REPORT NO. 28
AUGUST 21, 1964

COMMUNICABLE DISEASE CENTER

SALMONELLA

SURVEILLANCE

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For the Month of July 1964

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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

The Salmonella Surveillance Unit has been complemented by addition of Drs. Richard Collins and Read McGehee, EIS Officers, to the Unit. The extensive and expansive nature of the problem of salmonellosis in this country requires an enlarging task force. Drs. Collins and McGehee are welcome!

During the month of July, 2,159 human isolations of salmonellae were reported, for an average weekly total of 432, a decrease of 7 from the June figure.

The percentage of Salmonella derby isolations reported continues to drop (Table VII). Whether this represents a true drop in the incidence or reflects diminution of "interest" factors is as yet unclear.

A total of 595 nonhuman isolations were reported in July, for an increase of 154 over last month.

II. REPORTS OF ISOLATIONS FROM THE STATES

A. Human

During July, 2,159 isolations of salmonellae from humans were reported. While the average weekly total for July (432) demonstrated a decrease of 7 from June, it represented an increase of 21 over July 1963 (Figure 1). The patterns demonstrated by the curves in Figure 1 are remarkably similar and it will be interesting to see if this similarity continues during the remainder of the year.

The seven most frequently reported serotypes during July were:

Rank	Serotype	Number	Per Cent	Rank Last Month
1	S. typhi-murium	614	28.4	1
2	S. derby	217	10.1	2
3	S. heidelberg	204	9.4	3
4	S. newport	113	5.2	4
5	S. typhi	106	4.9	6
6	S. infantis	90	4.2	5
7	S. enteritidis	84	3.9	7
Total		1,428	66.1	

Total salmonellae isolated (July) 2,159.

Of the 68 different serotypes reported during July, the seven most common (10.3 per cent) accounted for 66.1 per cent of the 2,159 isolations reported.

The family attack rate during July was 18.9 per cent; consistent with past experience (Table II).

The age and sex distribution is consistent with past experience (Table IV).

B. Nonhuman

There were 595 nonhuman isolations in July. This number represents a 25.7 per cent increase over the 441 reported the previous month, and is the largest number of isolations reported for any month in 1964. There were 52 serotypes identified among isolates submitted by 36 States.

The seven most common types reported for July were:

No.	Serotype	Number	Per Cent	Standing Last Month
1	S. typhi-murium var. copenhagen	111	18.7	1
2	S. heidelberg	46	7.7	2
3	S. infantis	44	7.4	4
4	S. chester	42	7.1	7
5	S. montevideo	31	5.2	Not Listed
6	S. blockley	27	4.5	Not Listed
7	S. saint-paul	23	3.9	Not Listed
		324	54.5	

These seven serotypes accounted for 54.5 per cent of the total.

The 4 species from which most of the isolations were obtained in order of frequency were: turkeys 212 (35.6 per cent); chickens 170 (14.3 per cent); swine 36 (6.1 per cent); and bovine 29 (4.9 per cent). These isolations comprised 60.9 per cent of the total reported.

The increase in total salmonella isolates reported in July is reflected in the increased number from turkeys and chickens. Seasonal variations noted in human reports, which show a summer increase, are not as apparent with nonhuman isolates. Chicken isolates reported in 1963 showed a summer increase, but this was not observed in isolates from turkeys.

Ten turtle isolates were reported from Kansas, nine of which were S. blockley and one S. newport. Pet turtles have been incriminated as sources of human cases in several States, with isolation of S. panama, S. java, S. braenderup, S. saint-paul and S. hartford. Many other types have been isolated from turtles including S. new brunswick, S. richmond, S. rubislaw, S. heidelberg, S. montevideo, S. berta, S. kentucky, S. muenchen, and S. typhimurium.

S. stanley, previously observed only in monkeys and humans in 1963, was isolated from a turkey in Georgia. Monkey isolations obtained by a group in Florida prior to 1960 indicated that this type was isolated frequently in Rhesus and Cynomolgus species upon arrival from India and the Philippines.[1]

(1) Schneider, N.J., Prather, E.C., Lewis, A.L., Scatterday, J.E., and Hardy, A.V.: Enteric Bacteriological Studies in a Large Colony of Primates. Annals New York Academy of Sciences, 85:935-941, 1960.

II. CURRENT INVESTIGATIONS

A. An Outbreak of Gastroenteritis Due to Salmonella heidelberg. Reported by Elton Newman, M.D., Director, Division of Preventive Medicine and Medical Facilities, A. A. Jenkins, M.D. Director, Communicable Disease Section, Division of Preventive Medicine and Medical Facilities, Utah State Health Department, Paxton H. Howard, M.D., EIS Officer assigned to University of Oklahoma, and James B. Goldsby, EIS Statistician, Investigations Section, C.D.C.

Between January 1 and May 8, 1964, 88 isolations of S. heidelberg from individuals in the vicinity of Salt Lake City were made in the State Laboratory. The majority of these recoveries occurred in March and April. The normal incidence of S. heidelberg recoveries in Utah (data from 1956-1963) has been on the average five per year. The unusually high incidence of isolations of this serotype led to further studies.

Initially, the investigation determined that there were two categories of cases, with respect to source: 1) cases connected with a sorority luncheon held at noon on April 11 at the University of Utah, and 2) cases of gastroenteritis acquired in the community and not connected with the sorority luncheon.

The Sorority Luncheon

An estimated 700 people (all female) attended the sorority luncheon held at the University of Utah. The luncheon was served as a seated meal which included tossed green salad with Roquefort or French dressing, breaded veal over dressing with brown gravy, green beans, banana cream pie and a choice of coffee or punch. All of the food was prepared in the University Cafeteria by the regular kitchen and bakery personnel.

The epidemic curve for persons associated with the luncheon is depicted in Figure 2, which suggests a common source outbreak.

Symptoms for those ill included abdominal pain, diarrhea, fever, chills, nausea, vomiting and myalgia. Several were ill enough to require hospitalization. The median duration of symptoms was four days with a range of one to ten. There were no deaths.

Questionnaires were mailed out to the persons known to be associated with the luncheon. Of approximately 739 people who received the questionnaires (including part-time waitresses who were called in specifically for serving the luncheon), 135 (18.3 per cent) completed and returned it. Of these, 59 (43.7 per cent) indicated that they were ill following the luncheon. Twelve individuals submitted stools which were found positive for S. heidelberg by the State Laboratory.

Food specific attack rates were determined (Table VIII) and indicated that the banana cream pie was the most likely source of infection. The attack

rate for banana cream pie (51.4 per cent) was higher than that for any other single food item. None of the fifteen persons who did not eat banana cream pie became ill. None of the food was cultured.

Assuming that the pie was responsible, two modes of salmonella contamination seemed possible: 1) an ingredient contaminated with S. heidelberg was introduced during the preparation of the pie or 2) a carrier of S. heidelberg in the bakery introduced the infection.

The second possibility was eliminated early, primarily on the basis of data discussed below concerning cases in the area of Salt Lake City not associated with the luncheon. However, 10 of the 65 regular kitchen and cafeteria employees admitted to gastrointestinal illness prior to the luncheon. One of these helped prepare the pie. During mid-May, stool specimens were submitted by the regular employees and seven were found positive for S. heidelberg. One of these persons took part in the preparation of the pie, but she was asymptomatic so it is not known when she acquired her infection. Only one of the seven employees was known to have partaken of the pie and she was asymptomatic.

The ingredients and preparation of banana cream pie were discussed with the chief baker for the cafeteria. Among other things, frozen whole eggs supplied in 4 gallon (30 lbs.) cans were used in the preparation of the cream part of the pies. Other recipe items were water, non-fat milk powder, sugar, salt, lard, cornstarch, oleomargarine, vanilla and yellow food coloring. The frozen eggs were removed from the freezer 48 hours prior to cooking the cream and thawed in a walk-in refrigerator. The cream filling for the pie was reported to have been cooked one day prior to the luncheon. The cream preparation was boiled for 15 minutes after the introduction of the frozen eggs. The mixture was then placed in stainless steel cans, left to cool for an hour, and placed in the refrigerator over night, at 38 to 40 degrees F. The next morning (the day of the luncheon) the refrigerated cream was put back into the mixer, in which it was beaten the previous day, and stirred with paddles at a slow speed for about three minutes. During this process, some commercially prepared whipped cream was folded into the cream. The whipped cream was stated to be a sterilized blend of water, hydro-generated vegetable fats, mono and di-glycerides, edible casein, sorbitol, salt, vegetable gum and citric acid. The cream was then poured into pre-baked pie shells and returned to the refrigerator until just prior to the time of serving. About two hours prior to serving, a commercially prepared whipped topping was added to the pie. No egg albumen in any form was used in the preparation of the pie.

Since frozen egg albumen was incriminated in a large outbreak in Washington State during 1963 due to Salmonella heidelberg (see SSR Nos. 15, 18 and 20), frozen whole eggs used in the pie were suspect.

Community Acquired Cases not Connected with the Sorority Luncheon

Of 88 individuals in the community found to have been harboring S. heidelberg in Utah between January 1 and May 8, 1964, 12 were associated with

the sorority luncheon discussed above. Of the remaining 76, 55 (72.4 per cent) were interviewed and the information obtained indicated that:

7 persons had eaten chocolate eclairs within 48 hours prior to their illness, which they had purchased at two different area bakeries,
5 had apparently acquired their infection in local restaurants,
2 were asymptomatic and probably acquired their infection in the hospital as both were nurses and had cared for S. heidelberg patients,
29 others were symptomatic but could not provide remarkable food histories, and
12 were asymptomatic carriers and members of families with a case.

It was determined that the bakeries involved shared a common frozen egg source with the University of Utah and that frozen whole eggs were one of the ingredients in the eclairs.

