REPORT NO. 87
August 25, 1969

NATIONAL
COMMUNICABLE DISEASE CENTER

SALMONELLA

SURVEILLANCE

CONTENTS. . .

FOR THE MONTH OF JUNE 1969

U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE/PUBLIC HEALTH SERVICE
Health Services and Mental Health Administration

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

National Communicable Disease Center
Attn: Chief, Salmonellosis Unit
Epidemiology Program
Atlanta, Georgia 30333

National Communicable Disease Center ..... David J. Sencer, M.D., Director

Epidemiology Program ..... Alexander D. Langmuir, M.D., Director

Bacterial Diseases Branch ..... Philip S. Brachman, M.D., Chief
John V. Bennett, M.D., Deputy Chief

Enteric Diseases Section ..... Eugene J. Gangarosa, M.D., Chief

Salmonellosis Unit ..... Bernard Aserkoff, M.D., Chief
Andrew Mallory, M.D.

Statistics Section ..... Stanley M. Martin, M.S.
Theodore P. Feury, Jr., M.S.

Veterinary Public Health Section ..... James H. Steele, D.V.M., Chief

Epidemiological Services Laboratory Section ..... Philip S. Brachman, M.D., Acting Chief

Salmonella Laboratory Unit ..... George K. Morris, Ph.D., Chief

Collaborators

Laboratory Division
Bacteriology Section
Enteric Bacteriology Unit ..... William H. Ewing, Ph.D., Chief
William J. Martin, Ph.D., Asst. Chief

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I. SUMMARY

In June 1969, 1,721 isolations of salmonellae were reported from humans, an average of 430 isolations per week (Tables I, II, and V-A). This number represents an increase of 66 (18.1 percent) over the weekly average of May 1969 and an increase of 41 (10.5 percent) over the weekly average of June 1968.

Reports of 620 nonhuman isolations of salmonellae were received during June 1969 (Tables II, IV, and V-B).

II. REPORTS OF ISOLATIONS

The ten most frequently reported serotypes during June:

HUMAN				NONHUMAN		
Serotype	Number	Percent	Rank Last Month	Serotype	Number	Percent
1 typhi-murium*	472	27.4	1	typhi-murium*	151	24.4
2 enteritidis	193	11.2	2	cholerae-suis var. kunzendorf	75	12.1
3 thompson	127	7.4	3	heidelberg	42	6.8
4 newport	108	6.3	4	anatum	24	3.9
5 infantis	107	6.2	5	montevideo	20	3.2
6 heidelberg	95	5.5	6	saint-paul	19	3.1
7 saint-paul	59	3.4	7	derby	18	2.9
8 typhi	40	2.3	8	infantis	18	2.9
9 javiana	29	1.7	> 10	livingstone	16	2.6
10 blockley	28	1.6	9	newport	12	1.9
Total	1,258	73.1		Total	395	63.7
TOTAL (all serotypes)	1,721			TOTAL (all serotypes)	620	
*Includes var. copenhagen	18	1.0		*Includes var. copenhagen	40	6.5

III. CURRENT INVESTIGATIONS

NONE

IV. REPORTS FROM THE STATES

A. Connecticut, New Jersey, Louisiana, Tennessee, and Massachusetts - Five Hospital Outbreaks Due to Salmonella infantis

1. Connecticut

Reported by Norton G. Chaucer, M.D., Director of Health, Hartford; James C. Hart, M.D., Director, Division of Preventable Diseases, Connecticut State Department of Health; and Joel A. Krackow, M.D., EIS Officer located at the Connecticut State Department of Health.

During the first three weeks of April, 1969, Salmonella infantis was recovered from stool specimens from three patients in a 260-bed nursing and convalescent hospital in Hartford, Connecticut. On April 23, an investigation by the Hartford Health Department and the Connecticut State Department of Health was begun.

A review of hospital charts revealed that during the period March 22 through April 20, 29 patients had experienced diarrhea. Eighteen of these cases had onsets of illness on April 6 and 7. Stool cultures were obtained on all 29 patients; seven were found positive for S. infantis. Of the 18 cases on April 6 and 7, four were positive for S. infantis.

Although patients on all five floors of the hospital had experienced diarrhea, positive isolations of S. infantis were obtained from patients on only three of the floors. A stool culture survey was then conducted on all patients and personnel on these three floors. Three additional patients were found positive for S. infantis; a nurse's aide and a patient were found positive for S. newington; and an additional patient was found positive for S. senftenberg. Interviews of these six persons revealed that all had experienced minor gastrointestinal symptoms during the period April 7 to May 7.

The average age of the 13 persons with salmonella in their stools was 80 years. Ten were women and three were men. Illness was mild in ten; three patients experienced a moderately severe syndrome.

Detailed food histories could not be obtained due to the age and debilitated state of much of the patient population. No common diet, medications, dates of admission, attending physicians, nurses or nurse's aides, or underlying illnesses could be documented. In addition, there was no unusual clustering of cases within the hospital.

At the time of the investigation, there appeared to be no new cases so that an extensive environmental culture survey was not attempted.

Measures to halt the outbreak included careful attention to good hand washing techniques and the isolation of patients with poor levels of personal hygiene. No additional cases have occurred since May 7.

2. New Jersey

Reported by Martin Goldfield, M.D., Director, Division of Laboratories, Ronald Altman, M.D., Director, Division of Preventable Disease Control Programs, and Charles McK. Janeway, M.D., EIS Officer located at the New Jersey State Department of Health.

During the months of February, March, and April, 1969, nine isolations of S. infantis were obtained from stools of employees and patients at a hospital in New Jersey.

The first two cases occurred in late February 1969, and involved a radiologist and a licensed practical nurse. No known association between the cases could be established. Five additional isolations were obtained during the last two weeks in April, from five patients with diarrhea located in two buildings and four different wards of the hospital complex. Average age of these patients was 69 years; all had serious underlying illness. Food histories did not reveal a common food source for these cases. Cultures of several different food items prepared in the kitchen were found negative for salmonellae.

