

Two Gastroenteritis Outbreaks From Ham in Picnic Fare

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IN AUGUST 1959, two massive food poisoning outbreaks occurred in Indiana which were remarkably similar in many respects. Although circumstances that produce staphylococcal food poisoning are well recognized, outbreaks of this disease continue to occur with dismaying frequency. We are adding this report to an extensive bibliography of reported staphylococcal food poisoning outbreaks to document the large number of persons affected and to demonstrate again the need for education in food sanitation practices for persons participating in large feeding operations.

Similarities between the two outbreaks were many. Both occurred in conjunction with annual picnics, one sponsored by a pharmaceutical house and the other by a plant manufacturing electrical parts. The picnics were held for employees, their families, and guests. Both picnics were held on hot, humid days. In both instances, some of the food was prepared in small local bakeries. Evidence indicates that the same type of contaminated food was responsible for both epidemics. Essentially the same inadequacies in food-preparation techniques were common to the two picnics.

Investigations of the two outbreaks were conducted by personnel of the Indiana State Board of Health jointly with local health department officials. Excellent assistance was given by the

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management of the two sponsoring firms, making it possible to interview more individuals than would have been accomplished otherwise.

Outbreak of August 15

The pharmaceutical house picnic was held on a privately owned picnic ground, about 60 miles from the plant in the northeastern part of the State. Of the approximate 1,700 persons who attended, about 1,000 became ill following the meal, an attack rate of 58.8 percent. Information was obtained from 966 individuals (630 patients and 336 not affected) through the use of a standard form used by the Indiana State Board of Health personnel to investigate foodborne outbreaks. The plant management distributed the questionnaires to employees, who provided the information desired. This cooperation contributed significantly to obtaining the epidemiologic information necessary for this investigation.

The picnic menu consisted of baked beans, barbecued chicken, ham sandwiches, potato salad, pickles, olives, coffee, milk, soft drinks, and cake. Food service started about 11:30 a.m. and continued for several hours. The occurrence of illnesses by the time of onset of symptoms during the afternoon and evening following the picnic meal is shown in figure 1. The epidemic curve indicates that the outbreak began as early as 1 p.m., reached maximum intensity from 3 to 4:30 p.m., and ended by 9 p.m. Although a few individuals became ill after 9 p.m., the impact of the outbreak occurred within an 8-hour period.

The rapid onslaught of the outbreak imme-

diately affected the county in which the picnic was held. The two hospitals in the county, with a combined total of 79 beds, were quickly swamped with patients seeking emergency treatment. Most of the 13 doctors within the county were consulted. A local armory and a high school were used to provide emergency treatment for those not admitted to the hospitals. The State police and the sheriff's department aided in the evacuation of the patients from the picnic ground to the local treatment centers. Many persons had left the picnic site and were returning home by private automobile when stricken. Constant radio announcements cautioned individuals to pull off the road in case of illness. Aid to such individuals was given by State police. In spite of the size of this outbreak and the problems it posed, the citizens of the county, the officials, and the medical personnel handled the situation very well.

Among the 630 patients who were interviewed, vomiting, diarrhea, abdominal pain, and nausea occurred most frequently (table 1). The illness lasted less than 24 hours in the majority of the patients. Most of the patients were treated symptomatically and released from the treatment centers. Five individuals were in severe shock and were given intravenous fluids during their treatment. It was reported that a woman early in the third trimester of pregnancy began labor pains during the course of her illness. However, she did not deliver. All hospitalized patients were released by the end

Figure 1. Onset of symptoms in 630 picnickers, gastroenteritis outbreak, August 15, 1959

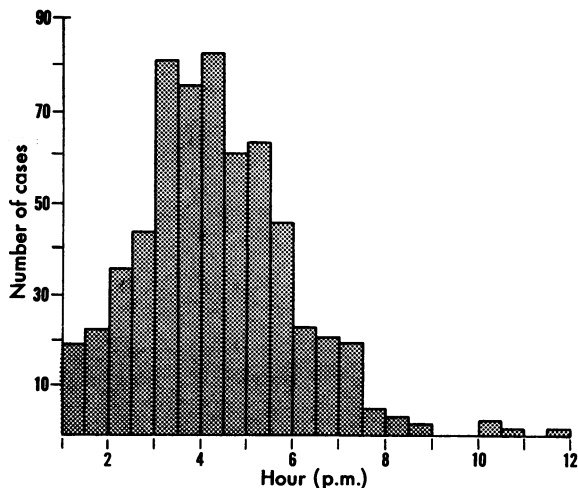


Table 1. Frequency of symptoms reported by 630 picnickers, gastroenteritis outbreak, August 15, 1959

