

1956 Summary of Disease Outbreaks

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THE PATTERN of disease outbreaks in 1956, especially those which were waterborne or foodborne, did not differ materially from that of the previous 5 years. About the same proportion of waterborne and foodborne outbreaks occurred in schools, public eating places, and private homes. Likewise, many of the underlying causes, namely, poor food-handling practices, were mentioned as frequently in the reports for 1956 as in former years.

An examination of the reports of epidemiological investigations of disease outbreaks of all types during the year suggests that a considerable number were conducted with a minimum amount of effort on the part of the investigator. At the other extreme, some reports indicated that unusual occurrences of disease were investigated with meticulous attention to pertinent details.

Some investigations falling into the first category were limited in scope because the epidemic was brought to the attention of health authorities so late that a satisfactory report could not be made. Other outbreaks may have received scant attention because they were not considered to be important, and still others perhaps because trained personnel were not available for conducting investigations.

On the other hand, as there are each year, a number of reports of investigations were outstanding, although not all were concerned with diseases or illnesses of great public health importance. For instance, one widespread outbreak of typhoid fever was investigated and

reported in great detail, and the probable source of infection was determined. Other examples include a large number of human cases of psittacosis, occurring in one State, which were associated with turkeys; a foodborne outbreak of gastroenteritis in a high school; an outbreak of shigellosis traced to a water supply; and a number of investigations of single cases of a disease, including plague and suspected smallpox. Many of the investigations were conducted by teams of specialized personnel from local, State, Federal, and, occasionally, nongovernmental agencies. The various types of skills found in such teams might include those of medical officers, microbiologists, veterinarians, sanitary engineers, or entomologists. When the talents of such persons are brought to bear on a disease outbreak problem, it is probable that the underlying as well as the immediate causes will be brought to light.

Waterborne Disease Outbreaks

There was an increase in the number of waterborne disease outbreaks in 1956 compared with those of the past several years. In 1955, there were only two outbreaks with an unknown number of cases, probably less than 50. However, in 1956, there were 9 waterborne outbreaks of disease in which 1,719 persons were affected.

The 1956 outbreaks represent 2 rather large and 2 small outbreaks among persons who drank water from contaminated public systems. One outbreak involving about 800 persons was classified as shigellosis. *Shigella flexneri* was isolated from stool specimens from several of the patients. The specific organism was not found in the water, but an organism resembling shigella was isolated. There was

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substantial evidence that the city supply had been contaminated with raw water from a mountain stream. Evidence of fecal contamination was found along the stream, probably deposited there by campers known to have used the area. In another outbreak, about 700 persons in a small town became ill after the public water supply became heavily contaminated with surface drainage following a sudden rain storm. A third outbreak occurred in one section of a city. Here, the supply was contaminated by raw water from a stream being forced into the public water system by a sprinkler system pump of a resident living in the area of contamination. The fourth outbreak was traced to contamination of the water system during repair of a city main. When a ditch was opened about the main it filled with water from seepage, necessitating continuous pumping while the repair was being done. Although the line was flushed upon completion of the work, no sterilizing agent was used.

Three other outbreaks of gastroenteritis occurred in camps where untreated water was being used. In one camp, the local water company pumped raw creek water into the system because a well, ordinarily used as a source of supply, produced insufficient water during periods of peak demand. The remaining outbreaks were in two separate families whose water supply was private. In one family, *Salmonella typhimurium* was isolated from stool specimens, and the water in an old dug well was found to be contaminated. The outbreak in the other family resulted from poison being dumped into a well.

Three other disease outbreaks were reported in which water was suspected, but definite evidence was lacking. One was hepatitis (number of cases unknown) in a school. Another was among social workers at a gathering held in a place where new water pipes had been installed. It was reported that the pipes had not been flushed when the system was placed in operation. The third occurred in persons attending a church camp and is described under typhoid fever.

Milkborne Disease Outbreaks

The number of milkborne disease outbreaks also exceeded the number reported in 1955.

