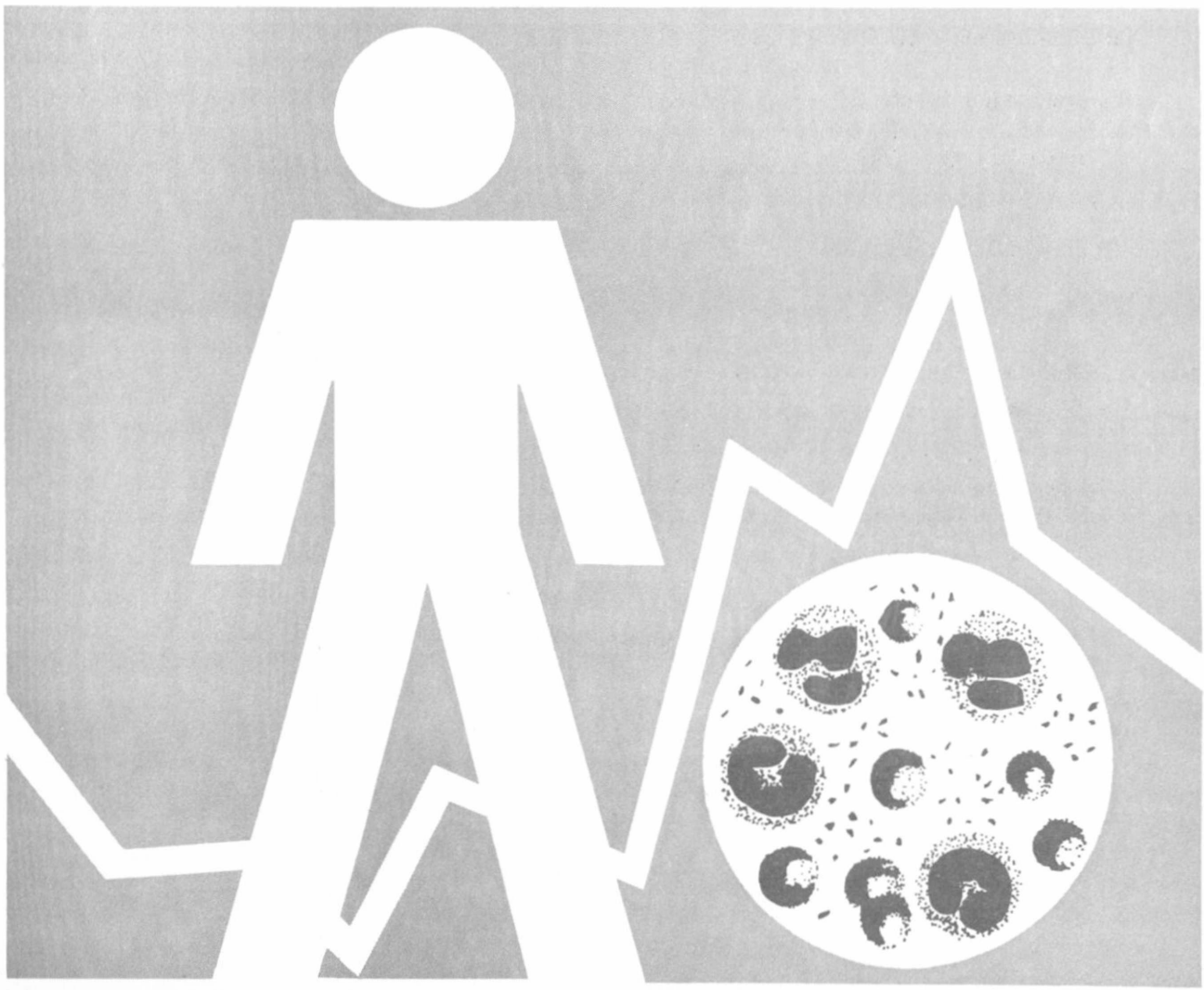
REPORT NO. 19
April 30, 1969

national communicable disease center

SHIGELLA

surveillance

TABLE OF CONTENTS
for the
First Quarter 1969



U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE : PUBLIC HEALTH SERVICE
HEALTH SERVICES AND MENTAL HEALTH ADMINISTRATION

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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TABLE OF CONTENTS

I. Summary

In the first quarter of 1969, 1,804 isolations were reported from humans. This number represents a decrease of 35.0 percent from the 2,776 isolations in the fourth quarter of 1968 and a decrease of 8.4 percent* from the 1,970 isolations in the first quarter of 1968 (Table I).

II. Reported Isolations

A. Human

1. General Incidence

During the first quarter of 1969, 67.4 percent of isolations were from children under 10 years of age (Table II); this is consistent with previous patterns. The highest attack rate was in the age group 1-4 years.