A bacteriological survey was undertaken in which stool cultures were obtained from employees in the dietary department and from certain employees on the wards where patient cases had occurred. A hospital attendant and a nurse both of whom were asymptomatic and took care of patients who were known to be positive for S. infantis were found to be excreting S. infantis in their stools. Stool cultures performed on 91 food handlers were all negative for S. infantis.

It was postulated that at least some of the cases had occurred because of person-to-person spread of infection. Because the onsets of illness for the April cases were spread out over a 7-day period, it was felt that a common food item served at one meal was probably not responsible. The possibility of repeated contact with a contaminated food item or medicine could not be ruled out.

3. Louisiana

Reported by Charles T. Caraway, D.V.M., Chief, Section of Epidemiology, Louisiana State Department of Health; George K. Morris, Ph.D., Andrew Mallory, M.D., and Jonathan L. Adler, M.D., Epidemiology Program, NCDC.

During May and June, 1969, an extensive outbreak of salmonellosis due to S. infantis occurred among patients and personnel at a large hospital in Louisiana. Between May 1 and 12, the hospital laboratory obtained 13 isolations of S. infantis from stools of patients experiencing diarrhea within the hospital. In the 7-month period prior to this time, this organism had been recovered from only four hospitalized patients, the last being on March 2.

To evaluate the extent of infection among patients, a stool culture survey of 214 symptomatic and asymptomatic patients was performed between May 14 and 21. Infection was documented in 54 persons from all areas of the hospital except in the premature nursery where all 44 infants cultured were negative. Thirty percent of infected patients were asymptomatic; 10 percent had fever without diarrhea. The infected patients had been admitted between January 31 and May 12. They ranged in age from 2 months to 76 years (median 44 years). No common procedures or medications could be determined.

Approximately 25 percent of the physicians and nurses from various services in the hospital had also experienced gastroenteritis between May 1 and 14. In a culture survey of staff personnel, two of 22 physicians and 12 of 215 nurses were positive for S. infantis.

All patients with positive stool cultures were on a regular or low residue diet except those under 1 year of age. In addition, most of the involved physicians regularly ate meals in the hospital; however, this was not the case for many of the nurses involved. Although the patients' food is cooked and served separately from employees' food, the menus are often identical and are prepared in the same kitchen. Because of the suspicion that a common food source was involved, 282 kitchen and pantry personnel were cultured between May 16 and 20; six were found positive for S. infantis. One of these prepared food for patients and one prepared salads for both patients and staff. In an environmental survey of the kitchen areas and a ward pantry conducted on May 19, 20, and June 4, S. infantis was recovered from a wooden block used for cutting cooked meats. Cultures of chicken, turkey, sausage, frozen egg whites and yolks, yeast, flour, ice cream, tube feedings, other foods, and ice obtained from the kitchen were negative for salmonella. Multiple water samples collected within the kitchen and throughout the hospital were negative for coliform organisms or salmonellae.

To evaluate the continued transmission of infection, a surveillance system for diarrhea among patients was instituted on May 22. Between May 22 and June 3, 66 patients developed diarrhea and were cultured; four were positive for S. infantis. The hospital bacteriology laboratory identified four other infected patients. All eight had been admitted prior to May 12. Another survey on June 3 and 4 of 136 asymptomatic patients admitted between May 16 and June 1 identified five infected patients (Table 1). However, four of the five patients had been in the hospital between May 1 and 12 and had been readmitted. This rapid decline in cases in mid-May suggests that the main source of infection was no longer present in the hospital and that large scale person-to-person transmission was not occurring.

The sharp clustering and rapid falloff of cases (Figure 1) and the identification of S. infantis in the environment of the kitchen suggest a common source outbreak related to the central kitchen. If a common food source was involved, a number of possible mechanisms could account for the pattern of spread. For example, a single contaminated food served at several different times may have been responsible. Alternatively, the kitchen environment may have become contaminated by a food or carrier with subsequent secondary contamination of other foods. A common food vehicle could not account for the index cases on pediatric wards, however, because one infant was receiving only commercially prepared formula and the other three were receiving prepared baby food. For these cases, infection could have been transmitted by infected nurses.

Table 1

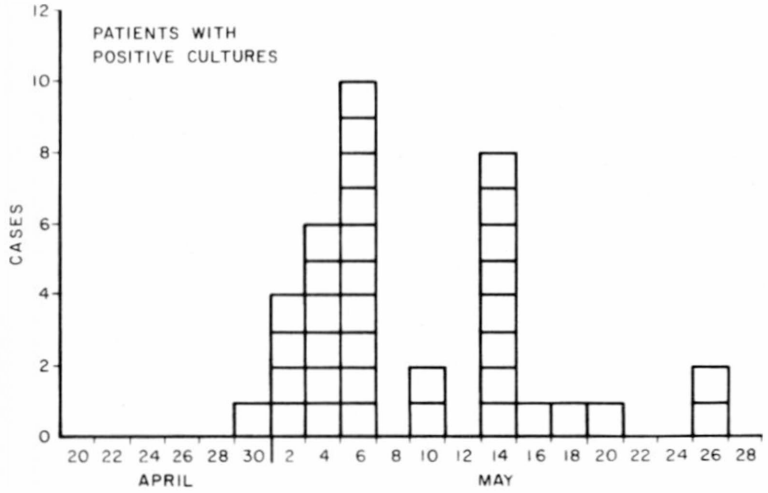
Prevalence of Salmonella infantis, Phage type C_1
in Patients by Date of Admission*, a Hospital, Louisiana

Date of Admission	Number Cultured	Number Positive	Percent
Prior to May 15	23	7	30
May 15 - May 21**	47	2	4
May 22 - May 28**	79	4	5
After May 28	38	0	0
TOTAL	187	13	

* Does not include 15 patients who developed diarrhea after May 21, had negative cultures, and were discharged.