Symptom	Number	Percent
Vomiting.....	594	94.3
Diarrhea.....	529	83.9
Abdominal pain.....	479	76.0
Nausea.....	466	73.9
Moist skin.....	378	60.0
Muscle soreness and cramps.....	272	43.2
Chills.....	252	40.0
Prostration.....	214	33.9
Fever.....	159	25.2
Disturbed vision.....	120	19.2
Metallic taste.....	74	11.7
Convulsions.....	11	1.7

of 24 hours with the exception of two known cardiac patients.

The time which elapsed between eating the meal and the onset of symptoms is shown in figure 2. The median incubation period was 3½ to 4 hours. The incubation periods for the 630 patients interviewed ranged from one-half hour to 30 hours. Approximately equal numbers of males and females were affected at each age level (table 2). Because age and sex information was not recorded for approximately 700 of the picnickers, attack rates cannot be determined accurately.

Attack rates were determined for each food item served (table 3). The ham sandwich was the only food served which produced a substantial difference in attack rates between those who had eaten it (75.6 percent), and those who did not (20.4 percent). Attack rates for all other food items served were not significantly different for the two groups. Thus, it was evident that individuals who ate the ham sandwiches were exposed to a greater risk of food poisoning than were those who did not eat the sandwiches.

Prompt action by the local health department sanitarian in obtaining food samples facilitated study by providing laboratory specimens for later analysis. Samples of the sliced ham and barbecued chicken, still in the original serving containers, were taken to a nearby locker plant and frozen. Because samples of the other foods were not available in their original containers, portions of the potato salad, baked beans, relishes, and cake were re-

moved from serving plates and transferred to the locker plant. Samples of milk, soft drinks, and hamburgers which were available from a concession stand, as well as several samples of the drinking water, were collected.

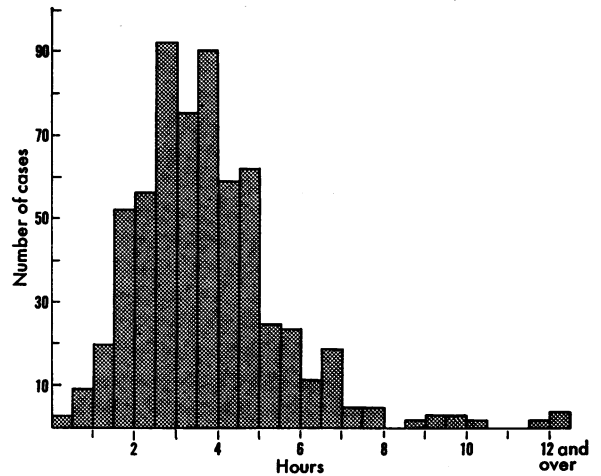
All the food samples, analyzed bacteriologically at the Indiana State Board of Health laboratory, were negative for the *Salmonella-Shigella* group of organisms. The positive findings are summarized in table 4. The coagulase-positive staphylococci isolated from samples of ham, barbecued chicken, and potato salad were phage typed. An identical phage type, 6-47-53-VA₄, was found from each source. A culture of staphylococcus isolated from the ham was sent to the Robert A. Taft Sanitary Engineering Center, Public Health Service, Cincinnati, Ohio, for the cat injection test for enterotoxin production. Four cats injected with a filtrate prepared from the culture exhibited vomiting within 30 minutes to 3 hours after injection. This is characteristic of the response of adult cats to known enterotoxic filtrates.

The sources and manner of preparation of all foods served at the picnic were investigated. However, since epidemiologic and laboratory evidence incriminated the ham as the transmission vehicle, this report is limited to a discussion of the ham. All food except the barbecued chicken, milk, coffee, and soft drinks was prepared by a family owned and operated, small

Table 2. Age and sex distribution among 630 picnickers affected, gastroenteritis outbreak, August 15, 1959

Age	Male	Female	Total
1-5	15	14	29
6-10	24	27	51
11-15	27	24	51
16-20	21	24	45
21-25	22	19	41
26-30	29	25	54
31-35	30	26	56
36-40	39	30	69
41-45	36	26	62
46-50	37	25	62
51-55	17	19	36
56-60	19	12	31
61-65	5	9	14
66 and over	13	11	24
Unknown	0	5	5
Total	334	296	630

Figure 2. Time between eating meal and onset of symptoms in 630 picnickers, gastroenteritis outbreak, August 15, 1959



neighborhood bakery. In addition to producing the usual bakery products, the bakery provides a catering service for weddings, parties, and picnics. The shop was found adequate in cleanliness and equipment for operation as a bakery. However, it was felt that any large volume of food preparation, such as for catering, would overload the equipment and workspace. Specifically, there appeared to be a lack of adequate refrigerated storage facilities for the large volume of perishable food necessary in conducting a catering operation. Much of the equipment did not appear large enough to permit volume preparation without excessive handling of food by employees.