2. Serotype Frequencies

Forty-nine of the 51 reporting centers participating in the Shigella Surveillance Program reported isolations of shigella. Seventeen different serotypes were reported (Table I). The six most frequently reported serotypes during the 3-month period were the following (Table III):

Rank	Serotype	Reported	Calculated Number*	Calculated Percent	Rank Last Quarter
1	*S. sonnei*	985	996	55.18	1
2	*S. flexneri 2a*	159	354	19.61	2
3	*S. flexneri 3a*	60	178	9.86	3
4	*S. flexneri 6*	61	75	4.16	4
5	*S. flexneri 2b*	28	62	3.43	6
6	*S. flexneri 4a*	25	58	3.21	5
Subtotal		1,318	1,723	95.45	
Total (all serotypes)		1,804	1,805		

* from Table III

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* If allowances are made for the fact that California has not reported isolates of shigella since February 1968, this decrease is only 1.9 percent.

Tables III and IV, calculated from data compiled during the first quarter of 1969 and from data compiled since the beginning of the Shigella Surveillance Program in October 1963, respectively, show the relative frequency of isolations 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

There were more reported cases of S. sonnei than S. flexneri in the United States except for Alaska and the southwestern section of the United States. The trend in the southeastern section of the United States toward more reported cases of S. sonnei than of S. flexneri is a recent one (Figure 1). Figure 4 portrays number of reported isolations per million population for January-March 1969, utilizing population estimates for July 1, 1968. The overall U.S. attack rate was 1.0 case per 100,000 for the first quarter of 1969 as compared with 1.4 cases per 100,000 for the fourth quarter of 1968 and 1.1 cases per 100,000 for the first quarter of 1968.

B. Nonhuman

For the first quarter of 1969, four cases of nonhuman isolations of shigella were reported:

Serotype	Number	Source	State
S. sonnei	2	Monkey	Idaho and Louisiana
S. flexneri 6	1	Monkey	Illinois
S. flexneri 4a	1	Monkey	Illinois

For the first quarter of 1969 no isolations of shigella from nonhuman sources were reported to the National Communicable Disease Center.

III. Current Investigations

Shigellosis in imported monkeys. Reported by George K. Morris, Ph.D., Chief, and Judith A. Koehler, Technologist, Salmonella-Shigella Unit, Epidemiologic Services Laboratory Section, Epidemiology Program; Edward J. Snow, Jr., Chief, Animal Products Activity, Scientific Services Section, Laboratory Division; and Enteric Diseases Section, Bacterial Diseases Branch, Epidemiology Program, NCDC.

Enteric infections in imported monkeys, both from the old world and the new world, have been reported in recent years. During the period December 1967 to January 1969, a sampling of 377 monkeys from seven shipments of newly arrived Rhesus monkeys from India, yielded shigella from 80 (21%). Identification and serotyping of the isolates revealed 68-S. flexneri 4b, 13-S. sonnei, and 2-S. dysenteriae 2. Only one salmonella, S. typhi-murium, was isolated from 145 monkeys.

Epidemiological studies of shigellosis on two colonies of these monkeys were conducted. The first colony was 15 percent positive at the time of arrival, but a bimodal curve of infection showed maximum infection of 61 percent during the 7th week after arrival. A study on a second colony revealed that 47 percent were positive for shigellae upon arrival with the infection rate reaching 83 percent on the 7th day after arrival. The shigellae spread through the first colony after arrival at NCDC, whereas spread of shigellae in the second colony apparently occurred prior to their arrival at NCDC.

A sampling of 60 monkeys from three shipments of new world monkeys yielded S. sonnei from seven (12%). In contrast to the findings in monkeys from India, 28 of these new world monkeys were positive for salmonellae and two were positive for Arizona species.

IV. Reports from the States

A. Shigellosis in a nursery in Utah.

Reported by Robert W. Sherwood, M.D., Director, Division of Preventive Medicine, Dale T. Callister, Laboratory Section, James E. Tidwell, Medical Care Services, and Richard A. Sweet, Environmental Health Section, Utah State Division of Health; and Spotswood L. Spruance, M.D., an EIS Officer located at the Utah Department of Health and Welfare.

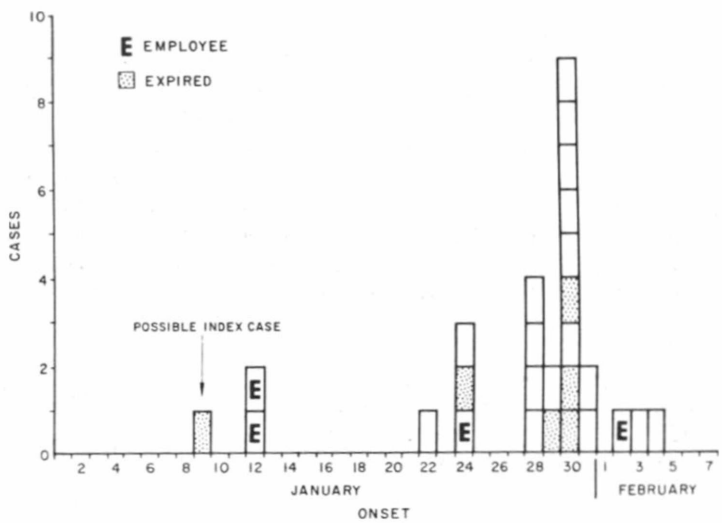
In January-February 1969, an outbreak of shigellosis occurred in a licensed private nursing home for mentally retarded children in Utah. The majority of the 32 severely retarded patients in the home were bedridden and ranged in age from 1 to 15 years (median age 7 years). A total of 22 patients became ill with fever and diarrhea for an attack rate of 69 percent with six deaths for a case-fatality rate for patients of 27 percent. Four employees also became ill with diarrhea (Figure A). Numerous environmental cultures were negative. S. flexneri 3 was cultured from the stools of nine patients and one employee. The shigella strain isolated was sensitive to all antibiotics tested including ampicillin, tetracycline, and sulfisoxazole.

