October 23, 1967

NATIONAL
COMMUNICABLE DISEASE CENTER

SALMONELLA

SURVEILLANCE

CONTENTS. . .

FOR THE MONTH OF AUGUST

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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I. SUMMARY

This issue of the Salmonella Surveillance Report contains reports of outbreaks from six states, a regulation on pet turtles recently passed by the Washington State Department of Health, and a discussion of the U.S. Food and Drug Administration program on contaminated animal feeds.

In August 1967, 2,566 isolations of salmonellae were reported from humans, an average of 513 isolations per week (Tables I and II). This number represents an increase of 44 (9.4 percent) over the weekly average of July 1967 and an increase of 31 (6.4 percent) over the weekly average of August 1966.

Reports of 358 nonhuman isolations of salmonellae were received during August, a decrease of 247 (40.8 percent) from July 1967 (Tables IV, V, and VI).

II. REPORTS OF ISOLATIONS FROM THE STATES

A. HUMAN

The seven most frequently reported serotypes during August were:

Rank	Serotype	Number	Percent	Rank Last Month
1	S. typhi-murium and S. typhi-murium var. copenhagen	653	25.4	1
2	S. newport	213	8.3	4
3	S. enteritidis	195	7.6	3
4	S. heidelberg	182	7.1	2
5	S. infantis	115	4.5	5
6	S. saint-paul	109	4.2	6
7	S. blockley	75	2.9	Not listed
	Total	1542	60.1	
	Total (all serotypes)	2566		

Salmonella newport ranks second this month due in part to 58 isolations from California. A discussion of an outbreak due to S. newport in San Bernardino County, California, is contained in this month's report.

The age and sex distribution is shown in Table III.

B. NONHUMAN

Twenty-five states reported nonhuman isolations of salmonellae, in which 53 different serotypes were represented.

The seven most frequently reported serotypes during August were:

Rank	Serotype	Predominant Source and Number	Number	Percent	Rank Last Month
1	S. typhi-murium and S. typhi-murium var. copenhagen	cattle (15)	66	18.4	1
2	S. heidelberg	chickens (28)	44	12.3	5
3	S. montevideo	bone meal/meat scraps (5)	17	4.7	Not listed
3	S. senftenberg	animal feed (7)	17	4.7	Not listed
5	S. derby	(none)	13	3.6	Not listed
5	S. infantis	chickens (6)	13	3.6	Not listed
7	S. tennessee	turkeys (7)	12	3.4	2
7	S. anatum	turkeys (5)	12	3.4	3
	Total		181	50.6	
	Total (all serotypes)		358		

The most prominent sources of salmonellae reported during August were chickens, 57 (15.9 percent); turkeys, 57 (15.9 percent); bone meal/meat scraps, 29 (8.1 percent); animal feed, unknown, 27 (7.5 percent); and cattle, 17 (4.7 percent).

III. CURRENT INVESTIGATIONS

A. Salmonella javiana Infections in Harris County, Texas

Reported by Marlin Luther, Epidemiologist, Richard Fenold, M.D., Director, Division of Communicable Diseases, City of Houston Health Department; Van C. Tipton, M.D., Director, Division of Communicable Disease Control, Victor Zalma, M.D., EIS Officer, Texas State Department of Health; Bernard Aserkoff, M.D., and Steven Schroeder, M.D., EIS Officers, Bacterial Diseases Section, Epidemiology Program, National Communicable Disease Center.

The unexplained geographic localization demonstrated by certain salmonella serotypes has been under study without solution for several years. The investigation of Salmonella saphra, localized almost solely to the city of Houston, was reported previously in Salmonella Surveillance Report No. 45. Another salmonella serotype with similar geographic localization is S. javiana. In 1966, 67.3 percent of all S. javiana isolates were reported from three Gulf states, Texas, Louisiana, and Florida; whereas, these states contributed only 15 percent of all serotypes reported. In addition, S. javiana isolates represented 9.4 percent of all human salmonella isolations in Texas in 1966, although constituting only 1.6 percent of the national total. No significant nonhuman reservoir of S. javiana has yet been demonstrated.

From May 1, 1967, to August 21, 1967, 29 isolations of S. javiana were reported from the city of Houston. In contrast, during the same 16-week period of 1966, only 2 such isolations had been reported from Houston. This marked increase in cases provided an opportunity to study S. javiana to clarify its previously undiscovered reservoir and its distinctive geographic localization.

The investigation included all new 1967 S. javiana cases reported from the city of Houston prior to August 21. Of the 28 individuals identified, 25 were located for interviews. Examination of data permitted classification of these 25 cases into two groups, 16 community-acquired and 9 hospital-acquired cases.

Community-acquired cases occurred in two clusters, 7 cases from mid-April through June and 9 in July. No significant distribution by age, sex, geographic location, or socioeconomic class was noted. Four cases in one family were traced to contaminated barbecued chicken purchased in Humble, Texas, 30 miles from Houston. However, in the remaining 12 cases, no food, travel, pets, or occupation could be implicated to link the apparently isolated illnesses.

The 9 hospital-acquired cases were related to two hospitals. Seven were from Hospital A, a 421-bed municipal hospital, serving mainly the indigent population of Houston and Harris County. Four cases of S. javiana infection were related to hospitalization on an 18-bed pediatric diarrhea ward during a 5-week interval. In 2 cases, infection was acquired during hospitalization, and in 2 others, salmonellosis was diagnosed within 2 days of discharge. Of the remaining 3 cases, 1 developed diarrhea 1 week after discharge from the same diarrhea ward, and a stool culture 5 weeks later showed S. javiana. A family survey subsequently revealed an asymptomatic sibling also positive for S. javiana. The third case was hospitalized on the regular pediatric ward, and 19 days after discharge had a stool culture positive for S. javiana. No positive family contacts could be identified. For several of these cases, interpersonal spread from case to case within the crowded diarrhea ward probably occurred. Because of turnover of personnel and the duration of time elapsed since the cases occurred, further delineation of personnel involved in transmission was not attempted.

Two cases were related to Hospital B, a 200-bed municipal obstetrical and nursery unit serving the same population group. The patients were twins, one of whom developed diarrhea on the day of discharge from the nursery. The other twin, who occupied the same crib, developed diarrhea 1 day after her sister returned home. Salmonella javiana was recovered from both.

EDITOR'S COMMENT: The problem of geographic localization of certain salmonella serotypes still persists. This investigation was of value in demonstrating and reemphasizing the problem of hospital-acquired salmonella infections (see SSR Nos. 53, 55, 59); however, no significant community reservoir or regional source of infection could be demonstrated to explain the community-acquired cases.

B. Outbreak of Salmonellosis at an Urban Training Center, St. Louis, Missouri

Reported by Arthur Townsend, M.D., and J. Earl Smith, M.D., Health Commissioner, Melvin Tess, M.D., Deputy Health Commissioner, Helen Bruce, M.D., Acting Epidemiologist, and Val Jonsson, D.P.H., Director, Public Health Laboratory, City of St. Louis Health Department.

An outbreak of febrile gastroenteritis involving 185 persons occurred in a women's residential and vocational training center in St. Louis in late June and early July 1967. The center houses 510 females between 16 and 21 years of age who come from 37 states. Between June 26 and June 29, 158 girls reported to the center infirmary with profuse diarrhea, abdominal cramps, and fever. Twenty-seven additional cases were seen between June 29 and July 3, giving a total attack rate of 36.3 percent. Most girls were moderately ill and required admission to the infirmary for 3 to 5 days. Treatment with either chloramphenicol or tetracycline was given, as well as supportive treatment, including intravenous fluids. Two girls, one with a history of previous nephrectomy and rheumatic heart disease, and the other who had marked dehydration, required hospitalization outside the center but eventually recovered. No deaths were reported. Stool cultures were performed on all residents of the center; 164 were positive for Salmonella heidelberg, 19 for S. manhattan.

