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SHIGELLA

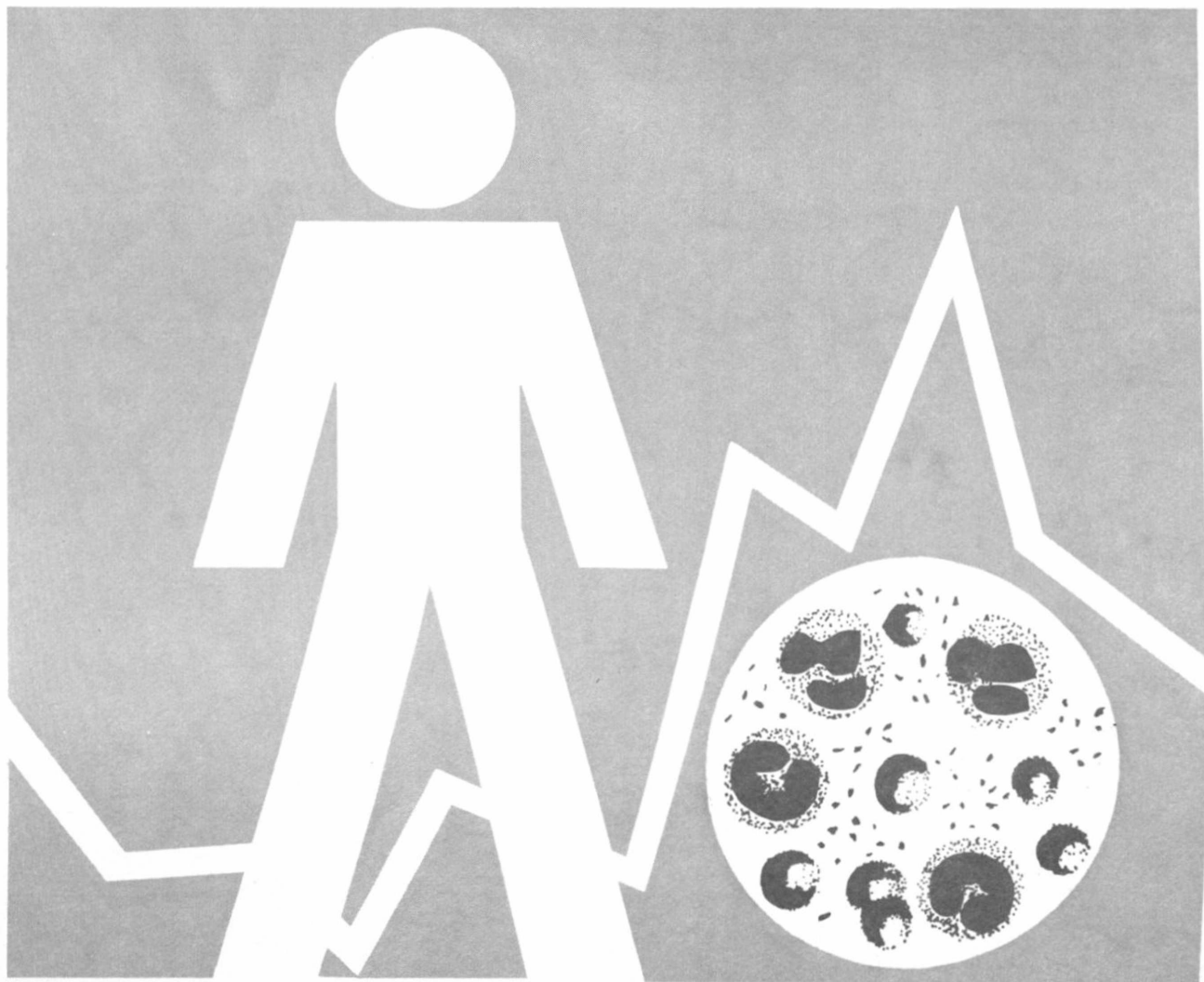
surveillance

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for the

First and Second Quarters 1968

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PREFACE

This report summarizes data voluntarily reported from participating state, territorial, and city health departments. Much of the information is preliminary.

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I. Summary

In the first 6 months of 1968, 3889 isolations were reported from humans. This number represents a decrease of 40.7 percent from the 6556 in the last half of 1967, and a decrease of 19.8 percent from the 4849 isolations reported in the first half of 1967 (Table I).

II. Reported Isolations

A. Human

1. General Incidence

During the first half of 1968, 64.9 percent of isolations of shigella were from children under 10 years of age (Table II); this is consistent with previous patterns. The highest attack rate was noted in the age group 1-4 years.

Cumulative data for April 1967 through June 1968 revealed significantly different attack rates between males and females in the age groups less than 1 year and those over 19 years (Table IIA).

Attack rates per million indicate a lower attack rate in the first half of the calendar year over the second half (Figure 2).