The first case was in an Indian child from an endemic area for shigellosis who was admitted to the home on January 9. The next two cases were in employees who may have acquired their infections from this child. The subsequent cases probably occurred through person-to-person spread from employees to patients or between patients. The possibility of spread via food later in the outbreak could not be excluded. No cases occurred among three children on tube feedings which required considerably less handling than the other meals.

Control measures included antibiotic treatment with ampicillin for the children and with tetracycline for all employees, isolation of ill patients, cessation of admissions until the outbreak abated, the use of disposable hand towels and diapers, a strict handwashing routine between handling patients, and follow-up stool cultures with antibiotic therapy until negative. Despite several courses of antibiotic therapy, the infection was eradicated from a few individuals only with great difficulty.

Figure A

CASES OF SHIGELLOSIS, BY DATE OF ONSET
UTAH NURSERY, JANUARY–FEBRUARY 1969



B. Shigellosis outbreak--Kansas City, Kansas. Reported by Robert A. French, Associate Epidemiologist, Kansas State Department of Health; Caroline Brown-Sanders, M.D., Clinic Director, Kansas City-Wyandotte County Health Department; and Donald E. Wilcox, M.D., State Epidemiologist, Kansas State Department of Health.

During March, April, and May 1968, an outbreak of acute diarrheal disease occurred among eight households in a low socioeconomic area of North Kansas City, Kansas. At least 40 persons became ill with severe diarrhea, fever, and abdominal cramps; attack rates of 90 to 100 percent were noted in most involved households. S. sonnei was cultured from stool specimens or rectal swabs obtained from most symptomatic cases. The organism was sensitive to ampicillin.

On the basis of a detailed and thorough epidemiologic investigation of cases and contacts, the mode of transmission was thought to be person-to-person spread. The following complex pattern of spread was felt to be responsible for the outbreak. The index case, a 21-year-old female practical nurse, introduced the infection to her sister and her two young children with whom she lived. This sister as well as the mother of a child who received private day care with the sister's children both work in a neighborhood day care center. The remainder of cases in the households affected could be traced to contacts with children who attended the neighborhood day care center.

After control measures were implemented no further cases occurred. Antibiotic therapy with ampicillin, to which the S. sonnei was shown to be sensitive, was given to all patients and contacts through a joint effort of a children and youth project neighborhood clinic and the Kansas City-Wyandotte County Health Department, which also provided necessary bacteriologic support. An intensive program of hygiene education was conducted in the affected neighborhood by a public health nurse.

V. Current Trends and Developments

Oral shigella vaccine studies in Yugoslavia.

> Studies on vaccination against bacillary dysentery. David M. Mel, M.D., Bogoljub L. Arsic, M.D., Bozidar D. Nikolic, M.D., and Miroslav L. Radovanic, M.D. Bulletin World Health Organization 39:375-380, 1968.

A controlled field trial conducted in 1963 in Yugoslavia demonstrated that a significant degree of protection could be achieved with a live oral dysentery vaccine prepared from streptomycin-dependent strains of S. flexneri 2a[1,2]. Presented in the current report are results of investigations made in 1964 which confirm and extend the previous findings: live oral vaccine, prepared from streptomycin-dependent strains of shigellae, confers strong, type-specific protection against acute bacillary dysentery. The carrier rate of shigellae was not reduced by vaccination. Use of a combined vaccine containing S. flexneri serotypes 2a and 3 showed no antagonizing effects from the type 3 component upon the protective effect of the 2a component contained in the same vaccine.

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1. Mel, D. M., Papo, R. G., Terzin, A. L., and Vuksic, L. Bull. Wld. Hlth. Org., 32:637-645, 1965.
2. Mel, D. M., Terzin, A. L., and Vuksic, L. Bull. Wld. Hlth. Org., 32:647-655, 1965.

