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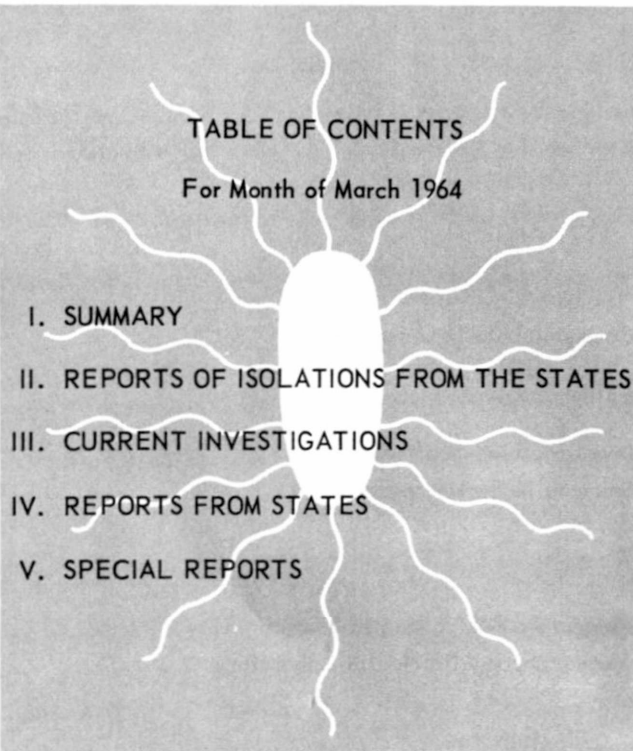
COMMUNICABLE DISEASE CENTER

# ALMONELLA

## SURVEILLANCE

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For Month of March 1964

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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 24th month of salmonella surveillance in the United States and presents data concerning 1,279 reported isolations of 55 serotypes from human beings. Also during March, there were 365 isolations from non-human sources, representing 44 different serotypes. This month demonstrated a decrease from the numbers of both human and non-human isolations reported in February.

Included in this month's report are reviews of: (1) a food borne outbreak of typhoid fever in Ohio; (2) an outbreak of typhoid fever traced to contaminated well water in Texas; (3) a case of osteomyelitis due to Salmonella cholerae-suis in Virginia; and (4) a death due to Salmonella schwarzengrund in Utah. A problem in the diagnosis of typhoid fever was reported from South Dakota and three family outbreaks of salmonellosis traced to pet dogs were reported from Illinois. An outbreak of food poisoning in New York City due to Salmonella bredeney was included.

A report of an isolation of S. derby from the dialysate bath of a hemodialysis unit in Pennsylvania was submitted and a summary of Salmonella derby isolations in California was reported.

## II. REPORTS OF ISOLATIONS FROM THE STATES

### A. Human

During March, 1,279 isolations of salmonellae were reported, representing an average weekly total of 320. This represents a drop of 25 per week from the average weekly total for February. The average weekly total for March 1964 exceeded that for March 1963 by 85 isolations. The first quarter of 1964 surpassed the same period for 1963 by an average of 92 isolations per week. However, Figure 1 demonstrates a monthly pattern for the first quarter in 1964 which parallels that experienced for the first quarter of 1963.

The seven most frequently reported serotypes during March were:

Rank	Serotype	Number	Per Cent	Rank Last Month
1	<u>S. typhimurium</u>	308	24.1	1
2	<u>S. derby</u>	290	22.7	2
3	<u>S. heidelberg</u>	86	6.7	4
4	<u>S. infantis</u>	56	4.4	3
5	<u>S. newport</u>	43	3.4	8
5	<u>S. typhi</u>	43	3.4	5
7	<u>S. oranienburg</u>	42	3.3	7
	TOTAL	868	67.9	

Total salmonellae isolated (March) 1,279

Of the 56 different serotypes reported during March, the seven most common (12.5 per cent) accounted for 67.9 per cent of the 1,279 recoveries reported. With only minor exceptions, the relative positions held by the serotypes on the above list are the same as last month. Once again the percentage of S. derby recoveries increased, this time to within 2 per cent of S. typhimurium. The possible reasons for the continued increase were included in a special resume of the S. derby problem in Report No. 23.



The age and sex distributions for individuals from whom salmonellae were recovered were consistent with those observed during previous months.

The family attack rate for this month, 16.8 per cent, is compatible with those computed for antecedent months (Table II).

#### B. Nonhuman

During March 365 isolations were reported from nonhuman sources. This number reveals little change from the 370 reported in February and is only slightly lower than 372 reported in March 1963. Forty-four serotypes were observed both this month and last month, of which 36 were the same types.

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

<u>No.</u>	<u>Serotype</u>	<u>Number</u>	<u>Per Cent</u>	<u>Standing Last Month</u>
1	<u>S. typhimurium</u> <u>S. typhimurium var.</u> <u>copenhagen</u>	71	19.5	1
2	<u>S. derby</u>	54	14.8	2
3	<u>S. heidelberg</u>	35	9.6	4
4	<u>S. infantis</u>	31	8.5	6
5	<u>S. montevideo</u>	19	5.2	Not listed
6	<u>S. pullorum</u>	15	4.1	Not listed
7	<u>S. anatum</u>	11	3.0	Not listed
		236	64.7	

These seven types account for 64.7 per cent of the total. As in previous months approximately 60 per cent of the total reported are included in this group consistently. In contrast to the human isolations which have about the same percentage in the top 7 types there is more variation in the serotypes that appear in this group from nonhuman sources each month.

The 4 species from which the greatest number of isolations were obtained are as follows: chickens 28 (31.5 per cent), turkeys 77 (21.1 per cent), swine 61 (16.7 per cent) and bovine 31 (8.5 per cent). They account for 81.4 per cent of the total number reported.

S. derby isolations again are high and result from the study mentioned in packinghouse swine in the previous month's report. The prevalence of this type in swine in certain areas of the country seems uncommonly high. In 1963 S. derby was isolated with high frequency from plants which render animal products in northeastern United States.

S. heidelberg was isolated from chickens and turkeys only and it was the most common type reported from California. This type is consistently one of the most common types in both man and fowl with a wide distribution throughout the states.

#### CURRENT INVESTIGATIONS

None.



# V. REPORTS FROM STATES

## A. California

Salmonella derby in California. Reported by Bureau of Communicable Diseases, State Department of Health, Berkeley, California, Dr. Philip K. Condit, Chief.

During the first twelve weeks of 1964, the number of Salmonella derby isolations reported weekly by the Microbiology Laboratory of the California State Department of Public Health was considerably greater than the number reported during the same period in 1963. The table below presents the number of salmonella isolations occurring weekly and the number identified as S. derby for this period.

Week Number	1964			1963		
	All Salmonella	S. derby	% S. derby	All Salmonella	S. derby	% S. derby
1	52	6	11.5	33	2	6.1
2	37	1	2.7	36	1	2.8
3	38	2	5.3	44	0	0
4	43	2	4.7	19	1	5.3
5	46	4	8.7	29	1	3.4
6	43	5	11.6	28	1	3.6
7	28	1	3.6	36	1	2.8
8	38	2	5.3	36	3	8.3
9	30	3	10.0	33	1	3.0
10	26	4	15.4	25	1	4.0
11	28	4	14.3	54	2	3.7
12	37	2	5.4	14		3.8
Total	446	36	8.1	373		

It has been ascertained that a number of the isolations obtained in California this year have been forwarded from hospital laboratories and have been obtained from patients who developed a diarrheal illness during the period of hospitalization. One hospital reported two cases of diarrhea occurring in patients within thirty-six hours after discharge from the hospital, a feature compatible with hospital acquired salmonellosis.