2. Serotype Frequencies

Fifty-one of the 54 reporting centers participating in the Shigella Surveillance Program reported isolations of shigella; 17 different serotypes were reported.

The six most frequently reported serotypes during the 6-month period were the following:

<u>Rank</u>	<u>Serotype</u>	<u>Number Reported</u>	<u>Calculated Number*</u>	<u>Calculated Percent</u>	<u>Rank Last Half</u>
1	S. sonnei	1975	1992	51.22	1
2	S. flexneri 2a	346	716	18.41	2
3	S. flexneri 3a	153	401	10.31	3
4	S. flexneri 2b	118	244	6.27	5
5	S. flexneri 6	133	162	4.17	4
6	S. flexneri 4a	88	154	3.96	6
	Subtotal	2813	3669	94.34	
	Total (all serotypes)	3889	3889		

*from Table III

Tables III and IV, calculated from data compiled during the first half of 1968 and from data compiled since the beginning of the Shigella Surveillance Program in October 1963, respectively, show the relative importance of the various serotypes. In these tables the isolations in each of the unspecified categories have been distributed in their subgroups in the same proportions as the completely specified isolations of that group. The resulting distributions in these tables are called the "calculated number," and from these are derived a "calculated percent" for each serotype. These provide approximate indices of the relative frequencies of the more common shigella serotypes in the United States. S. sonnei now accounts for slightly over half of all isolations, and S. flexneri 2a and b combined for slightly less than a quarter.

3. Geographical Observations

Figure 4 portrays attack rates by State per quarter for January-June, 1968, utilizing population estimates for July 1, 1967. The overall U.S. attack rate was 2.0 cases per 100,000 for the first 6 months of 1968, as compared to 3.3 cases per 100,000 for the last half of 1966 and 2.5 cases per 100,000 for the first half of 1967.

B. Nonhuman

For the first half of 1968 only two cases of nonhuman isolations of shigella were reported:

<u>Serotype</u>	<u>Number</u>	<u>Source</u>	<u>State</u>
S. flexneri 4b	1	Monkey	Michigan
S. flexneri, unspc.	1	Monkey	Florida

III. Current Investigations

Shigellosis in Sitka, Alaska. Reported by Donald K. Freedman, M.D., Director, Division of Public Health and State Epidemiologist; Robert Shules, M.D., Sitka City Health Officer; Miss Pauline Barrette, Sitka Public Health Nurse; and Paul S. Clark, M.D., EIS Officer, Alaska Department of Health and Welfare.

A widespread outbreak of diarrheal illness occurred in Sitka, Alaska, during April and May of 1968. Twenty-seven isolates of Shigella sonnei were recovered from one asymptomatic carrier and 26 persons with diarrhea, fever, and abdominal cramping. An additional 300 persons ill with similar symptoms but not confirmed by culture were uncovered through a community-wide survey.

The age distribution of cases revealed the majority to be under 15 years of age (63 percent of positive cultures and 69 percent ill by survey questionnaire fell into this age group). Although a sharp increment in diarrheal illness began in the first week in April, no common source could be found after intensive investigation of food, milk, and water supplies. The sustained elevation of the epidemic curve for 8 weeks was compatible with person-to-person spread.

Control measures included appropriate antibiotic therapy for all confirmed cases and surveillance of contacts for secondary cases. Personal hygiene was stressed as the most effective measure in preventing further person-to-person spread.

IV. Reports from the States

A. Outbreak of Shigella sonnei in Paso Robles, California. Reported by Mrs. Dougherty, PHN, Paso Robles; Howard Kusumoto, M.D., Acting Health Officer for San Luis Obispo; and William A. Renert, M.D., EIS Officer, California State Department of Public Health, Berkeley, California.

Between November 1967 and February 1968, 22 cases of shigellosis with cultures positive for Shigella sonnei occurred in the Oak Park Housing District, a low rent project, in Paso Robles, California. Person-to-person spread in a setting of poor sanitation was implicated. Control measures including health education and improved sanitation were instituted.

- B. Outbreak of shigellosis in Philadelphia, Pennsylvania. Reported by W. D. Schrack, Jr., M.D., Director, Division of Communicable Diseases and State Epidemiologist; Norman R. Ingraham, M.D., Commissioner, Philadelphia Department of Public Health; and Norman T. Ditchek, M.D., EIS Officer, Philadelphia Department of Public Health.

Five children at the Philadelphia Society for the Prevention of Cruelty to Children developed shigellosis characterized by severe diarrhea and fever.

Control measures consisted of isolation and treatment with ampicillin of all symptomatic, culture confirmed cases of shigellosis. Rectal swabs on all 57 persons living or working with the children were negative. No prophylactic treatment was given. It was postulated that one of the cases with community contacts imported the infection into the group after which person-to-person spread occurred.

- C. Shigellosis at a girl scout encampment. Reported by Donald R. Peterson, M.D., Epidemiologist, and S. P. Lehman, M.D., M.P.H., Director, Seattle-King County Department of Public Health.