The bakery personnel began to prepare for the Saturday picnic 4 days in advance. On Tuesday, August 11, 30 canned hams, averaging 13 pounds each and properly labeled regarding storage, were delivered under refrigeration to the bakery. These were stored in an unrefrigerated back room until Thursday. On Thursday, the cans were opened at 1:30 p.m., and the hams prepared for baking by removing the excess gelatin, scoring them, and adding spices. The hams were then encased in a shell of rye dough and placed in the oven at 350° F. at 3 p.m. After they were baked for 3 hours, the hams were set out to cool. The bakery manager removed the dough from the baked hams at 10 p.m. that evening, covered the hams with waxed paper, and stored them in the unrefrig-

erated back room. On Friday, six part-time employees helped with the preparation. Two of the employees began to slice the ham in the morning and completed the operation about 3 p.m. The hams were sliced on a small, old, and difficult-to-clean machine, and the slices were stacked on edge in enameled roasting pans which, when filled, contained about 25 pounds of tightly packed ham each. As each roaster was filled, it was stored in the unrefrigerated back room of the bakery.

At 4 p.m. on Friday, a cold-plate truck equipped with an electrical compressor refrigeration unit was brought to the bakery. This truck unit operated only when connected to an outside 110-volt circuit. The ham and other picnic food were loaded into the truck for storage overnight. According to the bakery operator, the truck's refrigerator unit was

operating from 4 p.m. Friday until 5 a.m. Saturday.

At 6:15 a.m. Saturday, the ham and other food were transferred from the cold-plate truck to a nonrefrigerated, aluminum-paneled truck which was sent from the pharmaceutical firm. The truck was then driven to the picnic site, some 60 miles away, where it was unloaded about 8:30 a.m. Employees prepared ham sandwiches until 11:30 a.m. The assembled sandwiches were not refrigerated.

Investigation did not reveal the source of contamination of the ham. No illness or skin lesions were detected among the bakery employees. That conditions for the subsequent multiplication of the contaminating staphylococci were good is obvious. There was no proper refrigeration of the ham from the time of its delivery to the bakery on Tuesday until

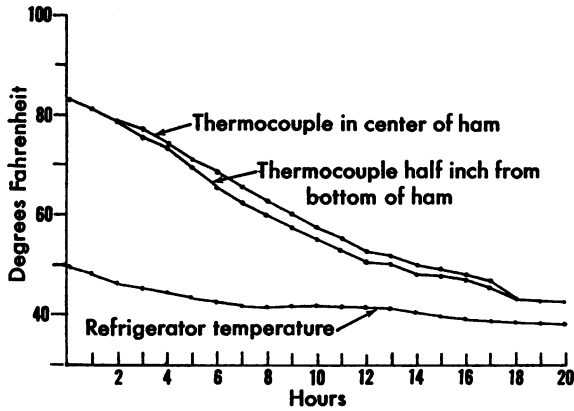
Table 3. Gastroenteritis attack rates per 100, by type of food eaten by 966 picnickers, August 15, 1959

Menu item	Did eat				Did not eat			
	Total	Ill	Not ill	Attack rate	Total	Ill	Not ill	Attack rate
Baked beans.....	577	391	186	67.8	389	239	150	61.4
Barbecued chicken.....	836	539	297	64.5	130	91	39	70.0
Cake.....	600	385	215	64.2	366	245	121	66.9
Coffee.....	249	170	79	68.3	717	460	257	64.1
Ham sandwich.....	784	593	191	75.6	182	37	145	20.4
Milk.....	106	70	36	66.0	860	560	300	65.1
Soft drink.....	303	173	130	57.1	663	457	206	69.1
Pickles and olives.....	497	321	176	64.6	469	309	160	65.8
Potato salad.....	791	522	269	66.0	175	108	67	66.1

Table 4. Results of bacteriological analysis of food served at picnic, gastroenteritis outbreak, August 15, 1959