Editor's comment: The Shigella Surveillance Report No. 15, July-December 1967, pp 6-7, discussed the important role of surveillance in identifying the high-risk groups for whom the use of a shigella vaccine would be most applicable. S. flexneri 2a is the serotype most commonly reported from mental institutions in the U.S. according to the review presented in the Shigella Surveillance Report No. 17, July-September 1968, pp 2-3. Thus this work of Mel, et al., in Yugoslavia has important implications in terms of the possible control of shigellosis in high-risk groups.

TABLE I
SHIGELLA SEROTYPES ISOLATED FROM HUMANS
FIRST QUARTER 1969

SEROTYPE	NORTHEAST																								NORTHWEST													NORTH TOTAL
	CONN	DEL	DC	ILL	IND	IOWA	KY	ME	MD	MASS	MICH	MINN	MO	NH	NJ	NY-A	NY-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. *S. dysenteriae*																																						
Unspecified																									0													0	0
1				1																					1													0	1
2	1			1																					2													0	2
3																									0													0	0
Total	1	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	3
B. *S. flexneri*																																						
Unspecified		4	4		6		1			1			15			5	41		1	1		3		14	96							1	8	5		1		15	111
1 Unspecified																		2							2										1	1		2	4
1A				2																					2													0	2
1B				1																					1	2												2	3
2 Unspecified								1	5		1	17						2							26				4						7	13		24	50
2A				36							1	4	2		1				3						47	2		5	1									8	55
2B				12							1				1										14			2										2	1
3 Unspecified									1				2					2	3						8	1									16			17	25
3A	1			33							1														35													0	35
3B																									0													0	0
3C											1														1													0	1
4 Unspecified											1	1						1							3											1		1	4
4A				1																					1	6			1									7	8
4B																									0	1												1	1
5																									0													0	0
6				6					1			2	3												12											2		2	14
Total	1	4	4	91	6	0	1	1	7	1	6	24	22	0	2	5	41	7	7	1	0	3	0	14	248	12	0	7	6	0	0	1	8	5	24	18	0	81	329
C. *S. boydii*																																						
Unspecified																	1					1			2													0	2
1																									0													0	0
2																									0													0	0
3																									0													0	0
4																							1		1													0	1
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	1	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	3
D. *S. sonnei*	27	2	13	82	9	4	6	5	67	59	54	34	9	3	14	9	33	6	38	4	30	16	0	37	561	32	6	10	3	0	0	2	14	1	11	34	0	113	674
Unknown			3																						3							16						16	19
Total	29	6	20	175	15	4	7	6	74	60	60	58	31	3	16	14	75	13	45	5	30	20	1	51	818	44	6	17	9	0	0	19	22	6	35	52	0	210	1028

TABLE I (CONTINUED)
SHIGELLA SEROTYPES ISOLATED FROM HUMANS
FIRST QUARTER 1969

SOUTHEAST										SOUTHWEST					SOUTH TOTAL	OTHER					TOTAL	PERCENT OF TOTAL	PREVIOUS QUARTER		SEROTYPE
ALA	ARK	FLA	GA	LA	MISS	NC	SC	TENN	SOUTHEAST TOTAL	ARIZ	NM	OKLA	TEX	SOUTHWEST TOTAL		ALASKA	CALIF	HAWAII	VIRGIN ISLANDS	OTHER TOTAL			TOTAL	PERCENT OF TOTAL	
						1			1					0	1					0	1		0	–	A. *S. dysenteriae* Unspecified
									0					0	0					0	1		2	0.1	1
									0				2	2	2					0	4		3	0.1	2
									0					0	0					0			1	0.0	3
0	0	0	0	0	0	1	0	0	1				2	2	3	0	0	0	0	0	6		6	0.2	Total
																									B. *S. flexneri*
5		6			3				14	1	6		1	8	22	1				1	134		190	6.8	Unspecified
		6	3					1	10					0	10					0	14		19	0.7	1 Unspecified
		1		1					2	1			3	4	6					0	8		8	0.3	1A
				1					1	1			4	5	6					0	9		21	0.8	1B
		20	14		1	21		13	69	2	33			35	104					0	154		193	7.0	2 Unspecified
	1			10					11	3		4	49	56	67			37		37	159		177	6.4	2A
				1					1	1			10	11	12					0	28		36	1.3	2B
		7	27					17	51	1	16		1	18	69			2		2	96		111	4.0	3 Unspecified
	2			4					6				19	19	25					0	60		122	4.4	3A
									0				2	2	2					0	2		2	0.1	3B
		1		3					4					0	4					0	5		4	0.1	3C
		2	1					2	5		15			15	20					0	24		29	1.0	4 Unspecified
	1			1					2	3		1	11	15	17					0	25		46	1.7	4A
									0	1				1	1					0	2		2	0.1	4B
									0	3			1	4	4					0	4		6	0.2	5
		3	1	2				1	7	3	19		16	38	45	2				2	61		106	3.8	6
5	4	46	46	23	4	21	0	34	183	20	89	5	117	231	414	3	0	39	0	42	785		1072	38.6	Total
																									C. *S. boydii*
									0	0				0	0					0	2		4	0.1	Unspecified
									0					0	0					0			1	0.0	1
									0	0			1	1	1					0	1		6	0.2	2
									0	1				1	1					0	1		0	–	3
									0	3				3	3					0	4		5	0.2	4
0	0	0	0	0	0	0	0	0	0	4	0	0	1	5	5	0	0	0	0	0	8		16	0.6	Total
1	4	78	48	20	1	25	2	31	210	6	11	4	55	76	286	0	1	24	0	25	985		1665	60.0	D. *S. sonnei*
							1		1						1					0	20		17		Unknown
6	**8**	**124**	**94**	**43**	**5**	**47**	**3**	**65**	**395**	**30**	**100**	**9**	**175**	**314**	**709**	**3**	**1**	**63**	**0**	**67**	**1804**		**2776**		Total

