REPORT NO. 12
DECEMBER 7, 1966

communicable disease center

SHIGELLA

surveillance

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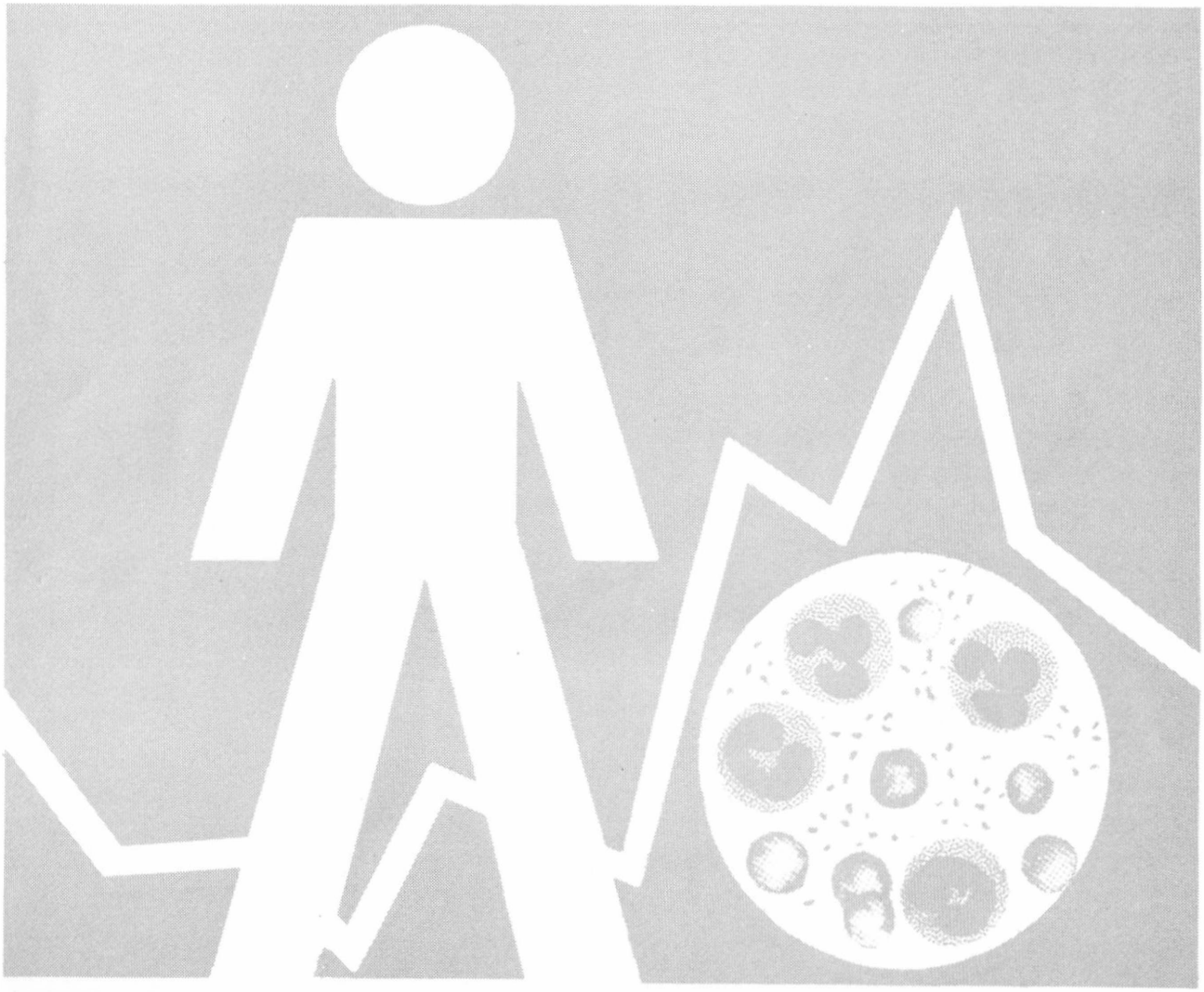
for the
Third Quarter 1966



