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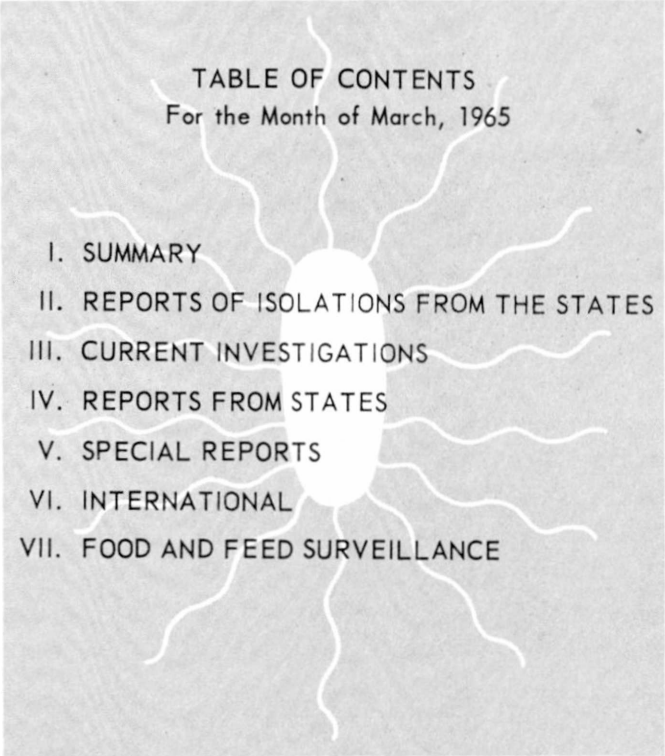
REPORT NO. 36  
APRIL 30, 1965

CDC  
COMMUNICABLE DISEASE CENTER

# SALMONELLA

## SURVEILLANCE

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For the Month of March, 1965

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# 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 to: Chief, Salmonella Surveillance Unit, Communicable Disease Center, Atlanta, Georgia, 30333.

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## I. SUMMARY

This report marks the 36th month of salmonella surveillance in the United States and presents data concerning 1,515 human isolations of salmonellae during March, for an average of 303 recoveries per week. This represented an increase of 3 per week over February and a decrease from March 1964 of 17. The first quarter of 1965 demonstrated 71 (1.6 per cent) fewer reported human recoveries than the same period last year. The difference can probably be accounted for by the Salmonella derby outbreak which resulted in 804 recoveries during the first quarter of 1964 as opposed to 175 for the same period this year. Salmonella derby accounted for an average of 62 recoveries per week during January, February, and March last year, 49 more than 1965. An editorial summarizing the S. derby problem to date appears under Special Reports in this issue.

There were 524 nonhuman isolations of salmonellae reported during March, representing an increase of 117 over February. In contrast to reported human recoveries, nonhuman recoveries during the first quarter this year accounted for more than the same period last year. This year, an average of 456 recoveries per month was reported, 78 (20.6 per cent) more than the first quarter of 1964.

## II. REPORTS OF ISOLATIONS FROM THE STATES

### A. Human

The seven most frequently reported serotypes during March were:

<u>Rank</u>	<u>Serotype</u>	<u>Number</u>	<u>Per Cent</u>	<u>Rank Last Month</u>
1	<u>S. typhi-murium</u> & <u>S. typhi-murium</u> <u>var. copenhagen</u>	466	30.8	1
2	<u>S. heidelberg</u>	110	7.3	3
3	<u>S. derby</u>	78	5.1	8
4	<u>S. infantis</u>	77	5.1	2
5	<u>S. typhi</u>	74	4.9	5
6	<u>S. newport</u>	69	4.6	6
7	<u>S. oranienburg</u>	<u>62</u>	<u>4.1</u>	<u>10</u>
Total		936	61.8	

Total salmonellae isolated (March) 1,515

The reappearance of S. derby among the seven most common serotypes this month is indicative of its apparent unpredictable nature and precludes any speculation of when, if indeed, it will ever revert to its level prior to March 1963 of 2 per cent of all salmonella recoveries. This month, New York and Pennsylvania accounted for about half of the S. derby isolations reported in the country.

Although S. oranienburg rarely appears on the list of the seven most frequently reported serotypes it is commonly found among the top ten.

As in previous months, the serotypes listed above accounted for almost two-thirds of all isolations reported.

The family case to total case ratio (.204) was consistent with past experience, as was the age and sex distribution - Table IV.

## B. Nonhuman

There were 524 isolations of salmonellae from nonhuman sources reported in March. This is an increase of 117 from the previous month. In spite of the fact that it has been necessary for the National Animal Disease Laboratory to limit their typing service to isolations from sick animals and feeds due to lack of personnel and space, the total reported isolations from nonhuman sources have remained above 500 for 6 of the past 9 months. There were 54 serotypes identified among those submitted from 34 states.

The seven most common types reported for March were as follows:

<u>Rank</u>	<u>Serotype</u>	<u>Number</u>	<u>Per Cent</u>	<u>Rank Last Month</u>
1	<u>S. typhi-murium</u> & <u>S. typhi-murium</u> <u>var. copenhagen</u>	109	20.8	1
2	<u>S. heidelberg</u>	62	11.8	2
3	<u>S. infantis</u>	38	7.3	Not Listed
4	<u>S. thompson</u>	25	4.8	Not Listed
5	<u>S. pullorum</u>	23	4.4	3
6	<u>S. cerro</u>	19	3.6	Not Listed
7	<u>S. blockley</u>	<u>14</u>	<u>2.7</u>	4
		290	55.4	

Of the 524 isolations, 403 (76.9 per cent) were from animals. Isolations from 4 species accounted for 340 (86.0 per cent) of these 403 isolations. These 4 species and the reported numbers of isolates in order of frequency are: chickens, 151 (37.5 per cent); turkeys, 129 (32.0 per cent); bovine, 33 (8.2 per cent); and swine, 27 (6.7 per cent). The remaining 121 isolations were from foods or animal feed ingredients. Sixty-two (51 per cent) of these were from eggs, egg products, or poultry products.

## III. CURRENT INVESTIGATIONS

Contamination of Easter Novelty Items with Salmonella Organisms. Reported by W. D. Schrack, M.D., Chief, Communicable Disease Control, Pennsylvania State Health Department, George H. Agate, M.D., State Epidemiologist, Michigan Department of Health, Monroe A. Holmes, D.V.M., Public Health Veterinarian, Oregon State Health Department, and Richard N. Collins, M.D., Investigations Section, CDC.

