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COMMUNICABLE DISEASE CENTER

SALMONELLA

SURVEILLANCE

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For the Month of October 1964

U. S. Department of Health, Education, and Welfare / Public Health Service

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 October, 1,848 human isolations of salmonellae were reported, for an average of 462 per week, a decrease of 63 from the September figure.

The percentage of Salmonella derby isolations reported (4.6) remained approximately the same as that determined in September (4.2). This figure has been steadily decreasing since March of this year (Table VII). Prior to the much publicized interstate hospital-associated outbreak of salmonellosis due to S. derby which began in March 1963, the percentage was approximately 2.0. The percentage of reported S. infantis recoveries remained abnormally high this month (13.3 per cent), but decreased slightly from the 16.2 per cent figure from last month. Salmonella infantis was responsible for a large hospital-associated outbreak in Philadelphia recently.

A total of 543 nonhuman isolations were reported in October, for a decrease of 19 from last month.

II. REPORTS OF ISOLATIONS FROM THE STATES

A. Human

During October, 1,848 isolations of salmonellae from humans were reported. The average number of isolations per week (462) represented a decrease of 63 from September and 28 from October 1963 (Figure 1).

The seven serotypes most frequently reported during October were:

Rank	Serotype	Number	Per Cent	Rank Last Month
1	S. typhi-murium & S. typhi-murium var. copenhagen	473	25.6	1
2	S. infantis	246	13.3	2
3	S. newport	137	7.4	4
4	S. heidelberg	135	7.3	3
5	S. derby	85	4.6	6
6	S. saint-paul	74	4.0	5
7	S. enteritidis	66	3.6	7
Total		1,216	65.8	

Total salmonellae isolated (October) 1,848.

The seven most frequently reported serotypes accounted for 65.8 per cent of all isolations this month while representing only 10.6 per cent of the 66 different types reported. This is consistent with past experience.

Salmonella infantis remained as the second most commonly reported serotype during October. However, the percentage of S. infantis recoveries decreased slightly from the August high of 16.2 per cent. The prominance of this serotype is due to a large hospital-associated outbreak in Philadelphia.

The percentage of S. newport recoveries increased from 4.7 last month to 7.4 during October to make this serotype the third most commonly reported. The highest incidence due to this serotype in October occurred in the southeastern states of Florida, Georgia, Tennessee and Louisiana. In addition, Texas and California demonstrated higher than normal incidence.

The family case to total case ratio during October was 18.7 per cent, consistent with past experience (Table II). The age and sex distribution is consistent with past experience (Table IV).

B. Nonhuman

There were 543 isolations of salmonellae reported from nonhuman sources during October. This is a decrease of 19 from the previous month when 562 were reported. There were 47 serotypes identified among those submitted from 31 states.

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

No.	Serotype	Number	Per Cent	Standing Last Month
1	S. typhi-murium S. typhi-murium var. copenhagen	130	23.9	1
2	S. heidelberg	52	9.6	2
3	S. oranienburg	32	5.9	Not Listed
4	S. infantis	30	5.5	4
5	S. newport	29	5.3	7
6	S. chester	29	5.3	Not Listed
7	S. anatum	25	4.6	Not Listed
		327	60.1	

These seven types account for 60.1 per cent of the total. Three of these types, S. oranienburg, S. chester, and S. anatum, did not appear in the list of seven most common types from human sources. Twenty-three of the 29 isolations of S. chester were obtained from turkeys; 2 from cattle and one each from chicken, sheep, pig and guinea pig. Two-thirds of the S. oranienburg cultures were isolated from turtle tanks.

The 4 species from which most of the isolations were obtained in order of frequency were: turkeys 158 (29.1 per cent); chickens 91 (16.8 per cent); bovine 61 (11.2 per cent); porcine 26 (4.8 per cent). These isolations comprised 71.9 per cent of the total reported.

I. CURRENT INVESTIGATIONS

A. Salmonella dublin Gastroenteritis in Dairy Cattle. Reported by G.D. Carlyle Thompson, M.D., Director of Public Health, Carl G. Peterson, M.D., Chairman, Salmonella Unit, Utah State Department of Health, and Arnold F. Kaufmann, D.V.M., Investigations Section, CDC.

An increased incidence in isolations of Salmonella dublin in Cache County Utah from dairy cattle was noted in October 1963 and continues to the present. No isolations have been made in other areas of the state during this same period. The reported isolations of S. dublin in Utah from 1958, the year in which it was first reported, to the present are as follows:

1958 - Bovine (1) Mink (3)	1962 - Bovine (2)
1959 - Bovine (1)	1963 - Bovine (5)
1960 - No isolations reported	1964 - Bovine (6) (to Sept. 1)
1961 - Bovine (3)	

One of the 1962 and all of the 1963 and 1964 isolations were from Cache County. Due to the virulence of the organism in young calves and the potential virulence for man, an investigation into the status of S. dublin in Cache County was conducted from September 8 to September 18, 1964.

Background

Cache County is located in northern Utah and has the geographical property of being ringed by low mountains with a central valley which extends northward into Idaho. The agriculturally useful portion of the county is roughly 10 miles by 30 miles. This valley is named Cache Valley after the habit of the early fur trappers in storing their furs in this region during the winter season. The county seat of Cache County is Logan, Utah, which is also the home of Utah State University. Aside from the college, the primary industry of the region is agriculture with dairy farming being the most prevalent endeavor. There were 1,158 dairy herds containing 22,160 adult animals in the county as of October 31, 1963, with this number being relatively stable for the preceding 15 years. There were 20 herds of beef animals with 3,100 adult members listed for the same census. Other species of animals are present in much fewer numbers with the exception of the summer months when sheep are brought in to graze in the mountains.

Investigation

Due to the size of the area and the number of dairy herds within the area, it was decided to concentrate on those premises from which S. dublin has been isolated in the past, in addition to a limited number of potential sources related to these premises. Investigation procedure consisted of obtaining the past history of the premises in regard to diarrheal disease and collecting specimens for culture. These specimens usually included swabs dipped in raw milk produced on the premises, rectal swabs from 10 per cent or better of the adult cows, and rectal swabs from calves present or swabs of feces in the calf pens. No specimens of hay or grain were obtained due to the low probability of these yielding salmonella.

Several things interferred with the procurement of accurate, meaningful data. Foremost, there was virtual complete absence of records. In addition, epizootics of infectious bovine rhinotracheitis (IBR) and viral polyarthritis were extant in the animals. To further complicate the picture, the 1963-64 winter was unusually long and arduous with a concomitant increase in cases of pneumonia and other diseases associated with exposure to the winter weather.

Eight separate locations were investigated; five private dairy farms, the Utah State University dairy herd, and two separate experimental projects involving dairy calves. Four of the five private farms were completely closed herds in that no new animals had been introduced into the herds in recent years. The fifth farm purchased its replacements from one of the other farms. The status of the college herd was undetermined. The experimental calves were primarily of local origin bought through a sales barn as newborn. The calves were all raised similarly on the dairy farms, being fed raw milk, hay and oats until old enough to subsist on hay alone. The water supplies were commonly from artesian wells. The calves on the experimental projects had similar diets. Most calves raised on the farms were housed in common pens, whereas, experimental calves were housed separately. In a few instances, calves on the dairy farms were isolated from all animal contact at birth in an attempt to stop diarrheal disease, but this was unsuccessful.

A factor worthy of note, common to all the dairy farms, was the recent problem of large flocks of starlings which migrated from farm to farm in search of food. These often served as competition for food to the dairy cattle.

All premises investigated gave a history of unusually severe diarrheal disease in the dairy calves with the exception of the college dairy herd which was stated to be having no problems. Most premises lost one-third of their calves due to diarrheal disease during the winter season and one premise had a 100 per cent death loss in a group of 39 calves due to diarrheal disease and viral polyarthritis.

Results of the culture survey of farms in Cache Valley were as follows:

	Cows	Calves	Milk	Environment	Total
Total Samples	98	110	25	13	246
Number positive for S. dublin	0*	15	0	0	15

*One cow positive for S. tennessee.

Salmonella dublin was isolated from only two premises, viz. the college dairy herd, which was having no problem, and the experimental calves which suffered severely from diarrheal disease.

It appeared from the investigation that S. dublin had been extant in Cache Valley previous to the winter season of 1963-1964 in wider proportion than previously detected. Possibly the harsh winter and the epizootics present in the valley this year which resulted in an increased mortality in the current calf crop led to a greater number of isolations of S. dublin solely due to increased number of necropsies. However, if one considers the impression of the owners that there had been a continuing increase in diarrheal disease, S. dublin may be increasingly infiltrating the cattle population. The means of spread of S. dublin within the cattle population investigated cannot be specified, however, several mechanisms are worthy of consideration: 1) contamination of calves at birth by carrier dams, 2) spread from calf to calf in common pens whether on the farm or in a livestock auction, 3) ingestion of contaminated raw milk of animals from one premise to another, 4) spread of fomites in the day to day intercourse between farms, and 5) possibly by the wild animal population with starlings and magpies being worthy of note.

