REPORT NO. 99
August 1970



CENTER FOR DISEASE CONTROL

# SALMONELLA

## SURVEILLANCE

CONTENTS. . .

FOR THE MONTH OFF

FOR THE MONTH OF JUNE 1970

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U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE/PUBLIC HEALTH SERVICE
Health Services and Mental Health Administration

# PREFACE

Summarized in this report is information received from State and City Health Departments, university and hospital laboratories, the National Animal Disease Laboratory (USDA, ARS), Ames, Iowa, and other pertinent sources, domestic and foreign. Much of the information is preliminary. It is intended primarily for the use of those with responsibility for disease control activities. Anyone desiring to quote this report should contact the original investigator for confirmation and interpretation.

Contributions to the Surveillance Report are most welcome. Please address

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## I. SUMMARY

In June 1970, 1,834 isolations of salmonellae were reported from humans, an average of 459 isolations per week (Tables I, II, and V-A). This number represents an increase of 78 (20.5 percent) over the weekly average of May 1970 and an increase of 29 (6.7 percent) over the weekly average of June 1969.

Reports of 582 nonhuman isolations of salmonellae were received during June 1970 (Tables II, IV, and V-B).

## II. REPORTS OF ISOLATIONS

The ten most frequently reported serotypes during June:

| | HUMAN | | | | NONHUMAN | | |
|---|---|---|---|---|---|---|---|
| | Serotype | Number | Percent | Rank Last Month | Serotype | Number | Percent |
| 1 | typhi-murium* | 472 | 25.7 | 1 | typhi-murium* | 98 | 16.8 |
| 2 | enteritidis | 162 | 8.8 | 2 | heidelberg | 34 | 5.8 |
| 3 | heidelberg | 118 | 6.4 | 3 | anatum | 32 | 5.5 |
| 4 | infantis | 115 | 6.3 | 5 | infantis | 32 | 5.5 |
| 5 | newport | 104 | 5.7 | 4 | saint-paul | 29 | 5.0 |
| 6 | saint-paul | 100 | 5.5 | 7 | cubana | 28 | 4.8 |
| 7 | thompson | 63 | 3.4 | 8 | montevideo | 22 | 3.8 |
| 8 | blockley | 44 | 2.4 | 6 | worthington | 21 | 3.6 |
| 9 | derby | 42 | 2.3 | >10 | eimsbuettel | 18 | 3.1 |
| 10 | typhi | 39 | 2.1 | >10 | san-diego | 17 | 2.9 |
| | Total | 1259 | 68.6 | | Total | 331 | 56.9 |
| | TOTAL (all serotypes) | 1834 | | | TOTAL (all serotypes) | 582 | |
| | *Includes var. copenhagen | 37 | 2.0 | | *Includes var. copenhagen | 17 | 2.9 |

## III. CURRENT INVESTIGATIONS

### A Salmonella thompson Outbreak Traced to Barbecued Pork - Tennessee

Reported by Eugene W. Fowinkle, Commissioner, William H. Armes, Jr., M.D., Deputy Commissioner of Health, and J. Howard Barrick, Ph.D., Director, Laboratories, Tennessee Department of Public Health; Edward Cutter, M.D., Director, and James Powell, Sanitarian, Montgomery County Health Department; James A. Edgett, D.V.M., Epidemiologist, Consumer Protection Program, U.S.D.A., Beltsville, Maryland; W. Curlette, Regional Office, U. S. Food and Drug Administration, Atlanta;

and Stephen R. Zellner, M.D., EIS Officer, and Carolyn G. Dunn, Microbiologist, Epidemiologic Services Laboratory, Bacterial Diseases Branch, Epidemiology Program, CDC.

On July 6, 1970, an outbreak of febrile gastroenteritis was reported to health officials in Clarksville, Tennessee. At least 303 persons were known to have developed symptoms of acute febrile gastroenteritis including diarrhea (87 percent), abdominal cramps (70 percent), temperature above 101°F. (68 percent), nausea (53 percent), vomiting (53 percent), chills (38 percent), headache (36 percent), and bloody diarrhea (4 percent). Fifty-four persons were hospitalized. There were 12 secondary cases including three nurses who had cared for the hospitalized persons. There were no deaths. Salmonella thompson was cultured from the stools of 17 of the hospitalized patients.

Questioning of a group of hospitalized patients revealed that all had consumed barbecued pork prepared by a local restaurant on the July Fourth weekend. Of 189 individuals interviewed who were exposed to barbecued pork, 166 had eaten the meat; 80 percent of these became ill. The mean incubation period was 40 hours (Figure 1).

Rectal cultures were obtained from 151 of the 189 persons interviewed. Of these, 106 (70 percent) were positive for S. thompson. Only four isolates were recovered from asymptomatic individuals. Blood for serologic study was also obtained. Titers of agglutinating antibodies were determined using an antigen prepared from an isolate of S. thompson recovered from one of the hospitalized patients. Seropositivity correlated directly with bacteriologic results. Agglutinating antibodies were present in significantly higher titer in persons who consumed the meat and became clinically ill than in those persons who ate the meat and did not report illness.

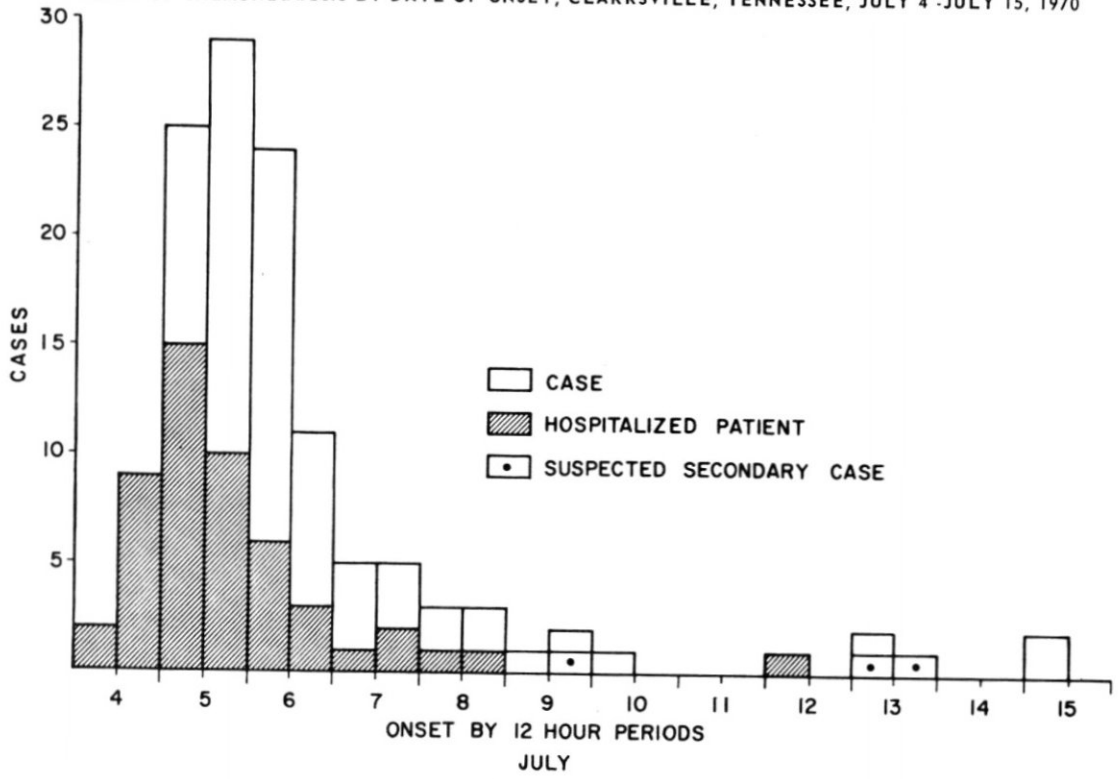
The barbecued pork was further implicated as the vehicle of infection in that only family members who consumed barbecue became ill; members who did not consume the meat remained well. One individual reported that two of his dogs died after eating leftover barbecue, but the third animal, not fed barbecue, remained well. Finally, high coliform counts were determined in the meat by the state laboratory, and S. thompson was recovered from the meat.

Improper facilities and procedures for storage of both raw and cooked meat and inadequate environmental sanitation were found during investigation of the implicated restaurant. Two of the four restaurant employees cultured were bacteriologically positive for S. thompson, the other two were both bacteriologically and serologically negative; all four had consumed at least one sandwich of barbecue on the July Fourth weekend. An estimated 4,000 persons had access to contaminated meat.

