REPORT NO. 89
October 6, 1969

NATIONAL
COMMUNICABLE DISEASE CENTER

SALMONELLA

SURVEILLANCE

CONTENTS. . .

FOR THE MONTH OF AUGUST 1969

U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE/PUBLIC HEALTH SERVICE
Bureau of Disease Prevention and Environmental Control

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

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I. SUMMARY

In August 1969, 2,096 isolations of salmonellae were reported from humans, an average of 524 isolations per week (Tables I, II, and V-A). This number represents an increase of 93 (21.6 percent) over the weekly average of July 1969 and an increase of 39 (8.0 percent) from the weekly average of August 1968.

Reports of 721 nonhuman isolations of salmonellae were received during August 1969 (Tables II, IV, and V-B).

II. REPORTS OF ISOLATIONS

The ten most frequently reported serotypes during August:

HUMAN				NONHUMAN		
	Serotype	Number	Percent	Rank Last Month	Serotype	Number	Percent
1	typhi-murium*	544	26.0	1	typhi-murium*	140	19.4
2	newport	176	8.4	3	cholerae-suis var. kunzendorf	91	12.6
3	enteritidis	173	8.3	2	anatum	82	11.4
4	heidelberg	146	7.0	4	heidelberg	66	9.2
5	thompson	96	4.6	7	derby	32	4.4
6	infantis	84	4.0	6	saint-paul	23	3.2
7	saint-paul	73	3.5	5	thompson	21	2.9
8	typhi	56	2.7	8	san-diego	18	2.5
9	javiana	53	2.5	9	blockley	15	2.1
10	blockley	40	1.9	>10	livingstone	14	1.9
					senftenberg	14	1.9
	Total	1,441	68.8		Total	530	73.5
	TOTAL (all serotypes)	2,096			TOTAL (all serotypes)	721	
	*Includes var. copenhagen	16	0.8		*Includes var. copenhagen	24	3.3

III. CURRENT INVESTIGATIONS

Vermont - Two Consecutive Outbreaks of Gastroenteritis in a Girls' Summer Camp

Reported by Linus J. Leavens, M.D., Director, Mr. William S. Royster, Public Health Advisor, and Mr. Ivan Pels, Program Representative, Office of Communicable Disease Control, Vermont Department of Health; Mr. John V. Richards, Director of Environmental Sanitation, Vermont Department of Health; Andrew Mallory, M.D., Matthew S. Loewenstein, M.D., and Marshall D. Fox, D.V.M., EIS officers, Bacterial Diseases Branch, and Mr. Bruce T. Wood, Senior Sanitarian, Microbiological Section, Bacterial Diseases Branch, Epidemiology Program, NCDC.

Between July 1 and 5, 1969, 38 campers and staff at a girls' summer camp in Vermont became ill with acute gastroenteritis. This outbreak then subsided spontaneously. However, beginning again on July 22 and extending until July 26, a second outbreak occurred with a total of 93 campers and staff affected. Symptoms for the first/second outbreak included fever (84/18 percent), nausea (61/53 percent), vomiting (18/21 percent), diarrhea (59/81 percent), cramps (64/58 percent), and headache (46/29 percent).

The camp is divided into a senior section which caters to girls ages 12 through 17 and a junior camp for girls 8 through 11. The junior camp is located immediately adjacent to a mountain lake while the senior camp is situated nearby at a higher elevation. Each of these two subcamps maintains its own kitchen and adult staff. The junior and senior camps utilize the same swimming facilities on the lake front.

The first outbreak affected only campers and staff eating at the junior kitchen. Twenty-eight campers and 10 staff were ill during the initial outbreak for an overall junior camp attack rate of 41 percent. Twelve individuals ill during this outbreak as well as the junior camp cook who had been asymptomatic submitted rectal swab cultures. Ten of these cultures were found to be positive for Salmonella enteritidis, including that submitted by the cook.

The second outbreak affected both the junior and senior camps with camp attack rates of 43 and 83 percent, respectively. Following the onset of this second outbreak, rectal swab cultures were obtained from individuals in both camps. These included seven food handlers (including both cooks), eight kitchen workers, one nurse, two ill junior girls and six ill senior girls and counselors. All of these cultures were reported as negative for salmonellae.

Detailed food histories for the 3-day period preceding each outbreak were obtained from 91 and 63 individuals eating at the junior and senior kitchens respectively. These failed to implicate any specific food. There was no clustering of cases within individual campers' cabins or dining room tables. Examination of the infirmary records from the two previous seasons failed to reveal earlier large scale outbreaks; rather there seemed to be a continuous low level appearance of gastrointestinal distress involving about one to five campers per day.