Seven of nineteen girl scouts camping along the Hood Canal of Washington's Olympic peninsula had laboratory confirmed Shigella sonnei infections after developing clinical dysentery.

Although an initial common source could not be excluded in the setting of primitive camp sanitary facilities, person-to-person spread certainly played a role. This conclusion was supported by the development of eight additional cases among members of the girls' families who were not at the camp.

- D. Shigellosis in Eastern State School and Hospital, Trevese, Pennsylvania. Reported by Helen Mallis, M.D., Medical Director, Eastern State School and Hospital; William D. Schrack, Jr., M.D., Director, Division of Communicable Diseases and State Epidemiologist; and Theodore H. Weinstein, M.D., EIS Officer, Pennsylvania Department of Health.

After two bacteriologically confirmed cases of Shigella sonnei in patients with diarrhea and fever were detected at the institution, a mass screening of stool specimens resulted in 21 isolations, including five from employees. Two of the employees were asymptomatic and one of these handled dishes for the infirmary where the index case, a patient, acquired the infection. Person-to-person spread among retarded children and to their caretakers perpetuated the infection until vigorous control measures of isolation and safe food handling were inaugurated. Thereafter no further cases occurred.

- E. Shigellosis outbreak in Iowa school children and their families. Reported by Arthur P. Long, M.D., Dr. P.H., Commissioner of Public Health; Arnold M. Reeve, M.D., M.P.H., Chief, Preventive Medical Service, Iowa State Department of Health; William J. Hausler, Jr., Ph.D., Director, State Hygienic Laboratory, and Franklin P. Koontz, Ph.D., Assistant Director, State Hygienic Laboratory, University of Iowa, and Robert G. Sharrar, M.D., EIS Officer, Iowa State Department of Health.

In October of 1967 shigellosis spread person-to-person through the two classrooms of the Rosedale School for Mentally Retarded Children. The attack rate among 27 exposed persons was 77.8 percent. Although some of those infected had no symptoms,

others had severe diarrhea with mucous and blood requiring hospitalization.

After a careful epidemiologic study, two pupils in the same family from the lower socioeconomic stratum were thought to be the source of introduction of Shigella sonnei into the school. The epidemic curve, lasting 1 week with the median date of onset 3 days after the first case occurred, is consistent with the incubation period of shigellosis and the presumed rapid fecal-oral transmission in the classroom after introduction of the organisms by the one family.

The secondary attack rate among family contacts was 35.9 percent. The culture positivity rate of 43.4 percent achieved with fecal specimens from symptomatic persons was unusually high. Whether or not the method of using buffered glycerol saline and freeze drying of rectal swabs during shipment of specimens to the laboratory, as employed in this study, was responsible for the high culture positivity rate will require further evaluation.

F. Epidemiology of a shigellosis outbreak with evaluation of FA technique. Reported by Edwin H. Jorris, M.D., State Health Officer; H. Grant Skinner, M.D., State Epidemiologist; Frank Pauls, M.D., Assistant Director, State Hygiene Laboratory; and Paul M. Cox, Jr., M.D., EIS Officer, Wisconsin Department of Health and Social Services, Division of Health.

Between September 26 and November 15, 1967, 49 cases of acute shigellosis (Shigella sonnei) occurred among the 348 residents of a northern Wisconsin Indian reservation. Epidemiologic study suggested person-to-person transmission spreading to family members of 3 to 6-year-old playmates with an overall secondary attack rate of 43 percent.

Laboratory studies on duplicate rectal swabs taken from 39 ill family members of primary cases yielded 18 cultures positive for S. sonnei and 17 specimens positive by the Fluorescent Antibody (FA) technique. Repeat testing of eight bacteriologic culture positive, but initially FA negative, specimens yielded seven additional FA positives.

Control measures included isolation of 3 to 6-year-old children in affected families and ampicillin treatment; the outbreak terminated on November 15, 1967. In a neighboring community where only antibiotic treatment was given without isolation, the outbreak continued into January 1968.

Editor's Comment: These six outbreaks of shigellosis occurred in diverse settings, yet they were all similar in that person-to-person transmission was the mode of spread. No evidence of a common source could be documented in these carefully studied outbreaks. These reports lend further support to the concept that the usual mode of transmission of shigellosis is by person-to-person spread in contrast to the common association of salmonellosis with foodborne outbreaks.

V. Current Trends and Developments

Endemic Shigellosis: A Study of Fifty Households. John D. Nelson, M.D., Helen T. Kusniesz, R.N., and Kenneth C. Haltalin, M.D. Abstracted from: American Journal of Epidemiology, Vol. 86, No. 3, 1967.

Factors contributing to the endemicity of shigellosis in a large Texas metropolitan area were studied in a one year follow-up involving 50 households of index cases.

The index patients consisted of all those admitted to the hospital pediatric ward with bacteriologically proved shigella infections. Shigellae were the most common bacterial pathogens in all patients hospitalized with diarrheal disease.

