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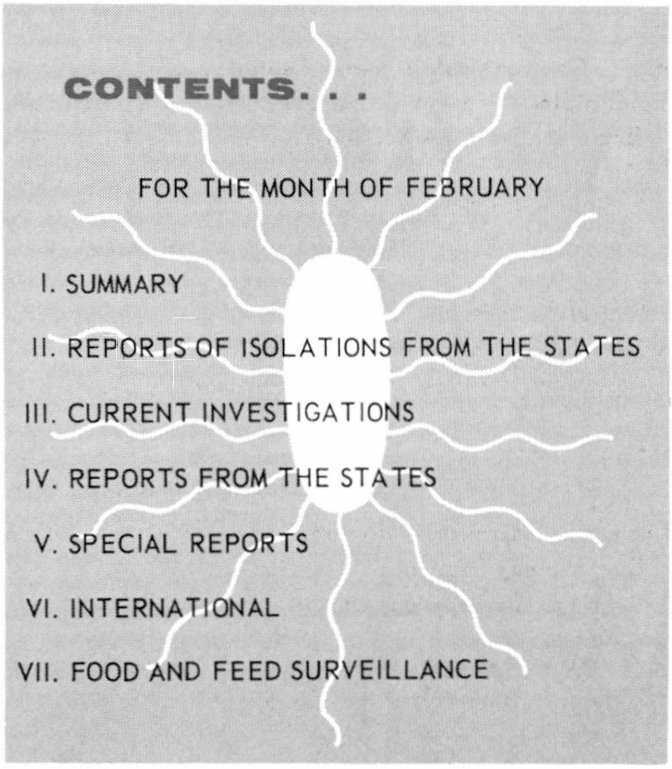
NATIONAL
COMMUNICABLE DISEASE CENTER

# SALMONELLA

## SURVEILLANCE




U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE/PUBLIC HEALTH SERVICE
Bureau of Disease Prevention and Environmental Control

# 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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TABLE OF CONTENTS

## I. SUMMARY

This issue of the Salmonella Surveillance Report contains discussions of three hospital-associated epidemics, details of an outbreak traced to a Montana restaurant, and the announcement of a course on methods for the isolation of salmonellae. In addition, the Food and Drug Administration Statement on Salmonella Contamination of Animal Feeds is reprinted.

In February 1967, 1184 isolations of salmonellae were reported from humans, an average of 296 isolations per week (Tables I and II). This number represents a decrease of 63 (17.5 percent) from the weekly average of January 1967 and an increase of 9 (3.1 percent) over the weekly average of February 1966.

Reports of 771 nonhuman isolations of salmonellae were received during February, a decrease of 208 (21.2 percent) from January 1967 (Tables IV, V, and VI).

## II. REPORTS OF ISOLATIONS FROM THE STATES

### A. Human

The seven most frequently reported serotypes during February were:

| Rank | Serotype | Number | Percent | Rank Last Month |
|---|---|---|---|---|
| 1 | *S. typhi-murium* and *S. typhi-murium var. copenhagen* | 347 | 29.3 | 1 |
| 2 | *S. heidelberg* | 106 | 9.0 | 2 |
| 3 | *S. enteritidis* | 68 | 5.7 | 6 |
| 4 | *S. newport* | 65 | 5.5 | 4 |
| 5 | *S. typhi* | 62 | 5.2 | 7 |
| 6 | *S. infantis* | 55 | 4.6 | 5 |
| 7 | *S. saint-paul* | 53 | 4.5 | 3 |
| | Total | 756 | 63.8 | |
| | Total (all serotypes) | 1184 | | |

The age and sex distribution is shown in Table III.

### B. Nonhuman

Thirty-six states reported nonhuman isolations of salmonellae, in which 68 different serotypes were represented.

The seven most frequently reported serotypes during February were:

| Rank | Serotype | Predominant Source and Number | Number | Percent | Rank Last Month |
|---|---|---|---|---|---|
| 1 | S. derby | swine (116) | 135 | 17.5 | 2 |
| 2 | S. typhi-murium and S. typhi-murium var. copenhagen | cattle (11) and swine (10) | 52 | 6.7 | 1 |
| 3 | S. anatum | swine (21) | 43 | 5.6 | 4 |
| 4 | S. heidelberg | turkeys (20) | 40 | 5.2 | 4 |
| 5 | S. infantis | chickens (24) | 35 | 4.5 | 6 |
| 6 | S. cubana | candy (13) | 34 | 4.4 | 3 |
| 7 | S. montevideo | dry milk (19) | 32 | 4.2 | Not listed |
| | Total | | 371 | 48.1 | |
| | Total (all serotypes) | | 771 | | |

The most prominent nonhuman sources of salmonellae reported during February were swine, 220 (28.5 percent); turkeys, 92 (11.9 percent); dry milk, 83 (10.8 percent); chickens, 68 (8.8 percent); and livestock feed, 64 (8.3 percent). Salmonella derby ranks first this month due mainly to 115 isolates from swine reported by Louisiana.

## III. CURRENT INVESTIGATIONS

### Salmonella typhi-murium Outbreak on a Pediatric Hospital Ward.

Reported by Herbert L. Slutsky, Ph.D., Epidemiologist, City of Chicago Board of Health; Alan Leviton, M.D., EIS Officer assigned to Presbyterian-St. Luke's Hospital, Chicago, Illinois; Walter Buell, M.D., EIS Officer assigned to the Illinois State Department of Public Health; and Jacques Caldwell, M.D., Aldo Milic, M.D., and Michael Treger, D.V.M., EIS Officers, Bacterial Diseases Section, Epidemiology Program, National Communicable Disease Center.

During the last quarter of 1966, a substantial increase in isolations of Salmonella typhi-murium from Cook County, Illinois, was reported to the Salmonella Unit. Of 185 total isolations of S. typhi-murium between September 1, 1966, and January 23, 1967, 110 had been isolated from infants less than 1 year of age. On the basis of previous surveillance data, only about 18 isolations were expected from this age group during this time. In contrast to the marked increase in the number of cases among infants, the 75 reported isolations of S. typhi-murium from persons older than 1 year of age, or whose ages were unknown, closely approximated the expected number (86 cases). Therefore, the outbreak seemed limited to infants, and subsequent investigations focused on this age group.

Nearly all the 110 cases had occurred among infants who resided in lower socioeconomic areas of South and West Chicago, and approximately 90 percent had been reported by a single pediatric diarrhea ward of a Chicago hospital. Further investigations were instituted at the hospital to determine whether these cases acquired their infections in the community or in the hospital. Ward-acquired infections with S. typhi-murium were considered to be present if the first positive culture was obtained under any of the following circumstances: (1) after 2 or more days of hospitalization with two earlier negative cultures during hospitalization (60 cases); (2) after 3 or more days of hospitalization with one earlier negative culture during hospitalization (14 cases); (3) after 7 days of hospitalization with no earlier cultures having been

taken (3 cases); and (4) if the first positive culture was obtained within 1 week after discharge from the ward (12 cases). Only a few patients had received antibiotics before initial culturing. Ward-associated cases were defined as those that had developed among susceptible infants within 7 days after intimate exposure to cases that were discharged from the ward. Using these criteria, 89 were identified as ward-acquired cases and 6 as ward-associated cases. The remaining 15 cases were classified as community acquired, a number that does not differ significantly from that expected in this age group on the basis of previous surveillance data. Meals and formulae served on the ward were prepared in a central hospital kitchen. Other pediatric wards in different areas of the hospital received the same foods but reported no cases of S. typhi-murium infection. It was, therefore, unlikely that the infections were acquired from a common dietary item.

Epidemiologic data suggested that the outbreak on the ward began in early September 1966 when an infant was admitted to the ward with S. typhi-murium enteritis. Stool cultures of this case remained positive for the organism during 18 days of hospitalization, and cross-infections to other hospitalized infants may well have occurred during this time. Since September 1, 1966, nearly 12 percent of all infants admitted to the ward have developed S. typhi-murium infections during hospitalization. Nine deaths have occurred in this group of patients.

Virtually all the ill patients excreted salmonellae that demonstrated a high degree of antibiotic resistance. Eighty percent of the salmonellae were variants of a pattern possessing resistance to tetracycline, streptomycin, ampicillin, sulfa, and cephalothin. Organisms isolated early in the outbreak were observed to have this pattern almost exclusively, while isolates obtained later in the outbreak showed variations of this pattern and four other patterns which were not multiply resistant. Phage typing is in progress, and results will be reported in the future.

Some of the factors that seemed to be responsible for this serious cross-infection problem on the ward were overcrowding of patients, inconveniently accessible handwashing facilities, a shortage of appropriately trained paramedical personnel, and inability to isolate individually new admissions because of limited physical facilities and overcrowding of patients.

Measures that might be necessary to control the outbreak were discussed with administrative personnel at the hospital and officials from Chicago, Cook County, and Illinois State Health Departments. There was general agreement and awareness among these groups that the following control measures seemed desirable:

1. The ward should be closed to all new admissions since there is a serious risk of acquiring S. typhi-murium infections after admission, and overcrowding would be alleviated as patients are discharged.

2. Patients currently on the ward should not be discharged until three consecutive negative stool cultures have been obtained in order to reduce the possibility of further satellite cases.

3. Nursing, medical, and paramedical staff should be reeducated in isolation techniques, and thorough handwashing following contact with infected infants should be stressed.

4. Stool specimens from ward personnel should be cultured at least once a month to detect asymptomatic carriers of enteric pathogens. Individuals found to be positive should be relieved of ward duties until three consecutive negative stool cultures are obtained.

5. To eliminate possible environmental reservoirs, a thorough cleaning and disinfection should be undertaken as soon as possible.

6. Exchange of personnel between the ward and other wards should be prohibited to reduce the possibility of spread to other areas of the hospital.

7. Children with acute diarrheal disease should be isolated separately until the etiology is determined and/or acute diarrhea ceases. Infants infected with the same pathogenic strain may be placed in the same room.

In addition to instituting some of the above measures, hospital officials consolidated all S. typhi-murium cases onto a different ward, and the ward involved in the outbreak was cleaned, disinfected, and fogged with an experimental solution containing quartenary ammonium and organic tin compounds. Subsequently, the number of new cases of S. typhi-murium reported from Cook County, Illinois, has approached normal levels.

## IV. REPORTS FROM THE STATES

### A. Montana

Salmonella typhi-murium Outbreaks Traced to a Montana Restaurant.

Reported by Edward L. Stow, Chief Sanitarian, James Neely and Lou Ladas, Sanitarians, and Oscar Baltrusch, M.D., City Health Officer, City of Billings Health Department; Mary E. Soules, M.D., M.P.H., Director, Division of Disease Control, and T. F. Lofthouse, State Sanitarian, Montana State Board of Health; L. Ariel Thomson, D.D.S., and Steven Schroeder, M.D., EIS Officers, Bacterial Diseases Section, Epidemiology Program, NCDC.

