-positive cases of shigellosis occurring in 29 families between July 9 and August 5, 1974, were reported to the City and County Health Departments, Dubuque, Iowa, by August 30. Symptoms included diarrhea (100%),

accompanied by fever (95%), abdominal pain (79%), chills (51%), headache (51%), vomiting (49%), and blood in stools (23%). Thirty-seven persons (95%) consulted a physician, 16 (41%) were hospitalized, and 1 underwent surgery for acute appendicitis. All isolates were Shigella sonnei.

Investigation revealed that 21 (72%) of the initial cases in each family had swum in a 5-mile portion of the Mississippi River about 6-11 miles south of Dubuque within 3 days before disease onset; 10 of these 21 persons swam at the same spot, a small beach near a camping park 10 miles south of Dubuque. The median age of all swimmers was 5 years and of the other initial cases, 12.5 years. Only 2 cases, both swimmers, had shared food or had personal contact; only 2 of the 10 swimmers from the park beach had consumed food or water while there. Swimming exposures and disease onsets for the 29 initial cases occurred over a 28-day period (Figure 4). Comparison of these cases with a neighbor-matched control group showed a statistically significant correlation ($p<.0000001$) between swimming and illness.

Fig. 4 **29 INITIAL SHIGELLOSIS CASES BY DATE OF ONSET, DUBUQUE, IOWA, JULY 9 - AUGUST 5, 1974**



A retrospective telephone survey of 60 family groups who had camped at the park showed a statistically significant association between diarrheal illness and swimming at the beach near the park ($p<.0001$) but no association with drinking water from the well or consuming food prepared at a park restaurant. The attack rate among all swimmers was 13%; among those swimmers who remembered getting river water in their mouths it was 21%. The attack rate for swimmers less than 20 years old (16%) was more than twice that for swimmers over 20 (6%).

S. sonnei isolates from the 21 swimmers were examined for antibiogram and colicin type. Isolates from 6 were resistant to tetracycline, streptomycin, carbenicillin, and ampicillin, sensitive to 8 other antibiotics tested, and colicin untypable. Isolates from 12 were resistant to tetracycline, streptomycin, and sulfathiazole and were colicin type 9. Isolates from 2 were resistant only to sulfathiazole and were colicin type 9. The antibiogram and colicin type of the isolate from 1 swimmer were unknown.

Water samples were obtained from a 5-mile stretch of river between the Dubuque sewage treatment plant and the swimming area on August 2, 5, 7, 13, and 20. Mean fecal coliform counts were 17,500 organisms per 100 ml in the swimming area near the park and 6,500 organisms per 100 ml 5 miles upstream just below the outfall of the Dubuque sewage treatment plant. S. sonnei, with the same antibiogram and colicin type as the isolates from 6 cases (resistant to tetracycline, streptomycin, carbenicillin, and ampicillin, colicin untypable), was isolated at the Mercy Medical Center Laboratory in Dubuque from a sample of water obtained at the swimming area on September 4. Several possible sources of river contamination were found, but the specific source of shigella contamination could not be identified.

A ban was posted on swimming and waterskiing in the involved area on August 2, and no cases directly attributable to river contact in that area occurred after the ban was announced. Investigations were initiated to further identify and correct sources of river contamination.

(Reported by John Schaefer, and Ray Ann Moriarity, Bacteriology Laboratories, Mercy

Medical Center; Mary Gleason Kline, Frances Kringle, Glenann Slade, Mary Jane Toner, Mary Unsen, Public Health Nurses, and Arthur J. Roth, Jr., M.P.H., City Health Administrator, Dubuque City Health Department; David Kunkel, Sanitarian, and Isabel Hagge, Public Health Nurse, Dubuque County Health Department; Kenneth K. Hazlet, M.D., Director, Dubuque City and County Health Departments; Kim Deppe, Public Health Nurse, Jackson County Health Department; Franklin P. Koontz, Ph.D., Assistant Director, William J. Hausler, Ph.D., Director, Iowa State Hygienic Laboratories; Kenneth Choquette, Director, Health Engineering Section, William Permar, Robert Olsen, Frank Thompson, and Charles A. Herron, M.D., State Epidemiologist, Iowa State Department of Health; and an EIS Officer.)

