

COMMUNICABLE DISEASE CENTER

# SALMONELLA

## SURVEILLANCE



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For the Month of May 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

During May, 1,448 isolations of salmonellae from humans were submitted for an average weekly total of 362. A total of 333 non-human isolations were reported, a decrease of 256 from the previous month.

This month's Reports from States include two outbreaks of hospital-associated salmonellosis in California, three outbreaks of salmonellosis traced to pet turtles, and an outbreak of Salmonella typhi-murium gastroenteritis on a farm.

A report describing a case of lung abscess due to Salmonella typhi is abstracted, and salmonellosis in Canada during 1963 is summarized.

Erratum: Salmonella Surveillance Report No. 25. On front cover, "For Month of June 1964" should read "For Month of April 1964".

## II. REPORTS OF ISOLATIONS FROM THE STATES

### A. Human

During May, 1,448 isolations of salmonellae were reported, representing an average weekly total of 362 (a decrease of 13 over April). The average weekly totals for each month during 1964 as compared with the average monthly totals for 1963 are depicted in Figure 1.

The seven serotypes reported most frequently during May 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>	368	23.9	1
2	<u>S. derby</u>	277	18.0	2
3	<u>S. heidelberg</u>	172	11.2	3
4	<u>S. newport</u>	78	5.1	5
5	<u>S. infantis</u>	57	3.7	4
6	<u>S. typhi</u>	54	3.4	8
7	<u>S. enteritidis</u>	38	2.5	7
		<u>1,044</u>	<u>67.8</u>	

Total salmonellae isolated (May) 1,448.

Of the 64 different serotypes reported during May, the seven most common (10.9 per cent) accounted for 67.8 per cent of the 1,448 reported.

The family attack rate for this month was 19.6 (Table II).

Age and sex distributions for individuals from whom salmonellae were isolated was consistent with past experience (Table IV).

### B. Non-human

There were 333 non-human isolations reported in May. This is a decrease of 256 from the previous month when 589 were reported. It is also the lowest number reported in a month this year. There were 43 serotypes identified among the 30 states submitting cultures.

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

<u>No.</u>	<u>Serotypes</u>	<u>Number</u>	<u>Per Cent</u>	<u>Standing Last Month</u>
1	<u>S. typhi-murium</u>			
	<u>S. typhi-murium</u>			
	<u>var. copenhagen</u>	61	18.3	1
2	<u>S. heidelberg</u>	30	9.0	3
3	<u>S. pullorum</u>	28	8.4	2
4	<u>S. infantis</u>	25	7.5	7
5	<u>S. anatum</u>	16	4.8	4
6	<u>S. saint-paul</u>	15	4.5	Not Listed
7	<u>S. montevideo</u>	14	4.2	5
	or <u>S. bredeney</u>	(14)	(4.2)	Not Listed
		189	56.7	

These seven types account for 56.7 per cent of the total.

The 4 species from which most of the isolates were obtained in order of frequency are: chickens 119 (35.7 per cent); turkeys 112 (33.6 per cent); hogs 24 (7.2 per cent); and cattle 13 (3.9 per cent). The isolates from these species comprise 80.4 per cent of the total reported. These percentages are similar to previous months with the exception of bovine isolates which are somewhat lower.

S. pullorum was isolated from ice cream which was a suspect vehicle in a family outbreak. The report on the outbreak has not been completed but should appear in a future issue.

Most of the previous S. derby isolations have been obtained from swine and poultry. This month an isolation was reported from a dog in Florida.

### III. CURRENT INVESTIGATIONS

None.

### IV. REPORTS FROM STATES

#### A. California

Hospital Associated Salmonella derby Infections. Reported by Dr. Philip K. Condit, Chief, Bureau of Communicable Diseases, California Department of Health, and George Perlstein, EIS Officer.

Upon reviewing the sources of isolations of Salmonella derby in California since July 1, 1963, it became evident that a significant number of these had been recovered from patients in one hospital. Thirteen cases occurred within this hospital between July, 1963 and May, 1964. Because of continued isolations of S. derby within the hospital, an extensive investigation was undertaken.



### Background Information

The hospital is a modern facility which has been in operation for seven years. The bed capacity is approximately 450. All patients are admitted under the direction of a private physician and are cared for by a complement of interns and residents and the admitting physician.

The pediatric wing is situated on the fourth floor of the hospital and has a fifty bed capacity. Twenty of these, located in the eastern portion of the wing, are regular beds, and the remainder, crib beds, are located in the western portion. Crib beds are generally used for patients less than eighteen months of age, although this is somewhat dependent upon the nature of the illness and the physiological and psychological maturity of the child. Variably, six to eight of the crib beds are located in the pediatric nursery, a facility in which isolation techniques are constantly employed. Most admissions to the pediatric ward originate from the community at large with some referrals from local naval installations. The reasons for admission - acute illness or diagnostic evaluation - are divided equally.

From June through December of 1963, the average daily census on the pediatric wing was 26. During the subsequent four months, this figure rose to 34.5, representing an increase in the daily patient load of 30 per cent. There was no information available from which a precise age breakdown of pediatric admissions could be derived.

### The Epidemic

All S. derby isolations for the period beginning January 1, 1963 to the present were reviewed, and those with a well-defined onset of symptoms and/or positive stool specimen occurring within the period from twenty-four hours after hospital admission to forty-eight hours after discharge from the hospital were regarded as hospital-associated cases. Thus, of fourteen isolations, thirteen cases, all of whom were symptomatic, were identified from July of 1963 through April of 1964. The following is a line listing of these cases.