Two outbreaks of gastroenteritis occurring over a 5-month period have been traced to a Billings, Montana, restaurant. In both instances the infecting serotype was Salmonella typhi-murium. The first outbreak occurred in July 1966 and involved at least 14 people, of whom 10 had eaten at the suspected restaurant within 8 to 48 hours before becoming ill. Food histories failed to incriminate any particular vehicle, but investigation of the restaurant disclosed unsanitary conditions, including uncleanliness, presence of decomposed food, improper dishwashing techniques, improper storage of perishable foods, and defective surfaces for food preparation. The restaurant was notified of the violation of sanitary ordinances, and remedial measures were apparently undertaken.

No further cases were reported until December 1966 when 31 persons became ill with febrile gastroenteritis following a company banquet at the same restaurant. Symptoms included fever, diarrhea, abdominal cramps, and nausea and 2 patients required hospitalization. A total of 57 persons had attended the banquet, giving a meal attack rate of 56 percent. Of the 31 who became ill following the banquet, 15 had positive stool cultures for S. typhi-murium. The average incubation time from the meal to onset of symptoms was 48 hours. Food histories obtained from all but 1 of those attending the banquet clearly incriminated two food items, turkey and turkey dressing.

None of the food served at the banquet was available for culturing, but bacterial analysis of environmental scrapings and other food ingredients obtained at the restaurant 1 week after the meal failed to disclose salmonellae. However, unsanitary conditions similar to those found the previous summer were again in evidence, and three restaurant employees were found positive for S. typhi-murium. The restaurant was closed for a 3-week period and has recently announced plans to remodel and to operate in the future strictly as a nightclub.

B. Kansas

Salmonella infantis Outbreak in a Newborn Nursery.

Reported by Rosemary B. Harvey, M.D., Director, Division of Preventive Medicine, Wichita-Sedgwick County Department of Public Health, Wichita, Kansas.

An outbreak of Salmonella infantis infections in a newborn nursery was traced to a dinner at which the then-pregnant mother (Mrs. A) of one of the infants became ill. On Sunday, August 14, 1966, a family dinner attended by 9 persons was held in the home of Mrs. A's mother-in-law. The day after the dinner, 4 of the persons who ate the meal became ill with gastroenteritis. On August 17, Mrs. A was admitted to the hospital and delivered her baby on the same day. Two days later she also became ill with gastroenteritis, and in the subsequent few days 6 infants, beginning with her own child, developed febrile diarrhea. Salmonella infantis was the infecting organism for Mrs. A and all the infants.

Further investigation showed that 8 of the 9 persons who had attended the dinner had stool cultures positive for S. infantis. These 8 persons included Mrs. A, the 4 who became ill earlier, and 3 who were asymptomatic. The menu for the meal included fried chicken, mashed potatoes with milk gravy, green beans, sliced tomatoes, hot rolls, custard pie, and pineapple cream pie. All persons at the dinner ate portions of everything. The investigators noted nothing unusual in food preparation. A sample of the pineapple cream pie was obtained from Mrs. A, who had taken home an extra piece, and S. infantis was isolated from the sample. The pie filling had been made with eggs, milk, cornstarch, vanilla, salt, and crushed pineapple; the meringue was prepared with egg whites, sugar, and salt. The filling was cooked on the stove and then poured into pie crust. There was some question as to whether the eggs used in the pie were purchased from a farmer or a local store.

The epidemiologic findings indicate that Mrs. A was infected before entering the hospital. The 5-day interval between the suspected meal and the onset of her symptoms, however, suggests a secondarily acquired infection. Seven additional cases of S. infantis infection were found in persons who were in contact with the hospital-acquired cases after they were discharged from the hospital. All of these cases were felt to represent secondary spread from the hospital-acquired cases.

In summary, a S. infantis outbreak resulting from a family meal was carried into a local hospital and then spread to contacts of the hospital cases. There were at least 21 cases:

| | |
|---|---|
| 8 | persons who ate the suspect meal |
| 6 | newborns who were infected in the hospital |
| 7 | contacts of the newborns |
| 21 | Total |

The only food available from the suspect meal was a portion of the cream pie, which was heavily contaminated with salmonellae.

EDITOR'S COMMENT: In typical nursery epidemics of salmonellosis the infant is infected at birth by the mother, who acquired her infection before entering the hospital[1-4]. In this outbreak the infant was born during the mother's presumed incubation period, and it is impossible to determine whether the infection was acquired at birth or during the first few days of life. Once the infection is introduced into a nursery, it is easily spread from infant to infant[5-7].

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C. Connecticut

Salmonella typhi-murium Outbreak in a Chronic Disease Hospital.


Reported by James Hart, M.D., Director, Division of Preventable Diseases, and Barbara Christine, M.D., Chief, Epidemiology Section, Connecticut State Department of Health.


An outbreak of gastroenteritis involving seven children and six adults occurred in October 1966 in a Connecticut chronic disease hospital. Two deaths occurred among children who were already severely debilitated. Salmonella typhi-murium was isolated from the stools of six patients. The pediatric and adult wards are located separately, and the only common factor that investigators could discover was that all patients who developed gastroenteritis were receiving tube feedings. Formula for the feedings was prepared in the main kitchen in large 24-hour batches and taken to the floors where it was stored in the refrigerator until use. It was then poured into bottles resembling infant feeding bottles and from there into naso-gastric or gastrostomy tubes. Ingredients for the pediatric and adult formulae were as follows:

| Pediatric Formula | Adult Formula |
|---|---|
| Sugar - 150 cc. | Sugar - 170 cc. |
| Somagen - 15 cc. | Somagen - 15 cc. |
| Fergon - 1 tablespoon | Fergon - 1 tablespoon |
| Fresh eggs - 3 | Fresh eggs - 3 |
| Whole milk - 900 cc. | Whole milk - 1000 cc. |
| Baby beef meat - 1 jar | Cream - 4 oz. |
| | Meritine - ½ cup |

Ingredients for both formulae were mixed and blended before storing. A specimen of the pediatric formula obtained from the ward was found positive for S. typhi-murium. Intensive culturing of all ingredients used in the formulae failed to yield any positive results. However, environmental swabs demonstrated S. typhi-murium contamination of two adult tracheotomy tubes. Salmonella typhi-murium was isolated from the chief cook, who occasionally prepared the formulae.

Numerous control recommendations included the following: removal of the cook from food preparation until stool cultures were negative; individual preparation of formulae; disposable containers for the feedings; elimination of raw and undercooked eggs from all diets; vigorous enforcement of kitchen sanitation and time-temperature controls in dishwashing; strict handwashing techniques for food handlers; and isolation of known cases.

No further cases have occurred since the institution of these control measures.

## V. SPECIAL REPORTS

### A. Statement of General Policy or Intrepretation: Animal Feeds Contaminated with Salmonella.

Statement by James L. Goddard, M.D., Commissioner, U.S. Food and Drug Administration. Published in the Federal Register, March 15, 1967.

Because of the significance to the public health of not having salmonella microorganisms in meat, milk, eggs, and other edible products of food-producing animals, the Commissioner of Food and Drugs calls attention to the applicability of the Federal Food, Drug, and Cosmetic Act to the salmonella contamination in animal feeds by issuing the statement of policy hereinafter set forth. Accordingly, under the authority vested in the Secretary of Health, Education, and Welfare by that act (secs. 402(a), 701(a), 52 Stat. 1046, as amended, 1055; 21 U.S.C. 342(a), 371(a)) and delegated by him to the Commissioner (21 CFR 2.120), Part 3 is amended by adding thereto the following new section:

§ 3.58 Animal feeds contaminated with salmonella microorganisms.

(a) Investigations by the Food and Drug Administration, the Communicable Disease Center of the U.S. Public Health Service, the Animal Health Division of the Agricultural Research Service, U.S. Department of Agriculture, and by various State public health agencies have revealed that processed fishmeal, poultry meal, meat meal, tankage, and other animal byproducts intended for use in animal feed may be contaminated with salmonella bacteria, an organism pathogenic to man and animals. Contamination of these products may occur through inadequate heat treatment of the product during its processing or through recontamination of the heat-treated product during a time of improper storage or handling subsequent to processing.

(b) Articles used in food for animals are included within the definition of "food" in section 201(f) of the Federal Food, Drug, and Cosmetic Act. Further, salmonella contamination of such animal feeds having the potentiality for producing infection and disease in animals must be regarded as an adulterant within the meaning of section 402(a) of the act. Therefore, the Food and Drug Administration will regard as adulterated within the meaning of section 402(a) of the act shipments of the following when intended for animal feed and encountered in interstate commerce and found upon examination to be contaminated with salmonella microorganisms: Bone meal, blood meal, crab meal, feather meal, fishmeal, fish solubles, meat scraps, poultry meat meal, tankage, or other similar animal byproducts, or blended mixtures of these.

EDITOR'S COMMENT: This statement should not be interpreted to mean that the Food and Drug Administration will undertake an active program of sampling and examination of finished feeds. It is, however, a significant step toward interruption of the principal epidemiologic cycle of salmonellosis in its major animal reservoirs.

### B. Announcement of Course on Methods for the Isolation of Salmonellae from Food Products and Animal Feeds.

The Veterinary Public Health Laboratory, Epidemiology Program, and the Bacteriology Section, Laboratory Program, at the National Communicable Disease Center, will conduct a course on methods for isolating salmonellae from food products and animal feeds. The course will be conducted June 12-23, 1967, and repeated January 8-19, 1968. Deadlines for registration are May 1, 1967, and November 27, 1967, respectively. Prerequisite is either 6 months' experience in bacteriology or in quality control

laboratory. State, federal, and industry personnel may apply. Application forms can be obtained through:

Training Office
Laboratory Consultation and Development Section
Laboratory Program
National Communicable Disease Center
Atlanta, Georgia 30333

C. Progress Report - Salmonella Contamination of Drug Substances of Animal Origin.

Reported by the U.S. Food and Drug Administration.