The most likely explanation for the outbreak is that inadequate sanitary practices in handling the barbecued pork permitted the survival, dissemination, and replication of contaminating salmonellae. It is not yet clear how the restaurant originally became contaminated. Investigations of the three meat plants which supply the restaurant are currently underway by U.S. Department of Agriculture officials.

Figure 1

CASES OF SALMONELLOSIS BY DATE OF ONSET, CLARKSVILLE, TENNESSEE, JULY 4 -JULY 15, 1970




## IV. REPORTS FROM THE STATES

### A. Laboratory Acquired Typhoid Fever - Baltimore, Maryland

Reported by Theodore R. Carski, M.D., Baltimore; Allan S. Moodie, M.D., D.P.H., Chief, Division of Communicable Diseases, Baltimore City Health Department; Edward W. Hofp, M.D., Chief, Division of Communicable Diseases, Baltimore County Health Department; Howard J. Garber, M.D., Chief, Division of Communicable Diseases, Maryland State Department of Health; and Harold Mellin, M.D., EIS Officer located at the Maryland State Department of Health.

In June 1970, two cases of laboratory-acquired typhoid fever were reported from Baltimore, Maryland. The first patient, a 21-year-old technician in a commercial biologics laboratory, was hospitalized on May 2, 1970, for evaluation of a fever of unknown etiology. She had become ill 3 days earlier with malaise, fever, and a brief episode of diarrhea. She was thought to have a viral syndrome and was discharged. She continued to have a spiking fever and was readmitted to the hospital on May 16, at which time blood cultures yielded Salmonella typhi.

The second patient, a 25-year-old woman who worked with the first patient, became ill on May 14 with general malaise, spiking fever, a brief episode of diarrhea, and nasal bleeding. She was initially thought to have a viral syndrome and was treated with tetracycline. When the nature of the first patient's illness became apparent, blood cultures were taken on the second patient and these also yielded S. typhi. Both patients were treated with chloramphenicol and gradually recovered.

The two patients and five other technicians worked in a laboratory where typhoid antigens and antisera were prepared: they worked constantly with cultures of S. typhi. The two patients had been employed there for 1 to 1½ years and the other five had been working for at least 3 years. The other five technicians had been immunized with typhoid vaccine approximately 3 years previously whereas the two patients had never been immunized. No technician could recall a laboratory accident which might have predisposed infection, and there was no known difficulty with ventilation or other laboratory facilities. Further investigation revealed no other probable source of infection. The two persons did not socialize together, and neither of their families had traveled or been in contact with foreigners or known typhoid carriers.

The isolate from the first patient was further identified as S. typhi phage type $E_1$, and that from the second was identified as S. typhi phage type A negative with 46 phage. These two phage types of S. typhi had been handled by the two patients as well as other technicians shortly before the onsets of illness in the two patients.

Following diagnosis of these patients' illnesses, the other five technicians were given booster immunizations of typhoid vaccine, and laboratory procedures were strengthened to insure maximum safety. The husbands of the two patients were also immunized.

B. Salmonellosis Following a Birthday Party - Omaha, Nebraska

Reported by James F. Speers, M.D., Health Director, Mr. Mal Crabill, Director of Environmental Health, Mr. Justin Diercks, Director of Food Sanitation, Mr. John Burleigh, Sanitarian, and the Food Sanitation Staff, Omaha - Douglas County Health Department.

An outbreak of salmonellosis occurred on June 14, 1970, following a home birthday party attended by approximately 200 persons. Sixty-five of 99 persons interviewed (66 percent) reported symptoms of gastroenteritis, including diarrhea, vomiting, nausea, abdominal pain, and fever. Four persons were hospitalized; no deaths were reported. Onsets of illness occurred from 5 to 54 hours after the party lunch with a mean incubation time of 22.1 hours and a median of 21 hours. Stool cultures from four patients were positive for Salmonella minnesota.

The party menu included chicken salad, marinated shrimp, cucumber salad, dried beef and cheese canapes, cheese canapes, assorted fruit, nuts and mints, fruit punch, and lemon-filled cake. All foods except the cake had been prepared by two hired cooks who used the kitchen facilities in the private home. Food specific attack rates (Table 1) implicated the chicken salad as a vehicle of infection and suggested that several other food items may have been contaminated. Leftover samples of chicken salad, cucumber salad, beef and cheese canapes, cheese canapes, and lemon-filled cake were collected for bacteriological analysis. S. minnesota was recovered from the chicken salad and cucumber salad.

Investigation of food preparation procedures revealed the probable method of transmission. Due to a shortage of counter space, the kitchen sink had been used to unwrap raw chicken breasts and partially thawed raw shrimp. After adequate cooking, the chicken breasts were returned to the sink to be boned and diced, and likewise, the cooked shrimp were poured into the sink to be cooled with tap water before being shelled, marinated, and then refrigerated.

Even though refrigerated, the large mass of warm chicken probably remained at incubation temperatures for several hours. The chicken was again subjected to temperatures suitable for bacterial growth the next day while being mixed with the dressing and served.

Other food items, such as the cucumber salad, were prepared at the same time as the chicken and shrimp and may have been contaminated at that time, since use of the kitchen sink for food preparation prevented handwashing.

S. minnesota was recovered from the stool specimens of one cook who had eaten several of the food items and had subsequently become ill. Cultures from the remaining cook were negative for salmonellae.

Table 1

Food Specific Attack Rates

| Food | Ate | | | | Did Not Eat | | | |
|---|---|---|---|---|---|---|---|---|
| | Sick | Well | Total | Attack Rate (Percent) | Sick | Well | Total | Attack Rate (Percent) |
| Chicken Salad | 63 | 10 | 73 | 86 | 2 | 24 | 26 | 8 |
| Shrimp | 52 | 7 | 59 | 88 | 13 | 27 | 40 | 32 |
| Cucumber Salad | 44 | 8 | 52 | 85 | 21 | 26 | 47 | 45 |
| Beef and Cheese Canapes | 44 | 9 | 53 | 83 | 21 | 25 | 46 | 46 |
| Cheese Canapes | 46 | 6 | 52 | 88 | 19 | 28 | 47 | 40 |
| Fruit Platter | 60 | 18 | 78 | 77 | 5 | 16 | 21 | 24 |
| Nuts & Mints | 46 | 10 | 56 | 82 | 19 | 24 | 43 | 44 |
| Fruit Punch | 54 | 31 | 85 | 64 | 11 | 3 | 14 | 79 |
| Lemon Cake | 41 | 17 | 58 | 71 | 24 | 17 | 41 | 59 |

C. A Foodborne Salmonella enteritidis Outbreak - Columbia, South Carolina

Reported by E. Kenneth Aycock, M.D., State Health Officer, Donald H. Robinson, M.D., Chief, Bureau of Preventable Diseases, Arthur F. DiSalvo, M.D., Chief, Bureau of Laboratory Services and Research, and Willard C. Horton, Jr., State Environmental Food Protection Program Manager, South Carolina State Board of Health; and John M. Wolff, M.D., EIS Officer located at the South Carolina State Board of Health.

On June 6, 1970, an outbreak of febrile gastroenteritis occurred among approximately 700 persons, mostly children, following a little league picnic in Columbia, South Carolina. One hundred eighty-one of 376 persons surveyed (48 percent) had become ill with symptoms including abdominal pain (82 percent), fever (80 percent), diarrhea (75 percent), nausea (70 percent), and vomiting (62 percent). Onsets of illness ranged from 12 to 96 hours following the picnic with a mean incubation period of 28 hours. At least two persons were hospitalized but no deaths were reported. Stool specimens were obtained from nine of the patients; seven were positive for Salmonella enteritidis.

The picnic meal had been prepared by a local catering firm and consisted of barbecued pork, barbecued chicken, beef hash on rice, baked beans, potato salad, and cole slaw. In addition, picnickers were supplied with ice cream in individual sealed paper cups

and bottled soft drinks served on ice. Food histories were obtained from 40 ill and 30 asymptomatic persons who had attended the picnic. Food specific attack rates did not implicate any one food as the probable vehicle of infection* (Table 1).

Left over samples of all foods except cole slaw and potato salad (which were entirely consumed) were cultured and found negative for salmonellae and other common pathogens.

None of the food handlers had experienced intestinal illness during the week prior to preparing the picnic meal. All refrigerators and freezers at the catering firm were operating at acceptable temperatures at the time of inspection. Stool specimens from all foodhandlers were negative for salmonellae; likewise, surface swabs taken from the kitchen environment 2 weeks after the outbreak failed to reveal salmonellae.