A detailed investigation of the camps' water and sewerage systems was undertaken. The camps maintain a dual water supply. Spring water is piped from its effluent point on the side of a neighboring hill to both kitchens where it forms the principal and supposedly sole source for dishwashing and drinking. The source of spring water appeared adequately protected, though small animals and birds could gain access. All other water in both camps is pumped directly from the lake and is used for such purposes as showering, brushing teeth and the making of soups and coffee. Each kitchen contains taps from both water supply systems. Several lake water taps were scattered throughout each camp, ostensibly not to be used for drinking.

Sewage from the senior girls kitchen and restroom flows into a 3,000-gallon septic tank. Since there is no drain field this then overflows into a narrow stream bed which courses approximately 200 yards into the lake. In periods following relative drought, the sewage seeps into the ground of the dry stream bed; after rain falls it flows directly into the lake. Sewage from the junior girls restroom is collected in two cesspools. Sewage from the junior kitchen and a single toilet is collected in a dry well beneath the junior kitchen and then is pumped uphill to the above mentioned cesspools. This dry well was noted to be leaking. Since this was located only approximately 10 yards from the lake it is presumed that in periods of heavy rainfall this sewage could also have been washed into the lake.

The inflow site for the lake water supply system was located approximately 75 and 150 yards from the entry points of senior and junior camp sewage respectively. Examination of the camp weather records revealed that there had been a period of drought between the time of the two outbreaks. However, the day and evening of July 22 was marked by a very heavy downpour.

In conclusion, it would appear that these consecutive outbreaks of gastroenteritis had different etiologies and means of dissemination. The initial outbreak was due to S. enteritidis and presumably was foodborne though no specific food was implicated. The second outbreak probably represented sewage poisoning, the result of drinking contaminated lake water. The heavy rainfall on July 22 could have easily and probably did wash large amounts of sewage down the stream bed and into the lake. This then grossly contaminated the lake water system to both camps. There were then numerous opportunities for individuals to drink the contaminated lake water, since this was used for purposes of brushing teeth and showering, and many campers and staff undoubtedly drank from lake water taps. It was also possible that a leak across the valve separating the lake and spring water supplies might have contaminated the latter. In support of the hypothesis that contaminated lake water caused the second outbreak is the fact that a water sample from the junior camp shower yielded a coliform count of 300 per 100 ml.

It was recommended that sewage entering the lake, as well as the lake and spring water supplies, be directly chlorinated. It was further recommended that adequate septic tanks and drain fields be installed prior to next year's camping season.

IV. REPORTS FROM THE STATES

Michigan - Related Outbreaks of Salmonellosis Due to Barbequed Chicken

Reported by Georgia Markakis, Microbiologist, and C. Colton Carr, Chief, Laboratory Division, Michigan Department of Agriculture; J. Lyle Littlefield, Chief, Albert P. Hafner, Food Technologist, Edwin Loesel, Food Inspector, Emory W. Cole, Food Inspector, Food Inspection Division, Michigan Department of Agriculture.

Four separate family outbreaks of gastroenteritis occurred over a 2-week period during the month of July, 1969, in Tuscola County, Michigan. The four outbreaks involved 24 individuals ranging in ages from 2 to 75 years, who became ill with symptoms of nausea, vomiting, diarrhea, abdominal cramps, fever, progressive weakness and dehydration. Eleven persons from the four groups were hospitalized as a result of the outbreaks; the mean duration of hospitalization was 6 days. All others affected required some form of medical treatment. No deaths were reported. Stool cultures were obtained from 13 of those ill, many of whom were already on antibiotics. One culture yeilded Salmonella berta and one was positive for an untyped salmonella species. All other stool cultures were negative for salmonellae.

The food item common to all of the patients was barbequed chicken purchased from the same store. In one of the outbreaks eight members of a family eating barbequed chicken became ill, while the ninth member who ate everything else the family had eaten except chicken did not become sick. Onset of symptoms for the four groups ranged from 9 to 20 hours after consumption of the suspected food.

Investigation of the barbequed chickens was undertaken after the first outbreak was reported. Since no leftovers were available from this outbreak, samples of barbequed chickens were obtained from the same store where the suspected food had been purchased. Microbiological examination revealed the presence of S. berta in these samples. Chicken leftovers from the second outbreak were also positive for S. berta; no leftovers were available from the two subsequent outbreaks.

The chickens had been purchased from a warehouse and were delivered to the retail store three times weekly. They were placed on skewers and then transferred to a rotisserie located behind the cashier's counter. According to store employees, the rotisserie was set at 300°F. and the chickens cooked for 3 hours, at which time the rotisserie temperature was reduced to 100°F. Upon a customer's request, the cashier removed the chicken from the rotisserie with a pair of tongs kept on the table, and the product was placed in a foil bag. At the time of inspection, the internal temperature of the chickens in the rotisserie was 100°F. and the interior temperature of the rotisserie was 90°F. One of the four heat lamps inside the rotisserie was not functioning.