Conclusions

The recent increase in S. heidelberg isolations from the western part of the country (see SSR No. 25 page 8) strongly suggests a common source interstate outbreak. Studies in Washington under the direction of Dr. E. Ager have implicated frozen egg albumen as the vehicle of infection for a large outbreak due to S. heidelberg in that state.

Studies are in progress in California to attempt identification of a common source to account for the increase in S. heidelberg isolations seen there.

The luncheon associated cases in Utah represent a common source outbreak, with banana cream pie serving as the suspect vehicle of infection. The presence of frozen whole eggs in the pie strongly suggest an association with the interstate problem.

The Utah community cases do not have a common meal to tie them together. Food histories indicate that 7 of 55 people interviewed had eaten commerical bakery food during the 48 hours preceding their illness. There were other unconfirmed illnesses associated with eclairs from one of the bakeries.

In the light of the total S. heidelberg picture, the common thread for the Utah cases most likely is frozen whole eggs used by a variety of bakeries, including the University.

Follow-up

With the bulk of the information pointing toward frozen whole eggs, it was decided by the Utah State Health Department that bacterial studies of frozen eggs used in the preparation of bakery items in the vicinity of Salt Lake City should be initiated. From mid-May to the present, 166 frozen whole egg core samples have been obtained under the supervision of the Chief of the Sanitation Division, Utah State Health Department. These have been processed in the State Laboratory with the following results:

Organism	No. of Samples Positive
S. heidelberg	9
S. thompson	1
S. oranienburg	1
S. infantis	1
arizona sp.	1
TOTAL	13

B. An Outbreak of Salmonella heidelberg Infection, Wadsworth VA Hospital, Los Angeles. Reported by William Davis, M.D., Director, Sidney Finegold, M.D., Chief, Division of Infectious Diseases, Joe Fremont, M.D., Senior Resident in Medicine, and Charles E. McCall, M.D. EIS Officer, Investigations Section, C.D.C.

During the afternoon and early evening of July 6, a number of patients in the intermediary care unit of the Wadsworth VA Hospital, Los Angeles, became acutely ill. Symptoms included nausea, vomiting, abdominal cramps, fever and diarrhea. New cases continued to occur, whereby in the 24 hours following the first case, 65 out of a total of 545 patients were reported ill. The average duration of illness ranged from one to three days. One death was reported. Several employees in the intermediary care unit kitchen also reported symptoms of gastroenteritis, although the illnesses were milder than those experienced by patients. No other divisions within the hospital were involved. The initial impression was that the outbreak represented staphylococcal food intoxication; however, within 36 hours of the onset of the outbreak, stool cultures taken from symptomatic patients were positive for Salmonella heidelberg.

Immediate steps were taken to prevent spread of the outbreak to other parts of the hospital. Quarantine was placed upon all patients in the intermediary care unit and symptomatic employees were relieved of their duties.

Background

The James Wadsworth VA Hospital, the largest VA Hospital in the United States, is located in West Los Angeles. The hospital complex with over 300 buildings has facilities to care for approximately 6,000 patients. Patients and hospital staff total approximately 15,000. Four categories of patients are treated at the institution, and are housed in separate buildings on the "campus". These four divisions are: 1) acute medical and surgical care, 2) intermediary care, 3) neuropsychiatric care, 4) domiciliary care.

Functions of the acute medical and surgical care and neuropsychiatric units are self-explanatory. The unit for intermediary care houses both

patients ambulatory, but not ready for discharge, and those with chronic illnesses such as arteriosclerotic heart disease, cerebrovascular disease, and cancer. In addition, patients with physical handicaps such as amputations are rehabilitated in this unit. All patients are males whose ages range from 20 to 90 years. The domiciliary unit functions as the home for "old soldiers" and veterans with minimal physical disability.

Although food preparation and serving is separate for each of the four divisions, all foods are purchased by one department. One meat cutting shop and one bakery supply a number of specific items to the entire hospital. Kitchen employees for the most part are civil servants and little exchange exists between kitchen employees of the four divisions of the hospital. Kitchen employees work in two shifts: 1) first shift, which begins at 6:00 A.M. and extends to 2:30 P.M., and 2) second shift, which begins at 10:30 A.M. and extends to 7:00 P.M.

Investigation

The investigation of the outbreak was directed along three pathways: 1) collection of basic epidemiologic information from all employees and patients in the intermediary care unit using printed questionnaires, 2) investigation of food services by the Los Angeles County Health Department, and 3) culture survey of all kitchen employees in the intermediary care unit.

Using the presence of fever and/or diarrhea as the clinical criteria for acceptance of a case, 121 of the 545 patients were affected, giving an attack rate of 22.2 per cent. The number of asymptomatic excreters was not determined. Fifty-two cultures taken from ill patients were positive for S. heidelberg. Seven of 77 kitchen employees (9.1 per cent) reported illnesses compatible with salmonellosis using the diagnostic criteria described. All but one of these worked during the second shift. None of 70 nurses caring for the patients were ill.

The epidemic curve revealed that the majority of cases occurred during a 72-hour interval, thus suggesting a common source single exposure outbreak. The only common factor between kitchen employees and patients in the intermediary care unit, the only groups affected by the outbreak, was the consumption of the same food. This fact coupled with the absence of disease in nurses and aids who had access to the same water but who did not eat the same food, immediately suggested the hypothesis that the vehicle (vehicles) of infection was (were) food. The presence of disease in all wards, although attack rates varied, suggested that the food was distributed to the majority of patients and, therefore, was probably a fairly common item. Further evidence of this was the presence of disease in persons consuming 8 out of 10 types of diets distributed. Although only a few items were common to all diets served, the absence of accurate histories of specific food consumption and the opportunity for some exchange of foods between patients prompted analysis of all foods served during the suspect meals. Using data only on patients served on trays, all items with usage rates greater than 80 per cent were considered (Table IX). Personal observation suggested that food exchange occurred, but on a very small scale and therefore, a vehicle of infection

served to less than 80 per cent of ill patients was unlikely. The items which remained suspect were parsley, carrots, potatoes, milk, and tapioca pudding. The first three were excluded because the techniques used in preparation virtually assured a level of temperature which would kill salmonellae, and the foods were not handled after cooking. Milk was excluded because the same milk is served in small cartons to all divisions of the hospital, and the chance that the only portion of the contaminated shipment would reach one hospital division was remote. The item left in question was tapioca pudding. The fact that 90 per cent of the patients not ill also were served this item was expected because serving of various foods and not specific consumption had been used in analysis.

The tapioca pudding had ample opportunity for contamination during its preparation. Its ingredients were milk, tapioca, cornstarch, sugar, egg yolks, and egg whites. The day before it was prepared, shell eggs were cracked by hand and the yolks and whites were pooled in separate containers. There were refrigerated overnight. Between 10:00 and 11:00 A.M. the following morning the pudding was prepared. Milk, sugar, tapioca, and cornstarch were boiled and allowed to cool slightly. The egg yolks were then added and the mixture was brought to the "breaking point" (just before boiling). After allowing the mixture to cool the refrigerated egg whites were then added to the pudding. The pudding was not reheated and was allowed to stand for two to three hours before being served during the evening meal.

The kitchen receives 300 dozen Grade A shell eggs twice each week. It was discovered that as high as 20 per cent of a Grade A lot could include Grades B or C, and as high as 5 per cent could include "checked" eggs, and the lot still pass as Grade A. No eggs from the shipment used in making the tapioca pudding were available for culture. The one egg distributor supplying the hospital during July obtained eggs from 45 farms and six other major distributors. Frozen egg products from two of the six distributors supplying shell eggs to this company were implicated epidemiologically with bacteriologic confirmation during a recent outbreak of S. heidelberg infection in the State of Utah (vide supra).

The only cases unexplained by implicating tapioca pudding as the vehicle of spread in this outbreak with shell eggs as the reservoir of the salmonella organisms were the two first-shift employees with cultures positive for S. heidelberg. All second-shift employees positive for S. heidelberg had consumed the tapioca pudding. The first-shift employees admitted to no gastrointestinal symptoms, recent or remote, and both denied eating tapioca pudding. Neither handled the suspected vehicle of infection, one being absent from work during the two days preceding the outbreak. The only explanations that could be invoked were that they were unrelated or secondary cases.

This outbreak again emphasized the alert given by the Salmonella Surveillance Unit (1). The large outbreaks of S. heidelberg gastroenteritis in Washington State (2) and Utah (vide supra), both of which were traced to egg products were well known within the State of California. Under the direction of Dr. Philip Condit, Director, Division of Communicable Disease, and Dr. Graham Kemp, Chief, Salmonella Surveillance, California State

Department of Health, steps to intensify surveillance of S. heidelberg infection in California had already been instigated at the time of this outbreak. The need for this was re-emphasized and it was suggested that the Department of Health and Agriculture combine efforts in an attempt to further define the S. heidelberg problem in California and other parts of the West.

References

(1) Salmonella Surveillance Report No. 20.
(2) Salmonella Surveillance Reports Nos. 17, 18 and 20.

C. Summary of the S. heidelberg "Problem."

In November 1963, the Washington State Department of Health extensively investigated an intrastate outbreak of gastroenteritis due to Salmonella heidelberg which involved at least 90 people (SSR #20). Epidemiologic evidence implicated frozen egg albumen as the vehicle of spread. This was substantiated bacteriologically when S. heidelberg was isolated from approximately 6 per cent of frozen albumen core samples.

During the months of February, March, April and May 1964, a rise in the number of isolations of S. heidelberg from the State of Utah was noted. A "S. heidelberg Alert" was given (SSR #25) and an investigation promptly ensued. A summary report of this outbreak is included in this issue. Similar to the Washington outbreak, the Utah outbreak can also be classified as an intrastate outbreak (in contra-distinction to a community or localized epidemic). Again frozen egg products were implicated epidemiologically with bacteriologic confirmation. A link between the Washington and Utah outbreaks was suggested when one egg product distributor was found common to both outbreaks. However, more than this one distributor was implicated in both outbreaks.