B. Outbreak of Typhoid Fever - Atlanta, Georgia. Reported by Malcolm Neel, M.D., Fulton County Health Department, Byron Mixson, Assistant Epidemiologist, Georgia Department of Public Health, and Richard N. Collins, M.D., Salmonella Surveillance Unit, CDC.

Investigation of the Outbreak

On August 30, the apparent index case, a six-year-old negro boy was admitted to the hospital because of fever, abdominal pain, and vomiting. Over the next two weeks, 14 additional negro children ranging in age from 2 to 14 years were admitted to the hospital with febrile illness and a variety of constitutional and gastrointestinal symptoms compatible with typhoid fever. (Table XI) Case #4 was admitted with marked dehydration and toxicity. Oliguria ensued and the patient expired in renal failure three days after admission. Post-mortem examination revealed intestinal and mesenteric lesions consistent with typhoid. Case #2 developed fever, headache, and abdominal pain two weeks after completing a course of chloramphenicol and was readmitted as a relapse with blood cultures again positive for Salmonella typhi E1.

Salmonella typhi, phage type E1, was isolated from each of the cases. This organism was recovered from blood cultures in 9 cases, stool cultures in 2 cases, and both blood and stool specimens in 4 cases. Thirteen of the 14 cases came from 3 closely situated homes in a single neighborhood in Northwest Atlanta. Although case #16 lived only three blocks away from the other cases, she did not know or play with them. In the absence of any common epidemiological ties with the other cases, this was considered most likely a separate and coincidental case. Subsequent investigation uncovered an additional case in a sibling of case #16 and both children were thought to have been infected by a carrier of S. typhi, type E1 in a household in which they frequently stayed while their mother was working.

Cases 1-14 represented a common source outbreak confined to three households. The epidemic curve based on date of onset of symptoms (Figure 2) indicated a span of 34 days between the index case and the last symptomatic case.

The neighborhood involved was a predominantly negro, middle to low socioeconomic area in Northwest Atlanta. No outhouses or privies were in use. Sewage disposal in this area was via standard storm and sanitary drains. Thorough inspection of the sewage system showed no evidence of disrepair or cross-connections. Moore swabs were placed in the sewers for 72 hours at various points in the neighborhood and these were negative for typhoid bacilli on culture. All of the homes in the area were on city water and no wells or cisterns were in use. Water samples taken from the tap in each of the homes involved conformed to the usual standards of purity. Food and milk were purchased from neighborhood stores and no unpasteurized milk or homemade ice cream was consumed.

The geographical relationship of the homes involved is shown on Figure 3. Members of households A and B were related both by kinship (cousins) and friendship and there was frequent visiting and joint play between these children. The one case from household C played frequently with children from both A and B. Food histories taken from the various households indicated that there had been no joint gatherings, picnics, or parties, etc., during the past summer. It was apparent that although on rare occasions, a child from one household might share a bag of cookies, cake or ice cream with a playmate from another household, there was no large scale sharing of meals between the families. Each of the families involved purchased the bulk of their household food from the neighborhood store across the street from household B. Two stool samples were obtained from each of the food handlers in this store and none revealed salmonella organisms.

During the summer children from households A, B, and C frequently played together. In the last half of August heavy rains resulted in flooding of the area about house A and the children enjoyed wading in water as deep as 2½ feet around the house. A culvert behind house A (Figure 3) composed of a narrow and slow-moving stream coursed through a ditch piled high with garbage, tin cans, and refuse. This area was also flooded and used for play. A similar culvert across the street was used less frequently because of more difficult access. Interview with both parents and neighborhood children indicated that during the summer the children frequently urinated and defecated in both the flooded areas and culverts. When the area was visited on September 9, it was no longer flooded. Three water samples were taken from each of the culverts and culture yielded E. coli and paracolon bacilli but no typhoid organisms were recovered.

Toilet and kitchen facilities in houses B and C were crowded but adequate. The water connection to the only toilet in household A had functioned poorly for the past two months and frequently it was necessary to connect a garden hose to a nearby faucet and place it in the toilet bowl in order to flush excreta down the toilet. It is considered likely that the children used the same hose for drinking water during outdoor play on summer days. An old washing machine and large pile of soiled clothing was noted in the kitchen and back porch of household A. After the washing cycle was completed the water from the washing machine was pumped onto the back lawn and drained toward the culvert.

Culture survey of family members and contacts in these households was undertaken early in the investigation. Inquiry was made throughout the neighborhood in search of new symptomatic cases but no cases were found outside these three households. No random stool survey of asymptomatic persons in the neighborhood was done. Attack rates for children in households A, B, and C were 50 per cent, 53 per cent, and 20 per cent respectively. Typhoid vaccine was administered to adults and children in the area early in the outbreak.

It was apparent that the relationship of the children involved was close enough that the presence of a single adult carrier in any household could have accounted for the entire outbreak. Accordingly, an intensive search for such a carrier took place. On the initial survey all ten adults residing in the three households were seen and stools obtained. None of these persons admitted to a history of previous illness compatible with typhoid fever and all stool cultures on the initial survey were negative. The father in household A was alleged by his wife to have had typhoid fever several years ago, but this was emphatically denied. Two additional fecal specimens were obtained by rectal swab from this person and cultures remained negative. It was decided to obtain repeat specimens on all adult members of households A, B, and C. The first and only positive isolation of S. typhi type E1 from an adult in this outbreak was reported on September 15, 1964.

Case #16 was a 49-year-old obese female residing in household B where she did a major portion of food preparation and child care. She had no previous history of typhoid fever. She indicated that she had been feeling poorly herself since the middle of August with vague symptoms of malaise, myalgea, headache, and an increase in her long standing shoulder pain. She had not received typhoid vaccine. There had been no fever, chills, or gastrointestinal symptoms. She rarely if ever, ate food outside her own home. Her only travel in the past six months had been a week-end trip to Greenville, South Carolina, for a family gathering in mid-August. All persons attending this gathering were interviewed by local health department personnel and stool cultures from these persons were negative. The patient worked part time until the last week of August as a maid in a private home in Atlanta. Family members were seen and cultures were obtained and no additional cases were found. The patient was subsequently admitted to the hospital for further evaluation. Stool cultures were positive for S. typhi phage type E1 on two successive days. Widal reactions were as follows:

	O Antigen	H Antigen
9/21	1:800	1:160
9/25	1:160	1:80
9/29	1:400	1:160

The gall bladder was not visualized on double dose cholecystogram. She was treated with chloramphenicol and discharged from the hospital with instructions to no longer participate in cooking and food handling.

Discussion

The clustering of cases in a single neighborhood suggested a common source outbreak. The epidemic curve with a span of 34 days between the onset of symptoms in the index case and the last case led to a hypothesis of multiple or continuous exposures to a common source rather than a single exposure to a single vehicle, although the latter was a theoretical possibility. Case #15 in her role as a major food handler and caretaker in household B acted as the principle disseminator in this outbreak. Whether she represents a true carrier or a so called "missed case" remains thus far a moot point. Her symptoms were vague and compatible with a variety of disease states unrelated to typhoid fever. Her antibody levels to O antigen were elevated, an unusual finding in a typhoid carrier, but the levels varied so greatly over a single week as to seriously question the value of the test. If her stools remain positive for S. typhi over a prolonged period of time, she may undergo cholecystectomy. If typhoid bacilli are recovered from gallstones at the time of cholecystectomy, this may be used as evidence of a genuine carrier state. The frequent interplay of children from households A, B, and C coupled with the breakdown of toilet facilities at household A promoted wide dissemination among these family members. Wading in the flooded areas and culverts about household A no doubt facilitated fecal-to-oral spread of infection.

Summary

An explosive outbreak of typhoid involved three families in a neighborhood in Northwest Atlanta. Fourteen children were hospitalized with one death. The presence of a missed case or typhoid carrier in one household is thought to have been the principle cause of the outbreak.

. REPORTS FROM STATES

A. California

Hospital-Associated Outbreak of Salmonella newport Infection. Reported by Philip K. Condit, M.D., Chief, Bureau of Communicable Diseases, Henry A. Renteln, M.D., Head of Special Surveillance Section, and George Perlstein, M.D., EIS Officer assigned to California State Department of Health; Herbert H. Cowper, M.D., Chief, Division of Communicable Diseases, and Caryl C. Carson, M.D., Epidemiologist, Los Angeles County Health Department.

An outbreak involving 14 cases of Salmonella newport infection in a newborn nursery in a large California hospital occurred in August 1964.

An epidemiological investigation suggested that the outbreak began when a mother, subsequently found to be an asymptomatic excreter of S. newport, delivered an infant, who shortly after birth, became ill with symptoms of fever and bloody diarrhea. The infant's stool culture was positive for S. newport. Approximately 48 hours following this case, gastroenteritis occurred in other infants. Within two weeks, 14 cases had been identified, 12 of whom were symptomatic. There was one death. The attack rate for the nursery population at risk was 10 per cent.

During the course of the epidemic, attempts were made to control the outbreak and to define the method of dissemination within the nursery population. Initially, pre-existing isolation techniques were strengthened and reinforced, and all infants suspected of having salmonellosis were transferred from the nursery to the pediatric floor, where more adequate facilities for patient isolation could be implemented. Spread within the nursery continued however, and eventually the entire delivery, maternity, and nursery units were closed. During this period a thorough cleaning, including scrubbing and germicidal fogging was performed. Since reopening, no new cases have been identified.