In all cases the product was further mishandled by the consumer. All families had carried the unrefrigerated chickens in their cars for 1 to 4 hours before consumption, or before cold storage at home. None of the chickens had been recooked before serving.

EDITOR'S COMMENT: Ready-to-eat poultry products have often been incriminated in outbreaks of human salmonellosis. In most cases, investigation reveals a series of improper processing and handling techniques resulting in frequent contamination of the dressed poultry. The majority of studies have revealed that between 15 to 50 percent of dressed carcasses are contaminated with salmonella organisms. Therefore, special care is necessary to ensure adequate cooking and sanitary handling of the finished product. A cooking temperature of at least 160°F. in the coolest portions of the meat is recommended to ensure destruction of salmonellae. Lower temperatures may only serve to incubate the organisms present. After cooking, the product should be consumed immediately or refrigerated until ready for use.

V. SPECIAL REPORTS

A. Summary of Foodborne Disease Outbreaks, USA, 1968

Compiled from reports submitted to the Enteric Diseases Section, Bacterial Diseases Branch, Epidemiology Program, National Communicable Disease Center.

In 1968, 42 states reported outbreaks of foodborne diseases to the NCDC. These surveillance data have been compiled in an effort to characterize and quantitate foodborne disease, to study the types of vehicles and sources of contamination, and to suggest possible control measures.

Food poisoning in the United States is grossly underreported. In England and Wales, where food poisoning surveillance has been well developed, 3,744 instances of food poisoning were reported in 1966, whereas only 181 instances of food poisoning were reported to the NCDC for the same period. These figures serve to emphasize the probable scope of involvement of food poisoning in this country and the gross discrepancy between the expected and actual number of foodborne disease incidents reported. From analysis of available data, however, various trends and a predominance

of certain etiologic agents becomes apparent. In 1968, a total of 17,567 persons were affected in the 345 reported foodborne disease outbreaks (Table 1). Bacterial etiology accounted for 45 percent of the outbreaks and 69 percent of cases of foodborne disease. The etiology was confirmed in 185 of the 345 outbreaks (Table 2). In 1968, staphylococcal food poisoning was the most common type reported and accounted for nearly one-fourth of all outbreaks and one-fourth of all patients. Clostridium perfringens food poisoning was the second most commonly reported etiology representing 16 percent of total outbreaks and 34 percent of all patients. Salmonella was in third place, causing 12 percent of reported outbreaks and 3 percent of cases. Table 3 lists the vehicles of infection by specific etiology. As in 1967, beef, pork, and turkey were the most commonly incriminated vehicles. Table 4 lists the places of acquisition of foodborne illness of specific etiology. The largest number of reported outbreaks originated in restaurants; the largest number of persons ill resulted from outbreaks originating in schools. Illness due to brucella, Clostridium botulinum, and Trichinella spiralis, tended to be caused by foods eaten at home while that due to C. perfringens and S. aureus, by foods served in public facilities.

Table 1

Etiology of Foodborne Illness Reported to NCDC From all Sources*
Annual Summary - 1968

Etiology	Outbreaks		Cases	
	Number	Percent	Number	Percent
Bacterial	156	45.2	12,180	69.3
Brucella	3	.9	10	.1
C. botulinum	3	.9	4	-
C. perfringens	40	11.6	4,878	27.8
E. coli	1	.3	360	2.0
Salmonella	40	11.6	1,280	7.3
Shigella	6	1.7	407	2.3
Staphylococcus	51	14.8	3,994	22.7
Streptococcus	12	3.5	1,247	7.1
Parasitic				
Trichinella spiralis	8	2.3	80	.5
Viral				
Hepatitis	6	1.7	238	1.4
Chemical	13	3.8	81	.5
Miscellaneous	2	.6	71	.4
Unknown*	160	46.4	4,917	28.0
Total	345	100.0	17,567	100.00

*Includes all outbreaks due to unknown and unconfirmed etiology.

Table 2

Division by Specific Etiology of Confirmed and Unconfirmed Outbreaks of Foodborne Illness
Annual Summary - 1968