Case #	Age	Sex	Date of hospitalization		Onset of G.I. Symptoms	Days between admission and onset	Admission diagnosis
			Admission	Discharge			
1.	4 m.	M	6/19/63	8/13/63	7/12/63	23	Subdural hematoma
2.	8 m.	F	7/17/63	7/29/63	7/21/63	4	Bilateral inguinal hernia
3.	2½ m.	F	12/5/63	12/27/63	12/11/63	6	<u>H. influenzae</u> meningitis
4.	13 m.	F	12/4/63	12/25/63	12/15/63	11	Congenital dislocation of the hip

Case #	Age	Sex	Date of hospitalization		Onset of G.I. Symptoms	Days between admission and onset	Admission diagnosis
			Admission	Discharge			
5.	6 m.	F	1/14/64	2/13/64	1/23/64	9	Hydrocephalus
6.	4 m.	F	1/23/64	2/18/64	2/10/64	18	Oropharyngeal hemangioma
7.	17 m.	M	2/7/64	3/4/64	2/21/64	14	Cerebral palsy with bronchitis
8.	11 m.	F	2/24/64	3/14/64	3/3/64	8	Microcephaly
9.	45 y.	F	3/3/64	3/11/64	3/7/64	4	Peptic ulcer
10.	16 m.	F	3/8/64	3/17/64	3/13/64	5	Ileus-laparo- tomy performed 3/9
11.	2½ y.	F	3/27/64	4/11/64	4/7/64	11	Malnutrition, failure to thrive
12.	3 m.	M	4/19/64	4/22/64	4/24/64	36 hours after discharge	Bilateral inguinal hernia
13.	1½ m.	F	4/24/64	5/5/64	4/30/64	6	Bronchitis

The mother of #2 developed gastrointestinal symptoms on 7/24/63 requiring hospitalization at another institution. Stool culture at that time grew S. derby.

To more fully evaluate the situation, an intensive review of the available clinical information was carried out. The primary reason for admission to the hospital was varied in most instances, and with the exception of two individuals admitted for surgical repair of inguinal hernias, there was no consistent pattern from one case to another. The period of time between admission and onset of symptoms of gastroenteritis ranged from four to twenty-three days with a mean of nine days. In all instances, diarrhea was the primary symptom of the salmonellosis, ranging from an occasional loose stool to severe diarrhea and vomiting of several days duration requiring vigorous intravenous fluid therapy. In seven of the thirteen cases, a febrile reaction over 100° F. was recorded. Leukocytosis, at the time of onset was not a constant characteristic. Coagulase positive Staphylococcus aureus was cultured concomitantly with S. derby in four of the thirteen cases. Six of the thirteen were receiving a variety of antibiotics prior to the onset of symptoms, and eleven of the total affected received antibiotic therapy shortly after the confirmation of the diagnosis. It was difficult to evaluate the efficacy of such therapy because of the marked variation in the nature of the drugs, the dosage schedule and the duration of therapy, and in most instances, long-term follow-up data was not available. However, the second and the sixth cases were both known to be excreting salmonella organisms one and two months after the onset of the disease despite administration of antibiotics.

The outbreak has been in progress over a period of ten months. The first two cases had their onsets in July of 1963 and were followed by an hiatus of four months before the third case was recognized in December. Twelve of the thirteen have been on the pediatric floor of the hospital and all were confined to crib beds. Although there was significant overlap, a review of the patients' movements in the hospital indicated that at no time during the period of hospitalization was one case quartered simultaneously in the same room as another.

### Investigation

There were three major areas which were investigated in order to differentiate the population at risk from the remainder of patients admitted to the pediatric ward and the remainder of the hospital population. These were (1) personnel, (2) drugs, diagnostic and therapeutic procedures, and (3) diet.

Personnel regularly responsible for care of the pediatric patients include nurses, floor aides, members of the housestaff, other physicians, and those responsible for transportation and technical services. In addition, others with irregular patient contact include student nurses and floor volunteers. Those with most intimate case contact, and those most susceptible to fecal contamination include nurses, aides, housestaff, and other physicians. The remaining groups are either very infrequent visitors to the ward or do not have intimate contact with the children. Generally, there are no people whose activities are confined solely to the crib population; there is a constant flow of staff from bed to crib patients and vice versa.

To evaluate the role personnel may be playing in the course of the outbreak, a culture survey was authorized by the administrative staff and performed by the laboratory personnel of the hospital. Between April 15 and May 1, twenty-eight stool cultures submitted by the pediatric nurses, aides, and clerks were negative for salmonellae. A survey of private physicians and housestaff is currently in progress, but to date, has been unrevealing. In addition, the charts of cases were compared with those of non-cases in order to identify personnel unique to cases. However, there was sufficient admixing to eliminate this possibility.

The second major area of concern was that of drugs, and diagnostic and therapeutic procedures. There are few drugs found to be unique to the crib population of the hospital. These are generally brought into the hospital pharmacy in small lots and dispensed by the pharmacy to the floor in individual patient containers. The few exceptions to this are materials used in large volume, such as aspirin and phenobarbital, but their use is widespread within the hospital. Other materials brought from the pharmacy in bulk and then dispensed to the crib patients, e.g. body lotions and aerosol materials, have been negative for salmonellae when examined bacteriologically. Also, extensive examination of the pediatric environment and equipment employed in patient care has failed to demonstrate contamination by enteric pathogens.

The remaining area of concern is the pediatric diet, which is unique when compared to other dietary programs. Although it will, of necessity, vary with age, the primary constituents for those less than eighteen months

of age are formula (a variety of milks and commercial preparations), jello, junket, commercially prepared fine grain cereals and baby foods, and raw eggs. All eggs, approximately five hundred dozen per week, are purchased from one supplier. According to those interviewed at the hospital, these are of Grade A quality, although on occasion, cracked eggs are observed to be present. Generally, all patients in the hospital are served eggs at one time or another; however, the distribution of raw eggs is limited to the crib population. It is not possible to determine who among this group has received eggs although the practice is sufficiently extensive to presume that most have been fed this item.