On Wednesday, April 7, 1965, the Pennsylvania State Health Department notified the Salmonella Surveillance Unit of a problem concerning contamination of an Easter novelty item with salmonella organisms. The item known in the trade as natural chicks and natural ducks consists of chick and duck skins which are processed and then stuffed for display in Easter baskets. This item is imported from Germany and/or Japan and it is distributed to novelty stores throughout the United States. In the initial report from Pennsylvania, 5 out of 7 samples, including both chicks and ducks, were found positive for Salmonella give. On April 9, 1965, telegrams were sent by the Salmonella Surveillance Unit to each of the 50 State and Territorial Epidemiologists relaying this information and indicating the potential hazard to health. Subsequently, Salmonella give has been recovered from natural ducks on sale in the State of Michigan. On April 19, 1965, the State of Oregon reported isolations of salmonella organisms from 3 out of 5 of the natural ducks imported from Japan. These have been identified as S. livingstone (2) and S. bareilly (1). Additional samples of this item are being examined in many of the State Laboratories and additional samples are being sent to the Veterinary Public Health Laboratory, CDC for

bacteriological examination. Two additional states, Connecticut and Rhode Island, have also reported salmonella isolations from this item. Four out of 9 natural ducks tested in Connecticut were positive; serotypes included S. give and S. enteritidis. Rhode Island has reported 6 of 12 samples positive for group C and E<sub>2</sub> organisms. The State of Alabama did not recover salmonella organisms from the natural ducks but reported toxic levels of insecticide in the dried skins. To date, no cases of human infection related to this item have been reported to the Salmonella Surveillance Unit. Any such reports from the states in the future will indeed be welcome.

In 1964, a total of 79 Salmonella give isolations were reported to the Salmonella Surveillance Unit out of a total of 21,113 salmonella isolates. During the first 3 months of 1965, a total of 25 isolates have been reported which compares to 17 isolates reported in the first 3 months of 1964. Nonhuman isolations of S. give in 1964 totalled 38, with the majority being from turkeys and chickens.

#### IV. REPORTS FROM THE STATES

##### A. Maryland

Salmonellosis on an Infant's Ward. Reported by J. W. Smith, M.D., and Larry G. Seidl, M.D., EIS Officers assigned to the Johns Hopkins University School of Medicine.

On January 14, the pediatric house staff in charge of the Children's Medical and Surgical Center, a 40-bed cubicle ward housing infants with medical and surgical diseases at the Johns Hopkins Hospital, noted an increased incidence of salmonellosis on their ward. The following report summarizes results of the investigations subsequently carried out.

To verify the increase, all pediatric enteric culture requests from September 1964 through January 1965 were reviewed. No salmonella had been isolated from in-patients in September or November. One isolation had been reported for October, 9 isolations in December, and 2 isolations in January. The patients are summarized below:

#### Salmonella - Children's Service

<u>CASE</u>	<u>INITIALS</u>	<u>LOCATION</u>	<u>DATE ADMITTED</u>	<u>DATE SALMONELLA CULTURED</u>	<u>SITE</u>	<u>SEROTYPE</u>
1	M.H.	C-5	10-19-64	10-26-64	rectal swab	<u>S. oranienburg</u>
2	T.J.	C-5	11-21-64	12-29-64	stool	<u>S. derby</u>
3	V.L.	C-5	11-24-64	12-29-64	stool	<u>S. thompson</u>
4	L.P.	C-5	12-2-64	12-9-64	stool	<u>S. thompson</u>
5	J.G.	C-5	12-7-64	12-11-64	stool	<u>S. thompson</u>
6	W.F.	C-5	12-8-64	1-12-65	stool	<u>S. thompson</u>
7	S.C.	C-5	12-11-64	12-15-64	stool	<u>S. thompson</u>
8	D.S.	C-5	12-15-64	12-15-64	CSF	<u>S. heidelberg</u>
9	P.S.	C-6	1-9-65	1-6(OPD)	stool	<u>S. typhi-murium</u>
10	S.B.	C-5	1-12-65	1-6(OPD)	blood	<u>S. typhi-murium</u>

Cases 3, 9, and 10 had been admitted with clinical salmonellosis. This left a total of 6 potentially hospital-acquired cases of salmonellosis in little over a month involving infants in one pediatric unit, all yielding salmonella organisms on or after the fifth hospital day. Additionally, S. thompson was the organism isolated from 5 of the 6 children.

The Enteric Laboratory of the Maryland State Health Department indicated that of the 40 separate isolates of salmonella other than S. typhi processed in December, 6 had been S. thompson, making this serotype second only to S. typhi-murium (11 isolations) in human recoveries in December.

The important clinical data concerning the 6 patients with probable hospital-acquired salmonellosis are summarized below:

Table 1

<u>PATIENT</u>	* <u>AGE/RACE/SEX</u>	<u>DATE</u> <u>ADMITTED</u>	<u>PRIMARY</u> <u>DIAGNOSIS</u>	<u>CULTURES</u>	<u>COMMENTS</u>
L.D.	12 W/F	12-2-64	Meningitis Pneumonia	12-9 stool 12-12 blood <u>S. thompson</u>	Died of pneumococcal meningitis 12-15
J.G.	12 W/M	12-7-64	Congenital biliary atresia	12-11 stool 12-12 blood 12-29 stool <u>S. thompson</u>	12/7 "3 large loose green-stools" abdominal surgery 1-12 Discharged 1-23
S.C.	16 W/F	12-11-64	Duodenal ulcer Anomaly of small intestines	12-15 stool 12-18 stool 12-29 stool <u>S. thompson</u>	History of painful BM's on admission. Discharged 1-4
V.L.	7 C/F	11-24-64	Fracture of femur	12-29 stool <u>S. thompson</u>	Asymptomatic Discharge 12-31
W.E.	7 C/M	12-8-64	Hemophilus influenzae meningitis	1-12 stool <u>S. thompson</u>	
T.J.	6 W/F	11-21-64	Biliary atresia	12-29 stool <u>S. derby</u>	Watery brown guaiac positive stools 12-10

\*Months

Case number 2, T.J., from whom S. derby was recovered on her 39th hospital day during the ward culture survey of 12-29, was probably not related to this outbreak. She remained free of any clinical evidence of salmonellosis throughout her stay in the hospital.

The first known case, L.D., was a small child with signs of listlessness, hypotonia, as well as chronic vomiting. She was dehydrated on admission. Cerebrospinal fluid cultures on December 9 and December 12 were negative and examination of the cerebrospinal fluid, though complicated because of bloody taps, did not indicate meningitis. At post-mortem, however, acute pneumococcal meningitis, bilateral bacterial pneumonia and acute fatty liver were found. Post-mortem cultures were negative for S. thompson.

Case number 5, J.G., had transient room contact with the index case for part of one day, but otherwise cannot be geographically related to the other S. thompson cases.