Etiology	Outbreaks						Cases					
	Confirmed		Unconfirmed		Total		Confirmed		Unconfirmed		Total	
	Number	Percent*	Number	Percent*	Number	Percent*	Number	Percent*	Number	Percent*	Number	Percent*
Bacterial	156	84.3	64	85.3	220	84.6	12,180	96.3	2,437	98.4	14,617	96.6
Brucella	3	1.6	1	1.3	4	1.5	10	.1	2	.1	12	.1
C. botulinum	3	1.6	6	8.0	9	3.5	4	-	6	.2	10	.1
C. perfringens	40	21.6	16	21.3	56	21.5	4,878	38.6	1,088	43.9	5,966	39.4
E. coli	1	.5	5	6.7	6	2.3	360	2.8	874	35.3	1,234	8.2
Salmonella	40	21.6	2	2.7	42	16.2	1,280	10.1	7	.3	1,287	8.5
Shigella	6	3.2	0	0	6	2.3	407	3.2	0	0	407	2.7
Staphylococcus	51	27.6	31	41.3	82	31.5	3,994	31.6	425	17.2	4,419	29.2
Streptococcus	12	6.5	3	4.0	15	5.8	1,247	9.9	35	1.4	1,282	8.5
Parasitic												
Trichinella spiralis	8	4.3	1	1.3	9	3.5	80	.6	2	.1	82	.5
Viral												
Hepatitis	6	3.2	0	0	6	2.3	238	1.9	0	0	238	1.6
Chemical	13	7.0	9	12.0	22	8.5	81	.6	32	1.3	113	.7
Miscellaneous	2	1.1	1	1.3	3	1.2	71	.6	5	.2	76	.5
Total	185	100.0	75	100.0	260	100.0	12,650	100.0	2,476	100.0	15,126	100.0
Unknown			85		85				2,441		2,441	

*Unknown etiology excluded

Table 3

Vehicles Associated with Foodborne Illness of Specific Etiology[1]
Annual Summary 1968
Selected Comparative Data 1967

Etiology	Vehicle												
	Turkey*	Chicken*	Egg	Milk	Beef*	Pork	Other Meat	Vegetable and Fruit	Shell-fish	Other Fish	Water	Other	Unknown
Brucella				4									
C. botulinum		2			1		1	2		1			2
C. perfringens[2]	17	6			24	2	1	3	1	3		2	2
E. coli			1				1				3	1	
Salmonella[3]	10	2	4		4	4	1	6	1		2	4	6
Shigella[5]		2						2					3
Staphylococcus[4]	8	6	3	4	13	24	2	9	4	3		8	6
Streptococcus[3]	1		3		4	3	1	3	1				1
Trichinella spiralis					1	7	1						
Viral hepatitis				1							4	1	
Chemical[5]		2	1		2	1		3		3	2	9	
Miscellaneous				1	1	1							
Unknown[6]	7	6	4	1	15	10	2	7	5	4	2	3	23
Total 1968	43	26	16	11	65	52	10	35	12	14	13	28	43
Total 1967	16	7	5	9	35	13	14	11	9	10	15	29	43

[1]Includes suspected as well as proven vehicles.
[2]Five outbreaks with two vehicles.
[3]Two outbreaks with two vehicles.
[4]Six outbreaks with two vehicles and one outbreak with three vehicles.
[5]One outbreak with two vehicles.
[6]Four outbreaks with two vehicles.
*Includes some outbreaks due to meat and/or gravy and/or dressing.

Table 4

Places of Acquisition of Foodborne Illness of Specific Etiology
Annual Summary 1968

Etiology	Place of Acquisition								
	Home	Restaurant	Banquet	School	Store	Medical Institution	Other	Unknown	Total
Brucella	3	1							4
C. botulinum	7	1	1						9
C. perfringens	6	23	8	14	1	1	2	1	56
E. coli	1	2	1				2		6
Salmonella	15	12	6	1	2	1	5		42
Shigella	1	1	1	1		1	1		6
Staphylococcus	17	27	10	10	10	2	6		82
Streptococcus	6	3		2	3		1		15
Trichinella spiralis	9								9
Hepatitis				3	2		1		6
Chemical	10	8			2		2		22
Miscellaneous	2						1		3
Unknown	19	37	8	13	3	2	3	—	85
Total outbreaks	96	115	35	44	23	7	24	1	345
Number of Persons Ill	1,720	3,165	2,768	6,959	343	440	2,168	4	17,567

B. Recent Articles on Salmonellosis

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

1. Baker, J. R.: An outbreak of salmonellosis involving veterinary hospital patients. Vet. Rec. 85:8, 1969.

2. Barber, C., et al.: Immunological specificities of polysaccharides and proteins from salmonellae of Group L. Path. Microbiol. 33:23, 1969.

3. Cicciardello, J. J., et al.: Development of radiation resistance in salmonella cultures. Appl. Microbiol. 18:24, 1969.

4. Esposito, V. M.: Agar plague formation by mouse spleen cells in response to vaccination with Vi antigen and typhoid vaccines. J. Bact. 99:356, 1969.

5. Esposito, V. M., et al.: Immunological response of three mouse strains to typhoid vaccine and Vi antigen. J. Bact. 99:8, 1969.

6. Finegold, S. M.: Intestinal bacteria--The role they play in normal physiology, pathologic physiology and infection. Calif. Med. 110:455, 1969.

7. Harper, J., et al.: A selective motility medium for routine isolation of salmonella. J. Hyg. 67:181, 1969.

8. Melikova, E. N., et al.: The sensitizing effect of various typhoid vaccines as revealed under experimental conditions. Bull. W.H.O. 40:395, 1969.