Food sample	Total plate count per gram	Streak plate	Organisms isolated	Estimated number of organisms isolated per gram
Ham (2 samples):				
No. 1.....	6.8 billion	-----	<i>Staphylococcus aureus</i> (coagulase positive).	>100,000,000
No. 2.....	>290,000,000	-----	<i>Staphylococcus aureus</i> (coagulase positive).	>1,000,000
Barbecued chicken.....	340	-----	<i>Staphylococcus aureus</i> (coagulase positive).	Few only
Potato salad.....	108,000	-----	<i>Staphylococcus aureus</i> (coagulase positive).	1,000
Baked beans.....	-----	Slight growth.....	No pathogens.....	-----
Pickles.....	-----	No growth.....	-----	-----
Hamburger.....	-----	Slight growth.....	No pathogens.....	-----
Cake.....	-----	Slight growth.....	No pathogens.....	-----

Figure 3. Temperature reduction from room temperature (82° F.) of three 9–10 pound baked hams sliced and stored in refrigerator which had initial temperature of 38° F.



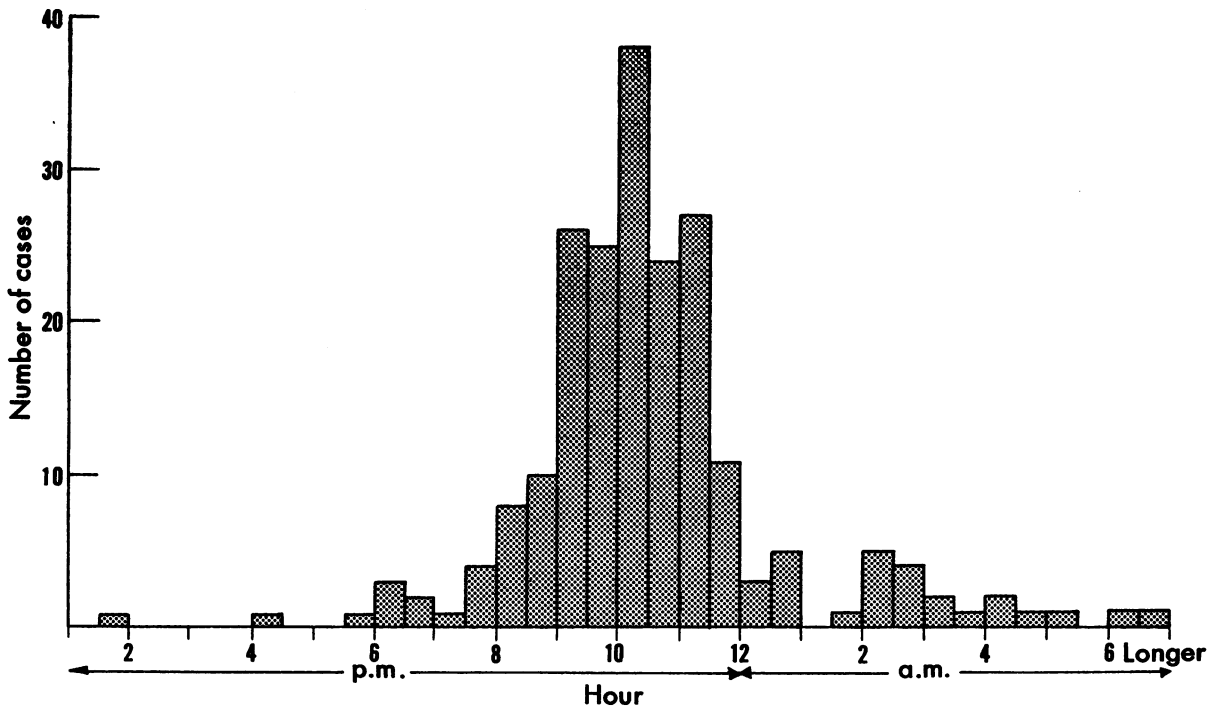
it was served on Saturday. Although the ham was placed in a refrigerated truck overnight on Friday, it is doubtful that the sliced, tightly packed ham was cooled to a point which would inhibit bacterial growth. Experiments conducted by laboratory personnel of the pharmaceutical house, using thermocouples placed near the bottom and in the middle of baked, sliced hams, indicated that a refrigerator at 38° F.

would reduce the temperature of ham from room temperature (82° F.) to 50° F. in approximately 13½ hours (fig. 3.) The hams used for the experiment were about 3 pounds lighter in weight than were those prepared for the picnic. The approximate temperature of the cold-plate truck at the time the hams and other food items were placed in it at the bakery on Friday evening at 4 p.m. was 60° F. Thus, in view of the 13½ hours required to lower the temperature to 50° F., as indicated by the experiment, it is doubtful that the hams reached this temperature by the following morning.