Water supply and sewage disposal were deemed adequate for most households. No common source exposures could be found during the year. Common to all households, however, were crowded conditions, sub-optimal diet, lack of education, and poor personal hygiene. Thus the source and cause of continuing shigellosis in the city was attributed to person-to-person spread in low socioeconomic groups. For public health control, the authors recommend investigation and prompt, effective treatment of each infected member in the household of an index case.

TABLE I
SHIGELLA SEROTYPES ISOLATED FROM HUMANS
JANUARY THROUGH JUNE 1968

SEROTYPE	NORTHEAST																	NORTHWEST											North Total											
	Conn	Del	DC	Ill	Ind	Iowa	Ky	Me	Md	Mass	Mich	Minn	Mo	NH	NJ	NV-A	NV-C	Ohio	Pa	RI	VT	Va	W. Va	Wisc	Northeast Total	Colo	Idaho	Kans		Mont	Neb	Nev	ND	Ore	SD	Utah	Wash	Wyo	Northwest Total	
A. <i>S. dysenteriae</i> Unspecified		1																							1														0	1
1																									0														0	0
2				36																				36															0	36
3																								0															0	0
9																								0															0	0
Total	0	1	0	36	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	37	0	0	0	0	0	0	0	0	0	0	0	0	0	0	37
B. <i>S. flexneri</i> Unspecified	4	15		3	4	1	1					15	2	32	116			1	1			14		11	220	1	2	2			1	9	16		1		32	252		
1 Unspecified							1		2		1														4											22	22	26		
1A				5																				6	2												2	8		
1B	1			2					1						1									4	9	1										10	14			
2 Unspecified							21	2	3	3							14	8							51												32	83		
2A									4		2														44	11	1		5		1	1			4	21	18	62		
2B	1			36			87						1		1									88	8		3		3						8	96				
3 Unspecified									1		2							1	1						5	1		4					2	11	18	23				
3A																									54											0	54			
3B	1			51						1					2									1												0	1			
3C										6														6													0	6		
4 Unspecified									1	12								1						14													0	14		
4A				4						1		1			1								7		17										17	24				
4B										1														2												0	2			
5																								2												2	3			
6							11		5	1	3	2	4					2						28	15		3						2		20	48				
Variant X																									0												0	0		
Total	3	4	15	199	3	4	1	1	27	4	23	19	23	0	8	32	116	18	10	1	0	14	0	11	536	65	4	4	13	0	1	5	9	16	6	57	0	180	716	
C. <i>S. boydii</i> Unspecified											1														1	2											0	2		
1																									0												0	0		
2																									0												0	1		
3				1																				0												0	0			
4																									0												0	0		
5																									0	1										1	1			
6																									0											0	0			
7																									0												0	0		
9																									0												0	0		
14																									0												0	0		
Total	0	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	3	1	0	0	0	0	0	0	0	0	0	0	1	4		
D. <i>S. sonnei</i>	66	0	142	102	4	27	2	0	43	51	33	42	33	2	16	32	92	26	90	2	0	38	6	93	942	112	9	12	9	1	2	2	38	6	9	146	1	347	1,289	
Unknown			18			2											1								3	24												5	29	
TOTAL	69	5	175	338	7	33	3	1	70	55	57	61	56	2	24	64	209	44	100	3	0	52	6	108	1,542	178	13	16	22	1	3	11	48	22	15	203	1	533	2,075	

Table II

Age and Sex Distribution of Individuals Infected with Shigellae
in the United States, January - June 1968

<u>Age (Years)</u>	<u>Male</u>	<u>Female</u>	<u>Unknown</u>	<u>Total</u>	<u>Percent</u>	<u>Cumulative Percent</u>	<u>Attack Rate/Million Population*</u>
< 1	94	80	1	175	6.3	6.3	49.4
1 - 4	482	486	16	984	35.6	41.9	62.9
5 - 9	332	299	4	635	23.0	64.9	30.4
10 - 19	189	154	3	346	12.5	77.4	9.2
20 - 29	122	159	1	282	10.2	87.6	10.6
30 - 39	72	74		146	5.3	92.9	6.5
40 - 49	46	30		76	2.8	95.7	3.1
50 - 59	28	30		58	2.1	97.8	2.9
60 - 69	12	28		40	1.4	99.2	2.7
70 - 79	8	9		17	0.6	99.8	1.9
80 +	2	3		5	0.2	100.0	1.5
Subtotal	1,387	1,352	25	2,764			
Child (unspec)	13	10	1	24			
Adult (unspec)	6	13	1	20			
Unknown	437	464	180	1081			
Total	1,843	1,839	207	3,889			
Percent of Total	50.1	49.9					

* Based on provisional data from Population Estimates, Series P25, No. 380, November 24, 1967.