On January 21, a rectal swab survey of all personnel and patients on the ward in question was undertaken, which may be summarized as follows:

<u>GROUP</u>	<u>STRENGTH</u>	<u>OBTAINED</u>	<u>POSITIVE FOR SALMONELLAE</u>
House staff	16	11	0
Medical students	8	7	0
Graduate nurses	19	18	0
Aides and clerks	27	25	0
Nursing instructors	6	6	0
Student nurses	17	14	0
Housekeeping	13	12	0
Formula room	10	10	0
Patients	40	39	3
	165	148	3

None of the cultures from personnel revealed salmonella. The initial survey revealed 2 previously unsuspected cases of salmonellosis; 1 was positive for S. tennessee and 1 was positive for both S. thompson and S. tennessee. An additional culture survey during the second week of February identified 2 additional excretors of S. thompson. Pertinent data on these additional cases are shown below:

Table 2

<u>PATIENT</u>	<u>AGE/RACE/SEX</u>	<u>DATE ADMITTED</u>	<u>PRIMARY DIAGNOSIS</u>	<u>CULTURES</u>	<u>COMMENTS</u>
V.M.	F	1-14-65		1-19 rectal <u>S. tennessee</u>	No relation to <u>S. thompson</u> case
T.M.	M	12-11-64	Congenital heart <u>disease.</u> First cardiac operation. Second cardiac operation	1-19 rectal <u>S. tennessee</u> <u>S. thompson</u> 2-16 rectal <u>S. thompson</u>	
S.G.	13 day W/M	1-5-65	Coarctation of aorta	2-5-65 <u>S. thompson</u>	Discharge 2-10-65
J.B.	1 day W/M	1-10-65	Imperforate anus	2-11-65 <u>S. thompson</u>	Still in hospital with guaiac posi- tive stools
D.B.	17 mo. W/F	1-11-65	Intradural lipoma	2-9-65 <u>S. thompson</u>	Discharge 2-24-65

It is of interest to note that of the 9 excretors of S. thompson, 7 were either on antibiotics at the time of positive culture or had previously received a course of antibiotics. Penicillin was the antibiotic used in 6 of the 7 cases. Three of the 9 patients with S. thompson had primary gastrointestinal disease, 6 of the 9 had major surgery prior to isolation of salmonellae.

Thus, a total of 9 excretors of S. thompson were identified on the single pediatric ward. The "epidemic curve" for these excretors is prolonged, evidence against a common source outbreak. Careful review of the dietary histories failed to reveal any suspicious items. It is postulated that the mode of spread in this outbreak may have been by person to person spread through personnel caring for infected patients and spreading to non-infected patients.

Surveillance is being continued by culturing all infants on admission and all patients on this particular ward once a week.



## B. Pennsylvania

Brain Abscess Due to Salmonella heidelberg. Reported by Herbert R. Domke, M.D., Director, Allegheny County Health Department, and Joshua Fierer, M.D., EIS Officer assigned to Allegheny County.

A 70-year-old white male was admitted to Allegheny General Hospital on July 6, 1964, because of severe pain in the left hip and knee. An unexplained temperature elevation to 101°F. was noted. The diagnosis of severe osteoarthritis of the knee was made and the patient was placed in traction and treated with analgesics. He was symptomatically improved with disappearance of fever after 48 hours of hospitalization. On July 29, the patient developed a low-grade temperature elevation and was notably lethargic. By August 1 he was unarousable and had a temperature of 101°. A lumbar puncture was performed and revealed turbid, frankly purulent spinal fluid. Laboratory examination of the spinal fluid revealed 35,000 white blood cells per cubic millimeter; protein, 469 milligrams per cent; and glucose, 36 milligrams per cent. No organisms were seen on direct smear. The patient appeared moribund and was treated with large doses of intravenous chloramphenicol and penicillin and intramuscular streptomycin. After 4 days of therapy, a repeat spinal puncture again revealed frankly purulent fluid. Gram-negative rods were seen on direct smear and therapy was switched to sulfadiazine and chloramphenicol intravenously. The patient remained unresponsive and subsequently experienced grand mal seizures. He expired on August 11.

On August 13, the initial spinal fluids were reported positive for Salmonella heidelberg.

At autopsy, the patient was found to have a tumor of the stomach which had ulcerated and caused localized peritonitis. The spinal fluid was turbid but the meninges were not inflamed. The base of the brain was coated with thick pus. The brain was opened and all ventricles were filled with pus. There was an abscess involving the left basal ganglia area that communicated with the ventricles. Post-mortem cultures of the abscess grew only Staphylococcus aureus.

Editor's Comment: Reports of brain abscesses due to salmonella organisms are quite rare. When present, they are frequently associated with a salmonella endocarditis. The question of whether in this particular patient the infection was hospital-acquired remains uncertain. In any case, the history of intensive treatment on admission with antibiotics and the presence of a co-existing serious malignancy places a patient in the readily identifiable high risk hospital group for salmonella infection.

## C. Washington

Salmonella typhi-murium Outbreak. Reported by E. A. Ager, M.D., Chief of Epidemiology, Washington State Department of Health, Leland Harris, M.D., Yakima County Health Officer, and Kenrad Nelson, M.D., EIS Officer assigned to Washington State Department of Health.

In October 1964, an increase in the number of human isolates of salmonella was reported from Yakima County, Washington. Nine of the 10 isolates reported were Salmonella typhi-murium. An investigation revealed that the cases were concentrated among Mexicans and thus a common source outbreak was suspected. It was learned that at least one member of each affected family had attended a wedding banquet during early October. Food histories were obtained from 55 of the estimated 150 persons attending the banquet. Twenty-two of these reported a febrile diarrheal illness with an onset during the week following the banquet. Three foods were eaten with sufficient frequency, a possible cause for the outbreak: green salad, pork chili, and

chicken with chili. One bit of evidence suggested that the chicken was probably responsible for the outbreak. In a family of 10, the only person who became ill had eaten chicken. None of the other members, some of whom attended the banquet, consumed this item.

The chickens served at the banquet had been raised, killed, and cleaned locally by a large co-operative prior to being sold to the supermarket. Peritoneal swabs were obtained from three chickens obtained from the same market and were all negative for salmonellae.

No epidemiologic association could be established between the cases of S. typhi-murium infection occurring among other persons in Yakima County.

## V. SPECIAL REPORTS

### A. Editorial - Salmonella derby Outbreak: A Momentous Momentum!

The outbreak of hospital-associated infections due to Salmonella derby represents an unusual chapter in the history of salmonellosis. Its presence warned hospitals, physicians, public health personnel, and industry of the importance of salmonellosis as a hospital-acquired infection. The implication of eggs as the initial source of the epidemic directly activated an interest by the poultry and egg industry which is leading to major advances in the control of salmonella contamination of these consumer goods. A Poultry and Egg National Board Salmonella Committee was established with goals of correlating research, co-ordinating and initiating control programs, and disseminating pertinent new information within the industry (See SSR Number 30). More is to come. Indirectly the outbreak has stimulated other industries to introspect their need for "cleaning house." A momentum has been generated which by sheer force will hopefully write a new page in the control of salmonellosis. In addition to stimulating interest and action, the epidemic has focused attention on deficiencies in the knowledge and control of hospital-acquired salmonellosis.

The epidemic pattern of this outbreak itself is an enigma. Prior to April 1963, S. derby represented about 2 per cent of the total number of salmonella isolations reported to the Communicable Disease Center. During the peak of the epidemic it represented from 12 to 22 per cent of the total isolations reported, being second only to S. typhi-murium. Presently less than 6 per cent of the total isolations are accounted for by S. derby. Thus, for practical purposes, the epidemic has lasted 2 years and perhaps is not yet over. The epidemic curve based on number of reported isolations is depicted in Figure 2. Although few answers exist to the questions which have arisen from studying this epidemic curve, the questions themselves are noteworthy. What was the cause of the secondary peak in the epidemic curve? Why did the outbreak last so long, as evinced both by the curve representing the epidemic as a whole and by the behavior of the outbreak within many of the involved hospitals? How do the interactions of host, environment, and organism differ from other outbreaks of salmonellosis which have behaved differently? One such example is the outbreak of S. reading infection in 1957 which involved over 300 people in 26 states but only lasted for approximately 10 months. Another example is the outbreak of S. hartford infection in 1961 which involved 145 reported cases in 18 states, but lasted less than 6 months. Why recently has the epidemic curve dropped so rapidly? That this reflects more than a decline in interest and reporting is suggested by several hospitals almost simultaneously noting a decrease in number of cases of hospital-acquired infection. Moreover, that it does not solely reflect a compromise of the bacterium's virulence such that the organism is now commensal is suggested by the drop in the total number of salmonella excretors in one hospital where all patients were cultured periodically.