Food histories obtained from many of those ill implicated turkey served for dinner on June 25 and as sandwiches on June 26 and 27. The turkeys had been prepared from frozen turkeys purchased in Sullivan, Missouri. They were thawed on June 24 and boiled, then permitted to cool for several hours at room temperature and refrigerated. On June 25, they were broiled and served. Although none of the turkey was available for culture, two frozen turkeys purchased from the same supplier at approximately the same time were cultured and were positive for S. heidelberg. In addition, S. heidelberg was recovered from the cutting board on which the turkeys were sliced.

A stool culture survey of food handlers revealed 5 asymptomatic persons positive for S. heidelberg. All admitted to having eaten the turkey, and none had been ill before the outbreak.

The center's program included training in clerical skills, child care, hospital skills, and food preparation. After the clinical illness had subsided, those girls working with children in hospitals or in food preparation were not permitted to return to on-job training until three negative stool cultures had been obtained. Five weeks after the outbreak, a repeat culture survey was performed. Nine girls were still carrying S. heidelberg, and 9 were still positive for S. manhattan.

EDITOR'S COMMENT: Early in the evaluation of this outbreak the problem of obtaining stool specimens for culture arose. Only when rectal swabs were substituted for fecal specimens did easy mass culturing become possible. In 1966, a study was done comparing yield of salmonella isolations from fecal specimens and rectal swabs[1]. The authors found that recovery of salmonella was directly related to number of organisms per gram of stool. They also found that 82 percent of recent infections could be documented by immediately inoculating a rectal swab in tetrathionate broth, as compared to 94 percent for directly culturing fecal specimens. Presumably, with acute infection in which excretion of the organisms is greater, this difference would be smaller. Because of the added convenience of obtaining rectal swabs, we feel that they are preferred in most epidemiologic investigations.

REFERENCE

1. McCall, C.E., Martin, W.T., and Boring, J.R.: Efficiency of cultures of rectal swabs and faecal specimens in detecting salmonella carriers: Correlation with numbers of salmonellas excreted. Journal of Hygiene, 64:261-269, 1966.

IV. REPORTS FROM THE STATES

A. CALIFORNIA

Salmonella newport Outbreak at a Resort Hotel

Reported by Henry A. Renteln, M.D., Head, General Epidemiology Section, California State Department of Public Health; Merle E. Cosand, M.D., Director of Public Health, John A. Scharffenberg, M.D., San Bernardino County Health Department; and William Renert, M.D., EIS Officer assigned to the California State Department of Public Health.

Two separate outbreaks of gastroenteritis due to Salmonella newport occurred at a conference center for an international religious organization during the month of August 1967. The center consists of a large hotel, living quarters, bungalows, an auditorium, swimming pool, and several other buildings. Total sleeping capacity is about 1600 persons, and the majority of the conference participants are college students from the United States and many foreign countries. The number of persons present at the center at any one time varies considerably, depending on the type of conference in progress.

The first outbreak involved about 250 persons and occurred between August 10 and 16. The predominant symptoms were diarrhea and cramps, although many also had nausea, vomiting, and fever. Three patients were hospitalized, but there were no deaths. A total of 195 stool specimens were collected, and 88 were found to be positive for salmonella, group C_2, subsequently serotyped as S. newport. Food histories were not taken because of the time interval between the outbreak and the investigation. Investigation of the water supply showed no evidence of contamination. Examination of the kitchen facilities disclosed poor handling and processing of food items.

Several control measures were suggested, including exclusion of food handlers with positive cultures or histories of illness and recommendations for safe water management, sewage disposal, and kitchen procedures.

No new cases were reported until August 27 when 69 new cases were reported over a 3-day period. Once again S. newport was cultured from ill patients. Investigation of this second outbreak included food histories from ill and well persons, but no food item could be incriminated. Following discussions with the conference center management, it was decided to close the kitchen completely, and all food would be prepared and brought in by an outside catering service. This continued until September 9, at which time a private food service took over the operation of the kitchen facilities.

EDITOR'S COMMENT: While the transient nature of the conferees made epidemiologic investigation difficult, it seems apparent that whatever improper food preparation conditions had contributed to the first outbreak had not been completely remedied, as evidenced by the recurrence of another epidemic due to the same salmonella serotype.

B. NEW YORK

Outbreak of Salmonella montevideo Occurring at a School Luncheon

Reported by Leo H. Buchner, M.D., City of New York Department of Health, and David Wegman, M.D., EIS Officer assigned to the City of New York Department of Health.

An outbreak of gastroenteritis among children and teachers at a private school in New York City occurred in May 1967. An estimated 250 persons were ill with diarrhea, cramps, fever, nausea, and vomiting. Fever as high as 105° was reported in 2 persons. At least six children and one adult were hospitalized; no deaths were reported. The illnesses were traced to two meals served on May 18, a Bar Mitzvah reception and a regular school lunch. Incubation periods ranged from 8 to 45 hours, with a mean of 21.6 hours. Food histories obtained from those attending both meals implicated egg salad served at the Bar Mitzvah and tuna salad served at the school lunch. Stool cultures on 57 persons were positive for Salmonella montevideo.

Investigation of the food preparation disclosed that lunch was prepared regularly at the school by a group of six food handlers assisted by two or three mothers. The egg salad served at the Bar Mitzvah was prepared the day before. Eggs were shelled by all six food handlers, and the salad was stored overnight in a refrigerator later found to be capable of maintaining a temperature of only 60° F. After the Bar Mitzvah, the remaining egg salad was added to tuna fish, mayonnaise, and monosodium glutamate to complete a "tuna salad," which was served about 1½ hours after the Bar Mitzvah. No egg salad was available for culture, but bacteriological examination of the food served at the lunch showed heavy bacterial contamination of the "tuna salad" and growth of S. montevideo. Stool cultures were obtained from the six food handlers and two mothers who had assisted in serving the incriminated meal; all were positive for S. montevideo. The two mothers and three of the food handlers were ill with gastroenteritis during the epidemic.

Investigation of the kitchen revealed several faults in hygienic technique. Since all of the food handlers had become infected and the school term was almost over, it was decided to close the kitchen for the remainder of the school year and to clean and sanitize it prior to the opening of the fall term.

EDITOR'S COMMENT: While it is not possible to determine whether contaminated food or a food handler was responsible for this epidemic, in our experience large outbreaks such as this one are usually due to contaminated food. It is difficult for a single food handler to contaminate a meal sufficiently to cause large outbreaks, and the handlers are more often victims of the epidemic than responsible for it. Epidemiologic evidence points to egg salad as the suspect food item. Salmonella montevideo is often found in poultry and eggs and was the second most common salmonella serotype isolated from eggs and egg products in 1966.

C. OREGON

Fatal Case of Salmonella enteritidis Infection

Reported by Monroe Holmes, D.V.M., Vivian Runte, R.N., and Edward L. Goldblatt, M.D., Epidemiology Section, Oregon State Board of Health.