All members of the nursery staff, including nurses, aids, physicians and floor assistants and dietary workers submitted stool specimens for examination. In most instances two or more specimens were obtained. One attendant in the nursery was positive for S. newport. Cultures from other individuals produced a variety of interesting results. One specimen from a nurse yielded S. blockley, a specimen from a dietary worker on the tray line in the cafeteria yielded S. typhi-murium, and a porter was positive for S. heidelberg. In addition a kitchen worker, father of one of the symptomatic infants, was found to be excreting S. newport.

Further investigation revealed that the nursery attendant positive for S. newport had had direct contact with all infants positive for S. newport, including the index case, during the time she was first symptomatic. No other person had contact with all cases. This suggested that this one individual spread the organism from case to case after becoming infected through contact with the index case. Although less likely, it was impossible to deny that spread may have occurred by other individuals and contamination of environmental materials.

Editor's Comment: Several salient points are demonstrated by this outbreak. First, attempts to control the outbreak by time-honored isolation techniques apparently were ineffective, and only by closing the nursery could the outbreak be terminated. Secondly, the index case in this outbreak probably was infected by the mother, either during birth or during association with the mother after birth. This is probably the most common way in which an outbreak such as the one described has its genesis. Re-emphasizing the need to obtain a good medical history from patients entering an obstetrical unit. Thirdly, finding other salmonella serotypes among the hospital population is interesting, although not unusual. It is likely that in a large hospital a number of asymptomatic excreters of salmonellae may be identified during a culture survey. This might be referred to as the "endemic" level of salmonellosis that exists within some hospitals. The potential hazard of these asymptomatic carriers is evinced by the outbreaks of hospital-associated infection which have been attributed to such persons.

B. North Carolina

Preliminary report - Salmonellosis Possibly Due to Contaminated Duck Eggs. Reported by F. T. Foard, M.D., Chief, Communicable Disease Control Section, and Ronald Levine, M.D., EIS Officer assigned to North Carolina State Board of Health.

On October 7, seven members of a rural family developed gastroenteritis and were hospitalized. Because of the large number of cases within one family, an investigation was initiated.

The family consisted of two separate households - a young farm couple and their three children, and the paternal grandparents. On September 19, the grandmother made a banana pudding, some of which she and her husband consumed the same afternoon and evening. The rest of the family ate some of the pudding the following morning. Approximately 18 hours after eating pudding, the grandparents became ill with symptoms of nausea and abdominal pain, which by the afternoon progressed to severe vomiting and diarrhea. They were hospitalized, and shortly thereafter, the other members of the family became ill with similar symptoms and were also hospitalized.

No food other than the banana pudding had been consumed by both households. The pudding was prepared in the following manner. A custard was prepared from sugar, flour, homogenized milk, and duck egg yolks. The custard was brought to a boil and fresh bananas were then added to form the pudding. A meringue was prepared with the whites of the duck eggs and sugar. The pudding was topped with meringue and placed in the over for a brief time until the meringue browned. It was then kept at room temperature until consumed. The eggs used came from several ducks kept by the grandparents in their backyard.

Salmonella typhi-murium was isolated from stool specimens from the parents. Specimens of the duck eggs and droppings have been submitted to the State Board of Health Laboratory for bacteriologic analysis and results of these cultures will be subsequently reported.

INTERNATIONAL

A. Salmonella Isolations Typed During the Second Quarter of 1964, Utrecht, The Netherlands. Reported by E. H. Kampelmacher, D.V.M., Head, Zoonoses Laboratory, National Institute of Health, The Netherlands.

During the second quarter of 1964, 2,940 isolations of salmonellae were typed in the Zoonoses Laboratory of the National Institute of Health in the Netherlands. This represented an increase of 1,394 (90.2 per cent) over the previous quarter. Of the 2,940 isolations, 1,586 (53.9 per cent) were from human specimens.

The seven most common types from human and nonhuman sources appear in Table VIII. Salmonella typhi-murium, S. panama and S. stanley, the three most frequently reported serotypes from humans also were among the seven most common from nonhumans.

Salmonella dublin, the second most commonly isolated serotype, was recovered primarily from cattle. The host-adapted feature of this serotype is recognized and confirmed by data from the United States.

Of the seven most frequently recovered types from humans, only S. typhimurium, S. heidelberg, and S. infantis are reported frequently in the United States. Salmonella panama and S. paratyphi B are not uncommon in this country, but S. stanley and S. bovis-morbificans are rarely recovered. In the United States, S. stanley is most frequently recovered from monkeys.

The most prevalent nonhuman sources of salmonellae during the second quarter of 1964 in the Netherlands were human foods --- meat and meat products (359 or 26.5 per cent), pigs 297 (21.9 per cent), cattle 201 (14.8 per cent), sewage 191 (14.1 per cent) and chickens 119 (8.8 per cent).

More than half of the nonhuman recoveries of salmonellae made in the United States are from poultry and poultry products. Pigs and cattle are also common sources, but isolations from human foods (especially meat and meat products) and sewage are rarely reported. The differences may well reflect "interest factors."

B. Common Salmonella Serotypes Isolated in Poland. Reported by Dr. Z. Buczowski, Director, Institute of Marine Medicine, Gdansk, Poland.

The common serotypes isolated in Poland between 1957 and 1963, and the percentage of the isolations of each serotype associated with clinical disease are depicted in Table IX. The percentage of persons with clinical symptoms range from 6.8 to 85.9 per cent. Salmonella cholerae-suis was more frequently associated with symptoms than other serotypes (85.9 per cent); S. enteritidis showed essentially the same frequency (84.0 per cent). Salmonella dublin, usually classified as a host-adapted serotype (cattle), accounted for 312 isolates. Of these, 212 (67.9 per cent) of persons positive were symptomatic. Salmonella typhi-murium was the most common serotype isolated, with 60.1 per cent of the persons positive having symptoms.

Editor's Comment: This is a most interesting report presenting differences in serotype virulence frequently alluded to in this country but seldom backed by factual information. As one might expect, S. cholerae-suis infection is frequently associated with clinical disease. Although S. typhi is not included in this report, it would also be expected to be close to the top in such a list. Although we have no comparative data, the high percentage of symptomatic cases caused by S. enteritidis. S. dublin, and S. typhi-murium is surprising. The low percentages of S. anatum and S. derby infections causing symptoms are comparable to experience in this country based on information collected from recent outbreaks of hospital-associated salmonellosis.

Table X lists the 10 most common serotypes isolated from humans in the United States during 1963. When the common types isolated in Poland between 1957 and 1963 are compared with the 10 most common types isolated from humans in the United States (Table X), there is little similarity in order of frequency, with the exception of S. typhi-murium which is the most common serotype isolated in both countries. Three other serotypes, S. enteritidis, S. derby, and S. heidelberg appear in both lists. Differences in the prevalence of serotypes isolated in various parts of the world probably reflect variations both in serotype prevalence and in the relative importance of various reservoirs and vehicles of infection responsible for human disease. In the United States there is correlation between serotypes isolated from human and nonhuman sources, suggesting the importance of the nonhuman reservoir as a source of human disease. It would be interesting to contrast the serotypes isolated from human and nonhuman sources in Poland to see if there is a similar correlation.

FOOD AND FEED SURVEILLANCE

A. Turtle Food.

Stimulated by the increase in reports of salmonella isolations from pet turtles (SSR Nos. 10 and 13), 65 boxes of dried commercial turtle food have been examined in the Veterinary Public Health Laboratory during October. The food was prepared by 3 different producers and packaged in 1/8 or 1/4 oz. amounts in small cardboard boxes or cartons. It was obtained from local pet and 10¢ stores. Approximately 15 gms. (the contents of 2-4 boxes) was inoculated into 50 ml. of tetrathionate enrichment broth and 3 ml. of 10 per cent tergitol added. The enrichment broths were incubated 48 hours and streaked to brilliant green agar plates containing sodium sulfadiazine. Salmonella senftenberg was isolated from one pool of 4 boxes. Salmonellae were not recovered from 9 other pooled samples of this brand or from 17 pooled samples of 2 other brands. The brand from which S. senftenberg was recovered contained both meat meal and bone meal.

B. Utah - Animal Feed Ingredients: 50 per cent meat meal and products from 2 rendering plants.

During the investigations following an outbreak of S. heidelberg infection in Utah attributed to frozen eggs used in bakery products, chicken feed ingredients were sampled. During July and September, 59 samples of 50 per cent meat meal were shipped to the Veterinary Public Health Laboratory, CDC, for examination. Sixteen salmonella serotypes were recovered from 21 (35.5 per cent) of these samples. Two or 3 serotypes were found in each of 7 samples.

In 2 rendering plants, samples of the cooked product were collected at 3 points: 1) before entering oil press, 2) after leaving oil press, and 3) after complete processing. Salmonellae were isolated from 100 per cent of the finished products examined in both plants. Thirteen serotypes were recovered from 21 (77 per cent) of the 27 samples. Nine of the serotypes recovered from the rendered products also were found in the meat meal (Table XII). S. heidelberg was isolated from both sources.