Table IIa

Age and Sex Distribution of Individuals Reported as Harboring Shigella
(Age and Sex known) April 1964 - June 1968

<u>Age (years)</u>	<u>Isolates from Males</u>	<u>Isolates from Females</u>	<u>Total</u>	<u>Estimated Ratio of Isolates Male:Female</u>	<u>% Total</u>
<1	1,250	996	2,246	1.26:100	8.5
1 - 4	5,042	5,036	10,078	1.00:100	38.0
5 - 9	3,017	2,813	5,830	1.07:100	22.0
10 - 19	1,691	1,699	3,390	1.00:100	12.8
20 - 29	808	1,442	2,250	0.56:100	8.5
30 - 39	463	673	1,136	0.69:100	4.3
40 - 49	266	308	574	0.86:100	2.2
50 - 59	191	245	436	0.78:100	1.6
60 - 69	110	193	303	0.57:100	1.1
70 - 79	74	108	182	0.69:100	0.7
80 +	41	51	92	0.80:100	0.3
Total	12,953	13,564	26,517	0.95:100	100.0

Table III

Relative Frequencies of Shigella Serotypes
Reported January - June 1968

<u>Serotype</u>	<u>Number Reported</u>	<u>Calculated Number*</u>	<u>Calculated Percent</u>	<u>Rank</u>
A. <u>S. dysenteriae</u>				
1	1	1	0.03	17
2	43	44	1.13	8
3	2	2	0.05	15
unspecified	1			
B. <u>S. flexneri</u>				
1a	17	40	1.03	9
1b	24	57	1.47	7
1 unspecified	39			
2a	346	716	18.41	2
2b	118	244	6.27	4
2 unspecified	324			
3a	153	401	10.31	3
3b	6	16	0.41	12
3c	7	18	0.46	11
3 unspecified	191			
4a	88	154	3.96	6
4b	2	3	0.08	14
4 unspecified	39			
5	9	11	0.28	13
6	133	162	4.17	5
unspecified	310			
C. <u>S. boydii</u>				
2	12	26	0.67	10
5	1	2	0.05	15
unspecified	15			
D. <u>S. sonnei</u>	1,975	1,992	51.22	1
unknown	33			
Total	3,889	3,889		

* Calculated Number is derived by distributing the unspecified isolations in each group to their subgroups in the same proportions as the distribution of the specified isolations of that group.

Table IV

Relative Frequencies of Shigella Serotypes
 Cumulated from October 1963 to Present

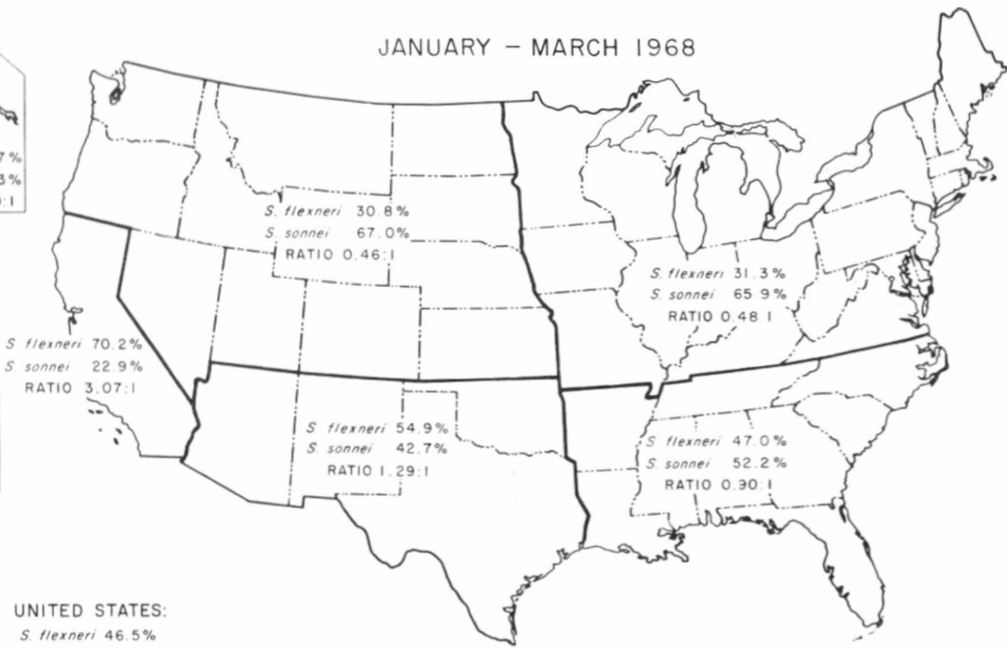
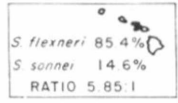
Serotype	Number Reported	Calculated Number*	Calculated Percent	Rank
A. <u>S. dysenteriae</u>				
1	7	9	0.02	21
2	172	223	0.55	12
3	33	43	0.11	16
6	1	1	0.00	31
9	3	4	0.01	24
unspecified	62			
B. <u>S. flexneri</u>				
1a	351	731	1.80	6
1b	286	596	1.47	8
1 unspecified	466			
2a	4,153	9,347	23.02	2
2b	731	1,645	4.05	7
2 unspecified	4,251			
3a	942	4,077	10.04	3
3b	73	316	0.78	10
3c	79	342	0.84	9
3 unspecified	2,841			
4a	1,049	2,330	5.74	5
4b	46	102	0.25	14
4 unspecified	926			
5	180	217	0.53	13
6	2,017	2,427	5.98	4
variant x	1	1	0.00	31
variant y	17	20	0.05	17
unspecified	3,570			
C. <u>S. boydii</u>				
1	10	15	0.04	19
2	154	238	0.59	11
3	1	2	0.00	27
4	29	45	0.11	15
5	7	11	0.03	20
6	2	3	0.01	25
7	3	5	0.01	23
8	1	2	0.00	27
9	2	3	0.01	25
10	11	17	0.04	18
11	1	2	0.00	27
12	1	2	0.00	27
14	4	6	0.01	22
unspecified	120			
D. <u>S. sonnei</u>	17,682	17,820	43.89	1
unknown	315			
TOTAL	40,600	40,602		