Extensive bacteriological examinations have been carried out by the hospital in evaluating the equipment and mode of preparation of the formulas and in the examination of the jello, junket, commercial baby foods, and individual eggs. None of these have demonstrated the presence of salmonellae. Cultures have been taken from dietary areas where raw foods are processed and from fifty-two of sixty-seven dietary employees (as of May 8). These, too, have been negative from salmonellae. Currently, the egg source is under investigation. The source of the above described outbreak of hospital-associated S. derby gastroenteritis has not been defined.

#### Recommendation

At a later date, recommendations made before the Infections Committee included (1) strict abstinence from the use of raw or undercooked eggs as outlined in the Surgeon General's Report of July 11, 1963, (2) intensive surveillance of gastrointestinal illness among patients and staff of the hospital, (3) prompt culture of patients with diarrheal illnesses, (4) reinforcement of strict isolation practices until the etiology of the diarrhea has been defined, (5) reduction of personnel contact between patients with known communicable diseases, and (6) intensive investigation of known cases of salmonellosis and their contacts, including attempts to define the asymptomatic carrier.

#### Summary

An outbreak of hospital-associated S. derby infection occurring almost exclusively among pediatric patients has been described. Ongoing investigative efforts to define the source has not, as yet, been revealing. Areas examined have included personnel, drugs and therapeutic devices, and diet. Certain components of the diet are highly suspicious. Recommendations were offered which will, hopefully, alleviate this problem and circumvent spread throughout the hospital. Close follow-up will continue.

An Outbreak of Salmonella bareilly Within a Nursery. Reported by Dr. Philip K. Condit, Chief, Bureau of Communicable Diseases, California Department of Health, and George Perlstein, EIS Officer.

During April, 1964, an outbreak of Salmonella bareilly gastroenteritis affected eight infants in a single nursery in California. The hospital is a modern plant serving a population of approximately 825,000. The nursery facility, with a total of 48 bassinets is subdivided into five units for



uncomplicated cases, and an intensive care unit utilized for the care of premature and ill infants. The five nursery units share a common nursing and medical staff. The average number of deliveries range from four to eight per day and the daily nursery census is approximately twenty-five.

On April 21, a healthy newborn female was admitted to the nursery. The delivery was uncomplicated, but for the fact the mother had some mild diarrhea during labor. On April 24, the infant was noted to have a few loose stools, and a stool culture performed on the same day before the infant was discharged to home was subsequently reported to be positive for S. bareilly.

On April 25, a second infant was also observed to have a few loose stools, and again, a stool specimen was obtained from which S. bareilly was isolated. Therefore, on April 27, to further define the extent of infection with S. bareilly, rectal swabs were taken from the twenty-nine infants in the nursery and an additional five cases were discovered. All were asymptomatic at the time. In addition, all staff members and personnel working in the nursery submitted rectal swabs, all of which were negative. At this time, more intensive isolation practices were reinforced and personnel were recruited from other areas of the hospital in order to decrease the current work load and patient contact. Subsequent to this, upon continued surveillance, one other infant, also asymptomatic, was discovered to be harboring S. bareilly organisms.

The following is a line listing of the known cases.

<u>Case #</u>	<u>Sex</u>	<u>Birth</u>	<u>Date Discharge</u>	<u>Culture</u>	<u>Comment</u>
*1.	F	4/21	4/24	4/24	Symptomatic (On 5/1 Mother (was negative
2.	M	4/21	4/27	4/25	4/27-Symptomatic-Mother negative rectal swabs
3.	M	4/21	4/27	4/27	
4.	F	4/25	4/28	4/27	
5.	F	4/25	4/28	4/27	
6.	F	4/26	4/29	4/27	4/29-Mother negative rectal swabs
7.	M	4/26	4/29	4/27	4/25-Mother negative rectal swabs
8.	F	4/28	5/1	5/1	Patient was negative on 4/29

\*An older sibling, a two and a half year old female, was admitted to the hospital in coma following drug ingestion of April 30. A stool culture was positive for S. bareilly and S. senftenberg.

Extensive examination of dietary components and environmental sites by the hospital and County Health Department staff have not contributed to discovering the source of the outbreak.

The authors concluded that in all probability the organism was introduced into the nursery following fecal contamination during the birth of the index case with subsequent spread from person to person in the crowded nursery. The nursery population and staff work load had increased significantly from April 22 through April 24, probably contributing to a relaxation of isolation technique and the contamination of other infants. Reinforcement and strengthening of existing isolation procedures undoubtedly contributed to the cessation of the problem.

Editor's Comment: The association of an increased nursing personnel work load and outbreaks of infantile diarrhea has been observed. Watt et al (1) noted a correlation between increased work load and an increased infection among infants during an outbreak of S. tennessee infection.

(1) Watt J., Wegman M.E., Brown, O.W., Schliessman, D.T., Maupin E. & Hemphill, E.C. Salmonellosis in a premature nursery unaccompanied by diarrheal disease. Pediatrics, 22:689, 1958.

#### B. Michigan

Salmonella typhi-murium Illness on a Farm. Reported by Dr. D.B. Coohon, Epidemiologist, Michigan Department of Health.

Between December 1, 1963 and January 21, 1964, 10 to 12 calves died with symptoms of diarrhea on a Michigan farm. Salmonella typhi-murium phage type 1a was isolated from two fecal cultures. Calf losses continued.

A 21 year-old mother living on this farm experienced nausea, vomiting, and diarrhea on March 14. No cultures were obtained at this time, but two weeks later, S. typhi-murium phage type 1a was recovered from a 1½ year old daughter with a similar illness. Subsequently, the father became ill and his stool was positive for S. typhi-murium. No source for the three infections was found.