## B. Illinois

Three Family Outbreaks of Salmonellosis Traced to an Infected Pet Dog. Reported by Samuel L. Andelman, M.D., M.P.H., Commissioner of Health, O. Brodnitsky, M.D., Epidemiologist, H. L. Slutsky, Ph.D., Epidemiologist, City of Chicago Board of Health.

Following the instructions of her physician, a Chicago resident brought stool specimens obtained from her family to the Chicago Board of Health. During the preceding two-week period, her children had experienced an illness characterized by diarrhea and cramps. Subsequent laboratory investigation revealed that Salmonella infantis was present in the three specimens, one of which had been labeled, "Tobias M., 2 years; male." The case was referred to a city public health physician, assigned to the Bureau of Communicable Disease Control.



A home visit disclosed Tobias M. to be a male Bassett Hound. The family pet dog had been obtained several weeks prior as a stray animal wandering in the neighborhood. From the time the dog was found, it had experienced diarrhea. Several days after the dog entered the household, the children developed diarrhea and cramps.

It was learned that a teenage baby sitter was frequently used by the family. In addition, the mother and two children of a family living directly across the apartment also had played with the Bassett Hound. Follow up of these possible contacts revealed that all had experienced diarrhea and cramps within 48 hours of the first meeting with the dog. Examination of their stool specimens revealed the presence of S. infantis in each.

Positive cases were referred to their private physicians and Tobias M. was treated by a neighborhood veterinarian.

Editor's Comment: A 'fascinating tail'. Certainly spread by contact appears likely, without the usual intermediary of an ingested food.

#### C. New York

Food poisoning due to Salmonella bredeney, an Uncommon Isolate in New York City. By Tibor Fodor, M.D., Acting Chief, Division of Epidemiology and Diagnosis, City of New York Department of Health.

A family of ten persons had a common meal on March 27, 1964. Eight persons became ill sixteen to twenty hours later with gastrointestinal symptoms and fever. The food history implicated roast turkey from which Salmonella bredeney was recovered. The same organism was recovered from stools of three of the people involved. Since S. bredeney is exceedingly rare in New York City, it is probable that the organism was present in the turkey before preparation.

The turkey was cleaned and eviscerated by the butcher. The woman who prepared it stated that the bird was scalded on the outside and the body cavity was washed with boiling hot water, after which it was cooked in the oven at 350° for three hours. After it was removed from the oven, it was covered with a "clean" kitchen towel and left cooling at room temperature for two hours before it was served. The turkey was bought at a retail store.

Editor's Comment: Outbreaks due to S. bredeney have indeed been rare. Those with which we are familiar (two) have been traced to fowl or their products. Dr. Fodor has traced the source of the turkey implicated in the above report. Should cases of S. bredeney gastroenteritis occur elsewhere, it would be of interest to determine if the sources are similar.

#### D. Ohio

Food Borne Epidemic of Typhoid Fever in Ohio. Reported by Harold G. Curtis, M.D., Health Commissioner, Cuyahoga County Health Department and Harold A. Decker, M.D., Chief, Division of Communicable Diseases, Ohio Department of Health.



On November 11, 1963, the Cuyahoga County Health Department received reports of four cases of typhoid fever, three within a single family and a fourth in a close personal friend of the family. Investigation revealed that the patients had been ill for as long as a month, but because of the non-specific nature of the symptoms the diagnosis of typhoid fever had not been made until quite late. Preliminary investigation revealed that there were, within close associates, additional cases of illness that were likely to be typhoid fever. The occurrence of several cases within a short period of time within a small social group indicated the presence of a common source epidemic.

Search for a common source quickly focused upon two social gatherings which were held nine and eleven days prior to the onset of the first case and twenty-one to twenty-three days prior to the onset of the three other known cases of typhoid fever. The second social function, September 29, was considered to be the most likely common event, since all those ill had not attended the first one. Thirty-seven people attended the second party. Thirty-four of them consumed one or more foods at that time. After interviewing each of the individuals who attended the party, obtaining medical information, Widal tests and stool cultures, it was found that thirteen individuals had experienced acute typhoid infections. The diagnosis of typhoid fever was made on the basis of isolation of S. typhi in nine cases, and on the basis of symptoms and a Widal reaction compatible with acute typhoid fever in four others. Table 2 shows the age distribution of attendants at the party, persons who ate, and cases.

The menu at the party consisted of the following:

Two commercially canned hams were machine-sliced in the market. Four hours before serving each slice was rolled individually and placed upon a serving tray. It was well refrigerated until time of serving.

Commercially pre-sliced and packaged American cheese was kept under refrigeration until the time of serving. Very little was consumed by the guests.

Home prepared potato salad. After boiling, the potatoes were permitted to cool without refrigeration, were cut up and mixed into the salad. Hard-boiled eggs, boiled at the same time the potatoes were prepared, were peeled and mixed into the salad. Pickles, radishes, olives, celery and onions were washed and added to the salad. Commercially prepared sour cream was refrigerated until added to the salad. Commercial mayonnaise from two separate containers was used. One jar was first opened at the time of preparing the salad. The remains of a second jar, which had been opened approximately ten days earlier and had been used by the family, was added and mixed into the salad. All of this preparation was performed by a woman who had no evidence of S. typhi infection at any time.

Four loaves of commercially prepared pre-sliced bread - white and rye.

Several types of commercially prepared soft drinks were drunk either separately or mixed with liquor.



Milk from a local dairy was kept under refrigeration in the original container until it was drunk by some of the children or used in coffee.

Water and ice used for food preparation and drinking were from a thoroughly treated, well controlled municipal supply.

Homemade pastries, including some with fruit, seed, or nut fillings, were prepared by a 37-year old woman who became ill with typhoid fever on the twenty-first day after the party.

The meal was served with disposable plates and utensils. No sauces or spreads were served.

Detailed food histories were taken from each person who attended the party and attack rates were calculated for each item on the menu. Except for foods that were eaten by very small numbers of people, the greatest difference in attack rates between those ill and not ill were for the ham and potato salad. (Table 1). There was only one ill person who had not eaten the ham and only one ill person who had not eaten the potato salad. The attack rate for the ham was 38.7 per cent and for the potato salad, 37.9 per cent. The fact that eating ham correlated almost perfectly with eating potato salad prevented distinguishing whether only one or both of the foods, if either, constituted the source.

In the search for a carrier who had contaminated the common source of the epidemic, each of the persons who had attended the party or participated in the preparation of the food, or was a family contact of any person attending the party was examined by means of Vi hemagglutination serological studies and stool culture. Forty-two such people were examined, including the thirty-seven who attended the party. In addition to those persons who had eaten food, there was one person who had a stool culture positive for S. typhi and a Vi hemagglutination titer of 1:80. Her Widal reaction, however, was negative, for both the flagellar and the somatic antigens. The presence of a positive stool culture, a high Vi hemagglutination titer and negative Widal in the absence of any symptoms of acute typhoid fever or exposure at the party raised the consideration of this person as the carrier. Phage typing results on her S. typhi culture were identical with those of nine persons who had positive cultures along with indications of acute infection. The phage type for all was D9, a very uncommon phage type in the State of Ohio and, according to the Surveillance Section of the Communicable Disease Center, very uncommon in the United States.