Review of food preparation methods used at the catering establishment revealed one questionable practice. The potato salad had been prepared by dicing hot, freshly cooked potatoes and eggs on the same table that had been used to cut the raw chicken. This table had only been "sponged off" after the chicken was removed. The potatoes and eggs were then left to cool at room temperatures for two hours or more before being refrigerated. This procedure would have permitted contamination and replication of salmonellae in the potato salad if the raw chicken had been contaminated. If this theory of transmission is correct, the chicken was subsequently decontaminated by adequate cooking.

EDITOR'S COMMENT: In 1969, 146 isolates of S. enteritidis were reported from nonhuman sources in the United States. Seventy-three of these isolates were from chickens, 12 from turkeys, 11 from swine, and seven from eggs; the rest were from miscellaneous nonhuman sources.

Table 1

Food Specific Attack Rates

| Food or Beverage | Ate Food Item | | | | Did Not Eat Food Item | | | |
|---|---|---|---|---|---|---|---|---|
| | Ill | Well | Total | Attack Rate (Percent) | Ill | Well | Total | Attack Rate (Percent) |
| Barbecue pork | 35 | 23 | 58 | 60 | 5 | 7 | 12 | 42 |
| Barbecue chicken | 37 | 22 | 59 | 63 | 3 | 8 | 11 | 27 |
| Hash and rice | 34 | 19 | 53 | 64 | 6 | 11 | 17 | 35 |
| Baked beans | 18 | 17 | 35 | 51 | 22 | 13 | 35 | 63 |
| Potato salad | 25 | 10 | 35 | 71 | 15 | 20 | 35 | 43 |
| Cole slaw | 21 | 12 | 33 | 64 | 19 | 18 | 37 | 51 |
| Ice cream | 26 | 19 | 45 | 58 | 14 | 11 | 25 | 56 |
| Soda | 37 | 29 | 66 | 56 | 3 | 1 | 4 | 75 |

*Even though the differential attack rate among those who ate and did not eat potato salad was significant at a P value of less than .05, the relatively high attack rate among non-eaters would imply that more than one food was involved.

## V. SPECIAL REPORTS

### A. Recent Articles on Salmonellosis

The following articles on salmonellosis of interest to public health workers have been published in recent months.


1. Armstrong RW, Fodor T, Curlin GT, Cohen AB, Morris GK, Martin WT, Feldman J: Epidemic salmonella gastroenteritis due to contaminated imitation ice cream. Amer J Epid:91:300, 1970

2. Francis J: Salmonella in healthy pigs. Aust Vet J 46:116, 1970

3. Frost AJ, Chung GT: The sensitivity of animal strains of salmonella in Australia to various chemotherapeutic agents. Med J Aust 1:1000, 1970

4. Fung DYC, Kraft AA: A rapid and simple method for detection and isolation of salmonella from mixed cultures and poultry products. Poul Sci 49:46, 1970

5. Goyal SM, Singh IP: Probable sources of salmonella on a poultry farm. Brit Vet J 126:180, 1970

6. Jackson MM, Jackson CG, Fulton M: Investigation of the enteric bacteria of the testudinata-I: Occurrence of the Geneva, Arizona, Citrobacter, Edwarsiella and Salmonella.Proc. Ann. Conf. Bull Wildlife Dis Assoc 5:328, July 1969

7. Maenza RM, Powell DW, Plotkin GR, Formal SB, Jervis HR, Sprinz H: Experimental diarrhea: Salmonella enterocolitis in the rat. J Infect Dis 121:475, 1970

8. Matejovska D, Kral J: Salmonella surveillance in Czechoslavakia IV. The occurrence of salmonella serotypes in veterinary material in the year 1965. J Hyg Epid Microb & Immun 14:110, 1970

9. Hall MLM, Taylor J: Salmonella dublin: The relation between a living calf vaccine strain and those isolated from human and other sources. Vet Record 86:534, 1970

10. Morris GK, Martin WT, Shelton WH, Wells JG, Brachman PS: Salmonellae in fish meal plants: Relative amounts of contamination at various stages of processing and a method of control. Appl Microbiol 19:401, March 1970

11. Morris GK, Wells JG: Salmonella contamination in a poultry processing plant. Appl Microbiol 19:795, May 1970

12. Riley MGI: The incidence of salmonella in normally slaughtered pigs. Aust Vet J 46:40, 1970

13. Sharma VK, Singh CM: Lysogenic conversion and transduction studies in Salmonella goverdham. Indian J Med Research 58:16, January 1970

14. Splittstoesser DF, Segen B: Examination of frozen vegetables for salmonellae. J Milk & Food Tech 33:111, 1970

15. Timoney J: Salmonella give infection in cattle. Vet Record 86:520, 1970

16. Williams LP, Newell KW: Salmonella excretion in joy-riding pigs. Amer J of Pub Health 60:926, 1970

B. Recalls of Products Contaminated with Salmonellae for Period May 27, 1970, to July 22, 1970 (reported by the U. S. Food and Drug Administration).

From May 27, 1970 to July 22, 1970, six products were recalled by manufacturers and distributors because of salmonella contamination. These products as reported by the U. S. Food and Drug Administration are summarized in the table below.

| Week Ending | Name, Label, Form | Manufacturer, Distributor | Lot No. | Use | Depth of Recall | Product Distribution | Serotype |
|---|---|---|---|---|---|---|---|
| 6/10 | Brewer's Dried Yeast for Animal or Poultry Feed | (Mfr.) Philadelphia Dry Yeast Co., Philadelphia, Pennsylvania | 1112691C and 1113691C | Animal Feed | Wholesale | Virginia | Salmonella Group $C_1$ (not definitively serotyped) |
| 6/17 | Purity Brand Sodium Caseinate | (Mfr.) Muskogee Products, Inc., Muskogee, Okla. | D04MB4 and D28AB2 | Food | Wholesale | Arkansas Tennessee Illinois | S. cubana |
| 7/8 | Bravo Enriched Egg Pastina | (Mfr.) Alfonso Gioia & Sons, Inc., DBA Bravo Macaroni Co., Rochester, New York | 031870 | Food | Retail | N.Y., Pa. Michigan, Ohio, Ill. | S. schwarzen-grund |
| | Treasure Island Frozen Cooked Shrimp | (Mfr.) Ocean Products, Inc., Dover, Florida | G-8736 | Food | Retail | Wisconsin | S. oranienburg |
| 7/22 | Pasteurized Dried Egg Product | (Mfr.) Seymour, Inc., Topeka, Kansas | 092-0B and 100-0 | Food | Wholesale | Buffalo, N.Y. Lake City, Pa. | S. typhi-murium<br>S. tennessee<br>S. senftenberg |
| | Treasure Isle Frozen Cooked Ready to Eat Shrimp | (Mfr.) Ocean Products, Inc., Dover, Florida | All lots prior to 01590 | Food | Retail | National | S. oranienburg |

## VI. INTERNATIONAL

### A. Salmonellosis in Australia - 1969

Reported by Suzanne F. Dixon, Salmonella Reference Laboratory, Adelaide, South Australia

The majority of salmonellae isolated in the Commonwealth of Australia, Papua and New Guinea, the Philippines and Tonga are serotyped under the direction of Dr. K. F. Anderson at the Salmonella Reference Laboratory, Institute of Medical and Veterinary Science, Adelaide. In 1969, a total of 1,313 isolates from humans and 4,548 isolates from nonhumans were serotyped. The ten most frequently isolated serotypes are listed in the table below. One hundred twelve of the 120 strains of Salmonella typhi were isolated outside the Commonwealth of Australia. Two new serotypes, Salmonella toowong (from a cat) and Salmonella cannonhill (from cattle), were characterized.

| HUMAN | | | NONHUMAN | | |
|---|---|---|---|---|---|
| Serotype | Number | Percent | Serotype | Number | Percent |
| typhi-murium | 473 | 36.0 | typhi-murium | 1,478 | 32.5 |
| typhi | 120 | 9.1 | derby | 436 | 9.6 |
| anatum | 118 | 9.0 | anatum | 354 | 7.8 |
| muenchen | 112 | 8.5 | oranienburg | 204 | 4.5 |
| chester | 59 | 4.5 | havana | 189 | 4.2 |
| bovis morbificans | 45 | 3.4 | singapore | 171 | 3.8 |
| worthington | 41 | 3.1 | bovis morbificans | 167 | 3.7 |
| derby | 36 | 2.7 | adelaide | 160 | 3.5 |
| adelaide | 33 | 2.5 | senftenberg | 155 | 3.4 |
| enteritidis | 31 | 2.4 | kottbus | 147 | 3.2 |
| TOTAL | 1,068 | 81.2 | TOTAL | 3,461 | 76.2 |
| TOTAL (all serotypes) | 1,313 | | TOTAL (all serotypes) | 4,548 | |

### B. Salmonella agona Infections in England

Based on reports to the Public Health Laboratory Service from public health and hospital laboratories in the United Kingdom and Republic of Ireland for the week ending July 24, 1970.

