REPORT NO. 22
MARCH 2, 1964

COMMUNICABLE DISEASE CENTER

SALMONELLA

SURVEILLANCE

TABLE OF CONTENTS

For Month of January, 1964

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

PREFACE

Summarized in this report is information received from State and City Health Departments, university and hospital laboratories, the National Animal Disease Laboratory (USDA, ARS), Ames, Iowa, and other pertinent sources, domestic and foreign. Much of the information is preliminary. It is intended primarily for the use of those with responsibility for disease control activities. Anyone desiring to quote this report should contact the original investigator for confirmation and interpretation.

Contributions to the Surveillance Report are most welcome. Please address to: Chief, Salmonella Surveillance Unit, Communicable Disease Center, Atlanta, Georgia, 30333.

Communicable Disease Center	Dr. James L. Goddard, Chief
Epidemiology Branch	Dr. Alexander D. Langmuir, Chief
Investigations Section	Dr. Philip S. Brachman, Chief
Salmonella Surveillance Unit	Dr. W. Eugene Sanders, Chief
	Dr. Charles E. McCall
	Mr. James B. Goldsby, Statistician
Veterinary Public Health Section	Dr. James H. Steele, Chief
Veterinary Public Health Laboratory	Mrs. Mildred M. Galton, Chief
	Dr. Kenneth D. Quist
	Dr. John R. Boring

Collaborators

Laboratory Branch	Dr. U. Pentti Kokko, Chief
Bacteriology Section	Dr. Philip R. Edwards, Chief
Enteric Bacteriology Unit	Dr. William H. Ewing, Chief

I. SUMMARY

A total of 1,601 human isolations of salmonellae were reported during January 1964. This represented an increase of 476 isolations above the total (1125) reported during the same period last year. In contrast, the 400 reported non-human isolations represent declines of 125 from the number (525) reported during January 1963, and 13 from the number (413) reported last month.

Included in this month's report is a summary of the investigation of an interstate outbreak of S. typhimurium gastroenteritis traced to contaminated custard-filled doughnuts. In addition, a case report involving possible direct animal to human spread of infection is presented.

II. REPORTS OF ISOLATIONS FROM THE STATES

A. Human

During January, 1,601 salmonella isolations were reported. The average weekly total, 320, represented a decrease of 40 from the average week in December. However, the average week in January, 1963 was only 222, 98 less than that reported this January. Should this difference persist, 1964 will show an increase of approximately 5,000 isolations (26 per cent) over last year.

The seven serotypes most frequently reported during January were:

No.	Serotype	Number	Per Cent	Standing Last Month
1	S. typhimurium	487	30.4	1
2	S. derby	213	13.3	2
3	S. heidelberg	114	7.1	3
4	S. infantis	77	4.8	5
5	S. enteritidis	67	4.2	6
6	S. newport	62	3.9	4
7	S. typhi	56	3.5	10
	Total	1,076	67.2	

Total salmonellae isolated (January) 1,601

The appearance of S. typhi among the 7 most common serotypes is unusual based on the data observed during the last 4 months. However, S. typhi does appear occasionally on the list and rarely falls below the 10th position. This month, the states showing the greatest number of S. typhi isolations are California and Florida where study of the geographical distributions and variety of phage types isolated do not indicate a common outbreak. While remaining in second position on the most common serotype list, once again the proportion of S. derby isolations increased. S. derby isolations for January increased by 1.1 per cent over December to 13.3 per cent of the total salmonella isolations. This percentage has been exceeded only once - during July, 1963 at the height of the interstate S. deby hospital associated outbreak. The increase during January was concentrated primarily in Massachusetts, New Jersey, Connecticut, and Ohio. The largest number of S. derby isolations were reported from New York and Pennsylvania, but there was a slight decrease

in the percentage S. derby isolations in those two states. Illinois also showed a percentage decrease while accounting for a substantial number of reported isolations. The only other state reporting a remarkable number of S. derby isolations was California, which showed a 6% increase in the percentage of isolations of this serotype over December. The proportion of S. derby isolations reported for December and January is certainly remarkable in that it has reached proportions observed during June & July, 1963 at the height of the outbreak.

Investigation of the increase in S. derby isolations is in progress in three states. Four possible factors account for this increase:

(1) There is perhaps a large reservoir of asymptomatic "carriers" of S. derby in involved hospitals - a residue of the recent epidemic. During epidemics of viral gastroenteritis, such as have been observed in areas of New England this winter, more enteric cultures are performed and segments of this reservoir of S. derby carriers are uncovered.

(2) Gradual relaxation of isolation and personal hygienic measures imposed during the epidemic has permitted renewed person to person spread of infection.

(3) A common source vehicle of initial infections has been reintroduced.

(4) Unrecognized personnel involved intimately in patient care are harboring S. derby and are responsible for isolated cases or small outbreaks.

Field studies thus far indicate that each of the above factors may be operative, to a greater or lesser degree, depending upon hospital and geographic location.

The age and sex distribution of individuals reported as harboring salmonellae during January is consistant with such distributions compiled during previous months (see table IV).

During January, 306 (19.1 per cent) of the 1,601 individuals from whom salmonella isolations were reported, had at least one other member of their family also reported. This month's family attack rate is consistant with those computed for antecedent months.

B. Nonhuman

A total of 400 salmonella isolations from nonhuman sources were reported during January. This number is slightly lower than the 413 reported in December and significantly lower than the 525 reported in January 1963. The total number of serotypes identified was 49, the same number as in December.

The seven most commonly reported serotypes for January are as follows:

		No.	Per Cent	Standing Last Month
1.	S. typhimurium S. typhimurium var. copenhagen	90	22.5	1
2.	S. heidelberg	34	8.5	2
3.	S. infantis	29	7.2	3
4.	S. anatum	28	7.0	Not listed
5.	S. san-diego	22	5.5	Not listed
6.	S. saint-paul	15	3.7	Not listed
7.	S. tennessee	15	3.7	Not listed
		233		

These 7 types comprise 58.2% of the total isolates reported. The four species of animals from which the greatest number were reported in order of frequency are turkeys 138 (34.5%) chickens 83 (20.7%), cows 36 (9.0%), and pigs 15 (3.7%). These 4 species represent 68% of all non-human isolations reported during January.