Previous issues of the Salmonella Surveillance Report (#51 and #53) reported the problem of salmonella contamination of drug substances of animal origin. A continuing surveillance program has resulted in isolation of many other serotypes from domestic and imported products. In order to assist epidemiologic investigation of suspected cases of salmonellosis, a complete list of all serotypes isolated by the Food and Drug Administration as of March 23, 1967, is printed below.

| PRODUCT | SEROTYPE | |
|---|---|---|
| Thyroid tablets | S. give | |
| | S. java | |
| | S. poona | |
| Thyroid powder | S. anatum | S. manila |
| | S. bareilly | S. muenchen |
| | S. binza | S. newport |
| | S. bovis-morbificans | S. oranienburg |
| | S. derby | S. poona |
| | S. give | S. saint-paul |
| | S. heidelberg | S. schwarzengrund |
| | S. infantis | S. typhi-murium |
| | S. manhattan | |
| Pancreatin powder | S. anatum | |
| | S. tennessee | |
| | S. urbana | |
| Pancreas substance | S. newington | |
| Raw pancreas | S. bredeney | |
| Pituitary substance | S. derby | |
| Heart substance | S. poona | |
| Supra renal cortex substance | S. derby | |
| Granular pepsin | S. derby | |
| Whole hog stomach substance | S. infantis | |

(Continued)

| PRODUCT | SEROTYPE | |
|---|---|---|
| Lymphatic substance | S. newport | |
| Glandular capsules | S. anatum | S. newport |
| | S. derby | S. urbana |
| | S. give | S. wichita |
| Edible gelatin | S. senftenberg | |
| Liver powder | S. bredeney | |
| | S. derby | |
| Desiccated liver | S. typhi-murium | |
| Lactalbumin | S. cubana | |
| Vitamin Tabs | S. derby | |

## VI. INTERNATIONAL

Food Poisoning in England and Wales, 1965.

Abstracted from an article by Enid Vernon, B.Sc. Monthly Bulletin of the Ministry of Health and the Public Health Laboratory Service, 25:194-207, 1966.

The article reviews food poisoning and salmonella infections in 1965 based on reports from public health and hospital laboratories and on returns submitted by medical health officers to the Ministry of Health. Table 1 divides all types of food poisoning which occurred in 1965 into general outbreaks, family outbreaks, and sporadic cases according to causal agent.

Table 1

Food Poisoning of All Types, 1965

| Presumed Causal Agents | General Outbreaks | | Family Outbreaks | | Sporadic Cases | | All Incidents | | All Cases* | |
|---|---|---|---|---|---|---|---|---|---|---|
| | No. | % | No. | % | No. | % | No. | % | No. | % |
| Salmonellae | 81 | 59 | 277 | 92 | 2,587 | 97 | 2,945 | 96 | 4,671 | 54 |
| Staphylococci | 11 | 8 | 14 | 5 | 49 | 2 | 74 | 2 | 899 | 10 |
| C. welchii | 46 | 33 | 10 | 3 | 8 | – | 64 | 2 | 3,044 | 35 |
| Chemical | 1 | 1 | – | – | – | – | 1 | – | 84 | 1 |
| All agents | 139 | 101 | 301 | 100 | 2,644 | 99 | 3,084 | 100 | 8,698 | 100 |
| Unknown | 57 | | 163 | | 787 | | 1,007 | | 2,619 | |
| Totals | 196 | | 464 | | 3,431 | | 4,091 | | 11,317 | |

– = less than 0.5 percent; * includes 697 symptomless excreters of salmonellae

Fewer cases of salmonella infection occurred compared with the previous year, but there were more cases due to Clostridium welchii. Nineteen fatal cases were recorded, all due to salmonella infections. Fourteen fatalities were due to Salmonella typhi-murium, 2 to S. dublin, and 1 each to S. butantan, S. indiana, and S. panama. Thirteen of the deaths occurred in patients aged 60 years or over, 4 in infants 1 year or younger, and 2 in adults under 60 years of age.

The premises where the contaminated food was obtained were known in 154 (79 percent) of the 196 general outbreaks. Thirty-three outbreaks occurred in hospitals; 17 of them were due to salmonella, 8 to C. welchii, and 8 to other causes. Restaurants, cafés, hotels, and boarding houses accounted for 32 outbreaks; in 11 of these the causal organism was not discovered. Twenty-one outbreaks occurred in schools; 6 were due to salmonella, 9 to C. welchii, and 6 to other causes. Nineteen outbreaks were reported in institutions: 8 in colleges and other educational centers, 2 in children's nurseries, 2 in old people's homes, and 7 in other residential institutions. Outbreaks in hospitals, schools, and institutions are more likely to come to the notice of public health authorities than illness associated with food obtained at shops or restaurants.

Seventeen outbreaks originated in farms. Five were associated with unpasteurized milk, but in 12 of them infection may have been acquired by direct contact with infected livestock. The food responsible for the outbreaks was established with reasonable certainty in 70 general and 14 family outbreaks. As in previous years, it was possible to trace the vehicle of infection in a high proportion of outbreaks due to staphylococci (60 percent) and C. welchii (71 percent); but in salmonella infections a particular food was incriminated in only 21 percent of general outbreaks and 1 percent of family outbreaks.

The number of salmonella infections was near the average for the last 5 years; there were 2,945 incidents, and 4,671 persons were known to have been affected. Table 2 shows the 10 salmonella serotypes most frequently involved in human incidents. The list is quite similar to that of the previous year.

Table 2

| Rank | Serotype | Incidents in Humans |
|---|---|---|
| 1 | S. typhi-murium | 1721 |
| 2 | S. enteritidis | 180 |
| 3 | S. brandenburg | 133 |
| 4 | S. panama | 86 |
| 5 | S. anatum | 85 |
| 6 | S. heidelberg | 78 |
| 7 | S. stanley | 50 |
| 8 | S. senftenberg | 44 |
| 9 | S. bredeney | 43 |
| 10 | S. newport | 34 |
| | Total | 2454 |
| | Total (all incidents) | 2945 |

## VII. FOOD AND FEED SURVEILLANCE

### A. Occurrence and Survival of Salmonellae in the Alimentary Tract of Some Freshwater Fishes.

Abstract of Master's Thesis by William T. Martin, Kansas State University, 1966.

A variety of fish collected as far as 1.5 miles below the sewage treatment plants of two towns on a river in Kansas were cultured for salmonella. Fish weighing over 5 pounds were cultured individually, while alimentary tracts of smaller fish were pooled, with from 2 to 10 fish per pool. Of the individually cultured fish, 7 of 14 (50 percent) yielded salmonellae. Twenty-nine of 32 pools (90.6 percent) were positive for salmonella. In all, 17 different serotypes were recovered from the fish. Over a 12-day period 3 swabs were placed at each of the two sewage plants and exposed for 48 hours. Three of the 36 swabs were lost, but all the remaining 33 were positive for salmonellae, yielding 17 serotypes. Eight of 11 and 6 of 10 of the serotypes were common to the respective sewer and fish cultures at both locations (Table 1).

Channel catfish taken from a farm pond which had been stocked the previous year were inoculated with a mixture of S. thompson, S. muenchen, and S. typhi-murium, and kept in tanks without feed. No salmonellae were isolated from the alimentary tracts of a control group of 20 fish. The alimentary tracts of the inoculated fish were cultured quantitatively and qualitatively in pools of 5 fish at 4-day intervals. Salmonellae were isolated from the gut of the fish in decreasing numbers during the 29-day test period. Water samples from the tanks were also positive for these serotypes, and the studies suggested that the number in the water was probably maintained by the fish. All fish were culturally positive 29 days after inoculation, and all 3 serotypes introduced into the fish were recovered at this time.

The author concludes that since the fish taken from the river were bottom feeders, it is most likely that organic particles from sewage containing salmonellae are eaten as a predominant part of the diet and thereby provide a source of infection. The isolation of many of the same serotypes from the sewage is indicative of a public health problem which is not fully appreciated, demonstrating the inadequacy of primary sewage treatment. This inadequate sewage treatment provides a ready source of infection not only to man but to wild and domestic animals and birds which have contact with the river. Man may become infected as a result of catching, cleaning, and eating such fish.

Table 1

Frequency of Isolations of Salmonella Serotypes from Sewer Swabs and from the Alimentary Tracts of Fish from Two Kansas Cities

| Serotype | City No. 1 | | City No. 2 | | Total No. Isolations |
|---|---|---|---|---|---|
| | No. Isolations from Sewer | Fish | No. Isolations from Sewer | Fish | |
| S. anatum | 5 | 4 | 2 | - | 11 |
| S. enteritidis | - | 8 | 7 | 4 | 19 |
| S. blockley | - | 6 | 3 | 1 | 10 |
| S. montevideo | 5 | 1 | - | - | 6 |
| S. thompson | 2 | 3 | - | - | 5 |
| S. bredeney | 2 | 2 | - | - | 4 |
| S. typhi-murium | 1 | 3 | - | - | 4 |
| S. tennessee | 1 | 2 | - | - | 3 |

Table 3 (continued)

| Serotype | City No. 1 | | City No. 2 | | Total No. Isolations |
|---|---|---|---|---|---|
| | No. Isolations from Sewer | Fish | No. Isolations from Sewer | Fish | |
| S. muenchen | 1 | 1 | - | - | 2 |
| S. newport | 1 | 1 | - | - | 2 |
| S. oranienburg | - | 1 | - | - | 1 |
| S. infantis | - | - | 3 | 2 | 5 |
| S. senftenberg | - | - | 2 | 1 | 3 |
| S. cubana | - | - | 1 | 1 | 2 |
| S. panama | - | - | 1 | 1 | 2 |
| S. berta | - | - | - | 1 | 1 |
| S. lomita | - | - | - | 1 | 1 |
| S. derby | - | - | 1 | - | 1 |
| S. give | - | - | 1 | - | 1 |
| S. meleagridis | - | - | 1 | - | 1 |

B. Progress Report on Food Surveillance

During February, 176 samples of baby foods in jars and 41 samples of dry cereals for babies were received from nine states by the Veterinary Public Health Laboratory and were examined for the presence of Escherichia coli, salmonellae, and coagulase-positive staphylococci. None of the samples yielded salmonellae or coagulase-positive staphylococci, but 1 cereal was positive for E. coli. Most of the cereals did yield growth of fungi and bacterial flora consisting mostly of gram-positive rods. Many of the baby foods in jars yielded some bacterial growth consisting mostly of gram-positive rods and cocci. Three samples of powdered instant dry baby formula containing milk products were examined for salmonellae and found to be negative.

In addition, the following samples have been received recently and examined for salmonellae: 31 samples of nonfat dry milk and 1 sample of meat preservative from Illinois; 15 samples of instant baby formula and 9 high protein food supplements from New York City; 1 sample each of high calcium food supplement, Royal jelly honey and high protein diet food from Atlanta; 13 dry eggs, 27 mixed feeds, 1 kelp meal, 1 tomato meal, 2 meat meals, 2 feather meals, and 3 fishmeals from Washington State. The 2 samples of meat meal were positive for Salmonella infantis; all other samples were negative.