Salmonella agona, hitherto an unusual serotype, has been reported as the cause of several outbreaks in different parts of England recently. Details of some of these episodes are now available.

In mid-May all five members of one family living in northwest England suffered from diarrhea and vomiting 24-48 hours after eating cold roast pork; Salmonella derby was isolated from all five persons. No pork was available for examination. A food handler at the retail shop where the pork was sold, who had herself eaten some of it, was found to be an asymptomatic shedder of this organism. No salmonellae were isolated from cold meats or surfaces at the shop. At the butcher's shop which supplied the pork, salmonellae were isolated from the feces of one of four staff members (S. agona) and from four of 15 swabs of equipment (S. agona and S. derby). Two other isolates, one from feces of another employee and one from boning knives, gave preliminary agglutination test results consistent with either S. agona or S. derby.

It was established that cooked meat was placed on surfaces that had been used for raw meat. After cleaning the premises, additional swabs of the environment and utensils were negative for salmonellae, as were swabs obtained at two other branches of the firm. S. agona was, however, isolated from an asymptomatic employee at one of these branches. Since this episode S. derby has been isolated from nine persons in eight households in the area, and S. agona from 14 persons in 13 households; most of these persons were symptomatic. However, no connection between these cases and the butcher's shop has been demonstrated.

At about the same time as this episode another small outbreak took place in north Wales. A 36-year-old man became ill with vomiting, diarrhea and fever which lasted 36 hours. During the next 2 days his father-in-law was also ill with diarrhea. S. agona was isolated from both patients. The wives of both men were symptomless excreters, but feces from the two children in the family were negative. The day before the first patient became ill, two oven-cooked chickens had been bought in the morning and kept at room temperature. One was eaten cold that evening and the other for lunch the next day. All members of the family ate the chicken. No chicken remained for examination and chicken heads from the same shop a week later gave negative results.

The third outbreak took place in northeast England. The first case was a mother who had diarrhea while in a maternity hospital. On investigation of her home contacts, four children were found to be excreting S. agona including a newborn baby thought to be suffering from pyloric stenosis. S. agona was also isolated from a mincing machine and chopping blocks at a food shop that supplied this family with chickens, and from swabs taken from a shelf where chickens were stored at the poultry wholesale firm. Investigation at a farm revealed S. agona on a wooden sticking tray. Other symptomless excreters were found among contacts and food handlers, and there may have been other infected persons in the community since S. agona was isolated from three separate blind-ended sewers in the locality. In another part of northeast England the infection was reported in two families and another sporadic case.

In June, S. agona was isolated from chicken carcasses from a farm in the west midlands. Both the farmer and his wife had had gastroenteritis in May, and S. agona was isolated from the farmer and his two children who were asymptomatic.

S. agona has also been isolated from 12 of 19 sets of broiler giblets from chickens killed in June, from imported fish meal used as raw material for animal food, and from raw poultry offal which is processed into poultry offal meal, a constituent of animal feed.

In the majority of these outbreaks, there was direct or indirect evidence that chickens were the source of infection. Strains of S. agona have also been isolated from bovine sources and pork sausages, so that other sources of infection must be considered and pork may have been the source of the first outbreak described above. S. agona has also been isolated from fish meal believed to have been produced in England, although the possibility of mixing with foreign fish meal cannot be overlooked. It is known that this fish meal is being used as poultry feed as well as in food for other animals.

EDITOR'S COMMENT: Salmonella agona continues to be a rare serotype in the United States. Since 1963, only six isolations have been reported, including three from human sources and three from turkeys. The most recent human isolation occurred in Illinois in May 1970.

## TABLE I. COMMON SALMONELLAE REPORTED FROM HUMAN SOURCES, JUNE, 1970

| SEROTYPE | GEOGRAPHIC DIVISION AND REPORTING CENTER | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | NEW ENGLAND | | | | | | MIDDLE ATLANTIC | | | | | EAST NORTH CENTRAL | | | | | WEST NORTH CENTRAL | | | | | | | SOUTH ATLANTIC | | | | | | | | |
| | ME | NH | VT | MAS | RI | CON | NYA | NYB | NYC | NJ | PA | OHI | IND | ILL | MIC | WIS | MIN | IOW | MO | ND | SD | NEB | KAN | DEL | MD | DC | VA | WVA | NC | SC | GA | FLA |
| *anatum* | | | | 2 | | | | 1 | | 2 | 1 | | | 3 | | | | | | | | | | | 1 | | | | | | | |
| *bareilly* | | | | 2 | | | | | 1 | | | | | 3 | | | | | | | | | | | | | | | 3 | | | |
| *blockley* | | | | 2 | | | | 2 | 3 | | 6 | 1 | | 1 | 1 | | 1 | | | | | | 1 | 1 | 4 | | 3 | | 2 | | 1 | |
| *braenderup* | | | | 1 | | | | | | | 1 | | | | | | | | | | | | | 3 | | | | | | | | |
| *bredeney* | | | | | | | | 1 | | | | 1 | | 2 | | | | | | | | | | | 1 | | | | | | | |
| *chester* | | | | 3 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *cholerae-suis v kun* | | | | | | | | | | 1 | | 1 | | | | | | | | | | | | | | | | | | | | |
| *cubana* | | | | | | | | | | | | 1 | | | | | | | | | | | | | 2 | | | | | | | |
| *derby* | | | | 2 | | | | | 3 | 1 | 1 | 2 | | 5 | 1 | 1 | 2 | | | 2 | | | | | 3 | | | | | | 3 | |
| *enteritidis* | | | | 11 | | 1 | | 11 | 17 | 6 | 15 | 8 | 12 | 14 | 5 | 5 | 4 | 1 | | | | | 1 | | 4 | 1 | 2 | | 6 | | 15 | |
| *give* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *heidelberg* | 1 | | | 4 | | 4 | | 8 | 2 | 4 | 5 | 5 | 1 | 15 | 9 | 4 | 1 | | 1 | | | | | | 2 | | 3 | | | | 9 | |
| *indiana* | | | | | | | | 1 | | | | 1 | | 1 | 1 | | | | | | | | | | 1 | | | | | | 2 | |
| *infantis* | | | | 3 | | 4 | | | 3 | 1 | 11 | 4 | 2 | 4 | 6 | 4 | | | 1 | | | | 1 | | 1 | | 5 | 1 | 1 | | 4 | |
| *java* | 1 | | | | | | | 3 | 2 | | 3 | | | 1 | | 2 | 6 | | | | | | | | | | | | 1 | | 1 | |
| *javiana* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 6 | | 6 | |
| *litchfield* | | | | | | | | 1 | | | | | | | | | | | 1 | | | | | | 3 | | | | | | 3 | |
| *livingstone* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *manhattan* | | | | | | | | | | | 3 | 2 | 1 | 4 | 7 | | | | | | | | | | 2 | | | 1 | | | 1 | |
| *miami* | | | | 1 | | | | | | 1 | | | | | | | | | | | | | | | 1 | | | | | | | |
| *mississippi* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 3 | |
| *montevideo* | | | | | | 1 | 1 | 3 | 1 | 3 | 1 | | 4 | 3 | 1 | 1 | | | | | | | 1 | | 1 | | 2 | | 2 | | 1 | |
| *muenchen* | | | | 1 | | 1 | | 2 | | 1 | 1 | | | | | 1 | | 1 | | | | 1 | | | | | 1 | | | | 1 | |
| *newington* | | | | | | | | | | | | | | 2 | | | | | | | | | | | | | | | | | | |
| *newport* | | | | 1 | | | | 2 | | 2 | 5 | 3 | 4 | 4 | 5 | | 5 | | | 1 | 2 | | 4 | | 1 | 1 | | 1 | 6 | | 3 | |
| *oranienburg* | | | | 1 | | | | 2 | 1 | | 1 | 2 | | 2 | | | | | | | | | | | 1 | | | | 1 | | 2 | |
| *panama* | | | | 3 | | | 1 | 2 | | | 1 | | | | | | 1 | 1 | | | | | | | | | | | | | 1 | |
| *paratyphi B* | | | | 2 | | | | 1 | 1 | | | 5 | | 1 | 1 | | | | | | | | | | | 1 | 4 | | | | | |
| *reading* | | | | | | | | | | | | | | 1 | | 24 | | | | | | | | | | | | | | | | |
| *saint-paul* | | | | 7 | | 1 | | 5 | 2 | 7 | 26 | 2 | 1 | 11 | 3 | 1 | 2 | 1 | 2 | | | | 1 | 1 | 3 | | 3 | | 1 | | 6 | |
| *san-diego* | 1 | | | | | | | | 1 | | 3 | | 1 | | 2 | | | | | | | | | | 1 | | | | | | | |
| *schwarzengrund* | | | | | | | | 3 | | | | | | | | | | | | | | 1 | | | | | | | | | | |
| *senftenberg* | | | | | | | | 1 | | | | | | 1 | | | | | | 1 | | | | | | | | | | | 1 | |
| *tennessee* | | | | | | | | | | | | | 1 | | | | | | | | | | | | | | | | | | 1 | |
| *thompson* | | | | 4 | 1 | 1 | | 1 | 1 | 2 | 4 | 1 | | 9 | 9 | 7 | 1 | | | | | | 1 | 1 | 1 | | 2 | | 2 | | 3 | |
| *typhi* | | | | | | 3 | 1 | | 2 | 2 | 1 | | | 3 | 2 | | | | | | | | | | 4 | | 2 | | 2 | | 3 | |
| *typhimurium* | 5 | | 1 | 31 | 4 | 16 | | 15 | 10 | 6 | 18 | 12 | 13 | 43 | 8 | 11 | 3 | 1 | 6 | 3 | | | | 1 | 22 | 3 | 7 | | 2 | | 25 | |
| *typhimurium v cop* | | | | 9 | | 3 | | | | 1 | | | | 1 | 10 | | | | | 1 | | 1 | | | | | | | | | | |
| *weltevreden* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *worthington* | | | | | | | | 1 | | | | | | | | | | | | | | | | | | | 1 | | | | | |
| TOTAL | 8 | — | 1 | 90 | 5 | 35 | 3 | 66 | 50 | 40 | 107 | 51 | 40 | 134 | 71 | 61 | 26 | 5 | 11 | 8 | 2 | 3 | 10 | 7 | 59 | 6 | 35 | 3 | 35 | — | 95 | — |
| ALL OTHER* | — | 14 | 2 | 4 | 1 | — | 34 | 5 | 12 | 2 | 2 | 5 | — | 1 | 8 | 3 | 1 | — | 3 | — | — | 3 | 1 | — | 3 | 5 | 2 | 1 | 3 | 2 | 7 | — |
| TOTAL | 8 | 14 | 3 | 94 | 6 | 35 | 37 | 71 | 62 | 42 | 109 | 56 | 40 | 135 | 79 | 64 | 27 | 5 | 14 | 8 | 2 | 6 | 11 | 7 | 62 | 11 | 37 | 4 | 38 | 2 | 102 | — |