** Five of the six positive patients had been in the hospital before May 12 and were readmitted.

Figure 1 SALMONELLOSIS DUE TO *S. INFANTIS* AMONG HOSPITAL PATIENTS BY DATE OF ONSET LOUISIANA, APRIL – MAY 1969



4. Tennessee

Reported by A. J. Mueller, M.D., Director, Jackson-Madison County Health Department; R. M. Neudecker, West Tennessee Regional Director, Tennessee Department of Public Health; J. H. Barrick, Ph.D., Director, Division of Laboratories, and Cecil B. Tucker, M.D., Director, Division of Preventable Diseases, Tennessee Department of Public Health; and William E. Scheckler, M.D., EIS Officer, Bacterial Diseases Branch, Epidemiology Program, NCDC.

Eight cases of S. infantis infection occurred in five premature and three term newborns during the period May 29 to June 4, 1969, in a hospital nursery in Tennessee. All 8 cases experienced diarrhea but only two were noted to have fever. Onsets of illness began on May 29, peaked on May 31, and ended on June 3.

A review of hospital records revealed that five of the infants had been born in the hospital delivery room; one had been born in the hospital operating room by C-section; and two had been born outside the hospital but transferred to the nursery on the day of birth. All eight infants had resided in the nursery from at least May 29 to June 1. During this time, they had received six different commercial formulas and one child had been breast fed. No food item common to more than three infants was noted. The infected infants had been treated by six different physicians, and any one physician did not care for more than three of the eight patients. The same nursing personnel served different areas of the nursery.

Cultures and histories on the families of the eight cases are currently being obtained. To date, salmonella has been recovered from the stools of a mother and 7-year-old sister of a case born at the hospital on May 29. This mother had not experienced diarrhea at the time of delivery or subsequently.

Although cultures of personnel who work in the nursery are still pending, no S. infantis isolates have been obtained to date. Environmental and formula cultures obtained in the nursery on July 7 were negative for salmonella and for growth of other gram negative organisms. Culture surveys performed on other infants in the nursery from June 12 through June 19 as well as a culture survey of all infants in the nursery on July 7 revealed no further salmonella isolates. Furthermore, no diarrhea has been noted since early June.

5. Massachusetts - Preliminary Report

Reported by A. D. Rubenstein, M.D., Deputy Commissioner of Public Health, and Nicholas J. Fiumara, M.D., Director, Division of Communicable Diseases, Massachusetts Department of Public Health.

Salmonella infantis was cultured from the stools of seven infants in a Massachusetts hospital during the period May 20 to June 5, 1969. All infants were from two of the four hospital nurseries and all had been in the hospital during the period May 18 to 20. Five of the infants were symptomatic; none were seriously ill.

A source of infection for the outbreak has not yet been confirmed. The mother of the index case had experienced diarrhea prior to delivery but multiple stool cultures before and after delivery were negative for salmonellae. All infants in the hospital receive one brand of formula except for those that are breast fed. Of the seven culture-positive infants, one was being breast fed.

Cultures of infants in all four nurseries, nursery personnel, infant formula, nursery environment, all performed on June 22, have been negative for salmonellae.

EDITOR'S COMMENT: During the 6-year period, 1963 - 1968, 44 hospital outbreaks of salmonellosis were reported in the Salmonella Surveillance Reports. Only two of these involved the serotype S. infantis. The occurrence of five separate hospital outbreaks due to S. infantis over a 2-month period in 1969 is therefore distinctly unusual and raises the possibility that a single common source may have been responsible for at least several of the outbreaks. Antibiotic sensitivity tests and phage typing of isolates from each of the five hospitals are being carried out in an attempt to document more clearly that the outbreaks were related. In the meantime, the Salmonellosis Unit would be extremely interested in learning the details of any outbreaks, hospital or otherwise, related to this particular serotype.

B. Maryland - Foodborne Outbreak Traced to Imported Beef

Reported by James Robb, Jr., and H. Clayton Ervine, Environmental Health Services, Montgomery County Health Department; Steven Lipson, M.D., Chief of Epidemiology, Montgomery County Health Department; Harold J. Garber, M.D., Chief, Division of Communicable Diseases, and Mr. Edwin Swecker, Bacteriologist, Bureau of Laboratories, Maryland State Health Department; Kenneth R. Lennington, Office of Associate Commissioner for Compliance, U.S. Food and Drug Administration; John E. Spaulding, D.V.M., Head, Toxicology Group, Technical Services Division, U.S. Department of Agriculture; and Harold Mellin, M.D., EIS Officer located at the Maryland State Health Department.

An outbreak of salmonellosis occurred among approximately 100 persons who attended a wedding reception in Wheaton, Maryland, on June 14, 1969. Thirty-three of 68 persons contacted reported an illness during the 3 days following the reception. Symptoms included diarrhea (70 percent), abdominal cramps (61 percent), nausea (48 percent), fever (48 percent), and vomiting (30 percent). Onsets of illness varied from 5 to 58 hours following ingestion of the meal with a mean of 18 hours and a median of 16 hours. Eleven persons had contacted their physicians and two stool specimens were obtained. One of these was positive for Salmonella welikada.

Food specific attack rates are illustrated in Table 1. On this basis, cooked beef was clearly implicated as the common food vehicle in this outbreak. Samples of beef were obtained from garbage cans at the site of the wedding reception, from the homes of several of the wedding guests, and from several unopened packed roasts. All were found positive for S welikada. High coliform counts were also noted.

Several steps were taken immediately to prevent further spread of infection. The Washington, D. C., food distributor voluntarily withheld the rest of the shipment from the market. The foreign review staff of the USDA was notified about this outbreak and took appropriate actions to notify the country of origin (Australia) of the contaminated beef. The plant responsible for importing and processing the beef was determined. This firm was visited on June 27, 1969, by USDA inspectors. Microbiological specimens were obtained and the food processing procedure was reviewed in detail. Production of the product in the plant was stopped for one week while new processing procedures were developed. Products produced by the old procedure were detained and reprocessed prior to release.