This is because 27 outbreaks of staphylococcal food poisoning involving more than 700 persons resulted from the ingestion of milk reconstituted from dry milk. Most of these outbreaks occurred among school children who drank United States surplus dry milk furnished through the school lunch program. No outbreak in 1956 was associated with pasteurized milk. Four cases of brucellosis occurred in a rural family who used raw milk from infected cows. Among customers of a restaurant, 80 persons became ill after eating a cheese sauce. Although none of the sauce was available for bacteriological examination, there was sufficient epidemiological evidence to incriminate it. The ingredients offered a rich media for pathogenic organisms, and the product was left at room temperature for 4 or 5 hours. The source of infection in two other outbreaks was traced to ice cream served at family gatherings, one of which was a picnic. In one outbreak, *S. typhimurium* was isolated both from the ice cream and from stool specimens of the patients. No source for either of these outbreaks was found. The second outbreak was believed to have been milkborne. Raw milk used in ice cream was considered to be the vehicle of infection. This, however, was not proved.

Other Foodborne Disease Outbreaks

The number (210) of foodborne outbreaks other than milk and milk products reported in 1956 is a little more than the 193 in 1955 but less than the 234 in 1954. This amount of variation suggests that no significant changes have occurred in incidence of these foodborne diseases in the past 3 years.

Most of the outbreaks were staphylococcal food poisoning, followed closely by unspecified types of gastroenteritis. A few miscellaneous organisms, including paracolon bacilli and streptococci, were found during the investigations of some outbreaks. Most of the outbreaks of typhoid fever and shigellosis, and almost half of the salmonellosis outbreaks were traced to carriers of the respective organisms who had handled or prepared food. Illness or infection was found in food handlers in a few of the outbreaks of staphylococcal food

poisoning and unspecified gastroenteritis. The sources of most of these outbreaks were not determined, but inadequate refrigeration was commonly a contributing factor permitting incubation of pathogenic organisms in food items.

As in previous years, poultry meat was most often incriminated in the outbreaks. Turkeys accounted for a large proportion and chickens for only a fraction of the total outbreaks. Beef, ham, and pastries were mentioned in almost equal numbers, about the same as in previous years. Potato salad was mentioned in only a few outbreaks but showed almost a five-fold rise over the number for the previous year, when outbreaks attributed to this item reached a low ebb.

Typhoid Fever

During 1956, there was an increase in numbers of cases of typhoid fever reported in the United States. Part of this increase was due to a relatively large number of cases which occurred early in the year in the North Central States. The fact that many of the cases were caused by one phage type (E_1) and that they were scattered over several States suggested that some article of food widely distributed through commercial channels might be the vehicle of infection. However, after an intensive investigation by State and Federal agencies, no common source of infection could be found. This widespread occurrence is not included in table 2.

Another group of persons became infected at one place but became ill in and were reported from several States. However, all of them are included in tables 1 and 2 as an epidemic originating in one State. Following a church camp meeting attended by several hundred people, 27 persons became ill after returning home. Epidemiological evidence indicated that water from a well at the camp site was the medium of spread. Furthermore, an epidemic of mild diarrhea which occurred during the camp meeting strengthened the belief that this supply of water was responsible for spread of the typhoid infection. It was determined that a typhoid carrier had attended the camp

and the organism isolated from her was the same type (C_2) as that isolated from the majority of the cases of typhoid fever.

Six other outbreaks consisting of only a few cases each were reported, all of them in association with carriers. Three were traced to contaminated food, and one was probably waterborne. A number of single cases for which epidemiological reports were received are not included in table 2.

Salmonellosis

Most of the 23 outbreaks of salmonellosis reported in 1956 were attributed to food, but in 6 outbreaks the vehicle of infection was not determined. Of the foodborne outbreaks, 4 were associated with turkeys, 1 with chickens, and 1 with ice cream. One outbreak of salmonellosis was waterborne.