The outbreak of S. heidelberg gastroenteritis in the VA Hospital in Los Angeles (vide supra) adds more data to the expanding problem due to this serotype. Although bacteriologic confirmation was not possible, epidemiologic evidence incriminated shell eggs. In tracing the source of these eggs, it was found that a portion came from two distributors in California whose frozen egg products had been implicated in the Utah outbreak.

The three outbreaks are clearly related. Multiple intermixing of eggs after laying until consumption, either as a shell egg or egg product, virtually precludes formulating a complete epidemiologic picture at this time. It seems fairly evident that there exists a sizeable reservoir of eggs contaminated with S. heidelberg.

Whether this reservoir is localized geographically or is widespread has not been established. Determination of the location and extent of this reservoir is most important.

Intensive surveillance and investigation of all S. heidelberg infections is urged. Communications and questions concerning this problem are welcomed by the Salmonella Surveillance Unit.

REPORTS FROM STATES

A. Arkansas

Gastroenteritis Caused by Arizona Group. Reported by William L. Bunch, Jr., M.D., Acting Director, Division of Communicable Disease Control, Arkansas State Department of Health.

Fourteen members of an Arkansas church group of twenty persons became ill approximately four to five hours following ingestion of home-made ice cream and cookies. Symptoms were mainly abdominal with diarrhea predominating and were severe enough to require hospitalization for ten of the fourteen.

Food histories suggested ice cream as the source of infection and subsequent culture of the ice cream and patients grew a bacterium of the Arizona species.

The ice cream contained fresh homogenized milk, canned condensed milk, vanilla, and raw eggs. It was mixed and allowed to stand at room temperature about two hours before freezing. Ingestion occurred three hours after mixing.

"Since both the ice cream residual and the patients' cultures reveal a bacterium of the Arizona groups, which proved to be the same rare serotype, 6:13,14, the gastroenteritis is probably due to this Arizona serotype."

B. Georgia

Salmonellae in Norway Rats. Reported by John H. Richardson, D.V.M., Public Health Veterinarian, and Mr. Thomas W. McKinley, Research Technician, Epidemiologic Investigations Branch, Georgia Department of Public Health.

Cecal cultures were made on 200 Norway rats trapped recently in the Metropolitan Atlanta area. Salmonellae were recovered from 12 or 6 per cent of these. Serotypes and frequency are shown below:

Salmonella Serotype	Times Recovered
S. typhi-murium	8
S. heidelberg	2
S. derby	1
S. infantis	1

Seven of the positive rodents were caught at one dump site. S. typhi-murium was isolated from 5 of these and S. heidelberg from the remaining 2.

It is interesting that the results of this survey are quite similar to the results obtained by Galton (Galton, M.M., Veterinary Public Health Laboratory Unit, Communicable Disease Center, Atlanta, Georgia, personal communication) in Jacksonville, Florida several years ago. She recovered salmonellae from 7 of 96 Norway rats examined.

C. Hawaii

Salmonella meleagridis Gastroenteritis Among Two Groups of Hospital Employees Attending Separate Banquets. Reported by W. E. Lyons, M.D., Chief, Epidemiology Branch, Hawaii Department of Health.

On May 23, 1964, two groups attended separate banquets at the Kanraku Tea House. One group attended the Kuakini Hospital Bowling League banquet and the other, a Shirokiya Hospital group, attended a farewell banquet for two employees. Fifteen of twenty-nine in the Kuakini group and nineteen of thirty in the Shirokiya group developed symptoms of nausea, vomiting, diarrhea, fever, and prostration. Both meals were served between 6:00 and 7:00 P.M. on May 23, 1964, and incubation period varied from 12 to 36 hours.

On June 3, 1964, two cultures of S. meleagridis, one from each group, were reported to the Epidemiology Branch of the Hawaii Health Department, and the following studies were initiated. Case histories, food records and cultures were obtained from all employees attending the two parties. Food handlers were questioned and cultured and menus were obtained from the Kanraku Tea Room.

Stool cultures revealed S. meleagridis in twelve of nineteen ill in the Shirokiya group and in one of eleven not ill. In the Kuakini group, nine of fifteen were positive in the ill group and one of fourteen in the not ill group. No positive cultures were obtained from the food handlers.

Foods common to both groups were sushi, namasu, fried chicken, roast duck, watermelon and sashimi. Roast duck was suspected as being the vehicle of infection but the epidemiologic data did not prove this conclusively. In the Shirokiya party, 63 per cent of those ill ate roast duck, and 73 per cent of those not ill did not partake of this food. In the Kuakini group, 100 per cent of those ill ate roast duck and 43 per cent of those not ill did not eat roast duck. No correlation could be found with illness and other foods.

D. Maryland

Salmonella heidelberg Isolations in Maryland. Reported by John H. Janney, M.D., Division of Epidemiology, Maryland State Department of Health.

Human isolations of S. heidelberg are listed for first six months of 1964 and compared to the first six months of 1963.

Human Salmonella Isolations, By Month

Period Ending	1964 Total	1964 S. heidelberg	1964 Per Cent S. heidelberg	1963 Total	1963 S. heidelberg	1963 Per Cent S. heidelberg
Jan. 31	26	-	-	16	1	6.2
Feb. 28	15	3	20.0	13	-	-
Mar. 27	13	2	15.3	14	1	7.1
May 1	29	1	3.4	29	1	3.4
May 29	17	2	11.7	22	-	-
June 26	22	2	9.0	23	3	13.0
Thru July 10	22	4	18.1	7	-	-
TOTAL	144	14	9.7	124	6	4.8

E. (1) Pennsylvania

Conjunctivitis Due to Salmonella typhi-murium. Reported by Michael Lane, M.D., EIS Officer assigned to Allegheny County Health Department, Pittsburgh, Pennsylvania.

A four-month-old infant with congenital toxoplasmosis living in the hospital from the time of birth developed a mild conjunctivitis from which culture yielded Salmonella typhi-murium. Stool cultures were repeatedly negative. The patient had been seen frequently since birth by medical students and house staff because of the classical findings of occular toxoplasmosis and it is suggested that an infected examining instrument such as an ophthalmoscope may have been the source of infection in this case.

(2) Apparent Salmonella typhi-murium Carrier State in 13-month-Old Girl. Reported by Dr. Michael Lane, EIS Officer assigned to Allegheny Health Department. Pittsburgh, Pennsylvania.

An asymptomatic female child residing in a foster home was found to have stools positive for S. typhi-murium at age 5 months during family follow-up of another child in the home who had gastroenteritis. The child remained positive on eight subsequent specimens taken at approximately two-week intervals. The family was visited by public health officials and sanitarians, and no source of infection could be found. The home was very clean, sanitary practices were excellent and the only family pet was negative on culture. The child was placed in another foster home far from the original home but has continued to have positive stool cultures at two-week intervals and is now 13 months old. No persons in the new home have developed positive cultures to date.

(3) Salmonella newport Gastroenteritis Related to Exposure to a Pet Cat. Reported by Sylvan M. Fish, M.D., Chief, Communicable Disease Section, City of Philadelphia Health Department.

A twenty-four-year-old male developed sudden onset of diarrhea while recovering from infectious hepatitis. Stool culture revealed Salmonella newport. His course was uneventful and follow-up stool examinations were negative. Investigation revealed that two weeks prior to the patient's illness a stray kitten had been taken into the household. The kitten had had a good deal of loose, watery stools and the patient frequently cleaned up after the animal. Examination of the kitten's feces showed S. newport. The animal is no longer residing in the household.

Editor's Comment: Case reports of human salmonellosis related to infection in cats are not frequent. This is surprising in view of the study by Smith (1) in England in which mesenteric lymph nodes on 200 healthy cats were cultured with recovery of salmonella organisms on 2.5 per cent. Infection in cats as in dogs is probably acquired by ingestion of contaminated foodstuffs. The relatively high infection rate and the close proximity in which cats have to man suggests that they represent a potentially significant reservoir of infection. Possibility of exposure to infected cats should be kept in mind in investigations of human salmonellosis in which the source of infection is obscure.

(1) Smith, H. W., J. Hyg., Cam. 57:266, 1959.

F. Washington

Outbreak of Gastroenteritis Due to Salmonella typhi-murium. Reported by Kenrad E. Nelson, M.D., EIS Officer, and Ernest Ager, M.D., Chief, Division of Epidemiology, State Department of Health, Olympia, Washington.

Over the Memorial Day week end, eighteen members of a family congregated in Olympia, Washington to celebrate the holiday. Three of these persons came from Oregon, six from Seattle and the remainder from Olympia. Over the week end the mother of the Seattle family developed fever and pharyngitis diagnosed by a local physician as streptococcal sore throat. Eight days previously her ten-month old daughter had developed fever, vomiting, and diarrhea. The mother remained at the Olympia household for an additional week to recover from the pharyngitis. Shortly after her return home, she developed diarrhea, fever to 103.5° and headache. She was hospitalized and stool cultures yielded Salmonella typhi-murium. Meanwhile, an 82-year old woman relative in the Olympia household, also developed diarrhea and fever and was seen by a different physician who reported several additional cases in the household with similar symptoms. Subsequent investigation disclosed a total of 13 cases of febrile gastroenteritis among permanent or transient living in the Olympia household between May 30 and June 19. Stool cultures were taken from all available persons and 8 yielded S. typhi-murium, including 2 isolates from asymptomatic persons. The severe crowding and the poor hygienic conditions in the household is thought to have facilitated person-

to-person spread of salmonellosis in this outbreak. Epidemiologic investigation to date has not definitely established the source of infection in the index case of the 10-month-old girl. Her mother recalled the purchase of two dozen checked eggs from a Seattle grocery store, shortly prior to the girl's illness. Several dozen egg samples from the same source were negative on culture. Other studies are still in progress.