Periodic stool cultures as late as 19 weeks after the date of the party have been persistently positive for S. typhi, in spite of repeated courses of antibiotic treatment.

The suspected carrier is a 68-year old American-born woman of German ancestry. She is the grandmother of the child whom the party honored. When she was eleven years old, while living in Buffalo, New York, her brother had typhoid fever. She had fever at the same time her brother was ill but the same diagnosis was never made. She lives in an apartment above the main floor of the residence where the party was held. She did not attend the party or take part in the food preparation. A sanitary survey of the plumbing within the home disclosed no cross connections or back siphonage arrangement from her quarters to those where the food was prepared and



eaten. No means by which she could have contaminated either of the implicated foods has been established.

Summary: Thirteen cases of acute typhoid fever have been attributed to a common source exposure at a party. The probable source was food served at the party. All foods but sliced ham and potato salad could be eliminated as the source. No direct contact could be established between a suspect, who carried the same phage type as the cases, and the probable common source of the epidemic.

Table 1. Occurrence of Illness by History of Foods Eaten and Foods not Eaten.

Food	Persons Eating Food				Persons Not Eating Food			
	Total	Ill	Well	Attack Rate	Total	Ill	Well	Attack Rate
Ham	31	12	19	38.7%	3	1	2	0.0%
Cheese	2	2	0	100.0	32	11	21	31.2
Potato Salad	29	12	17	37.9	5	1	4	20.0
Cake - white	14	6	8	35.7	20	7	13	35.0
Cake - choc.	14	5	9	28.6	20	8	12	40.0
Cookies - 1	13	5	8	38.5	21	8	13	33.3
Cookies - 2	5	2	3	40.0	29	11	18	33.3
Cookies - 3	4	2	2	50.0	30	11	19	34.5
Cookies - 4	13	5	8	38.5	21	8	13	33.3
Pickles	15	6	9	33.3	19	7	12	36.8
Olives	14	5	9	35.7	20	8	12	35.0
Bread - white	14	4	10	28.6	20	9	11	40.0
Bread - rye	8	5	3	67.5	26	8	18	26.9
Mixed Drinks	12	4	8	33.3	22	9	13	36.4
Beer	2	2	0	100.0	32	11	21	31.3
Soft Drinks	17	6	11	33.3	17	7	10	35.3
Coffee-with cr.	6	1	5	16.7	28	12	16	39.3
Coffee-black	4	1	3	25.0	30	12	18	36.7
Milk	3	0	3	0.0	31	13	18	38.7
Any Food	34	13	21	35.3%				



Table 2. Age Distribution & Attack Rates for Those Attending Party.

Age	Number Attending	Number Eating	Number of Typhoid Fever Cases	Attack Rate Among Those Eating
0-11 mo	2	0	0	0
1-4 yr	2	2	1	50
5-9 yr	9	9	5	56
10-19 yr	9	9	3	33
20-29 yr	5	5	0	0
30-39 yr	6	6	2	33
40-49 yr	4	3	2	67
All Ages	37	34	13	38

#### E. Pennsylvania

Isolation of S. derby from a Hemodialysis Bath in an Institution Without Known Infections Due to this Organism. By F. E. Zimmer, M.D., Department of Medicine, The Geisinger Medical Center, Danville, Pennsylvania and I. S. Gratch, M.D., Epidemiology Section, Pennsylvania Department of Health.

Salmonella derby was isolated from the dialysate bath of a hemodialysis unit. This specimen was one of the routine cultures taken after running the unit for an 18-hour period and was collected on February 20. There was nothing unusual about the dialysis and a pseudomonas specimen which was cultured along with the salmonella was an organism found not infrequently in the bath following the dialysis procedure. The bath consists of some 378 liters of electrolyte and glucose solution which is circulated thru a Kiil dialyzer. Needless to say, the dialysis solution is never expected to come in contact with the patient's blood and, in fact, the hydrostatic pressure difference across the membrane insures that any leak will result in a flow of blood into the dialysis fluid rather than vice versa. Such occurrences are rare and no leak was evident in the period of dialysis under question.

The dialysis solution is originally made up from tap water and is expected to be clean but not sterile, although quantitative cultures usually show less than one organism per cc. before the dialysis and anywhere from 5 to several thousand organism per cc. after the dialysis. The temperature of the bath is kept below 20 degrees to retard the growth of bacteria. There are many areas in the tank where cleaning is a problem although the tank has been designed to minimize this as much as possible. These areas (the drain plug, gasket seals around ports, hose connections, etc.) were all cultured separately and individually following the finding of this



salmonella organism in the bath. None of these areas was found to contain anything but pseudomonas. A half dozen or more personnel associated with the dialysis procedure had rectal swab cultures, all of which were negative for salmonella. Although the patient himself has not been cultured, logistically he is the last person in connection with the dialysis expected to be able to contaminate the dialysate.

The patient is a 51-year-old man with chronic pyelonephritis who had been undergoing weekly hemodialysis for the past 11 months and who has maintained a reasonably good state of nutrition and activity by this procedure. He has no present or past symptoms or history suggesting salmonellosis.

The authors believe that the finding of the S. derby in the dialysate bath is extremely interesting but no clinical significance can be ascribed at the present time.

Editor's Comment: We are aware of no other problem with the S. derby organism in this institution.

#### F. South Dakota

A Problem in the Diagnosis of Typhoid Fever. Reported by Dr. Jack Robertson, Deputy Area Director, Indian Health Services, Aberdeen, South Dakota.

On December 1, 1963 a patient was admitted to the Pine Ridge Public Health Service, Indian Hospital with symptoms of lethargy, fever, nausea, and loss of appetite. Determination of febrile agglutinins revealed elevated titers to both O and H antigens of salmonella groups D and E. Subsequent serology revealed a falling O antigen titer. In spite of the absence of diarrhea, a stool culture obtained was positive for Shigella flexneri. Salmonella typhi was not recovered. A presumptive diagnosis of typhoid fever was made and treatment initiated.

Editor's Comment: A diagnosis of typhoid fever based primarily on serological responses is at best tenuous. In spite of this, treatment based on a presumptive diagnosis must often be initiated. It should be pointed out, however, that some have postulated that infections with organisms other than salmonellae may at times cause nonspecific elevations of salmonella O antigen titers.

#### G. Virginia

Case Report: Osteomyelitis due to Salmonella cholerae-suis. Reported by Dr. J. B. Kenley, Director, Bureau of Epidemiology, Department of Health, Virginia.

A 55-year-old white female was admitted to a hospital with a suspected diagnosis of osteomyelitis of the third and fourth lumbar vertebrae. An intervertebral biopsy was performed and the tissue cultured, which grew Salmonella cholerae-suis. The patient, a housewife, has no previous contact with hogs or other farm animals, and no family members had been ill. The source of the infection remains a mystery.



**Editor's Comment:** Salmonella cholerae-suis (sometimes referred to as S. suipestifer<sup>1</sup>) is a highly invasive organism. This organism is associated with systemic infection with localized abscess formation more frequently than with gastroenteritis, and the mortality rate is higher than that of other salmonella organisms.