It is of interest to note that S. typhimurium was isolated more frequently from bovine sources this month as well as in previous months. Turkeys likewise are frequent sources of S. typhimurium but in contrast to cattle many breeding flocks are being tested serologically in efforts to rid stock of this type. All of the 22 isolates of S. san-diego were obtained from turkeys.

Most of the rare salmonella types reported are from reptiles: S. adelaide from a lizard, S. inverness from an alligator, and S. wandsbek from a lizard.

CURRENT INVESTIGATIONS

None.

REPORTS FROM STATES

A. Michigan and Ohio

An Interstate Outbreak of S. typhimurium Gastroenteritis Traced to Commercially Prepared Doughnuts. Dr. George H. Agate, Director of Epidemiology Section, Dr. D. B. Cohoon, Chief, Zoonoses Section, and Dr. Harold Lambert, Chief, Acute Communicable Disease Section, Michigan State Department of Public Health; Dr. R. F. Willson, Director, Bureau of Food Inspection, City of Detroit, Department of Public Health; Mr. Thomas Brown, FDA Regional Office, Detroit, Michigan; Dr. Harold Decker, Division of Communicable Diseases, Ohio Department of Health, and an EIS officer.

Introduction

An outbreak of gastroenteritis with fever occurred among at least 100 residents of Michigan and northern Ohio during a 7-day period, January 13-19 inclusive, which suggested a common source of infection. This was subsequently identified as commercially prepared custard-filled doughnuts. The infecting organism was Salmonella typhimurium, which has been recovered from both patients and the doughnuts. A chronological account of the outbreak and its investigation will be presented.

The Outbreak

At 2:30 AM Saturday, January 18, the Detroit Police Department Homocide Division phoned Dr. R. F. Willson, Director, Bureau of Food Inspection, to report that a family of 5 had just been hospitalized with symptoms suggestive of an "acute food-borne intoxication." It was soon learned that the patients had developed fever, diarrhea, and nausea. In each instance, symptoms appeared approximately 6 hours following ingestion of custard-filled doughnuts. The doughnuts were purchased from a large commercial bakery Wednesday, January 15, and were consumed then and the day following. All family members were treated at home for at least one day, but persistence of symptoms necessitated their hospitalization at 11:00 PM, Friday, January 17. No samples of the suspect doughnuts were immediately available for culture. Stool specimens were obtained from these 5 patients, and S. typhimurium was subsequently recovered from each.

The Detroit press carried a brief account of this family episode on Sunday, January 19, and immediately reports of similar occurrences began to reach Dr. Willson. Each report followed a repetitious pattern: an involved family experienced gastrointestial illness affecting only members who had consumed custard-filled doughnuts. In each instance, the doughnuts could be traced to the same commercial bakery. They were invariably consumed between Monday, January 13 and Friday, January 17. The bakery operation was closed Sunday, January 19, two days following the report of the first cases. A bacteriologic study of the bakery plant was begun and cultures were obtained from food-handlers involved in the preparation of the doughnuts. The federal Food and Drug Administration joined in the plant investigation.

During the week following the first reported illness, 44 hospitalized cases were recognized in Michigan, each traced to the doughnuts. Additional cases were also uncovered in Toledo, Ohio during this period. Most hospitalized cases have been bacteriologically confirmed as S. typhimurium gastroenteritis. Total cases accumulated to date exceeds 100. Doughnuts from the lots held responsible for the outbreak were obtained in Detroit and Pontiac, Michigan and Toledo, Ohio. All were found contaminated with S. typhimurium. Gross quantitative bacteriologic studies suggested that the custard fill was more heavily contaminated than the shells or frosting.

The Investigation

The bakery was studied intensively to determine the source of contamination of the doughnuts. Doughnuts of the type involved were made

only on the nights of January 12 and 13. None were made during the preceding week or subsequently. Since earliest onsets of illness occurred during daylight hours January 13, it is apparent that the January 12 lot was contaminated. It is impossible to assess whether the January 13 lot was also contaminated because of mixing of the two lots. It is known that approximately 400 dozen doughnuts were made on the two evenings. About one-third of these were sold to the Michigan "retail trade" (groceries and supermarkets). Slightly less than two-thirds were distributed to the Michigan "home trade" by route men. Perhaps 300 doughnuts were sent to outlets in Toledo, Ohio. Tracing doughnuts to the individual consumer was not possible, unless illness was reported to local health facilities.

The doughnut shells were prepared from a commercial dry mix and were thoroughly cooked before filling. The custard fill was prepared from a dry mix which was heated with sugar and water until semi-solid. The custard fill was protein-free and consisted of sugar, starch, vegetable gums and sodium proprionate. No eggs or milk were added. Some of the doughnuts were frosted with a mixture of hard fat, sugar, salt, water and chocolate liquor. No protein ingredients were added to the frosting. Since protein ingredients of bakery products have most commonly been incriminated as sources of salmonellae, the doughnut shell mix could at first appear most suspect of the three major components of the doughnuts. However, there is evidence that the shells were cooked sufficiently to destroy any salmonellae that may have resided in the dry mix. No samples of shell, custard, or frosting mix from the lots used were available for culture. However, cultures of other lots of custard and frosting mix have been sterile. Samples of individual ingredients of the doughnut shell mix are currently being cultured. (These ingredients are listed in Table 1). To date, Group C and Group B salmonella organisms have been recovered from the dried egg ingredients of the doughnut shell mix. (S. typhimurium is a Group B salmonella organism).

Interviews with bakery personnel have indicated that during the doughnut baking process, several opportunities for introduction of salmonella organisms existed: (1) some cake-baking equipment which had been in contact with raw and powdered egg, may have been used in preparing the doughnuts without intervening cleaning, (2) the protein-free custard mix may have been stored in dried egg containers, and (3) some plant equipment was used to prepare both "raw" and cooked ingredients without thorough intermediate cleaning. In addition the possibility of contamination from infected egg dust on working surfaces and utensils in the bakery must be considered.