Detailed information regarding these investigations will be described in a paper for publication in the near future by Mr. Russell S. Fraser, Director of Laboratories, Utah State Health Department, and Dr. Leslie Paul Williams, Veterinary Epidemiologist, Communicable Disease Center.

TABLE I

SALMONELLA SEROTYPES ISOLATED FROM HUMANS DURING ** OCTOBER, 1964

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
adelaide									2				2						
amager																			
anatum				1		1	2				1		1		1	1	3		5
bareilly	1					3	4			1			1				1		1
berta								1					1			1			1
binza																1			1
blockley				6			6	1	1	2	1		5			1			1
braenderup				2		1	3				1		1			1			1
bredeney				1		3	4	2	1		1		4			1	1	1	3
california								1					1						
cerro						1	1												
chester																			
concord																			
cubana												1	1						
derby				2		2	4	7	11	5	2	10	35	5		1	1		7
dublin																			
eastborne									1				1						
enteritidis	1			13		4	18	4	5	5	2	6	22	4	4	4	2	1	15
florida																			
georgia																			
give																			
heidelberg	2			11			13	2	10	6	5	7	30	5		5	1	2	13
indiana									1	1			2						
infantis			1	3		8	12	6	4	4	4	127	145	5	5	6	5	4	25
java																		3	3
javiana				1			1												
kentucky																			
litchfield									1				1			1	1		2
livingstone																			
loma-linda																			
manhattan										1			1			1		1	2
meleagridis																3			3
miami																			
minnesota																			
mississippi																			
montevideo	1		1		1	1	4	5	6	3	1	9	24	1		3			4
muenchen									3	1	1	1	6						
muenster																			
newington																			
newport						1	1	1	4	4	2	7	18		2	4	2		8
oranienburg				1			1		4	1			5	1	1	2	2		6
panama				2		1	3	1		1			2	1		1			2
paratyphi A																1			1
paratyphi B				6			6		1			2	3	1			1		2
pensacola																			
poona																	1		1
reading								1					1	2					2
richmond																			
rubislaw																			
saint-paul				5		1	6	5	11	10	2	2	30		1	4	6		11
san-diego								1	1	1		1	4	1			1		2
schwarzengrund									2				2				1		1
senftenberg																3			3
simsbury																			
stanley																			
tennessee												1	1	1	1	2		1	5
thompson								4		1			5	1		1			2
travis																			
typhi								3	5		1		9	4	1	1	1		7
typhi-murium	1			23	8	10	42	19	14	21	11	12	77	18	4	25	21	14	82
typhi-murium v cop				2			2				1		1				1		1
uganda																			
urbana						2	2												
virchow																			
weltevreden																			
worthington								1					1	1					1
Untypable Group B																			
Untypable Group C-1																			
Untypable Group C-2																			
Untypable Group D																			
Untypable Group E																			
Untypable																			
Unknown		5					5											1	1
TOTAL	6	5	2	79	9	39	140	65	88	68	36	186	443	51	20	74	52	28	225

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

* The Beth-Israel Salmonella Typing Center in New York is a reference laboratory and processes many cultures from other states which are assigned to the respective states although reported by N.Y.-B.I.

** Includes September late reports.

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	SEROTYPE
																		adelaide
		1					1											amager
									1		1				1	6	9	anatum
								1			1					2	4	bareilly
																		berta
											1						1	binza
1		1					2		2		1						3	blockley
		1					1						1				1	braenderup
																1	1	bredeney
																		california
																		cerro
	2						2											chester
																		concord
						1	1											cubana
1							1	1	8				3		2	2	16	derby
																		dublin
																		eastborne
2		1					3				4					1	5	enteritidis
																		florida
						1	1											georgia
																1	1	give
1			1			2	4		3		1		3		1	2	10	heidelberg
									1								1	indiana
5		2				3	10	2	2	1					2	4	11	infantis
	1	2					3								2		2	java
						1	1								4	5	9	javiana
1							1											kentucky
									1						1		2	litchfield
																		livingstone
																		loma-linda
									1								1	manhattan
																		meleagridis
																9	9	miami
																		minnesota
															7		7	mississippi
1		1					2						1			2	3	montevideo
		1					1									4	4	muenchen
													1			1	2	muenster
																		newington
			1			1	2		1				2		17	18	38	newport
2		1				6	9				2		1		3	7	13	oranienburg
									1		4					1	6	panama
																		paratyphi A
											4						4	paratyphi B
															1		1	pensacola
						1	1											poona
																		reading
																		richmond
															1		1	rubislaw
1		1	1				3		2		1		2		3	4	12	saint-paul
									1						1		2	san-diego
1							1									5	5	schwarzengrund
													2			1	3	senftenberg
																		simsbury
																1	1	stanley
																1	1	tennessee
									6				1		2	11	20	thompson
																		travis
		2					2				1		1		4	4	10	typhi
15	4	14	5	1		15	54	2	12	3	23		4		26	22	92	typhi-murium
								2									2	typhi-murium v cop
																		uganda
																		urbana
								2									2	virchow
																		weltevreden
											1						1	worthington
	1						1			5							5	Untypable Group B
																		Untypable Group C-1
																		Untypable Group C-2
										1							1	Untypable Group D
																		Untypable Group E
																		Untypable
	1						1						1				1	Unknown
31	9	28	8	1	-0-	31	108	10	42	10	45	-0-	23	-0-	78	115	323	TOTAL

TABLE I (CONTINUED)

SEROTYPE	REGION AND REPORTING CENTER																		
	EAST SOUTH CENTRAL					WEST SOUTH CENTRAL					MOUNTAIN								
	KY	TENN	ALA	MISS	TOTAL	ARK	LA	OKLA	TEX	TOTAL	MONT	IDA	WYO	COLO	NM	ARI	UTAH	NEV	TOTAL
delaide																			
mager																			
anatum	1				1		4	1		5									
bareilly						1			1	2									
berta							1			1									
binza							1		1	2									
binza'--							4	1		5									
binza'--up							1			1									
binza'--							1			1						1			1
cubapa_ia																			
cubana																			
cubana																			
cubana									1	1									
cubana														1					1
derby		1			1		5			5	1			3		1			5
dublin																			
eastborne																			
enteritidis	1				1												1		1
florida																			
georgia									4	4									
give																1			1
heidelberg	4		2		6	1	6	1	3	11				2		3	9	1	15
indiana							1			1									
infantis	1				1		2	2	3	7	1			4		1	1		7
java								1		1									
javiana		1	1		2	1	11	1	3	16									
kentucky									1	1						1			1
litchfield																			
livingstone																			
loma-linda																			
manhattan																			
meleagridis							1			1									
miami																			
minnesota																			
mississippi							1			1									
montevideo				1	1		9		1	10				3					3
muenchen								1	23	24						3			3
muenster																			
newington		2			2														
newport		9	1		10	3	23	1	7	34				1		6		1	8
oranienburg		1			1														
panama		1			1			2	4	6	3			1		1			5
paratyphi A									1	1						1			1
paratyphi B																			
pensacola			1		1				5	5									
poona		1			1														
reading									1	1									
richmond																			
rubislaw									1	1									
saint-paul							1		1	2									
						1	1			2		1		2		1	1		5
san-diego																			
schwarzengrund		6			6			1		1							1		1
senftenberg				1	1		3		1	4						1			1
simsbury							2	1		3									
stanley																			
tennessee			1		1														
thompson		1			1														
travis							2	2	3	7							1		1
typhi	1				1				1	1									
typhi-murium		3			3	2		3	2	7					1		1		2
typhi-murium v cop						1	6	3	3	13	1	1		8		5	1	3	19
uganda							7			7	2	1				1			4
urbana							1			1									
virchow																			
weltevreden																			
gton																			
le Group B																			
le Group C-1		1	2	3	6	3													4
le Group C-2										3					4				1
le Group D				1	1										1				1
						1									1				1
ble Group E										1					1				1
ble																			
n															1				
TOTAL	8	27	8	6	49	14	94	21	71	200	8	3	-0-	25	9	27	16	5	93

TABLE I (CONTINUED)