- (1). Harvey, A. M. Salmonella suipestifer infection in human beings. Review of the literature and report of 21 new cases, Arch. Int. Med. 59:118, 1937.

A Case of Gastroenteritis due to Salmonella london. Reported by Dr. J. B. Kenley, Director Bureau of Epidemiology, Department of Health, Virginia.

On February 3 Salmonella london was isolated from an eight-week old male with symptoms of gastroenteritis. Stool cultures were obtained on family members and Salmonella london was isolated from the stool of a ten-year old brother. The infant's family lived in a modern dwelling, utilizing city sewage and water. The family owned no pets or farm animals. The only clue to the source of the infection was the fact that a table recently obtained from a relative had been used as a stand for a pet parakeet that had died shortly before the infant's illness.

**Editor's Comment:** An extremely rare serotype, first isolated in 1934. Between 1947 and 1957 only two isolates were reported, both from cases of human gastroenteritis - one in Texas and one in Florida.

#### H. Texas

Common Source Outbreak of Typhoid Fever Traced to Contaminated Well Water. Reported by J. E. Peavy, M.D., Commissioner of Health, and M. S. Dickerson, M.D., Epidemiologist, State of Texas Department of Health.

An outbreak of 6 cases of typhoid fever due to Salmonella typhi, Phage Type E, was traced to well water apparently contaminated by a carrier.

The 6 patients were among 20 relatives who had attended a family gathering in Texas. Fifteen to 17 days later, 3 of the children, 2 of the women, and one of the men attending this gathering became ill with symptoms suggestive of typhoid fever. Two cases were confirmed by blood and stool cultures, which demonstrated S. typhi, Phage Type E; the remaining 4 cases were clinically consistent with the diagnosis of typhoid fever.

Although no food had been consumed at the reunion, it was learned that the women and children had drunk water from a private well. Only one man consumed water, and he contracted typhoid fever.

The well was 16 ft. in depth, with a 1½ inch pipe imbedded in sand. The surrounding hole was much larger than the pipe, thus easily allowing surface drainage to enter.



Investigation of the suspected premises revealed human feces strewn in the yard from slop jars used during the night, and feces deposited behind trees and out-buildings. Although an outside toilet was available, it apparently was rarely used.

Of fecal specimens obtained from occupants of the house, S. typhi, Phage Type E, was isolated from an asymptomatic male member of the family. Cultures of the well water revealed S. typhi Phage Type E.

Texas health officials concluded that the male host, an unsuspected typhoid carrier who had never been known to have had the disease, had probably contaminated the well water.

#### I. Utah

Death due to Salmonella schwarzengrund. Reported by Dr. G. D. Carlyle Thompson, Director of Public Health, Utah Department of Health.

An eight-week old white male was transferred to a University Hospital with fever, failure to gain weight, and a bulging anterior fontanel. The child was apparently in good health until four weeks prior to admission at which time he developed diarrhea. Shortly thereafter, he convulsed and was immediately hospitalized. He did well while in the hospital and after two days was discharged. Shortly after discharge his appetite decreased somewhat, and approximately a week later, he again developed a fever and was re-hospitalized. A bulging anterior fontanel was noted and the patient was thus transferred.

Upon admission the infant was rigid and very irritable, lying in a position of opisthotonos. Cranial transillumination was performed and an area of translucency was noted over the right temporo-parietal region. A subdural tap was performed and thick purulent fluid aspirated. On Gram's stain of this material Gram-negative bacilli were demonstrated and the child was started on triple therapy for meningitis. Salmonella schwarzengrund was subsequently identified from the culture. Recurrent convulsions ensued, the infant developed respiratory distress, and soon thereafter died.

Editor's Comment: See SSR #23 - Editor's Comment following the reports of two cases of meningitis.

#### J. California

Isolation of Salmonella tennessee from Noodles. Reported by Dr. Graham Kemp, Public Health Veterinarian, Division of Communicable Diseases, California State Health Department.

During a routine survey of products produced by a noodle company in California, Salmonella tennessee was recovered. Investigation revealed that the noodles from which the strain was obtained contained 5 per cent egg yolk. Several other lots of this product have been found positive for salmonellae, but the serotypes isolated are as yet unknown.



# SPECIAL REPORTS

## A. Salmonellosis, New Jersey, 1963.

Submitted by Dr. William Dougherty, Director, Division of Preventable Disease Control, and Dr. Stephen Cohen, EIS Officer, New Jersey State Department of Health.

In 1963, there was a substantial rise in reported and discovered isolations of salmonellosis in New Jersey. Below are listed isolations reported over the past five years.

### Isolations of Salmonellosis in New Jersey, 1959-1963

<u>Year</u>	<u>No. of Isolations</u>
1959	63
1960	78
1961	70
1962	154
1963	562

A total of 476 reports were obtained from physicians' notifications to local boards of health, hospital laboratory reports, and requests for culture or identification of isolates made to the Division of Laboratories State Health Department. An additional 86 cases were uncovered by investigation, 25 as part of outbreaks and 61 in families of known cases.

Twenty-nine different serotypes (excluding S. typhi) were identified in New Jersey residents. The 10 most common are listed below:

### Frequency of Serotypes Isolated in New Jersey, 1963

<u>No.</u>	<u>Serotype</u>	<u>No. of Cases</u>
1	S. derby*	133
2	S. heidelberg*	129
3	S. typhimurium*	81
4	S. enteritidis*	32
5	S. schwarzengrund*	21
6	S. oranienburg*	19
7	S. tennessee	8
8	S. montevideo*	7
9	S. paratyphoid B	7
10	S. newport	6

\*Involved in outbreaks

This frequency distribution is in general agreement with the national experience as given in the publications of the Salmonella Surveillance Unit of the Communicable Disease Center.



Isolates listed by month of reporting demonstrates a peak in April, May, and June. This peak was the result of an outbreak of hospital-associated infections due to S. derby. The list suggests a drop in incidence during the months of December, January, February and March.

**Salmonella Isolations in New Jersey (1963) Listed by Month of Onset.**

<u>Month of Onset</u>	<u>No. of Isolations</u>
Jan	7
Feb	16
Mar	12
Apr	30
May	191
June	77
July	32
Aug	45
Sept	49
Oct	41
Nov	29
Dec	30
<u>Unknown</u>	<u>3</u>
<u>Total</u>	<u>562</u>

The following table lists isolations by age group without correction for the total populations within these age groups.

**Isolations Listed by Age Group, New Jersey, 1963**

<u>Age Group</u>	<u>Cases</u>
0-4	85
5-9	37
10-19	36
20-29	24
30-39	32
40-49	41
50-59	41
60-69	31
70-79	18
80 and over	4
<u>Unknown</u>	<u>213</u>
<u>Total</u>	<u>562</u>



Geographical attack rates per 100,000 population were calculated. The relatively high rate noted in the southern section reflects the large number of S. derby infections acquired in nearby Philadelphia hospitals.

#### Geographical Attack Rates in New Jersey, 1963

District	Population (est. mid-1961)	Cases	Rate/per 100,000 Pop.
Northern	595,000	54	9.1
Metropolitan	3,275,000	272	8.3
Central	1,425,000	109	7.7
Southern	926,000	129	13.9*

\*Reflects patients who were involved in hospital-associated infections of S. derby in nearby Philadelphia.