Examination of involved foodhandlers uncovered two employees who harbored S. typhimurium. Both worked on the production line, and admitted eating doughnuts both baking nights (January 12 and 13). Both employees developed gastroenteritis January 14, and were thus more than likely victims of the outbreak rather than its cause.

Table 1

Ingredients of Dry Doughnut "Shell" Mix

wheat flour (3 types)	dried milk
potato flour	baking soda
soy flour	variety artificial flavors
dextrose	sodium diacetate
other sugars	sodium proprionate
lecithin	dried egg (from 50 commercial sources)
soy oil	
emulcifiers	
whole milk	

Discussion and Conclusions

A sizeable interstate outbreak of salmonella gastroenteritis occurred January 13-19. The source was clearly custard-filled doughnuts from a single commercial bakery. The source of contamination of the doughnuts must remain conjecture. The doughnut shells were cooked sufficiently for effective sterilization, thus, contamination of the custard, frosting, or final product must have occurred. Since the custard and frosting ingredients have seldom been implicated as vehicles or resevoirs of salmonellae, an exogenus source of contamination is suggested. Alternatively, since one of the shell mix ingredients (dried egg) has been shown to contain salmonellae, cross contamination of the custard fill or frosting could have occurred from this source. The opportunity for such cross contamination through multipurpose equipment use has been documented.

Bacteriophage typing of S. typhimurium organisms recovered in the investigation will be performed. Information gained from this technique may allow more definitive conclusions about the chain of events leading to contamination of the doughnuts.

B. Texas

Multiple Isolations of S. panama, an Uncommon Salmonella Serotype. Reported by Dr. Van C. Tipton, Director, Communicable Disease Division, Texas State Department of Health.

A case of Salmonellosis, type not specified, was reported to the City Health Department of San Antonio on December 18, 1963. The patient was a 9 month old white male. This child had been ill for one month prior to admission to the hospital on December 7, 1963. A nurse from the local public health department visited the patient's home on December 20, and found four families living in two houses at the same address, all using common toilet facilities. Although city water and sewage are supplied to the main house, sanitary conditions are extremely poor.

Fifteen of the 19 people living at this address, all contacts of the patient, submitted stool specimens. Salmonella panama was isolated from 8 of these specimens. None of these 19 contacts to the single case were ill at any time. The source of the infection was not determined.

C. Minnesota

Salmonella typhimurium Outbreak Traced to Dairy Calf Herd Salmonellosis. Dr. D. S. Fleming, Director, Division of Disease Prevention and Control, Minnesota Department of Health; Dr. Josef Preizler, Director, Bureau of Communicable Diseases, Wisconsin State Board of Health; Dr. E. P. Pope, Assistant Chief State Veterinarian, Wisconsin State Department of Agriculture, and Dr. Leslie P. Williams, Jr., EIS Veterinary Officer assigned to Minnesota Department of Health.

On December 11, 1963, a St. Paul physician submitted a blood specimen from a patient suffering a recurrent diarrhea. In agglutination tests this serum reacted to a titer of 1:2560 with Salmonella paratyphi B antigen and 1:80 with S. typhi O antigen.

An investigation revealed that the patient had been in St. Paul only 1 month. Previous to this he had raised calves in Wisconsin. Information obtained from the Wisconsin State Board of Health and the Wisconsin State Department of Agriculture regarding their studies is incorporated into this report. During September and October the patient purchased 24 baby calves from various sources. Twelve of them came from one Wisconsin dealer. Early in November several of the calves became ill with "shipping fever." The owner, his 3 year old son and 5 year old daughter experienced a diarrheal illness about this same time. The daughter was taken to a doctor and a stool specimen was cultured. S. typhimurium was isolated from this specimen. S. typhimurium was also obtained from the 3 year old son's stool. The medical investigator found that calf feeding utensils and equipment were being washed in the kitchen sink of the patient's home. Thirteen of the calves died and 2 were diagnosed as death due to salmonella enteritis caused by S. typhimurium at a Wisconsin Veterinary Diagnostic Laboratory. The remaining calves were disposed of by selling them through a Wisconsin sale.

It was also found that the family of the patient's sister (from St. Paul) had visited the farm early in November. Their 2 children played with the calves. On November 10, their 3 year old son was admitted to a St. Paul hospital with severe diarrhea. S. typhimurium was isolated from his stools. The mother and the 12 year old son developed diarrhea and S. typhimurium was recovered from the latter's stool.

The veterinary epidemiologist from the Wisconsin Agriculture Department found that 40 calves were purchased by another farmer from the same cattle dealer who sold the patient the 12 calves. He experienced no disease problems in these 40 calves. However, a neighbor sold the patient several calves in September or October. In November 2 of the neighbor's calves died and S. typhimurium was isolated from their tissues.

A follow-up of the patient's claves that went through the sale was made. Six were sold to a packing company and all passed post-mortem inspection. One calf was sold to another packer and its disposition was unknown. Three were sold to 2 farms. Two calves housed in the same barn

as 1 of these calves died of diarrhea shortly after its introduction to the herd. Blood samples from the remaining calves and the sale calf were negative serologically for S. typhimurium. One of the calves sent to sale by the patient died in the sale pen.

Of the 8 persons exposed to the infected group of calves, 6 suffered a diarrheal illness (75%) and S. typhimurium was isolated from 5 (50%).

Three Family Outbreaks of Salmonellosis Traced to Infected Pet Turtles: Dr. D. S. Fleming, Director, Division of Disease Prevention & Control, Minnesota Department of Health; and Dr. Leslie P. Williams, EIS Veterinary Officer, assigned to Minnesota Department of Health.

Within a four or five day period beginning December 30, 1963, the five children and father of a Brooklyn Center (Minneapolis suburb) family experienced an illness characterized by diarrhea and cramps. The four and one-half year old boy was taken to the doctor and a stool specimen was obtained. Salmonella panama was isolated from this specimen.