A fatal case of Salmonella enteritidis infection in an 11-year-old male resulted from a family outbreak in a rural community in Oregon in August 1967. Seven members of the family became ill with severe gastroenteritis following a luncheon on August 2. The suspected meal consisted of chocolate eggnog made with raw eggs, pancakes, and fried eggs (all using the same batch of eggs). Normally the family consumed eggs collected from nests on the farm; however, the suspected meal included eggs collected from the hayloft and around the farm. These eggs had been highly contaminated with fecal material and dirt, and the shells had not been cleaned prior to breaking the eggs during food preparation. Raw eggnog was consumed quite frequently by most members of the family. The deceased child was thought to have consumed the remainder of a 2-quart mixture made for the lunch and to have possibly made an additional amount for himself.

The deceased child became ill with abdominal cramps and diarrhea 5 hours after consumption of the suspect meal. Symptoms of central nervous system involvement developed, and the boy was brought to a doctor's office, where he was pronounced dead. The other six members of the family became ill with an average incubation period of about 16 hours, and three were hospitalized subsequently. The father and the oldest boy, who were not hospitalized, drank only one glass of eggnog each, and the father did not eat any pancakes or fried eggs.

Stool cultures obtained from all members of the family, including the deceased boy, and a blood culture from the deceased boy were found positive for S. enteritidis. Bacteriologic cultures taken from the animals and environmental samples taken from milking equipment were negative for pathogenic enteric organisms. However, shells of eggs used for the eggnog also yielded S. enteritidis as did a portion of the pancake batter and the chocolate drink.

EDITOR'S COMMENT: The short incubation period and the severity of clinical infection in the fatal case are uncommon in human salmonellosis. Incubation periods are seldom less than 8 hours, and fatal infections in previously healthy children in this age group are rare. The infecting dose of salmonella organisms in this patient must have been large, and this assumption is substantiated by his food history.

D. TENNESSEE

Salmonella chester Outbreak Traced to Barbecued Pork

Reported by Cecil B. Tucker, M.D., Director, Division of Preventable Diseases, Tennessee Department of Public Health.

Approximately 90 cases of gastroenteritis occurred in northwestern Tennessee and neighboring Kentucky during the week of July 24, 1967. The predominant symptoms were diarrhea (100 percent), fever (97 percent), abdominal cramps (92 percent), nausea (92 percent), vomiting (74 percent), and headache (59 percent). At least 15 of the cases were hospitalized, and several required intravenous fluids. There were no deaths. Cases were equally distributed among males and females of all age groups.

Food histories on the ill patients revealed one common item, pork barbecue, which had been prepared at a restaurant in Henry County. This restaurant had been specializing in barbecuing various types of meats for over 25 years. The first cases occurred in a family which had taken pork shoulder to the restaurant, where the meat was shredded and barbecued. The meat was consumed that evening, and four members of the family became ill during the night. Incubation periods were obtained for 70 of the cases and ranged between 5 and 42 hours, with a median of 17.2 hours. Stool cultures on 8 of the patients were positive for Salmonella chester.

Salmonella chester was isolated from two specimens of barbecued pork. One specimen was obtained directly from the restaurant, and the other at a private home where it had been brought from the restaurant. There were at least three sources of meat involved in the outbreak. Most of the meat was obtained from one of two packing houses in Tennessee, but at least one family consumed local pork. The meat obtained from the packing houses was government inspected, and several cultures were negative for salmonellae.

Preparation of the barbecue commenced with cooking pork shoulders. After cooking, the meat was shredded by hand and placed in a walk-in cooler. General sanitation of the restaurant was poor. A meat block used for preparation of the meat was greasy and unclean, but specimens were negative for salmonella. The cooler used for storage of the shredded barbecue was also unclean and was quite overcrowded. Air temperature was shown to be 52° F, and there was visible mold growth on the ceiling.

Of the six employees of the restaurant, four admitted having gastroenteritis during the epidemic period and five had stool cultures positive for S. chester.

EDITOR'S COMMENT: It is not clear whether salmonellae were present in the original meat or were subsequently introduced at the restaurant. Regardless of the original source of contamination, conditions in the restaurant were favorable for bacterial growth once contamination was introduced.

E. WASHINGTON

Regulation on Pet Turtles

The following regulation was recently passed by the Washington State Department of Health and is quoted in its entirety.

"No live turtles shall be sold or offered for sale on or after January 1, 1968, except where adequate bacteriological proof is submitted to the State Department of Health that such turtles are free from salmonella contamination. Adequate bacteriological proof as used herein shall consist of a statement issued by the chief public health official of the state from which the lot of turtles is shipped, certifying

that the turtles have been found free of salmonella based upon laboratory examination, and stating the examinations upon which the statement is based. Such certificates shall accompany and be provided to the dealer of any turtle to be sold from an approved lot. The state director of health may in addition thereto withhold approval of any lot of turtles whether certified or not until a series of at least six consecutive cultures taken at intervals of not less than one week have been found negative for salmonella in a laboratory approved for this purpose by the State Department of Health. The results of such examinations shall be submitted on a form to be provided by the State Department of Health. The state director of health or any representative thereof or any local health officer or his representative may at any time take samples of tank water or any other appropriate samples from turtles offered for sale and order the immediate destruction of any lot of turtles found contaminated with salmonella.

"The following warning must be posted conspicuously at every display of turtles for retail sale:

> "'CAUTION: Turtles may transmit bacteria causing disease in humans. It is important to wash the hands thoroughly after handling turtles or material in a turtle bowl; not to allow water or any other substance from a turtle bowl to come into contact with your food or areas where your food is prepared; and to make sure that these precautions are followed by children or others handling turtles.'"

EDITOR'S COMMENT: Washington becomes the first state to pass legislation concerning salmonella contamination of turtles.

V. SPECIAL REPORTS

The FDA Program on Salmonella in Protein Feeds of Animal Origin

Excerpts from a speech presented by Kenneth R. Lennington, Salmonella Project Officer, U.S. Food and Drug Administration, to the National Renderers Association, Inc., Salmonella Workshop, Baltimore, Maryland, May 9, 1967.

".....At this stage of our knowledge on the epidemiology and cycles of infection with salmonella, it appears that material reduction of the incidence in animal feeds is a fundamental starting place.

"A number of investigators over the past 10 to 15 years have demonstrated and confirmed the frequent presence of salmonella in feeds of animal by-product origin. Pomeroy, Morehouse and Wedman, Watkins, and Boring, to name only a few, have conducted surveys and specialized studies which have shown contamination to be commonplace..... The Food and Drug Administration made a limited survey last summer of about 60 plants producing meat scraps and bone meal, fishmeal, poultry scraps, feather meal, and similar products. Our survey showed an even higher incidence of contamination.

"There has been much discussion concerning the significance of these contaminated feeds and their impact upon salmonellosis in our domestic animals, and in turn, in man. While this is an area where further study is needed to evaluate the true significance of contamination in feeds, the evidence is mounting to indicate that they do play an important role.

".....An inherent hazard in feeding salmonella-contaminated products to our meat and poultry animals lies in the risk of the flesh becoming contaminated by intestinal contents during slaughter and processing, thus contaminating the foods taken into our kitchens. You are probably aware that the isolations of salmonella reported to the National Communicable Disease Center point to animals and poultry as the major

reservoir. We recognize that contaminated feeds constitute only a step in the chain of infection. The contaminated environment in which food is processed, the present production and marketing practices such as the feed lots, brooders, etc., where we get a high concentration of animals in a confined area, and the abattoir and packing plant conditions, all enter the picture. Since the salmonella-infected animal provides the primary source of contamination of human foods, it appears that steps to reduce animal infection is one of the logical approaches toward reducing salmonellosis in man.