Table II

Age and Sex Distribution of Individuals Infected with Shigella in the United States, First Quarter, 1969

Age (Years)	Male	Female	Sex Unknown	Total	Percent	Cumulative Percent	Number of Reported Isolations/ Million Population*
< 1	42	43	1	86	6.7	6.7	25.1
1 - 4	224	225		449	35.2	41.9	29.7
5 - 9	172	155		327	25.6	67.5	15.6
10 - 19	112	81		193	15.1	82.6	5.8
20 - 29	44	61		105	8.2	90.8	4.8
30 - 39	25	27	1	53	4.2	95.0	2.2
40 - 49	9	14		23	1.8	96.8	1.0
50 - 59	8	17		25	2.0	98.8	1.4
60 - 69	2	3		5	0.4	99.2	0.3
70 - 79	1	5		6	0.5	99.7	0.7
80 +	3	2		5	0.4	100.1	1.4
Subtotal	642	633	2	1,277			
Child (unspec)	4	2		6			
Adult (unspec)	2	4		6			
Unknown	250	249	16	515			
Total	898	888	18	1,804			
Percent of total	50.3	49.7					

* Based on provisional data from Population Estimates, Series P25, No. 416, February 17, 1969.

Table III

Relative Frequencies of Shigella Serotypes
Reported, First Quarter, 1969

	Serotype	Number Reported	Calculated Number*	Calculated Percent	Rank
A.	S. dysenteriae				
	1	1	1	0.06	12
	2	4	5	0.28	11
	unspecified	1			
B.	S. flexneri				
	1a	8	18	1.00	8
	1b	9	20	1.11	7
	1 unspecified	14			
	2a	159	354	19.61	2
	2b	28	62	3.43	5
	2 unspecified	154			
	3a	60	178	9.86	3
	3b	2	6	0.33	10
	3c	5	15	0.83	9
	3 unspecified	96			
	4a	25	58	3.21	6
	4b	2	5	0.28	11
	4 unspecified	24			
	5	4	5	0.28	11
	6	61	75	4.16	4
	unspecified	134			
C.	S. boydii				
	2	1	1	0.06	12
	3	1	1	0.06	12
	4	4	5	0.28	11
	unspecified	2			
D.	S. sonnei	985	996	55.18	1
	Unknown	20			
	Total	1,804	1,805		

* 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.	*S. dysenteriae*				
	1	10	13	0.03	20
	2	190	243	0.51	12
	3	35	45	0.09	16
	4	1	1	0.00	31
	6	1	1	0.00	31
	9	4	5	0.01	23
	unspecified	65			
B.	*S. flexneri*				
	1a	384	808	1.69	7
	1b	337	710	1.49	8
	1 unspecified	536			
	2a	4,652	10,594	22.17	2
	2b	815	1,857	3.89	6
	2 unspecified	4,842			
	3a	1,226	4,858	10.16	3
	3b	80	317	0.66	10
	3c	92	365	0.76	9
	3 unspecified	3,188			
	4a	1,144	2,572	5.38	5
	4b	55	124	0.26	14
	4 unspecified	1,033			
	5	197	238	0.50	13
	6	2,312	2,793	5.84	4
	variant x	1	1	0.00	31
	variant y	17	21	0.04	17
	unspecified	4,150			
C.	*S. boydii*				
	1	11	17	0.04	18
	2	169	256	0.54	11
	3	2	3	0.01	25
	4	38	58	0.12	15
	5	7	11	0.02	21
	6	2	3	0.01	25
	7	3	5	0.01	23
	8	1	2	0.00	28
	9	2	3	0.01	25
	10	11	17	0.04	18
	11	1	2	0.00	28
	12	1	2	0.00	28
	14	4	6	0.01	22
	unspecified	127			
D.	*S. sonnei*	21,668	21,841	45.70	1
	Unknown	378			
	TOTAL	47,792	47,795		

* See footnote Table III

Table V

Sources of Reported Isolations of Shigella
by Residence at Time of Onset

Source	Jan	Feb	Mar	Total	Percent of Subtotal	Percent of Total
Mental institutions	97	72	55	224	15	
Indian reservations	10	8	5	23	2	
Other residences	479	404	365	1,268	83	
Subtotal	586	484	425	1,515		84.0
Residences unknown	152	77	60	289		16.0
Total	738	561	485	1,804		