9. Morahan, R. J., et al.: Salmonella from New Guinea. Med. J. Aust. 2:20, 1969.

10. Pietkiewicz, K., et al.: Salmonellosis in Poland, 1957-1966. Public Health Rep. 84:712, 1969.

11. Velandapillai, T., et al.: Salmonellas, shigellas and enteropathogenic Escherichia coli in uncooked food. J. Hyg. 67:187, 1969.

12. Weissman, M. A., et al.: Incidence of salmonellae in meat and meat products. Appl. Microbiol. 17:899, 1969.

C. Recalls of Products Contaminated with Salmonellae for Period July 14 to September 22 (reported by the U.S. Food and Drug Administration)

From July 14 to September 22, 1969, one product was recalled by manufacturers and distributors because of salmonella contamination. This product as reported by the U.S. Food and Drug Administration is summarized below.

Week Ending	Name, Label, Form	Manufacturer, Distributor	Lot No.	Use	Depth of Recall	Distribution	Serotype
9/8	Extra Grade Roller Process sweet cream buttermilk in 100-lb., polylined, multi-layer paper bag. (Burkey Creamery, Cushing, Oklahoma)	(Mfr.) Burkey Creamery, Cushing, Oklahoma	225	Food	User (bakery)	Texas	S. cubana

VI. INTERNATIONAL

Salmonellosis in Western Australia - 1968

Reported by E. M. Mackay-Scollay, Head of Microbiology Division, Public Health Laboratory Services, Western Australia.

In 1968, a total of 738 isolations of salmonellae from human sources and 587 isolations from nonhuman sources were reported by the Public Health Laboratory Services, Western Australia. The five most common serotypes from human and nonhuman sources are listed below.

HUMAN			NONHUMAN		
Serotype	Number	Percent of Total	Serotype	Number	Percent of Total
S. typhi-murium	187	25.3	S. derby	71	12.1
S. muenchen	63	8.5	S. typhi-murium	52	8.8
S. chester	50	6.8	S. pullorum	43	7.3
S. anatum	46	6.2	S. muenchen	40	6.8
S. hvittingfoss	41	5.6	S. fremantle	29	4.9

TABLE I. COMMON SALMONELLAE REPORTED FROM HUMAN SOURCES, AUGUST, 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				2		1			1		1		1	2											1				1		1	1
bareilly														1													2					
blockley				5	1	2		1			1			3	1		2		1		2						1				2	6
braenderup				1												1																
bredeney									2	1																			2			1
chester																																2
cholerae-suis v kun														1			1															
cubana				1		2								2	1				1								1					1
derby				4				1		1	1		1	3	2				1						1	1	2					
enteritidis			1	39	1	5		8	5	7	6	2		9	3	10	4				1		2		4	2	2		2		5	15
give								1	1	1	1																		1			2
heidelberg				8		4		4	8	1	10	2	5	21	8	3	1	1	2		1		2		5	1	6		5		3	11
indiana																															2	3
infantis				4	1	5		8	5	2	4	4	2	6	1	3	2		3								3				4	2
java											1			1									1				1					
javiana												3			1	1													1		4	20
litchfield						1		1	1		1				1										8				1		2	4
livingstone																																
manhattan														5		1									1	1	2					1
miami																										1						16
mississippi																																
montevideo				2		1		2	1	2	1	3		1	1								2		1							2
muenchen				4			1		2	2				2											3	1	3				1	3
newington																							1									
newport				5	1	11		2	3	9		1	2	5	4	5		2	2				4		3		4		5		6	41
oranienburg				4	2	1					1			1		1			1	1			1	1						2	1
panama						1		1	1		4			6	2	2			1						1		2		1		1	
paratyphi B				5								1		1	2									1								
reading				2		1					1																	1				
saint-paul				5				1	7	1	9			1	2			1							5		3		3		4	16
san-diego				1										1															1			
schwarzengrund				1									2	1		1	2															
senftenberg																									1							
tennessee														1		1																
thompson	1	1		18		2		4	3					3	4		5				1		3	1			3	1	11		2	6
typhi				4		1		1	2	1			1	2			3		5						1				2			9
typhimurium	1		3	32	5	12	1	34	24	8	29	14	14	16	34	18	13	2	11	1	2	1	4	1	7	5	22	2	9		9	34
typhimurium v cop				3		2								1	1			2											1			
weltevreden																																
worthington																																
TOTAL	2	1	4	150	11	52	2	69	66	36	71	30	28	96	68	47	33	8	28	2	7	1	20	4	42	12	57	4	46	–	48	197
ALL OTHER*	–	9	4	10	3	1	43	2	9	4	3	–	3	12	4	5	1	–	1	–	–	1	–	–	4	7	2	–	2	1	2	15
TOTAL	2	10	8	160	14	53	45	71	75	40	74	30	31	108	72	52	34	8	29	2	7	2	20	4	46	19	59	4	48	1	50	212