Several phenomena observed during the study of this outbreak should be re-emphasized. Control and therapeutic measures employed by hospitals and physicians were for the most part disappointing. Antibiotic therapy had minimal effect upon the clinical disease and some evidence suggests that the use of antibiotics in infected patients prolonged their carrier state. The organism displayed a high degree of communicability (infectivity) while for the most part causing a mild clinical syndrome of gastroenteritis or asymptomatic carrier state. It has been suggested that the clinical virulence was sacrificed in favor of epidemiologic virulence or the capacity to persist and disseminate.

The Salmonella derby story has not been concluded. Before a conclusion is realized the unanswered questions must be explained. Until then the momentum generated will turn many pages in the yet unwritten history of salmonellosis.

B. Announcement: Conference on Further Processing of Poultry and Eggs.

Dr. A. W. Brant, Food Technologist, University of California Agricultural Extension Service announces a conference on further processing of poultry and eggs to be held at the University of California in Davis, California, June 17-18, 1965. Subjects will range from influence of processing on texture and flavor of poultry meat to a discussion of the pet food industry.

All inquiries should be directed to Dr. Brant, Department of Food Science and Technology, University of California, 209 Roadhouse Hall, Davis, California.

VI. INTERNATIONAL

Report of Salmonella Isolations Typed in the Salmonella Center, Hygiene Institute, Hamburg, Germany During the Third Quarter of 1964.

During the third quarter of 1964, 830 isolations of salmonellae were identified at the Institute of Hygiene in Hamburg, Germany. Of these, 569 (68.6 per cent) were from human cases and carriers. The most common types recovered from human specimens were; S. typhi-murium, 121; S. paratyphi B, 96; S. typhi, 50; S. enteritidis, 27; S. panama, 25; and S. oranienburg, 24.

With the exception of S. paratyphi B and S. panama, these types are among the ten most commonly reported in the United States. While not uncommon in this country, both S. paratyphi B and S. panama are seen quite frequently in Germany, England and the Netherlands.

Of the 261 nonhuman isolations identified, 100 were from animals, 97 from food and feed and 64 from water.

VII. FOOD AND FEED SURVEILLANCE

A. Results of the Examination of Fresh and Frozen Chicken for Salmonellae.

Additional samples of fresh poultry meat obtained from local retail stores have been examined for salmonellae during the past month (See SSR Number 33, page 8). Although the samples were purchased in 6 different stores, the chickens were processed in 2 large poultry processing plants. The same procedure described previously (SSR number 33, page 8) was used to prepare and culture these samples.

Ninety, 30 gram samples were cultured from 30 packages of cut chicken parts and salmonellae were recovered from 12 (13.3 per cent) of the individual samples and from 6 (20.0 per cent) of the packages. Serotypes isolated included S. infantis, 2 packages; S. blockley, 3 packages; S. montevideo, S. typhi-murium, and S. heidelberg from 1 package each. Two samples were positive for two serotypes each.

Frozen chicken and chicken parts have also been obtained from retail stores and examined for salmonellae. These products were produced in 3 different states. Three frozen Cornish hens were cultured and of nine samples taken, salmonellae were found in eight. The serotypes recovered included S. typhi-murium, 1; S. blockley, 4; and S. infantis, 3.

No salmonellae were isolated from 30 samples cultured from 3 packages of frozen chicken breasts, 2 packages of legs, and 5 packages of livers.

Results of the Examination of Fresh Chicken Meat  
for Salmonellae

Store	Source	Number and Description of Packages	Number Positive Packages	Individual Samples Examined		Serotype
				Number	Positive	
I	A	2 pkg. legs	0	6	0	
		1 pkg. breasts	0	3	0	
		1 pkg. thighs	0	3	0	
		1 pkg. wings	1	3	2	<u>S. infantis</u> (2)
II	B	1 pkg. necks	1	3	1	<u>S. blockley</u>
		1 pkg. wings	0	3	0	
		2 pkg. legs and thighs	0	6	0	
		1 pkg. legs	0	3	0	
III	A	2 pkg. legs	1	6	2	<u>S. blockley</u> (2) <u>S. montevideo</u> (1)
		2 pkg. thighs	1	6	3	<u>S. blockley</u> (3)
		1 pkg. breasts	0	3	0	
IV	B	3 pkg. thighs	0	9	0	
		1 pkg. legs	0	3	0	
		1 pkg. breasts	0	3	0	
V	A	4 pkg. thighs	2	12	4	<u>S. typhi-murium</u> (1) <u>S. heidelberg</u> (3) <u>S. infantis</u> (1)
		1 pkg. legs	0	3	0	
VI	A	3 pkg. wings	0	9	0	
		1 pkg. breast	0	3	0	
		1 pkg. legs				
		and thighs	0	3	0	
Total		30	6	90	12	

Results of the Examination of Frozen Chicken Meat  
for Salmonellae

Store	Source	Number and Description of Product	Number of Positive Packages or Hens	Individual Samples Examined		Serotype
				Number	Positive	
II	C	3 whole cornish hens	3	9	8	<u>S. typhi-murium</u> (1) <u>S. blockley</u> (4) <u>S. infantis</u> (3)
VI	D	3 pkg. breasts	0	9	0	
		2 pkg. legs	0	6	0	
VII	E	5 pkg. livers	0	15	0	
Total		13	3 Hens	39	8	

B. Abstract: Incidence of Salmonellae in Dressed Broiler-Fryer Chickens.  
Margy Woodburn. Applied Microbiology 12:492-495, 1964.

Salmonellae were isolated from 72 (27 per cent) of 264 broiler-fryer dressed chickens purchased in retail stores in the Lafayette, Indiana area in 1963. Meat from the tail area and giblet portions were cultured. Equal numbers of dressed whole and cut-up birds were positive for salmonellae. Thirteen different serotypes were identified. The most common were S. infantis, S. reading, S. blockley, and S. heidelberg. A larger number of positive specimens were obtained from poultry processed in-state than that processed out-of-state except during the fall season when a marked increase occurred in the samples from the latter sources.

Figure 1.