"As the first action in a program directed toward reducing incidence of salmonella in animal feeds, the FDA issued a Statement of Policy in the Federal Register on March 15, 1967. This statement in essence announced that salmonella in the basic protein foods of animal origin (including those of marine and poultry origin) constitutes adulteration within the meaning of section 402(a) of the Act. Concurrent with the publishing of the Statement of Policy, Dr. Goddard, Commissioner of Food and Drugs, addressed a letter to the executive officers of eight national industry associations, including the National Renderers Association, explaining the basis for the Statement of Policy and soliciting cooperation and assistance of the industries in developing voluntary compliance.

".....The questions 'Must our products be salmonella free? Will FDA seize every lot of products in which salmonella is found? When will the FDA program go into effect? Will there be any tolerance for salmonella in feeds?' have been raised frequently. In arriving at answers to these and similar questions, let us look back to the incidence of salmonella contamination in these products--33 to 50 percent--in contrast to the 0.5 to 3.5 percent incidence in other feeds and feed ingredients.

"The USDA survey data show the incidence of salmonella contamination in finished swine and poultry feeds to be significantly higher than that found in vegetable and cereal grain feeds. When we consider that the vegetable and cereal grain ingredients constitute a high percentage of the final mix, the net effect of adding contaminated animal protein becomes apparent.

"We are not demanding at this time that every lot or shipment be salmonella free, but neither are we establishing any tolerance. Salmonella is a pathogen, an infectious organism; hence tolerances would be unrealistic. At the same time, however, to take a position that effective on a given date all feeds must be salmonella negative would also be unrealistic. Our enforcement approach is, and will be, to take regulatory action against the more flagrant offenders, against the contaminated products of those plants who continue to operate with a demonstrated disregard for the recommended Sanitation Guidelines developed by USDA and your association. Our short-time goal is significant reduction in contamination. When the incidence of contamination of your products is reduced to levels comparable to other categories of feeds, that will be the time to reevaluate the situation and consider what further improvements are practicable. Hopefully by then we will have some information from special scientific studies which may provide sound bases for handling the remaining problems.

"As you can appreciate, our microbiological resources are limited by laboratory facilities and qualified scientific manpower. We will not undertake to sample and analyze each lot of product, nor the output of each plant. We will allocate the resources that can be devoted to the animal feed program to those firms failing to observe and adhere to good manufacturing practices. We shall not inaugurate an enforcement program until guidelines and instruction are issued to our 17 field districts in order that uniform nationwide enforcement will result. These guides are now in their final stage and will be issued soon. Sampling and examination of imported animal by-product feeds will be part of the program. Foreign products must comply or the shipments will be detained and refused entry unless they are heat treated or otherwise reprocessed to destroy salmonella. The State Department has

already alerted those countries engaged in exportation of meat scrap, rendered tankage, fishmeal, and similar products to the United States to these requirements.

"We are hopeful that seizure, injunction, and prosecution will not be necessary. We firmly believe that voluntary industry compliance is more realistic and more effective than enforcement through punitive action..."

VI. INTERNATIONAL

A. Salmonellosis in Canada, 1966

Reported by J. Yurack, Ph.D., Officer-in-Charge, Enteric Bacteriology, Laboratory of Hygiene, Department of National Health and Welfare, Ottawa, Canada.

During the year 1966, 2,551 human isolations of salmonella were reported in Canada. This number represents a decrease of 359 (11.4 percent) from 1965. The peak months for salmonella infections were August through October. Ten of the 54 serotypes recovered accounted for 87.3 percent of the total isolations. The 10 serotypes most frequently isolated from humans were:

Rank	Serotype	Number	Percent
1	S. typhi-murium and S. typhi-murium var. copenhagen	745	29.2
2	S. newport	320	12.5
3	S. heidelberg	300	11.8
4	S. saint-paul	298	11.7
5	S. thompson	149	5.8
6	S. montevideo	113	4.4
7	S. infantis	110	4.3
8	S. blockley	69	2.7
9	S. enteritidis	69	2.7
10	S. typhi	57	2.2
	Total	2230	87.3
	Total (all serotypes)	2551	100.0

Of the 1,048 nonhuman isolations reported, the most common sources were animal and poultry feeds, bone meal and feed constituents (25.7 percent), poultry (25.5 percent), egg products (19.8 percent), animal sources (15.6 percent), processing and rendering plants (5.1 percent), and reptiles (3.8 percent).

The 10 most frequently isolated serotypes from nonhuman sources were:

Rank	Serotype	Number	Percent
1	S. typhi-murium and S. typhi-murium var. copenhagen	169	16.1
2	S. infantis	126	12.0
3	S. newport	122	11.6
4	S. montevideo	80	7.6
5	S. saint-paul	64	6.1
6	S. worthington	63	6.0
7	S. oranienburg	57	5.4
8	S. heidelberg	47	4.5
9	S. blockley	32	3.1
10	S. thompson	28	2.7
	Total	788	75.1
	Total (all serotypes)	1048	100.0

EDITOR'S COMMENT: The overall incidence of salmonellosis, the specific serotypes reported, and the nonhuman sources of salmonellae in Canada are all quite similar to data from this country.

B. Salmonella Isolations from England, Wales, and Scotland in 1966

Reported by Dr. Joan Taylor, Salmonella Reference Laboratory, Central Public Health Laboratory, Colindale, London.

During 1966, 4,105 isolations of salmonella were identified in England, Wales, and Scotland. Of these, 2,331 were from humans and 1,774 from nonhuman sources. The 10 most frequently isolated serotypes were as follows:

HUMAN

Rank	Serotype	Number	Percent
1	S. typhi-murium and S. typhi-murium var. copenhagen	593	25.4
2	S. panama	206	8.8
3	S. enteritidis	177	7.6
4	S. anatum	120	5.1
5	S. stanley	109	4.7
6	S. brandenburg	106	4.5
7	S. paratyphi B	83	3.6
8	S. newport	67	2.9
9	S. derby	66	2.8
10	S. heidelberg	65	2.8
	Total	1592	68.3
	Total isolations	2331	

NONHUMAN

Rank	Serotype	Number	Percent
1	S. typhi-murium and S. typhi-murium var. copenhagen	122	6.9
2	S. dublin	121	6.8
3	S. anatum	118	6.7
4	S. senftenberg	83	4.7
5	S. oranienburg	77	4.3
6	S. bredeney	59	3.3
7	S. california	59	3.3
8	S. derby	51	2.9
9	S. panama	48	2.7
10	S. cubana	47	2.6
	Total	785	44.2
	Total isolations	1774	

Figure 1.