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 172 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		2	16	0.8	93	0.7	*anatum*
					1		1														5	0.2	41	0.3	*bareilly*
		1			2		1										1	7			40	1.9	293	2.3	*blockley*
					2																4	0.2	55	0.4	*braenderup*
							1											2		2	11	0.5	86	0.7	*bredeney*
																		2			4	0.2	28	0.2	*chester*
																					2	0.1	10	0.1	*cholerae-suis v kun*
																		1			10	0.5	95	0.7	*cubana*
	1				1						2			1		1		4		2	30	1.4	192	1.5	*derby*
1	4	1				1	2	3								7		11		10	173	8.3	1185	9.2	*enteritidis*
					2													1		1	11	0.5	51	0.4	*give*
	5	5			1		1				1		1			3		17			146	7.0	839	6.5	*heidelberg*
		4																			9	0.4	73	0.6	*indiana*
	4	3			1		5									1		9		2	84	4.0	747	5.8	*infantis*
		2		2	2													3			13	0.6	97	0.8	*java*
				2	7	1	11											2			53	2.5	206	1.6	*javiana*
		1																			21	1.0	73	0.6	*litchfield*
																		1			1	0.0	23	0.2	*livingstone*
					1													4		1	17	0.8	148	1.1	*manhattan*
																					17	0.8	70	0.5	*miami*
		1																			1	0.0	21	0.2	*mississippi*
	1				2	1	1						5					1			30	1.4	174	1.3	*montevideo*
	1	2			1																26	1.2	123	1.0	*muenchen*
																					1	0.0	14	0.1	*newington*
	4			11	10		25						3					6		2	176	8.4	872	6.8	*newport*
				1	1	3	2											3			27	1.3	154	1.2	*oranienburg*
					1	2	2											2		9	39	1.9	188	1.5	*panama*
							2				2						1				15	0.7	113	0.9	*paratyphi B*
							1									3	1	1			11	0.5	40	0.3	*reading*
	1	2			3		3									1	2	3			73	3.5	569	4.4	*saint-paul*
													1			1		2			7	0.3	36	0.3	*san-diego*
											1							2			10	0.5	47	0.4	*schwarzengrund*
		1																		1	3	0.2	49	0.4	*senftenberg*
					1																3	0.2	28	0.2	*tennessee*
	1	5		2			3									1	2	13			96	4.6	660	5.1	*thompson*
	3			3	3					1			2			1	1	10			56	2.7	327	2.5	*typhi*
3	5	7	1		6	5	15	6			18		1	3		5	2	67	1	15	528	25.2	3537	27.4	*typhimurium*
	2				2											1	1				16	0.8	148	1.1	*typhimurium v cop*
																				5	5	0.2	31	0.2	*weltevreden*
																		1			1	0.0	21	0.2	*worthington*
5	32	35	1	21	50	13	76	9	–	1	24	–	13	4	–	25	11	176	1	52	1791	85.4	11557	89.6	TOTAL
–	4	3	8	10	2	–	13	–	–	–	1	22	–	–	3	–	2	20	68	1	305		1339		ALL OTHER*
5	36	38	9	31	52	13	89	9	–	1	25	22	13	4	3	25	13	196	69	53	2096		12896		TOTAL

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

SEROTYPE	REPORTING CENTER																						
	ALA	ALK	ARK	CAL	COL	CON	DC	FLA	GA	HAW	ILL	IND	LA	MD	MAS	MIC	MIN	MIS	MO	NEB	NEV	NH	NJ	NM
abaetetuba						1																		
alachua								1			1													
albany																								
amager																								
berta											1			1		2								
bradford					1																			
california	1																							
carrau				1																				
cerro				1						1				1										
cholerae-suis																								
claibornei													1											
degania								1																
drypool								1																
elomrane				1																				
essen																							1	
gaminara								2					1											
georgia	1																							
habana															1									
hartford								3																
irumu	1																							
johannesburg									1															
kentucky				1							1													
kottbus																1								
lomita																								
london				1																				
minnesota			1	4							2				1		1						1	
muenster									1															
neuminster																								
norwich																								
ohio											2													
orion																			1					
paratyphi A											1													
pensacola																								
poona				7				3			1			1	1								1	
saphra																								
siegburg																							1	
stanley											1													
tallahassee								3																
urbana				1										1	3									
virchow											1													
TOTAL	3	–	1	17	1	1	–	14	2	1	11	–	2	4	6	3	1	–	1	–	–	–	4	–
NOT TYPED*	–	68	9	3	–	–	7	1	–	–	1	3	–	–	4	1	–	8	–	1	3	9	–	22
TOTAL	**3**	**68**	**10**	**20**	**1**	**1**	**7**	**15**	**2**	**1**	**12**	**3**	**2**	**4**	**10**	**4**	**1**	**8**	**1**	**1**	**3**	**9**	**4**	**22**