REPORTED HUMAN ISOLATIONS OF SALMONELLAE  
IN THE UNITED STATES

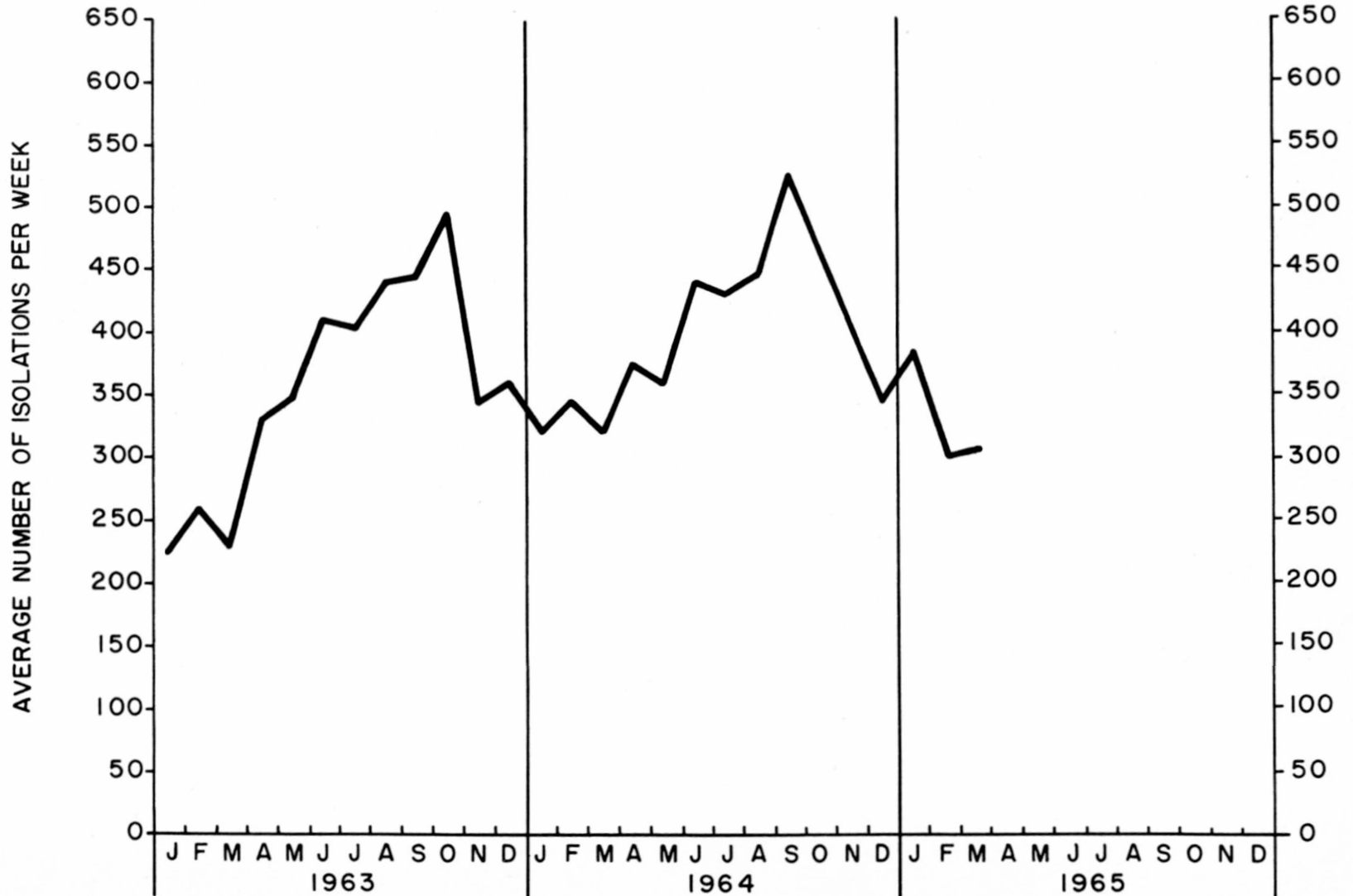


TABLE I  
SALMONELLA SEROTYPES ISOLATED FROM HUMANS DURING MARCH 1965

SEROTYPE	REGION AND REPORTING CENTER																			
	NEW ENGLAND							MIDDLE ATLANTIC						EAST NORTH CENTRAL						
	MAINE	NH	VT	MASS	RI	CONN	TOTAL	NY-A	*NY-BI	NY-C	NJ	PA	TOTAL	OHIO	IND	ILL	MICH	WIS	TOTAL	
alachua				1			1	2	2	1			5			2	1		3	
anatum												1	1							
bareilly											1									
berta																				
binza																				
blockley								1				1	2		1	2	1	2	6	
bovis-morbificans									1				1							
braenderup																				
bredeney																				
california																				
cerro					1		1					1	1							
chester		1				2	3				1		1			1	3		4	
cholerae-suis v kun								1					1			1			1	
cubana				5			5	4	1				5			1	4	3	8	
daytona																				
derby				7		1	8	12	7	3	1	16	39	5		2	3	1	11	
dublin																				
enteritidis				12			12	3	2		2	5	12	2	1	7	1	1	12	
fayed																				
fresno																				
gaminara												2	2							
give																				
hartford																				
heidelberg				7	1	4	12	6	1	4	6	5	22	7		6	17	2	32	
indiana				2			2				1	4	5			1			1	
infantis				2		1	3	5		1	6	4	16	1	1	6	1	4	13	
irumu																				
java								3					3			3			3	
javiana															1				1	
kottbus																				
litchfield									2				2							
livingstone																				
madelia												1	1							
manhattan																	1		1	
meleagridis																				
miami																				
mission																				
mississippi																				
montevideo				1		1	2	1		2	2	3	8	3		2	1	2	8	
munchen								1	1				2	1	1	1			3	
muenster																				
newington				1			1									3			3	
newport				3	2		5	1	1		3	1	6		3	9	1	2	15	
norwich																				
oranienburg		1		2		1	4	3	2		4	1	10	2	1	1	6	2	12	
oslo																				
panama																2		2	4	
paratyphi A										1			1							
paratyphi B									1							1	2		4	
poona											2		3	1			2		2	
reading														1					1	
remo																				
saint-paul				1			1		1	1		6	8		1	2	3	2	8	
san-diego												1	1							
schwarzengrund								3	2	1			6	5		2			7	
senftenberg																5			5	
tennessee				2			2				1		1			1	1		2	
thompson				1		1	2					2	2	3		3		1	8	
typhi								4		3	3	2	12	7	2			1	9	
typhi-murium				29	6	15	50	32	11	14	23	30	110	18	9	17	14	7	65	
typhi-murium v cop											4		4				3		3	
weltrevreden																				
worthington					1		1									3	1		4	
Untypable Group B															1				1	
Untypable Group C-1																				
Untypable Group C-2																				
Untypable Group D																				
Untypable Group O																				
unknown		1					1			1			1					4	4	
TOTAL	-0-	3	-0-	76	11	26	116	82	35	32	60	85	294	56	21	85	67	35	264	

New York (A-Albany, B-Beth Israel Hospital, 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 N.Y.-B.I.