Nine of the outbreaks were traced to carriers. In one outbreak, 521 persons in a mental institution became ill over a 10-day period. A food handler was found to be a carrier of *Salmonella newport*, but two organisms, *S. newport* and *S. typhimurium*, were isolated from stool specimens of cases traced to this source. Two other outbreaks were reported among persons patronizing establishments selling products to the public. In one of these, pre-packaged chicken salad was the vehicle. A total of 323 cases were reported in connection with this outbreak, but the total number was estimated to be at least 3,000 symptomless infections in approximately 100,000 persons who were exposed to 28,000 individual cartons of chicken salad distributed over a 4-week period. Of 18 food handlers who had some contact with this salad, 5 were found to be carriers of *Salmonella blockley*. The second outbreak affected persons who ingested cream-filled cookies from a bakery that distributed this product in several western States. Of the remaining outbreaks, 5 were in universities and schools, 1 in a country club, 1 followed a community gathering, and several smaller outbreaks were in restaurants, labor camps, a farm, a bakery, and a club.

Two outbreaks of salmonellosis occurred in hospital nurseries for the newborn. *Salmonella oranienburg* was isolated in one such out-

break, and the same organism was isolated from a woman in the isolation unit. However, there was no contact between the nursery and the isolation unit except through medical officers and nursing supervisors. The source of this outbreak was not found. The source of the other outbreak was a mother whose stool yielded the same organism as that found in the infants.

Organisms isolated from specimens collected during the investigation of the *Salmonella* outbreaks were *anatum*, *blockley*, *chester*, *enteritidis*, *heidelberg*, *infantitis*, *montevideo*, *meunshen*, *newport*, *oranienburg*, *rabistaw*, *thompson*, and *typhimurium*.

Shigellosis

Of the 8 outbreaks of shigellosis reported, 1 was waterborne, 2 were transmitted by person-to-person contact, and 3 were traced to carriers handling food. In two, the source and mode of infection was not determined.

One of the outbreaks spread by personal contact was in a farm labor camp. Here, poor environmental conditions and lack of adequate water supply were contributing factors. The other was in an elementary school where there was evidence of poor personal hygiene which might allow rapid transmission of the disease by the fecal-oral route. Examination of the restroom facilities at this school revealed that water pressure was low and insufficient to flush toilets during periods of increased water usage and to permit adequate handwashing.

The largest outbreak of shigellosis reported in 1956, involving 800 cases, resulted from contamination of a public water supply by a mountain stream polluted with fecal waste. Three of the outbreaks resulted from the *sonnei* type of organism, and three from the *flexneri* type. *Shigella alkalescens* was isolated from specimens collected during one of the outbreaks, and in another, no specific organism was found.

Staphylococcal Food Poisoning

In 1956, there were 111 outbreaks of staphylococcal food poisoning with 4,313 cases reported as compared with 102 outbreaks with

Table 1. Foodborne and waterborne disease outbreaks reported in 1956 by vehicle of infection

Area	Water		Milk and milk products ¹		Other foods ¹	
	Outbreaks	Cases	Outbreaks	Cases	Outbreaks	Cases
United States	9	1,719	31	873	210	11,133
New England:						
Maine					11	227
Vermont					2	98
Massachusetts					8	129
Rhode Island					1	24
Connecticut					4	162
Middle Atlantic:						
New York	1	6	1	68	9	593
New Jersey					4	167
Pennsylvania					2	38
East North Central:						
Ohio	1	700			7	38
Indiana					5	324
Illinois			1	9	10	528
Michigan					3	269
Wisconsin					1	11
West North Central:						
Minnesota					3	102
Iowa					1	12
Missouri			1	13	4	238
North Dakota					2	72
Kansas						
South Atlantic:						
Maryland	1	10			1	152
District of Columbia					2	39
Virginia					5	236
North Carolina					3	212
Georgia					3	383
Florida					7	182
East South Central:						
Kentucky					6	898
Alabama					1	60
West South Central:						
Arkansas					2	390
Louisiana	1	72			5	622
Texas					1	100
Mountain:						
Montana					1	700
Idaho	1	15			4	20
New Mexico					1	323
Utah	1	800				
Nevada					1	25
Pacific:						
Washington			1	4	5	299
Oregon					6	52
California	3	116	1	80	73	3,331
Alaska					2	3
Hawaii					4	74
Puerto Rico			21	579		
Virgin Islands			5	120		
United States 1955	2	22	3	302	193	9,633
United States 1954	7	452	9	200	234	11,704

¹ Includes outbreaks among military personnel.