* See Table V-A

TABLE II – Continued

REPORTING CENTER													TOTAL	CUMULATIVE TOTAL	SEROTYPE
NYA	NYB	NYC	NC	ORE	PA	RI	SC	TEN	TEX	VT	VA	WIS			
													1	1	*abaetetuba*
													2	6	*alachua*
								1					1	8	*albany*
		2										4	6	20	*amager*
								2					6	22	*berta*
					1								2	2	*bradford*
							1						2	8	*california*
													1	2	*carrau*
	1												4	11	*cerro*
	1												1	10	*cholerae-suis*
													1	1	*claibornei*
													1	1	*deganía*
					1						1		3	8	*drypool*
													1	1	*elomrane*
													1	1	*essen*
													3	8	*gaminara*
													1	2	*georgia*
													1	6	*habana*
													3	26	*hartford*
													1	4	*irumu*
													1	5	*johannesburg*
													2	7	*kentucky*
													1	2	*kottbus*
									1				1	5	*lomita*
													1	6	*london*
				2									12	18	*minnesota*
					1								1	20	*muenster*
													1	1	*neuminster*
								1					1	9	*norwich*
													2	9	*ohio*
													1	3	*orion*
									1				2	9	*paratyphi A*
											1		1	2	*pensacola*
		2							1				17	47	*poona*
									1				1	2	*saphra*
													1	13	*siegburg*
													1	8	*stanley*
													3	9	*tallahassee*
		1								1		1	8	28	*urbana*
				1									2	2	*virchow*
–	2	5	2	1	3	–	1	4	4	1	2	5	102	515	TOTAL
43	–	4	–	1	–	3	–	–	9	3	–	–	203	824	NOT TYPED*
43	**2**	**9**	**2**	**2**	**3**	**3**	**1**	**4**	**13**	**4**	**2**	**5**	**305**	**1339**	**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, AUGUST, 1969

SEROTYPE	DOMESTIC ANIMALS AND THEIR ENVIRONMENT							ANIMAL FEEDS			
	CHICKENS	TURKEYS	SWINE	CATTLE	HORSES	OTHER	SUBTOTAL	TANKAGE	VEGETABLE PROTEIN	OTHER	SUBTOTAL
anatum	2	61	6			1	70	5			5
bareilly							—				—
blockley	6	4	3				13	1			1
braenderup							—				—
bredeney		2	1				3	9			9
chester		7					7				—
cholerae-suis v kun			91				91				—
cubana							—			6	6
derby			24		1	2	27	3		2	5
enteritidis	5						5				—
give		3	1			1	5	1			1
heidelberg	18	31	8		4		61	2			2
indiana						1	1				—
infantis	7	2	1				10				—
java							—				—
javiana						1	1				—
litchfield							—				—
livingstone							—	12			12
manhattan	4		4				8				—
miami							—				—
mississippi							—				—
montevideo	6	1					7	3			3
muenchen		1					1				—
newington			3				3	1			1
newport		1	4	1	1	1	8				—
oranienburg					1		1				—
panama			1			1	2				—
paratyphi B							—				—
reading		5					5				—
saint-paul	3	15	2	1		1	22				—
san-diego	1	14				1	16				—
schwarzengrund		4					4	1			1
senftenberg	1	8	2				11			2	2
tennessee	1	1	1				3	1			1
thompson	12	3	1			2	18				—
typhi							—				—
typhimurium	17	8	42	18	21	5	111				—
typhimurium v cop	11	2	3	1		5	22				—
weltevreden							—				—
worthington	6	1					7				—
TOTAL	100	174	198	21	28	22	543	39	—	10	49
ALL OTHER*	16	9	8	11	1	6	51	14	—	1	15
TOTAL	**116**	**183**	**206**	**32**	**29**	**28**	**594**	**53**	**—**	**11**	**64**