U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
PUBLIC HEALTH SERVICE

PREFACE

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

Communicable Disease Center	Dr. David J. Sencer, Chief
Epidemiology Branch	Dr. Alexander D. Langmuir, Chief
Bacterial Diseases Section	Dr. Theodore C. Eickhoff, Chief
Enteric Diseases Unit	Dr. Eugene J. Gangarosa, Chief Dr. Edward R. Eichner Dr. Thomas M. Vernon, Jr. Dr. Robert W. Armstrong Dr. George T. Curlin
Statistics Section	Mr. Stanley M. Martin Mr. Richard C. Arnold
Epidemic Aid Laboratory Section	Dr. John R. Boring, Chief

In collaboration with

Dr. William H. Ewing, Chief
Enteric Bacteriology Unit
Laboratory Branch

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I Current Trends and Developments

Multiple Antibiotic Resistance

A recent editorial commented that "unless drastic measures are taken very soon, physicians may find themselves back in the preantibiotic Middle Ages in the treatment of infectious diseases[1]." This concern is the result of the demonstration of multiple antibiotic resistance in Enterobacteriaceae isolated in the United States and recent studies on resistance transfer in pathogenic Enterobacteriaceae[2,3,4]. These studies have confirmed and brought close to home a problem long familiar to Japanese workers[5-7].

Resistance factors are conveyed by an extrachromosomal genetic particle known as an episome, which may be transferred from one organism to another at the time of conjugation of Enterobacteriaceae. Numerous studies have demonstrated bacterial transmission of drug resistance to sulfonamides, tetracyclines, penicillins, chloramphenicol, streptomycin, neomycin, kanamycin, and nitrofurantoin. *In vivo* transfer of resistance is strongly suspected in patients who were known to have had sensitive organisms prior to single drug treatment and from whom multiple resistant organisms of the same serotype were subsequently isolated[3]. Multiple drug resistant shigellae have so far been noted in Baltimore, Chicago, and in Atlanta by two groups working with organisms from institutional and family outbreaks[8,9]. In the Chicago and Atlanta studies the resistance has been transferred *in vitro* from donor shigellae to recipient *E. coli*.

The full significance of this genetic mechanism is not clear. Multiple resistance is easily lost[4]; yet, resistant organisms are continually being selected by widespread and sometimes indiscriminate antibiotic usage.

Increasing awareness of the problem may result in further reporting of multiple resistance. It should be noted, however, that there has been no spectacular rise in shigella isolations to date despite an increasingly comprehensive surveillance program. The importance of surveillance is certainly enhanced by this new development.

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1. Editorial, Infectious Drug Resistance: New Engl. J. Med. 275:277, 1966.
2. Coffin, G. S., and Swecken, E. E.: Two American strains of *Shigella flexneri* resistant to common antibiotics. Antibiot. Med. 5:533, 1958.
3. Kabins, S. A., and Cohen, S.: Resistance-transfer factor in Enterobacteriaceae. New Engl. J. Med. 275:248, 1966.
4. Smith, D. H.: Salmonella with transferable drug resistance. New Engl. J. Med. 275:625, 1966.
5. Watanabe, T.: Infective heredity of multiple drug resistance in bacteria. Bact. Rev. 27:87, 1963.
6. Watanabe, T.: Infectious drug resistance in enteric bacteria. New Engl. J. Med. 275:888, 1966.
7. Mitsuhashi, S.: Transmissible drug-resistance factor R. Gunma J. Med. Sci. 14:169, 1965.
8. Boring, J. R.: Personal communication. See section III A of this report.
9. Farrar, W. E.: Unpublished work. See section V A of this report.

II Summary

A total of 3,139 isolations of shigella from humans were reported by the 54 reporting centers during the third quarter of 1966 (Table I). This number was a 69.1 percent increase over the 1,856 isolations reported during the second quarter. This is in keeping with the increased seasonal trend seen in the third quarter in past years.

During the third quarter, 70.6 percent of the isolations of shigella were from children under 10 years of age (Table II); this is consistent with the distributions of previous quarters. There was no apparent sex predilection as seen in the previous quarter when there was a predominance of males among the less than 5-year age group. The regional distribution continued as in previous quarters (Figure 1).

III Reported Isolations

A. Human

1. General Incidence

The seasonal pattern (Figures 2 and 3) continued as in 1964 and 1965; these figures are based on reports from the centers which have been reporting since January 1964.

2. Serotype Frequencies

Forty-nine of the fifty-four reporting centers now participating in the Shigella Surveillance Program reported isolations of shigella from humans; 18 different serotypes were reported.