An unrelated case of S. typhi-murium phage type 1a infection was diagnosed two days following the discharge of a one year old male from a hospital. This patient also lived in a rural area. Although this case was suspected as being hospital acquired, no source was found and no other cases occurred within the hospital in question.

Editor's Comment: All too little recognition has been given to the problem of salmonella infection in cattle. This subject was reviewed with references in Salmonella Surveillance Report #7. This summary will not be repeated, except to emphasize certain points. Most outbreaks of salmonellosis traced to infected cattle have been caused by S. typhi-murium and resulted from drinking contaminated raw milk (1). Out of 33 milk borne salmonella epidemics in the United Kingdom between 1942-1962, only five were traced to contamination by symptomless cows (1). The majority of these outbreaks were the result of raw milk being contaminated by cow feces.

- (1) Know, W.A. et al. A Milk-borne Outbreak of Food Poisoning due to Salmonella heidelberg. J. Hyg. Camb. 61:175, 1963.

C. Minnesota

Family Outbreaks of Salmonellosis Traced to Turtles. Reported by D. S. Fleming, M.D., Director, Division of Disease Prevention and Control, Minnesota Department of Health.

Fourteen members of 3 families in Minnesota experienced diarrhea shortly after the acquisition of pet turtles. Salmonella panama was cultured from 2 victims and the 3 families' pet turtles.

During a 4-day period in early January, a father and his 5 children experienced diarrhea and abdominal cramps. S. panama was cultured from the 4-year-old son. When no specific food or meal could be incriminated, recently acquired family pets were suspect. S. panama was cultured from a turtle swab and turtle water. This pet ate only commercial turtle food. Its water was changed every 3 days and dumped into the kitchen sink.

This finding stimulated retrospective investigation of a S. panama isolate, reported in October. A 2-year-old girl was hospitalized for 10 days because of diarrhea; during this time her parents also experienced diarrhea and cramps. Two turtles had been purchased 2 months earlier. The girl had been scolded several times for sucking pebbles taken from the turtle dish. The turtles were given to an aunt, whose husband and 4 of her 5 children later experienced diarrhea; cultures, taken 5 weeks after the illness, were negative. A cloacal swab from one turtle was positive for S. panama. The turtle had been fed commercial turtle food and fish eggs.

Editor's Comment: The probable method of spread of salmonellosis from pet turtles to humans merits mention. Airborne spread or direct contamination of foods from such a source is unlikely. Spread by direct contact is the most probable method by which dissemination occurs. Contaminated liquid (turtle bath) is a most effective transport media.

V. SPECIAL REPORTS

Abstract: Lung Abscess due to Salmonella typhi. Otto H. Hahne, The American Review of Respiratory Diseases. 89:566, 1964.

A 45-year-old factory worker was treated for bacteriologically confirmed tuberculosis from April, 1948 through February, 1949. One month later he developed fever, chills, anorexia and weight loss. Chest X-ray revealed a cavity compatible with a lung abscess. Gram-stained smears of the sputum as well as cultures for aerobes and anaerobes were negative for pneumococci, acid-fast bacilli, or predominant organisms. The tentative diagnosis was "lung abscess, etiology undetermined," and therapy with procaine penicillin and sulfadiazine was initiated. Bronchoscopy was negative. Repeat sputum cultures several days later revealed Salmonella typhi. Treatment with chloramphenicol was started and open drainage of the abscess was subsequently performed, after which the patient rapidly improved.

One month following open drainage, the patient developed fever and chills with diarrhea; splenomegaly was noted. These symptoms and signs were attributed to typhoid fever and chloramphenicol therapy was again instituted. Stool cultures remained positive for S. typhi and 5 months later a cholecystectomy was performed. Cultures for S. typhi from the specimen were negative, but subsequent stool cultures were again positive. The patient was discharged as a chronic typhoid carrier. Two years later an excision of the residual pulmonary cavity was performed. A culture of the resected specimen was negative for S. typhi as were frequent stool cultures taken during 12 months following resection.

Although pulmonary complications of typhoid fever in the form of bronchitis or pneumonitis as well as abscesses in other parts of the body are relatively frequent, the occurrence of lung abscesses due to S. typhi are very rare. The author found only seven such cases which are reviewed in the publication.

## INTERNATIONAL

- A. Salmonellosis in Canada, 1963. Submitted by Dr. E.W.R. Best, Chief, Division of Epidemiology, Department of National Health & Welfare, Ottawa, Canada.

During 1963, 3,021 isolations of salmonellae from humans were reported by the Department of National Health and Welfare in Canada. The serotypes most commonly isolated were: Salmonella typhi-murium (42.1 per cent), S. thompson (19.9 per cent), S. heidelberg (11.2 per cent), S. newport (6.4 per cent), S. paratyphi B (3.0 per cent), S. typhi (2.9 per cent) and S. saint-paul (2.7 per cent).

The outstanding feature was the almost threefold increase in the incidence of S. typhi-murium in man from 15.4 per cent and third in frequency in 1962 to 42.1 per cent in 1963 and the re-emergence of this type as the most commonly isolated serotype in human salmonellosis. The total of 3,021 human isolations for 1963 was again a significant increase over the 2,532 and 1,978 isolations reported for 1962 and 1961 respectively. These figures suggested that the overall incidence of human salmonellosis in Canada had again increased. Actually the apparent increase for 1963 was due primarily to increased infections in 2 Provinces, Ontario and Quebec; Ontario from 999 salmonella isolations in 1962 to 1,662 in 1963, and Quebec from 381 in 1962 to 547 in 1963. In both Provinces, S. typhi-murium, almost exclusively was responsible for this altered incidence; the Ontario isolations of this type were 148 and 791 for 1962 and 1963 respectively and for Quebec, 148 and 309 respectively. In addition, an increased number of S. thompson isolations in Ontario was also an important factor in the overall increased salmonella incidence. It was also of interest to note that for the first 5 months of 1963 as for the past 2 years, S. thompson was the most frequently found type in human salmonella infections. The upsurge in S. typhi-murium isolations in the two Provinces mentioned above began in June 1963 continued throughout the rest of the year.