Table VI

Shigella Serotypes from Mental Institutions
Number of Isolations by State
First Quarter 1969

State	dysenteriae 2	flexneri unspecified	flexneri 1 unspecified	flexneri 2 unspecified	flexneri 2a	flexneri 2b	flexneri 3 unspecified	flexneri 3a	flexneri 3c	flexneri 6	sonnei	sonnei variant R	TOTAL
Del	0	4	0	0	0	0	0	0	0	0	0	0	4
Fla	0	6	0	5	0	0	0	0	0	0	0	0	11
Ga	0	0	1	6	0	0	0	0	0	0	0	0	7
Ill	1	0	0	0	29	9	0	3	0	0	13	0	55
Mass	0	0	0	0	0	0	0	0	0	0	4	0	4
Mich	0	0	0	0	0	1	0	1	1	0	45	0	48
Minn	0	0	0	15	2	0	0	0	0	1	12	4	34
NY	0	34	0	0	0	0	0	0	0	0	0	0	34
NC	0	0	0	13	0	0	0	0	0	0	0	0	13
Tenn	0	0	0	0	0	0	2	0	0	0	0	0	2
Wash	0	0	0	0	0	0	0	0	0	0	12	0	12
Total	1	44	1	39	31	10	2	4	1	1	86	4	224

Figure 1

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

UNITED STATES, JANUARY-MARCH 1969

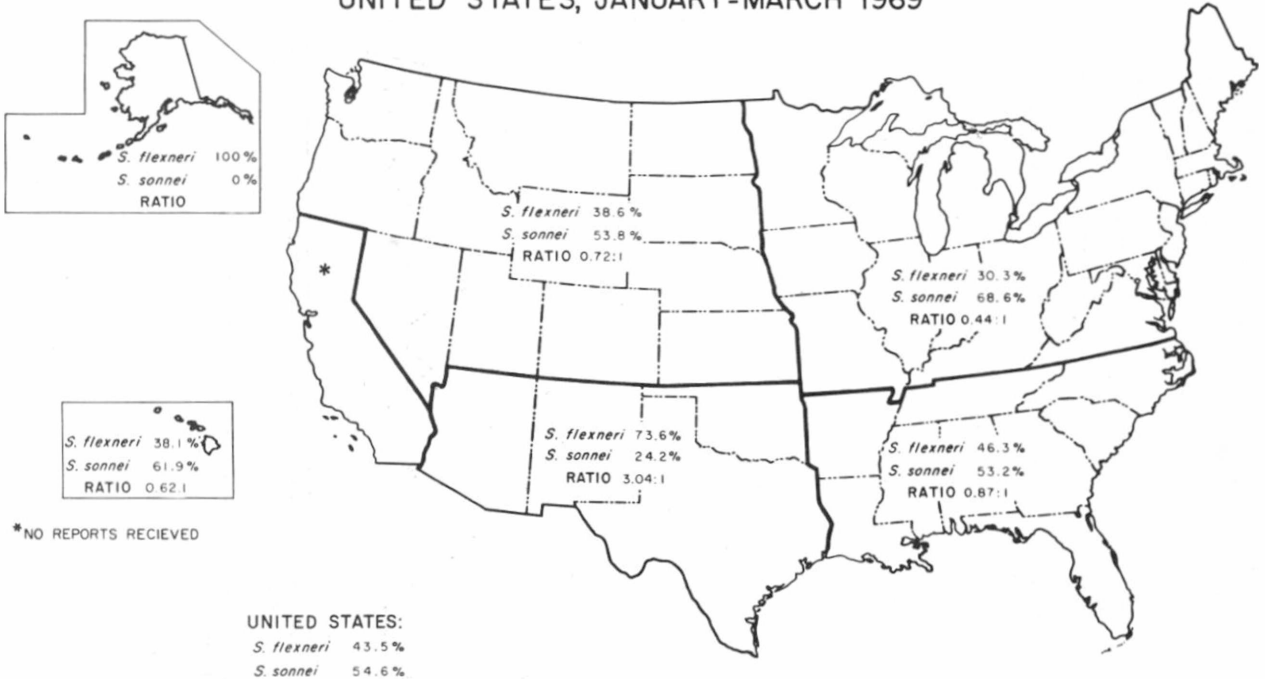
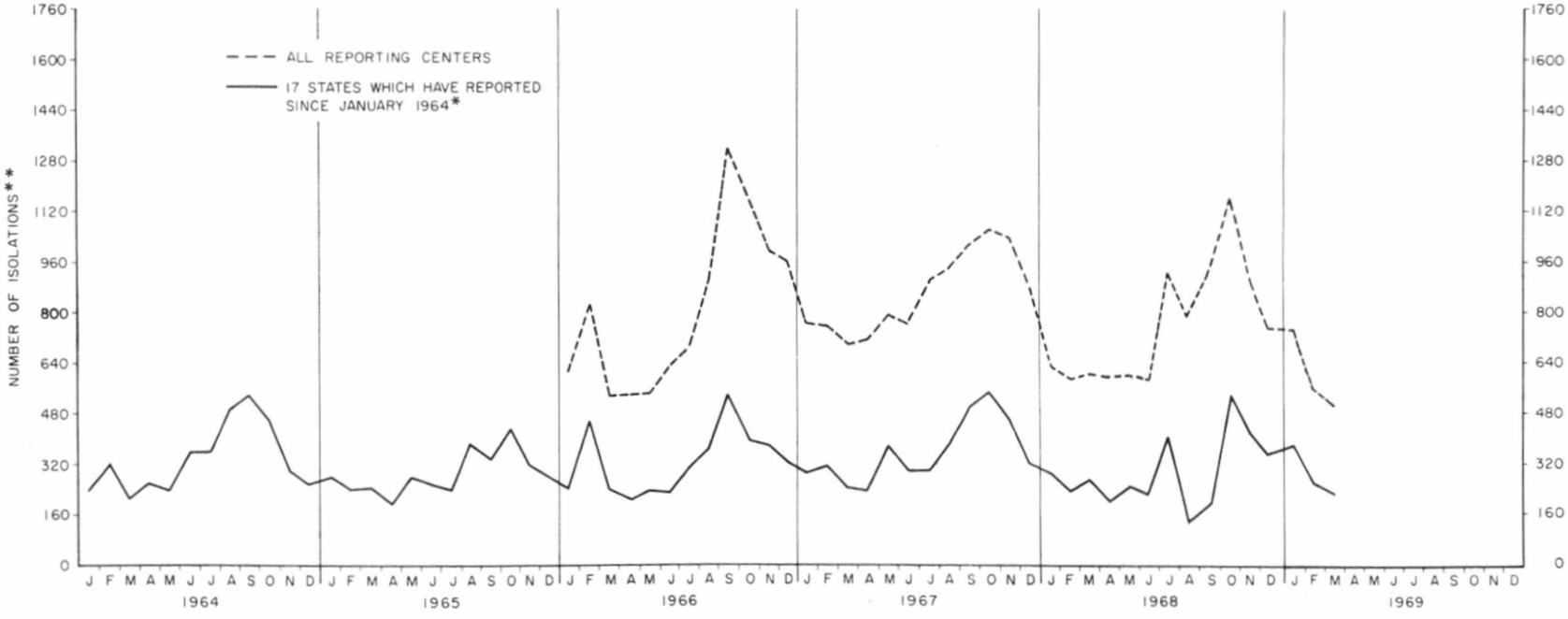