Review of the food processing procedure revealed a number of deficiencies in production. The meat had arrived frozen and had been slowly defrosted overnight in water at 60°F. Thawed but uncooked meat had been allowed to remain at a temperature of 50° for considerable periods of time. In general, insufficient cooking temperatures had been reached. Furthermore, since widely different sizes of meat had been cooked together, larger portions were not as well cooked as the smaller ones. And lastly, following cooking, slow chilling procedures were employed using water at 60°F.

The cooked beef had been shipped to a Washington, D. C., food distributor on June 6. The caterer had received the beef from a refrigerated truck at 4:30 PM on June 13. The beef was at that time immediately placed in the refrigerator and held overnight and then sliced on the morning of June 14. The sliced beef was then placed back into the refrigerator and held until 5:45 PM when it was taken to the church where the wedding reception was being held. It was then served at a buffet which was open from 6:20 to 11:15 PM and was replenished as needed.

Smaller amounts of the same production lot had gone to the states of Virginia, Ohio, and Florida. The individual state health departments in these states were notified of the shipments by the NCDC. To date, no further isolations of S. welikada have been reported by the state health laboratories in these states or any other states.

Table 1

FOOD SPECIFIC ATTACK RATES

	ATE				DID NOT EAT			
Food	Sick	Well	Total	Attack Rate (Percent)	Sick	Well	Total	Attack Rate (Percent)
Turkey	20	20	40	50	13	15	28	46
Meat balls	10	13	23	44	23	22	45	51
Potato salad	21	21	42	50	12	14	26	46
Cole slaw	8	10	18	44	25	25	50	50
Roast beef	32	15	47	68	1	20	21	5

EDITOR'S COMMENT: Salmonella outbreaks due to contaminated imported meats are not frequently reported in the United States. That the meat was contaminated prior to entry into this country appears quite likely in view of the serotype involved. Since the institution of the current salmonella surveillance system at the NCDC in 1962, isolations of S. welikada have not been reported from human or nonhuman sources in the United States. On the other hand, S. welikada is periodically isolated in Australia, the country from which the beef originated.

After importation into this country processing was deficient in that any organisms already present were not destroyed by adequate cooking and, in fact, further multiplication of organisms may have been facilitated by inadequate refrigerating techniques. Since the product was then "ready to eat," the contamination was readily passed to the consumer.

C. Texas - Salmonellae in Pet Turtles

Reported by Marlin E. Luther, Epidemiologist, City of Houston Health Department.

In April of 1969, the City of Houston Health Department began a survey of retail pet shops within the City of Houston to determine the incidence of salmonellae in pet turtles. Ten milliliter samples of water were collected from turtle containers in 21 different pet shops or variety store pet departments in the Houston area. A total of 25 samples were obtained and of these, six were found positive for salmonella species. Six different serotopes were isolated including S. bredeney, S. newport, S. javiana, S. oranienburg, S. pomona, and one unknown serotype.

EDITOR'S COMMENT: Human cases of salmonellosis presumably secondary to contact with pet turtles are frequently reported to the NCDC. In many instances, it is not clear from the investigations of the human cases whether the human case was caused by an infected turtle or the infected turtle was secondary to the human case. The above report is presented to re-emphasize the point that pet turtles are frequently contaminated with salmonella organisms prior to being brought into the home. The exact source of the contamination is not clear. Contamination of turtle breeding pond water with salmonella organisms has frequently been documented and has been ascribed to the use of contaminated water for filling the ponds and to the use of contaminated animal products as turtle feed. Transovarian passage of salmonella organisms and penetration of turtle eggs by salmonella organisms have also been thought to contribute to the high prevalence of turtle infection.

The Salmonellosis Unit is interested in learning of all human cases or outbreaks associated with turtles so that a better assessment of the overall problem can be made.

V. SPECIAL REPORTS

A. Recent Articles on Salmonellosis

The following articles on salmonellosis of interest to public health workers have been published in recent months.

1. Bissett, M., et al.: Immunofluorescent identification of Salmonella typhi during a typhoid outbreak. Appl. Microbiol. 17:507, 1969.

2. Fantasia, L. D., et al.: Comparison of two procedures for detection of salmonella in food, feed, and pharmaceutical products. Appl. Microbiol. 17:540, 1969.

3. Garibaldi, J. A., et al.: Heat resistance of salmonella in various egg products. Appl. Microbiol. 17:491, 1969.

4. Hejfec, L. B., et al.: Laboratory characteristic of paratyphoid B vaccines tested in control field trials. J. Bact. 98:502, 1969.

5. Julseth, R. M., et al.: Effect of temperature on growth of salmonella in rehydrated skim milk from a food poisoning outbreak. Appl. Microbiol. 17:767, 1969.

6. Marx, M. B.: Prevalence of salmonella in Virginia poultry flocks and in feed. J. Amer. Vet. Med. Assoc. 154:1055, 1969.

7. Sperber, W. H., et al.: Accelerated procedure for salmonella detection in dried foods and feeds involving only broth cultures and serological reactions. Appl. Microbiol. 17:533, 1969.

8. Wahab, M. F. A., et al.: Paratyphoid A Fever. Ann. Int. Med. 70:913, 1969.

B. Recalls of Products Contaminated with Salmonellae for Period May 12 to July 7 (reported by the U.S. Food and Drug Administration).

From May 12 to July 7, 1969, six products were recalled by manufacturers and distributors because of salmonella contamination. These products as reported by the U.S. Food and Drug Administration are summarized in the table on page 10.