Outbreak of August 22

On Saturday, August 22, 1 week after the outbreak described above, a picnic was held for employees, their families, and guests by a firm which manufactures electrical parts. Having heard of the outbreak of the previous week, the chairman of the firm's board of directors requested the picnic committee to take every precaution to prevent a similar occurrence. The picnic committee responded by deciding to use ice to chill the salads to be served. Unfortunately, precautions were not established relative to other foods served.

Figure 4. Onset of symptoms in 216 picnickers, gastroenteritis outbreak, August 22, 1959



The picnic was held in a park adjacent to the plant. The day was humid and hot, with a temperature over 90° F. Records kept by the company indicated that 1,813 individuals attended the picnic. Data obtained from 896 picnickers, by personal interview and the board of health's questionnaire, revealed that at least 216 of them had been affected, an attack rate of 11.8 percent.

Food service began at 4:30 p.m. and continued until 6:30 p.m. The menu consisted of baked ham sandwiches, macaroni salad and potato salad, cottage cheese, baked beans, scalloped corn, cole slaw, barbecued hamburger, sliced fresh cucumbers in vinegar, individual portions of ice cream, cakes, soft drinks, beer, and coffee. The number of people affected after the picnic meal was undetermined because of the ever-increasing number of persons who had become ill (fig. 4). The crest of the epidemic curve was reached at 10-10:30 p.m. and although it had subsided considerably by midnight, illnesses continued to occur throughout the early morning hours of the following day. The epidemic curve also indicates that several individuals became ill prior to the time food service began. These persons had assisted in the food preparation and had sampled some of the food earlier in the afternoon.

Approximately one-half of the affected persons needed medical care. Many of the patients were seen by the plant physician at the shelter house on the picnic ground. Approximately 60 persons received emergency treatment at hospitals in neighboring cities, and an indefinite number went to physicians of their choice.

The most frequently mentioned symptoms were abdominal pain, vomiting, nausea, and diarrhea (table 5). The duration of illness was 12 hours or less for 87.5 percent of the patients. The remainder either did not indicate the duration or had illnesses lasting more than 24 hours.

The median time lapse between eating the meal and onset of symptoms for this outbreak was 4½-5 hours. The bulk of the incubation periods fell within 3-6 hours (fig. 5). There were a few excessively long incubation periods, the longest being 24 hours.

The attack rates for each item on the menu are shown in table 6. The greatest difference in attack rates between those who ate a specific

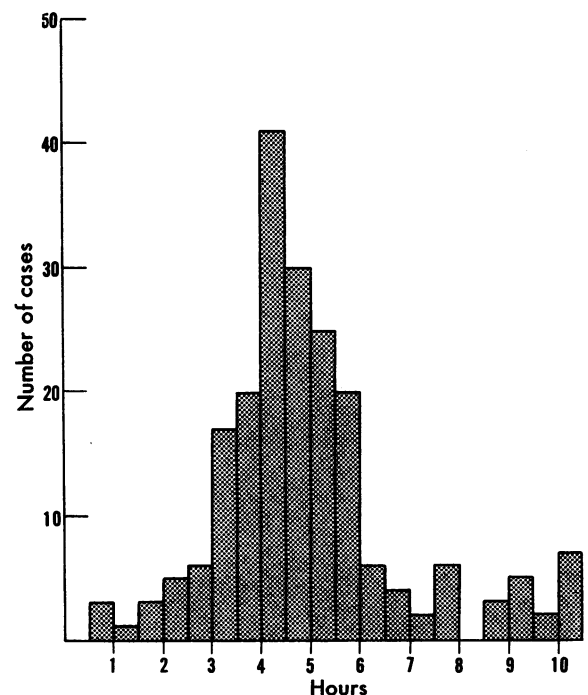
food and those who did not occurred with the ham sandwich. This finding, together with several instances in which individuals were known to have been ill after eating ham alone, was presumptive epidemiologic evidence that ham was once again the offending vehicle.