The increased incidence of recovery of S. saint-paul particularly, and also S. infantis was significant.



The serotypes most frequently identified from non-human sources were: S. thompson (20.2 per cent), S. typhi-murium (17.3 per cent), S. heidelberg (11.3 per cent), S. infantis (6.6 per cent), S. oranienburg (5.7 per cent) and S. cholerae-suis (5.1 per cent). Of the 231 S. thompson isolates listed, 221 were from human foods; and with one exception, all were from cake mixes and egg products. S. typhi-murium and S. heidelberg were still the serotypes most often responsible for salmonella infections in animals and poultry. These serotypes are also the second and third most commonly found types respectively from cake mixes and egg products. Particularly noteworthy was the increased incidence of S. infantis isolations from animals, poultry and egg products as compared to previous years; and also the increased incidence of S. saint-paul from poultry, particularly turkeys. As mentioned above, this increase is reflected in the higher number of human infections due to these serotypes.

During the year, eight new serotypes not previously found in Canada were identified. S. bukavu, S. glostrup, S. johannesburg, and S. pharr were isolated from human cases of infection and identified by the National Center; while S. gatuni, S. hamburg and S. duesseldorf, also isolated from man, were reported by the Ontario Laboratories. Salmonella gaminara which was isolated from monkey intestine by the British Columbia laboratories was also identified at the National Laboratory of Hygiene. These bring to 109 the number of serotypes which have been found to date in Canada.

During the year, 59 different serotypes were identified among the salmonella strains from all sources.

- B. Two Recent Paratyphoid Outbreaks, from a paper presented at a session in the Department of Bacteriology, University Medical School, Edinburgh, for the travelling Seminar or Organization and Administration of Schools of Public Health, Pan American Health Organization, World Health Organization, Scientific Public No. 94, page 14, February 1964.

One outbreak occurred in 1961 and involved 35 cases, most of which were traced with a high degree of probability to dried coconut from Ceylon. In January 1963, a 9-year-old girl developed Paratyphoid B infection after attending a party with some 180 children. Investigations traced the infection to imported dried egg powder in a widely used cake mix. Part of the same shipment was traced to London, but no cases had been reported outside the Edinburgh area when this report was given.

- C. Follow up: Outbreak of Typhoid Fever in Aberdeen, Scotland. Reported by Dr. Joe Stockard, Assistant Chief for Epidemiology and Immunization, Division of Foreign Quarantine, U.S.P.H.S., Washington, D.C.

Press releases concerning the typhoid epidemic in Aberdeen, Scotland indicated on June 10 that a total of 416 cases had occurred. The daily incidence of cases was reported to be slowly declining. No figures from official sources within the United Kingdom have been obtained. Likewise, unequivocal evidence implicating a specific source is not available.

TABLE I  
SALMONELLA SEROTYPES ISOLATED FROM HUMANS DURING MAY, 1964  
REGION AND REPORTING CENTER

SEROTYPE	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
albany								2					2						2
anatam																			
atlanta								1					1						1
bareilly																			
berta				1			1							1					1
blockley																			
braenderup				1		2	3			1	3	1	5	3		5	7	4	19
bredeney													1				1	2	3
california										2	2	2	6			1	2	1	4
chester																			
cholerae-suis v. kun																			
cubana																			
derby	1			26	2	32	61	23	23	5	14	75	140	3		22	4	1	1
enteritidis																			
florida				3		2	5	2	5	7		2	16	1		2		2	3
give																			
grumpensis																			
hartford																			
heidelberg				8	1		9	5	1	2	6	10	24	3	2	6	4	6	21
indiana						1	1					2	2			1			1
infantis																			
irumu				2		2	4		1			4	5			3	3	1	7
javiana																			
kentucky											1		1	1					1
litchfield									1				1						1
livingstone																			
manchester																			
manhattan								2	1										
meleagridis												2	5						
miami												1	1			3			3
minnesota																			
mississippi																			
montevideo	1					2	3	2		1	1	5	9	1		4	1		6
muenchen								1				2	3	2		1	1		4
new-haw																			
newport				12		1	13	1	1			3	5	3		3	6		12
norwich																			
oranienburg				3			3	3	1			1	5					1	1
panama																			
paratyphi A						2	2		3	1		2	6				2		2
paratyphi B v. java						1	1		3				3			1		2	4
paratyphi B				1			1					4	4	2					4
poona												1	1			1			1
reading								1					1						
rubislaw																			
saint-paul				1			1	1	2	2		1	6			1			1
san-diego								1					3			2			2
schwarzengrund				1			1												
senftenberg												1	1			23			
simsbury																			
tennessee				1		3	4		1			1	1	1	2	6	2		11
thompson				1			1									4			5
typhi						2	2		5			1	6	1	3	3			7
typhimurium	1		2	16		12	31	13	15	20	4	21	73	2	4	20	19	9	54
typhimurium v. cop				10			10					2	2			2			2
urbana																			
weltvreden																			
worthington																			
Untypable Group B			6				6												1
Untypable Group C-1																			
Untypable Group C-2																			
Untypable Group D					1		1												
untypable				1			1									3			3
unknown																			
TOTAL	3	6	2	88	6	60	165	61	61	43	31	144	340	25	6	104	75	31	241