Below, isolations are grouped into sporadic cases, family clusters, and large outbreaks.

#### Isolates Listed by Epidemiologic Character, New Jersey 1963

Sporadic Case*	180 (32%)
Family Cluster	102 (18%)
Outbreak	280 (50%)
	562

\*Sporadic cases are so defined when no source is found on investigation and no one else in the family is ill. Family clusters occur in a clear grouping with no extra-familial contacts known to be involved. For the purposes of this tabulation, single cases never investigated were assumed to be sporadic.

#### Major Outbreaks

Major outbreaks occurred with seven serotypes. Abstracts of these appear below.

- I. Salmonella derby, the source of much publicity in the spring and summer because of hospital outbreaks in several eastern states, stuck also in New Jersey hospitals. Additionally, New Jersey residents, hospitalized in Philadelphia and nearby Pennsylvania were frequently infected. A total of 133 cases due to S. derby occurred.

Because of the question of involvement of uncooked or undercooked eggs as the source of S. derby infections, egg farmers were visited and 9,460 cultures made by the Department of Agriculture on feces, feed, wash water, drinking water, dust and cracked eggs. The results of these cultures, taken between June 3, 1963 and January 2, 1964 from 68 farms were that only 18 cultures of feces out of 9,242 examined, were positive. Recoveries included S. bredeney, S. anatum, S. kentucky, S. typhimurium, S. muenchen, S. tennessee, S. montevideo, S. saint-paul, and an unidentified Group E-2. Five cultures of drinking water, 62 of egg-wash water, 72 of feed, 49 of dust, and 30 of eggs were all negative for salmonellae.



This positive chicken feces rate of 0.2 per cent differs markedly from figures of 4 per cent obtained by others in nearby Pennsylvania during the same period.

Subsequently, from September 19 to December 13, half-pint slurries of eggs were sampled at a south Jersey egg-breaking plant and 1 of the 7 slurries was found positive for S. typhimurium.

When the first cases of S. derby infection acquired in New Jersey hospitals were reported, the Commissioner issued on May 31 a recommendation through the New Jersey Hospital Association that all hospitals serve only hard-boiled eggs, and that special attention be directed to sterilization of equipment and tightening of precaution techniques. On June 19, because no sharp outbreak appeared to be occurring, the recommendation was modified suggesting that in addition to the use of hard boiled eggs, the serving of other well-cooked eggs was acceptable.

It is noteworthy that in addition to the well publicized S. derby outbreak, and to a nursery outbreak described below, 6 other hospital-acquired cases were discovered during 1963 at 5 different hospitals, involving S. heidelberg, S. chester, S. newport, and untyped Group B strain, and one ungrouped strain.

I. One hundred and one cases of S. heidelberg infection occurred among Spanish-speaking customers of a north Jersey sandwich shop. The mean incubation period of the cases was approximately 12 hours. Investigation disclosed that the shop owner had diarrhea three weeks before the outbreak. The organism was recovered from the pork and from food handlers at the shop, but no conclusion could be drawn as to which infection came first.

II. Three isolates of S. typhimurium were made at a north Jersey nursing home among 34 residents, 11 of whom had diarrhea. No source could be definitely incriminated although two of the staff were found also to be infected. Two chickens on the premises were found to have S. pullorum in their stools, and over 20 more were found to be pullorum serologic reactors. Interestingly, ducks were also kept, and stool cultures were negative.

III. At least seven college freshmen and one sophomore student became ill with gastroenteritis in the fall, and S. enteritidis was cultured from five, and S. montevideo from one other. No general survey of the student population was done but it is thought that any cases of more than minimal severity would have been seen at the college infirmary. Thirty one food handlers were cultured at the school cafeteria where the suspect meals were eaten by all those from whom a salmonella was isolated; those were negative. The suspect food was scrambled eggs prepared from frozen whole eggs. Bacteriologic sampling of the eggs shortly after the outbreak was negative (the original material was not available for culture). Current bacteriological screening of batches of frozen eggs similar to those used earlier are being obtained and have revealed the presence of salmonellae.

IV. Two cases of S. oranienburg infection diagnosed four months after birth in two infants born three weeks apart in the same hospital led to



an intensive retrospective investigation for other unreported diarrheal cases among 48 children born in the three-week interval separating the known cases. No further positive cultures were obtained at this late date, but in 17 of 40 newborn's on whom a history could be obtained, diarrhea occurred within the first weeks of life, usually while the babies were still in the hospital. One mother also had diarrhea. No source could be found at the time of the investigation. Failure to close the nursery to new admissions when the diarrheal cases began to occur was undoubtedly responsible for most of the later illnesses though the method of introduction of infection remains unknown. Additionally, poor nursing techniques undoubtedly contributed to the spread of infection.

Eighteen cases of gastroenteritis among 23 members of a north Jersey club attending a banquet were found to be due to S. schwarzen-grund, which was isolated from left over uncooked turkey dressing and from the stools of 13 members.

Ill pet animals were implicated in six small episodes of gastroenteritis. The number of cases and organisms incriminated are listed:

Pet	Number of Cases	Serotype	Pet Positive
Easter chicks	3	S. saint-paul	Yes
Easter ducklings	5	S. typhimurium	Yes
Turtle, Mice, chicks	1	S. typhimurium	---
Dog	1	S. derby	No-late
Dog	1	S. heidelberg	Not done
Dog	1	S. bovis morbificans	Not done

In 5 cases, the pets were ill prior to the humans. The chicks, duckling and turtle were all newly-purchased. The dog related to the S. derby case ate cracked raw eggs daily.