REPORTED HUMAN ISOLATIONS OF SALMONELLAE
IN THE UNITED STATES

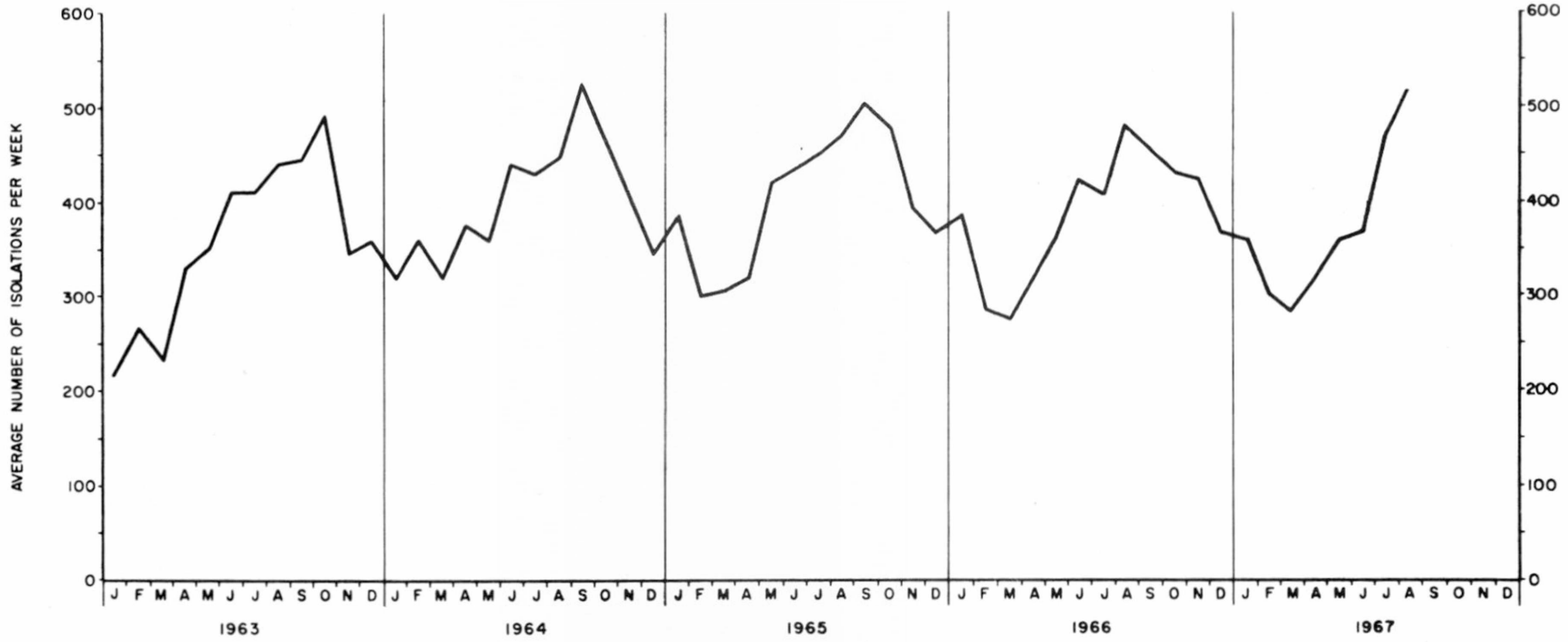

TABLE I

COMMON SALMONELLA SEROTYPES ISOLATED FROM HUMANS IN THE UNITED STATES DURING AUGUST 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	1	3	1	2	2	9			3		1	4		1					1		1						3	4	anatum
bareilly																7			7											1				1	bareilly
berta				2			2			1			1																					1	1	berta
blockley				9		4	13		3	3	1	9	16	1		5	3	2	11			1	1			2		2		2			1	1	6	blockley
braenderup									2				2			1			1						1	1				1			1	7	9	braenderup
bredeney				1			1		1			3	4				1		1	1						1	1	1							1	bredeney
chester														1			1		2			1				1		1		2					3	chester
cholerae-suis v.k.																1			1														1		1	cholerae-suis v.k.
cubana																												1						1	2	cubana
derby				1			1		1	3	2	2	8			4			4									1	1	6	1				9	derby
enteritidis				44	1	9	54		9	7	11	10	37	6	1	19	4	3	33	1	1	1					3	1	3	2	4	13		5	10	38	enteritidis
give						1	1		1		2		3																		1		1		2	give
heidelberg	1		1	9			11		12	13	4	11	40	7	8	11	13	2	41			5					5	1	7	2	3	10		5	6	34	heidelberg
indiana				1			1			3			3	2					2													1		1		2	indiana
infantis				12		1	13		9	3	1	3	16	3	4	6	3		16			1			2	3	1	1		1		1		6	5	15	infantis
java				1		1	2		2	3	2		7			5		1	6	1		1				2										java
javiana														3					3															4	9	13	javiana
kentucky																1			1																	kentucky
litchfield									1	1		1	3		1				1	1							1							2		2	litchfield
livingstone												3	3									1					1									livingstone
manhattan				2			2		1	2		1	4	1	1			2	4			1				1		2	1	1			4	2	10	manhattan
meleagridis																																				meleagridis
miami																																	3	8	11	miami
mississippi																																	1		1	mississippi
montevideo				3		2	5		4	1	2	4	11			1	5		6	4					2	6				1			1		2	montevideo
muenchen									1	3			4			1			1						1	1				1		2	5	8	muenchen
newington									1				1																							newington
newport				2			2		6	4	4	2	16	3		10	7	1	21		1	1			4	6				1	1	7	2	17	28	newport
oranienburg				4			4		3	3	4		10	1	1		1	2	5	3	4				2	9	2	1						9	12	oranienburg
panama									2	2		1	5			3		1	4				1		3	4										panama
paratyphi B				22			22		7	1			8		2		1		3									1	1						2	paratyphi B
poona																																		3	3	poona
saint-paul	3			4		4	11		6	8	7	4	25	7		2	1	3	13	4	2	1				3	10	1	3		5	2		7	11	29	saint-paul
san-diego									1				1			1		1	2																	san-diego
schwarzengrund				3			3									1			1															4	4	schwarzengrund
senftenberg						1	1		1				1			2			2																		senftenberg
tennessee	1						1				1		1																							tennessee
thompson				1		2	3		5	3	1	6	15	4			3	1	8	1		1			1	3	1	1		4	2		1		9	thompson
typhi									1	1	1	2	5	4	4		2		10			2				2		3	1		3		5	2	14	typhi
typhi-murium		1	1	66	2	14	84	2	31	21	15	24	93	24	5	34	17	26	106	12	7	9	2	1	4	11	46	8	19	5	13	3	10		11	40	109	typhi-murium
typhi-murium v.c.				3		18	21					11	11				7		7		1						1									typhi-murium v.c.
urbana												1	1			1			1																	urbana
weltevreden									1				1																							weltevreden
worthington																																				worthington
untyp., group B		11			1		12		1	1			2				3		3			35				35			15						15	untyp., group B
untyp., group C1					1		1																													untyp., group C1
untyp., group C2		1					1															17				17			1					1	2	untyp., group C2
untyp., group D		2					2																						3						3	untyp., group D
untyp., group E																													1						1	untyp., group E
untyp. or unk.				1	1		2		1				1		1			5	6		1					1			1						1	untyp. or unk.
Total Common	5	15	2	192	6	57	277	3	117	88	60	100	368	67	28	119	72	51	337	28	18	78	4	1	4	30	163	16	47	33	46	4	52	-0-	64	145	407	Total Common
Total Other	-0-	0-	-0-	2	-0-	1	3	-0-	4	1	1	9	15	1	-0-	4	1	-0-	6	2	5	-0-	-0-	1	-0-	-0-	8	1	-0-	-0-	2	-0-	1	-0-	2	4	10	Total Other
Grand Total	5	15	2	194	6	58	280	3	121	89	61	109	383	68	28	123	73	51	343	30	23	78	4	2	4	30	171	17	47	33	48	4	53	-0-	66	149	417	Grand Total

**Includes July late reports
(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 315 isolations during August covering a 9 week period.