Figure 2

REPORTED ISOLATIONS OF SHIGELLA IN THE UNITED STATES



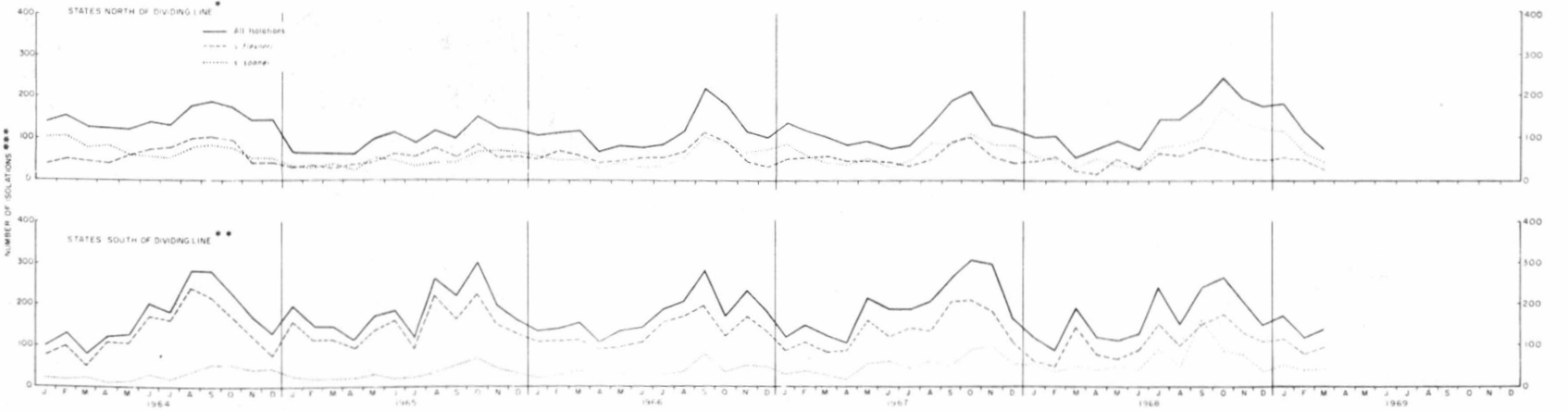
*ALASKA, ARIZONA, HAWAII, ILLINOIS, KANSAS, MARYLAND, NEW JERSEY, NEW MEXICO, NORTH CAROLINA, NORTH DAKOTA, OHIO, OKLAHOMA, OREGON, SOUTH DAKOTA, TENNESSEE, TEXAS AND VERMONT