*Figure 1.*

REPORTED HUMAN ISOLATIONS OF SALMONELLAE
IN THE UNITED STATES

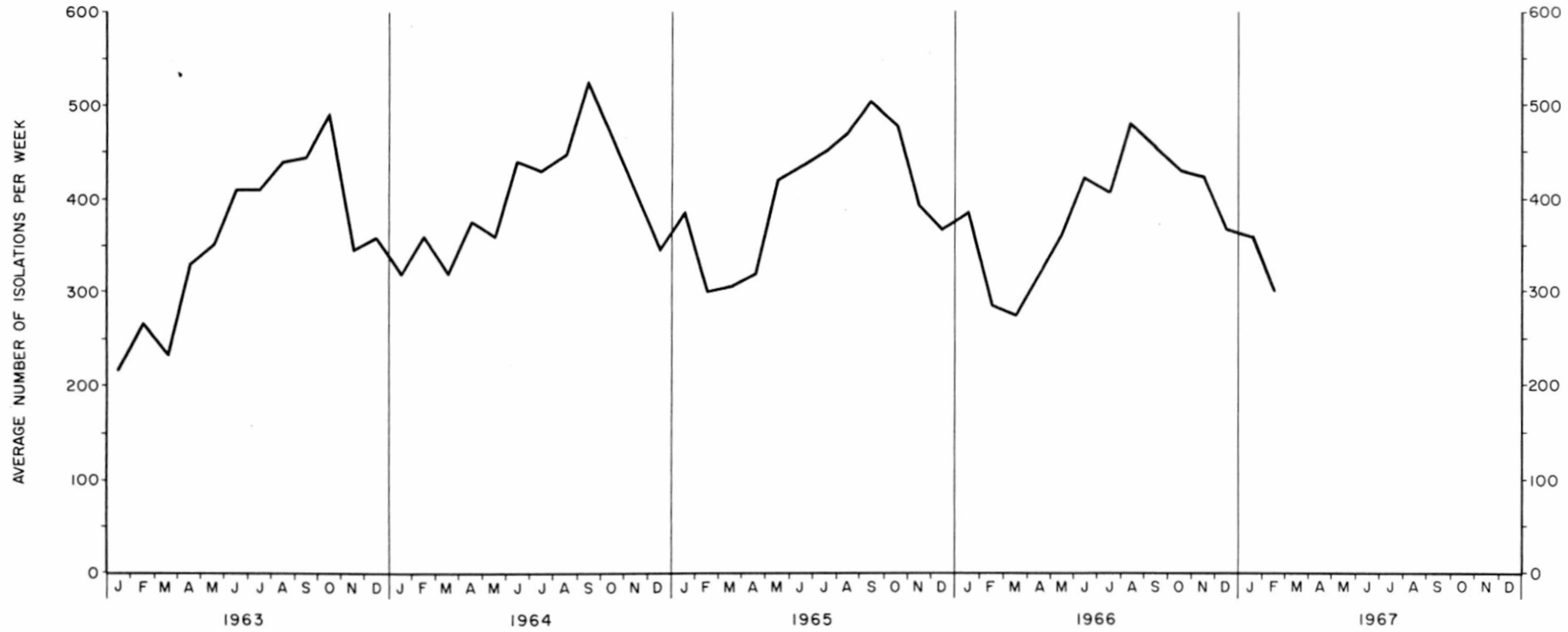

TABLE I
COMMON SALMONELLA SEROTYPES ISOLATED FROM HUMANS IN THE UNITED STATES DURING FEBRUARY, 1967

| SEROTYPE | GEOGRAPHIC DIVISION AND REPORTING CENTER | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | SEROTYPE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | NEW ENGLAND | | | | | | | MIDDLE ATLANTIC | | | | | | EAST NORTH CENTRAL | | | | | | WEST NORTH CENTRAL | | | | | | | | SOUTH ATLANTIC | | | | | | | |
| | ME | NH | VT | MASS | RI | CONN | TOT | NY-A | NY-BI | NY-C | NJ | PA | TOT | OHIO | IND | ILL | MICH | WIS | TOT | MINN | IOWA | MO | ND | SD | NEBR | KAN | TOT | DEL | MD | DC | VA | WV | NC | SC | GA | FLA | TOT | |
| anatum | | | | 1 | | | 1 | | | | | | | | | | 2 | | 2 | | | | | | | | | | | | | | | 4 | 1 | 7 | anatum |
| bareilly | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 1 | 1 | bareilly |
| berta | | | | | | | | | 1 | 1 | | | 2 | | | | 1 | 1 | 2 | | | | | | | | | | | | | | | | | | berta |
| blockley | | | | | | | | | 1 | 1 | | 2 | 4 | 1 | | 1 | 9 | 1 | 12 | 1 | | | | | | | 1 | | | | | 1 | | | | 1 | blockley |
| braenderup | | | | | | 2 | 2 | | 1 | | 1 | | 2 | 1 | | 1 | | | 2 | | | | | | | | | | | | | | | 1 | | 1 | braenderup |
| bredeney | | | | | | 1 | 1 | | 1 | 1 | | | 2 | | | | | | | | | 2 | | | | 2 | | | | | | | | 1 | | 1 | bredeney |
| chester | | | | | | | | | | | | | | | | | | | | | | | | 1 | | 1 | | | | | | | | | 3 | 3 | chester |
| cholerae-suis v kun | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | cholerae-suis v kun |
| cubana | | | | | | | | | | | | | | | | 1 | | | 1 | | | | | | | | | | | | | | | 1 | | 1 | cubana |
| derby | | | | 1 | | | 1 | | | 1 | 1 | 4 | 6 | 1 | 2 | 2 | 3 | 2 | 10 | | | | | | | | | | 1 | | | | | | | 1 | derby |
| enteritidis | | | 1 | 9 | | 2 | 12 | | 5 | 6 | | 6 | 17 | 2 | 1 | 8 | 4 | 2 | 17 | 2 | 1 | 2 | 1 | | | 1 | 7 | | 1 | 1 | 1 | | | 6 | | 9 | enteritidis |
| give | | | | | | | | | | | | | | | | | 1 | | 1 | | | | | | | | | | | | | | | | | 1 | give |
| heidelberg | 5 | | | 9 | | 1 | 15 | | 4 | | 1 | 4 | 9 | 6 | 1 | 2 | 8 | | 17 | | | 2 | | 1 | | 1 | 4 | | 1 | | 2 | | 2 | 5 | 14 | 24 | heidelberg |
| indiana | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | indiana |
| infantis | 4 | | | | | | 4 | | 1 | 2 | | | 3 | 4 | 1 | 3 | | 2 | 10 | | 1 | | | | | | 1 | | | 1 | | | | 4 | 2 | 7 | infantis |
| java | | | | | | 1 | 1 | | 1 | 2 | | 3 | 6 | 1 | | 2 | | 2 | 5 | | | 1 | | | | | 1 | | 1 | | | | | | 1 | 1 | 3 | java |
| javiana | | | | | | | | | | | | | | | | | | | | | | | | | | 1 | 1 | | 1 | | | | | | 3 | 4 | javiana |
| kentucky | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | kentucky |
| litchfield | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 1 | | | | | | | 1 | litchfield |
| livingstone | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | livingstone |
| manhattan | | | | 1 | | 1 | 2 | | 1 | | | | 1 | 1 | | | 1 | | 2 | 1 | | 1 | | | | | 2 | | | | | | | 2 | 2 | manhattan |
| meleagridis | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 1 | 1 | meleagridis |
| miami | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 1 | 2 | 3 | miami |
| mississippi | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 1 | | | | | | 1 | mississippi |
| montevideo | | | | | | | | | | 1 | | | 1 | 1 | 2 | | 1 | | 4 | 1 | | 3 | | | | | 4 | | | | | | | | 2 | 2 | montevideo |
| muenchen | | | | 2 | | | 2 | | | | | | | 1 | 2 | | 1 | | 4 | 2 | | | | | | 1 | 3 | | | | | | | | 1 | 1 | muenchen |
| newington | | | | | | | | | 2 | | | | 2 | | | | 1 | | 1 | | | | | | | | | 1 | | | | | | | | 1 | newington |
| newport | | | | | | | | | 7 | 10 | | 5 | 22 | | | 3 | | 2 | 5 | 1 | | 1 | | | | | 2 | | | 1 | | | | | 16 | 17 | newport |
| oranienburg | | | | 2 | | 1 | 3 | | 2 | 1 | | 2 | 5 | | | 2 | | | 2 | 1 | | | | | | | 1 | | | 1 | 1 | | | 2 | 2 | 6 | oranienburg |
| panama | | | | | | | | | | | | | | | | 2 | | | 2 | | | | | | | | | | | | | | | | | | panama |
| paratyphi B | | | | | | | | | | | | | | | | | | | | | 2 | | | | | | 2 | | | | 2 | | | | | 2 | paratyphi B |
| poona | | | | | | | | | 1 | 1 | | | 2 | 1 | | | | | 1 | | | | | | | | | | | | | | | | | | poona |
| saint-paul | | | 1 | | | | 1 | | | 2 | | 5 | 7 | 6 | | 13 | 1 | 3 | 23 | | | 1 | | | | | 1 | | | 4 | | | | 3 | 4 | 11 | saint-paul |
| san-diego | | | | 2 | | | 2 | | | | | | | | | 2 | | | 2 | | | | | | | | | | | | | | | | | | san-diego |
| schwarzengrund | | | | | | 2 | 2 | | | 1 | | | 1 | | | | | | | | | | | | | | 1 | 1 | | | | | | | | | | schwarzengrund |
| senftenberg | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 1 | 1 | senftenberg |
| tennessee | | | | | | | | | | | | 2 | 2 | | | | | | | | | | | | | | | | | | | | | | | | tennessee |
| thompson | | | | 1 | | 1 | 2 | | | 1 | 2 | 2 | 5 | 2 | | 2 | 2 | | 6 | | | 2 | | | | | | 3 | 1 | | 3 | | 1 | | | 5 | thompson |
| typhi | | | | | | 1 | 1 | 2 | 1 | 3 | | 2 | 8 | 1 | 2 | | | | 3 | | | | | | | | 2 | | 3 | 1 | 3 | 1 | | | 3 | 11 | typhi |
| typhi-murium | 1 | | | 6 | 1 | 10 | 18 | | 9 | 16 | 5 | 13 | 43 | 6 | 1 | 40 | 15 | 9 | 71 | 6 | | 5 | 1 | | | 7 | 19 | | 3 | 3 | 8 | 1 | 6 | | 8 | 23 | 52 | typhi-murium |
| typhi-murium v cop | | | | 6 | | | 6 | | | | 4 | 1 | 5 | | | | 2 | | 2 | | | | | | | | | | 1 | | | | | | | 1 | typhi-murium v cop |
| urbana | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | urbana |
| weltevreden | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | weltevreden |
| worthington | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | worthington |
| untypable, group B | | | | | | | | | | | | | | | | 1 | 1 | | 2 | 1 | | | | | | | 1 | | | | | | 1 | | | 1 | untypable, group B |
| untypable, group C1 | | | | | 1 | 1 | 2 | | | | | | | | | | 1 | | 1 | | | | | | | | | | | | | | | | | | untypable, group C1 |
| untypable, group C2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 2 | | | | | | | 2 | untypable, group C2 |
| untypable, group D | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | untypable, group D |
| untypable, group E | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | untypable, group E |
| untypable or unknown | | 1 | | | | | 1 | | | | | | | | | | | 5 | 5 | | | | 2 | | | | 2 | | 1 | | | | 2 | | | 3 | untypable or unknown |
| Total Common | 10 | 1 | 2 | 40 | 2 | 24 | 79 | 2 | 38 | 50 | 14 | 51 | 155 | 35 | 12 | 85 | 54 | 29 | 215 | 16 | 4 | 20 | 4 | 2 | 0 | 12 | 58 | 1 | 13 | 11 | 22 | 4 | 14 | 3 | 38 | 82 | 188 | Total Common |
| Total Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 3 | 5 | 2 | 0 | 2 | 0 | 0 | 4 | 2 | 0 | 1 | 0 | 0 | 0 | 1 | 4 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 3 | 11 | 15 | Total Other |
| Grand Total | 10 | 1 | 2 | 40 | 2 | 24 | 79 | 2 | 39 | 51 | 14 | 54 | 160 | 37 | 12 | 87 | 54 | 29 | 219 | 18 | 4 | 21 | 4 | 2 | 0 | 13 | 62 | 1 | 14 | 11 | 22 | 4 | 12 | 3 | 41 | 93 | 203 | Grand Total |