Table 2. Foodborne, waterborne, and other disease outbreaks by type of infection, reported in 1956

Area	Typhoid fever		Salmonellosis		Shigellosis		Trichinosis		Botulism		Staphylococcal food poisoning		Gastroenteritis		Toxic agents	
	Outbreaks	Cases	Outbreaks	Cases	Outbreaks	Cases	Outbreaks	Cases	Outbreaks	Cases	Outbreaks	Cases	Outbreaks	Cases	Outbreaks	Cases
United States..	7	52	23	1,999	8	1,107	11	98	11	22	111	4,313	188	6,688	9	160
New England:																
Maine.....	2	8	2	59			2	10			3	131	4	27		
Vermont.....	1	2									1	91	1	7		
Massachusetts.....											7	95	1	34		
Rhode Island.....													1	24		
Connecticut.....											1	20	3	142		
Middle Atlantic:																
New York.....	1	7	1	6					1	1	2	96	6	532		
New Jersey.....							3	34					1	133		
Pennsylvania.....							2	38								
East North Central:																
Ohio.....	1	6	1	9	1	12	1	2					5	718		
Indiana.....					1	11					1	7	3	306		
Illinois.....			3	131							7	206	1	200		
Michigan.....											2	229	1	40		
Wisconsin.....											1	11				
West North Central:																
Minnesota.....											2	56	1	46		
Iowa.....											1	12				
Missouri.....	1	27									2	220	3	31		
North Dakota.....			1	9							2	72				
Kansas.....															1	3
South Atlantic:																
Maryland.....													1	152	1	10
District of Columbia.....											1	19	1	20		
Virginia.....											4	192	1	44		
North Carolina.....			1	200			2	12								
Georgia.....			2	377							1	6				
Florida.....			1	6							3	146	3	34	1	2
East South Central:																
Kentucky.....									1	1	3	209	1	650	1	38
Alabama.....														1	60	
West South Central:																
Arkansas.....											1	40	3	418		
Louisiana.....			1	38			1	2			1	6	3	648		
Texas.....			1	100												
Mountain:																
Montana.....											1	700				
Idaho.....									1	6	1	3	3	26		
New Mexico.....													1	323		
Utah.....					1	800										
Nevada.....													1	25		
Pacific:																
Washington.....			1	135							2	117	2	47		
Oregon.....					1	17					4	23	1	8	1	21
California.....	1	2	7	927	3	211			6	11	30	891	36	2,053	3	26
Alaska.....									2	3						
Hawaii.....			1	2	1	56					1	16				
Puerto Rico.....											21	579				
Virgin Islands.....											5	120				
United States 1955....	5	36	16	971	10	475	5	92	5	14	102	4,130	66	5,160	5	99
United States 1954....	16	92	26	1,164	19	1,471	6	53	8	18	100	4,868	103	5,914	10	279

¹ Includes outbreaks among military personnel.

4,130 cases in 1955. This represents a small increase in both number of outbreaks and number of cases over those for the previous year. During the past 3 years, the number of cases per year has exceeded 4,000. The 26 outbreaks with about 700 cases in Puerto Rico and the Virgin Islands might be considered as one single episode since all resulted from the same product, milk reconstituted from dry milk used in school lunch programs. Although only 36 outbreaks (33 *Staphylococcus aureus* and 3 *Staphylococcus albus*) were laboratory confirmed, there was enough epidemiological evidence to substantiate classification of the remaining outbreaks as staphylococcal food poisoning. In 1955, there were 15 laboratory-confirmed outbreaks and in 1954 the number was 26.

In about half of the outbreaks of staphylococcal food poisoning reported this year, lack of refrigeration or a food handler was given as the source of infection. A typical example of infection by a food handler is the outbreak reported in a high school, where 103 persons became ill following a turkey dinner. An investigation revealed that 1 of the 3 persons who deboned the turkeys had an infected burn on one finger. It was postulated that this individual infected about a third of the meat. The fact that about a third of those who ate turkey became ill from 2 to 6 hours later would seem to make this explanation a reasonable one.