When it became evident that an outbreak was occurring, the factory management contacted the Indiana State Board of Health which advised them to refrigerate the food served for

Table 5. Frequency of symptoms reported by 216 picnickers, gastroenteritis outbreak, August 22, 1959

Symptom	Number	Percent
Abdominal pain.....	149	68.9
Vomiting.....	146	67.5
Nausea.....	102	47.2
Diarrhea.....	95	43.9
Moist skin.....	72	33.3
Fever.....	67	31.0
Chills.....	62	28.2
Muscle soreness and cramps.....	51	23.6
Metallic taste.....	39	18.0
Prostration.....	30	13.8
Disturbed vision.....	23	10.6
Convulsions.....	0	0

Figure 5. Time between eating meal and onset of symptoms in 216 picnickers, gastroenteritis outbreak, August 22, 1959



subsequent sampling. Bacteriological analysis of specimens of ham, barbecued hamburger meat, potato salad, macaroni salad, scalloped corn, cottage cheese, and cake was made by the board of health laboratory. The findings are summarized in table 7. The *Staphylococcus*

aureus cultures isolated from the ham and potato salad were phage typed by the laboratory and the Communicable Disease Center, Public Health Service, Atlanta, Ga. The cultures were found to be phage type 7 when concentrated phage suspensions were employed. A

Table 6. Gastroenteritis attack rates per 100, by type of food eaten by 896 picnickers, outbreak of August 22, 1959

Menu item	Did eat				Did not eat			
	Total	Ill	Not ill	Attack rate	Total	Ill	Not ill	Attack rate
Baked beans.....	398	85	313	21.3	498	131	367	26.3
Barbecued hamburger.....	476	89	387	18.7	420	127	293	30.2
Beer.....	25	6	19	24.0	871	210	661	24.1
Cake.....	397	82	315	20.6	499	134	365	26.6
Coffee.....	130	38	92	29.2	766	178	588	23.2
Cole slaw.....	196	45	151	23.4	700	171	529	24.4
Cottage cheese.....	111	25	86	22.5	785	191	594	24.3
Cucumbers.....	56	14	42	25.0	840	202	638	24.0
Ham sandwich.....	476	189	287	39.9	420	27	393	6.4
Ice cream.....	535	134	401	25.0	361	82	279	22.4
Macaroni salad.....	217	59	158	27.2	679	157	522	23.1
Soft drink.....	320	79	241	24.7	576	137	439	23.8
Potato salad.....	346	87	259	25.1	550	129	421	23.4
Scalloped corn.....	238	66	172	27.7	658	150	508	22.8

Table 7. Results of bacteriological analysis of food served at picnic, gastroenteritis outbreak, August 22, 1959

Food sample	Total plate count per gram	Streak plate	Organisms isolated	Estimated number of organisms isolated per gram
Ham (5 samples):				
No. 1.....	>300,000,000	-----	<i>Staphylococcus aureus</i> (coagulase positive). <i>Streptococcus faecalis</i> <i>Proteus mirabilis</i>	>1,000,000 >1,000,000
No. 2.....	>196,000,000	-----	<i>Staphylococcus aureus</i> (coagulase positive). <i>Streptococcus faecalis</i>	>1,000,000 >1,000,000
No. 3.....	>370,000,000	-----	<i>Staphylococcus aureus</i> (coagulase positive). <i>Streptococcus faecalis</i>	>900,000 >1,000,000
No. 4.....	>300,000,000	-----	<i>Staphylococcus aureus</i> (coagulase positive). <i>Streptococcus faecalis</i> <i>Proteus morgani</i>	>1,000,000 >1,000,000
No. 5.....	>300,000,000	-----	<i>Staphylococcus aureus</i> (coagulase positive). <i>Streptococcus faecalis</i> <i>Proteus morgani</i>	>1,000,000 >1,000,000
Potato salad.....	105,000	-----	<i>Staphylococcus aureus</i> (coagulase positive).	Few only
Macaroni salad.....	790,000	-----	No pathogens.....	
Barbecued hamburger.....	-----	Slight growth.....	No pathogens.....	
Scalloped corn.....	-----	Growth.....	<i>Streptococcus faecalis</i>	Few only
Cottage cheese.....	-----	Growth.....	No pathogens.....	
Cake.....	-----	Growth.....	No pathogens.....	

culture of *S. aureus* isolated from the vomitus of one of the patients was also phage type 7.

Cultures of *S. aureus*, coagulase positive, isolated from ham and from vomitus were submitted to the Robert A. Taft Sanitary Engineering Center for cat injection tests. No response was observed in cats injected with filtrates prepared from these isolates. However, as indicated by laboratory personnel at the center, a negative result is less meaningful than a positive one. Basing the test on a culture grown from a single isolated colony is not always satisfactory. Negative cat tests have been observed on culture filtrates produced from a single-colony inoculum of a strain known to be enterotoxigenic. There is also the possibility that a staphylococcus strain may produce enterotoxin in certain foodstuffs, but not in the casein hydrolysate broth which was used for these tests.