The six most frequently reported serotypes during the third quarter were the following:

Rank	Serotype	Number Reported	Calculated Number*	Calculated Percent*	Rank Last Quarter
1	S. sonnei	1259	1267	40.41	1
2	S. flexneri 2a	425	810	25.84	2
3	S. flexneri 3a	54	291	9.28	3
4	S. flexneri 6	204	246	7.85	4
5	S. flexneri 4a	94	205	6.54	5
6	S. flexneri 3c	13	70	2.23	10
Total		2049	2889		
Total (all serotypes)		3139	3135		

* from Table II

Tables III and IV, calculated from data compiled during the third quarter of 1966 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.

A regional difference exists in shigella isolations with a significantly higher percentage of S. flexneri isolations in the South than in the North. In the southern states S. flexneri has accounted for about three-fourths of the shigella isolations.

Shigella flexneri has an apparent seasonal pattern which is more evident in the southern states as is shown in Figure 3. This figure was prepared from data from only 15 states in order that comparison could be made with 1964 and 1965 data, when only 17 states were reporting. Of these 17, Alaska and Hawaii were excluded since they are not among the contiguous states.

Of the 3,139 isolations reported in the United States during the third quarter of 1966, 809 (25.8 percent) represented isolations from families with other members of the same family positive for shigella. This is consistent with past experience.

B. Nonhuman

There were 15 nonhuman isolations of shigella reported during the third quarter of 1966:

Serotype	Number	Source	Reporting Center
S. flexneri 2a	1	Gorilla	Illinois
S. flexneri 3	10	Monkeys	Florida (3) Maryland (7)
S. flexneri 4a	1	Monkey	California
S. sonnei	3	Monkeys (2), Gorilla (1)	Illinois
	15		

IV Current Investigations

A. Epidemic of Shigella flexneri 6 at a State Institution for the Mentally Retarded. Reported by Dr. E. Charlton Prather, Director, Division of Epidemiology, Florida State Board of Health; Dr. Joseph W. Lawrence, Director, Lee County Health Department; Dr. W. B. Barrows, Medical Director, Fort Myers Sunland Training Center, Florida; and Drs. Thomas M. Vernon, Jr., and Robert W. Armstrong, EIS Officers.

An epidemic of bloody diarrhea with fever and due to Shigella flexneri 6 began in May 1966 in one nursery and rapidly spread to five other residences of the Fort Myers Sunland Training Center. A total of 123 persons including two employees were infected at the time of the investigation in August. Investigation did not reveal the precise means of spread. The epidemic curve suggested a person-to-person spread (See Figure 4). Deficiencies in the isolation of sick children and movement of personnel directly from attending a sick child to attending a well child were noted. Food preparation and distribution by the children's attendants were correlated with the spread of the infection in a given cottage.

Shigellae isolated from seven patients were tested for antibiotic sensitivity by the Epidemic Aid Laboratory Section, Epidemiology Branch, CDC. Four of the isolations were resistant to tetracycline, streptomycin, and sulfadiazine. The other three were resistant to these three and also to chloramphenicol. Of special interest is that while tetracycline and other antibiotics had been used at the institution, streptomycin and sulfa drugs had not been used. All organisms transferred their resistance to sensitive E. coli in vitro, confirming the role of Resistance Transfer Factor (RTF).

B. Epidemic of Shigella flexneri 2 in a Private Institution for the Mentally Retarded. Reported by Dr. William Brumfield, Director, Westchester County Health Department, Dr. Jack Goldman, First Deputy Commissioner, Westchester County Health Department, and Dr. Thomas M. Vernon, Jr., EIS Officer.

A sudden outbreak of shigellosis appeared in a private institution in late June 1966, in one of two resident buildings with 77 patients and 15 employees. The epidemic curve suggested a common-source introduction into the "Nursery" building where there were 14 shigella isolations among 25 children. The source of infection could not be determined.

The second of the two buildings, housing older patients, did not have clinical cases but a culture survey revealed 15 isolations of the same organism among 52 patients. The isolation of Shigella flexneri 2 from 15 asymptomatic patients of the second building were of interest. There was no history of frank illness in these patients. One or more of them may have transmitted the organism to the infants and younger children living in the "Nursery" building.

C. Shigellosis in Children and Young Adults from a Middle Socioeconomic Group. Reported by Drs. William Schrack, Director, Division of Communicable Diseases, and Jorge Bello, Epidemiologist, Pennsylvania State Health Department; and Drs. George Curlin, Aldo Milic, and Thomas Vernon, Epidemic Intelligence Service.