Editorial Note

Epidemiologic data strongly implicated swimming in the Mississippi River as the vehicle of transmission of shigellosis for 21 of the 29 initial cases in this study. Other infectious diseases associated with swimming in polluted natural waters include hepatitis (MMWR, Vol. 20, No. 26), typhoid fever (1), dermatitis (MMWR, Vol. 18, No. 41), primary amebic meningoencephalitis (MMWR, Vol. 20, No. 24), and leptospirosis (2). An outbreak of shigellosis in 1969 in Medford, Oregon, was traced to 8 index patients, 2 to 6 years old, who had used a wading pool grossly contaminated with fecal coliforms (MMWR, Vol. 18, No. 46); however, shigellae were not cultured from the pool, and epidemiologic data could not further implicate the pool as the source.

In this outbreak, fecal coliform counts where the children swam greatly exceeded the recommended federal standards of 200 per 100 ml of water used for swimming and other recreational purposes (3). The small number of swallowed shigellae necessary to cause disease (10^1-10^2 shigella organisms, compared to 10^5 salmonellae or 10^8 Vibrio cholerae) suggest that this organism may pose a significant risk to swimmers in polluted waters (4).

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F. INVESTIGATION OF A WATERBORNE OUTBREAK

Pretest

1. Where did the outbreak occur?

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

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

_____ (3-8)

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

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

4. History of exposed persons:

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

5. Incubation period (hours):

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

6. Duration of illness (hours):

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

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

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

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

9. Water supply characteristics

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

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

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

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

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

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

10. Point where contamination occurred: (66)

☐ Raw water source ☐ Treatment plant ☐ Distribution system

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

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

CDC 4.461
2-75

11. Water specimens examined: (67)

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

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

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

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

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

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

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

14. Unusual occurrence of events:

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

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

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

16. Etiology: (69-70)

Pathogen _____

Chemical _____

Other _____

(71)

Suspected 1

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

Unknown 3

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

Name of reporting agency: (72)

Investigating Official:

Date of investigation:

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

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

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

CDC 4.461 (Back)
2-75

G. LINE LISTING OF WATERBORNE DISEASE OUTBREAKS

G. Line Listing of Waterborne Disease Outbreaks, 1974

State	Month	Disease	Cases	Type of System	System Deficiency*
Alaska	July	Salmonella typhimurium gastroenteritis	34	Semi-public	3
California	September	Acute gastrointestinal illness	18	Individual	1
Colorado	August	Acute gastrointestinal illness	85	Semi-public	3
Colorado	June-July	Giardiasis	18	Semi-public	1**
Florida	January-March	Shigella sonnei gastro-enteritis***	1,200	Municipal	3
Idaho	March	Acute gastrointestinal illness	9	Municipal	3
Illinois	September	Furadan insecticide poisoning	1	Municipal	4
Montana	December 1974-January 1975	Acute gastrointestinal illness	615	Semi-public	2
New Hampshire	June-August	Giardiasis	78	Municipal	1**
New Hampshire	August	Acute gastrointestinal illness	7	Individual	1
New Jersey	January-February	Acute gastrointestinal illness	57	Semi-public	2
New York	September	Acute chromate poisoning	20	Municipal	4
New York	November 1974-June-1975	Giardiasis	4,800	Municipal	1**
North Carolina	April	Acute fluoride poisoning	213	Semi-public	3

Ohio	July	Shigella gastroenteritis	6	Semi-public	5
Oregon	February	Cutting oil poisoning	18	Municipal	4
Oregon	August	Acute gastrointestinal illness	19	Municipal	4
Oregon	August	Acute gastrointestinal illness	400	Municipal	3
Pennsylvania	June	Acute gastrointestinal illness	12	Municipal (Ice vending machine)	5
Pennsylvania	July	Acute gastrointestinal illness	72	Semi-public	3
Pennsylvania	August	Shigella sonnei gastro-enteritis	600	Semi-public	2
Pennsylvania	October	Acute gastrointestinal illness	18	Semi-public	2
Tennessee	August 1973****	Giardiasis	5	Individual	5
Utah	September	Giardiasis	34	Individual	1
Vermont	November 1974-April 1975	Giardiasis	32	Municipal	1**
Vermont	December 1973**** April 1974	Giardiasis	20	Municipal	1**
Washington	June	Typhoid fever	5	Individual	2
Wisconsin	July	Phenol poisoning	17	Individual (Multiple)	5

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

**Surface water treated only with chlorination

***Only 10 cases culture-proven but clinical signs and symptoms of others compatible with shigellosis

****Outbreak began in 1973 but reported in 1974

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V. ARTICLES ON FOODBORNE AND WATERBORNE DISEASE OUTBREAKS, 1974, TAKEN FROM MORBIDITY AND MORTALITY WEEKLY REPORT

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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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