* see footnote Table III

Figure 1

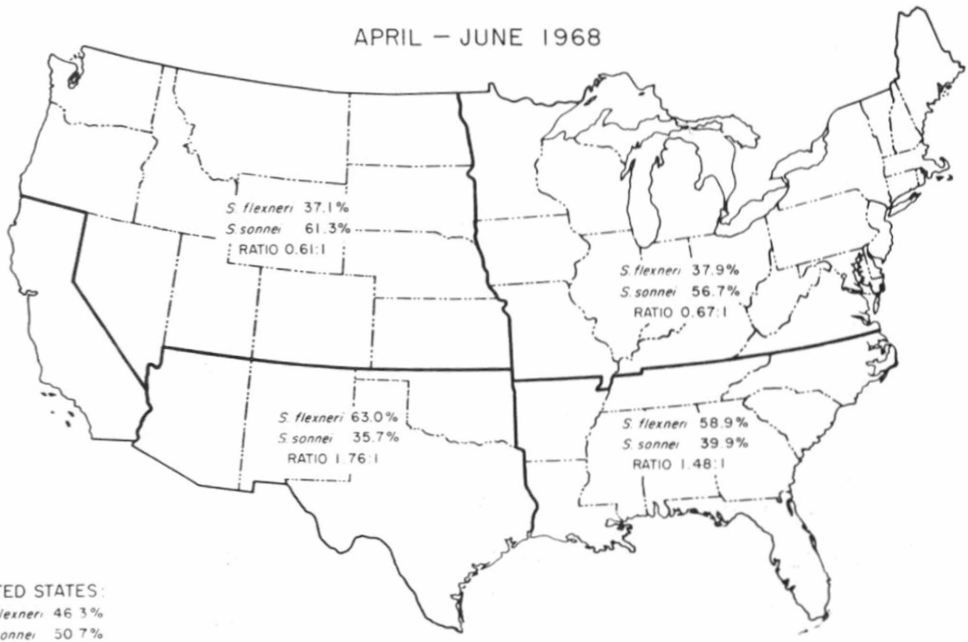
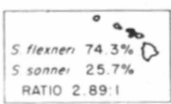
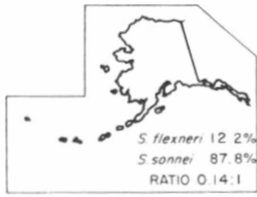
PERCENTAGE *S. flexneri* AND *S. sonnei* OF TOTAL SHIGELLA ISOLATIONS REPORTED FROM INDICATED REGIONS