Note: NYA — New York, Albany; NYB — Beth Israel Hospital; NYC — New York City. Beth Israel Hospital laboratory is a reference laboratory and this month serotyped a total of 123 cultures.

* See Table II.

TABLE I – Continued

| GEOGRAPHIC DIVISION AND REPORTING CENTER | | | | | | | | | | | | | | | | | | | | TOTAL | % OF TOTAL | CUMULATIVE TOTAL | % OF CUMULATIVE TOTAL | SEROTYPE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| EAST S. CENTRAL | | | | WEST S. CENTRAL | | | | MOUNTAIN | | | | | | | | PACIFIC | | | | | | | | |
| KY | TEN | ALA | MIS | ARK | LA | OKL | TEX | MON | IDA | WYO | COL | NM | ARI | UTA | NEV | WAS | ORE | CAL | ALK | HAW | | | | | |
| | | | | | 1 | | | | | | | | | | | | | 3 | 1 | | 15 | 0.8 | 87 | 0.9 | *anatum* |
| | | | | | | | | | | | | | | | | | | | | | 9 | 0.5 | 26 | 0.3 | *bareilly* |
| 2 | 1 | | | | 1 | | 3 | | | | | | | | | | | 7 | | 1 | 44 | 2.4 | 302 | 3.3 | *blockley* |
| | | | | | | | | | | | | | | | | | | 3 | | | 8 | 0.4 | 29 | 0.3 | *braenderup* |
| | | | | | | | 1 | | | | | | 1 | | | | | 3 | | 1 | 11 | 0.6 | 83 | 0.9 | *bredeney* |
| | | | | | | | | | | | | | | | | | | 1 | | | 4 | 0.2 | 38 | 0.4 | *chester* |
| | | | | | | | | | | | | | | | | | | | | | 2 | 0.1 | 10 | 0.1 | *cholerae-suis v kun* |
| | | | | | | | | | | | | | | | | | | 1 | | | 4 | 0.2 | 76 | 0.8 | *cubana* |
| | 1 | | | | | 1 | 4 | | | | | | | | | | | 8 | | 2 | 42 | 2.3 | 210 | 2.3 | *derby* |
| 1 | 3 | 3 | | | | | 5 | | | | | | | | | 1 | | 9 | | 1 | 162 | 8.8 | 739 | 8.0 | *enteritidis* |
| | | 1 | | | 2 | | 1 | | | | | | | | | | | 2 | | 1 | 7 | 0.4 | 26 | 0.3 | *give* |
| | 1 | 4 | | 2 | 1 | 2 | 6 | | | | 3 | | 3 | 1 | | 1 | | 15 | | 1 | 118 | 6.4 | 756 | 8.2 | *heidelberg* |
| | | | | | | | | | | | | | | | | | | | | | 7 | 0.4 | 48 | 0.5 | *indiana* |
| | 1 | 1 | | 1 | | | 2 | | | | 1 | | 2 | | | | | 9 | | 42 | 115 | 6.3 | 529 | 5.7 | *infantis* |
| | 1 | | | | 2 | | | | | | | | | | | | 2 | 8 | | 1 | 34 | 1.9 | 164 | 1.8 | *java* |
| | 1 | | | 2 | 1 | 1 | 8 | | | | | | | | | | 2 | 5 | | | 32 | 1.7 | 78 | 0.8 | *javiana* |
| | | 1 | | | 1 | | 2 | | | | | | | 1 | | | | 4 | | 1 | 18 | 1.0 | 90 | 1.0 | *litchfield* |
| | | | | | | | | | | | | | | | | | | | | | – | – | 9 | 0.1 | *livingstone* |
| | | | | | | | | | | | | | | | | | | 1 | | 1 | 23 | 1.3 | 156 | 1.7 | *manhattan* |
| | | | | | | | | | | | | | | | | | | | | | 3 | 0.2 | 17 | 0.2 | *miami* |
| | | | | | 3 | | 1 | | | | | | | | | | | | | | 7 | 0.4 | 16 | 0.2 | *mississippi* |
| | | | | 1 | | | 1 | | | | | | | | | | | 2 | | | 30 | 1.6 | 147 | 1.6 | *montevideo* |
| | 1 | 1 | | | | | 1 | | | | | | | | | | | 1 | | | 15 | 0.8 | 81 | 0.9 | *muenchen* |
| | | | | | | | | | | | | | | | | | | | | 1 | 3 | 0.2 | 16 | 0.2 | *newington* |
| | 5 | 2 | | 2 | 7 | 2 | 10 | | | | 1 | | 4 | | | | | 19 | | 2 | 104 | 5.7 | 578 | 6.2 | *newport* |
| | | 2 | | | 1 | | 1 | | | | | | 4 | | | | | 1 | | | 22 | 1.2 | 154 | 1.7 | *oranienburg* |
| | | | | | | | 6 | | | | 1 | | | | | | | 1 | | 1 | 19 | 1.0 | 71 | 0.8 | *panama* |
| | | | | | | | 4 | | | | | | | | | 1 | | | | | 21 | 1.1 | 87 | 0.9 | *paratyphi B* |
| | | | | | | | | | | | | | | | | 1 | 7 | | | | 33 | 1.8 | 74 | 0.8 | *reading* |
| | | | | | | | 2 | | | | 1 | | | | | 1 | | 7 | | 3 | 100 | 5.5 | 393 | 4.2 | *saint-paul* |
| | | | | | | | | | | | | | | | | | 1 | 6 | | 3 | 19 | 1.0 | 158 | 1.7 | *san-diego* |
| | | | | | | | | | | | | | | | | | | 2 | | | 6 | 0.3 | 27 | 0.3 | *schwarzengrund* |
| | | | | | | | | | | | | | | | | | | 1 | | | 5 | 0.3 | 31 | 0.3 | *senftenberg* |
| | | | | | 1 | | | | | | | | | | | | | | | | 3 | 0.2 | 24 | 0.3 | *tennessee* |
| 1 | 4 | 1 | | | 1 | | 1 | | | | 1 | | | | | 1 | | 2 | | | 63 | 3.4 | 376 | 4.1 | *thompson* |
| | | | | | | | 5 | | | | | 1 | | | | 1 | | 7 | | | 39 | 2.1 | 202 | 2.2 | *typhi* |
| 6 | 6 | 10 | | 3 | 3 | 7 | 15 | 4 | | | 10 | | 6 | 4 | | 13 | 3 | 74 | | 5 | 435 | 23.7 | 2258 | 24.4 | *typhimurium* |
| | 3 | | | | | | 1 | | 6 | | | | 1 | | | | | | | | 37 | 2.0 | 118 | 1.3 | *typhimurium v cop* |
| | | | | | | | | | | | | | | | | | | | | 11 | 11 | 0.6 | 46 | 0.5 | *weltevreden* |
| | | | | | | | | | | | | | | | | | | | | | 2 | 0.1 | 32 | 0.3 | *worthington* |
| 10 | 28 | 26 | – | 11 | 25 | 13 | 80 | 4 | 6 | – | 18 | 1 | 21 | 6 | – | 20 | 15 | 202 | 1 | 78 | 1632 | 89.0 | 8362 | 90.2 | TOTAL |
| 1 | – | – | 4 | 4 | 1 | 1 | 14 | – | – | – | – | 37 | 1 | – | – | – | 5 | 5 | 2 | 3 | 202 | | 908 | | ALL OTHER* |
| 11 | 28 | 26 | 4 | 15 | 26 | 14 | 94 | 4 | 6 | – | 18 | 38 | 22 | 6 | – | 20 | 20 | 207 | 3 | 81 | 1834 | | 9270 | | TOTAL |