Investigation did not incriminate any food or meal, although meringue cookie was suspect. These were made by adding chocolate bits to meringue. Cookie portions on a cookie sheet were placed in an oven pre heated to 350°. The oven was then turned off and the cookies "baked" over night.

The family dog and the family pet turtle were considered as possible sources of salmonella. They were swabbed and the turtle water was sampled. Salmonella panama was isolated from the turtle swab and the turtle water. The turtle ate commercial turtle food only, and little of that, as it seemed to be in a state of semi-hibernation. It had been in the household about five months and the water in its dish was changed every three or four days, being discharged into the kitchen sink.

This finding stimulated a follow up of a case of Salmonella panama diarrhea that had occurred in a two year old Minneapolis girl. She became ill in October of 1963 and was hospitalized for ten days. During her hospitalization her parents experienced diarrhea and cramps. It was learned that this family had purchased two pet turtles during August. The little girl had been scolded on several occasions for sucking pebbles taken from the turtle dish.

In November the turtles were given to the girl's aunt. Early in January four of the five cousins and the uncle experienced diarrhea over a week's period. The one year old child had diarrhea for two weeks.

One of the turtles was killed in January. Samples of turtle water and a cloacal swab of the remaining turtle were positive for Salmonella panama. It has been fed commercial turtle food and fish eggs. The water was changed every three days, also being discharged into the kitchen sink.

Stool specimens from the children are currently being cultured.

A total of seventeen members in these three families were in close contact with these turtles. Of these, 14 had diarrhea (82%). It is tenable that infection occurred either through direct contact with the turtle and/or water or by contamination of the kitchen environment

and/or food.

Further studies of Salmonellosis in pet turtles are in progress.

D. California

Family Outbreak of Gastroenteritis Due to Multiple Serotypes: Dr. Donald V. Miller, Director Public Health Laboratory, County of Monterey Department of Public Health and Philip Condit, M.D., M.P.H., Chief, Division of Preventive Medical Services, Bureau of Chronic Diseases, State of California Department of Public Health.

Four different salmonella serotypes were simultaneously isolated from among the 8 members of a family of 8, all of whom experienced symptoms of gastroenteritis 24-60 hours after eating sandwiches prepared from leftover Thanksgiving turkey.

After thawing at room temperature the day before Thanksgiving, a frozen 17 lb. turkey, prepared, broiled, and stuffed in a rotisserie for 6 hours, from 350-380°F., was served for Thanksgiving dinner. The turkey remaining after the meal was left at room temperature until the following day when it was used to prepare sandwiches for all 8 family members.

About 24 hours later, 2 of the children complained of sore throats. They also experienced nausea, vomiting, and diarrhea. By 48 hours after the ingestion of the sandwiches, the other 4 children had experienced nausea, vomiting, and diarrhea. The parents became ill later in the day with similar symptoms, thus making a 100% attack rate.

Stool cultures were obtained from all members of the family, as well as from the turkey carcass, which was recovered from a garbage can. From the turkey and from among the family, Salmonella heidlberg, S. blockley, S. newport, and S. anatum were typed at the State Laboratory. Although the 4 serotypes were recovered from members of the family, no one victim harbored all 4 types. S. newport was isolated from 8, S. anatum from 7, S. heidelberg from 5 and S. blockley from 1.

Table I

Age	Sex	Culture S. newport	S. anatum	S. heidelberg	S. blockley
1-1/2	M	X	X		X
4	M	X	X	X	
5	M	X			
7	M	X	X	X	
9	M	X	X	X	
12	M	X	X	X	
43	M	X	X	X	
44	F	X	X		
		8	7	5	1
Turkey		X	X	X	X

No family member was known to be a salmonella carrier. No source of this multiple Salmonellosis outbreak was discovered. The turkey was not traced to its source.

Editor's Comment:

This outbreak demonstrates the value of picking multiple colonies for typing from salmonella cultures. Juenker studied stool cultures of 75 individuals with Salmonellosis, presumably due to only a single serotype, and found that 17 cer cent harbored multiple types.

(1) Juenker, A.P., "Infections with Multiple Types of Salmonellae." Am. J. Clin Path. 27:646-651, 1957.

V. SPECIAL REPORTS

A. Colorado

Salmonella Surveillance Reporting on a Statewide Basis by the Colorado State Department of Public Health, Epidemiology Section: An editorial.

During recent months the Epidemiology Section of the Colorado State Department of Public Health has circulated a monthly statewide Salmonella Surveillance Report. The report has included the particular month's human isolations categorized by serotype, patient initials, age, sex, and county of origin of the culture. (See Table VIII). More often than not an accompanying commentary upon outbreaks or unusual isolations is included. The Epidemiology section believes that interest in followup of salmonella isolations has been heightened by circulation of this monthly report.

The following is quoted directly from the December 1963 Colorado State Report.