(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

WEST NORTH CENTRAL						SOUTH ATLANTIC											SEROTYPE
MO	ND	SD	NEBR	KAN	TOTAL	DEL	MD	DC	VA	WV	NC	SC	GA	FLA	TOTAL		
1					1									2	2	albania anatum	
1					1		2						2			atlanta bareilly berta	
1					1		2		1		1		1	1	4	blockley braenderup bredeney california chester	
1					2				1						1		
1					2	5	2		2				1	2	3	cholerae-suis v. kun cubana derby enteritidis florida	
1					1	2	1	1	2				1	1	7		
									1						2	give grumpensis hartford heidelberg indiana	
					5	1	2		1		1		6	4	15		
2	2				12			1	3				3	3	10	infantis irumu javana kentucky litchfield	
1					1										2		
							1								1	livingstone manchester manhattan meleagridis miami	
													1		1		
													2	1	2	minnesota mississippi montevideo muenchen new-haw	
					1		1						1	4	3		
3				2	5		1				2		5	4	12	newport norwich oranienburg panama paratyphi A	
2		4		3	9				1				1	5	6		
					6										1		
															1	paratyphi B v. java paratyphi B poona reading rubislaw	
					3		2		3		1		1	2	9	saint-paul san-diego schwarzengrund senftenberg simsbury	
													1		1		
	1				3				1	1			2	1	1	tennessee thompson typhi typhimurium typhimurium v. cop	
3					1				1				2	4	5		
9	7	3		4	28	4	4		11	1	1		14	13	7		
															5		
														1	1	urbans weltevreden worthington	
							2								2	Untypable Group B	
					1			5							2	Untypable Group C-1	
								2								Untypable Group C-2 Untypable Group D untypable unknown	
									2						2		
24	10	7	-0-	9	88	12	21	11	30	2	11	-0-	43	57	187	TOTAL	

TABLE I

S E R O T Y P E	R E G I O N A N D R E P O R T I N G C E N T E R																		
	E A S T S O U T H C E N T R A L					W E S T S O U T H C E N T R A L					M O U N T A I N								
	KY	TENN	ALA	MISS	TOTAL	ARK	LA	OKLA	TEX	TOTAL	MONT	IDA	WYO	COLO	NM	ARI	UTAH	NEV	TOTAL
albany																			
anatum							1		1	2				1					1
atlanta																			
bareilly	1				1			1		1									
berta																			
blockley							1		3	4									
braenderup																			
bredeney								1	1		1			1					2
california																			
chester																			
cholerae-suis v. kun																			
cubana																			
derby		1			1									1					1
enteritidis																	2		2
florida								1		1									
give			1		1		1		1	2									
grumpensis																			
hartford			1		1														
heidelberg			4		4		3		1	4		4		9		41			54
indiana																			
infantis			1		1				3	3	1	3			1				5
irumu																			
javiana							1	1	2	3									
kentucky										1									
litchfield																			
livingstone									1	1									
manchester										1									
manhattan							1												
meleagridis																			
miami																			
minnesota							1			1									1
mississippi								2	1	3				1					2
montevideo														1		1			1
muenchen												1							
new-haw																			
newport							1		15	16									
norwich						1				1									2
oranienburg		1			1				2	2			1		1				
panama																		1	1
paratyphi A																			
paratyphi B v. java						2	1			3	2								2
paratyphi B								1		1									
poona																			
reading									1	1									
rubislaw																			
saint-paul	1	2			3									2					2
san-diego														1					1
schwarzengrund																			
senftenberg																			
simsbury																			
tennessee							2		7	9									4
thompson		1			1				1	1									2
typhi						4		1	2	7									26
typhimurium		4			4	8	10		7	25	7	2		12	1	3	2		
typhimurium v. cop																			
urbana																			2
weltevreden																			1
worthington						1				1				1		1			1
Untypable Group B				1	1														2
Untypable Group C-1																			
Untypable Group C-2				1	1	1				1					2				1
Untypable Group D												1							
untypable				1	1														
unknown																			
TOTAL	2	9	7	3	21	19	23	6	48	96	11	10	1	30	5	8	47	1	113

TABLE I

REGION AND REPORTING CENTER				OTHER VI	TOTAL	PERCENT OF TOTAL	FIVE MONTH TOTAL	% OF FIVE MONTH TOTAL	FIVE MONTH TOTAL	% OF 1963 5 MO. TOTAL	% OF 1963 5 MONTH TOTAL	S E R O T Y P E
WASH	ORE	CAL	P A C I F I C									
		ALASKA	HAWAII	TOTAL								
		1	2	3	1	0.8	3	1.0	83	1.3		albany anatum atlanta bareilly berta
		11		11	3		23		21			
		6		6	42	2.9	179	2.3	120	1.9		blockley braendrup bridney california chester
		1		1	9		32		16			
		2		2	105		105		35			
		4		4	13		13		13			
					1	-0-	26	0.3	97	1.6		
		16		16	3		14		34			cholerae-suis v. kun cubana derby enteritidis florida
					263	18.2	1,466	19.2	280	4.3		
					35	2.4	245	3.2	179	2.9		
					1		1					
		23	1	28	5		24		18			give grompenis harford heidelberg indiana
					1		2		3			
					1		7		6			
		6		6	164	11.3	585	7.6	553	9.0		
					4		13		6			
					57	3.9	344	4.5	335	5.4		infantis irumu javyana kentucky litchfield
					1		1		2			
					1		1		2			
		3	1	4	1		7		87	1.4		livingstone manchester manhattan melegridis miami
					11		168	2.2	164			
					3		8		7			
					15	1.0	89	1.2	123	2.7		minnesota mississippi montevideo munchen new-jaw
					1		1		4			
		9		9	74	5.1	287	3.8	435	7.1		newport norwich orandenburg panama paratyphi A
					1		2		2			
		1	1	2	29	2.0	220	2.9	142	2.3		paratyphi B v. java paratyphi B poona reading rubislaw
					18		76		27			
					2		3		4			
					14		94		31			
		2		2	13		71		44			
					3		10		10			
					2		13		10			
					1		1		6			
		4		4	29	2.0	149	1.9	179	2.9		saat-paal san-diego schwarzengrund senftenberg slubury
		11		13	18	1.2	68	0.9	58	0.9		
					2	0.1	30	0.4	75	1.2		
		2		2	26		44		9			
					1		1		6			
					30		189		46			tennessee thompson typhi typhimurium v. copenhagen
					1		94		94			
					14		124		283	4.6		
		12		14	50	3.5	246	3.2	318	32.2		typhimurium v. copenhagen
		31	3	49	341	23.5	1,958	25.6	1,988			
					14		69		45			
					1		8		17			urbana wettereden
					1		9		8			
					2		27		14			worthington
					3		101		103			Untypable Group B
		1		2	17		25		17			Untypable Group C-1
					4		31		19			Untypable Group C-2
					4		11		11			Untypable Group D
		1		1	1		8		19			Untypable
					1		1		27			unknown
					9		31		19			
23	10	151	-0-	197	1,448		7,652		6,169			TOTAL