TABLE II. OTHER SALMONELLAE REPORTED FROM HUMAN SOURCES, JUNE, 1970

| SEROTYPE | REPORTING CENTER | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | ALK | ARI | ARK | CAL | DC | GA | HAW | ILL | KAN | KY | LA | MD | MAS | MIC | MIN | MIS | MO | NEB | NH | NJ | NM | NYA | NYB |
| *albany* | | | | | | 2 | | | | | | | | | | | | | | | | | |
| *atlanta* | | | | | | 3 | | | | | | | | | | | | | | | | | |
| *berta* | | | | | | | | | | | 1 | | | 3 | | | | | | 1 | | | |
| *binza* | | | | 1 | | | | | | | | | | | | | | | | | | | |
| *bovis-morbificans* | | | | | | | | | | | | | | | | | | | | | | | |
| *brandenburg* | | | | | | | | | | | | | | | | | | | | | | | |
| *cholerae-suis* | | | | | | | | | | | | | | | | | | | | | | | 1 |
| *coleypark* | | | | | | | | | | | | | | 1 | | | | | | | | | |
| *concord* | | | | | | | | | 1 | | | | | | | | | | | | | | |
| *drypool* | | | | | | | | | | | | | | | | | | | | | | | |
| *eimsbuettel* | | | | | | | | | | | | 1 | | | | | | | | | | | |
| *florida* | | | | | | 1 | | | | | | | | | | | | | | | | | |
| *hartford* | | | | | | | | | | | | 1 | | 1 | | | | | | | | | |
| *ibadan* | | | | | | | | | | | | | | | | | | | | | | | |
| *irumu* | | | | | | | | | | | | | | | | | 3 | | | | | | |
| *kentucky* | | | | | | 1 | | | | | | | | | | | | | | | | | 2 |
| *kottbus* | | | | | | | | | | 1 | | | | | | | | | | | | | |
| *london* | | | | | | | | 1 | | | | | | | | | | | | | | | |
| *meleagridis* | | | | | | | | | | | | | | | | | | | | | | | |
| *minnesota* | | 1 | | | | | | | | | | | | | | | | | | | | | |
| *muenster* | | | | | | | | | | | | | 1 | | | | | | | | | | |
| *oslo* | | | | 1 | | | 3 | | | | | | | | | | | | | 1 | | | 1 |
| *paratyphi C* | | | | 1 | | | | | | | | | | | | | | | | | | | |
| *pomona* | | | | | | | | | | | | | | | | | | | | | | 1 | |
| *poona* | | | | 1 | | | | | | | | | | 1 | 1 | | | | | | | | |
| *san-juan* | | | | | | | | | | | | | 1 | | | | | | | | | | |
| *siegburg* | | | | | | | | | | | | | | 2 | | | | | | | | | |
| *simsbury* | | | | | | | | | | | | | | | | | | | | | | | 1 |
| *stanley* | | | | | | | | | | | | 1 | | | | | | | | | | | |
| *urbana* | | | | | | | | | | | | | 1 | | | | | | | | | | |
| TOTAL | – | 1 | – | 4 | – | 7 | 3 | 1 | 1 | 1 | 1 | 3 | 3 | 8 | 1 | – | 3 | – | – | 2 | – | 1 | 5 |
| NOT TYPED* | 2 | – | 4 | 1 | 5 | – | – | – | – | – | – | – | 1 | – | – | 4 | – | 3 | 14 | – | 37 | 33 | – |
| TOTAL | 2 | 1 | 4 | 5 | 5 | 7 | 3 | 1 | 1 | 1 | 1 | 3 | 4 | 8 | 1 | 4 | 3 | 3 | 14 | 2 | 37 | 34 | 5 |

* See Table V-A

TABLE III. COMMON SALMONELLAE REPORTED FROM NONHUMAN SOURCES, JUNE, 1970

| SEROTYPE | DOMESTIC ANIMALS AND THEIR ENVIRONMENT | | | | | | | ANIMAL FEEDS | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | CHICKENS | TURKEYS | SWINE | CATTLE | HORSES | OTHER | SUBTOTAL | TANKAGE | VEGETABLE PROTEIN | OTHER | SUBTOTAL |
| *anatum* | 2 | 5 | 2 | 1 | | | 10 | 18 | | | 18 |
| *bareilly* | | | 2 | | | 1 | 3 | 3 | | 2 | 5 |
| *blockley* | 6 | | | | | | 6 | | | | – |
| *braenderup* | 2 | | | | | | 2 | | | | – |
| *bredeney* | 1 | 1 | | | | | 2 | 4 | | | 4 |
| *chester* | | 4 | | | | 1 | 5 | | | | – |
| *cholerae-suis v kun* | | | 9 | | | | 9 | | | | – |
| *cubana* | 4 | | | | | 2 | 6 | 9 | | | 9 |
| *derby* | | 4 | | 1 | | 1 | 6 | 5 | | | 5 |
| *enteritidis* | 1 | | | | | 1 | 2 | | | | – |
| *give* | | 3 | | | | | 3 | 2 | | | 2 |
| *heidelberg* | 2 | 25 | 1 | 2 | 1 | 1 | 32 | | | 1 | 1 |
| *indiana* | | | | | | | – | | | | – |
| *infantis* | 16 | | 1 | | | 1 | 18 | 3 | | 2 | 5 |
| *java* | | | | | | | – | | | | – |
| *javiana* | | | | | | | – | | | | – |
| *litchfield* | | | 1 | | | 1 | 2 | | | | – |
| *livingstone* | | | | | | | – | 1 | | 6 | 7 |
| *manhattan* | 1 | 1 | | | | | 2 | | | | – |
| *miami* | | | | | | | – | | | | – |
| *mississippi* | | | | | | | – | | | | – |
| *montevideo* | 16 | | | | | 1 | 17 | 2 | | | 2 |
| *muenchen* | 1 | 7 | | | | | 8 | | | | – |
| *newington* | | | | | 1 | | 1 | | | | – |
| *newport* | | | 1 | 2 | 2 | | 5 | | | | – |
| *oranienburg* | | | | | | | – | 1 | | | 1 |
| *panama* | | | | | | | – | | | | – |
| *paratyphi B* | | | | | | | – | | | | – |
| *reading* | | 1 | | | | | 1 | | | | – |
| *saint-paul* | 11 | 11 | | | 2 | | 24 | | | | – |
| *san-diego* | | 8 | | 1 | | | 9 | 8 | | | 8 |
| *schwarzengrund* | | 5 | | | | | 5 | 3 | | | 3 |
| *senftenberg* | 2 | 2 | | | | 1 | 5 | 3 | | 3 | 6 |
| *tennessee* | 1 | 1 | | | | | 2 | 6 | | | 6 |
| *thompson* | 2 | | 1 | | | | 3 | | | | – |
| *typhi* | | | | | | | – | | | | – |
| *typhimurium* | 4 | 11 | 3 | 18 | 26 | 6 | 68 | 1 | | | 1 |
| *typhimurium v cop* | 6 | 1 | 2 | 2 | 3 | 2 | 16 | 1 | | | 1 |
| *weltevreden* | | | | | | | – | | | | – |
| *worthington* | 17 | 1 | | | | | 18 | 1 | | 1 | 2 |
| TOTAL | 95 | 91 | 23 | 27 | 35 | 19 | 290 | 71 | – | 15 | 86 |
| ALL OTHER* | 22 | 7 | 3 | 7 | 1 | 5 | 45 | 43 | – | 10 | 53 |
| TOTAL | 117 | 98 | 26 | 34 | 36 | 24 | 335 | 114 | – | 25 | 139 |