An unusually high incidence of febrile diarrhea due to S. sonnei was noted during the summer months in Cumberland County, Pennsylvania. Fifty-one cases were confirmed and a minimum of 200-300 cases were estimated. Isolations were made from persons having a wide range of symptomatology, from a complete absence of symptoms to fever, bloody diarrhea, and severe abdominal cramps. Eighty-two percent of the documented cases were between the ages of 5 and 34, a pattern consistent with the expected clientele of the food service establishments implicated. Thirty-five of the 51 cases were related directly or indirectly to a concession stand of a drive-in theater, a Girl Scout camp, a root beer stand, a major chain restaurant, and a middle socio-economic subdivision. Plausible, but not necessarily causal, links were found from the latter four to the movie concession. The vehicle common to the cases from the drive-in movie was a fountain soft drink mixed with ice and water obtained from a private well. The private chlorinator was found to be operating, but no residual chlorine could be detected in several water samples. However, cultures of these samples failed to reveal shigella at the time of the investigation. Foods, food distributors, soft drink distributors, and water supplies were investigated, but no epidemiologic pattern could be found. The probable mechanism of spread was person to food to person.

One teenage girl who became ill in late July after attending the drive-in movie took a job as a waitress at the restaurant prior to the outbreak there. Although asymptomatic while working in the restaurant, she was found to have a positive stool culture 8 weeks after her illness. This emphasizes the relevance of studies on the carrier state and the importance of follow-up of food handlers.

V Reports from the States

A. Family Outbreak of Shigellosis in Atlanta. Reported by L. C. Dekle, third-year medical student; W. E. Farrar, M.D.; and W. M. Marine, M.D., Emory University Medical School, Atlanta, Georgia.

A family outbreak of diarrhea due to Shigella flexneri 2a was reported involving all ten members of one household, and two grandmothers, each in a different household (Figure 4). The illness consisted of fever, bloody diarrhea, and often headache, vomiting, abdominal tenderness, and dehydration. An 11-year-old child was the index case, and spread was from person to person. Positive cultures were obtained at the onset of illness in 6 of the 12; initial and follow-up cultures confirmed shigellosis in 10 of 12 persons.

Each isolate was tested for sensitivity to antibiotics. Seven of the 10, including the isolate from the index case, were sensitive to all antibiotics tested, while 3 were resistant to tetracycline, streptomycin, chloramphenicol, ampicillin, and sulfadiazine. Transfer of this multiple resistance from the shigella to sensitive E. coli in vitro was demonstrated by Dr. Farrar. It should be noted that no organisms were seen which were resistant only to one, two, three, or four of these antibiotics. Resistance and transfer were shown either to all or none of these five antibiotics.

Presumably, the index case had been infected with a sensitive shigella, but in passage through the family it acquired multiple resistance perhaps from a nonpathogenic enteric organism. Of clinical and epidemiological significance is the fact that members of the family had been treated variously with chloramphenicol, penicillin, sulfadiazine, tetracycline, and ampicillin; yet, the organism continued to spread through the family.

B. Neighborhood Shigellosis in Syracuse, New York. Reported by Dr. Howard H. Volan, Director of the Bureau of Communicable Disease, Syracuse City Health Department, and Dr. Sheldon Greenfield, EIS Officer, Department of Preventive Medicine, State University of New York, Upstate Medical Center.

Following the admission to the Syracuse Medical Center of two brothers with diarrhea due to Shigella flexneri 4b, it was recognized that an epidemic of diarrheal disease had occurred among nine families in a low-income neighborhood. Review of outpatient records revealed several isolations of the same organism in relatives and contacts of the two boys. An investigation uncovered 30 cases of diarrheal disease among 47 exposed persons in the nine families. Twenty-one of the 30 persons with diarrhea were below 10 years of age.

The first case occurred in a 2-year-old girl living in an old, untidy apartment house. No contacts or other sources could be found though a poorly functioning toilet on the floor above was suspected. Subsequent spread of infection among the families seemed to have occurred by frequent intimate person-to-person contact. The low level of sanitation in the exposed families, the confinement of the disease to a small number of households, and the predilection of the disease for young children suggested that spread was by the fecal-oral route. There was no evidence to implicate food, water, or other common source.