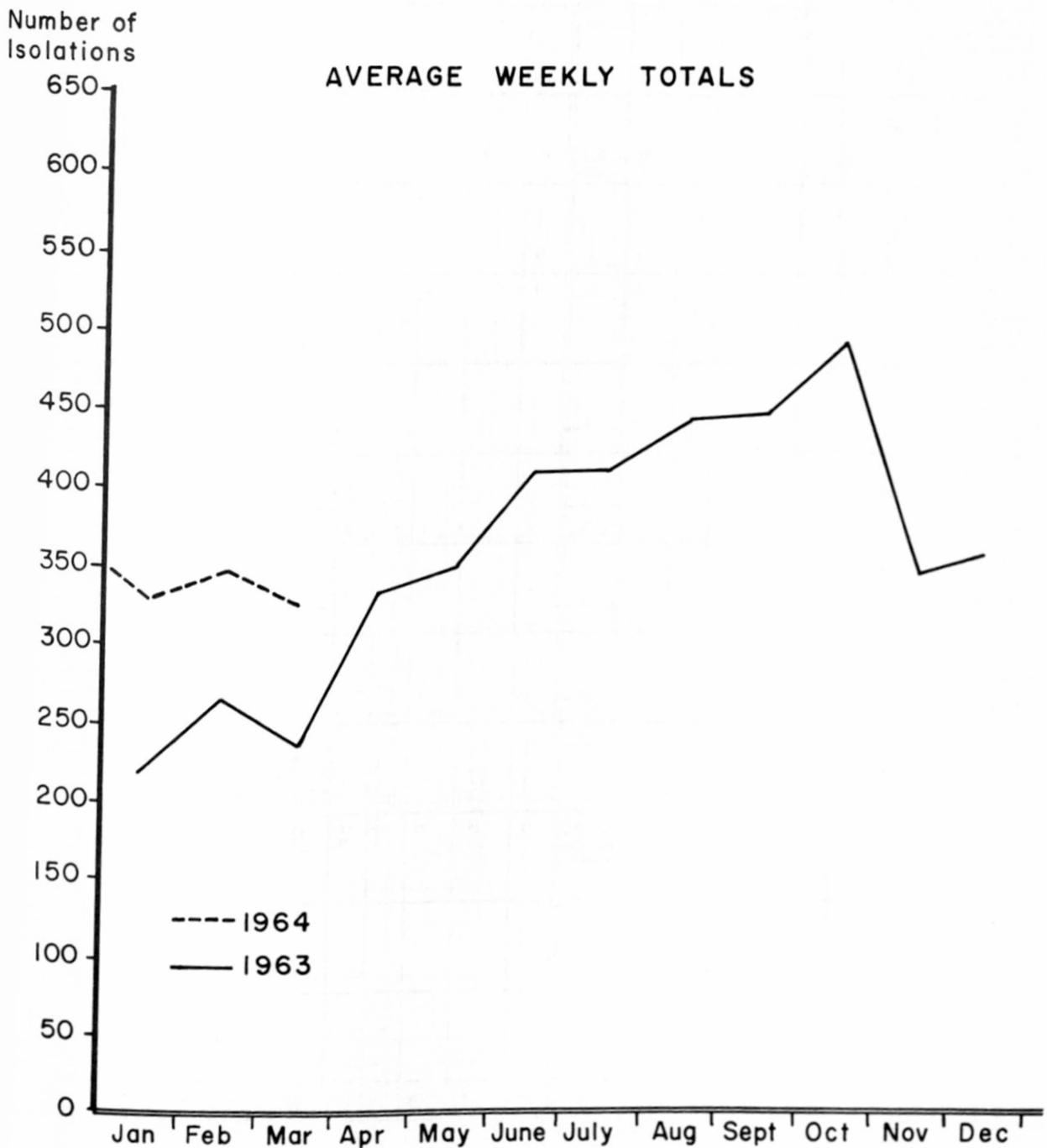
"Salmonellosis continues to be a massive public health problem of increasingly recognized proportions. Whether or not a true increase in incidence is occurring or whether, as we believe, better diagnosis is merely discovering what has always been among us, remains to be seen. Intensive attempts to better document source foods and mechanisms of dissemination seem warranted."

Editor's Comment: This summary of salmonellosis in New Jersey during 1963 presents a most valuable group of data. The authors not only have defined the significance of salmonellosis within the state of New Jersey for 1963, they have also assembled information which will serve as a baseline for comparing future experience. Their work deserves the highest praise.



FIGURE 1.

## REPORTED HUMAN ISOLATIONS OF SALMONELLAE in the United States



Note: Average weekly totals rather than monthly totals are presented because some months have 5 instead of 4 weeks.



**TABLE I**  
**SALMONELLA SEROTYPES ISOLATED FROM HUMANS DURING MARCH, 1964**

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
adelaide																			
amager																			
anatum												1	1		1		4		5
bareilly								1	1				2						1
berta										1			1						1
blockley						1	1				8	2	11	1	3	6	2	1	13
bovis-morbificans									1										
branderup																2			2
bredeney												2	2				1		1
chester										1		1	2				1		1
cholerae-suis									1	1			2						
cholerae-suis v. kun																			
cubana									1				2						
derby												1	2						
enteritidis				24	1	36	61	29	36	9	11	62	147	14		13	8	13	48
						1	1	4	2	3		8	17	4	2	3	1		10
give																			
grumpensis																		1	1
hartford																1			1
hato																			
heidelberg				3		2	5	3			2	1	6	6		5	1		12
infantis				1		2	3	3	4	1			8	1	3	1	9	2	16
javiana																			1
kentucky								1					1						7
litchfield																7			7
manhattan									1				1			1			1
meleagridis																			
miami												1	1						
mississippi																			
montevideo				1		2	3		1		2	3	6	3		2	2		7
muenchen									1			2	3					1	1
													3						
new-brunswick																			
newington																1			1
newport												1	1						
ohio				1			1	2	1		2	1	6		2	3	3		8
oranienburg				2		3	5	2	1	1		3	7	1		3	4	2	10
oslo																			
panama										1			1	1			1		2
paratyphi B v. java								2			3		5			1	1	3	5
paratyphi B				1			1					2	2	1	1				2
poona														1					1
pullorum																			
reading																			1
redlands																	1		
saint-paul						2	2	4		1		1	6		1	1	3		5
san-diego								3	3				6	1				3	4
													6						
schwarzengrund				1			1						2						22
senftenberg								1	1				2						8
tennessee								1			1		3	5	2	2	13		10
thompson									1			1	2			4	2		
typhi									1				1	8	1	1			
typhimurium				12	1		13	12	19	20	1	14	66	15	2	19	32	9	77
typhimurium v. cop				4			4				1	3	4				4		4
urbana	1						1												
weltevreden																			
westhampton																			
Worthington														1		1			2
Untypable Group A																			
Untypable Group B																7			7
Untypable Group C-1																			
Untypable Group C-2																			
Untypable Group D																			
Untypable Group E																			
Unknown																			
TOTAL	1	0	0	50	2	49	102	69	76	39	31	110	325	67	18	84	93	35	297

(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 N.Y. - B.I.



TABLE I  
BY SEROTYPE AND REPORTING CENTER

REGION AND REPORTING CENTER																	
WEST NORTH CENTRAL								SOUTH ATLANTIC									
MINN	IOWA	MO	ND	SD	NEBR	KAN	TOTAL	DEL	MD	DC	VA	WV	NC	SC	GA	FLA	TOTAL
								1			1		1				2
																	1
															1	9	10
															1		1
																2	2
1		2				1	1	6	3						3	2	1
						1	3		1		3		1				1
						2	3										5
											1						1
																1	1
3						1	4		1		1		2			1	5
5		2				1	8				1		2			3	5
		1					1									3	5
	1						1									3	5
1							1									2	2
									1						1	3	3
						1	1									1	1
2						2	4		1						1	4	6
1		1				1	3		1		2		1			6	10
																2	1
																1	1
4							4								1	1	1
1							1		1	1	2					2	2
	2	3				5	10				8		1			2	6
7	1	1	6	2		6	23		1		6		10		12	20	49
									1								1
										1							1
										2		1					2
												1					1
				2			2		1								1
25	4	10	6	4	0	21	70	10	12	6	25	0	19	0	21	73	166



TABLE 1 (Cont'd)