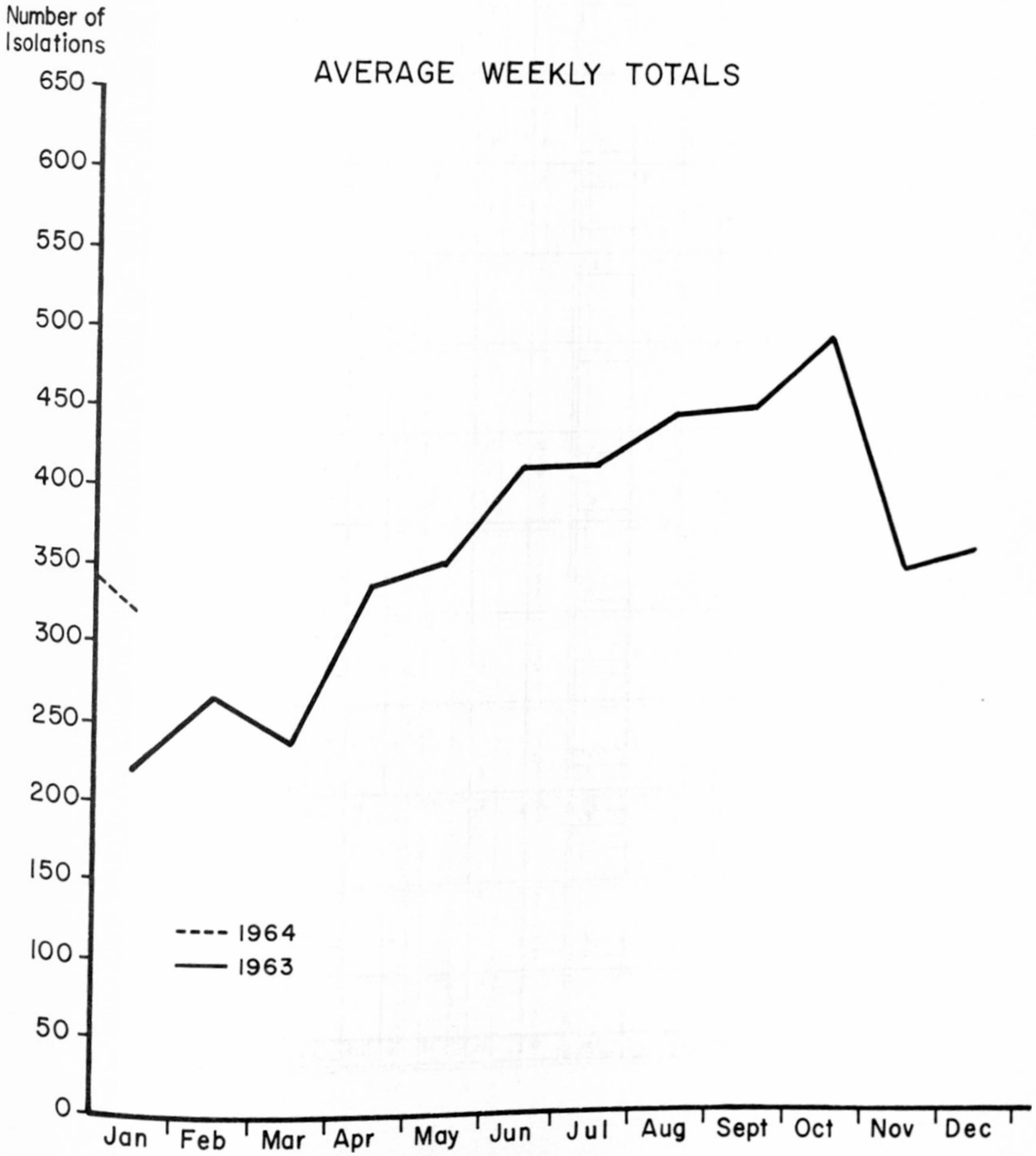
"A total of 357 salmonella cultures were identified by serotype in 1963. The true incidence of Salmonellosis in Colorado is unknown but undoubtedly far exceeds the number identified. The following table lists serotypes by month for 1963. For comparison, monthly 1962 totals are also included. Hopefully the significant increase in salmonella cultures in 1963 reflects an increased interest in salmonella problems and better reporting. We again invite you to submit proven or suspected salmonella cultures or specimens for determination of serotypes."

Editor's Comment:

More and more states are instituting such programs of surveillance and regular reports to interested parties within their states. The Colorado Report is a useful model. Results of such programs are so far most rewarding.

Figure I.

REPORTED HUMAN ISOLATIONS OF SALMONELLAE in the United States



Note: Average weekly totals rather than monthly totals are presented because some months have 5 instead of 4 weeks.

SALMONELLA SEROTYPES ISOLATED FROM HUMANS DURING JANUARY, 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
abony										1			1						
adelaide												1	1						
alachua																			
albany																			
amager																			
anatum				1			1	7				1	8	1	1		1		3
bareilly									1			1	2						
berta														1					1
blockley	1				1	2	4	1				2	3	2		2	4	1	9
bovis-morbificans																			
branderup				2			2		1	1			2						
bredeney								1	5	2		2	10						
california														1					1
cambridge																1			1
chester										1		2	3				2		2
cholerae-suis																			
cholerae-suis var.kun											1		1						
cubana															1		1	1	3
colorado																			
derby				24	1	10	35	13	24	13	9	43	102	14	1	19	2	3	39
enteritidis				12		5	17	9	2	2		5	18	2		2	7	3	14
gatuni																			
give									1				1		1				1
heidelberg				7		2	9			5	1	3	9	16	1	11	7	11	46
indiana												2	2						
infantis	1				1	1	3	3	3	6		6	18	7	4	3	5		19
javiana																			
kentucky												1	1						
litchfield																1			1
luciana																			
manhattan				1			1					1	1	1					1
meleagridis														1					1
miami																			
minnesota																			
mississippi																			
montevideo				3			3	2	2			5	9	1	1	2	1		5
muenchen												3	3	1	1				2
newington								6	1				7						
newport										1			1	3	2	5	3		13
oranienburg				3	2	1	6	1	1	3	1	1	7			3	1		4
oslo																			
othmarschen																			
panama								1				1	2			4	1		5
paratyphi B var.java								2					2			4		1	5
paratyphi B				2			2	1				3	4				1		1
poona										1			1						
reading																	1	1	2
saint-paul				1		1	2	1	1			2	4	2		7	3		12
san-diego				2			2	2	1				3			1	1		2
schwarzengrund												1	1			1			1
senftenberg																1			1
shipley										1			1						
tennessee						1	1				1	1	2		1		5	3	9
thompson				4			4	2			2	1	5	4		1		1	6
typhi					1		1		1				1	2		2	1		5
typhimurium				16	2	9	27	23	9	12	1	24	69	23	3	23	70	4	123
typhimurium var.cop				8			8				1		1				1		1
urbana																1			1
virchow																			
weltevreden																			
worthington									2	1			3	1		2			3
Untypable Group A																			
Untypable Group B											1		1						
Untypable Group C-1					1		1	1			1		2						
Untypable Group C-2					1		1												
Untypable Group D																			
Untypable Group H																			
Unknown																		1	1
TOTAL	2	-0-	-0-	86	10	32	130	76	55	50	19	112	312	83	17	96	118	30	344