TABLE I (Continued)

SERO TYPE	REGION AND REPORTING CENTER																			
	EAST SOUTH CENTRAL					WEST SOUTH CENTRAL					MOUNTAIN									
	KY	TENN	ALA	MISS	TOTAL	ARK	LA	OKLA	TEX	TOTAL	MONT	IDA	WYO	COLO	NM	ARI	UTAH	NEV	TOTAL	
alachua																				
anatum							4			4										
bareilly							2			2										
berta									1	1										
binza																				
blockley							2		2	4										
bovis-morbificans								1	1	1										
braenderup							1	1		2										
bredenev																				
california																				
cerro																1			1	
chester							1			1										
cholerae-suis v kun																				
cubana									1	1										
daytona		1			1															
derby								1		1	2									
dublin								1												
enteritidis	1	2			3			2		2						1			1	
fayed																				
fresno		1			1															
gaminara									2	2										
give				1	1		1			1										
hartford																				
heidelberg		1	1		2	1		1		2	1	1			2				4	
indiana																				
infantis	1	2	1		4	1	1		3	5			1			2			3	
irumu																				
java								1		1										
javiana									1	3	4									
kottbus																				
litchfield																				
livingstone									2	2				1					1	
madelia																				
manhattan																				
meleagridis																				
miami																				
mission																				
mississippi								1		1										
montevideo		2			2		4		5	9										
muenchen									1	1										
muenster																				
newington														1					1	
newport						1	3		5	9					4				4	
norwich									1	1										
oranienburg	1				1	1	2		1	4			1	5	1				7	
oslo																				
panama									1	1										
paratyphi A																				
paratyphi B																				
poona															1	1			1	
reading																				
remo																				
saint-paul																	1		1	
san-diego														1					1	
schwarzengrund																				
senftenberg																				
tennessee					1		2		1	1									1	
thompson	1				6	4	3		4	2						1			1	
typhi		1		5	6				4	11					2				2	
typhi-murium	1	12	1	1	15		9	4	6	19		1	2	2	2	2			7	
typhi-murium v cop								2		2					1				1	
weltevreden																				
worthington																				
Untypable Group B				1	1										6				6	
Untypable Group C-1															3				3	
Untypable Group C-2																3			3	
Untypable Group D																				
Untypable Group O																				
unknown																				
<b>TOTAL</b>	5	22	4	7	38	10	42	6	40	98	1	3	-0-	11	14	13	7	1	50	

TABLE I (Continued)

REGION AND REPORTING CENTER						OTHER VI	TOTAL	PERCENT OF TOTAL	THREE MONTH TOTAL	% THREE MONTH TOTAL	1964 3 MO. TOTAL	% 1964 THREE MONTH TOTAL	S E R O T Y P E
P A C I F I C													
WASH	ORE	CAL	ALASKA	HAWAII	TOTAL								
1		2 1		4	7		1		1		50		alachua
					1		30		67		14		anatum
							6		18		8		bareilly
							1		9		1		berta
									1		1		binza
3 2		1 1 1			1		16	1.1	77	1.8	87	2.0	blockley
					1		1		1		2		bovis-morbificans
							6		16		11		braenderup
					4		12		26		75		bredeney
					2		2		2		6		california
1	1	4 1 2		3	9		2		2		23		cerro
					1		12		34		9		chester
					2		6		11		18		cholerae-suis v kun
							1		27		42		cubana
									1		1		daytona
2		9		4	15		2		2		17		gaminara
							6		25		3		give
							1		5		269		hartford
							110	7.3	325	7.6	6.2		heidelberg
							9		12		indiana		
2	1	13 2		4	20		77	5.1	257	6.0	207	4.8	infantis
					2		1		3		52		irumu
							10		26		26		java
							5		30		26		javiana
							1		5		5		kottbus
2		3		5	8		4		27		13		litchfield
							5		9		52		livingstone
							2		2		5		madelia
							10		29		5		manhattan
							1		4		5		meleagridis
1	1	1		2	1		4		19		11		miami
							2		3		7		mission
							2		7		94	2.2	mississippi
					1		43	2.8	128	3.0	52		montevideo
							14		40		52		muenchen
2		1 16 11		1	1		1		1		12		muenster
					18		6		12		138	3.2	newington
							69	4.6	192	4.5	138		newport
							2		4		133	3.1	norwich
					12		62	4.1	150	3.5	133		oranienburg
1	1	1		1	1		1		2		3		oslo
					3		8		31		50		panama
							1		3		22		paratyphi A
							9		40		9		paratyphi B
							4		13		9		poona
1 1	3	4 56 4		3	8		1		2		9		reading
							1		1		85	2.0	remo
							42	2.8	164	3.9	33		saint-paul
							57		101		16		san-diego
							7		23		16		schwarzengrund
18	1 2 7	2 4 11 68		2	2		8		18		15		senftenberg
					1		19	1.3	47	1.1	94	2.2	tennessee
					4		32	2.1	88	2.1	67	1.6	thompson
					13		74	4.9	214	5.0	150	3.5	typhi
					95		452	29.8	1,207	28.4	1,187	27.5	typhi-murium
18		1		4 2	4		14		51		40		typhi-murium v cop
					2		4		10		6		weltvedren
							7		12		20		worthington
							22		51		56		Untypable Group B
							3		20		15		Untypable Group C-1
34	17	224	-0-	35	2		7		20		3		Untypable Group C-2
					1		2		3		3		Untypable Group D
							2		2		7		Untypable Group O
							1		11		25		unknown
					310	-0-	1,515		4,251		4,322		

(VI - Virgin Islands)