REGION AND REPORTING CENTER																			
SEROTYPE	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
adelaide																			
amager							1			1									
anatum							1			1									
bareilly																			
berta							1			1									
blockley									2	2									
bovis-morbificans																			
branderup																			
bredeney																			
chester																			
cholerae-suis	1				1														
cholerae-suis v. kun							1			1									
cubana																			
derby									1	1				1					1
enteritidis							2			2				1					1
give																			
grumpensis							1			1									
hartford																			
hato																			1
heidelberg		3			3		1			1				1		1	10		20
infantis			2		2	2			1	3			1			2			3
javana						1	1			1									
kentucky																			
litchfield										1									
manhattan							2			2									
meleagridis																			
miami																			
mississippi									1	1									1
montevideo									2	2	1								4
muenchen							1			1									
new-brunswick																			
newington																			
newport	1		2	5	8		2		3	5							1		1
ohio																			
oranienburg									2	2									
oslo																1			1
panama							1			1									
paratyphi B v. java									1	1									1
paratyphi B																1			
poona							1		1	2									
pullorum																			
reading	1				1														
redlands																			
saint-paul	1				1														
san-diego																			
schwarzengrund																			
senftenberg			1		1			1	1	2									
tennessee			1		1				1	1									
thompson							2												1
typhi								1		1					1				
typhimurium		2	1	3	6		15		4	19				5		1	4		11
typhimurium v. cop											1	1							1
urbana																			
weltevreden																			
westhampton																			
worthington																			
Untypable Group A																			10
Untypable Group B																			1
Untypable Group C-1															9		1		1
Untypable Group C-2															1				
Untypable Group D																			
Untypable Group E																	1		1
Unknown																			
TOTAL	4	5	7	8	24	3	33	6	18	60	2	1	1	17	12	6	21	0	60



TABLE I (Cont'd)

REGION AND REPORTING CENTER						OTHER VI	TOTAL	PERCENT OF TOTAL	THREE MONTH TOTAL	% OF THREE TOTAL	1963 3 MO. TOTAL	% OF 1963 3 MO. TOTAL	SEROTYPE
PACIFIC													
WASH	ORE	CAL	ALASKA	HAWAII	TOTAL								
1		2			2		2		3				adelaide
							1		8				anatum
		2			3		12		50		53		bareilly
				1	1		5		14		14		berta
							2		8		8		
		1			1		38	3.0	87	2.0	56	1.8	blockley
		1			1		1		2		1		bovis-morbificans
							2		11		12		branderup
		6		1	7		10		75		20		bredey
		1			1		4		23	0.5	79	2.5	chester
	1				1		5		7		4		cholerae-suis
							3		9		16		cholerae-suis v. kun
			11		15		4		18		9	2.6	cubana
		1		4	1		290	22.7	704	16.3	80		derby
							40	3.1	156	3.6	96	3.1	enteritidis
				1	1		4		17		10		give
				1	1		1		1		1		grumpensis
							2		3		5		hartford
							1		1				hato
2	5	22		1	30		86	6.7	269	6.2	222	7.2	heidelberg
2		3		3	8		56	4.4	207	4.8	167	5.4	infantis
							8		26		12		javana
							2		7		2		kentucky
							8		13		12		litchfield
1		3		5	9		14		52		39		manhattan
							1		5		24		meleagridis
							3		11		12		miami
							1		3		2		mississippi
	1		2		2		26	2.0	94	2.2	105	3.4	montevideo
		7			8		19		52		42		muenchen
							1		1		3		new-brunswick
							1		12		6		newington
		4			4		43	3.4	138	3.2	219	7.1	newport
	2	1			1		1		1				ohio
	2				5		42	3.3	133	3.1	71	2.3	oranienburg
1				2	1		2		3		2		oslo
					2		6		50		19		panama
		2			3		16		52		16		paratyphi B v. java
		1			1		8		27		29		paratyphi B
							4		9		4		poons
1		2			2		1		1		5		pullorum
							4		9				reading
							1		1				redlands
	1				1		21	1.6	85	2.0	81	2.6	saint-paul
		1			2		12		33		26		san-diego
1							1		16		26		schwarzengrund
							5		15		7		senftenberg
		1			1		34	2.7	94	2.2	25	0.8	tennessee
		2			3		19	1.5	67	1.6	57	1.8	thompson
		5			5		43	3.4	150	3.5	173	5.6	typi
9				4	44		308	24.1	1,187	27.5	1,034	33.3	typhimurium
							13		40		26		typhimurium v. cop
							1		5		12		urbana
				1	1		1		6		5		weltevreden
				1	1		1		1				westhampton
				3	3		6		20		8		worthington
							1		3		42		Untypable Group A
							19		56		6		Untypable Group B
							6		15		3		Untypable Group C-1
			2		2		1		3		3		Untypable Group C-2
1							1		3		12		Untypable Group D
							1		1		3		Untypable Group E
					1		4		19				Unknown
23	8	114	2	28	175	0	1,279		4,322		3,101		TOTAL

(VI - Virgin Islands)



TABLE II

Number of Salmonella Isolates from Two or More  
Members of the same Family - March 1964

<u>Reporting Center</u>	<u>Total Number of Isolates Reported</u>	<u>Number of Isolates From Family Outbreaks</u>	<u>Per Cent of Total</u>
Alabama	7	4	57.1
Alaska	2	1	50.0
Arizona	6	0	0.0
Arkansas	3	0	0.0
California	114	22	19.3
Colorado	17	4	23.5
Connecticut	49	0	0.0
Delaware	10	3	30.0
District of Columbia	6	0	0.0
Florida	73	25	34.2
Georgia	21	3	14.3
Hawaii	28	0	0.0
Idaho	1	0	0.0
Illinois	84	6	7.1
Indiana	18	2	11.1
Iowa	4	0	0.0
Kansas	21	11	52.4
Kentucky	4	0	0.0
Louisiana	33	5	15.2
Maine	1	0	0.0
Maryland	12	1	8.3
Massachusetts	50	3	6.0
Michigan	93	29	31.2
Minnesota	25	10	40.0
Mississippi	8	3	37.5
Missouri	10	0	0.0
Montana	2	0	0.0
New Jersey	31	3	9.7
New Mexico	12	1	8.3
New York	184	19	10.3
North Carolina	19	7	36.8
North Dakota	6	1	16.7
Ohio	67	16	23.9
Oklahoma	6	0	0.0
Oregon	8	2	25.0
Pennsylvania	110	23	20.9
Rhode Island	2	0	0.0
South Dakota	4	0	0.0
Tennessee	5	0	0.0
Texas	18	0	0.0
Utah	21	4	19.0
Virginia	25	1	4.0
Washington	23	2	8.7
Wisconsin	35	4	11.4
Wyoming	1	0	0.0
Total	1,279	215	16.8



TABLE III

Serotype	Center	Infrequent Serotypes 3 Month 1963			Comment
		March	Total*	Total**	
<u>S. adelaide</u>	CALIF	2	3	0	Isolated from human source in Pa. and from a lizard in Mich. SSR No. 22
<u>S. bovis-morbificans</u>	CALIF	1	2	4	First isolated in 1894. Rare cause of human illness.
<u>S. grumpensis</u>	HAI	1	1	3	Of 7 recoveries reported to this unit in 1963, 3 were from humans and 4 were from animal feeds.
<u>S. hato</u>		1	1	0	
<u>S. new-brunswick</u>		1	1	6	Nine of 5,389 nonhuman isolates during 1963 were of this type (7 turkeys, 1 cow, 1 meat scraps).
<u>S. Ohio</u>	CALIF	1	1	0	Two of 5,389 nonhuman isolates (1 chicken & 1 animal feed) were this type, one each from Indiana and Ohio.
<u>S. oslo</u>	CALIF	2	3	5	All five 1963 recoveries from Hawaii.
<u>S. pullorum</u>		1	1	1	Rare cause of human illness. One isolate during 1963 caused death of 2½ year old male. Two isolations during 1962 caused severe illnesses.
<u>S. redlands</u>	GA	1	1	0	Cause of mild illness in child, who may have contracted infection (source undetermined) in Tennessee.
<u>S. westhampton</u>	HAI	1	1	0	First reported (1953) as isolated from the feces of an apparently normal dog in Richmond, Virginia.