REGION AND REPORTING CENTER: PACIFIC — WASH	ORE	CAL	ALASKA	HAWAII	TOTAL	OTHER VI	TOTAL	PERCENT OF TOTAL	TEN MONTH TOTAL	% TEN MONTH TOTAL	1963 TEN MONTH TOTAL	% OF 1963 10 MOS. TOTAL	SEROTYPE
							2		6				adelaide
							1		10				amager
		1	23		24		47		243		187		anatum
		1			1		13		80		50		bareilly
		1			1		4		45		57		berta
				1	1		4		18		7		binza
2				1	3		23	1.2	357	2.0	300	1.9	blockley
1		2		2	5		11		87		48		braenderup
							19		176		123		bredeney
							1		27		8		california
		1			1		1		5		4		cerro
							3	0.2	63	0.4	178	1.1	chester
							1		2		2		concord
							3		51		32		cubana
	3	2		6	11		85	4.6	2,223	12.5	1,318	8.3	derby
		1			1		1		2				dublin
							1		1				eastborne
		1			1		66	3.6	609	3.4	658	4.1	enteritidis
							4		6				florida
							1		1				georgia
							2		65		54		give
8	2	19	2	2	33		135	7.3	1,451	8.1	1,325	8.3	heidelberg
							4		44		13		indiana
1	2	12		13	28		246	13.3	1,264	7.1	798	5.0	infantis
		4			4		13		192		116		java
							29	1.6	210	1.2	143	0.9	javiana
							3		19		51		kentucky
							5		53		48		litchfield
				1	1		1		8		14		livingstone
	1				1		1		2		6		loma-linda
		1		1	2		7		156		150		manhattan
							3		43		78		meleagridis
							9		42		57		miami
							1		11		12		minnesota
							7		33		25		mississippi
1		2		1	4		55	3.0	423	2.4	414	2.6	montevideo
		1	1		2		40		225		237		muenchen
1					1		3		5		5		muenster
							2		29		40		newington
		17		1	18		137	7.4	842	4.7	928	5.8	newport
		3			3		49	2.7	449	2.5	455	2.9	oranienburg
		1			1		17		152		118		panama
							1		6				paratyphi A
2					2		22		145		134		paratyphi B
							2		9		6		pensacola
		1			1		5		35		3		poona
							3		33		43		reading
							1		2				richmond
							3		15		11		rubislaw
1	2	1		1	5		74	4.0	544	3.1	492	3.1	saint-paul
		3			3		13		132		99		san-diego
2		1		3	6		26		126		129		schwarzengrund
							10		92		30		senftenberg
		1			1		1		2				simsbury
							1		6		13		stanley
		2			2		10		302		120		tennessee
	1	2			3		39	2.1	324	1.8	276	1.7	thompson
							1		1				travis
	1	9			10		48	2.6	591	3.3	644	4.1	typhi
12	5	48	1	7	73		455	24.6	4,767	26.8	4,686	29.5	typhi-murium
							17	0.9	167	0.9	143	0.9	typhi-murium v cop
							1		4				uganda
		1			1		3		21		25		urbana
							2		4				virchow
				3	3		3		19		42		weltevreden
		1			1		4		42		25		worthington
							19		255		259		Untypable Group B
	3				3		4		73		56		Untypable Group C-1
							2		45		41		Untypable Group C-2
							3		33		63		Untypable Group D
			5		5		6		13		16		Untyable Group E
		1			1		1		3				Untypable
							8		86		63		Unknown
31	20	141	32	43	267	-0-	1,848		17,818		15,881		TOTAL

(VI - Virgin Islands)

TABLE I-A

SEROTYPES REPORTED FROM HUMANS PREVIOUSLY DURING 1964
BUT NOT IN OCTOBER

Serotype	Month(s)	Reporting Center(s)	Number of Isolations
aberdeen	Sept	N.Y.-B.I.	1
abony	Jan	N.Y.-C	1
alachua	Jan-Apr	Calif(2)	
	Sep	N.Y.-B.I.(1)	3
albany	Jan	La(2)	
	May-Jul	Mo(2)	
	Jun	Fla(1)	5
amsterdam	Apr	Colo	1
ardwick	Apr	Ill	1
arechavaleta	Jun	Okla	1
atlanta	Apr-May-Jun-Jul	Ga	5
banana	Jul	Ariz	1
birkenhead	Sep	Hawaii	1
bonariensis	Sep	Kan	1
bovis-morbificans	Jan	La(1)	
	Mar-Jul	Calif(3)	
	Aug	Hawaii(1)	
	Sep	Mass(1)	6
bradford	Jul	Mo(1)	
	Sep	N.J.(1)	2
brancaster	Jul	Ind	1
brandenburg	Jun	Colo	1
bristol	Aug	Tex	1
cambridge	Jan	Ill	1
caracas	Sep	Tex	1
carrau	Jul	Mich(1)	
	Sep	Fla(1)	2
cholerae-suis	Jan	D.C.(1)	
	Feb-Mar-Apr	N.Y.-C(3)	
	Mar	Calif(1)	
	Mar	Ky(1)	
	Mar	Ga(1)	
	Mar	N.Y.-B.I.(1)	
	Jul-Sep	Ohio(3)	
	Sep	Pa(1)	12
cholerae-suis v kun	Jan-Jul-Aug	N.C.(3)	
	Jan-Mar-May-Aug	Fla(7)	
	Jan-Feb-Apr-Jun-Jul	Va(5)	
	Jan	N.J.(1)	
	Feb	Mo(1)	
	Mar-Sep	La(2)	
	Apr-Jul	Mich(2)	
	May-Jul-Aug	Ga(4)	
	Jun	Tex(1)	
	Jul-Sep	Ill(2)	
	Aug	Minn(1)	29
colorado	Jan-Jun	Hawaii	2
decatur	Aug	Okla	6
denver	Apr	Calif	1
duesseldorf	Jun	Pa(1)	
	Aug	Tex(2)	3
emek	Jul	Calif	1
essen	Sep	Colo	1
galiema	Apr	Colo	1
gallinarum	Jul-Sep	Miss	3
gaminara	Jul	La	1
gatuni	Jan	Fla	1
goettingen	Jul	N.C.	1
grumpensis	Mar-May-Jun	Hawaii	4
halle	Jun	Mass	1
hamlstad	Apr	Mich	1

TABLE I-A (CONTINUED)

SEROTYPES REPORTED FROM HUMANS PREVIOUSLY DURING 1964 BUT NOT IN OCTOBER

Serotype	Month(s)	Reporting Center(s)	Number of Isolations
hartford	Feb-Mar-Apr	Fla(3)	9
	Mar-Jun	Ill(2)	
	Apr	La(1)	
	Apr	Dela(1)	
	May	Ala(1)	
	Sep	Mo(1)	
hato	Mar	Colo	1
irumu	May	Mo(1)	4
	Jul	Colo(2)	
	Jul	N.C.(1)	
johannesburg	Apr	Calif(1)	2
	Apr	N.Y.-A(1)	
kottbus	Jun	N.Y.-A	1
lexington	Aug	Tex	1
lomita	Sep	La	4
london	Feb-Jun	Va	3
luciana	Jan	Ariz	1
madelia	Feb	Wisc	1
manchester	May-Jun	Tex(2)	3
	Sep	Va(1)	
michigan	Apr-Jun	Calif	2
mission	Aug	Fla	1
new-brunswick	Mar	Ill(1)	4
	Apr-Jul	Calif(2)	
	Jul	Ga(1)	
new-haw	May	Ida	1
norwich	Apr-Jul	Fla(2)	10
	May	Ark(1)	
	Jun	Va(1)	
	Jul	Mo(1)	
	Jul	Ga(1)	
	Sep	La(3)	
	Sep	Tex(1)	
ohio	Mar-Aug	Calif	3
orion	Feb	Mass(1)	3
	Aug	Mo(1)	
	Sep	Fla(1)	
oslo	Jan-Jul-Aug	Hawaii(3)	7
	Mar	Calif(1)	
	Mar	Airz(1)	
	Jul	N.Y.-B.I.(1)	
	Aug	Va(1)	
othmarschen	Jan	Tex	1
pullorum	Mar	Ga	1
redlands	Mar	Ga	1
salinatis	Sep	Calif	1
saphra	Sep	Tex	1
senftenberg v newcastle	Sep	N.Y.-B.I.	5
shipley	Jan	N.Y.-C	1
siegburg	Aug	Mich	1
sundsvall	Feb	Ariz	1
tallahassee	Jul	Fla(1)	2
	Jul	N.J.(1)	
thomasville	Sep	Fla	1
weslaco	Jul	Tex	1
westerstede	Sep	Tex	1
westhampton	Mar	Hawaii	1
TOTAL			184

TABLE II

Number of Salmonella Isolates from Two or More Members of the Same Family - October 1964

Reporting Center	Total Number of Isolates Reported	Number of Isolates From Family Outbreaks	Per Cent of Total
Alabama	8	0	0.0
Alaska	32	2	6.3
Arizona	27	0	0.0
Arkansas	14	4	28.6
California	141	30	21.3
Colorado	25	12	48.0
Connecticut	39	7	17.9
Delaware	10	1	10.0
District of Columbia	10	0	0.0
Florida	115	26	22.6
Georgia	78	19	24.4
Hawaii	43	6	13.4
Idaho	3	0	0.0
Illinois	74	5	6.8
Indiana	20	5	25.0
Iowa	9	2	22.2
Kansas	31	6	19.4
Kentucky	8	2	25.0
Louisiana	94	22	23.4
Maine	6	3	50.0
Maryland	42	9	21.4
Massachusetts	79	16	20.3
Michigan	52	16	30.8
Minnesota	31	8	25.8
Mississippi	6	0	0.0
Missouri	28	2	7.1
Montana	8	2	25.0
Nevada	5	2	40.0
New Hampshire	5	2	40.0
New Jersey	36	6	16.7
New Mexico	9	0	0.0
New York - A	65	9	13.8
New York - BI	88	13	14.8
New York - C	68	8	11.8
North Carolina	23	3	13.0
North Dakota	8	0	0.0
Ohio	51	7	13.7
Oklahoma	21	7	33.3
Oregon	20	0	0.0
Pennsylvania	186	44	23.7
Rhode Island	9	1	11.1
South Dakota	1	0	0.0
Tennessee	27	2	7.4
Texas	71	5	7.0
Utah	16	0	0.0
Vermont	2	1	50.0
Virginia	45	12	26.7
Washington	31	9	29.0
Wisconsin	28	9	32.1
Totals	1,848	345	18.7