V. SPECIAL REPORTS

Incidence of Salmonella in the Hog Colon as Affected by Handling Practices Prior to Slaughter. Hansen, R., Rogers, R., Emge, S., Jacobs, N. J. Journal American Veterinary Medical Association, 145:139-140, July 15, 1964.

The authors conducted a study to determine if the practice of holding hogs for several days prior to slaughter at the slaughter plant had any effect on the incidence of intestinal salmonella contamination.

Two groups of hogs consisting of 60 hogs slaughtered within three hours of arrival at the plant and of 72 hogs held for three days at the plant prior to slaughter were examined in groups of approximately twelve at two-week intervals during a six-month period. Selection for inclusion in either group was randomly made from hogs received from a number of farms. The hogs held at the plant were fed a salmonella-free corn ration. A portion of the large intestines of the hogs under study was collected at the time of slaughter. The fecal contents were removed aseptically and the presence of salmonella was determined.

In the group held three days prior to slaughter, 25 intestines were found to contain salmonella. Nine serotypes were identified in this group. In the group slaughtered immediately, six intestines were found to contain salmonella. Two serotypes were identified in this group.

The authors feel these results substantiate conclusions of earlier studies that the holding pen environment causes a marked increase of incidence of intestinal salmonella contamination, probably due to crowding together of many hogs from different sources and inadequate sanitary practices in the holding pens.

VI. INTERNATIONAL

A. Aberdeen Typhoid Fever Epidemic. Reported by Dr. Joe Stockard, Division of Foreign Quarantine.

Approximately 450 cases of typhoid fever were hospitalized in Aberdeen, Scotland, between May 20 and June 17, 1964. The organism was identified as Salmonella typhi, phage type 34, heretofore rare in the United Kingdom. Geographically, cases were spread throughout most of the city.

There was some discussion of waves of infection, but consensus of the United Kingdom Ministry of Health was that the epidemic curve (Figure 3) represented a common-vehicle outbreak with continued exposure.

Cold meats sold at one large food shop were suspected as the source of the outbreak. The shop was closed until after disinfection and examination of food handlers could be completed. No carrier was detected and all cold meats were negative for S. typhi on culture. Although no direct proof was obtainable, the hypothesis was that one or more 6 lb. cans of contaminated corned beef were opened and sliced by the store, that the slicing equipment became contaminated and this resulted in further contamination involving other meats. The meat and cans actually thought to be involved as source had been disposed of before the investigation began.

It is estimated that the United Kingdom consumes about 80,000 tons of corned beef annually, most of which is imported from South America. Three previous smaller outbreaks of typhoid fever in the past year have been attributed to corned beef although direct proof of this is not available. These were at Harlow in June, 1963, phage type A, involving 26 persons; at South Shields in July, 1963, phage type degraded Vi strain; and Bedfore in November, 1963, phage type E-1.

A recent British Medical Journal article on the Harlow outbreak (1) establishes that 21 out of 26 persons ill had eaten corned beef purchased sliced from the same butcher shop. Infection by a carrier was excluded as far as possible. Ten cans of the same batch of corned beef were examined bacteriologically. Salmonella typhi was not isolated, but in two of the cans viable mesophilic aerobic and anaerobic spore-forming bacteria were found. This suggested poststerilization contamination through seam leakage because organisms could not have survived the high temperature at which the meat adjacent to the end seam area and not in the center. The conclusion was reached that there was seam leakage in the tin responsible for the outbreak and that contamination of the product occurred through cooling in polluted water or from a typhoid carrier who handled the tin when it was still wet after cooling.

Although evidence is suggestive, the Government is still not positive that the Aberdeen epidemic was produced by infected corned beef. The results of a Government committee inquiring into the course of the outbreak will be awaited before a definitive statement is made.

References

(1) Ash, I. et al. Outbreak of Typhoid Fever Connected with Corned Beef. Brit. Med. J. Vol. 1:1474, 1964.

Editor's Comment: No cases of typhoid fever in the United States due to Salmonella typhi, phage type 34, have come to our attention during 1963 or 1964. A culture survey of corned beef imported into the U. S. is presently underway at C.D.C.

The original S. typhi cultures of phage type 34 were typed in the Enteric Bacteriology Unit, CDC in 1954. The 6 cultures were received from the Division of Laboratory, California Department of Public Health, Berkeley.

Information recently provided by Dr. Howard L. Bodily revealed that the cultures were recovered in 1952 and 1953 from two cases and two carriers.

One of the cases was the husband of one of the carriers. There was no apparent connection between the other two individuals. According to information available from records in the Enteric Bacteriology Unit since these first cultures were typed, 28 cultures have been identified as type 34 from 21 persons. These cultures came from widely separated areas of the United States, including Georgia, Michigan, and Massachusetts.

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

During the first quarter of 1964 a total of 730 salmonella isolations from human and nonhuman sources were typed in the Hamburg Center. In all, 89 serotypes were identified including 7 new types. The new types were represented by single isolates; 3 were from human cases (S. connstatt, S. kahla, and S. kassberg) and 4 were from animals (S. bockenheim, S. khartoum, S. nikolaiflett, and S. slatograd). Thirty-five per cent of the cultures were from human cases or carriers and 65 per cent were from nonhuman sources. The 10 most common types from all sources are compared with the 10 most common types from man, animals, food and feed, and sewerage and surface waters (Table X). It may be noted from the table that only 2 of the common types in animals, S. kottbus and S. braenderup, appeared in the lists of common types from other sources. As the Hamburg laboratory is a reference center, it is believed that the apparent prevalence of so many unusual types in animals may represent bias in that the usual types such as S. typhi-murium are identified in other laboratories and only the rare types were submitted.

II. FOOD AND FEED SURVEILLANCE

Bacteriological Studies of Imported Canned Corned Beef.

The implication of canned corned beef imported from South America in the recent large outbreak of typhoid fever in Aberdeen, Scotland, has stimulated interest in cooked canned meat products as a potential source of salmonellosis. Although Salmonella typhi was not isolated from suspected cans of meat during the Aberdeen outbreak or the 3 previous outbreaks, Sandiford (1954) recovered this organism from a can of imported "Sterilized Cream" examined because there had been complaints about the taste and smell of the product. After cultures were taken, thorough examination of the can by the British Food Manufacturing Industries Association suggested that it had been ineffectively sealed at the canner's end and that contamination occurred from leakage of cooling water applied after heat sterilization. The water was from a shallow well subject to pollution. Subsequently, 955 cans of the same make were cultured and S. typhi was not recovered but 17 per cent contained viable sporing and non-sporing species of bacteria. Investigations of canning plants in which suspected meats have been processed also suggested that the cans were contaminated after processing by sewage-polluted river water used for cooling.

In the summary of food poisoning outbreaks associated with canned meat in England and Wales (1962), the isolation of Salmonella onderstepoort was reported from the remains of a 5-3/4 lb. can of corned beef and from a carving knife. The can was opened and the meat sliced immediately before the meal. The same serotype was obtained from 39 of 50 patients and 5 staff members in a boarding school. The meat came from Africa. In the same report the isolation of S. montevideo was recorded from a 7-8 oz. can of corned beef, 3 patients and a foodhandler. The source of this beef was not indicated.

During July and August, the Veterinary Public Health Laboratory obtained in the local retail markets 18, 12 oz. cans of canned corned beef imported from Argentina and 4, 6 lb. cans of Argentine corned beef obtained through a local wholesaler for bacteriological examination. The 18, 12 oz. cans consisted of 6 each of 3 different brands packed in 2 different establishments. The 6 lb. cans were of one brand packed in a third establishment. A hole about the size of a lead pencil point was found in the end of one of these cans. When opened the beef had dried so that it had shrunk to about one inch below the top of the can. The contents had turned dark brown and a putrefactive odor was noticed. Findings on bacteriological examination of the 22 cans are given in Table XI.

As a result of our memorandum of June 9, 1964, sent to all recipients of the Salmonella Surveillance Report concerning the Aberdeen typhoid outbreak and in which mention was made of the suspect brands (Fray Bentos and Helmet), the Communicable Disease Center received 8 cans of Fray Bentos canned corned beef imported from Argentina from Mr. Ralph L. Horst, Chief, Food Laboratory, Florida Department of Agriculture, Tallahassee. The cans were found by one of their Food Inspectors in a market in Havana, Florida.

Before examination, the paper labels were removed and the cans were immersed in 70 per cent alcohol for several minutes. The can opener was sterilized by flaming in alcohol. Immediately after opening, the inside seams and surface of the meat in each can was swabbed and smears prepared from this material were Gram stained. Gram positive cocci were found on the smears from 6 cans and Gram positive bacilli from 2 cans. Cultures of the meat and swabs from seams revealed coagulase negative staphylococci, Gram positive aerobic spore forming bacilli in 1 can, coagulase negative staphylococci only in 3 cans, Gram positive aerobic spore forming bacilli in 1 can, and a Coryne-bacterium species in 1 can. No organisms were cultured from 2 cans.

REFERENCES

1. Sandiford, B. R., Salmonella typhi in Canned Cream. Monthly Bull. Minist. Health (Lond) 13:153-158, 1954.

2. Food Poisoning in England and Wales, 1962. Monthly Bull. Minist. Health (Lond) 22:200-214, 1963.

Figure 1.