(New York, A-Albany, BI-Beth Israel, C-City)

*The Beth Israel Salmonella Typing Center in New York is a reference laboratory and processes many cultures from other states which are assigned to the respective states although reported by NY-BI. Beth-Israel reported a total of 76 isolations for February.

TABLE I (Continued)
COMMON SALMONELLA SEROTYPES ISOLATED FROM HUMANS IN THE UNITED STATES DURING FEBRUARY, 1967

| SEROTYPE | GEOGRAPHIC DIVISION AND REPORTING CENTER | | | | | | | | | | | | | | | | | | | | | | | FEB. TOTAL | % OF TOTAL | JAN. FEB. 1967 TOTAL | % OF JAN. FEB. 1967 TOTAL | JAN. FEB. 1966 TOTAL | % OF JAN. FEB. 1966 TOTAL | SEROTYPE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | EAST SOUTH CENTRAL | | | | | WEST SOUTH CENTRAL | | | | | MOUNTAIN | | | | | | | | | PACIFIC | | | | | | OTHER | | | | | | |
| | KY | TENN | ALA | MISS | TOT | ARK | LA | OKLA | TEX | TOT | MONT | IDA | WYO | COLO | NM | ARI | UTAH | NEV | TOT | WASH | ORE | CAL | ALAS | HAI | TOT | VI | | | | | | |
| anatum | | | 1 | | 1 | | | | | | | | | | | | | | | | | 3 | | 4 | 7 | | 18 | 1.5 | 47 | 1.8 | 56 | 2.1 | anatum |
| bareilly | | | | | | | 1 | | | 1 | | | | | | | | | | | | | | 1 | 1 | | 3 | 0.3 | 8 | 0.3 | 8 | 0.3 | bareilly |
| berta | | | | | | | | | | | | | | | | | | | | | | | | | | | 4 | 0.3 | 7 | 0.3 | 7 | 0.3 | berta |
| blockley | | 1 | | | 1 | | 3 | | | 3 | | | | | | | | | | 1 | | 7 | | 1 | 9 | | 31 | 2.6 | 64 | 2.4 | 53 | 2.0 | blockley |
| braenderup | | 1 | | | 1 | | | | | | | | | | | | | | | | | | | 1 | 1 | | 9 | 0.8 | 13 | 0.5 | 25 | 0.9 | braenderup |
| bredeney | | | | | | | | | | | | | | 3 | | | | | 3 | | | 2 | | 2 | 4 | | 13 | 1.1 | 25 | 1.0 | 22 | 0.8 | bredeney |
| chester | | | 1 | | 1 | | | | | | | | | | | | | | | | 2 | 1 | | | 3 | | 8 | 0.7 | 20 | 0.8 | 16 | 0.6 | chester |
| cholerae-suis v kun | | | | | | | | | | | | | | | | | | | | | | | | | | | 0 | 0.0 | 0 | 0.0 | 5 | 0.2 | cholerae-suis v kun |
| cubana | | | | | | | | | | | | | | | | | | | | | 1 | 1 | | | 2 | | 4 | 0.3 | 8 | 0.3 | 27 | 1.0 | cubana |
| derby | | | | | | 1 | | | | 1 | | | | | | | | | | | 1 | 6 | | 3 | 10 | | 29 | 2.4 | 62 | 2.4 | 52 | 1.9 | derby |
| enteritidis | | 1 | 2 | | 3 | | | | | | | | | | | | | | | | | 3 | | | 3 | | 68 | 5.7 | 112 | 4.3 | 191 | 7.1 | enteritidis |
| give | | | | | | | 1 | | | 1 | | | | | | | | | | | | | | 2 | 2 | | 5 | 0.4 | 9 | 0.3 | 15 | 0.6 | give |
| heidelberg | | | 2 | | 2 | | 9 | 7 | 1 | 17 | | | | | | | 1 | | 1 | 2 | 1 | 9 | | 5 | 17 | | 106 | 9.0 | 223 | 8.5 | 182 | 6.8 | heidelberg |
| indiana | | | | | | | | | | | | | | | | | | | | | | | | | | | 0 | 0.0 | 9 | 0.3 | 12 | 0.4 | indiana |
| infantis | | | 1 | | 1 | | 2 | 1 | 2 | 5 | | | | 12 | | | 1 | | 13 | | 1 | 3 | | 7 | 11 | | 55 | 4.6 | 117 | 4.5 | 228 | 8.5 | infantis |
| java | | | 1 | | 1 | | 2 | | | 2 | | | | | | | | | | | | 2 | | 1 | 3 | | 22 | 1.9 | 45 | 1.7 | 21 | 0.8 | java |
| javiana | | | | | | | 2 | | 5 | 7 | | | | | | | | | | | | | | | | | 12 | 1.0 | 27 | 1.0 | 36 | 1.3 | javiana |
| kentucky | | | | | | | | | | | | | | | | 1 | | | 1 | | | | | | | | 1 | 0.08 | 5 | 0.2 | 3 | 0.1 | kentucky |
| litchfield | | | | | | | | | | | | | | | | | | | | | | 1 | | | 1 | | 2 | 0.2 | 10 | 0.4 | 9 | 0.3 | litchfield |
| livingstone | | | | | | | | | | | | | | | | | | | | | | | | 4 | 4 | | 4 | 0.3 | 7 | 0.3 | 7 | 0.3 | livingstone |
| manhattan | | 2 | | | 2 | | | 1 | | 1 | | | | | | | | | | | | 3 | | 5 | 8 | | 20 | 1.7 | 53 | 2.0 | 16 | 0.6 | manhattan |
| meleagridis | | | | | | | | | | | | | | | | | | | | | | | | | | | 1 | 0.08 | 1 | 0.04 | 1 | 0.04 | meleagridis |
| miami | | | | | | | | | | | | | | | | | | | | | | | | | | | 3 | 0.3 | 5 | 0.2 | 11 | 0.4 | miami |
| mississippi | | | | | | | 1 | | | 1 | | | | | | | | | | | | | | | | | 2 | 0.2 | 9 | 0.3 | 8 | 0.3 | mississippi |
| montevideo | | | | | | | 1 | | | 1 | 1 | | | | | | 1 | | 2 | | | 2 | | | 2 | | 16 | 1.4 | 22 | 0.8 | 37 | 1.4 | montevideo |
| muenchen | | | 2 | | 2 | | | 1 | 1 | 2 | | | | | | 1 | | | 1 | | | 1 | | | 1 | | 16 | 1.4 | 25 | 1.0 | 30 | 1.1 | muenchen |
| newington | | | | | | | | | | | | | | | | | | | | | | | | | | | 4 | 0.3 | 7 | 0.3 | 3 | 0.1 | newington |
| newport | | | | | | 1 | 2 | | 9 | 12 | | | | | | 1 | | | 1 | 1 | | 5 | | | 6 | | 65 | 5.5 | 147 | 5.6 | 163 | 6.1 | newport |
| oranienburg | | | | | | 1 | | 3 | 2 | 6 | | | | | | | | | | | 4 | 1 | | | 5 | | 28 | 2.4 | 43 | 1.6 | 61 | 2.3 | oranienburg |
| panama | | | | | | | | | 2 | 2 | | | | | | | | | | | | | | 8 | 8 | | 12 | 1.0 | 39 | 1.5 | 26 | 1.0 | panama |
| paratyphi B | | | | | | | | | 4 | 4 | | | | | | 1 | | | 1 | | | | | | | | 9 | 0.8 | 20 | 0.8 | 19 | 0.7 | paratyphi B |
| poona | | | | | | | | | | | | | | | | | | | | | | 1 | | | 1 | | 4 | 0.3 | 10 | 0.4 | 6 | 0.2 | poona |
| saint-paul | | | | | | | | | | | | | | 1 | | | 2 | | 3 | 1 | 2 | 4 | | | 7 | | 53 | 4.5 | 139 | 5.3 | 93 | 3.5 | saint-paul |
| san-diego | | | | | | | | | 1 | 1 | | | | | | | | | | 1 | | 1 | | | 2 | | 7 | 0.6 | 17 | 0.6 | 15 | 0.6 | san-diego |
| schwarzengrund | | 1 | | | 1 | | | | | | | | | | | | | | | | | | | | | | 5 | 0.4 | 12 | 0.5 | 11 | 0.4 | schwarzengrund |
| senftenberg | | | | | | | | | | | | | | | | | | | | | | 2 | | | 2 | | 3 | 0.3 | 7 | 0.3 | 11 | 0.4 | senftenberg |
| tennessee | | | | | | | | | 1 | 1 | | | | | | | | | | | | | | | | | 3 | 0.3 | 17 | 0.6 | 18 | 0.7 | tennessee |
| thompson | | | | | | | 1 | | | 1 | | | | | | | 1 | | 1 | | | 4 | | 1 | 5 | | 25 | 2.1 | 50 | 1.9 | 96 | 3.6 | thompson |
| typhi | 1 | | | | 1 | 2 | 17 | 1 | 2 | 22 | | | | | | | | | | 2 | 11 | | | 1 | 14 | | 62 | 5.2 | 103 | 3.9 | 108 | 4.0 | typhi |
| typhi-murium | 2 | 5 | 3 | | 10 | | 16 | 9 | 14 | 39 | 9 | | | 5 | | 4 | | | 18 | 12 | 2 | 38 | | 7 | 59 | | 329 | 27.8 | 763 | 29.1 | 765 | 28.5 | typhi-murium |
| typhi-murium v cop | | | | | | 1 | 3 | | | 4 | | | | | | | | | | | | | | | | | 18 | 1.5 | 55 | 2.1 | 13 | 0.5 | typhi-murium v cop |
| urbana | | | | | | | | | | | | | | | | | | | | | | | | | | | 0 | 0.0 | 0 | 0.0 | 3 | 0.1 | urbana |
| weltevreden | | | | | | | | | | | | | | | | | | | | | | | | 6 | 6 | | 6 | 0.5 | 9 | 0.3 | 2 | 0.07 | weltevreden |
| worthington | | | | | | | | | | | | | | | | | | | | | | | | 1 | 1 | | 3 | 0.3 | 5 | 0.2 | 7 | 0.3 | worthington |
| untypable, group B | | | | 1 | 1 | 3 | | | | 3 | 1 | | | | 7 | | | | 8 | | 1 | 1 | | | 2 | | 16 | 1.4 | 53 | 2.0 | 44 | 1.6 | untypable, group B |
| untypable, group C1 | | | | | | | | | | | | | | | 12 | | | | 12 | | | | | | | | 15 | 1.3 | 63 | 2.4 | 20 | 0.7 | untypable, group C1 |
| untypable, group C2 | | | | 1 | 1 | | | | 1 | 1 | | | | | 1 | | | | 1 | | | | | | | | 5 | 0.4 | 6 | 0.2 | 6 | 0.2 | untypable, group C2 |
| untypable, group D | | | | | | | | | | | | | | | | | | | | | | | | | | | 0 | 0.0 | 6 | 0.2 | 5 | 0.2 | untypable, group D |
| untypable, group E | | | | | | | | | 2 | 2 | | | | | | | | | | | | | | | | | 2 | 0.2 | 2 | 0.08 | 2 | 0.07 | untypable, group E |
| untypable or unknown | | | | | | | | | 2 | 2 | | | | | | | | | | | 1 | | | | 1 | | 14 | 1.2 | 25 | 1.0 | 13 | 0.5 | untypable or unknown |
| Total Common | 3 | 11 | 13 | 2 | 29 | 9 | 61 | 23 | 49 | 142 | 11 | 0 | 0 | 21 | 20 | 8 | 6 | 0 | 66 | 18 | 18 | 112 | 0 | 60 | 208 | | 1,140 | 96.3 | 2,531 | 96.6 | 2,588 | 96.5 | Total Common |
| Total Other | 0 | 1 | 0 | 0 | 1 | 0 | 1 | 0 | 4 | 5 | 0 | 0 | 0 | 1 | 0 | 1 | 1 | 0 | 3 | 0 | 0 | 5 | 0 | 2 | 7 | | 44 | 3.7 | 88 | 3.4 | 93 | 3.5 | Total Other |
| Grand Total | 3 | 12 | 13 | 2 | 30 | 9 | 62 | 23 | 53 | 147 | 11 | 0 | 0 | 22 | 20 | 9 | 7 | 0 | 69 | 18 | 18 | 117 | 0 | 62 | 215 | | 1,184 | | 2,619 | | 2,681 | | Grand Total |