JANUARY - MARCH 1968



UNITED STATES:
S. flexneri 46.5%
S. sonnei 50.9%
RATIO 0.91:1

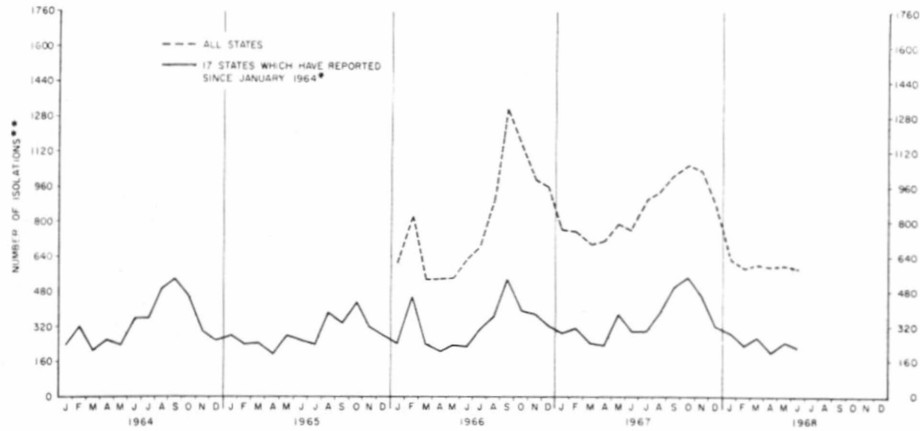
APRIL - JUNE 1968



UNITED STATES:
S. flexneri 46.3%
S. sonnei 50.7%
RATIO 0.91:1

* *S. flexneri* : *S. sonnei*

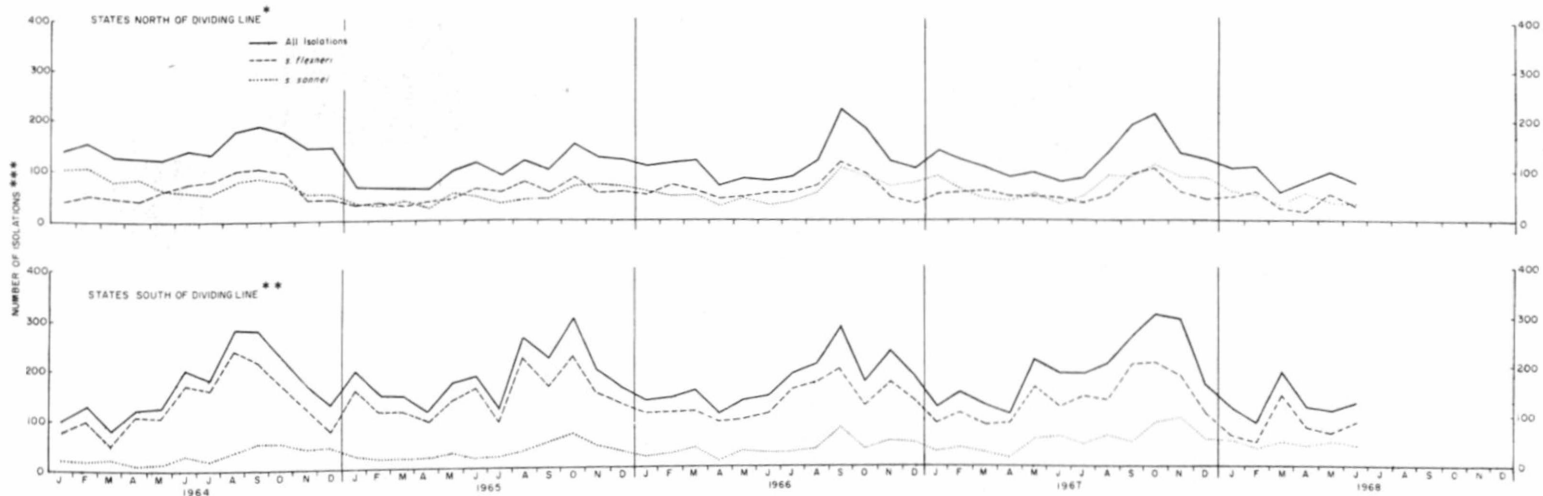
Figure 2
REPORTED ISOLATIONS OF SHIGELLA IN THE UNITED STATES



*ALASKA, ARIZONA, HAWAII, ILLINOIS, KANSAS, MARYLAND, NEW JERSEY, NEW MEXICO, NORTH CAROLINA, NORTH DAKOTA, OHIO, OKLAHOMA, OREGON, SOUTH DAKOTA, TENNESSEE, TEXAS AND VERMONT

**ADJUSTED TO FOUR-WEEK MONTHS

Figure 3
SEASONAL DISTRIBUTION OF SHIGELLA ISOLATIONS
BY SEROTYPE AND REGION
15 STATES WHICH HAVE REPORTED SINCE JANUARY 1964



* ILLINOIS, KANSAS, MARYLAND, NEW JERSEY, NORTH DAKOTA, OHIO, OREGON, SOUTH DAKOTA, AND VERMONT.