REPORTED HUMAN ISOLATIONS OF SALMONELLAE
In The United States
1963 - 1964

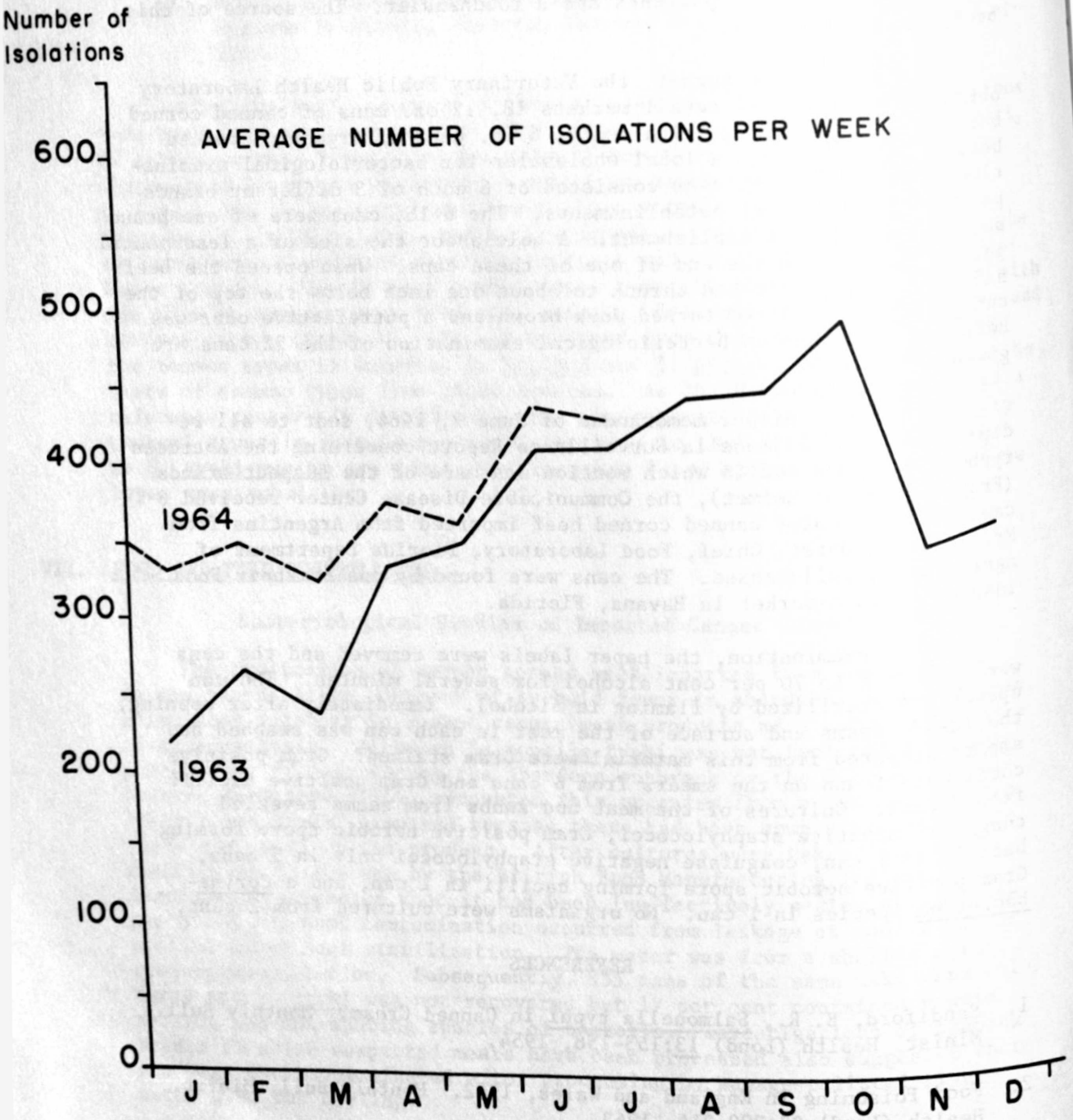
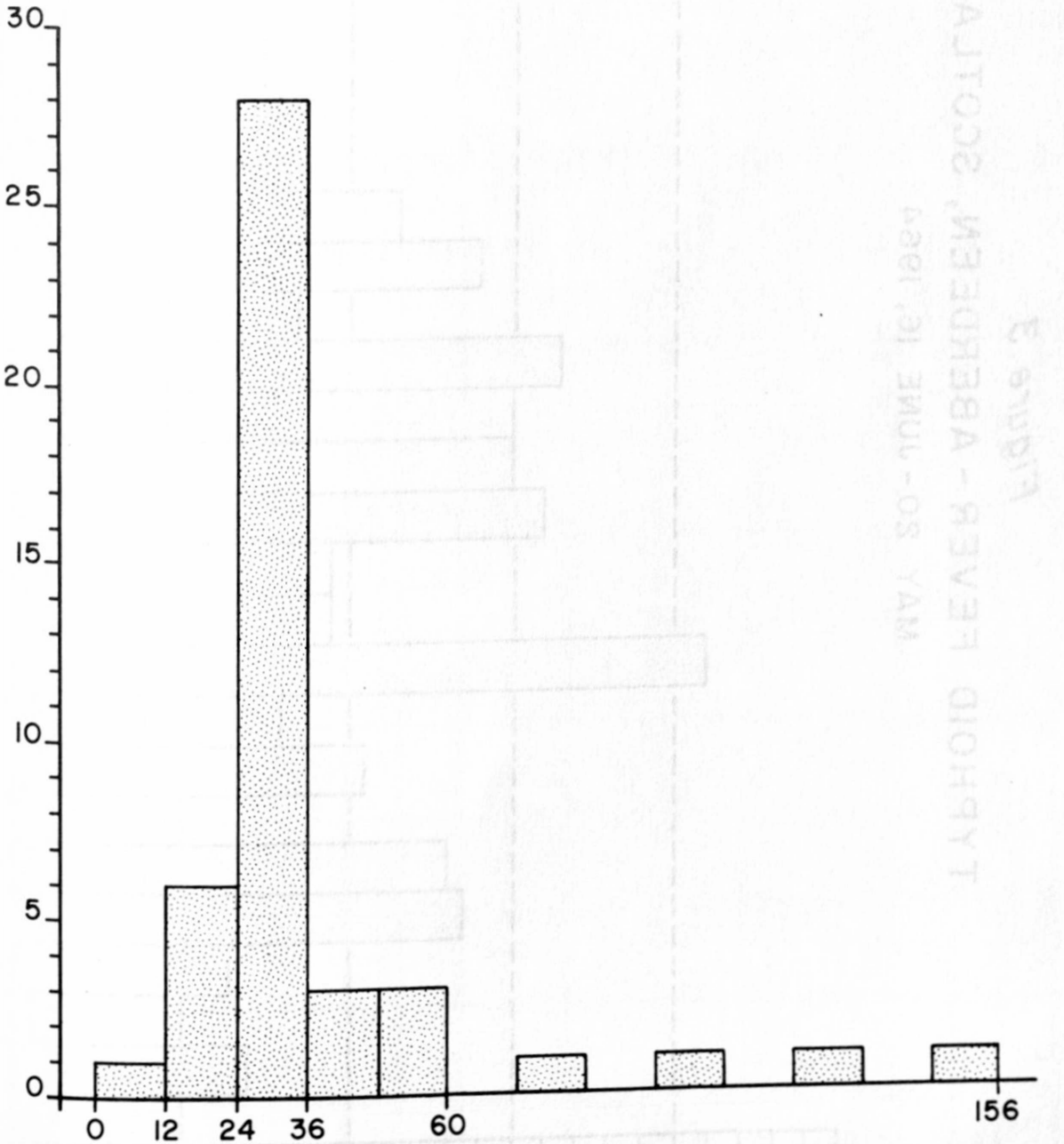