TABLE I (Continued)
GEOGRAPHIC DIVISION AND REPORTING CENTER

SEROTYPE	East South Central					WEST SOUTH CENTRAL					MOUNTAIN									PACIFIC					OTHER	AUG	% OF AUG	JAN-AUG 1967	%JAN-AUG 1967	JAN-AUG 1966	%JAN-AUG 1966	SEROTYPE
	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	TOTAL	TOTAL	TOTAL	TOTAL	TOTAL	TOTAL	
anatum	1		1		2		4		2	6				2					2			5		3	8		37	1.4	206	1.6	213	1.6	anatum
bareilly						1	1			2																	10	0.4	43	0.3	46	0.4	bareilly
berta							1			1												1		1	2		7	0.3	29	0.2	25	0.2	berta
blockley			3		3		2		5	7	2			2					4	5	2	6			13		75	2.9	394	3.0	410	3.2	blockley
braenderup		1			1		1		1	2												2			2		18	0.7	63	0.5	66	0.5	braenderup
bredeney							4		2	6												1		2	3		17	0.7	74	0.6	85	0.7	bredeney
chester	5	14			19																	1	1		2		27	1.1	73	0.6	80	0.6	chester
cholerae-suis v.k.																											2	0.08	12	0.09	18	0.1	cholerae-suis v.k.
cubana						1			1	2																	4	0.2	45	0.3	106	0.8	cubana
derby	1				1		3		1	4			1	1					2		1	5			6		35	1.4	213	1.6	255	2.0	derby
enteritidis		2			2		2	2	2	6							10		10			12			12		195	7.6	803	6.2	769	6.2	enteritidis
give			1		1		1		6	7																	14	0.5	48	0.4	57	0.4	give
heidelberg		2	2		4		3		7	10				1		8			9	8	2	16		2	28		182	7.1	1,178	9.1	1,080	8.4	heidelberg
indiana	1				1																						9	0.4	34	0.3	54	0.4	indiana
infantis	2				2		8	2	6	16	1			3					4		1	22		7	30		115	4.5	627	4.8	941	7.3	infantis
java		1			1		1			1			1						1			1			1		21	0.8	194	1.5	267	2.0	java
javiana			2		2	2	6	2	21	31																	49	1.9	210	1.6	147	1.1	javiana
kentucky																											1	0.04	21	0.2	15	0.1	kentucky
litchfield				1	1																	7			7		15	0.6	61	0.5	41	0.3	litchfield
livingstone									2	2																	6	0.2	44	0.3	17	0.1	livingstone
manhattan	2				2				1	1				1					1		1	4			5		30	1.2	201	1.5	69	0.5	manhattan
meleagridis																											0	0.0	5	0.04	4	0.0	meleagridis
miami																											11	0.4	40	0.3	50	0.4	miami
mississippi							3		2	5																	6	0.2	36	0.3	31	0.2	mississippi
montevideo		3			3		1	9	7	17												8		1	9		59	2.3	301	2.3	212	1.6	montevideo
muenchen		1	1		2		2	3	1	6				1					1			4		1	5		28	1.1	152	1.2	135	1.0	muenchen
newington																											1	0.04	32	0.2	31	0.2	newington
newport		3	2	4	9	4	17	9	39	69				2		1			3			58		1	59		213	8.3	766	5.9	772	6.0	newport
oranienburg							5	3	4	12						2	1		3			1			1		56	2.2	258	2.0	273	2.1	oranienburg
panama							1			1						2			2	2		4		4	10		26	1.0	127	1.0	168	1.3	panama
paratyphi B								2	3	5				1					1	1		1			2		43	1.7	91	0.7	104	0.8	paratyphi B
poona									1	1												4			4		8	0.3	34	0.3	25	0.2	poona
saint-paul							1		1	2						2			2	3		12	2		17		109	4.2	525	4.0	499	3.9	saint-paul
san-diego																				1		1			2		5	0.2	112	0.9	96	0.7	san-diego
schwarzengrund																						1			1		9	0.4	54	0.4	44	0.3	schwarzengrund
senftenberg							3		2	5																	9	0.4	40	0.3	39	0.3	senftenberg
tennessee		1	1		2				1	1														1	1		6	0.2	48	0.4	86	0.7	tennessee
thompson			1		1	1	2		2	5										2	3	13		1	19		63	2.5	254	2.0	411	3.2	thompson
typhi	2	2			4	7	3	2	2	14					1				1		3	12	4		19		69	2.7	471	3.6	473	3.7	typhi
typhi-murium	1	2	4		7	3	25	9	21	58	1			15		5			21	14	1	58		11	84		608	23.7	3,621	27.9	3,649	28.5	typhi-murium
typhi-murium v.c.																1			1		4				4		45	1.8	206	1.6	102	0.8	typhi-murium v.c.
urbana									1	1																	3	0.1	15	0.1	17	0.1	urbana
weltevreden																								5	5		6	0.2	48	0.4	25	0.2	weltevreden
worthington									1	1				1					1					1	1		3	0.1	20	0.2	27	0.2	worthington
untyp., group B				2	2	7			4	11					27				27		1		1		2		109	4.2	336	2.6	226	1.7	untyp., group B
untyp., group C1						2			2	4					6				6								11	0.4	117	0.9	68	0.5	untyp, group C1
untyp., group C2				4	4	7			6	13					13				13			1			1		51	2.0	107	0.8	33	0.3	untyp., group C2
untyp., group D						2			3	5											9				9		19	0.7	55	0.4	32	0.2	untyp., group D
untyp., group E				2	2										3				3								6	0.2	19	0.1	7	0.0	untyp., group E
untyp. or unk.				1	1				25	25																	37	1.4	130	1.0	48	0.4	untyp. or unk.
Total Common	15	32	18	14	79	37	100	43	185	365	4	-0-	2	30	50	21	11	-0-	118	36	28	261	8	41	374		2,488	97.0	12,593	97.0	12,475	96.6	Total Common
Total Other	-0-	-0-	2	-0-	2	4	5	1	7	17	-0-	-0-	-0-	-0-	2	-0-	2	-0-	4	1	-0-	8	-0-	4	13		78	3.0	395	3.0	440	3.4	Total Other
Grand Total	15	32	20	14	81	41	105	44	192	382	4	-0-	2	30	52	21	13	-0-	122	37	28	269	8	45	387		2,566		12,988		12,915		Grand Total

TABLE II

OTHER SALMONELLA SEROTYPES ISOLATED FROM HUMANS DURING AUGUST, 1966

SEROTYPE	REPORTING CENTER																										AUG TOTAL	8 MOS TOTAL	SEROTYPE
	ALA	ARK	CAL	CONN	DELA	FLA	GA	HAI	ILL	IOWA	LA	MASS	MICH	MINN	NJ	NM	NY-BI	NY-C	NC	OHIO	OKLA	PA	SD	TEX	UTAH	VA	WASH			
alachua			1				1																					1	8	alachua
atlanta																						4						4	13	atlanta
berlin								1																1				1	4	berlin
bovis-morbificans		1																										2	8	california
california																														
carrau									2																			2	2	carrau
cerro						1																						1	7	cerro
cholerae-suis	1				1																							2	3	cholerae-suis
eimsbuettel							1		1										1									3	18	eimsbuettel
emek									1																			1	1	emek
essen										4																		4	4	essen
gaminara											1																	1	6	gaminara
haarlem																		1										1	1	haarlem
habana						1																						1	11	habana
hartford														1														1	14	hartford
heilbron								1																				1	1	heilbron
ibadan			1																									1	2	ibadan
inverness						2																						2	3	inverness
johannesburg																									2			2	12	johannesburg
kunduchi																										1		1	1	kunduchi
lexington																	1											1	1	lexington
lomita																								1				1	3	lomita
madelia		1																				1						2	6	medelia
minnesota																								1				1	15	minnesota
mission	1																					1						2	15	mission
muenster																					1							1	17	muenster
new-brunswick														1														1	1	new-brunswick
new-haw																											1	1	2	new-haw
nigeria																									1			1	1	nigeria
norwich											1																	1	10	norwich
ohio																				1								1	3	ohio
orion															1							2						3	5	orion
oslo								2																				2	12	oslo
pullorum													1															1	1	pullorum
reading			6	1						1		2					1							1		1		13	40	reading
rubislaw											1																	1	17	rubislaw
saphra											1																	3	5	saphra
sieburg																	1											1	5	sieburg
simsbury																	1											1	2	simsbury
stanley																						1						1	5	stanley
untypable group F																1												1	1	untypable group F
untypable group G		2																							1			3	3	untypable group G
untypable group H																1												1	4	untypable group H
untypable group K											1																	1	1	untypable group K
TOTAL	2	4	8	1	1	4	2	4	4	5	5	2	1	2	1	2	4	1	1	1	1	9	1	7	2	2	1	78	395	TOTAL