TABLE II
OTHER SALMONELLA SEROTYPES ISOLATED FROM HUMANS DURING FEBRUARY, 1967

| SEROTYPE | REPORTING CENTER | | | | | | | | | | | | | | | | | | | FEB TOTAL | JAN. FEB. 1967 TOTAL | SEROTYPE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | ARI | CALIF | COLO | FLA | GA | HAI | ILL | KAN | LA | MD | MINN | MO | NY-BI | NY-C | OHIO | PA | TENN | TEX | UTAH | | | |
| abortus-bovis | | | | | | | 1 | | | | | | | | | | | | | 1 | 1 | abortus-bovis |
| adelaide | | 1 | | | | | | | | | | | | | | | | | | 1 | 1 | adelaide |
| alachua | | | | | | | | | | | | 1 | | | | | | | | 1 | 6 | alachua |
| albany | 1 | | | | | | | | | | | | | | | | | | | 1 | 1 | albany |
| binza | | | | | 1 | | | | | | | | | | | 1 | | | | 2 | 3 | binza |
| cerro | | | | | | | | | | | | | | | | | 1 | | | 1 | 1 | cerro |
| durban | | | | | | | | | | | | | | | | | | | 1 | 1 | 1 | durban |
| durham | | 1 | | | | | | | | | 2 | | | | | | | | | 3 | 4 | durham |
| eimsbuettel | | | | 1 | | | | | 1 | | | | | | | | | | | 2 | 3 | eimsbuettel |
| gallinarum | | | | | | | | | | | | | | 1 | | | | | | 1 | 1 | gallinarum |
| hartford | | | | 1 | | | | | | | | | | | | 1 | | | | 2 | 3 | hartford |
| minnesota | | 1 | | 1 | | | | | | | | | | | | | | | | 2 | 4 | minnesota |
| mission | | | | | | | | 1 | | | | | | | 2 | | | | | 3 | 3 | mission |
| muenster | | 1 | | 6 | | | | | | | | | | | | | | | | 7 | 8 | muenster |
| norwich | | | | | 2 | | | | | | | | | | | | | | | 2 | 5 | norwich |
| oslo | | | | | | 2 | | | | | | | | | | | | | | 2 | 3 | oslo |
| pensacola | | | | | | | | | | 1 | | | | | | | | | | 1 | 1 | pensacola |
| reading | | | 1 | | | | 1 | | | | | | 1 | | | | | 2 | | 5 | 12 | reading |
| rubislaw | | | | | | | | | | | | | | | | | | 2 | | 2 | 2 | rubislaw |
| stanley | | | | | | | | | | | | | | | | 1 | | | | 1 | 1 | stanley |
| tallahassee | | | | 1 | | | | | | | | | | | | | | | | 1 | 1 | tallahassee |
| thomasville | | 1 | | | | | | | | | | | | | | | | | | 1 | 3 | thomasville |
| westerstede | | | | 1 | | | | | | | | | | | | | | | | 1 | 1 | westerstede |
| TOTAL | 1 | 5 | 1 | 11 | 3 | 2 | 2 | 1 | 1 | 1 | 2 | 1 | 1 | 1 | 2 | 3 | 1 | 4 | 1 | 44 | 88 | TOTAL |

TABLE III

Age and Sex Distribution of Individuals Reported as Harboring Salmonellae During February 1967

| Age (Years) | Male | Female | Unknown | Total | Percent | Cumulative Percent |
|---|---|---|---|---|---|---|
| < 1 | 85 | 87 | 3 | 175 | 20.9 | 20.9 |
| 1 - 4 | 113 | 107 | 1 | 221 | 26.4 | 47.3 |
| 5 - 9 | 53 | 48 | | 101 | 12.1 | 59.4 |
| 10 - 19 | 45 | 34 | | 79 | 9.4 | 68.8 |
| 20 - 29 | 23 | 49 | | 72 | 8.6 | 77.4 |
| 30 - 39 | 13 | 22 | 1 | 36 | 4.3 | 81.7 |
| 40 - 49 | 13 | 32 | | 45 | 5.4 | 87.1 |
| 50 - 59 | 14 | 22 | | 36 | 4.3 | 91.4 |
| 60 - 69 | 10 | 30 | | 40 | 4.8 | 96.2 |
| 70 - 79 | 7 | 21 | | 28 | 3.3 | 99.5 |
| 80 + | | 5 | | 5 | 0.6 | 100.1 |
| Subtotal | 376 | 457 | 5 | 838 | | |
| Child (Unspec.) | 11 | 11 | 1 | 23 | | |
| Adult (Unspec.) | 1 | 7 | | 8 | | |
| Unknown | 142 | 151 | 22 | 315 | | |
| Total | 530 | 626 | 28 | 1184 | | |
| Percent of Total | 45.8 | 54.2 | | | | |