Figure 2

ONSET OF GASTROENTERITIS ASSOCIATED WITH THE SORORITY LUNCHEON

UNIVERSITY OF UTAH - APRIL 11, 1964



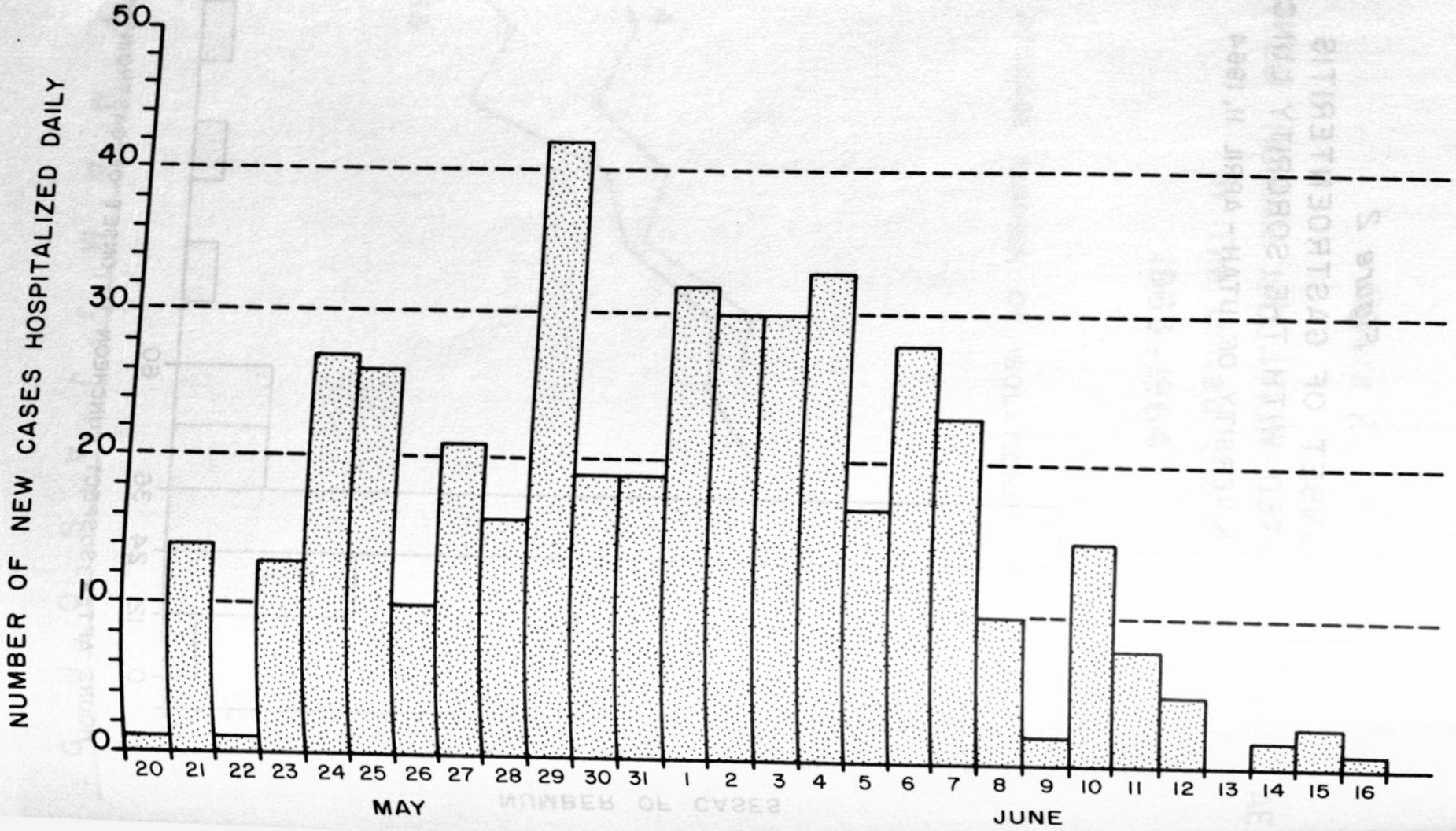

NUMBER OF NEW CASES HOSPITALIZED DAILY
50
40
30
20
10
0
20 21 22 23 24 25 26 27 28 29 30 31 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
MAY
JUNE

TABLE I

SALMONELLA SEROTYPES ISOLATED FROM HUMANS DURING JULY, 1964

SEROTYPE	REGION AND REPORTING CENTER																	
	NEW ENGLAND							MIDDLE ATLANTIC						EAST NORTH CENTRAL				
	MAINE	NH	VT	MASS	RI	CONN	TOTAL	NY-A	NY-BI*	NY-C	NJ	PA	TOTAL	OHIO	IND	ILL	MICH	WIS	TOTAL
albany				1		3	4		2	1		3	6						
anatum																			
atlanta																			
banana												1	1	1					1
bareilly																			
berta										1			1						
binza																			
blockley	2		1	6			9	3	2	2		3	10	2		7	3	1	13
bovis-morbificans																			
bradford																			
braenderup				1		1	2				1		1				1		1
brancaster															1				1
bredeney										1			1			4	1		5
california																			
carrau																	1		1
chester												2	2					3	3
cerro														2					2
cholerae-suis																1	1		2
cholerae-suis v kun																1	1	1	3
cubana																			
derby	2	1		35	1	19	58	10	18	29	7	41	105	8		15	3	5	31
emek																			
enteritidis				15		3	18	12	3	6	1	5	27	12		3	2	3	20
gallinarum																			
gaminara																			
give										1			1						
goettingen																			
heidelberg			2	29		1	32	2	11	5	3	8	29	2	6	11	10	1	30
indiana										1		1	2	1	1				2
infantis				6		1	7	5	1	1	4	7	18	2	2	3		1	8
irumu																			
javiana				1			1	2				3	5	1					1
kentucky																			
litchfield									2	2			4			1			1
manhattan																			
meleagridis																1			1
miami																	1		1
mississippi																	6	2	9
montevideo				1			1	2	2	1	1	3	9	1			1		1
muenchen									1			1	2						
new-brunswick												1	1				1		1
newington						1	1					7	17	1		2	1	2	6
newport				7	1	2	10	1	3	4	2								
norwich												9	9		1		3		4
oranienburg																			
oslo									1				1						
panama										2			2		1	1	1	2	5
paratyphi B v java						1	1											1	1
paratyphi B				1			1		1			2	3			1	1		2
pensacola				1			1								1				1
poona											4		4			3			3
reading																1			1
rubislaw																			
saint-paul				2			2	1	8	3	1	3	16	1	3	1			5
san-diego														2					2
schwarzengrund																			
senftenberg																			
stanley								1					1						
tallahassee											1		1						
tennessee				2			2				1		1			1	6	1	8
thompson					2		2	3	1		1	1	6			4	1		5
typhi				1	2	1	4		2			4	6	4	2	8	3	1	18
typhi-murium	2	1	4	40		8	55	26	31	28	13	39	137	17	5	34	21	9	86
typhi-murium v cop	1			4			5				3	2	5				5		5
urbana				1			1												
weltevreden																			
weslaco																	2		2
worthington																	1		1
Untypable Group B		3					3												
Untypable Group C-1																			
Untypable Group C-2																			
Untypable Group D		1					1												
Untypable Group E																1			1
Unknown																			
TOTAL	7	6	7	154	6	41	221	68	89	88	43	146	434	57	23	104	77	33	294

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

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

TABLE I
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
		1					1											albany
								1	1						1	3	6	anatum
															1		1	atlanta
																		banana
															1		1	bareilly
											1						1	berta
1						2	3		1				1		2	1	5	binza
		1					1											blockley
																		bovis-mobificans
																		bradford
2							2						1				1	braenderup
																		brancaster
2							2											bredeney
																		california
																		carrau
									2						2		4	chester
															1		1	cerro
																		cholerae-suis
											1		1		2		4	cholerae-suis v kun
																		cubana
		2					2	1	3	2	3					1	10	derby
5	1	5					11	1	1						1	1	4	emek
																		enteritidis
																		gallinarum
																		gaminara
4		1	1			1	7		5	2	1		1				1	give
3		3	3			1	10		1				9		9	2	28	goettingen
									1								1	heidelberg
													3		4	2	10	indiana
																		infantis
								1					1				1	irumu
															18	5	24	javiana
																		kentucky
									1		1		1		3	2	5	litchfield
															1		4	manhattan
																		meleagridis
1			1				2						1			3	4	miami
						2	2				3	1			1		1	mississippi
											1		2		1	9	14	montevideo
																3	6	muenchen
1		1													1		1	new-brunswick
		1				3	5		3	2								newington
2							1						2		14	16	37	newport
							2								1	1	2	norwich
											9		4		11	1	25	oranienburg
																		oslo
		1							1									panama
							1		1							3	4	paratyphi B v java
																	1	paratyphi B
																		pensacola
1											2							poona
							1		8				1				2	reading
															5	5	19	rubislaw
																		saint-paul
																		san-diego
																12	12	schwarzengrund
																1	1	senftenberg
																		stanley
									2		1					1	1	tallahassee
		1				1	2										3	tennessee
15		10	4	2	2	1	1		3		1				1	7	9	thompson
						9	42		25		21	1	15		1	8	28	typhi
												1	8		31	15	101	typhi-murium
																		typhi-murium v cop
																		urbana
					1		1				1							weltevreden
										11							1	weslaco
1										2				1			12	worthington
					1		2			5							2	Untypable Group B
2			1							3							5	Untypable Group C-1
							3			2							3	Untypable Group C-2
														5			7	Untypable Group D
40	1	27	10	2	4	20	104	4	59	29	46	3	51	6	113	102	413	Untypable Group E
																		Unknown
																		TOTAL

TABLE I

REGION AND REPORTING CENTER

SEROTYPE	EAST SOUTH CENTRAL					WEST SOUTH CENTRAL					MOUNTAIN								
	KY	TENN	ALA	MISS	TOTAL	ARK	LA	OKLA	TEX	TOTAL	MONT	IDA	WYO	COLO	NM	ARI	UTAH	NEV	TOTAL
albany																			
anatum						1	6		2	9									
atlanta																			
banana																1			1
bareilly		1			1		1			1									
berta							1			1									
binza							3			3									
blockley							2			2									
bovis-morbificans																			
bradford																			
braenderup									1	1									
brancaster																			
bredeney														2			1		3
california																			
carrau																			
chester																			
cerro																			
cholerae-suis																			
cholerae-suis v kun																			
cubana									4	4									
derby				1	1									2					2
emek																			
enteritidis																			
gallinarum				1	1														
gaminara							1			1									
give							4			4									
goettingen																			
heidelberg		2			2		1	1	4	6	1	1		5		1	27		35
indiana																			
infantis								1	3	4	1			2		1	1		5
irumu														2					2
javiana				1	1		2		4	6									
kentucky							1	1		2									
litchfield																			
manhattan									1	1									
meleagridis																			
miami																			
mississippi						1	2		1	4									
montevideo	1	14			15		1		1	2									
muenchen			1		1														
new-brunswick																			
newington																			
newport		3		1	4	1	7	1	8	17									
norwich														1		2			3
oranienburg							2		5	7									
oslo																			
panama																			
paratyphi B v java						1	3			4	1						1		2
paratyphi B									2	2									
pensacola																			
poona								1	1	2									
reading																			
rubislaw				1	1											1			2
saint-paul	1		1		2		1			1	1								
san-diego	1				1				1	1									
schwarzengrund		16			16														
senftenberg							6		2	8									
stanley																			
tallahassee														1					1
tennessee		1			1	1			1	2									
thompson	1	2			3		2		1	3					5				6
typhi	6	1			7	8	3		5	16			1	6	1		1		9
typhi-murium	1	2	2	2	7	5	17	2	26	50	1								2
typhi-murium v cop							2			2	2								
urbana																			
weltevreden									1	1									
weslaco																			
worthington															9	1			10
Untypable Group B						7				7					3				3
Untypable Group C-1				1	1	2				2									
Untypable Group C-2						3	1			4					1	1			2
Untypable Group D						3				3									
Untypable Group E															1				1
Unknown																			
TOTAL	11	42	4	8	65	33	69	7	74	183	7	1	1	21	20	8	31	-0-	89