NY-BI = Beth Israel; NY-C = City

NY-

NY-

NY-

TABLE III

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

Age (Years)	Male	Female	Unknown	Total	Percent	Cumulative Percent
< 1	144	137	8	289	26.0	26.0
1 - 4	126	105	2	233	21.0	47.0
5 - 9	64	57		121	10.9	57.9
10 - 19	46	43		89	8.0	65.9
20 - 29	47	58		105	9.5	75.4
30 - 39	34	37		71	6.4	81.8
40 - 49	21	41		62	5.6	87.4
50 - 59	29	29	1	59	5.3	92.7
60 - 69	25	20		45	4.1	96.8
70 - 79	9	20		29	2.6	99.4
80 +	1	7		8	0.7	100.1
Subtotal	546	554	11	1111		
Child (Unspec.)	10	8	1	19		
Adult (Unspec.)	8	10		18		
Unknown	642	669	107	1418		
Total	1206	1241	119	2566		
Percent of Total	49.3	50.7				

TABLE IV

REPORTED NONHUMAN ISOLATES BY SEROTYPE AND SOURCE, AUGUST 1967

SEROTYPE	chicken	turkey	duck	pigeon	macaw	pheasant	partridge	umbrella bird	penguin	road runner	avian	equine	bovine	ovine	porcine	canine	feline	guinea pig	rabbit	monkey	ape	chipmunk	tiger	animal, unknown	egg	egg yolk	dried egg	frozen egg	egg products	egg shell	raw hamburger	drink mix	dry milk	frozen corn	barbecue	raw shrimp	turkey loaf	egg & milk	poultry feed, unknown	feather meal	bone meal/ meat scraps	animal feed, unknown	fish meal	protein supplement, unknown	turtle	lizard	river water	turtle water	grease trap/ sewer line	milk drying plant environment	stock culture	dust	unknown	TOTAL	8 MOS. TOTAL	SEROTYPE
anatum	1	5						1							1													1																								12	320	anatum
bareilly																																										1												1	25	bareilly
binza																																1																					4	107	binza
blockley	5	1													1									1				1																				1						10	72	blockley
bonariensis																																																						1	1	bonariensis
braenderup																1																																						1	44	braenderup
bredeney	1																																										1												1	95	bredeney
california																																											1												1	10	california
carrau																						1																																	1	2	carrau
cerro																									1													6				1												8	52	cerro
chester		1																																	2																			3	39	chester
cubana																																																						2	183	cubana
decatur																												5																										5	5	decatur
derby		3													2																												3	3											1	13	379	derby
drypool																1																																							1	20	drypool
eimsbuettel																																							1	1	3	4	1												10	158	eimsbuettel
enteritidis	3																																																					4	42	enteritidis
give																												1																			1							2	34	give
heidelberg	28	10											2		1													1		1																							1	44	345	heidelberg
illinois																																								1														1	3	illinois
indiana							1				1																																											2	15	indiana
infantis	6	1										1				1														1																								1	13	224	infantis
irumu											1																																											1	2	irumu
java																																																							4	18	java
javiana		1																		1																					1													3	15	javiana
johannesburg																																									5												5	10	johannesburg
kentucky		1													1																												1	8											11	56	kentucky
livingstone																																									1												1	53	livingstone
meleagridis																																																4						4	21	meleagridis
miami																																																1						1	2	miami
minneapolis																																																1						1	33	minneapolis
montevideo		1																				2					3			1					3				1			5	1											17	197	montevideo
muenchen		1																												1												1												4	72	muenchen
new-brunswick																												1																										1	1	new-brunswick
newington	1																																																					2	131	newington
newport															1	2																																							7	97	newport
norwich																												1																										1	1	norwich
oranienburg														1													2		1														3	2											9	127	oranienburg
orion																																															1						1	19	orion
pullorum	2	1																										1																										4	31	pullorum
reading	2	4																																																			6	71	reading
saint-paul		3									2				1														2															1											11	255	saint-paul
san-diego	1	2																																																		1	4	60	san-diego
schwarzengrund	2									1																																												1	5	90	schwarzengrund
senftenberg		5																																																			2	1	17	155	senftenberg
siegburg																																																						1	23	siegburg
taksony		1																																																				1	3	taksony
tennessee		7																											4																									1	12	228	tennessee
thompson																											1							1																			1	4	98	thompson
typhi-murium	2	7	1		1				1		3	4	14		3	1	6		1		1		1	1				1	1							1											1		1				4		56	573	typhi-murium
typhi-murium v cop	1			1									1															7																				1						10	113	typhi-murium v cop
urbana																																																					1	11	urbana
worthington	2					1																						1																							1			5	93	worthington
untypable group B		1																1																																				3	14	untypable group B
untypable group D																														1		1					1											1						4	5	untypable group D
untypable		1																																																		1	2	untypable
TOTAL	57	57	1	1	1	1	1	1	1	1	7	5	17	1	11	6	6	1	1	1	1	1	1	1	1	6	15	16	1	4	1	1	1	2	3	1	7	4	2	29	27	1	2	10	2	9	7	1	6	6	2	8	358	5,357	TOTAL

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

TABLE V
REPORTED NONHUMAN ISOLATES BY SEROTYPE AND STATE, AUGUST, 1967

SEROTYPE	ARIZ	CAL	CONN	FLA	HAI	ILL	IND	IOWA	KAN	LA	MASS	MICH	MINN	MO	NEB	NJ	NM	OHIO	ORE	TENN	TEX	UTAH	VA	WASH	WISC	TOTAL	8 MOS. TOTAL	SEROTYPE
anatum		9											1								1		1			12	320	anatum
bareilly		1																								1	25	bareilly
binza						4																				4	107	binza
blockley		4					2	1	1				1												1	10	72	blockley
bonariensis									1																	1	1	bonariensis
braenderup									1																	1	44	braenderup
bredeney		1																								1	95	bredeney
california																		1								1	10	california
carrau		1																								1	2	carrau
cerro													1			1		6								8	52	cerro
chester								1												2						3	39	chester
cubana						1			1																	2	183	cubana
decatur									5																	5	5	decatur
derby		6				1	1					1	1					1						2		13	379	derby
drypool												1														1	20	drypool
eimsbuettel						1	8			1																10	158	eimsbuettel
enteritidis							3														1					4	42	enteritidis
give						1			1																	2	34	give
heidelberg		6					1		1			5	4						26		1					44	345	heidelberg
illinois							1																			1	3	illinois
indiana													1					1								2	15	indiana
infantis		4				1	4		1		1	1									1					13	224	infantis
irumu					1																					1	2	irumu
java			3			1																				4	18	java
javiana		1								1													1			3	15	javiana
johannesburg																		5								5	10	johannesburg
kentucky		10											1													11	56	kentucky
livingstone												1														1	53	livingstone
meleagridis		4																								4	21	meleagridis
miami		1																								1	2	miami
minneapolis		1																								1	33	minneapolis
montevideo						7	1		1	1			1					4			1	1				17	197	montevideo
muenchen		1				2															1					4	72	muenchen
new-brunswick									1																	1	1	new-brunswick
newington						1						1														2	131	newington
newport		1				3															3					7	97	newport
norwich																					1					1	1	norwich
oranienburg		2				2	2		3																	9	127	oranienburg
orion													1													1	19	orion
pullorum												3									1					4	31	pullorum
reading		3					2																1			6	71	reading
saint-paul		3				2			2			1						2						1		11	255	saint-paul
san-diego		4																								4	60	san-diego
schwarzengrund		2					2																	1		5	90	schwarzengrund
senftenberg		3					8						5					1								17	155	senftenberg
siegburg						1																				1	23	siegburg
taksony		1																								1	3	taksony
tennessee									4				8													12	228	tennessee
thompson		1							2		1															4	98	thompson
typhi-murium		32		1		4	2	1	1	1		4			2			3			4				1	56	573	typhi-murium
typhi-murium v cop	1		7									1							1							10	113	typhi-murium v cop
urbana						1																				1	11	urbana
worthington						1		1				2									1					5	93	worthington
untypable group B		2													1											3	14	untypable group B
untypable group D																	1		3							4	5	untypable group D
untypable		1																								1	2	untypable
TOTAL	1	105	10	1	1	34	37	4	26	4	2	21	25	1	2	1	1	24	30	2	16	1	3	4	2	358	5,357	TOTAL