TABLE IV

REPORTED NONHUMAN ISOLATES BY SEROTYPE AND SOURCE, *FEBRUARY, 1967

| SEROTYPE | chicken | turkey | pigeon | poultry environment | starling | avian | equine | bovine | ovine | porcine | canine | feline | mouse | rabbit | monkey | mink | Leopard | buffalo | animal, unknown | egg | powdered egg | frozen egg | beef jerky | cake mix | candy | dry milk | coconut | yeast | turkey & dressing | vitamins | livestock feed | cat food | feather meal | bone meal/ meat scraps | animal feed, unknown | dried blood | turtle | lizard | turtle water | alligator water | bay water | milk plant | environmental swab | throid powder | carmine dye | dust | unknown | Total | 2 Mos. Total | SEROTYPE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| alchua | | | | | | | | | | | | | | | | | | | | | | | | | | 4 | | | | | | | | 1 | | | | | | | | | | | | | 1 | 6 | 52 | alachua |
| albany | | | | | | | | | | | | | | | | | | | | | | | | | | 2 | | | | | | | | 1 | | | | | | | | | | | | | | 2 | 4 | albany |
| anatum | 2 | 1 | | | | | | 1 | | 21 | | | | | 1 | | | | | 3 | | | | | | 2 | | | | | 2 | | | 4 | | | | | | | | 2 | | | | 1 | 2 | 43 | 95 | anatum |
| bareilly | 1 | | | | | | | | | | | | | | | | | | | | | | | | | 4 | | | | | 4 | | | | | 1 | | | | | | | | | | | 1 | 6 | 7 | bareilly |
| berta | | | | | | | | 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 1 | 2 | berta |
| binza | | 1 | | | | | | | | | | | | | | | | | | | | | | | | 7 | | | | | 4 | | | | | 1 | | | | | | | | | | | 1 | 3 | 17 | 54 | binza |
| blockley | | 2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 1 | | | | | | | | | | | | | 1 | 3 | 7 | blockley |
| braenderup | 1 | | | | | | | | | | | | | | | | | | | 1 | | 1 | | | | | | | | | | | | | | | | | | | | | | | | | | 2 | 22 | braenderup |
| bredeney | 1 | 1 | | | | | | | | 13 | | | | | | | | | | | | | | | | 1 | | | | | | | | 4 | | 1 | | | | | | | | | | | 3 | 24 | 49 | bredeney |
| california | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 1 | | | | | | | | | | | | | | | | 1 | 2 | california |
| cerro | | | | | | | | | | | | | | | | | | | | 1 | | | | | | 1 | | | | | | | | | | | | | | | | | | | | | | 1 | 3 | 27 | cerro |
| champaign | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 1 | | | | | | | | | | | | | | 1 | 1 | champaign |
| chester | | 2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 2 | 5 | chester |
| cholerae-suis v kun | | | | | | | | | | 5 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 5 | 10 | cholerae-suis v kun |
| corvallis | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 2 | | | | | | | | | | | | | | | | | 2 | 3 | corvallis |
| cubana | 1 | | | | | | | | | | | | | | | | | | | | | | | | 13 | 9 | | | | | 1 | | | | 1 | | | | 3 | | 1 | 2 | | | 2 | | | 34 | 92 | cubana |
| derby | | | | | | | | 8 | | 116 | | | | | | | | | | 2 | | | | | | 2 | | | | | 3 | | | | 1 | 3 | | | | | | | | | | | 135 | 199 | derby |
| drypool | | | | | | | | | | 1 | | | | | | | | | | | | | | | | | | | | | | | | | 1 | | | | | | | | | | | | | 2 | 4 | drypool |
| eimsbuettel | 1 | | | | | | | | | 1 | | | | | | | | | | | | | | | | 1 | | | | | 16 | 1 | 4 | | 1 | 1 | | | | | | | | | | | 26 | 51 | eimsbuettel |
| enteritidis | 3 | | | | | | | | | | | | 2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 5 | 11 | enteritidis |
| gallinarum | 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 1 | 2 | gallinarum |
| give | | | | | | | | | | 10 | | | | | | | | | | | 3 | | | | | | | | | | | | | | | | | | | | | | | | | | | 13 | 21 | give |
| heidelberg | 7 | 20 | | | | | | | | 11 | | | 2 | | | | | | | | | | | | | | | | | | | | | | 1 | 3 | | | | | | | | | | | 40 | 92 | heidelberg |
| infantis | 24 | 1 | | | | | 1 | | | | 1 | 1 | | 1 | | | | 1 | | 1 | | | | | | | | | | | | | | 1 | | | 1 | | | | | 1 | | | | 1 | 35 | 86 | infantis |
| javiana | | | | | | | | 2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 2 | 8 | javiana |
| kentucky | | 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 2 | | 1 | | | | | | | | | | 4 | 14 | kentucky |
| lexington | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 1 | | | | | | | | | | | | | | | | 1 | 4 | lexington |
| litchfield | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 1 | | | | | | | | | | | | | | | | 1 | 1 | litchfield |
| livingstone | | 3 | | | | | | 2 | | | | | | | | | | | | | | | | | | | | | | | 1 | | | | | 1 | | | | | | | | | | 7 | 15 | livingstone |
| manhattan | | 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 1 | | 1 | | | | | | | | | | | | | | 3 | 3 | manhattan |
| meleagridis | | 1 | | | | | | 1 | | 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 3 | 5 | meleagridis |
| minneapolis | | | | | | | | | | | | | | | | | | | | | | | | | | 9 | | | | | | | | | | | | | | | | | | | | | | 9 | 9 | minneapolis |
| minnesota | | | | | | | | | | 1 | | | | | | | | | | | | | | | | | | | | | | | | | 2 | | | | | | | | | | | | | 3 | 9 | minnesota |
| mississippi | | | | | | | | | | 2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 2 | 2 | mississippi |
| mokolo | | | | | | | | | | 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 1 | 1 | mokolo |
| montevideo | 2 | 1 | | | | | | | | 2 | | | | | | | | | | | 3 | | | | | 19 | | | | | 1 | 2 | 1 | | | | | | | | | | 1 | | | | | 32 | 57 | montevideo |
| muenchen | 1 | 1 | | | 3 | | | | | 5 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 1 | | 1 | | | 11 | 20 | muenchen |
| muenster | | | | | | | | | | 1 | | | | | | | | | | | | | | | | | | | | | 1 | | | | | | | | | | | | | | | | 2 | 6 | muenster |
| new-haw | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 1 | | | | | | | | | | | | 1 | 1 | new-haw |
| newington | | | | | | | | | | | | | | | | | | | | | | | | | | 12 | | | | | | | | | | | | | | | | | | 1 | | | | 2 | 15 | 33 | newington |
| newport | 3 | 1 | | | | | | 1 | | 9 | 1 | 1 | 1 | | | 2 | | | | | | | | | | 1 | | | | | 1 | 2 | | | | | 1 | | | | | | | | | | 24 | 44 | newport |
| okerara | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 1 | | | | | | | | | | | | | | | | 1 | 1 | okerara |
| oranienburg | | | | | | | | | | 1 | | | | | | | | | | | | | | | | | | | | | 1 | | | | | | | | | | | | | | | | 1 | 1 | oranienburg |
| oslo | | | | | | | | | | | | | | 2 | | | | | | 3 | 3 | | | | | 8 | | 3 | | | | | | | 1 | 1 | 1 | | | 1 | | | 5 | | | | 3 | 30 | 63 | oslo |
| panama | 3 | 18 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 1 | | | 2 | 22 | 30 | panama |
| poona | | | | | | | | | 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 1 | 9 | poona |
| pullorum | 3 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 3 | 3 | pullorum |
| reading | | 3 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 3 | 37 | reading |
| redlands | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 1 | 1 | redlands |
| rubislaw | | | | | | | | | | 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 1 | 2 | rubislaw |
| saint-paul | | 6 | | | | | 1 | 1 | | 1 | | | | | | | | | | | | | | | | | | | | | | | | | 1 | | | | | | | | | | | | | 10 | 33 | saint-paul |
| san-diego | | 3 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 3 | 11 | san-diego |
| schwarzengrund | | 12 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 12 | 28 | schwarzengrund |
| senftenberg | | 2 | | | | | | | | | | | | | | | | | | | 1 | | | | | | | | | | 6 | | | | 8 | 3 | | | | | | | | | | | 21 | 37 | senftenberg |
| shubra | | | | | | | | | | 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 1 | 1 | shubra |
| siegburg | | | | | | | | | | 1 | | | | | | | | | | | | | | | | | | | | | 1 | 2 | | | | 1 | | | | | | | | | | | | 5 | 17 | siegburg |
| taksony | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 1 | | | | | | | | | | | | | | | | 1 | 2 | taksony |
| tennessee | 2 | | | | | | | | | | | | | | | | | | | 1 | 1 | | 1 | | | 6 | | | | | | | | 2 | | 2 | | | | | | | | | | 4 | 19 | 22 | tennessee |
| thompson | 8 | 4 | | | | | | | | | | | | | | | | | | | | 4 | | | | | | | | | | | | | | | | | | | | | | | | | 1 | 17 | 34 | thompson |
| tucson | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 1 | | | | | | | | | | | 1 | 1 | tucson |
| tuindorp | | | | | | | | | | | | | | | | | | | | | | | | | | | | 1 | | | | | | | | | | 1 | | | | | | | | | | 1 | 1 | tuindorp |
| typhi-murium | 2 | 4 | 3 | | | 1 | 1 | 10 | | 10 | 2 | 1 | | | | | | | | 1 | | | | | | | | | | | 6 | | | | | | | | | | 2 | 1 | | | 1 | | 46 | 156 | typhi-murium |
| typhi-murium v cop | 2 | 1 | | 1 | | | 1 | 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 6 | 23 | typhi-murium v cop |
| urbana | | | | | | | | | | 1 | | | | | | | | | | | | | | | | | | | | | | | | | 1 | | | | | | | | | | | | | 2 | 2 | urbana |
| vejle | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 1 | | | | | | | | | | | | | | | | | 1 | 1 | vejle |
| westhampton | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 3 | | | | | | | | | | | | | | | | | 3 | 10 | westhampton |
| wichita | | | | | | | | | | | | | | | | | | | | | | | | | | | | 1 | | | | | | | | | | | | | | | | | | | | 1 | 1 | wichita |
| worthington | | 2 | | | | | | | | 2 | | | | | | | | | | | | | | | | 3 | | | | | 4 | | | | 1 | 1 | | | | | | | | | | | 20 | 40 | worthington |
| untypable group B | | | | | | | | 2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 2 | 3 | untypable group B |
| untypable group C1 | | | | | | | | | | 2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 2 | 22 | untypable group C1 |
| untypable group E | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 1 | | | | | | | | | | | | | | | | | 1 | 3 | untypable group E |
| untypable group K | | | | | | | | | | | | | | | | | | | | | 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | 1 | 3 | untypable group K |
| TOTAL | 68 | 92 | 3 | 3 | 1 | 3 | 1 | 4 | 30 | 1 | 220 | 4 | 3 | 5 | 1 | 2 | 1 | 2 | 1 | 1 | 12 | 12 | 2 | 4 | 1 | 13 | 83 | 1 | 3 | 1 | 1 | 64 | 2 | 8 | 36 | 15 | 8 | 3 | 1 | 4 | 1 | 1 | 15 | 1 | 4 | 2 | 3 | 27 | 771 | 1,750 | TOTAL |

Source: National Disease Laboratory, Ames, Iowa, weekly Salmonella Reports from individual states and US-FDA-Div of Microbiology, Washington, D.C.