Among the places most often mentioned in connection with these outbreaks of staphylococcal food poisoning were private residences and public eating places, with 18 outbreaks attributed to each. There were 15 outbreaks in schools and colleges, and in 12 outbreaks products from bakeries were considered to be vehicles of infection.

Gastroenteritis

Of the 88 outbreaks of gastroenteritis shown in table 2, 69 resulted from food other than milk and milk products. In these foodborne outbreaks, 5,100 persons were affected. In many instances, no food was available for laboratory tests, and in others, no pathogenic or-

ganisms could be isolated from the suspected food or from stool specimens from the patients. This is similar to the experience in previous years. Bacteriological tests on specimens from 4 outbreaks revealed paracolon organisms, and specimens from 3 yielded streptococci. In one outbreak, an unidentified gram-positive coccus was found.

Six outbreaks of gastroenteritis, with 903 cases, were waterborne, and 2 outbreaks, with 93 cases, were milkborne. In five outbreaks there was evidence of person-to-person spread, suggesting viral infections, but virus isolations were not made. An outbreak in Colorado was first thought to have been waterborne because routine examinations showed the water supply to be substandard, but investigation revealed that the cases were not related to water consumption. The outbreak was regarded as gastroenteritis of viral origin, a type of infection common in the area in certain seasons.

During the year, reports were received of 12 outbreaks of gastroenteritis (2,112 cases) in which turkeys were incriminated. Of these, 9 outbreaks were in schools, 2 in institutions, and 1 followed a church dinner. No etiological agent was found in any of these outbreaks. Some may have been due to salmonella infections, and others possibly were due to *Clostridium welchii*.

Trichinosis

Eleven outbreaks of trichinosis with 98 cases were reported in 1956. About the same number of cases were reported as for 1955, but the number of outbreaks more than doubled. In 1955, one outbreak with 69 cases was reported among members of two fraternities. In 1954, there was no large outbreak, but in 1953 one outbreak with 73 cases in an institution was reported. The largest outbreak in 1956, with 29 cases, resulted from sausage eaten in 3 counties of Pennsylvania. The source was a local butcher who supplied the pork product. In another outbreak, 12 cases developed in persons who ate a German delicacy supplied by a local butcher. One outbreak followed a cocktail party, and one was in a boys' camp. The remainder were in private families, including a

family gathering where only 2 persons developed the disease among the 14 present.

Botulism

Eleven outbreaks with 22 cases (9 deaths) of botulism were reported by 4 States and Alaska. In only one outbreak was the botulism organism isolated, this being type A. There was sufficient evidence, including clinical manifestations, to warrant a diagnosis of botulism in the other outbreaks. Most of the outbreaks involved only one case. However, in 1 outbreak, there were 6 cases (1 death) in a private family. These individuals had eaten home-canned beet greens. Four persons in another family became ill after eating string beans. In Alaska, there were 2 outbreaks, 1 from seal meat and 1 from whale meat, presumably type E infections. Although the organism was not recovered, a heat-labile toxin was found. Also, the investigator has recovered the same type of botulism organism previously in these kinds of meat. Other foods involved in the outbreaks were all home-canned products, including pickled pigs' feet, potatoes, and olives.

Toxic Agents

Two disease outbreaks were from arsenic poisoning, one from spray being blown from a peach orchard to a cabbage field. Sixty people who ate cabbage from this field became ill. The other episode of arsenic poisoning was in a rural family who drank water from a well which was deliberately contaminated with rat poison. Two outbreaks were attributed to food coloring—1 was caused by nitrite from the coloring used in weiners and 1 by copper found in a cake coloring. Three children became ill after playing with an insect spray. Soft drinks were the vehicles of infection from the remainder of the outbreaks. One outbreak resulted from the accidental contamination by insect spray of paper cups used for dispensing the soft drink. In another outbreak, cadmium from a container contaminated an acid drink. The other outbreak was copper poisoning which developed when a defective valve in a dispensing machine permitted carbonated water to back up and remain in contact with cop-

per pipes. The ninth outbreak was due to antimony in an acid drink which had been left too long in a defective coffee pot.