TABLE III

Infrequent Serotypes

Serotype	Center	October	10 Month Total*	1963 Total**	Comment
S. adelaide	NY-BI	2	6	0	First reported 1943 from Australia; common contaminant of Kangaroo meat.
S. amager	MO	1	10	39	Nonhuman isolates primarily poultry and swine.
S. cerro	CONN	1	5	6	Majority 1963 isolates from animal feed and fertilizer.
S. concord	TEX	1	2	2	1963 isolates from VA; first reported from chicks and a food poisoning case in England in 1944.
S. dublin	CALIF	1	2	2	Most commonly reported from cattle in Far West; first reported Dublin, Ireland 1929 from a fatal human septicemia.
S. eastbourne	NY-BI	1	1	0	Nonhuman isolates primarily poultry; first isolated from case of paratyphoid in Eastbourne, England, 1931.
S. florida	TEX	4	6	0	Human isolates primarily in S. Eastern U.S.; first reported 1943 from case of enteritis in Florida.
S. georgia	KAN	1	1	2	1963 isolates ARK and NY; first reported in GA 1944 from asymptomatic carrier.
S. livingstone	HAI	1	8	17	Forty-five nonhuman isolates 1963 from poultry, swine and meat scraps.
S. loma-linda	ORE	1	2	6	Isolations in humans only in ORE and CALIF; only 1 nonhuman isolation of record from ARIZ.
S. minnesota	LA	1	11	13	All 1963 isolates from Midwest and East.

TABLE III (cont'd)

Serotype	Center	October	10 Month Total*	1963 Total**	Comment
S. muenster	FLA, N.C. & WASH	3	5	5	1963 isolates from FLA, LA, and TEX.
S. paratyphi A	ILL	1	6	8	1963 isolates from CALIF, NY, and OHIO; common problem on other continents.
S. pensacola	ALA & GA	2	9	6	Mainly reported from the S.E.; first reported in 1945 from FLA.
S. richmond	TEX	1	2	5	First isolated in VA, 1946; 4 of 1963 isolates and 1 of 1964 from KAN.
S. simsbury	CALIF	1	2	6	Most common nonhuman sources poultry, swine and lower primates.
S. stanley	FLA	1	6	13	A common isolate from lower primates.
S. travis	TEX	1	1	0	First isolated in TEX, 1961 from case of enteritis.
S. uganda	LA	1	4	0	Isolated from a turtle in KAN this month which originated from LA.
S. virchow	DEL	2	4	1	Nonhuman isolates from red meat and eggs.

*Represents 17,818 human isolations of salmonellae during the first ten months of 1964.

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

TABLE IV

Age and Sex Distribution of 1,802 Isolations of Reported for October, 1964

Age	Male	Female	Total
Under 1	99	97	196
1-4 yrs.	140	116	256
5-9 yrs.	47	56	103
10-19 yrs.	73	62	135
20-29 yrs.	58	55	113
30-39 yrs.	46	29	75
40-49 yrs.	32	34	66
50-59 yrs.	39	29	68
60-69 yrs.	28	25	53
70-79 yrs.	15	22	37
80+	15	12	27
Unknown	325	348	673
Total	917	885	1,802
% of Total	50.9	49.1	

NON-HU[illegible] BY THE NATIONAL ANIMAL DISEASE LABORATORY AND STATE REPORTING CENTERS BY SEROTYPE AND SOURCE OCTOBER 1964

SEROTYPE	chicken	turkey	duck	pigeon	guinea fowl	parakeet	pheasant	wild fowl unknown	avain	equine	bovine	ovine	porcine	canine	feline	guinea pig	rabbit	monkey	mink	buffalo	bobcat	eggs	egg yolk	frozen eggs	egg product	egg shell	chicken	food mix	ice cream	stuffed cabbage	bone meal/ meat scraps	feed unknown	tankage	turtle	snake	sewage	turtle water	turtle tank	egg processing equipment	unknown	Total	Ten Months Total
alachua		1																																							1	7
albany		1																																							1	3
anatum	2	14									4		2							1													1			1					25	225
bareilly																						1		2							1						4				8	25
binza		1												1																	1										3	37
blockley	3	4																																							7	98
braenderup																																		4				1			5	15
bredeney		2																																							2	99
california	2																																								2	20
cerro																																	1								1	39
chester	1	23									2	1	1			1																									29	164
cholerae-suis													1																												1	31
cholerae-suis v kun													7																												7	94
cubana																								1																	1	32
derby	1	1											1													1															4	194
dublin											4																														4	25
enteritidis	1												4																												5	76
gallinarum	9	1																																							10	55
give	1																																							1	2	35
heidelberg	14	29											2						1					6																	52	408
illinois																															1		1								2	8
infantis	5	2											1				1							16			3				1					1					30	308
kentucky																															1										1	28
litchfield	1	1																																							2	13
livingstone		1																						1							3	1	1								7	44
madelia								1																																	1	1
manhattan		1																																							1	43
meleagridis	1																																								1	36
minnesota		2																																							2	10
montevideo	6																					1		4	2		1	2			1	1	1						1		20	181
muenchen	1	3																				7	6					4													21	83
newington	3	2																																							5	34
newport		2								2	7	2								1														1		1	1	12			29	134
ohio																							1									1									2	12
oranienburg													1									2	2		4						2			1				20			32	122
orion		1																													1										2	13
panama		8							1					1																											10	24
poona		1																																	1			1			3	5
pullorum	6																																								6	181
saint-paul	2	8			1																			4		1						1									17	175
san-diego	1	12																																							13	81
schwarzengrund		6																																1							7	96
senftenberg		2																													1										3	73
tennessee																							1								2					1					4	85
thompson	4	2																1				2	1	3	1		1														15	103
typhi-murium	15	18	1	2			1		1	3	41	3	1			1		1	1					1					1	2						1		6			100	809
typhi-murium v cop	12	5		2		1					3		5		1						1																				30	132
uganda																																						1			1	1
worthington		4																																							4	56
untypable group B										1																															1	5
untypable group C-1																											1														1	4
TOTAL	91	158	1	4	1	1	1	1	2	6	61	6	26	2	1	2	1	2	2	2	1	13	11	38	7	2	6	6	1	2	15	4	5	7	1	5	5	41	1	1	543	4,709

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

									4			6				12
cholerae-suis																
cholerae-suis v kun									6			1				
cubana																
derby									1			1				1
dublin				4												
enteritidis													1			4
gallinarum			1													
give				1				1								
heidelberg			2	19		2		3					3	4		12
illinois									1							1
infantis	1		1	7					1					1		2
kentucky																1
litchfield	1															
livingstone				1					1			3				1
madelia							1									
manhattan				1												
meleagridis																
minnesota				2												
montevideo			2	3				1	2							1
muenchen								1								3
newington							1	1						1		
newport		4		6	1						12	1				4
ohio																
oranienburg									1		20				1	2
orion																2
panama				1												
poona				1							1				1	
pullorum									1							
saint-paul	1			1					1							5
san-diego								1								8
schwargrund				3					2							2
senftenberg												1				2
tennessee									1							3
thompson			1	3												2
typhi-murium	1	1	1	25	6		1		8	2	8	4		2	9	14
typhi-murium v cop	1	3						4	7	1			5			3
uganda											1					
worthington				2												
untypable group B												1				
untypable group c-1			1													
TOTAL	6	9	10	90	8	2	3	12	41	4	51	22	9	11	14	89

Source: National Animal Disease Laboratory, Ames, Iowa and

															1	39	cerro
														7	29	164	chester
					1										1	31	cholerae-suis
															7	94	cholerae-suis v kun
											1				1	32	cubana
								1							4	194	derby
															4	25	dublin
															5	76	enteritidis
1		1	4	2			1								10	55	gallinarum
															2	35	give
											6			1	52	408	heidelberg
															2	8	illinois
						1					16				30	308	infantis
															1	28	kentucky
									1						2	13	litchfield
											1				7	44	livingstone
															1	1	madelia
															1	43	manhattan
										1					1	36	meleagridis
															2	10	minnesota
					7						4				20	181	montevideo
					17										21	83	muenchen
2															5	34	newington
									1						29	134	newport
					2										2	12	ohio
					8										32	122	oranienburg
															2	13	orion
			1		1					7					10	24	panama
															3	5	poona
												5			6	181	pullorum
				1				1			4		1	2	17	175	saint-paul
	1					1				2					13	81	san-diego
															7	96	schwargrund
															3	73	senftenberg
															4	85	tennessee
					4	1					3		1		15	103	thompson
					1	5	2		2	1	2			5	100	809	typhi-murium
							3			3					30	132	typhi-murium v cop
															1	1	uganda
														2	4	56	worthington
															1	5	untypable group B
															1	4	untypable group c-1
4	1	1	6	3	41	8	6	2	4	22	39	5	2	18	543	4,709	TOTAL