TABLE I

REGION AND REPORTING CENTER						OTHER VI	TOTAL	PERCENT OF TOTAL	SEVEN MONTH TOTAL	% SEVEN MONTH TOTAL	1963 7 MONTHS TOTAL	PERCENT OF 1963 SEVEN MOS. TOTAL	SEROTYPE
PACIFIC													
WASH	ORE	CAL	ALASKA	HAWAII	TOTAL								
							1		5		3		albany
1		4		3	8		33		135		119		anatum
							1		5		2		atlanta
							1		1		1		banana
							5		51		35		bareilly
							3		28		31		berta
							3		10		4		binza
		2			2		44	2.0	248	2.1	217	2.2	blockley
		2			2		2		4		4		bovis-mobificans
							1		1				bradford
		4			4		12		52		24		braenderup
		1			1		1		1				brancaster
							10		122		61		bredeney
							2		18		4		california
							1		1				carrau
	2				2		11		45		127		chester
							1		2				cerro
							2		10				cholerae-suis
							6		22		41		cholerae-suis v kun
							7		37		20		cubana
		6		2	8		217	10.1	1,878	16.2	771	7.8	derby
		1			1		1		1				emek
3		1			4		84	3.9	376	3.3	383	3.9	enteritidis
							1		1				gallinarum
							1		1				gaminara
		2		1	3		8		41		30		give
							1		1				goettingen
2	2	28	1	2	35		204	9.4	956	8.3	884	9.0	heidelberg
5	3	18		2	28		5		21		9		indiana
							90	4.2	507	4.4	509	5.2	infantis
							3		4		5		irumu
							38		111		69		javiana
		2			2		2		13		18		kentucky
		5		6	11		12		37		30		litchfield
							16		103		106		manhattan
				1	1		2		38		46		meleagridis
		1					4		22		32		miami
1	2	2			1		7		16		11		mississippi
		1			5		57	2.6	257	2.2	225	2.3	montevideo
					1		13		133		178		muenchen
		1			1		2		4				new-brunswick
		1			1		4		20		31		newington
	3	12		2	17		113	5.2	479	4.1	604	6.1	newport
		4			4		3		6		5		norwich
							54	2.5	306	2.6	223	2.3	oranienburg
		1		1	1		2		5		5		oslo
2		4		2	3		10		92		69		panama
	1				6		18		132		65		paratyphi B v java
					1		11		97		77		paratyphi B
							2		4				pensacola
		3					8		25		37		poona
		1			3		8		25		16		reading
7	4	8		1	1		1		3				rubislaw
6	1	9			20		68	3.1	259	2.2	273	2.8	saint-paul
					16		20		103		84		san-diego
		3			3		31		64		88		schwarzengrund
		2		1	3		12		70		19		senftenberg
							1		3		8		stanley
		2			2		2		2		6		tallahassee
							20		236		66		tennessee
2		1			3		33		179		124		thompson
1	7	12			20		106	4.9	405	3.5	430	4.4	typhi
26	15	73		13	127		614	28.4	3,173	27.4	3014	30.6	typhi-murium
							19		104		76		typhi-murium v cop
							1		10		22		urbana
				2	2		2		12		17		weltevreden
			1				1		1		1		weslaco
					1		3		33		17		worthington
	1						35		176		180		Untypable Group B
							8		42		32		Untypable Group C-1
					1		14		29		22		Untypable Group C-2
			1		1		7		18		34		Untypable Group D
							1		4		8		Untypable Group E
							12		50		40		Unknown
56	41	217	3	39	356	- 0 -	2,159		11,569		9863		TOTAL

VI (Virgin Islands)

TABLE I-A

Serotypes Reported from Humans Previously during 1964
But Not in July

Serotype	Month(s)	Reporting Center(s)	Number of Isolations
S. abony	Jan	NY-C	1
S. adelaide	Jan	Pa(1)	4
	Mar	Calif(2)	
	Apr	Ohio(1)	
S. alachva	Jan & Apr	Calif	2
S. amager	Jan & Mar	La	8
S. amsterdam	Apr	Colo	1
S. ardwick	Apr	Ill	1
S. arechavaleta	Jun	Okla	1
S. atlanta	Apr, May & Jun	Ga	4
S. brandenburg	Jun	Colo	1
S. cambridge	Jan	Ill	1
S. colorado	Jan & Jun	Hawaii	2
S. concord	Feb	Colo	1
S. denver	Apr	Calif	1
S. duesseldorf	Jun	Pa	1
S. florida	Mar	Fla	1
S. galiema	Apr	Colo	1
S. gatuni	Jan	Fla	1
S. grumpensis	Mar, May & Jun	Hawaii	4
S. halmstad	Apr	Mich	1
S. hartford	Feb, Mar & Apr	Fla(3)	8
	Mar & Jun	Ill(2)	
	Apr	La(1)	
	May	Ala(1)	
S. hato	Mar	Colo	1
S. johannesburg	Apr	Calif(1)	2
	Apr	NY-A(1)	
S. Kottbus	Jun	NY-A	1
S. livingstone	Apr	Ark(1)	2
	May	Md(1)	
S. london	Feb & Jun	Va	3
S. luciana	Jan	Ari	1
S. madelia	Feb	Wis	1
S. manchester	May & Jun	Tex	2
S. michigan	Apr & Jun	Calif	2
S. minnesota	Jan & May	Calif(2)	4
	Feb	Ill(2)	
S. muenster	Jun	Mich	1
S. new-haw	May	Ida	1
S. ohio	May	Calif	1
S. orion	Feb	Mass	1
S. othmarschen	Jan	Tex	1
S. paratyphi A	Feb, May	Calif(2)	4
	May	Nev(1)	
S. pullorum	Jun	NY-BI(1)	
S. redlands	Mar	Ga	1
S. shipley	Mar	Ga	1
S. simsbury	Jan	NY-C	1
	May	Ga	1
S. sundsvall	Feb	Ari	1
S. virchow	Jan	Wash	1
S. westhampton	Mar	Hawaii	1
TOTAL			80

TABLE II

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

Reporting Center	Total Number of Isolates Reported	Number of Isolates From Family Outbreaks	Per Cent of Total
Alabama	4	2	50.0
Alaska	3	0	0.0
Arizona	8	0	0.0
Arkansas	33	2	6.0
California	217	65	29.9
Colorado	21	3	14.3
Connecticut	41	1	2.4
Delaware	4	0	0.0
District of Columbia	29	5	17.2
Florida	102	9	8.8
Georgia	113	29	25.7
Hawaii	39	2	5.1
Idaho	1	0	0.0
Illinois	104	17	16.3
Indiana	23	6	26.1
Iowa	1	0	0.0
Kansas	20	4	20.0
Kentucky	11	0	0.0
Louisiana	69	14	20.3
Maine	7	0	0.0
Maryland	59	16	27.1
Massachusetts	154	37	24.0
Michigan	77	17	22.1
Minnesota	40	6	15.0
Mississippi	8	0	0.0
Missouri	27	7	25.9
Montana	7	1	14.3
Nebraska	4	0	0.0
New Hampshire	6	0	0.0
New Jersey	43	4	9.3
New Mexico	20	6	30.0
New York 1-A	68	9	13.2
New York 2-BI	89	3	3.4
New York 3-C	88	7	5.7
North Carolina	51	5	9.8
North Dakota	10	2	20.0
Ohio	57	11	19.3
Oklahoma	7	2	28.6
Oregon	41	6	14.6
Pennsylvania	146	39	26.7
Rhode Island	6	3	50.0
South Carolina	6	5	83.3
South Dakota	2	0	0.0
Tennessee	42	0	0.0
Texas	74	16	21.6
Utah	31	9	29.0
Vermont	7	2	28.6
Virginia	46	13	28.3
Washington	56	16	28.6
West Virginia	3	0	0.0
Wisconsin	33	6	18.2
Wyoming	1	0	0.0
Totals	2,159	407	18.9

TABLE III

Infrequent Serotypes

Serotype	Center	July	7 Month Total*	1963 Total**	Comment
S. albany	MO	1	3	3	Second isolation of this type from Mo. this year from an 8-month-old-female. 1963 isolations from Fla., La., & Va.
S. banana	ARI	1	1	1	Extremely rare. First isolated from a "serpent" in the Belgian Congo, 1951.
S. bovis-morbificans	CALIF	2	4	4	One of the earliest salmonella organisms identified (1894). Sixth most common from humans in the Netherlands, 1962.
S. bradford	MO	1	1	0	Extremely uncommon serotype.
S. brancaster	IND	1	1	0	First isolated 1948 from mussels (shellfish) in England.
S. carrau	MICH	1	1	1	First isolated 1936 from mesenteric gland of a pig. Isolated from a snake and an unknown wild animal during 1963.
S. cerro	GA	1	2	6	Sixteen of 25 recoveries from nonhumans during 1963 from animal feeds. Recently isolated from egg products.
S. emek	CALIF	1	1	0	Second most common serotype in Israel in 1962.
S. gallinarum	MISS	1	1	0	Fifty-four of 55 1963 nonhuman isolates from domestic fowl; 35 from chickens.
S. gaminara	LA	1	1	3	Two recoveries during 1963 from nonhuman specimens; both cold-blooded vertebrates. Frequently found in animal feeds.
S. goettingen	NC	1	1	0	First isolated 1940. Extremely rare serotype.

TABLE III (cont'd)

Serotype	Center	July	7 Month Total*	1963 Total**	Comment
S. new-brunswick	CALIF & GA	2	4	6	Responsible for a family outbreak in Va. in 1963. Not infrequently isolated from dogs.
S. pensacola	MASS & IND	2	4	6	All 6 1963 recoveries from Southeastern U.S.; Va. 3, Fla. 1, Ga. 1 & La. 1.
S. rubislaw	MISS	1	3	11	All 11 1963 isolates from La. (9) & Tex. (2). Six of 8 1963 nonhuman recoveries from swine.
S. stanley	NY-A	1	3	8	Frequently isolated from monkeys. Second most common serotype from humans in the Netherlands during 1962.
S. tallahassee	CALIF	2	2	6	Five of 6 isolations during 1963 from Fla; 1 from Ga.
S. weslaco	TEX	1	1	1	La. reported 1963 recovery. First isolated 1947 from a cat in Weslaco, Texas.