Streptococcal Infections

Only 4 outbreaks of streptococcal food poisoning were reported; 2 were in school, 1 in personnel of the Armed Forces, and 1 in a private household. Three were associated with salads, two of them with egg salads. Although no organisms were isolated from the food, there was good evidence that food handlers had contaminated it. In 1955, egg salad was responsible for one large outbreak of streptococcal food infection reported during that year. A streptococcal organism was isolated from both the salad and the person who prepared it. One outbreak of two cases, in 1956, was from canned spaghetti and meat balls. It probably was contaminated in the home because unopened cans appeared to be normal.

Streptococcal infections not associated with food were reported from three schools and an Armed Forces training center. A total of 776 cases were reported in these 4 outbreaks.

Miscellaneous Outbreaks

During 1956, various outbreaks of illness not associated with food were reported. Some of the more important are summarized briefly in the following paragraphs.

Only two outbreaks of diarrhea of the newborn were reported in 1956. In one, *Escherichia coli* was found; in the other, alpha *coli* was reported as the etiological agent. Twenty-two infants were involved in these outbreaks. Another type of disease in newborn infants which apparently is increasing in frequency is characterized by staphylococcal skin infection. Six epidemics were reported among infants in hospital nurseries, and in some instances, the same serotype of organism was found in breast abscesses of some of the mothers who nursed these infants.

Another type of skin infection (erythema infectiosum) was reported among school children in four States and Hawaii. This infection was also found in some adults.

Several outbreaks of diphtheria were re-

ported, one of the largest being in Illinois. Here, 60 cases developed among migratory workers from Texas. Later in the year, during October, an outbreak occurred in a relatively low income group in which primary immunizations had not been given to most of the inhabitants. A total of 165 cases, with at least 2 deaths, were reported in Detroit in 1956. Smaller outbreaks occurred in Indiana and New Mexico. Other outbreaks reported in 1956 involved fewer than 10 cases.

Eight outbreaks of infectious hepatitis were reported in 1956. One outbreak with an undetermined number of cases was similar to one reported in 1955, that is, both were among members of a football squad who had been drinking contaminated water. Another 1956 outbreak of 276 cases was also considered to be waterborne and *E. coli* was isolated from water samples. Although water was associated with these outbreaks, there was no evidence which would definitely incriminate it. None of the outbreaks in 1956 were foodborne. In about half of the outbreaks there was evidence of person-to-person transmission, and for the other half, the source was not determined.

Localized outbreaks of arthropod-borne types of infectious encephalitis occurred in several parts of the United States in 1956. In Massachusetts, a group of 11 confirmed and 3 presumptive cases of the eastern equine type of infection was reported, and in Maryland, there were 3 human cases, 2 presumptive and 1 confirmed. This disease in horses and in pheasants was observed in these and several other States. Fourteen scattered human cases

of western equine encephalitis in California and 16 in northwestern Texas were confirmed by serologic tests. A large urban epidemic, 110 cases with 13 deaths, of the St. Louis type of encephalitis was reported in Louisville, and another, consisting of 17 cases, in southwestern Kentucky. A sizable outbreak occurred in northwestern Texas, smaller ones in two areas of Colorado, and one in Kansas.

During the year, more than 500 cases of psittacosis in humans were reported. Most of these were single cases and resulted from contact with pet parakeets. However, outbreaks were reported in five States. Early in the year, the disease occurred in Oregon among a large number of persons who worked on turkey farms, in rendering plants which handled dead turkeys, and in employees of poultry processing plants. Two other small groups of cases were reported in which there was contact with infected birds. Ducks on a farm in Virginia were found to be infected with psittacosis, and at least four persons working on the farm became ill with the disease. In Minnesota, seven persons who became ill with psittacosis had contact with Easter chicks. No virus was found in any of the chicks.

Only one outbreak of brucellosis was reported, this being milkborne. It involved four children who drank raw milk. There were several single cases of the disease from raw milk. Others were from handling cow or hog carcasses in processing plants. In Maine, Newcastle disease was reported among poultry flocks, and one human case is known to have occurred.