Surveillance Reports from Individual States

TABLE VI-A

SEROTYPES REPORTED FROM NONHUMAN SOURCES
PREVIOUSLY DURING 1964 BUT NOT IN OCTOBER

Serotype(s)	Month(s)	Reporting Center(s)	Number of Isolations
adelaide	Jan	Mich	2
amager	May	Ga(1)	
	Aug	Fla(1)	2
belem	Mar	Mich	1
berta	Mar-Jul	N.C.(2)	
	May	Mo(1)	
	Jul	Ga(2)	
	Aug	Calif(1)	6
blukwa	Mar-Apr	Mich	2
cambridge	Jul	Ind	1
duesseldorf	Sep	Ind	1
gaminara	Jun	Ind	1
grumpensis	Aug	Mich	1
indiana	Feb-Sep	Minn(2)	
	Feb	N.C.(1)	
	Apr-Aug-Sep	Ill(7)	
	Apr-May-Jun-Jul-Aug-Sep	Ind(8)	
	Jun	Mo(1)	19
inverness	Jan	Mich	1
java	Feb	Calif(1)	
	Jul	La(1)	2
javiana	Feb	La	1
johannesburg	Feb	Ala(1)	
	May	Mo(2)	3
lille	Sep	Ind(1)	
	Sep	N.J.(1)	2
manila	Jan	Mo	2
miami	Jun	Mich(1)	
	Sep	Fla(1)	2
minneapolis	Jan-Aug	Ill	2
mission	Jan	Mo	2
muenster	Jun	Minn	1
new-brunswick	Sep	Va	1
new-haw	Jul	Miss	1
oslo	Sep	Kan	9
paratyphi B	Aug	Pa	1
pomona	Jul-Aug	Mich	3
reading	Jan	Ind(1)	
	May-Jun-Jul	Iowa(4)	
	May	Va(1)	
	Jun-Aug-Sep	Wash(4)	
	Aug	Ill(2)	12
rubislaw	Jul	Iowa	1
siegburg	Feb	Alaska(1)	
	Feb-Mar-Jul	Ill(3)	4
simsbury	Jan-Apr-Jun-Jul-Aug	Calif(5)	
	Jan	Va(1)	
	May	S.C.(1)	
	Jun	Fla(1)	8
stanley	Feb	Calif(2)	
	May-Aug	Mich(3)	
	Jun	Pa(1)	
	Jul	Ga(1)	
	Aug	Iowa(1)	
	Sep	La(1)	9
taksony	Jun	Calif	1
tallahassee	Apr	Fla	1
thomasville	Jun	Ga	1
typhi-suis	Feb-Jun	Mass(2)	
	Mar	Wisc(1)	
	Jul	Calif(1)	4
urbana	Aug	Ill(1)	
	Sep	Kan(6)	7
wandsbek	Jan	Mich	1
wassenaar	Sep	Kan	1
zehlendorf	Apr	Mich	1
TOTAL			120

TABLE VII

Salmonella derby Isolations and Total Salmonella Isolations Reported by Month*

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

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

TABLE VIII

Seven Most Commonly Recovered Salmonella Serotypes from Human and Nonhuman Sources in The Netherlands - 2nd Qtr., 1964

	Human			Nonhuman		
Rank	Serotype	No.	%	Serotype	No.	%
1	S. typhi-murium	538	33.9	S. typhi-murium	236	17.4
2	S. panama	394	24.8	S. dublin	213	15.7
3	S. stanley	213	13.4	S. bareilly	132	9.7
4	S. heidelberg	66	4.2	S. panama	118	8.7
5	S. infantis	54	3.4	S. oranienburg	100	7.4
6	S. bovis-morbificans	33	2.1	S. stanley	75	5.5
7	S. paratyphi B	26	1.6	S. meleagridis	55	4.1
Total		1,324	83.5		929	68.6
Total (all serotypes)		1,586			1,354	

serotypes isolated
in Poland - 1957 - 1962

Salmonella Serotype	Number of persons from whom salmonellae were isolated								Number of Symptomatic cases	Percentage of persons positive with symptoms
	1957	1958	1959	1960	1961	1962	1963	Total 1957 - 63		
S. cholerae-suis	54	52	15	44	33	29	29	256	220	85.9
S. enteritidis	101	242	118	224	255	1026	2017	3983	3347	84.0
S. dublin	39	23	39	93	18	57	43	312	212	67.9
S. typhi-murium	1229	1283	1004	1431	1802	1983	1187	9919	5967	60.1
S. heidelberg	38	46	107	31	54	34	45	355	135	38.0
S. bovis-morbificans	24	28	105	49	294	189	106	795	226	28.4
S. brandenburg	11	9	56	78	276	154	257	841	112	13.3
S. newington	92	365	229	127	467	293	310	1883	196	10.4
S. derby	1	3	5	4	193	56	132	394	40	10.1
S. anatum	134	83	44	59	155	85	627	1187	100	8.4
S. give	1	692	157	19	827	174	255	2125	145	6.8

Rank	Human Serotype	No.	%	Nonhuman Serotype	No.	%
1	S. typhi-murium & typhi-murium var. copenhagen	5,608	30.1	typhi-murium & typhi-murium var. copenhagen	1,325	24.6
2	S. derby	1,610	8.6	heidelberg	365	6.8
3	S. heidelberg	1,533	8.2	infantis	347	6.4
4	S. newport	1,080	5.8	anatum	270	5.0
5	S. infantis	970	5.2	montevideo	243	4.7
6	S. enteritidis	801	4.3	saint-paul	206	3.8
7	S. typhi	706	3.8	newport	203	3.8
8	S. saint-paul	586	3.1	pullorum	195	3.6
9	S. oranienburg	539	2.9	schwarzengrund	191	3.5
10	S. montevideo	490	2.6	cholerae-suis var. kunzendorf	139	2.6
	Total	13,923	74.7		3,594	66.7
	Total (all serotypes)	18,649			5,389	

Atlanta, Georgia 1964

Case No.	Age	Sex	House	Onset of Symptoms	Clinical Picture: T° >101°	Pulse >120	Abdominal Pain	Headache	Diarrhea	Positive Culture *S. typhi* E_1: Blood	Stool	Comment
1	6	M	A	8/25	+	+	+	0	0	+	0	
2	14	M	B	8/26	+	0	+	0	+	+	+	Relapse 14 days p̄ chloramphenicol-Re-adm.10/5
3	4	F	A	9/3	+	+	+	0	0	+	0	
4	4	F	B	9/3	+	+	+	+	+	+	0	Death in Renal Failure-9/10/64
5	5	M	C	9/5	+	+	+	+	0	+	0	
6	8	F	B	9/6	+	0	+	+	+	+	0	
7	8	F	B	9/6	+	0	0	+	+	+	+	
8	10	M	A	9/10	+	+	+	0	0	+	+	
9	9	F	B	9/8	+	+	+	+	0	+	0	
10	2	F	A	9/10	+	0	+	0	0	0	+	
11	6	M	B	9/29	+	+	0	+	0	+	0	
12	11	M	B	9/12	0	0	+	+	+	+	+	
13	6	M	B	9/22	+	+	0	0	+	+	0	
14	3	M	A	-	0	0	0	0	0	0	+	No apparent symptoms
15	49	F	B	8/10?	0	0	0	+	0	0	+	Carrier or missed case
16	8	F	-	9/6	+	+	+	+	0	+	0	Not related to main outbreak