**ADJUSTED TO FOUR-WEEK MONTHS

Figure 3

SEASONAL DISTRIBUTION OF SHIGELLA ISOLATIONS BY SEROTYPE AND REGION

15 STATES WHICH HAVE REPORTED SINCE JANUARY 1964

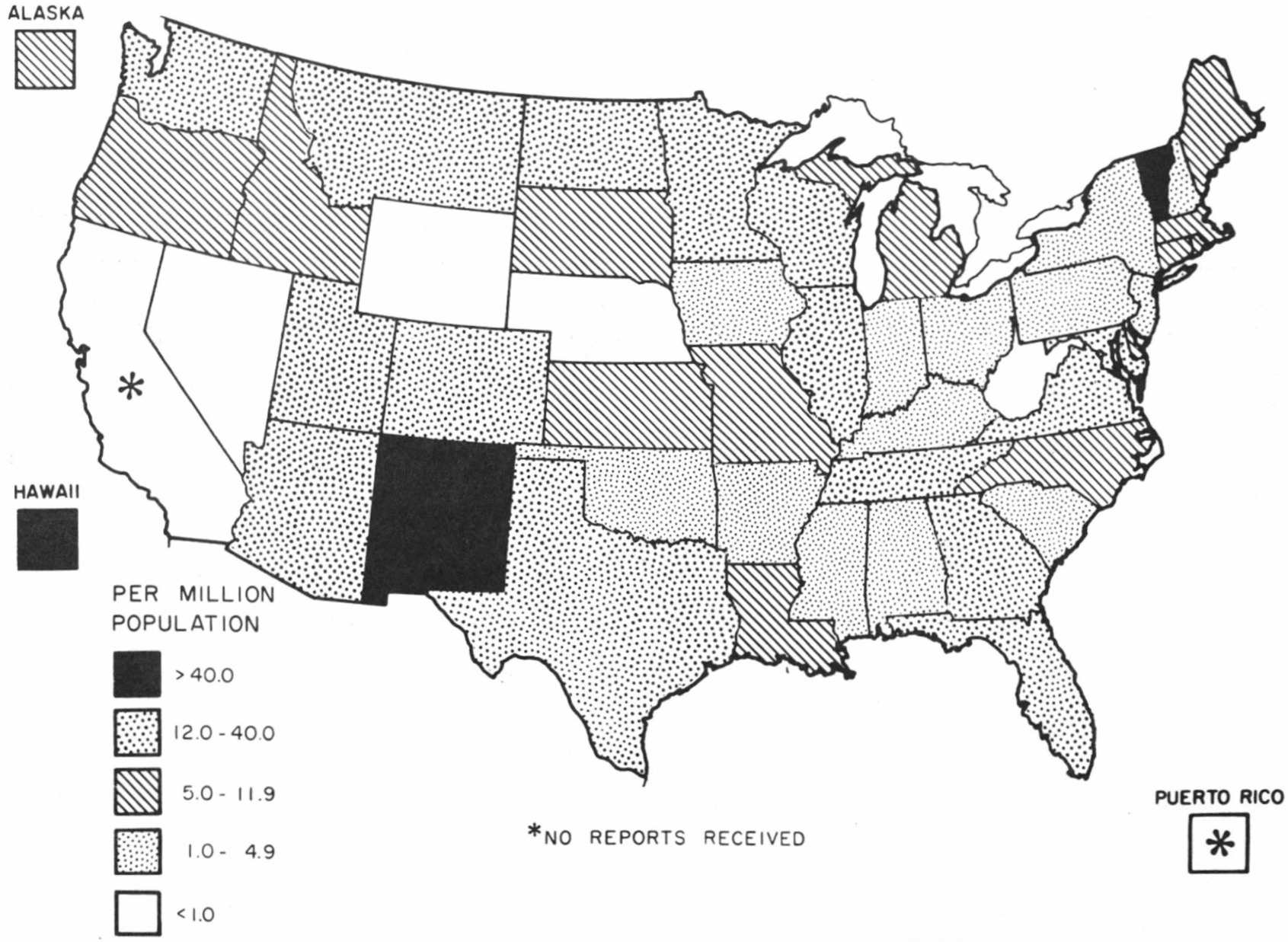


* ILLINOIS, KANSAS, MARYLAND, NEW JERSEY, NORTH DAKOTA, OHIO, OREGON, SOUTH DAKOTA, AND VERMONT

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

*** ADJUSTED TO 4-WEEK MONTHS

Figure 4 ATTACK RATES OF SHIGELLOSIS BY STATE
JANUARY - MARCH 1969



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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