TABLE II

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

<u>Reporting Center</u>	<u>Total Number of Isolates Reported</u>	<u>Number of Isolates From Family Outbreaks</u>
Alabama	7	4
Alaska	0	0
Arizona	8	0
Arkansas	19	6
California	151	42
Colorado	30	6
Connecticut	60	5
Delaware	12	0
District of Columbia	11	1
Florida	57	11
Georgia	43	11
Hawaii	13	0
Idaho	10	7
Illinois	104	6
Indiana	6	4
Iowa	5	0
Kansas	9	4
Kentucky	2	0
Louisiana	23	8
Maine	3	0
Maryland	21	8
Massachusetts	88	17
Michigan	75	25
Minnesota	33	9
Mississippi	3	0
Missouri	24	4
Montana	11	2
Nevada	1	0
New Hampshire	6	0
New Jersey	31	9
New Mexico	5	0
New York 1-A	61	8
New York 2-BI	61	8
New York 3-C	43	5
North Carolina	11	2
North Dakota	10	0
Ohio	25	5
Oklahoma	6	0
Oregon	10	2
Pennsylvania	144	28
Rhode Island	6	0
South Dakota	7	2
Tennessee	9	0
Texas	48	0
Utah	47	11
Vermont	2	0
Virginia	30	10
Washington	23	1
West Virginia	2	0
Wisconsin	31	12
Wyoming	1	0
Totals	<u>1,448</u>	<u>283</u>

TABLE III

## Infrequent Serotypes

Serotype	Center	5 Month to 1963			Comment
		May	Total*	Total**	
<u>S. minnesota</u>	CAL	1	1	13	Not infrequently isolated from dogs. Predominantly in Southeast.
<u>S. alban</u>	MO	1	1	3	Four of 6 CDC isolations 1947-1958 from Washington, D.C.
<u>S. atlanta</u>	GA	2	2	11	50% of isolates in 1963 from Georgia
<u>S. florida</u>	FLA	1	1	0	Most prevalent in Southeast. Isolated once in 1962 from Florida.
<u>S. grumpensis</u>	HAI	1	1	1	Originally named after a doctor named "Grumpy". Isolated from animal feed in Hawaii in 1963.
<u>S. paratyphi A</u>	CAL NEV	2	2	8	Common in Europe
<u>S. livingston</u>	MD	1	2	17	Uncommon cause of symptomatic human illness.
<u>S. norwich</u>	ARK	1	1	13	Recent recoveries from swine and dogs.
<u>S. new haw</u>	IDAHO	1	1	0	Only isolate in 1963 was from Cal.
<u>S. simsborg</u>	GA	1	1	6	Between 1947-1959, 143 isolations reported since then prevalence has declined.

\*Represents 7,749 human isolations during the first five months of 1964.

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

TABLE IV

Age and Sex Distribution of 1,386 Isolations of Salmonella  
Reported for May, 1964

<u>Age</u>	<u>Male</u>	<u>Female</u>	<u>Total</u>	<u>Per Cent of Total</u>
Under 1	76	79	155	11.2
1-4 yrs.	111	122	233	16.8
5-9 yrs.	56	46	102	7.3
10-19 yrs.	38	27	65	4.7
20-29 yrs.	27	50	77	5.6
30-39 yrs.	24	34	58	4.2
40-49 yrs.	12	30	42	3.0
50-59 yrs.	35	38	73	5.2
60-69 yrs.	25	23	48	3.5
70-79 yrs.	24	23	47	3.4
80+	10	12	22	1.6
Unknown	<u>228</u>	<u>236</u>	<u>464</u>	<u>33.5</u>
Total	666	720	1386	
% of Total	48.1	51.9		