Recalls of Products Contaminated with Salmonellae for
Period May 12 to July 7
(Reported by the U.S. Food and Drug Administration)

Week Ending	Name, Label, Form	Manufacturer, Distributor	Lot Number	Use	Depth of Recall	Distribution	Serotype
5/19	Natural Brewer's dried yeast flakes with cobalamin (Vit. B-12) in 1-lb. canisters	(Mfr. of bulk) Yeast Products, Inc., Paterson, N. J. (Repacker) Lanotone Products, Inc., New York, N. Y.	112568	food	retail, doctor, consumer	National, Liberia	S. montevideo
	Schiff Brewer's Yeast Flakes (Powder) in 8 oz. and 1-lb. btls., and 4-lb. tins (Schiff Bio-Food Products, Inc., Moonachie, N. J.)	(Mfr.) Leeds-Dixon Labs., Inc., Moonachie, N. J.		food	retail	National	S. newington
	Schiff Brewer's Yeast 7½ gr. tabs. in 1000s.	(Mfr.) Leeds-Dixon Labs., Inc., Moonachie, New Jersey		food	retail	National	S brandenburg & S. oranienburg
	Schiff Natural Hi-B-Complex Caps. (High potency yeast blend with Vit. B-12)	(Mfr.) Leeds-Dixon Labs., Inc., Moonachie, N. J.		food	retail	National	S. cubana & S cerro
	Schiff Natural Hi-B-Complex Tabs.	(Mfr.) Leeds-Dixon Labs., Inc., Moonachie, N. J.		food	retail	National	S. derby & S. oranienburg
	Extra grade pasteurized spray process low heat powdered nonfat dry milk in 50-lb. multi-wall paper bags	(Mfr.) Milk Producers Inc., Kansas Div., Arkansas City, Kansas	All	food	user (Manu-facturer)	Mo., Okla., Kan., Tenn., Texas, Minn., Ariz., Ark., Calif.	S. cubana, S minneapolis, & S. newington

VI. INTERNATIONAL

Salmonellosis in Czechoslovakia - 1967

Reported by Dr. Dobromila Matejovska CSc., Institute of Epidemiology and Microbiology, Prague.

During 1967, a total of 4,609 isolations of salmonella from human sources and 15,416 isolations from nonhuman sources were reported by the National Salmonella Reference Laboratory at the Institute of Epidemiology and Microbiology. Isolations of Salmonella typhi were not included in these figures. A marked seasonal variation in the number of isolations occurred with the greatest number occurring between July and October and the lowest number from December through March. The younger age groups appeared most affected with 40.2 percent of all human isolations occurring in children less than 10 years of age. The 10 most common serotypes isolated from humans are presented below in Table 1.

A review of the most common human isolations from 1962-1967 revealed a remarkable similarity from year to year. S. typhi-murium and S. enteritidis ranked first and second each year in that order with the exception of 1963 when S. anatum accounted for the greatest percentage of isolations. In the years prior to 1967, S. typhi-murium accounted for 22.6 to 38.0 percent of the total human isolations.

In Table 2, the ten most common serotypes isolated from nonhuman sources are presented.

Table 1

The Ten Most Common Serotypes Isolated from Humans
Czechoslovakia, 1967

Serotype	Number of Isolations	Percent of Total
S. typhi-murium*	2,330	50.6
S. enteritidis	961	20.9
S. anatum	286	6.2
S. derby	205	4.5
S. bareilly	186	4.0
S. paratyphi B	116	2.5
S. heidelberg	79	1.7
S. panama	69	1.5
S. bovis-morbificans	43	0.9
S. newport	42	0.9
Total	4,317	93.7
TOTAL (all serotypes)	4,609	
*Includes var. copenhagen	7	

Table 2

The Ten Most Common Serotypes Isolated from Nonhuman Sources, Czechoslovakia, 1967

Serotype	Number of Isolations	Percent of Total
S. cholerae-suis var. kunzendorf	9,332	60.6
S. typhi-murium*	3,336	21.6
S. gallinarum-pullorum	1,165	7.6
S. cholerae-suis	431	2.8
S. bareilly	373	2.4
S. anatum	316	2.0
S. enteritidis	174	1.1
S. thompson	143	0.9
S. abortus-ovis	29	0.2
S. derby	25	0.2
S. infantis	16	0.1
Total	15,340	99.5
TOTAL (all serotypes)	15,416	
*Includes var. copenhagen	7	

TABLE I. COMMON SALMONELLAE REPORTED FROM HUMAN SOURCES, JUNE, 1969

SEROTYPE	GEOGRAPHIC DIVISION AND REPORTING CENTER																												
	NEW ENGLAND						MIDDLE ATLANTIC					EAST NORTH CENTRAL					WEST NORTH CENTRAL							SOUTH ATLANTIC							
	ME	NH	VT	MAS	RI	CON	NYA	NYB	NYC	NJ	PA	OHI	IND	ILL	MIC	WIS	MIN	IOW	MO	ND	SD	NEB	KAN	DEL	MD	DC	VA	WVA	NC	SC	GA	FLA
anatum							1							1	1												3				1	4
bareilly																																
blockley				1	2	2		1				2		1	1	1								1	1						3	
braenderup								1										1													2	
bredeney				1				1					1				1								1				1		2	
chester																																
cholerae-suis v kun																																
cubana				1		1					2			2											1		1				1	1
derby														2	1									1	3	1						
enteritidis				48	1	5		19	5	1	33	10	1	15	6	1	4		1	1			1	2	1	5	3		4		8	1
give																																1
heidelberg				3	2	3		2	5	1	6	2	6	3	5				1				1	1	7	1	3		10		2	6
indiana						2																									12	
infantis			1	12		4		2		1	1	2	2	7	3		2		4				4	1	4		3				3	3
java														4						1					1						1	1
javiana										1		1			1												1				3	13
litchfield				3							1																1		1			1
livingstone																																
manhattan				3							1			3			2								1		1		2		5	3
miami											1																					9
mississippi																															4	
montevideo				3		1		1				2												1							3	2
muenchen														1	1																1	3
newington								1								1																
newport				2	1	3		2		5	3	3	5	8	6	2			1				2	1	1				2		1	16
oranienburg					2			1				1					2															2
panama									1					1	8																	
paratyphi B				7										1	1				1								1					4
reading																																2
saint-paul				5		1		3	1		1	4		7	4	1		1	1						4		2		2		1	5
san-diego																								1								
schwarzengrund													1																			
senftenberg				2								1		1										1								3
tennessee																																
thompson	32			25		1		3	4	2				2	3	8	1								3		5	2	5		3	6
typhi	1			2	1	3	2	1				3		1	1				1				1						3			6
typhimurium	1		3	58	7	15		19	13	7	30	19	5	26	13	9	10	1	11	2	1		4	1	7	1	15	1	4	1	16	27
typhimurium v cop				1		1				2					6			1											5			
weltevreden											1			1																		
worthington																															1	
TOTAL	34	–	4	177	16	42	3	57	29	20	80	50	21	87	61	23	22	4	21	4	1	–	13	11	35	8	39	3	39	1	73	119
ALL OTHER*	–	5	2	3	5	–	21	–	4	4	8	2	1	5	3	–	–	1	1	–	–	1	1	1	1	4	1	–	–	3	10	4
TOTAL	34	5	6	180	21	42	24	57	33	24	88	52	22	92	64	23	22	5	22	4	1	1	14	12	36	12	40	3	39	4	83	123