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

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
																		abony
																		adelaide
																		alachua
																		albany
																		amager
						1	1				1						1	anatum
																1	1	bareilly
											1						1	berta
						2	2									1	1	blockley
																		bovis-morbificans
2							2		1		1						2	branderup
									1								1	bredeney
																		california
																		cambridge
																		chester
										1							1	cholerae-suis
											1		1			1	3	cholerae-suis var. kun
															2	1	3	cubana
																		colorado
								2	5	2					1		10	derby
1							1	1							4	2	7	enteritidis
																1	1	gatuni
																		give
2	1			1		1	5			1				1	1	1	4	heidelberg
																		indiana
4		1					5		3		5		1		2	6	17	infantis
															1	4	5	javiana
																		kentucky
																1	1	litchfield
																		luciana
	1						1				1						1	manhattan
																2	2	meleagridis
																		miami
																		minnesota
																		mississippi
2		1					3		1		1		2		2		6	montevideo
		1					1						1		1	1	3	muenchen
																2	2	newington
2		1					3				1		1		1	7	10	newport
3	2					2	7		1	2						5	8	oranienburg
																		oslo
																		othmarschen
2							2											panama
		1					1						1			1	1	paratyphi B var. java
																	1	paratyphi B
																1	1	poona
											1						1	reading
8							8									3	3	saint-paul
																1	1	san-diego
																		schwarzengrund
																1	1	senftenberg
																		shipley
6							6		1		1		1		1		4	tennessee
	1					1	2				2					1	3	thompson
		6					6					1	5	2	2	10	20	typhi
14	5	2	11	1	3	16	52	1	11	4	8	1	6		13	13	57	typhimurium
																		typhimurium var. cop
																		urbana
																		virchow
																		weltevreden
															1		1	worthington
										1							1	Untypable Group A
										2				1			3	Untypable Group B
										1							1	Untypable Group C-1
																		Untypable Group C-2
										1							1	Untypable Group D
																		Untypable Group H
										2							2	Unknown
46	10	13	11	2	3	23	108	4	24	17	24	2	19	4	32	67	193	TOTAL

SEROTYPE	REGION AND REPORTING CENTER																		
	EAST SOUTH CENTRAL					WEST SOUTH CENTRAL					MOUNTAIN								
	KY	TENN	ALA	MISS	TOTAL	ARK	LA	OKLA	TEX	TOTAL	MONT	IDA	WYO	COLO	NM	ARI	UTAH	NEV	TOTAL
abony																			
adelaide																			
alachua																			
albany							2			2									
amager							7			7									
anatum							3			3									
bareilly	1				1														
berta							1			1									
blockley							1		2	3									
bovis-morbificans							1			1									
branderup																			
bredeney	1				1														
california																			
cambridge																			
chester		2			2						1								1
cholerae-suis																			
cholerae-suis var. kun																			
cubana																1			1
colorado																			
derby							1		2	3				1					1
enteritidis							3		5	8							1		1
gatuni																			
give																			
heidelberg	1	1			2				1	1		1		1		4	2		8
indiana																			
infantis		2			2			2		2				1			1		2
javiana							3		2	5							1		1
kentucky																			
litchfield																			
luciana																1			1
manhattan							3		2	5									
meleagridis																			
miami																			
minnesota																			
mississippi							2			2									
montevideo	2	2			4		4			4							4		4
muenchen							1		5	6									
newington																			
newport	1	1			2		4		7	11		1				3	1		5
oranienburg		5		1	6	2			2	4									
oslo																			
othmarschen									1	1									
panama			1		1				9	9									
paratyphi B var. java							5			5									
paratyphi B									2	2				1					1
poona																			
reading																			
saint-paul												1					1		2
san-diego															2				2
schwarzengrund																			
senftenberg			1		1		1			1									
shipley																			
tennessee							1			1									
thompson			1		1	1	5		1	7									
typhi	1	2			3	1		1	3	5									
typhimurium	2	7			9	2	2	3	15	22		4		6		2	8		20
typhimurium var. cop							2			2						2			2
urbana																	1		1
virchow																			
weltevreden																			
worthington																			
Untypable Group A																			
Untypable Group B						5		1		6					3				3
Untypable Group C-1																			
Untypable Group C-2																			
Untypable Group D																			
Untypable Group H													1						1
Unknown											1						1		2
TOTAL	9	22	3	1	35	11	52	7	59	129	2	7	1	10	5	13	21	-0-	59

REGION AND REPORTING CENTER						OTHER VI	TOTAL	PERCENT OF TOTAL	JAN., 1963 TOTAL	PERCENT OF Jan. 1963 Tot.	SEROTYPE
PACIFIC											
WASH	ORE	CAL	ALASKA	HAWAII	TOTAL						
							1				abony
							1				adelaide
		1			1		1				alachua
							2				albany
							7				amager
				2	2		19	1.2	13	1.2	anatum
							4		7		bareilly
		1			1		4		4		berta
		1			1		23	1.4	26	2.3	blockley
							1		1		bovis-morbificans
							4		5		branderup
		11		3	14		29	1.8	14	1.3	bredeney
							2				california
							1				cambridge
							8		11		chester
							1				cholerae-suis
							4		7		cholerae-suis var. kun
		1			1		8		1		cubana
				1	1		1				colorado
1	1	14		7	23		213	13.3	30	2.7	derby
	1				1		67	4.2	31	2.8	enteritidis
							1				gatuni
				2	2		4		3		give
3	1	19		7	30		114	7.1	91	8.2	heidelberg
							2		1		indiana
1		6		2	9		77	4.8	72	6.5	infantis
							11		2		javiana
							1		1		kentucky
	1				1		3				litchfield
							1				luciana
		2		9	11		21	1.3	22	2.0	manhattan
							1		6		meleagridis
							2		2		miami
		1			1		1		1		minnesota
							2				mississippi
				1	1		39	2.4	32	2.9	montevideo
		1			1		16	1.0	22	2.0	muenchen
							9		4		newington
1		12		4	17		62	3.9	67	6.0	newport
		7			7		49	3.1	26	2.3	oranienburg
				1	1		1		2		oslo
							1				othmarschen
		1		6	7		26		11		panama
2	1	3			6		20		8		paratyphi B var. java
							11		9		paratyphi B
		1			1		3		3		poona
1					1		4		1		reading
1	1	3		1	6		37	2.3	29	2.6	saint-paul
1		1			2		12		8		san-diego
		3			3		5		4		schwarzengrund
							4		3		senftenberg
							1				shipley
1		6			7		30	1.9	14	1.3	tennessee
1		1			2		30	1.9	25	2.2	thompson
	2	13			15		56	3.5	59	5.3	typhi
27	8	65		8	108		487	30.4	355	32.0	typhimurium
							14		15	1.3	typhimurium var. cop
							3		3		urbana
		1			1		1		1		virchow
1					1		1		3		weltevreden
				1	1						
				3	3		10		3		worthington
							1				Untypable Group A
	1				1		14		16		Untypable Group B
							4		2		Untypable Group C-1
							1				Untypable Group C-2
							1		6		Untypable Group D
							1				Untypable Group H
							5				Unknown
41	17	175	-0-	58	291	-0-	1,601		1,111		TOTAL