* 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				
							–	7	82	289	*anatum*
							–	1	1	24	*bareilly*
							–	1	15	102	*blockley*
							–		–	6	*braenderup*
							–		12	76	*bredeney*
							–		7	29	*chester*
							–		91	444	*cholerae-suis v kun*
2							–		8	84	*cubana*
							–		32	140	*derby*
2							–		7	97	*enteritidis*
1							–		7	37	*give*
							–	3	66	579	*heidelberg*
							–		1	13	*indiana*
							–	1	11	176	*infantis*
							–		–	7	*java*
	1						–		2	11	*javiana*
							–		–	2	*litchfield*
		2					2		14	92	*livingstone*
							–		8	38	*manhattan*
							–		–	6	*miami*
							–		–	–	*mississippi*
							–	2	12	173	*montevideo*
							–		1	28	*muenchen*
							–		4	30	*newington*
						1	1		9	98	*newport*
							–		1	72	*oranienburg*
							–		2	12	*panama*
							–		–	4	*paratyphi B*
							–		5	36	*reading*
	1						–		23	219	*saint-paul*
							–	2	18	114	*san-diego*
							–		5	42	*schwarzengrund*
							–	1	14	136	*senftenberg*
						1	1		5	80	*tennessee*
		2				1	3		21	175	*thompson*
							–		–	–	*typhi*
	4						–	1	116	800	*typhimurium*
1							–	1	24	195	*typhimurium v cop*
							–		–	2	*weltevreden*
2	1				1		1	1	12	86	*worthington*
8	7	4	–	–	1	3	8	21	636	4554	TOTAL
2	4	3	5	–	–	–	8	5	85	1150	ALL OTHER*
10	11	7	5	–	1	3	16	26	721	5704	TOTAL

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

SEROTYPE	DOMESTIC ANIMALS AND THEIR ENVIRONMENT							ANIMAL FEEDS			
	CHICKENS	TURKEYS	SWINE	CATTLE	HORSES	OTHER	SUBTOTAL	TANKAGE	VEGETABLE PROTEIN	OTHER	SUBTOTAL
alachua	1	1					2				—
albany		1					1				—
berta							—				—
binza		1	1				2	2			2
california			1				1				—
cerro							—	2			2
cholerae-suis			2				2				—
drypool			1				1	4			4
dublin				11			11				—
eimsbuettel	1						1	2			2
houten						1	1				—
johannesburg							—	1			1
london		1					1				—
meleagridis		2					2				—
minneapolis							—			1	1
minnesota	1						1				—
poona			2				2				—
pullorum	4						4				—
siegburg							—	1			1
simsbury	8					2	10				—
taksony							—				—
typhi-suis			1				1				—
urbana						1	1				—
wassenaar							—				—
TOTAL	15	6	8	11	—	4	44	12	—	1	13
NOT TYPED*	1	3	—	—	1	2	7	2	—	—	2
TOTAL	**16**	**9**	**8**	**11**	**1**	**6**	**51**	**14**	**—**	**1**	**15**

*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				
1							–		2	24	*alachua*
							–		2	34	*albany*
			5				5		5	9	*berta*
							–		4	46	*binza*
							–		1	28	*california*
							–		2	55	*cerro*
							–	2	4	14	*cholerae-suis*
							–		5	34	*drypool*
							–		11	75	*dublin*
							–		3	95	*eimsbuettel*
							–		1	1	*houten*
							–		1	18	*johannesburg*
							–		1	5	*london*
							–		2	38	*meleagridis*
							–		1	5	*minneapolis*
							–		1	72	*minnesota*
							–		2	6	*poona*
							–	1	5	32	*pullorum*
							–		1	52	*siegburg*
							–	1	11	45	*simsbury*
1							–		1	10	*taksony*
							–		1	11	*typhi-suis*
	2						–	1	4	24	*urbana*
	2						–		2	2	*wassenaar*
2	4	–	5	–	–	–	5	5	73	1065	TOTAL
–	–	3	–	–	–	–	3	–	12	85	NOT TYPED*
2	**4**	**3**	**5**	**–**	**–**	**–**	**8**	**5**	**85**	**1150**	**TOTAL**

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

A. HUMAN SOURCES

REPORTING CENTER	GROUP															TOTAL
	A	B	C			C1	C2	D			E	G	UNK			
ALASKA		2						66								68
ARKANSAS		2					7									9
CALIFORNIA		3														3
DISTRICT OF COLUMBIA		2						4			1					7
FLORIDA		1														1
ILLINOIS													1			1
INDIANA		1	1				1									3
MASSACHUSETTS		2						2								4
MICHIGAN								1								1
MISSISSIPPI		5					1					2				8
NEBRASKA						1										1
NEVADA							2				1					3
NEW HAMPSHIRE		7				1							1			9
NEW MEXICO		7				8	5	1				1				22
NEW YORK – A													43			43
NEW YORK – C			2					2								4
OREGON												1				1
RHODE ISLAND		1					1				1					3
TEXAS		2				1	2	2					2			9
VERMONT		3														3
TOTAL	–	38	3			11	19	78			3	4	47			203

B. NONHUMAN SOURCES

SOURCES	GROUP															TOTAL
	A	B	C			C1	C2	D			E	G	UNK			
DOMESTIC ANIMALS AND THEIR ENVIRONMENT		2											5			7
ANIMAL FEEDS	2															2
WILD ANIMALS AND BIRDS																–
REPTILES AND ENVIRONMENT																–
HUMAN DIETARY ITEMS													3			3
MISCELLANEOUS																–
TOTAL	2	2	–			–	–	–			–	–	8			12