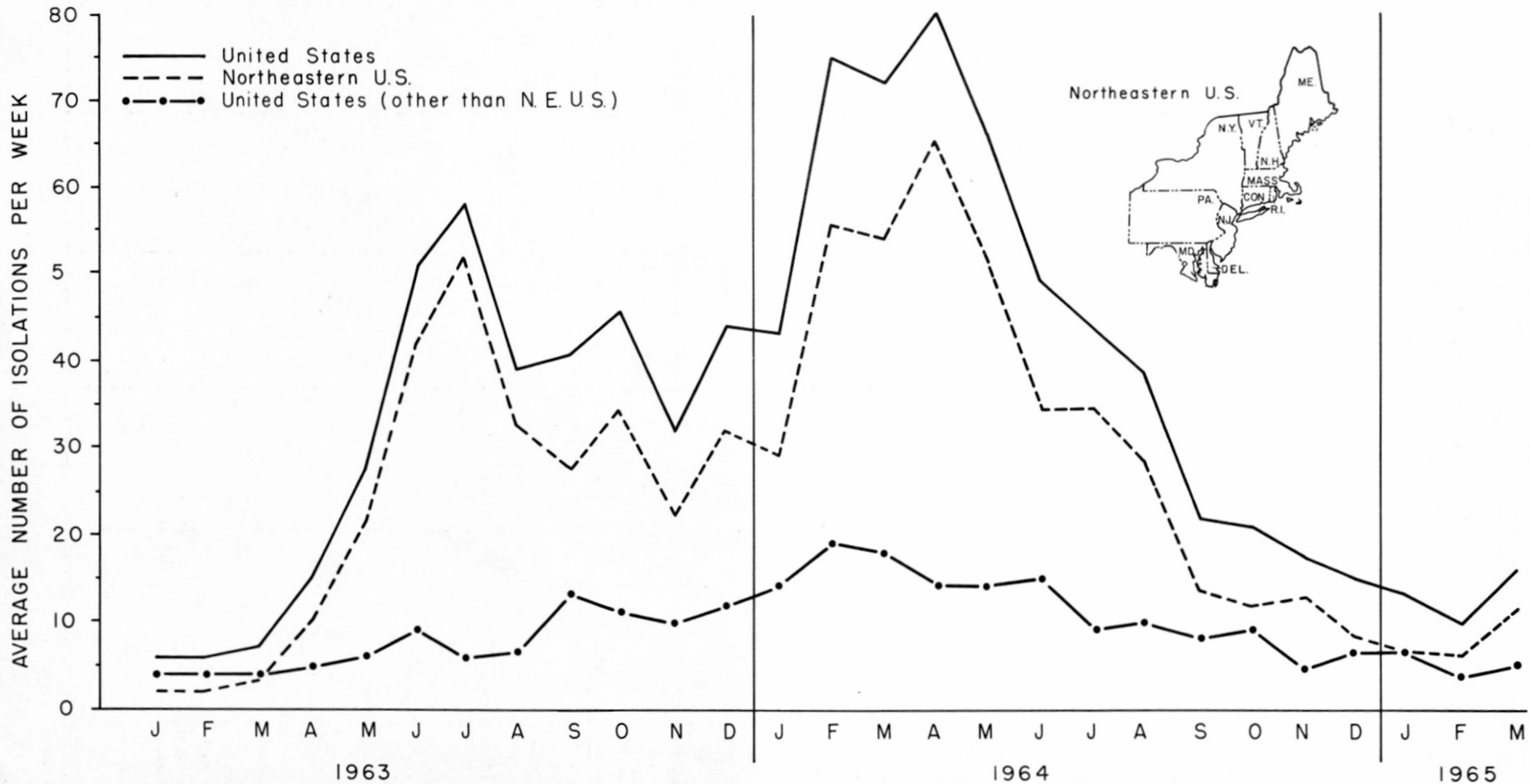
TABLE I-A

SEROTYPES REPORTED FROM HUMANS  
PREVIOUSLY DURING 1965 BUT NOT IN MARCH

SEROTYPE	MONTH(S)	REPORTING CENTER(S)	NUMBER OF ISOLATIONS
albany	Jan-Feb	Ill(2)	3
	Feb	Conn(1)	
blegdam	Feb	SD	
carrau	Jan	La	
cholerae-suis	Jan	Ohio	
colorado	Jan	Hai	1
corvallis	Feb	Hai	1
denver	Feb	La	1
duesseldorf	Jan	Ohio	1
essen	Feb	Colo	1
florida	Jan	Fla	1
heilbron	Jan	Mo	1
kaapstad	Feb	Colo	1
kentucky	Jan	Calif(1)	3
	Jan-Feb	Hai(2)	
lexington	Feb	Calif	1
luciana	Jan	Ariz	1
mishmar- haemek	Feb	Calif	1
ohio	Feb	Conn(1)	2
		Wisc(1)	
pensacola	Feb	Okla	1
rubislaw	Jan	La	2
siegburg	Jan	Ill	1
stanley	Jan	Kan	1
taksony	Jan	NY-BI	1
thomasville	Jan	NJ	1
urbana	Jan	Ill	1
virchow	Jan	Colo	1
westhampton	Feb	Mass	1
<b>TOTAL</b>			<b>32</b>

Figure 2

REPORTED ISOLATIONS OF SALMONELLA DERBY FROM HUMANS  
IN THE UNITED STATES



**TABLE II**  
**REPORTED ISOLATIONS OF S. TYPHI, BY PATIENT STATUS - MARCH 1965**

STATE	REPORTED TO SALMONELLA SURVEILLANCE UNIT							CLINICAL CASES REPORTED IN MMWR		
	Cases		Carriers		Unknown		Total		Mar.	1965 Cuml.
	Mar.	1965 Cuml.	Mar.	1965 Cuml.	Mar.	1965 Cuml.	Mar.	1965 Cuml.		
<b>UNITED STATES</b>	14	38	31	80	29	96	74	214	39	90
<b>NEW ENGLAND</b>	-	-	-	-	-	3	-	3	1	1
Maine	-	-	-	-	-	-	-	-	-	-
New Hampshire	-	-	-	-	-	-	-	-	-	-
Vermont	-	-	-	-	-	-	-	-	-	-
Massachusetts	-	-	-	-	-	1	-	1	1	1
Rhode Island	-	-	-	-	-	2	-	2	-	-
Connecticut	-	-	-	-	-	-	-	-	-	-
<b>MIDDLE ATLANTIC</b>	4	7	5	9	3	7	12	23	6	11
New York	4	7	3	5	-	3	7	15	4	9
New Jersey	-	-	-	-	3	4	3	4	1	1
Pennsylvania	-	-	2	4	-	-	2	4	1	1
<b>EAST NORTH CENTRAL</b>	-	3	8	14	1	5	9	22	5	12
Ohio	-	1	7	10	-	1	7	12	1	3
Indiana	-	-	1	3	1	2	2	5	2	4
Illinois	-	-	-	-	-	2	-	2	-	1
Michigan	-	2	-	1	-	-	-	3	2	3
Wisconsin	-	-	-	-	-	-	-	-	-	1
<b>WEST NORTH CENTRAL</b>	-	1	6	8	4	7	10	16	-	3
Minnesota	-	-	-	1	-	-	-	1	-	-
Iowa	-	-	-	-	-	-	-	-	-	-
Missouri	-	1	6	7	-	3	6	11	-	3
North Dakota	-	-	-	-	-	-	-	-	-	-
South Dakota	-	-	-	-	-	-	-	-	-	-
Nebraska	-	-	-	-	-	-	-	-	-	-
Kansas	-	-	-	-	4	4	4	4	-	-
<b>SOUTH ATLANTIC</b>	5	10	5	17	1	8	11	35	6	22
Delaware	-	-	-	-	-	-	-	-	-	2
Maryland	2	2	-	2	-	5	2	9	2	8
District of Columbia	-	-	-	-	-	-	-	-	-	-
Virginia	-	1	1	2	-	-	1	3	-	2
West Virginia	1	2	2	3	-	-	3	5	-	1
North Carolina	2	4	-	4	-	1	2	9	3	7
South Carolina	-	-	-	-	-	-	-	-	1	2
Georgia	-	-	-	1	-	1	-	2	-	-
Florida	-	1	2	5	1	1	3	7	-	-
<b>EAST SOUTH CENTRAL</b>	1	1	-	8	5	13	6	22	9	12
Kentucky	-	-	-	1	-	2	-	3	5	5
Tennessee	1	1	-	1	-	1	1	3	1	3
Alabama	-	-	-	-	-	-	-	-	1	2
Mississippi	-	-	-	6	5	10	5	16	2	2
<b>WEST SOUTH CENTRAL</b>	4	14	5	20	2	4	11	38	4	13
Arkansas	2	3	1	6	1	1	4	10	2	5
Louisiana	-	5	2	11	1	1	3	17	-	2
Oklahoma	-	1	-	-	-	1	-	2	-	1
Texas	2	5	2	3	-	1	4	9	2	5
<b>MOUNTAIN</b>	-	2	2	3	-	17	2	22	5	11
Montana	-	-	-	-	-	1	-	1	-	-
Idaho	-	-	-	-	-	-	-	-	-	-
Wyoming	-	-	-	-	-	-	-	-	-	1
Colorado	-	-	-	-	-	-	-	-	-	-
New Mexico	-	2	2	3	-	16	2	21	4	7
Arizona	-	-	-	-	-	-	-	-	1	3
Utah	-	-	-	-	-	-	-	-	-	-
Nevada	-	-	-	-	-	-	-	-	-	-
<b>PACIFIC</b>	-	-	-	1	13	32	13	33	3	5
Washington	-	-	-	-	-	1	-	1	1	1
Oregon	-	-	-	1	2	2	2	3	-	-
California	-	-	-	-	11	28	11	28	2	3
Alaska	-	-	-	-	-	-	-	-	-	-
Hawaii	-	-	-	-	-	1	-	1	-	1
<b>Virgin Islands</b>	-	-	-	-	-	-	-	-	*	*

\* Does not report.