\* Represents 4,322 human isolations of salmonellae during the first three months of 1964.

\*\* Represents 18,649 human isolations of salmonellae during 1963.



TABLE IV

Age and Sex Distribution of 1,241 Isolations of Salmonellae  
Reported for March, 1964

<u>Age</u>	<u>Male</u>	<u>Female</u>	<u>Total</u>	<u>Per Cent of Total</u>
Under 1	93	63	156	12.6
1-4 Yrs.	104	84	188	15.1
5-9 Yrs.	53	36	89	7.2
10-19 Yrs.	37	31	68	5.5
20-29 Yrs.	25	36	61	4.9
30-39 Yrs.	19	27	46	3.7
40-49 Yrs.	20	24	44	3.5
50-59 Yrs.	29	32	61	4.9
60-69 Yrs.	23	21	44	3.5
70-79 Yrs.	21	20	41	3.3
80+		9	9	0.7
Unknown	<u>227</u>	<u>207</u>	<u>434</u>	<u>35.0</u>
Total	651	590	1,241	
% of Total	52.5	47.5		



SOURCE

SEROTYPE	Chicken	Turkey	Duck	Pigeons	Parakeet	Parrot	Pheasant	Equine	Bovine	Porcine	Canine	Lab Mouse	Lab Rat	Deer	Animal Unknown	Eggs	Egg Yolk	Frozen Eggs	Powdered Albumin	Egg Product	Chicken (Food)	Bone Meal/ Meat Scraps	Animal Feed Unknown	Snake	Other	Unknown	Total	3 Mos. Total	SEROTYPE
anatum	1	6																								11	70	anatum	
bartelley	2																									2	8	bartelley	
bellem		1																								1	1	bellem	
berta																										1	1	berta	
bluza	2	1									1															4	7	bluza	
blockley																													blockley
bredeley	1	2																								3	15	bredeley	
cerro		7														3										3	14	cerro	
chester		8																								8	16	chester	
cholerae-suis												1														1	4	cholerae-suis	
cholerae-suis v. kun									1	9					1						2					11	28	cholerae-suis v. kun	
cubana	1	9								43	1															3	5	cubana	
derby	5	1																								54	100	derby	
enteritidis						1																				7	41	enteritidis	
gallinarum	4																									4	9	gallinarum	
give																										3	8	give	
heidelberg	20	15																				1				35	98	heidelberg	
illinois																										1	1	illinois	
infantis	24	1						1	1	1	1						1									31	80	infantis	
kentucky	1																									1	9	kentucky	
live																										1	1	live	
heidelberg																										5	8	heidelberg	
livingstone									1	3																1	4	livingstone	
manhattan																										1	2	manhattan	
minnesota																										1	6	minnesota	
montevideo	15	1														2										19	38	montevideo	
munichen																										1	11	munichen	
newington		1													3							1				4	11	newington	
newport	1	3							1	1						1										6	25	newport	
ohio																2										1	2	ohio	
orantienburg											1											1				6	26	orantienburg	
orton																										1	2	orton	
poona		1																								1	2	poona	
pullorum	15	5																								15	40	pullorum	
saint-paul	2	3																								9	41	saint-paul	
san-diego																										3	50	san-diego	
schwarzengrund																										4	17	schwarzengrund	
seinfenbourg	1	1									1															4	17	seinfenbourg	
stieburg	2																									1	3	stieburg	
tennessee	1	1																								7	27	tennessee	
thompson	7										1					3										8	18	thompson	
typhimurium v. cop	19	5	1	4	1			6	27	2	2	2	2													69	221	typhimurium v. cop	
typhimurium v. cop	2										1															2	10	typhimurium v. cop	
typhimurium v. cop																										1	2	typhimurium v. cop	
worthington											2															4	11	worthington	
TOTAL	128	77	1	4	1	1	1	9	31	61	10	2	1	6	1	12	1	2	3	1	1	5	1	1	1	3	365	1135	TOTAL



S T A T E																																
S E R O T Y P E	ALA	ALASKA	ARK	CALIF	CONN	FLA	GA	ILL	IND	IOWA	ME	MD	MASS	MICH	MINN	MISS	MO	MONT	N.J.	N.C.	OHIO	ORE	PA	S.C.	TENN	TEXAS	VA	WASH	WISC	TOTAL	3 MOS TOTAL	S E R O T Y P E
anatum				2					1			3			1						1						2	1		11	70	anatum
barielly	1								1																					2	8	barielly
belem														1																1	1	belem
berta																					1									1	1	berta
binza				1								1				1	1													4	7	binza
blockley				2		1																					6			3	15	blockley
bredeney																						1								7	10	bredeney
cerro																					3									3	14	cerro
chester															4					2										8	16	chester
cholerae-suis				1																										1	4	cholerae-suis
cholerae-suis v. kun									1											2	2			4	2					11	28	cholerae-suis v. kun
cubana											1										2									3	5	cubana
derby				4								43	1			3							1				2			54	100	derby
enteritidis									6							1														7	41	enteritidis
gallinarum																3				1										4	9	gallinarum
give				3																										3	8	give
heidelberg	1			18		1	6															3					4			35	98	heidelberg
illinois																1		1	1											1	1	illinois
infantis	1	1		5				1	19										1		2		1							31	80	infantis
kentucky												1																		1	9	kentucky
litchfield				1																										1	1	litchfield
livingstone				1						3												1								5	8	livingstone
manhattan																						1								1	2	manhattan
minnesota				1																										1	6	minnesota
montevideo	3			1			5	1				2					2							3						19	38	montevideo
muenchen																														1	11	muenchen
newington												3																		4	11	newington
newport			1										1														1			6	25	newport
ohio																						1								1	2	ohio
oranienburg									1							1					3		1							6	26	oranienburg
orion				1																										1	2	orion
poona				1																										1	2	poona
pullorum	2						1		3							1				2	5			1						15	40	pullorum
saint-paul				1			2									1									1					9	41	saint-paul
san-diego				3												1				1							1			3	30	san-diego
schwarzengrund			1										1																	4	17	schwarzengrund
senftenberg			1																								1			4	17	senftenberg
siegburg								1																						1	3	siegburg
tennessee			1					2																						7	27	tennessee
thompson									4													3	1							8	18	thompson
typhimurium				4	11	2	1	1	20	2		1		2	11	1	5				2	1				1	1	1	2	69	221	typhimurium
typhimurium v. cop																										1	1			2	10	typhimurium v. cop
typhi-suis								1																						1	2	typhi-suis
worthington			2						1																					4	11	worthington
TOTAL	8	5	5	59	2	2	16	7	56	6	2	55	2	3	32	7	9	2	3	11	19	9	4	8	4	16	4	1	8	365	1135	

Source: National Animal Disease Laboratory, Ames, Iowa and Weekly Salmonella Surveillance Reports from Individual States.

\* Includes February Late Reports



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

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