*Includes January late reports

TABLE V

REPORTED NONHUMAN ISOLATES BY SEROTYPE AND STATE, *FEBRUARY, 1967

| SEROTYPE | ARIZ | ARK | CAL | COLO | CONN | DC | FLA | HAI | IDA | ILL | IND | IOWA | KAN | LA | MD | MASS | MICH | MINN | MISS | MO | NEB | NJ | NM | NY-A | ND | OHIO | ORE | PA | TENN | TEX | UTAH | VT | VA | WASH | WVA | WISC | TOTAL | 2 MOS. TOTAL | SEROTYPE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| alachua | | | | | | | | | | | 4 | | | | | | | 1 | | | | | | | | | | | | 1 | | | | | | | 6 | 52 | alachua |
| albany | | | | | | | | | | 1 | | | | | | | | | 1 | | | | | | | | | | | | | | | | | | 2 | 4 | albany |
| anatum | 1 | 1 | 1 | | 1 | | 3 | | | 7 | | | 1 | 24 | | | | 2 | | | | | | | | | | | | | | | | 1 | | 1 | 43 | 95 | anatum |
| bareilly | | 1 | | | | | | | | | | | | 4 | | | | 1 | | | | | | | | | | | | | | | | | | | 6 | 7 | bareilly |
| berta | 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 1 | 2 | berta |
| binza | | 1 | | | | | 1 | | | 1 | | | 6 | 4 | | | | 3 | | | | | | | | | | | | 1 | | | | | | 17 | 54 | binza |
| blockley | | | 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 1 | | 1 | 3 | 7 | blockley |
| braenderup | | 1 | | | 1 | | | | | | | | | | | | | | | | | | | | | | | | | 1 | | | | | | 3 | 22 | braenderup |
| bredeney | | | 2 | | 1 | | | | | 3 | | | | 14 | | | | 3 | | | | | | | | | | | | | | | | 1 | | | 24 | 49 | bredeney |
| california | | | | | | | | | | | 1 | | | | | | | | | | | | | | | | | | | | | | | | | | 1 | 2 | california |
| cerro | | | | | | | | | | | | | | 1 | | | | 1 | | | | | | | | 1 | | | | | | | | | | | 3 | 27 | cerro |
| champaign | | | | | | | | | | | | | | | | | | 1 | | | | | | | | | | | | | | | | | | | 1 | 1 | champaign |
| chester | | | 1 | | | | | | | | | | | | | | | 1 | | | | | | | | | | | | | | | | | | | 2 | 5 | chester |
| cholerae-suis v kun | | | | | | | | | | | 2 | 1 | | | | | | | | 1 | | | | | | | | 1 | | | | | | | | | 5 | 10 | cholerae-suis v kun |
| corvallis | | | | | | | | | | | | | | 2 | | | | | | | | | | | | | | | | | | | | | | | 2 | 3 | corvallis |
| cubana | | 1 | 7 | | | | | | | 4 | 8 | | 1 | 1 | 10 | | 2 | | | | | | | | | | | | | | | | | | | 34 | 92 | cubana |
| derby | | | | | | | 2 | | | 1 | 3 | 1 | | 126 | | 1 | | | | | | | | | | 1 | | | | | | | | | | | 135 | 199 | derby |
| drypool | | | | | | | | | | | | | | 1 | | | | | | | | | | | | 1 | | | | | | | | | | | 2 | 4 | drypool |
| eimsbuettel | | | | | | 1 | | | | 5 | 2 | | | 17 | | | | 1 | | | | | | | | | | | | | | | | | | | 26 | 51 | eimsbuettel |
| enteritidis | | | 2 | | | | | | | | 3 | | | | | | | | | | | | | | | | | | | | | | | | | | 5 | 11 | enteritidis |
| gallinarum | | 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 1 | 2 | gallinarum |
| give | | | | | | | | | | | | 2 | | 10 | | | | 1 | | | | | | | | | | | | | | | | | | | 13 | 21 | give |
| heidelberg | | 1 | 18 | | | | | | | | 4 | 7 | | 6 | | | | 1 | | | | | | | | | 1 | | | | | | 1 | 1 | | | 40 | 92 | heidelberg |
| infantis | | 4 | 3 | | | | | | | 6 | 4 | | | 1 | | | | 1 | | 10 | | | | 1 | 1 | | 1 | | 1 | | | | 2 | 1 | | 35 | 86 | infantis |
| javiana | | | | | | | | | | | | | | 2 | | | | | | | | | | | | | | | | | | | | | | | 2 | 8 | javiana |
| kentucky | | | 1 | | | | | | | 1 | | | | | | | | 2 | | | | | | | | | | | | | | | | | | | 4 | 14 | kentucky |
| lexington | | | | | | | | | | | | | | 1 | | | | | | | | | | | | | | | | | | | | | | | 1 | 4 | lexington |
| litchfield | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 1 | | | 1 | 1 | litchfield |
| livingstone | | | 4 | | | | | | | | | | | 1 | | | | | | | | | | | | 2 | | | | | | | | | | | 7 | 15 | livingstone |
| manhattan | | | 1 | | | | | | | | 1 | | | 1 | | | | | | | | | | | | | | | | | | | | | | | 3 | 3 | manhattan |
| meleagridis | | | | | | | | 1 | | | | | | 1 | | | | | | 1 | | | | | | 9 | | | | | | | | | | | 3 | 5 | meleagridis |
| minneapolis | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 9 | 9 | minneapolis |
| minnesota | | | | | | | | | | 1 | | | | 1 | | | | | | | | | | | | | | | | | 1 | | | | | | 3 | 9 | minnesota |
| mississippi | | | | | | | | | | | | | | 2 | | | | | | | | | | | | | | | | | | | | | | | 2 | 2 | mississippi |
| mokolo | | | | | | | | | | | | | | 1 | | | | | | | | | | | | | | | | | | | | | | | 1 | 1 | mokolo |
| montevideo | | | 1 | | | | | | | 1 | 1 | 1 | | 2 | 2 | | | 4 | | | 1 | | | | | 1 | | 18 | | | | | | | | | 32 | 57 | montevideo |
| muenchen | | | 1 | | | | | | | | 1 | | | 6 | | | | | | | | 3 | | | | | | | | | | | | | | | 11 | 20 | muenchen |
| muenster | | | | | | | | | | | | | | 2 | | | | | | | | | | | | | | | | | | | | | | | 2 | 6 | muenster |
| new-haw | | | | | | | | | | | | 1 | | | | | | | | | | | | | | | | | | | | | | | | | 1 | 1 | new-haw |
| newington | | | 2 | | | | | | | 1 | | | | | | | 12 | | | | | | | | | | | | | | | | | | | | 15 | 33 | newington |
| newport | 2 | 1 | 2 | | | | | | | 1 | 2 | | | 10 | | | | 2 | 1 | | | | | | | | | | 1 | 1 | | | | 1 | | | 24 | 44 | newport |
| okerara | | | | | | | | | | | | | | 1 | | | | | | | | | | | | | | | | | | | | | | | 1 | 1 | okerara |
| oranienburg | | | | | | | | | | 6 | 1 | 3 | | | | | 8 | 3 | | | | 1 | | 3 | | 4 | | | | | | | | | 1 | 30 | 63 | oranienburg |
| oslo | | | | | | | 2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 2 | 2 | oslo |
| panama | | 21 | | | | 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 22 | 30 | panama |
| poona | | | | | | | | | | | | | | | | | | | | 1 | | | | | | | | | | | | | | | | | 1 | 9 | poona |
| pullorum | | | | | | | | | | | | | | | | | | | | | | | | | | | | 1 | | | | 1 | 1 | | | 3 | 3 | pullorum |
| reading | | | 3 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 3 | 37 | reading |
| redlands | | | | | | | | | | | | | | 1 | | | | | | | | | | | | | | | | | | | | | | | 1 | 1 | redlands |
| rubislaw | | | | | | | | | | | | | | 1 | | | | | | | | | | | | | | | | | | | | | | | 1 | 2 | rubislaw |
| saint-paul | | | 3 | | | | | | | 1 | | | | 2 | | | | 2 | | | | | | | | | | | | | | | | | | | 10 | 33 | saint-paul |
| san-diego | | | 3 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 3 | 11 | san-diego |
| schwarzengrund | | | 12 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 12 | 28 | schwarzengrund |
| senftenberg | | | 1 | | 8 | 2 | | | | | 3 | | | 6 | | | | 1 | | | | | | | | | | | | | | | | | | | 21 | 37 | senftenberg |
| shubra | | | | | | | | | | | | | | 1 | | | | | | | | | | | | | | | | | | | | | | | 1 | 1 | shubra |
| siegburg | | | | | | | | | | | 1 | | | 1 | | | | | | 1 | | | | | | | | | | | 2 | | | | | | 5 | 17 | siegburg |
| taksony | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 1 | | | | | 1 | 2 | taksony |
| tennessee | | | 3 | | | | | | | 3 | 2 | | | | 1 | | | 4 | | | 4 | | | | | 1 | | | | | 1 | | | | | 19 | 22 | tennessee |
| thompson | | 6 | 2 | | | | | | | 1 | 1 | | | | | | | 1 | | 1 | | 4 | | | | | | | | | | | | | | 17 | 34 | thompson |
| tucson | | | 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 1 | 1 | tucson |
| tuindorp | | | | | | | | | | 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | 1 | 1 | tuindorp |
| typhi-murium | | 2 | 5 | | | | 1 | | 1 | 3 | 1 | | 1 | 19 | | | | 3 | | 4 | | | | 1 | | 1 | | | | | 2 | 1 | | | 1 | 46 | 156 | typhi-murium |
| typhi-murium v cop | | 1 | | 1 | 2 | | | | | | 1 | | | | | | | 1 | | | | | | | | | | | | | | | | | | 6 | 25 | typhi-murium v cop |
| urbana | | | | | | | | | | 1 | | | | 1 | | | | | | | | | | | | | | | | | | | | | | | 2 | 2 | urbana |
| vejle | | | | | | | | | | | | | | 1 | | | | | | | | | | | | | | | | | | | | | | | 1 | 1 | vejle |
| westhampton | | | | | | | | | | | | | | 3 | | | | | | | | | | | | | | | | | | | | | | | 3 | 10 | westhampton |
| wichita | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 1 | | | | | 1 | 1 | wichita |
| worthington | | | | | | 1 | | | | 2 | 4 | | | 7 | | | | 3 | | 1 | | | | | | | | | | | | | | | 1 | 1 | 20 | 40 | worthington |
| untypable group B | | | 2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 2 | 3 | untypable group B |
| untypable group C1 | | | | | | | | | | | | | | 2 | | | | | | | | | | | | | | | | | | | | | | | 2 | 21 | untypable group C1 |
| untypable group E | | | | | | | | | | | | | | 1 | | | | | | | | | | | | | | | | | | | | | | | 1 | 3 | untypable group E |
| untypable group K | | | | | | | | | | | | | | | | | | | | | | | | | | 1 | | | | | | | | | | | 1 | 3 | untypable group K |
| TOTAL | 4 | 42 | 82 | 1 | 13 | 5 | 9 | 1 | 1 | 51 | 50 | 16 | 9 | 287 | 3 | 10 | 21 | 45 | 2 | 20 | 5 | 4 | 4 | 5 | 1 | 22 | 2 | 20 | 2 | 3 | 9 | 2 | 3 | 10 | 1 | 6 | 771 | 1,750 | TOTAL |

Source: National Disease Laboratory, Ames, Iowa, weekly Salmonella Reports from individual states and US-FDA-Div. of Microbiology, Washington, D.C.

(NYA-New York - Albany)

*Includes January late reports

TABLE VI
OTHER SEROTYPES REPORTED DURING 1967
FROM NONHUMAN SOURCES

| SEROTYPE | MONTH | REPORTING CENTER(S) | NUMBER OF ISOLATIONS |
|---|---|---|---|
| carrau | Jan | La | 1 |
| cholerae-suis | Jan | Cal(1) | |
| | Jan | Ohio(1) | 2 |
| eastbourne | Jan | Minn | 1 |
| grumpensis | Jan | La | 2 |
| hartford | Jan | Hai | 1 |
| indiana | Jan | Ind(2) | |
| | Jan | NC(1) | 3 |
| java | Jan | Cal | 1 |
| johannesburg | Jan | Utah | 1 |
| orion | Jan | Minn | 1 |
| pomona | Jan | La | 1 |
| thomasville | Jan | Iowa(2) | |
| | Jan | La(1) | 3 |
| typhi-suis | Jan | Minn | 1 |
| TOTAL | | | 18 |