TABLE III

## Infrequent Serotypes

<u>Serotype</u>	<u>Center</u>	<u>March</u>	<u>1965*</u>	<u>Total 1963 &amp; 1964**</u>	<u>Comment</u>
<u>S. alachua</u>	MASS	1	1	15	Nonhuman recoveries primarily from turkeys.
<u>S. binza</u>	TEX	1	1	28	Most commonly recovered from poultry and animal feed.
<u>S. bovis- morbificans</u>	CALIF	1	1	11	Relatively common human pathogen in Europe.
<u>S. cerro</u>	PA & RI	2	2	15	Twenty-three of 44 nonhuman isolations in 1964 from eggs.
<u>S. daytona</u>	TENN	1	1	3	Three previous recoveries from FLA (2) and TEX.
<u>S. dublin</u>	CALIF	1	2	5	All 90 nonhuman isolations reported to this unit from cattle.
<u>S. fayed</u>	NC	1	1	6	Very rare. Previously reported from VA (5) and FLA.
<u>S. fresno</u>	TENN	1	1	0	Extremely rare. First recovered from the intestine of a 6-day-old poult from a group in which 69% mortality had occurred in CALIF.
<u>S. gaminara</u>	TEX	2	2	6	Recoveries reported this month from infants from the same county.
<u>S. hartford</u>	FLA	1	5	27	Caused interstate outbreak of unknown origin in the Middle West in 1962.
<u>S. irumu</u>	MO	1	3	83	Responsible for a large common source outbreak traced to a restaurant in NC in 1963. Undercooked turkey believed to have been vehicle of infection.
<u>S. kottbus</u>	IND	1	5	5	Extremely uncommon. Cause of a family outbreak in NY last month.
<u>S. madelia</u>	FLA & PA	2	2	2	Of 25 nonhuman isolates at CDC, 20 from dogs.
<u>S. mission</u>	FLA	2	3	4	Responsible for a case of hospital-associated gastroenteritis and two asymptomatic excreter contacts in FLA.
<u>S. muenster</u>	CALIF	1	1	12	Ten of the 12 previous recoveries from states in the Southeast.

Table III (continued)

<u>Serotype</u>	<u>Center</u>	<u>March</u>	<u>1965*</u>	<u>Total</u>	<u>Comment</u>
				<u>1963 &amp; 1964**</u>	
<u>S. norwich</u>	FLA & TEX	2	4	25	Only three nonhuman recoveries on Salmonella Unit records - all from chickens in IND.
<u>S. oslo</u>	CALIF	1	2	14	Ten of the 14 previous isolates from HAI.
<u>S. paratyphi A</u>	NYC	1	3	15	A relatively common type in the Far East; isolated from an immigrant from the Far East.
<u>S. remo</u>	VA	1	1	0	Extremely rare. First isolate on record at CDC; isolated from cervix removed due to carcinoma.

\* Represents 4,251 human isolations of salmonellae during the first 3 months of 1965.

\*\* Represents 39,762 human isolations of salmonellae during 1963 and 1964.

TABLE IV

Age and Sex Distribution of 1,464 Isolations of Salmonellae Reported for March 1965

<u>Age</u>	<u>Male</u>	<u>Female</u>	<u>Total</u>	<u>%</u>	<u>Cumulative %</u>
Under 1	89	81	170	16.8	16.8
1-4 yrs.	157	120	277	27.4	44.2
5-9 yrs.	68	51	119	11.8	56.0
10-19 yrs.	39	44	83	8.2	64.2
20-29 yrs.	28	60	88	8.7	72.9
30-39 yrs.	23	27	50	5.0	77.9
40-49 yrs.	20	36	56	5.5	83.4
50-59 yrs.	22	37	59	5.8	89.2
60-69 yrs.	25	32	57	5.6	94.8
70-79 yrs.	14	18	32	3.2	98.0
80+	6	9	15	1.5	99.5
Unknown	226	232	458		
<b>Total</b>	<b>717</b>	<b>747</b>	<b>1,464</b>		
<b>% of Total</b>	<b>49.0</b>	<b>51.0</b>			







TABLE VI-A

SEROTYPES REPORTED FROM NONHUMAN SOURCES  
PREVIOUSLY DURING 1965 BUT NOT IN MARCH

SEROTYPE	MONTH(S)	REPORTING CENTER(S)	NUMBER OF ISOLATIONS
alachua	Jan	Calif(2)	10
	Feb	Ind(1)	
	Feb	Minn(4)	
	Feb	Tex(1)	
	Feb	Utah(2)	
berta	Feb	Fla	1
brandenburg	Jan	NC	1
florida	Jan	Ill	1
goerlitz	Jan	Wash	1
lexington	Jan	Tenn	1
miami	Feb	Minn(1)	2
	Feb	Mo(1)	
mission	Jan	Ark(1)	2
	Jan	SC(1)	
norwich	Feb	NC	1
tallahassee	Jan	Fla	1
typhi-suis	Feb	Calif	1
westerstede	Jan	Miss	2
westhampton	Feb	Mass	1
TOTAL			25

TABLE VII

Salmonella derby Isolations and Total Salmonella Isolations  
Reported by Month\*

	<u>Total Salmonella Isolations</u>	<u>S. derby Isolations</u>	<u>Per Cent of Total</u>
1962 November	922	18	2.0
December	794	16	2.0
1963 January	1,111	30	2.7
February	1,059	22	2.1
March	931	28	3.0
April	1,330	61	4.6
May	1,738	139	8.0
June	1,640	*203	12.4
July	2,133	303	14.2
August	1,770	155	8.8
September	1,786	164	9.2
October	2,462	228	9.3
November	1,381	127	9.2
December	1,439	175	12.2
1964 January	1,601	213	13.3
February	1,442	301	20.9
March	1,279	290	22.7
April	1,882	399	21.2
May	1,545	277	18.0
June	1,758	195	11.1
July	2,159	217	10.1
August	1,777	151	8.5
September	2,624	109	4.2
October	1,848	85	4.6
November	1,595	69	4.3
December	1,719	76	4.4
1965 January	1,538	58	3.8
February	1,198	39	3.3
March	1,515	78	5.1

\* As reported to the Salmonella Surveillance Unit from 50 States and the District of Columbia.