The source, manner of preparation, and handling of all food items served at the picnic were investigated. Only those items which laboratory evidence indicated were grossly contaminated are discussed below.

The ham, subsequently made into sandwiches, was obtained from two local grocery stores. Twenty smoked hams of "bone in" type were delivered, under refrigeration, to a local bakery on Thursday, August 20, between 9 a.m. and 1 p.m. The hams were all large, varying between 22 and 26 pounds in weight. They were stored in their original containers, unrefrigerated, until Friday evening at approximately 8 p.m. when they were baked during the night. When baked, the hams were stored in pans until cooled and then boxed. The complete baking operation was finished by 8:15 a.m. Saturday.

At approximately 9 a.m. Saturday, the boxes of baked ham were picked up and delivered to the plant cafeteria. At the cafeteria, the picnic chairman and another employee cut the hams into four quarters and boned them, and one employee sliced the quarters on a small machine. This operation took from about 9:30 a.m. until noon. As the quarters were sliced, the individual slices were stacked by hand into flat shallow pans, which were then placed in two reach-in refrigerators for temporary storage.

Between 12:30 p.m. and 2 p.m. members of the picnic committee assembled ham sandwiches. The pans of ham were placed on the cafeteria serving counter and three or four persons working around each pan inserted the meat slices in the buns by hand. It was reported that approximately 1,200 sandwiches were made in the plant cafeteria, placed in layers separated by wax paper, and stored in metal bread containers and in cardboard bun boxes on the floor of the cafeteria, pending removal to the picnic. It was not established that the sandwiches were refrigerated at any time during preparation, storage, transportation, or serving.

The potato and the macaroni salads were made in the plant cafeteria on Saturday morning by members of the picnic committee. It is significant that both of these salads were made by mixing the ingredients by hand. After the salads were made, they were packed into large, clean plastic containers, which were set in tubs of ice water and stored outside the back door of the cafeteria. To make certain that all parts of the salad in the containers were adequately cooled, a member of the food committee periodically inserted his hand and arm into the salad and stirred it. All the foods prepared at the plant cafeteria were delivered to the picnic grounds by truck at approximately 3 p.m. on Saturday.

An inspection of both the bakery and the plant cafeteria was conducted by sanitarians of the Indiana State Board of Health, who found that the sanitation of the small retail bakery was below standard. The building was not rodent proof, and several lots of insect-infested flour stock were condemned and destroyed during the inspection. The work area was generally untidy as exemplified by cracked and dirty worktable tops, wooden floors with open seams and cracks, plaster falling from the walls, and stacks of unused equipment cluttering the premises. It was the opinion of the investigators that, while the equipment in the bakery was quantitatively adequate for the normal load for bakery products, it was probably inadequate for preparation and storage of large volumes of perishable foods.

There was no evidence of gross unsanitary conditions present in the plant cafeteria at the

time of the inspection. The equipment and facilities were, in the opinion of the board of health sanitarians, adequate for the preparation and serving of the number of meals per shift indicated by the number of employees of the plant. Here again it was apparent that this food service facility may not have been adequately equipped to safely prepare the large volume of food needed for this picnic.

Discussion

The clinical and epidemiologic features of the two reported outbreaks, together with the laboratory findings, indicate that staphylococcal enterotoxin was responsible for producing the illnesses. The laboratory finding of significant contamination of the hams by pathogenic staphylococci plus the demonstration of increased risk of infection in those who ate the ham designates this food item as being the common contaminated vehicle in each outbreak. The vomiting exhibited by cats inoculated with filtrates of staphylococcal cultures isolated from hams served at the first picnic indicates that the isolated staphylococcus produced enterotoxin. The negative cat test obtained following injection of staphylococcal filtrates from ham and vomitus isolates from the second picnic does not exclude the possibility that staphylococcus enterotoxin production was actually present.

The investigations of the two outbreaks did not disclose the source of the staphylococci or the manner in which the organisms reached the ham. Examination of the bakery personnel in each instance did not reveal clinical evidence of staphylococcal infection. Nose and throat specimens obtained from the bakery personnel who prepared ham for the first picnic were submitted to the laboratory, but were unsatisfactory for laboratory analysis. It is apparent, however, that optimum conditions of time and temperature prevailed for abundant bacterial growth in the hams between the time of delivery to the bakeries and the time that they were eaten by the picnickers.