*Represents 11,569 human isolations of salmonellae during the first seven months of 1964.

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

TABLE IV

Age and Sex Distribution of 2,111 Isolations of Salmonellae Reported for July 1964

Age	Male	Female	Total	
Under 1	107	89	196	9.3
1-4 yrs.	163	124	287	13.6
5-9 yrs.	86	78	164	7.8
10-19 yrs.	70	76	146	6.9
20-29 yrs.	50	56	106	5.0
30-39 yrs.	44	62	106	5.0
40-49 yrs.	44	48	92	4.4
50-59 yrs.	39	56	95	4.5
60-69 yrs.	27	46	73	3.5
70-79 yrs.	30	30	60	2.8
80+	10	16	26	1.2
Unknown	362	398	760	
Total	1,032	1,079	2,111	
% of Total	48.9	51.1		

NON-HUMAN ISOLATES REPORTED BY THE NATIONAL [illegible] AND STATE REPORTING CENTERS BY SEROTYPE AND SOURCE JULY 1964

SEROTYPE	fowl	chicken	turkey	duck	pigeon	fowl environment	pheasant	quail	dove	gull	avain	bovine	ovine	porcine	canine	feline	mouse	guinea pig	monkey	chimpanzee	beaver	mink	llama	tiger	fox	deer	eggs	frozen eggs	egg albumen	egg shell	chicken (food)	commercial pet cake	gravy	potato salad	beet soup	bean salad	chicken salad	creamed corn	food sample	bone meal/ meat scraps	animal food unk.	tankage	turtle	lizard	cistern water	turtle water	unknown	Total	Seven Months Total	SEROTYPE
alachua		1	10									1																																			1	3	alachua
anatum		2	1									2		1	1				3								1																					21	175	anatum
bareilly		2	1													2																															3	14	bareilly
berta			1																																												3	5	berta
binza			6																																												8	24	binza
blockley		10	7									1																									1		1					9				27	64	blockley
bredeney		4	7				1																															1	1							15	41	bredeney
cambridge			1																																												1	1	cambridge
cerro		1																						1																							4	25	cerro
chester		5	35		1																						2																	1			42	107	chester
cholerae-suis v kun														19		1																								1	1		1					19	72	cholerae-suis v kun
cubana			1											4													1																				5	19	cubana
derby			3							1		4				1											1															1					11	147	derby
dublin		1	1											1			5																													4	17	dublin
enteritidis																																															8	59	enteritidis
gallinarum		4										1																14		3																4	33	gallinarum
give		12	1									1		2	2																															2	27	give
heidelberg		1	12																																												46	264	heidelberg
illinois			1																																												1	3	illinois
indiana																																															2	11	indiana
infantis		27	7			2																					2	2		1		1														2	44	201	infantis
kentucky		1	2																																												1	1	17	kentucky
livingstone			7																																						1	1					1	5	19	livingstone
manhattan			2	1																																											7	39	manhattan
meleagridis																																															3	27	meleagridis
montevideo		19	3																								8																				31	128	montevideo
muenchen		1																																													1	54	muenchen
new-haw		1																																													1	1	new-haw
newington			3																												1																4	21	newington
newport			5									2			1																								1						1		13	63	newport

TABLE VI-A

SEROTYPES REPORTED FROM NON-HUMAN SOURCES
PREVIOUSLY DURING 1964 BUT NOT IN JULY

Serotype	Month(s)	Reporting Center(s)	Number of Isolations
S. adelaide	Jan	Mich	2
S. albany	Jan	Ky	1
S. amager	May	Ga	1
S. belem	Mar	Mich	1
S. blukwa	Apr	Mich	1
S. braenderup	Feb	Miss (1)	5
	May	Ark (1)	
	May	Mo (3)	
S california	Jan	Calif (1)	14
	Jan	Ill (1)	
	Jan & Apr	Miss (2)	
	Jan	Tex (1)	
	Apr	Ark (1)	
	Apr	Ga (3)	
	Apr & Jun	Ind (3)	
	Apr	Minn (1)	
	May	Fla (1)	
S. cholerae-suis	Jan, Apr, May, & Jun	Ind (10)	29
	Jan, May & Jun	Ohio (6)	
	Mar	Calif (1)	
	Apr	Tenn (1)	
	May	Colo (1)	
	May	SC (2)	
	May	Tex (2)	
	Jun	Fla (5)	
	Jun	NC (1)	
S. gaminara	Jun	Ind	1
S. inverness	Jan	Mich	1
S. javiana	Feb	La	1
S. johannesburg	Feb	Alas (1)	3
	May	Mo (2)	
S. litchfield	Mar & May	Calif (2)	4
	Jun	Me (1)	
	Jun	SC (1)	
S. manila	Jan	Mo	2
S. miami	Jun	Mich	1
S. minneapolis	Jan	Ill	1
S. minnesota	Jan	Ala (3)	7
	Jan	Tex (1)	
	Feb	Ohio (1)	
	Mar	Calif (1)	
	Apr	Miss (1)	
S. mission	Jan	Mo	2
S. muenster	Jun	Minn	1
S. ohio	Feb & Mar	Ohio	2
S. poona	Feb	Mich (1)	2
	Mar	Calif (1)	
S. taksony	Jun	Calif	1
S. tallahassee	Apr	Fla	1
S. thomasville	Jun	Ga	1
S. wandsbek	Jan	Mich	1
S. zehlendorf	Apr	Mich	1
TOTAL			87

TABLE VII

Salmonella derby Isolations and Total Salmonella Isolations Reported by 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

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

	Ate		
	Ill	Not Ill	Total
Roast Veal	53	65	118
Gravy	51	59	110
Dressing	51	60	111
Green Beans	51	56	107
Tossed Salad	53	62	115
Roquefort Dressing	28	37	65
French Dressing	19	28	47
Banana Cream Pie	55	52	107
Coffee	22	25	47
Punch	21	34	55

...ook April 11, 1964

Did Not Eat				
% Ill	Ill	Not Ill	Total	% Ill
44.9	2	2	4	50.0
46.4	5	8	13	38.5
45.9	5	7	12	41.7
47.7	5	11	13	38.5
46.1	3	5	8	37.5
43.1	28	30	58	48.3
40.4	37	39	76	48.7
51.4	0	15	15	0.0
46.8	34	42	76	44.7
38.7	35	33	68	51.5

TABLE IX

Food Histories, Outbreak of Salmonellosis
Wadsworth VA Hospital, July, 1964

	ILL			NOT ILL		
Food	Served	Not Served	Per Cent	Served	Not Served	Per Cent
Ham	19	65	23	84	141	37
Turkey	65	19	77	141	84	63
Cherry Cream Pie	74	32	70	285	48	85
Tapioca Pudding	121	0	100	382	40	90
Parsley (Cooked)	121	0	100	384	40	90
Carrots (Cooked)	121	0	100	384	40	90
Candied Sweet Potatoes	121	0	100	384	40	90
Green Peas	56	28	70	356	68	84
Meat Loaf	52	54	49	360	64	85
Gravy	41	65	39	283	50	85
Lamb	74	47	61	233	191	55
Vanilla Ice Cream	85	36	70	360	64	85
Milk	121	0	100	384	40	90

Serotype	No.	Serotype	No.	Serotype
1. S. typhi	70	S. kottbus	15	S. braenderup
2. S. paratyphi B	54	S. canastel	12	S. typhi-murium*
3. S. typhi-murium*	28	S. mikawasima	12	S. senftenberg
4. S. newport	12	S. detroit	10	S. blockley
5. S. manchester	11	S. ahuza	9	S. infantis
6. S. blockley	8	S. braenderup	9	S. cubana
7. S. kottbus	8	S. charity	8	S. reading
8. S. enteritidis	7	S. pull-gall,***	7	S. potsdam
9. S. braenderup	5	S. uphill	7	S. newport
10. S. infantis	5	S. salford	5	S. anatum
				S. binza
				S. bornam

nnnnnnnnnd

Water		Total	
No.	Serotype	No.	Serotype	No.
22	S. paratyphi 3	82	S. paratyphi B	141
9	S. manchester	31	S. typhi	71
7	S. newport	19	S. typhi-murium*	56
6	S. typhi-murium	15	S. manchester	42
6	S. muenchen	12	S. braenderup	40
5	S. oranienburg	8	S. newport	38
5	S. bariely	7	S. kottbus	25
5	S. anatum	5	S. blockley	18
4	S. braenderup	4	S. muenchen	17
3	S. montevideo	4	S. oranienburg	15
3				
3				

Table XI

Results of Bacteriological Examinations of Canned Corned Beef

Imported from Argentina

Code	No. of Cans Examined	Size	Direct Gram Stained Smears	Culture Findings
Brand A	6	12 oz.	No organisms found	(4) No growth (1) Coagulase negative staphylococci, and Gram positive aerobic bacilli (1) Coagulase negative staphylococci
Brand B	6	12 oz.	Few Gram positive cocci (1 can) Few Gram positive rods (1 can) No organisms found (4 cans)	(6) No growth
Brand C	6	12 oz.	Few Gram positive rods and Gram positive cocci (2 cans) No organisms found (4 cans)	(6) No growth
Brand D	4	6 lb.	Gram positive rods, yeast, and Gram positive cocci (1 can)*	(1)* Coagulase negative staphylococci (1) Gram positive aerobic bacilli (1) Coagulase negative staphylococci and Gram positive aerobic bacilli

*A small hole was found in the end of this can.