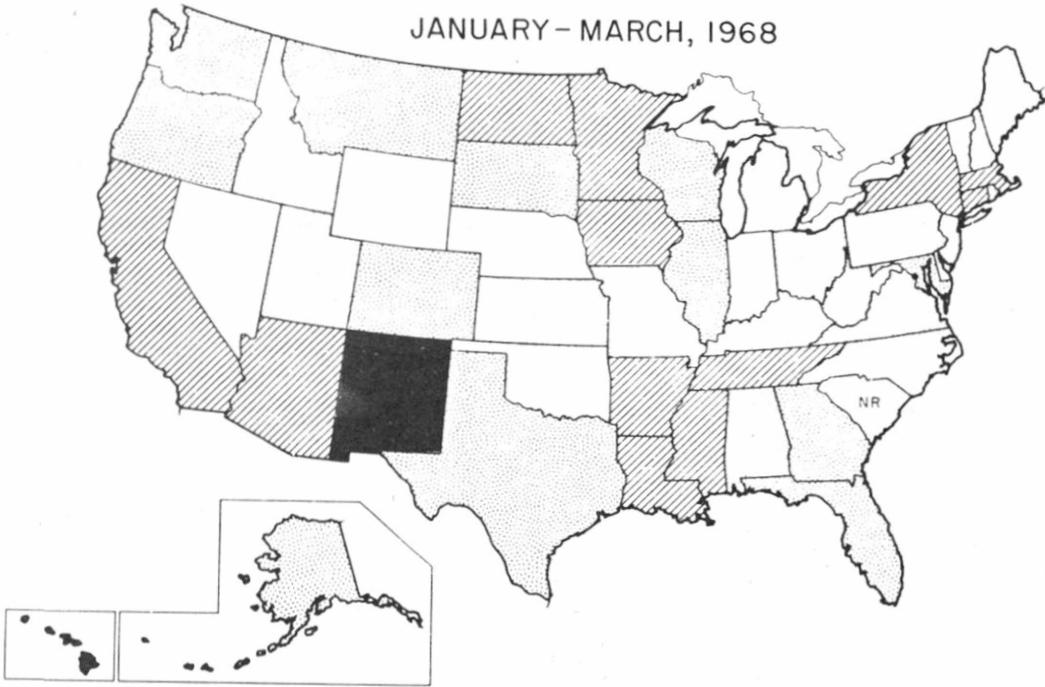
** ARIZONA, NEW MEXICO, NORTH CAROLINA, OKLAHOMA, TENNESSEE AND TEXAS.

*** ADJUSTED TO 4-WEEK MONTHS

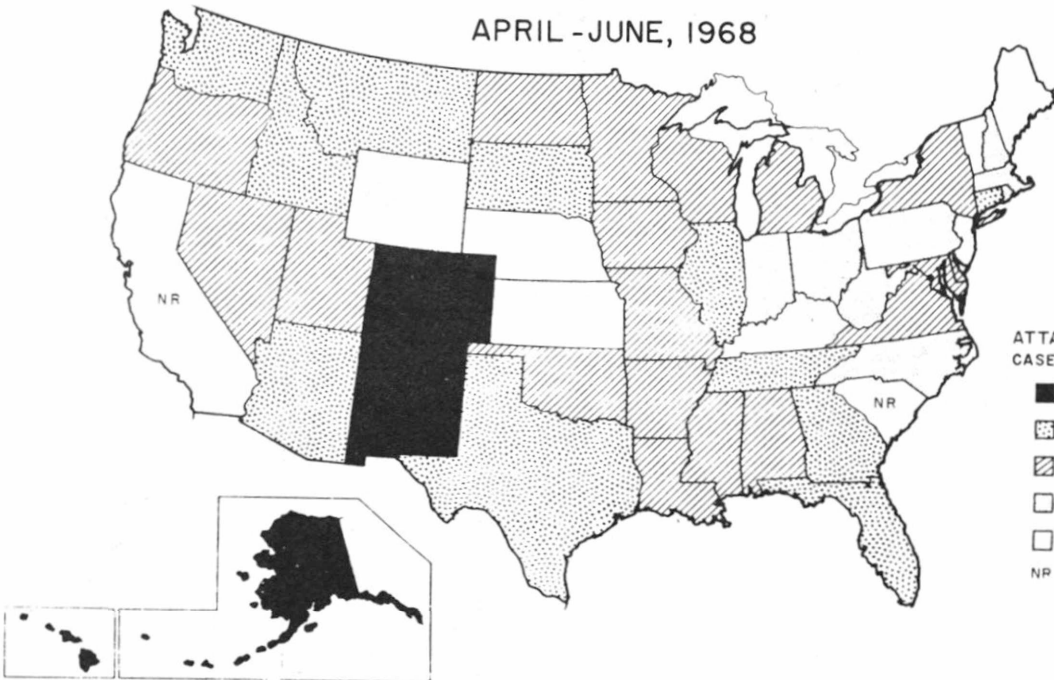
Figure 4

ATTACK RATES OF SHIGELLOSIS BY STATE

JANUARY - MARCH, 1968



APRIL - JUNE, 1968



ATTACK RATE:
CASES PER 1,000,000

■ = > 40.0

▨ = 12.0 - 40.0

▧ = 5.0 - 11.9

▩ = 1.0 - 4.9

□ = < 1.0

NR = NO REPORTS RECEIVED

REFERENCE: POPULATION ESTIMATES, SERIES P-25, NO. 380, NOVEMBER 24, 1967.

STATE EPIDEMIOLOGISTS AND STATE LABORATORY DIRECTORS

Key to all disease surveillance activities are the physicians who serve as State epidemiologists. They are responsible for collecting, interpreting, and transmitting data and epidemiological information from their individual States; their contributions to this report are gratefully acknowledged. In addition, valuable contributions are made by State Laboratory Directors; we are indebted to them for their valuable support.

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