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

TABLE VI
OTHER SEROTYPES REPORTED DURING 1967
FROM NONHUMAN SOURCES

SEROTYPE	MONTH(S)	REPORTING CENTER(S)	NUMBER OF ISOLATIONS
adelaide	Jun	Ill	1
alachua	Jan-Mar-May-Jul	Cal(10)	
	Jan-Apr	Conn(4)	
	Jan-Feb-Mar-Apr-May-Jun-Jul	Ind(32)	
	Jan	Iowa(4)	
	Jan-Mar	La(34)	
	Feb-Mar-May	Minn(5)	
	Feb	Utah(1)	
	Mar-Jun-Jul	Mich(6)	
	Jul	Mo(6)	
	Jul	Ohio(1)	103
albany	Jan	Ky(2)	
	Feb-Jul	Ill(3)	
	Feb-Mar	Miss(15)	
	Mar	Ark(1)	
	Mar	Ohio(2)	23
amager	Mar	Ill	4
arkansas	Mar	La	1
berlin	May	Pa	1
berta	Jan	Ill(1)	
	Feb-Jun-Jul	Ariz(11)	12
canoga	Apr	Ind(1)	
	Jul	Minn(1)	2
champaign	Feb	Minn(1)	
	Jul	Mich(2)	3
cholerae-suis	Jan	Cal(1)	
	Jan-Jun-Jul	Ohio(5)	
	Mar	Va(1)	7
cholerae-suis v kun	Jan-Mar	Ill(3)	
	Jan-Feb-Mar-Apr-May	Ind(12)	
	Feb-Mar	Iowa(3)	
	Feb	Mo(1)	
	Feb-Apr	Pa(2)	
	Mar	Ark(1)	
	Mar-May-Jul	Cal(3)	
	Mar	Miss(1)	26
corvallis	Jan-Feb	La	3
dublin	May-Jun-Jul	Cal(5)	
	May	NY-A(1)	6
duesseldorf	Mar	Ohio(8)	
	Apr	Mich(1)	9
duisburg	Jun	Ohio	1
eastbourne	Jan	Minn	1
gallinarum	Jan	Ark(2)	
	May-Jun	Pa(5)	7
gaminara	Apr-Jul	Cal(2)	
	Apr	Neb(1)	
	Jun	Tex(1)	
	Jul	Ill(1)	
	Jul	La(1)	6
gatow	Apr	Wash(4)	
	May	Kan(1)	5
grumpensis	Jan	La(2)	
	Jun	Mich(1)	3

TABLE VI (Continued)
OTHER SEROTYPES REPORTED DURING 1967
FROM NONHUMAN SOURCES

SEROTYPE	MONTH(S)	REPORTING CENTER(S)	NUMBER OF ISOLATIONS
habana	Apr	Fla	2
halmstad	Jun-Jul	Mich	5
hartford	Jan	Hai	1
hato	Jun	La	1
lexington	Jan-Mar-Apr	Ill(6)	
	Jan-Feb	La(2)	
	Jan	Ohio(1)	
	Mar-Jun	Cal(2)	
	May	Ariz(1)	12
litchfield	Feb-Mar-May	Va	3
madelia	Jul	DC	1
manchester	Jul	NJ	1
manhattan	Feb-Apr-May-Jun	Cal(4)	
	Feb-May	Ind(2)	
	Feb-Apr	La(3)	
	Apr	Kan(1)	
	Apr-May	Minn(2)	
	Apr	Pa(1)	
	Mar	Ohio(1)	
	May	Mich(1)	
	Jul	SD(1)	16
minnesota	Jan	Conn(1)	
	Jan-Feb	La(6)	
	Feb-Mar	Ill(2)	
	Feb	Utah(1)	
	Mar-Jul	Mo(2)	
	May	Ariz(6)	
	May	Iowa(4)	
	May	Minn(1)	
	Jun-Jul	Mich(4)	
	Jul	Miss(1)	
	Jul	Ohio(2)	30
mission	May	Ohio	1
mississippi	Feb	La	2
mokola	Feb	La	1
muenster	Jan	Ark(2)	
	Jan-Feb	La(4)	
ness-ziona	Jul	NC	2
new-haw	Feb	Iowa(1)	
	Apr	Ill(1)	2
okerara	Feb	La	1
oslo	Feb	Fla	2
panama	Jan-Feb-Mar-Apr	Ark(40)	
	Feb	DC(1)	
	Mar	Mo(1)	
	Jul	Mass(2)	44
paratyphi-B	Jun	Wash(1)	
	Jul	Mass(1)	
	Jul	Tenn(1)	3

TABLE VI (Continued)
OTHER SEROTYPES REPORTED DURING 1967
FROM NONHUMAN SOURCES

SEROTYPE	MONTH(S)	REPORTING CENTER(S)	NUMBER OF ISOLATIONS
pomona	Jan	La	1
poona	Jan	Fla(4)	
	Jan	Ill(1)	
	Jan	Neb(13)	
	Feb	Mo(1)	
	Apr	Mich(1)	
	Apr	Neb(4)	14
putten	Jun	Cal	1
redlands	Feb	La	1
rubislaw	Jan-Feb-Mar	La(3)	
	Apr	Kan(10)	
	Apr-Jul	Tex(2)	15
saphra	Jun	Tex	1
shubra	Feb	La	1
simsbury	Mar	Mo(1)	
	Apr	Kan(2)	3
stanley	Apr	La	1
sundsvall	Jul	Ariz	2
thomasville	Jan-Mar-May	Iowa(4)	
	Jan	La(1)	
	Mar-May	Ill(2)	
	Jun	Minn(1)	8
tucson	Feb	Cal	1
tuindrop	Feb	Ill(1)	
	Apr	Cal(1)	2
typhi	Jul	Cal	1
typhi-suis	Jan-May-Jun-Jul	Minn(4)	
	Mar	Cal(4)	8
vejle	Feb	La	1
westhampton	Jan-Mar	Ill(2)	
	Jan-Feb	La(9)	
	May	Minn(2)	
	Jun	SD(1)	
	Jul	Kan(5)	19
wichita	Feb	Utah	1
zanzibar	May	NJ(1)	
	Jul	DC(2)	3
TOTAL			444