VI (Virgin Islands)

TABLE II

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

Reporting Center	Total Number of Isolates Reported	Number of Isolates From Family Outbreaks	Per Cent of Total
Alabama	3	0	00.0
Arizona	13	1	7.7
Arkansas	11	4	36.4
California	175	38	21.7
Colorado	10	3	30.0
Connecticut	32	3	9.4
Delaware	4	0	00.0
District of Columbia	17	4	23.5
Florida	67	14	20.9
Georgia	32	9	28.1
Hawaii	58	2	3.4
Idaho	7	0	00.0
Illinois	96	7	7.3
Indiana	17	3	17.6
Iowa	10	0	00.0
Kansas	23	7	30.4
Kentucky	9	0	00.0
Louisiana	52	15	28.8
Maine	2	1	50.0
Maryland	24	6	25.0
Massachusetts	86	18	20.9
Michigan	118	40	33.9
Minnesota	46	2	4.3
Mississippi	1	0	00.0
Missouri	13	2	15.4
Montana	2	0	00.0
Nebraska	3	2	66.7
New Jersey	19	0	00.0
New Mexico	5	2	40.0
New York-Albany	76	17	22.4
New York-Beth Israel Hosp.	55	3	5.5
New York City	50	3	6.0
North Carolina	19	2	10.5
North Dakota	11	2	18.2
Ohio	83	21	25.3
Oklahoma	7	1	14.3
Oregon	17	2	11.8
Pennsylvania	112	28	25.0
Rhode Island	10	3	30.0
South Carolina	4	3	75.0
South Dakota	2	0	00.0
Tennessee	22	6	27.3
Texas	59	21	35.6
Utah	21	0	00.0
Virginia	24	1	4.2
Washington	41	4	9.8
West Virginia	2	0	00.0
Wisconsin	30	6	20.0
Wyoming	1	0	00.0
Total	1,601	306	19.1

TABLE III

Infrequent Serotypes
1963

Serotype	Center	January	Total*	CDC**	Comment
S. abony	N.Y.C.	1	1	2	Isolation this month from sibling of child reported in December.
S. adelaide	PA	1	0		Rare cause of human illness. Isolate from a lizard this month.
S. albany	LA	2	3	6	Four of 6 CDC isolations from humans in Washington, D.C.
S. cambridge	ILL	1	2	16	Of C.D.C. isolations, 11 from turkeys, 4 from swine and 1 from a human being.
S. colorado	HAI	1	3	0	Isolated from humans in Hawaii in March, Fla. in April, and Fla. in Oct. '63
S. gatuni	FLA	1	1	2	Two C.D.C. recoveries from humans in Hawaii. Isolated from human of unknown history in Fla. in 1946.
S. luciana	ARIZ	1	0	0	Isolated from a mother and 4-week old child, both suffering gastroenteritis in Fla. 1962. See Reports #4 and 5.
S. othmarschen*	TEX	1	0		Extremely uncommon serotype.
S. shipley	NYC	1	0		No previous isolations reported.
S. virchow	WASH	1	1	0	Reported only once from a human in 1963 from Oregon. Reported 9 times from humans in 1962--5 from N.Y., 3 from Colo. & 1 from Calif.

*Represents 18,696 human isolations of salmonellae reported to the Salmonella Surveillance Unit - January 1 - December 27, 1963.
**Represents approximately 28,000 isolations of salmonellae from all sources between 1947 and 1958.

TABLE IV

Age and Sex Distribution of 1,579 Isolations of Salmonellae Reported for January, 1964

Age	Male	Female	Total	Per Cent of Total
Under 1	103	62	165	10.4
1-4 Yrs.	136	109	245	15.5
5-9 Yrs.	62	51	113	7.2
10-19 Yrs.	37	38	75	4.7
20-29 Yrs.	23	50	73	4.6
30-39 Yrs.	26	43	69	4.4
40-49 Yrs.	23	31	54	3.4
50-59 Yrs.	30	37	67	4.2
60-69 Yrs.	22	31	53	3.4
70-79 Yrs.	14	18	32	2.0
80+	13	11	24	1.5
Unknown	335	274	609	
TOTAL	824	755	1579	
% of Total	52.2	47.8		