Inadequate food-handling practices were demonstrated in both outbreaks. In both, food was prepared in large quantities in facilities not designed for quantity food preparation.

The two bakeries and the plant cafeteria were adequately equipped for normal operations but not for the preparation of the large volumes of food required for the picnics. The outstanding equipment deficiencies noted were inadequate refrigeration space, small slicing machines which were difficult to clean, and inadequate work and storage space. The cold-plate truck used for the first picnic did not provide the proper degree of refrigeration. The refrigeration compartment of a cold-plate truck should be lowered to the refrigerating temperature and then loaded with prechilled food. This type truck is totally inadequate to refrigerate warm food over a short period of time.

In addition to the factors of inadequacy and misuse of equipment, there appeared to be a lack of understanding and practice of safe food-handling procedures on the part of the foodhandlers; for example, the importance and techniques of refrigeration. Although the hams were delivered to the two bakeries under refrigeration, they were held at room temperature for approximately 48 hours in one bakery and 36 hours in the other prior to being baked. The attempt to refrigerate the ham slices was probably nullified by the tightly packed layers of warm ham that were placed in the refrigerator. Furthermore, no refrigeration facilities were provided for the assembled ham sandwiches. There were two examples which demonstrated that the foodhandlers did not understand the necessity of avoiding excessive hand contact with the food.

The two outbreaks constituted public health catastrophes in the areas where they occurred. The outbreak of August 15 is especially noteworthy from the standpoint of the number of people affected, approximately 1,000. Dr. G. M. Dack, director, Food Research Institute, University of Chicago, has commented in a personal communication that he is unfamiliar with any reported outbreaks of this type among the civilian population in which more persons were made ill.

Summary

Two large outbreaks of food poisoning occurred among persons attending picnics in

Indiana on August 15 and August 22, 1959. Approximately 1,000 persons were affected in the first epidemic and 216 in the second.

Clinical, epidemiologic, and laboratory investigations incriminated staphylococcal enterotoxin as the cause of the outbreaks. Sliced ham served in sandwiches at both picnics proved to be the common contaminated vehicle. *Staphylococcus aureus*, phage type 6-47-53-

VA₄, was isolated from the ham in the first epidemic and phage type 7 in the second.

The use of facilities which were inadequate for preparing and storing large quantities of food was significant in both outbreaks. Also, in both instances, there were serious violations of food sanitation practices, notably a lack of continued refrigeration for the perishable foods served at the picnics.

Influenza Vaccination Recommended

Dr. Luther L. Terry, Surgeon General of the Public Health Service, has recommended immediate influenza vaccinations for persons with heart disease, pulmonary disease, diabetes, and other chronic illness; for persons over 65 years of age, and for pregnant women. These groups accounted for most of the 86,000 influenza-associated deaths between September 1957 and March 1960.

Outbreaks of Asian influenza have been predicted for this winter on the basis of their previous patterns of occurrence. Influenza A, appearing in cycles of 2 to 3 years, has been dormant since March 1960. Influenza B, with a periodicity of 4 to 6 years, last appeared in 1955.

Both types of influenza were prevalent in other countries in 1960-61, notably in England, where they directly caused 1,000 deaths and indirectly several more thousand. A similar epidemic in England in 1951 reached this country the following year.

The Surgeon General's Advisory Committee recommends for adults an initial dosage of 1.0 cc. (500 cca units) of polyvalent vaccine administered subcutaneously. Persons not previously immunized should also receive, if feasible, a second injection of 1.0 cc. subcu-

taneously approximately 8 weeks later. This second dose will protect a small but significant proportion of persons who do not develop adequate antibodies after the first injection. Persons previously vaccinated should be reinoculated each year with a single booster dose of 1.0 cc. subcutaneously. Vaccination should be administered as soon as practicable after September 1 and no later than January 1.

Use of influenza vaccine is contraindicated for persons with a history of food allergy to eggs or chicken or those who have had a definite allergic reaction, whether urticarial, asthmatic, or anaphylactic, when inoculated with an egg vaccine.

Physicians and health officers are being alerted by the Public Health Service, and State welfare agencies are being urged by the Bureau of Public Assistance to include influenza vaccinations in medical care provided under public assistance. Recommendations on the use of influenza vaccine, prepared by the Surgeon General's Advisory Committee on Influenza, including a detailed listing of chronic conditions vulnerable to influenza complications, are being supplied to private physicians and health officers.