Note: NYA – New York, Albany; NYB – Beth Israel Hospital; NYC – New York City. Beth Israel Hospital laboratory is a reference laboratory and this month serotyped a total of 101 cultures.

* See Table II.

TABLE I – Continued

GEOGRAPHIC DIVISION AND REPORTING CENTER																				TOTAL	% OF TOTAL	CUMULATIVE TOTAL	% OF CUMULATIVE TOTAL	SEROTYPE
EAST S. CENTRAL				WEST S. CENTRAL				MOUNTAIN								PACIFIC								
KY	TEN	ALA	MIS	ARK	LA	OKL	TEX	MON	IDA	WYO	COL	NM	ARI	UTA	NEV	WAS	ORE	CAL	ALK	HAW				
																		1		1	13	.8	71	.8	*anatum*
																	1				1	.1	25	.3	*bareilly*
	1						4				1							6			28	1.6	215	2.5	*blockley*
																					4	.2	43	.5	*braenderup*
																				2	10	.6	58	.7	*bredeney*
											1							1			2	.1	19	.2	*chester*
																					—	—	5	.1	*cholerae-suis v kun*
					1													1			12	.7	66	.8	*cubana*
							1									2		8		3	22	1.3	142	1.6	*derby*
		1			1	1	1		1		1					4	3	4			193	11.2	819	9.5	*enteritidis*
					1																2	.1	32	.4	*give*
1	3			1	3	1	1	1					4	2		5		1		2	95	5.5	556	6.4	*heidelberg*
																					14	.8	52	.6	*indiana*
	12	1			17		3		2		2		2	1				5		3	107	6.2	559	6.5	*infantis*
					2																10	.6	63	.7	*java*
		3					5											1			29	1.7	112	1.3	*javiana*
		1											2								10	.6	38	.4	*litchfield*
																		3			3	.2	19	.2	*livingstone*
	2															1		3			27	1.6	106	1.2	*manhattan*
																					10	.6	46	.5	*miami*
		1																			5	.3	11	.1	*mississippi*
1				1	2		2				1							1			21	1.2	110	1.3	*montevideo*
		1			2								1				1				11	.6	77	.9	*muenchen*
																					2	.1	11	.1	*newington*
1		3		4	6		10				2		2			1		13		2	108	6.3	546	6.3	*newport*
		1			1		2				1							5			18	1.0	100	1.2	*oranienburg*
	1			1	2		2											10		1	27	1.6	109	1.3	*panama*
	1						2														18	1.0	84	1.0	*paratyphi B*
																1					3	.2	25	.3	*reading*
							7				1							7		1	59	3.4	383	4.4	*saint-paul*
											1						1				3	.2	23	.3	*san-diego*
		1																			2	.1	28	.3	*schwarzengrund*
														1				1			10	.6	39	.5	*senftenberg*
		1																			1	.1	19	.2	*tennessee*
1	2	3			8		3	1			3							1			127	7.4	489	5.7	*thompson*
1	1			1		1	1	1				1	1					5		1	40	2.3	227	2.6	*typhi*
2	4	7		1	9	1	11	2	5		12		3	1		2	4	58		5	454	26.4	2353	27.2	*typhimurium*
	1				1																18	1.0	103	1.2	*typhimurium v cop*
																				4	6	.3	21	.2	*weltevreden*
							1													1	3	.2	15	.2	*worthington*
7	28	24	—	9	56	4	56	5	8	—	26	1	15	5	—	16	10	135	—	26	1528	88.8	7819	90.4	TOTAL
—	—	4	4	8	5	—	23	4	—	—	1	19	2	—	2	12	—	17	1	—	193		826		ALL OTHER*
7	28	28	4	17	61	4	79	9	8	—	27	20	17	5	2	28	10	152	1	26	1721		8645		TOTAL

TABLE II. OTHER SALMONELLAE REPORTED FROM HUMAN SOURCES, JUNE, 1969

SEROTYPE	REPORTING CENTER																					
	ALA	ALK	ARI	ARK	CAL	COL	DEL	DC	FLA	GA	ILL	IND	IOW	KAN	LA	MD	MAS	MIC	MIS	MO	MON	NEB	NEV
amager																							
arkansas																							
atlanta										4													
azteca																							
berta	1				2										2								
bovis-morbificans					1																		
bukavu																	1						
cambridge																	1						
cerro					1																		
cholerae-suis					1																		
coleypark					1																		
eimsbuettel																							
gallinarum					1																		
gaminara	1																						
garoli																							
habana										1													
hartford									1		1										3		
invernesa					1				1														
irumu																				1			
johannesburg															1								
lomita																							
london											1												
madelia																							
manchester																							
maracaibo	1																						
meleagridis					1						1												
muenster									1	4													
nashua														1									
new-brunswick	1																						
norwich															1								
ohio															1			1					
oslo											1												
paratyphi A												1											
paratyphi B odense																							
poona			2		2											1	1						
siegburg																							
simsbury							1																
stanleyville																							
urbana																		1					
weslaco																							
TOTAL	4	—	2	—	11	—	1	—	3	9	4	1	—	1	5	1	3	2	—	1	3	—	—
NOT TYPED*	—	1	—	8	6	1	—	4	1	1	1	—	1	—	—	—	—	1	4	—	1	1	2
TOTAL	4	1	2	8	17	1	1	4	4	10	5	1	1	1	5	1	3	3	4	1	4	1	2