* See Table IV

TABLE II – Continued

| REPORTING CENTER | | | | | | | | | | | | | | TOTAL | CUMULATIVE TOTAL | SEROTYPE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| NYC | NC | OHI | OKL | ORE | PA | RI | SC | TEX | VT | VA | WVA | WIS | | | | |
| | | | | | | | | | | | | | | 2 | 11 | *albany* |
| | | | | | | | | | | | | | | 3 | 5 | *atlanta* |
| | | | | | 1 | | | | | | | | | 6 | 34 | *berta* |
| | | | | | | | | | | | | | | 1 | 5 | *binza* |
| | | | | | | | | | 1 | | | | | 1 | 4 | *bovis-morbificans* |
| 1 | | | | | | | | 2 | | | | | | 3 | 3 | *brandenburg* |
| 1 | | | | | | | | | | | | | | 2 | 5 | *cholerae-suis* |
| | | | | | | | | | | | | | | 1 | 1 | *coleypark* |
| | | | | | | | | | | | | | | 1 | 3 | *concord* |
| | | 3 | | | 1 | | | | | | | | | 4 | 5 | *drypool* |
| | | | | | | | | | | | | | | 1 | 8 | *eimsbuettel* |
| | | | | | | | | | | | | | | 1 | 1 | *florida* |
| | | | | | | | | | | | | | | 2 | 10 | *hartford* |
| | | | | | | | | 1 | | | | | | 1 | 1 | *ibadan* |
| | | | | | | | | | | | | | | 3 | 5 | *irumu* |
| | 2 | | | | | | | 2 | | 1 | | | | 8 | 19 | *kentucky* |
| | | | | | | | | | | | | | | 1 | 4 | *kottbus* |
| | 1 | | | | | | | | | | | | | 2 | 5 | *london* |
| | | | | | | | | 1 | | | | | | 1 | 4 | *meleagridis* |
| 1 | | | | | | | | | | | | | | 2 | 19 | *minnesota* |
| | | | | | | | | | | | 1 | | | 2 | 9 | *muenster* |
| | | | | | | | | | | | | | | 6 | 12 | *oslo* |
| | | | | | | | | | | | | | | 1 | 1 | *paratyphi C* |
| | | | | | | | | | | | | | | 1 | 1 | *pomona* |
| | | 1 | 1 | | | | | 1 | | 1 | | 1 | | 8 | 37 | *poona* |
| | | | | | | | | | | | | | | 1 | 1 | *san-juan* |
| | | | | | | | | | | | | | | 2 | 10 | *siegburg* |
| | | | | | | | | | | | | | | 1 | 6 | *simsbury* |
| | | | | | | | | | | | | | | 1 | 4 | *stanley* |
| 1 | | 1 | | | | | | | | | | | | 3 | 20 | *urbana* |
| | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | |
| 4 | 3 | 5 | 1 | – | 2 | – | – | 7 | 1 | 2 | 1 | 1 | | 72 | 377 | TOTAL |
| 8 | – | – | – | 5 | – | 1 | 2 | 7 | 1 | – | – | 2 | | 130 | 531 | NOT TYPED* |
| 12 | 3 | 5 | 1 | 5 | 2 | 1 | 2 | 14 | 2 | 2 | 1 | 3 | | 202 | 908 | TOTAL |

Cumulative Totals include isolations of all serotypes (except those listed in Table I) reported this year.

TABLE III – Continued

| WILD ANIMALS AND BIRDS | REPTILES AND ENVIRONMENT | HUMAN DIETARY ITEMS | | | | | | MISCELLANEOUS | TOTAL | CUMULATIVE TOTAL | SEROTYPE |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | EGGS AND PRODUCTS | POULTRY | RED MEAT | DAIRY PRODUCTS | OTHER | SUBTOTAL | | | | |
| | | | 2 | | | 1 | 3 | 1 | 32 | 267 | *anatum* |
| | | | | | | | – | | 8 | 26 | *bareilly* |
| | | | | | | | – | | 6 | 80 | *blockley* |
| | | | | | | | – | 1 | 3 | 14 | *braenderup* |
| | | | | | | | – | | 6 | 83 | *bredeney* |
| | | | | | | | – | | 5 | 26 | *chester* |
| | | | | | | | – | | 9 | 189 | *cholerae-suis v kun* |
| | | | | | 1 | | 1 | 12 | 28 | 64 | *cubana* |
| | | | | | | | – | 1 | 12 | 68 | *derby* |
| | | | | | | | – | | 2 | 64 | *enteritidis* |
| | | | | | | | – | 3 | 8 | 17 | *give* |
| | | | | | | | – | 1 | 34 | 397 | *heidelberg* |
| | | | | | | | – | | – | 21 | *indiana* |
| 1 | 1 | 1 | | 2 | | | 3 | 4 | 32 | 181 | *infantis* |
| | 2 | | | | | | – | | 2 | 22 | *java* |
| | | | | | | | – | | – | 4 | *javiana* |
| | | | | | | | – | | 2 | 4 | *litchfield* |
| | | | | | | | – | | 7 | 37 | *livingstone* |
| | | | 1 | | | | 1 | | 3 | 14 | *manhattan* |
| | | | | | | | – | | – | 8 | *miami* |
| | | | | | | | – | | – | 1 | *mississippi* |
| | | | | | | | – | 3 | 22 | 157 | *montevideo* |
| | | | | 1 | | | 1 | | 9 | 22 | *muenchen* |
| | | | | | | | – | 2 | 3 | 13 | *newington* |
| | 1 | | | | | 4 | 4 | 3 | 13 | 104 | *newport* |
| | | | | | | | – | | 1 | 96 | *oranienburg* |
| | | | | | | | – | | – | 2 | *panama* |
| | | | | | | | – | | – | 2 | *paratyphi B* |
| | | | | | | | – | | 1 | 27 | *reading* |
| 1 | 2 | | 1 | 1 | | | 2 | | 29 | 294 | *saint-paul* |
| | | | | | | | – | | 17 | 98 | *san-diego* |
| | | | | | | 2 | 2 | | 10 | 43 | *schwarzengrund* |
| | | | | | | 1 | 1 | | 12 | 148 | *senftenberg* |
| 1 | | 1 | | | | | 1 | 2 | 12 | 125 | *tennessee* |
| | | 1 | 1 | | | 1 | 3 | 1 | 7 | 180 | *thompson* |
| | | | | | | | – | | – | – | *typhi* |
| 10 | | | | | | | – | 2 | 81 | 552 | *typhimurium* |
| | | | | | | | – | | 17 | 104 | *typhimurium v cop* |
| | | | | | | | – | | – | – | *weltevreden* |
| | | | | | 1 | | 1 | | 21 | 126 | *worthington* |
| 13 | 6 | 3 | 5 | 4 | 2 | 9 | 23 | 36 | 454 | 3680 | TOTAL |
| 5 | 2 | 5 | – | – | – | 1 | 6 | 17 | 128 | 963 | ALL OTHER* |
| **18** | **8** | **8** | **5** | **4** | **2** | **10** | **29** | **53** | **582** | **4643** | **TOTAL** |