TABLE VI

NON-HUMAN ISOLATES REPORTED BY THE NATIONAL ANIMAL DISEASE LABORATORY AND STATE REPORTING CENTERS BY SEROTYPE AND S

SEROTYPE	STATE																										
	ALA	ARK	CALIF	CONN	FLA	GA	ILL	IND	IOWA	KANS	KY	MD	MASS	MICH	MINN	MISS	MO	NJ	NYA	NC	OHIO	ORE	PA	SC	TENN	TEXAS	UTAH	VA	WASH
adelaide														2														
albany											1																	
anatum			3			1	1														1					19			3
bareilly																	2	4										
binza							1																					
blockley			1										1			3										2			1
bredeney			2																									
california			1				1									1										1			
cerro							3									4	2												
chester											3																		
cholerae-suis								1													2							
cholerae-suis var. kun								5									2							2				1	
cubana																	1									1			
derby			1				1																			1			
dublin			1																								1		
enteritidis								6									1												
gallinarum	1																						1						
give	1																			1									
heidelberg			19	2		4	3					1												1		1	1		2
infantis	2	1	7				3	2		8	1				2							1				1		1	
inverness														1															
kentucky			1					1								1	1									1			
livingstone																												1	
manhattan													1																
manila																	2												
meleagridis						1																				1			
minneapolis							1																						
minnesota	3																									1			
mission																													
montevideo	1					1		1									2												4
muenchen																													
newington	1					1											1							1		7			
newport	1		4																							4			
oranienburg														2			3									7		1	
orion			1																										
panama																										2			
pullorum	2							5									1							1				1	1
reading								1																					
saint-paul								2				6			1		1									1			
san-diego			2																			6				14			
schwarzengrund	1		5			1		1									1												
senftenberg														1			3												
simsbury			1																					1				1	
tennessee							4	1		9																			
thompson													1								1								
typhimurium	2		24			8		8	1				1	4			12		1		2	2			1	10	1	4	
typhimurium var. cop	1							2													1		1	2					
wandsbek														1															
worthington			2																		1								
Untypable Group O			1																										
TOTAL	16	1	76	2	8	9	18	36	1	17	5	7	4	11	3	9	35	4	1	1	8	9	2	8	1	74	3	10	11

Source: National Animal Disease Laboratory, Ames, Iowa and Weekly Salmonella Surveillance Reports from California, Colorado, Connecticut, Illin
Mississippi, New Jersey, New York, Ohio, Oklahoma, Rhode Island, Texas, Virginia and Washington.
NYA (New York - Albany)

* Includes delayed December Reports

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

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

TABLE VIII

SALMONELLA SEROTYPES BY MONTH - 1963

COLORADO

	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	TOTAL
anatum											1		1
bareilly							1						1
bredeney	1							1	1			1	4
chester										1	5	5	11
derby								2	2		1	3	8
heidelberg		5	5	1				5	9	3	1	1	30
infantis		2	1			4	2		1		1		11
irumu				1		2	1				1		5
lindenburg		1											1
litchfield										1			1
montevideo	2	6	2	4		1	1			7			24
muenchen						1	1						2
newport		7	3		5	1	1			1		3	21
oranienburg	4	4	2	2	3	1		1		1	1		19
paratyphi B		2		1						1	1		5
reading	1							1					2
san diego		1	1										2
schwarzengrund												1	1
st. paul	1							1	1	2		3	8
stanley	2			1									3
typhi	2	2	1		1	1	1	2	2				12
typhimurium	15	12	24	19	10	14	17	19	9	21	17	8	185
TOTAL - 1963	28	42	39	29	19	25	25	32	25	39	29	25	357
TOTAL - 1962	5	5	10	8	29	14	11	16	30	27	9	14	178

Key to all disease surveillance activities are those in each State who serve the function as State epidemiologists. Responsible for the collection, interpretation and transmission of data and epidemiological information from their individual States, the State epidemiologists perform a most vital role. Their major contributions to the evolution of this report are gratefully acknowledged.

STATE	NAME
Alabama	Dr. W. H. Y. Smith
Alaska	Dr. Edwin O. Wicks
Arizona	Dr. Philip M. Hotchkiss
Arkansas	Dr. Wm. L. Bunch, Jr.
California	Dr. Philip K. Condit
Colorado	Dr. C. S. Mollohan
Connecticut	Dr. James C. Hart
Delaware	Dr. Floyd I. Hudson
D. C.	Dr. William E. Long
Florida	Dr. Clarence M. Sharp
Georgia	Dr. W. J. Murphy
Hawaii	Dr. James R. Enright
Idaho	Dr. John A. Mather
Illinois	Dr. Norman J. Rose
Indiana	Dr. A. L. Marshall, Jr.
Iowa	Dr. Ralph H. Heeren
Kansas	Dr. Don E. Wilcox
Kentucky	Mr. J. Clifford Todd
Louisiana	Dr. John M. Bruce
Maine	Mrs. Margaret H. Oakes
Maryland	Dr. John H. Janney
Massachusetts	Dr. Nicholas J. Fiumara
Michigan	Dr. George H. Agate
Minnesota	Dr. D. S. Fleming
Mississippi	Dr. Durward L. Blakey
Missouri	Dr. E. A. Belden
Montana	Dr. Mary E. Soules
Nebraska	Dr. E. A. Rogers
Nevada	Dr. B. A. Winne
New Hampshire	Dr. William Prince
New Jersey	Dr. W. J. Dougherty
New York State	Dr. Robert M. Albrecht
New York City	Dr. Harold T. Fuerst
New Mexico	Dr. H. G. Doran, Jr.
North Carolina	Dr. Jacob Koomen
North Dakota	Mr. Kenneth Mosser
Ohio	Dr. Harold A. Decker
Oklahoma	Dr. F. R. Hassler
Oregon	Dr. Grant Skinner
Pennsylvania	Dr. W. D. Schrack, Jr.
Puerto Rico	Dr. Rafael A. Timothee
Rhode Island	Dr. James E. Bowes
South Carolina	Dr. G. E. McDaniel
South Dakota	Dr. G. J. Van Heuvelen
Tennessee	Dr. C. B. Tucker
Texas	Dr. Van C. Tipton
Utah	Dr. Elton Newman
Vermont	Dr. Linus J. Leavens
Virginia	Dr. James B. Kenley
Washington	Dr. E. A. Ager
West Virginia	Dr. L. A. Dickerson
Wisconsin	Dr. Josef Preizler
Wyoming	Dr. Helen A. Moore