* See Table V-A

TABLE II – Continued

REPORTING CENTER													TOTAL	CUMULATIVE TOTAL	SEROTYPE
NH	NJ	NM	NYA	NYC	OHI	PA	RI	SC	TEX	VT	VA	WAS			
												11	11	14	*amager*
						1							1	1	*arkansas*
													4	6	*atlanta*
	1												1	1	*azteca*
													5	13	*berta*
													1	2	*bovis-morbificans*
													1	1	*bukavu*
													1	1	*cambridge*
						1							2	5	*cerro*
				1	2								4	9	*cholerae-suis*
													1	1	*coleypark*
												1	1	15	*eimsbuettel*
													1	2	*gallinarum*
													1	2	*gaminara*
										1			1	2	*garoli*
													1	2	*habana*
													5	19	*hartford*
													2	3	*inverness*
													1	1	*irumu*
													1	2	*johannesburg*
						2							2	3	*lomita*
													1	4	*london*
									1				1	7	*madelia*
											1		1	2	*manchester*
													1	2	*maracaibo*
													2	8	*meleagridis*
	3												8	19	*muenster*
													1	1	*nashua*
						1							2	6	*new-brunswick*
													1	5	*norwich*
													2	4	*ohio*
													1	7	*oslo*
													1	6	*paratyphi A*
						1							1	3	*paratyphi B odense*
				1					1				8	18	*poona*
				1					1				2	11	*siegburg*
													1	14	*simsbury*
						1							1	1	*stanleyville*
						1							2	11	*urbana*
									1				1	1	*weslaco*
–	4	–	–	3	2	8	–	–	4	1	1	12	86	320	TOTAL
5	–	19	21	1	–	–	5	3	19	1	–	–	107	506	NOT TYPED*
5	4	19	21	4	2	8	5	3	23	2	1	12	193	826	TOTAL

Cumulative Totals include isolations of all serotypes (except those listed in Table I) reported this year.

TABLE III. COMMON SALMONELLAE REPORTED FROM NONHUMAN SOURCES, JUNE, 1969

SEROTYPE	DOMESTIC ANIMALS AND THEIR ENVIRONMENT							ANIMAL FEEDS			
	CHICKENS	TURKEYS	SWINE	CATTLE	HORSES	OTHER	SUBTOTAL	TANKAGE	VEGETABLE PROTEIN	OTHER	SUBTOTAL
anatum	1	10	5				16	5			5
bareilly				1			1				—
blockley	7	1					8				—
braenderup							—				—
bredeney	1	2				1	4				—
chester		1					1				—
cholerae-suis v kun			74		1		75				—
cubana	1						1	3			3
derby		8	8				16	2			2
enteritidis	4		1				5				—
give			1				1				—
heidelberg	13	25	2				40	2			2
indiana	1					1	2				—
infantis	7	2				1	10	1			1
java							—				—
javiana				1		2	3				—
litchfield							—				—
livingstone			1				1	5		9	14
manhattan			1				1				—
miami						2	2				—
mississippi							—				—
montevideo	3						3	8		1	9
muenchen		1					1				—
newington							—	3			3
newport			2	4		2	8			1	1
oranienburg	1						1	3		4	7
panama		1					1				—
paratyphi B							—				—
reading		2					2			1	1
saint-paul	5	9	1			1	16				—
san-diego		8				1	9				—
schwarzengrund	1						1	3			3
senftenberg	1	5					6	1			1
tennessee		3					3	6			6
thompson	3		2	1		1	7	1			1
typhi							—				—
typhimurium	15	9	13	31	19	9	96				—
typhimurium v cop	22	1	3	4	2	7	39				—
weltevreden							—				—
worthington	2	2					4	3			3
TOTAL	88	90	114	42	22	28	384	46	—	16	62
ALL OTHER*	15	9	7	8	—	2	41	28	—	5	33
TOTAL	103	99	121	50	22	30	425	74	—	21	95

* See Table IV

TABLE III – Continued

WILD ANIMALS AND BIRDS	REPTILES AND ENVIRONMENT	HUMAN DIETARY ITEMS						MISCELLANEOUS	TOTAL	CUMULATIVE TOTAL	SEROTYPE
		EGGS AND PRODUCTS	POULTRY	RED MEAT	DAIRY PRODUCTS	OTHER	SUBTOTAL				
							–	3	24	166	*anatum*
							–		1	17	*bareilly*
							–		8	76	*blockley*
						1	1		1	3	*braenderup*
							–		4	56	*bredeney*
		1					1		2	16	*chester*
							–		75	300	*cholerae-suis v kun*
					2		2		6	73	*cubana*
							–		18	87	*derby*
	1	1					1		7	78	*enteritidis*
							–		1	23	*give*
							–		42	462	*heidelberg*
							–		2	11	*indiana*
	2	1					1	4	18	131	*infantis*
	1						–		1	6	*java*
							–		3	6	*javiana*
							–		–	2	*litchfield*
				1			1		16	53	*livingstone*
							–		1	26	*manhattan*
	1						–		3	6	*miami*
							–		–	–	*mississippi*
		5				2	7	1	20	129	*montevideo*
1	1						–		3	24	*muenchen*
						7	7		10	25	*newington*
	3						–		12	74	*newport*
		1				1	2	1	11	58	*oranienburg*
							–	1	2	7	*panama*
							–		–	4	*paratyphi B*
	1						–		4	25	*reading*
1	2						–		19	187	*saint-paul*
							–		9	85	*san-diego*
							–		4	33	*schwarzengrund*
							–		7	88	*senftenberg*
					1		1		10	73	*tennessee*
	1	1					1	1	11	139	*thompson*
							–		–	–	*typhi*
7	2			1	1	1	3	3	111	617	*typhimurium*
		1					1		40	146	*typhimurium v cop*
							–		–	2	*weltevreden*
							–		7	66	*worthington*
9	15	11	–	2	4	12	29	14	513	3380	TOTAL
1	8	4	–	1	5	6	16	8	107	930	ALL OTHER*
10	23	15	–	3	9	18	45	22	620	4310	TOTAL