TABLE XII

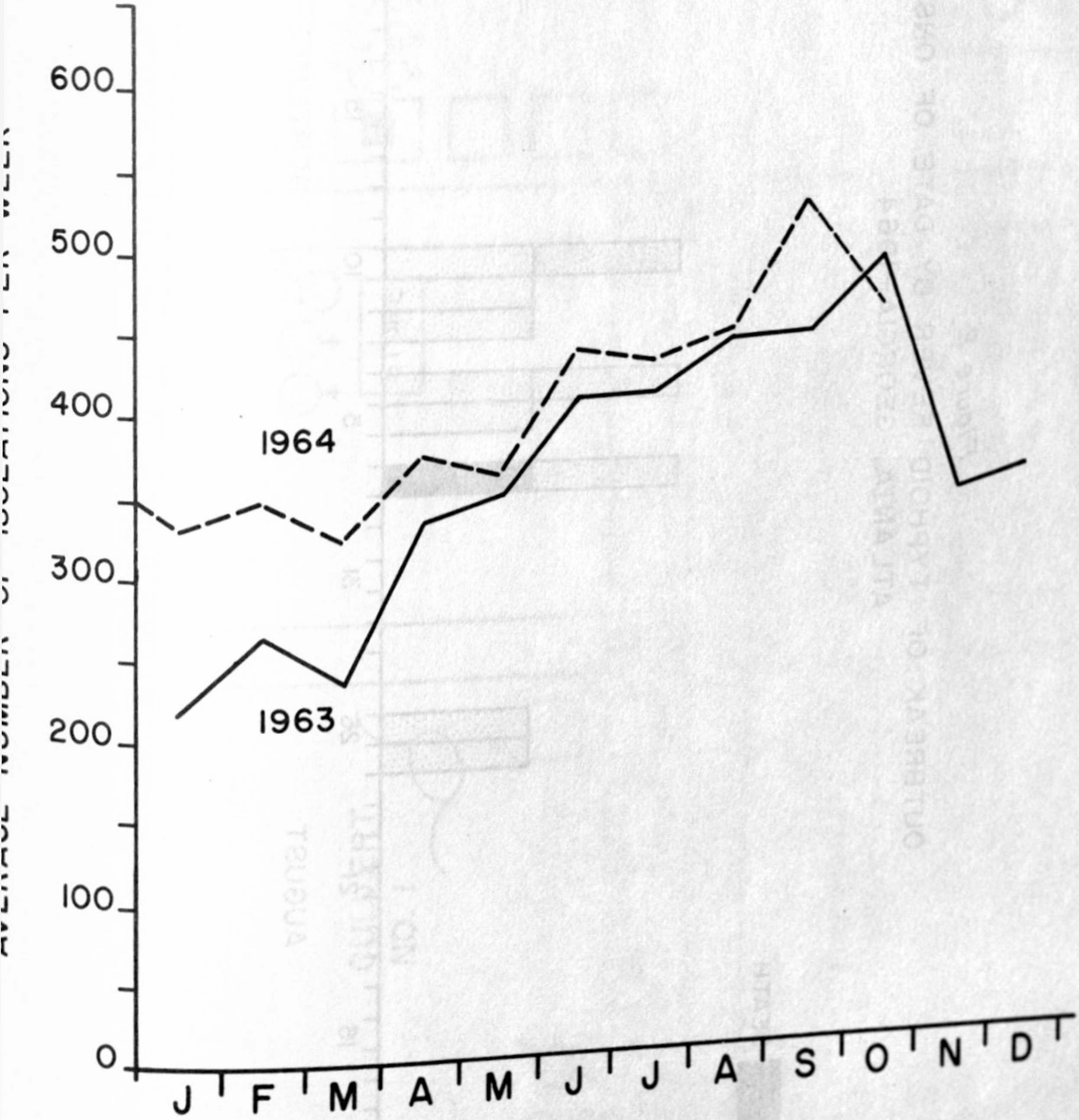
Salmonella serotypes isolated from meat meal and by-products in 2 rendering plants in Utah

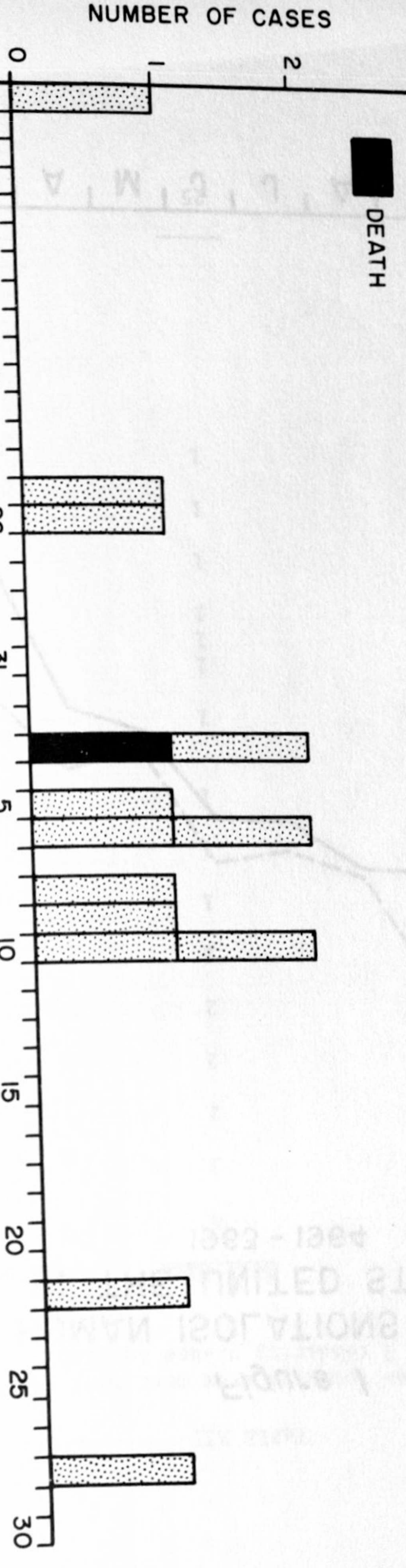
Serotype	Meat Meal	Rendered Products
S. binza	4	
S. tennessee	3	1
S. derby	2	4
S. montevideo	2	4
S. oranienburg	2	3
S. heidelberg	2	1
S. newington	1	3
S. lexington	1	1
S. manila	1	1
S. typhi-murium var. copenhagen	1	1
S. anatum	1	
S. bareilly	1	
S. blockley	1	
S. meleagridis	1	
S. orion	1	
S. worthington	1	
S. cerro		5
S. senftenberg		5
S. illinois		1
S. kentucky		1
	25	31

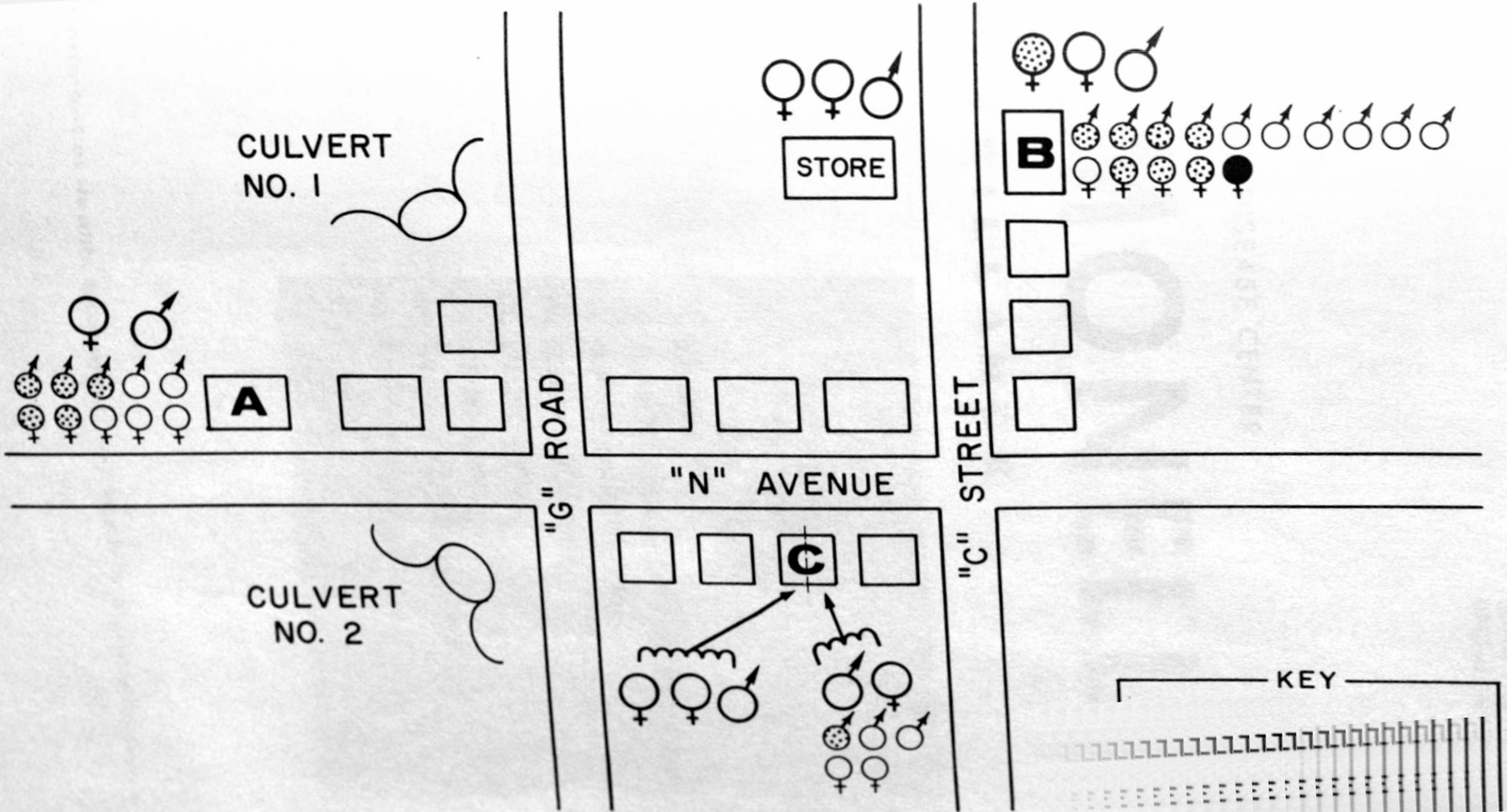
Figure 1

REPORTED HUMAN ISOLATIONS OF SALMONELLAE IN THE UNITED STATES

1963 - 1964




NUMBER OF CASES
0
1
2
3
DEATH
21
26
31
5
10
15
20
25
30



CULVERT NO. 1
STORE
B
A
ROAD
"G"
"N" AVENUE
STREET
"C"
C
CULVERT NO. 2
KEY