TABLE IV. OTHER SALMONELLAE REPORTED FROM NONHUMAN SOURCES, JUNE, 1970

| SEROTYPE | DOMESTIC ANIMALS AND THEIR ENVIRONMENT | | | | | | | ANIMAL FEEDS | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | CHICKENS | TURKEYS | SWINE | CATTLE | HORSES | OTHER | SUBTOTAL | TANKAGE | VEGETABLE PROTEIN | OTHER | SUBTOTAL |
| *alachua* | | | | | | | – | 2 | | | 2 |
| *babelsberg* | | | | | | | – | 1 | | | 1 |
| *berta* | 1 | | | 2 | | | 3 | | | | – |
| *binza* | | | | | | | – | 2 | | 1 | 3 |
| *bornum* | | | | | | | – | 2 | | | 2 |
| *california* | 5 | | | | | | 5 | 1 | | | 1 |
| *carrau* | | | | | | | – | | | | – |
| *cerro* | | | | | | | – | 1 | | 1 | 2 |
| *cholerae-suis* | | | 1 | | | | 1 | | | | – |
| *drypool* | | | | | | | – | 11 | | | 11 |
| *dublin* | | | | 5 | | | 5 | | | | – |
| *eimsbuettel* | 4 | | 1 | | | | 5 | 5 | | 2 | 7 |
| *good* | | | | | | 1 | 1 | | | | – |
| *hartford* | | | | | | | – | | | | – |
| *johannesburg* | | | 1 | | | | 1 | | | | – |
| *kentucky* | | | | | | | – | 6 | | | 6 |
| *lexington* | | | | | | 1 | 1 | 1 | | | 1 |
| *madelia* | | | | | | | – | 1 | | | 1 |
| *minnesota* | | | | | | | – | 2 | | 3 | 5 |
| *ohio* | | | | | | | – | | | | – |
| *orion* | | | | | | | – | 2 | | | 2 |
| *pullorum* | 4 | 3 | | | | | 7 | | | | – |
| *siegburg* | | | | | | 2 | 2 | 1 | | | 1 |
| *simsbury* | 7 | | | | 1 | | 8 | | | | – |
| *stanley* | | 1 | | | | | 1 | | | | – |
| *taksony* | | | | | | | – | 2 | | | 2 |
| *tallahassee* | | | | | | | – | | | | – |
| *tanger* | | | | | | | – | | | | – |
| *thomasville* | | | | | | | – | | | 1 | 1 |
| *urbana* | | | | | | | – | | | | – |
| TOTAL | 21 | 4 | 3 | 7 | 1 | 4 | 40 | 40 | – | 8 | 48 |
| NOT TYPED* | 1 | 3 | – | – | – | 1 | 5 | 3 | – | 2 | 5 |
| **TOTAL** | **22** | **7** | **3** | **7** | **1** | **5** | **45** | **43** | **–** | **10** | **53** |

* See Table V-B

TABLE IV – Continued

| WILD ANIMALS AND BIRDS | REPTILES AND ENVIRON-MENT | HUMAN DIETARY ITEMS | | | | | | MISCEL-LA-NEOUS | TOTAL | CUMU-LATIVE TOTAL | SEROTYPE |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | EGGS AND PRODUCTS | POULTRY | RED MEAT | DAIRY PRODUCTS | OTHER | SUBTOTAL | | | | |
| | | 2 | | | | | 2 | | 4 | 9 | *alachua* |
| | | | | | | | – | | 1 | 1 | *babelsberg* |
| | | | | | | | – | | 3 | 11 | *berta* |
| | | | | | | | – | 1 | 4 | 17 | *binza* |
| | | | | | | | – | | 2 | 11 | *bornum* |
| | | | | | | | – | | 6 | 25 | *california* |
| 4 | | | | | | | – | | 4 | 6 | *carrau* |
| | | | | | | | – | | 2 | 26 | *cerro* |
| | | | | | | | – | | 1 | 8 | *cholerae-suis* |
| | | | | | | | – | | 11 | 34 | *drypool* |
| | | | | | | | – | | 5 | 43 | *dublin* |
| | | 3 | | | | | 3 | 3 | 18 | 145 | *eimsbuettel* |
| | | | | | | | – | | 1 | 1 | *good* |
| | 1 | | | | | | – | | 1 | 6 | *hartford* |
| | | | | | | | – | | 1 | 9 | *johannesburg* |
| | | | | | | | – | 1 | 7 | 59 | *kentucky* |
| | | | | | | | – | | 2 | 11 | *lexington* |
| | | | | | | | – | | 1 | 9 | *madelia* |
| | | | | | | | – | 2 | 7 | 82 | *minnesota* |
| | | | | | | | – | 8 | 8 | 9 | *ohio* |
| | | | | | | | – | | 2 | 14 | *orion* |
| | | | | | | | – | 1 | 8 | 39 | *pullorum* |
| | | | | | | | – | | 3 | 43 | *siegburg* |
| | | | | | | | – | | 8 | 30 | *simsbury* |
| | | | | | | | – | | 1 | 1 | *stanley* |
| | | | | | | | – | | 2 | 20 | *taksony* |
| 1 | | | | | | | – | | 1 | 1 | *tallahassee* |
| | | | | | | | – | 1 | 1 | 1 | *tanger* |
| | | | | | | | – | | 1 | 40 | *thomasville* |
| | 1 | | | | | | – | | 1 | 19 | *urbana* |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| 5 | 2 | 5 | – | – | – | – | 5 | 17 | 117 | 861 | TOTAL |
| – | – | – | – | – | – | 1 | 1 | – | 11 | 102 | NOT TYPED* |
| 5 | 2 | 5 | – | – | – | 1 | 6 | 17 | 128 | 963 | TOTAL |

TABLE V. SALMONELLAE REPORTED BY GROUP IDENTIFICATION ONLY, JUNE, 1970

A. HUMAN SOURCES

| REPORTING CENTER | GROUP | | | | | | | | | | | | | | | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | B | C | | C1 | C2 | | D | M | | O | UNK | | | | | |
| ALASKA | 1 | | | 1 | | | | | | | | | | | | 2 |
| ARKANSAS | | | | 1 | 3 | | | | | | | | | | | 4 |
| CALIFORNIA | | | | | 1 | | | | | | | | | | | 1 |
| D.C. | 2 | | | | | | 1 | | | | 2 | | | | | 5 |
| MASSACHUSETTS | | | | | | | | | | | 1 | | | | | 1 |
| MISSISSIPPI | 3 | | | 1 | | | | | | | | | | | | 4 |
| NEBRASKA | 1 | | | 2 | | | | | | | | | | | | 3 |
| NEW HAMPSHIRE | 10 | | | | | | 3 | | | | 1 | | | | | 14 |
| NEW MEXICO | 24 | | | 1 | 1 | | 11 | | | | | | | | | 37 |
| NEW YORK-A | | | | | | | | | | | 33 | | | | | 33 |
| NEW YORK-C | 2 | 2 | | | | | | | | | 4 | | | | | 8 |
| OREGON | | | | 5 | | | | | | | | | | | | 5 |
| RHODE ISLAND | 1 | | | | | | | | | | | | | | | 1 |
| SOUTH CAROLINA | | | | | | | | | | | 2 | | | | | 2 |
| TEXAS | 3 | | | 1 | 1 | | 1 | | | | 1 | | | | | 7 |
| VERMONT | 1 | | | | | | | | | | | | | | | 1 |
| WISCONSIN | 2 | | | | | | | | | | | | | | | 2 |
| TOTAL | 50 | 2 | | 12 | 6 | | 16 | | | | 44 | | | | | 130 |

B. NONHUMAN SOURCES

| SOURCES | GROUP | | | | | | | | | | | | | | | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | B | C | | C1 | C2 | | D | M | | O | UNK | | | | | |
| DOMESTIC ANIMALS AND THEIR ENVIRONMENT | 4 | | | | | | | | | | 1 | | | | | 5 |
| ANIMAL FEEDS | 1 | | | | | | | 3 | | | 1 | | | | | 5 |
| WILD ANIMALS AND BIRDS | | | | | | | | | | | | | | | | – |
| REPTILES AND ENVIRONMENT | | | | | | | | | | | | | | | | – |
| HUMAN DIETARY ITEMS | | | | | | | | | | 1 | | | | | | 1 |
| MISCELLANEOUS | | | | | | | | | | | | | | | | – |
| TOTAL | 5 | – | | – | – | | – | 3 | | 1 | 2 | | | | | 11 |

## STATE EPIDEMIOLOGISTS

Key to all disease surveillance activities are those in each State who serve the function as State epidemiologists. Responsible for the collection, interpretation and transmission of data and epidemiological information from their individual States, the State epidemiologists perform a mast vital role. Their major contributions to the evolution of this report are gratefully acknowledged.

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