TABLE IV. OTHER SALMONELLAE REPORTED FROM NONHUMAN SOURCES, JUNE, 1969

SEROTYPE	DOMESTIC ANIMALS AND THEIR ENVIRONMENT							ANIMAL FEEDS			
	CHICKENS	TURKEYS	SWINE	CATTLE	HORSES	OTHER	SUBTOTAL	TANKAGE	VEGETABLE PROTEIN	OTHER	SUBTOTAL
alachua							–			2	2
albany		1					1	3			3
berta	1						1				–
binza		1					1				–
california	1						1				–
cerro							–	4			4
cholerae-suis			4				4				–
dublin				8			8				–
eimsbuettel							–	5		1	6
gallinarum	1						1				–
gatow							–				–
good							–	1			1
habana							–	1			1
illinois							–	1			1
johannesburg							–	4			4
kentucky	1	1					2			1	1
kottbus	1						1				–
lille							–	1			1
madelia							–				–
minneapolis							–	2			2
minnesota	1					1	2	3			3
muenster		1					1				–
new-brunswick							–	1			1
orion		1					1				–
oslo							–				–
poona							–	1			1
pullorum	7						7				–
siegburg							–			1	1
simsbury	1						1				–
taksony							–				–
thomasville							–				–
typhi-suis			1				1				–
urbana							–				–
TOTAL	14	5	5	8	–	1	33	27	–	5	32
NOT TYPED*	1	4	2	–	–	1	8	1	–	–	1
TOTAL	15	9	7	8	–	2	41	28	–	5	33

*See Table V-B

TABLE IV – Continued

WILD ANIMALS AND BIRDS	REPTILES AND ENVIRONMENT	HUMAN DIETARY ITEMS						MISCELLANEOUS	TOTAL	CUMULATIVE TOTAL	SEROTYPE
		EGGS AND PRODUCTS	POULTRY	RED MEAT	DAIRY PRODUCTS	OTHER	SUBTOTAL				
							–		2	22	*alachua*
					2		2		6	29	*albany*
							–		1	4	*berta*
							–		1	32	*binza*
							–	1	2	27	*california*
						1	1		5	44	*cerro*
							–		4	8	*cholerae-suis*
							–		8	52	*dublin*
						4	4	1	11	89	*eimsbuettel*
							–		1	8	*gallinarum*
	1						–		1	1	*gatow*
							–		1	2	*good*
							–		1	6	*habana*
							–		1	5	*illinois*
							–		4	16	*johannesburg*
					1		1	1	5	101	*kentucky*
							–		1	5	*kottbus*
							–		1	5	*lille*
	2						–		2	3	*madelia*
					2		2		4	4	*minneapolis*
							–		5	70	*minnesota*
							–		1	6	*muenster*
							–		1	7	*new-brunswick*
							–		1	1	*orion*
	1						–		1	4	*oslo*
							–		1	2	*poona*
1							–		8	23	*pullorum*
		4					4		5	48	*siegburg*
							–	2	3	33	*simsbury*
							–	1	1	9	*taksony*
						1	1		1	14	*thomasville*
							–		1	6	*typhi-suis*
	3						–		3	6	*urbana*
1	7	4	–	–	5	6	15	6	94	864	TOTAL
–	1	–	–	1	–	–	1	2	13	66	NOT TYPED*
1	8	4	–	1	5	6	16	8	107	930	TOTAL

TABLE V. SALMONELLAE REPORTED BY GROUP IDENTIFICATION ONLY, JUNE, 1969

A. HUMAN SOURCES

REPORTING CENTER	GROUP														TOTAL
	B	C		C1	C2		D	E		G	UNK				
ALASKA	1														1
ARKANSAS				1	3		2			1	1				8
CALIFORNIA	6														6
COLORADO	1														1
D.C.	1						2				1				4
FLORIDA	1														1
GEORGIA											1				1
ILLINOIS											1				1
IOWA	1														1
MICHIGAN											1				1
MISSISSIPPI		1					3								4
MONTANA	1														1
NEBRASKA										1					1
NEVADA	2														2
NEW HAMPSHIRE	4										1				5
NEW MEXICO	9			4	3		1			2					19
NEW YORK – A											21				21
NEW YORK – C	1														1
RHODE ISLAND	2			2							1				5
SOUTH CAROLINA	2										1				3
TEXAS	7				2			1			9				19
VERMONT		1													1
TOTAL	39	2		7	8		8	1		4	38				107

B. NONHUMAN SOURCES

SOURCES	GROUP														TOTAL
	B	C		C1	C2		D	E		G	UNK				
DOMESTIC ANIMALS AND THEIR ENVIRONMENT											8				8
ANIMAL FEEDS											1				1
WILD ANIMALS AND BIRDS															–
REPTILES AND ENVIRONMENT											1				1
HUMAN DIETARY ITEMS											1				1
MISCELLANEOUS					1						1				2
TOTAL	–	–		–	1		–	–		–	12				13