S T A T E

S E R O T Y P E	Ala	Ariz	Ark	Calif	Colo	Conn	Fla	Ga	Ill	Ind	Iowa	La	Md	Mass	Mich	Minn	Miss	Mo	Mont	Neb	NY-BI**	NC	Ohio	Ore	Pa	SC	Tenn	Tex	Va	Wisc	Total	5 mos Total	S E R O T Y P E		
	amager anatum berta blockley braenderup				1 7				1		3						1		1										2	1				1 16 1 8 4	1 131 2 32 5
bredeney california chester cholerae-suis cholerae-suis v. kun		1						1		3						2							1						2	1			9 6 1 14 11 2	22 13 47 19 46	bredeney california chester cholerae-suis cholerae-suis v. kun
cubana derby enteritidis gallinarum give				2 1				1	1							3									2		1						3 4 5 2 4	11 126 47 23 20	cubana derby enteritidis gallinarum give
heidelberg indiana infantis johannesburg kentucky	4			8				7		1			1			3						1		1		1		1	2				30 1 25 2 1	178 7 126 3 14	heidelberg indiana infantis johannesburg kentucky
litchfield livingstone manhattan meleagridis montevideo				1 1 8					1							1							1							3			1 3 9 3 14	2 13 18 22 81	litchfield livingstone manhattan meleagridis montevideo
muenchen newington newport oranienburg orion				2						2						1							1			1				1			1 1 3 6 1	20 12 40 41 4	muenchen newington newport oranienburg orion
pullorum reading saint-paul san-diego schwarzengrund	1							2		1			1				2		7			6	1	1	1	2	1		1	1			28 3 15 13 6	120 4 71 52 41	pullorum reading saint-paul san-diego schwarzengrund
senftenberg simsbury stanley tennessee thompson									4							1										1				1			4 1 1 7 7	28 4 3 40 33	senftenberg simsbury stanley tennessee thompson
typhimurium worthington untypable group B				6 11				2		10 1		1	2		2	1	6		4			1		3	4	1	1	3	1	3			61 3 1	405 27 3	typhimurium worthington untypable group B
TOTAL	8	2	16	56	2	2	3	27	14	34	6	3	1	2	3	26	3	14	8	2	3	12	10	5	9	14	2	19	7	20	333	2,057	TOTAL		

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

\* Includes April late report

\*\* NY-BI = New York - Beth Israel

TABLE VII

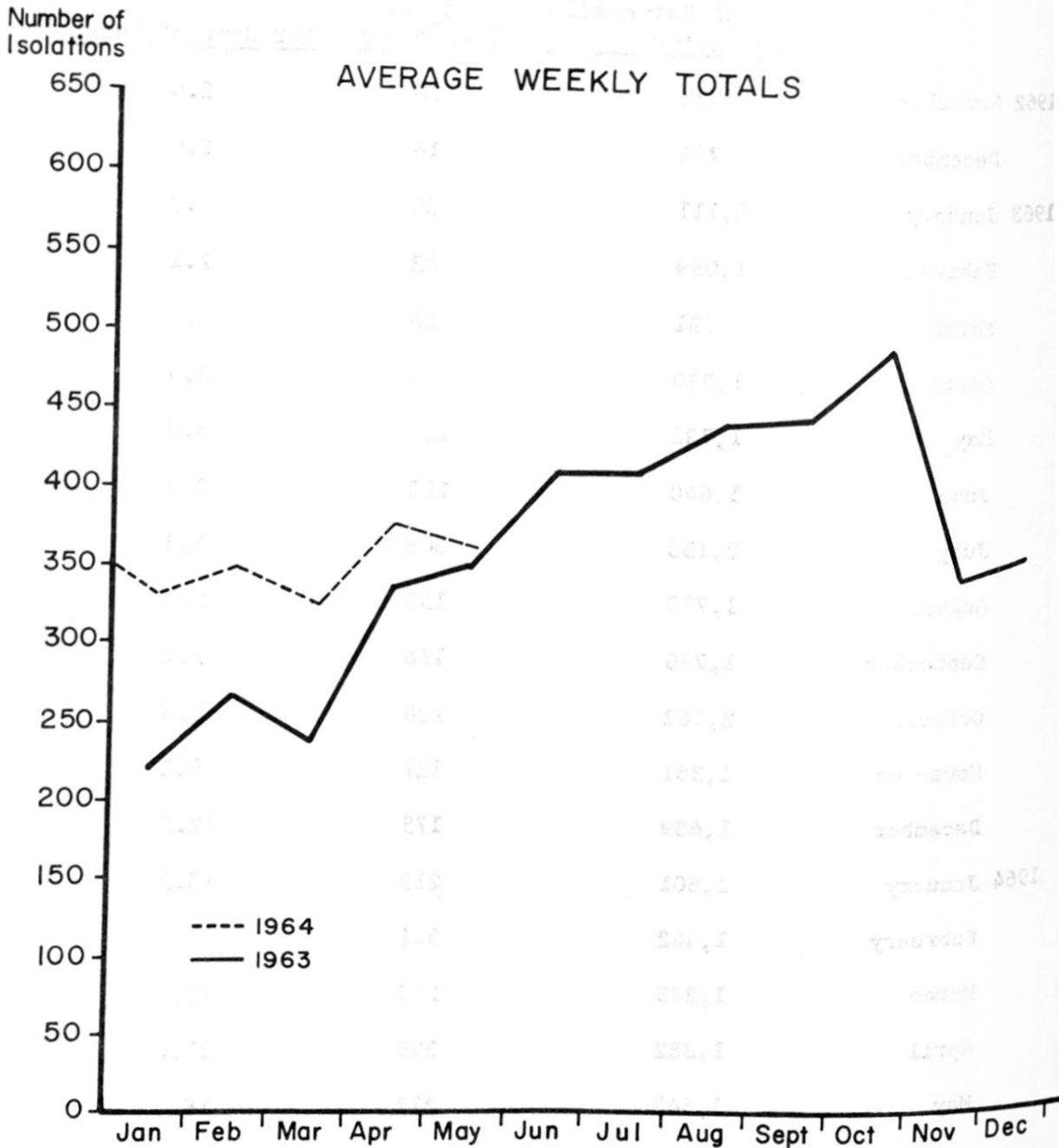
Salmonella derby Isolations and Total Salmonella Isolations  
Reported by Month\*

	<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

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

Figure 1.

# REPORTED HUMAN ISOLATIONS OF in the United States



Note: Average weekly totals rather than monthly totals are presented. Some months have 5 instead of 4 weeks and some States report more frequently than weekly.