Rectal swab cultures from 39 of the 47 exposed persons revealed the same organism in 19 (49 percent) in spite of the fact that 3-4 weeks had elapsed since the last symptoms in many of the patients.

C. Surveillance of Shigellosis in an Institution for the Mentally Retarded in Illinois. Reported by Dr. Louis Belinson, Superintendent, Dr. Pedro Rodriguez, Clinical Director, and Mr. Steve Bellack, Clinical Laboratory Supervisor, Lincoln State School and Colony, Lincoln, Illinois.

In Shigella Surveillance Report No. 10, an outbreak of shigellosis caused by Shigella dysenteriae 2 or Schmitz's bacillus was reported. This outbreak which occurred in March 1966, involved 8 cases and 6 asmyptomatic carriers in one cottage housing 139 children under 6 years of age. Control measures were taken, and the outbreak abruptly ceased. Since that time the staff of the institution has maintained careful surveillance of shigellosis. Although S. dysenteriae 2 has not been isolated again, there has been shigellosis caused by S. flexneri, as summarized below:

During the period from April to July 1966, only three cases of shigellosis occurred in the institution, which has more than 4,000 patients. In July three asymptomatic carriers were detected, two of whom were new admissions. In August two cases of

shigellosis caused by S. flexneri occurred in an annex hospital prompting a bacteriological survey of all hospital patients and student employees. Seventy-seven persons were cultured, and three (3.9 percent) were shown to be carriers of S. flexneri. In September two more cases of shigellosis occurred in the hospital, and one case occurred in each of two annex cottages. All patients and student employees in both cottages were cultured; in the first cottage, 23 of 182 people were shown to be carrying S. flexneri (12.6 percent carrier rate), and in the second cottage, only 1 of 123 people was a carrier (0.8 percent carrier rate). Carriers were isolated and treated with furazolidone and oxytetracycline. Two weeks later following another survey in the first cottage no carriers were detected.

Comment: Although shigellosis remains endemic in this institution, the incidence is low. Thorough cultural surveys and prompt isolation of carriers, such as practiced in this institution, may help to minimize the spread of disease.

TABLE I
SHIGELLA SEROTYPES ISOLATED FROM HUMANS
THIRD QUARTER, 1966

SEROTYPE	NORTHEAST																										NORTHWEST															NORTH
	Conn	Del	DC	Ill	Ind	Iowa	Ky	Me	Md	Mass	Mich	Minn	Mo	NH	NJ	NY-A	NY-BI	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	Total
A. S. dysenteriae Unspecified			1																							1														1
1.																																								
2				2																						2														2
3																																								
4																																								
5																																								
6																																								
7																																								
8																																								
9																																								
10																																								
3573-50																																								
Variant R																																								
Total			1	2																						3														3
B. S. flexneri Unspecified		1	6		2	3	4		1	1	1		9			4		53		2	1		7		12	107					1	3	18	13		17		52	159
1 unspecified													1													1														1
1a				7																						7	3			9		1						13	20
1b											2															2	3		1									4	6
2 unspecified									28	1		3	1			38			12	1						84									6	1		7	91
2a				68							14				4											86	4		4	13		1	7		5			34	120
2b				4																						4	4											4	8
3 unspecified				25					11	5	7	2						1		1						52									4	4		8	60
3a				2											1											3				1								1	4
3b																																								
3c											2															2														2
4 unspecified									1			36				1			2							40														40
4a	1			2			1				2															6				1	1							2	8
4b																																								
5				9																						9	2											2	11
6	1			7							1	1			1											11	9								1	2		12	23
Variant X																																								
Variant Y																																								
Variant R																																								
Total	2	1	6	124	2	3	5		41	7	29	42	11		6	43		54	14	4	1		7		12	414	25		6	24		2	11	18	18	11	24		139	553
C. S. boydii Unspecified																																								
1				1																						1														1
2				3																						3		1										1	4
3																																								
4																											1												1	1
5																																								
6																																								
7																																								
8																																								
9																																								
10																																								
11																																								
12																																								
13																																								
14																																								
15																																								
3615-53																																								
2710-54																																								
1621-54																																								
2044-54																																								
Variant R																																								
Total				4																						4	1	1										2	6
D. S. sonnei	20		6	84	8	8			57	121	43	17	14		9	59	1	75	15	50			1	1	85	674	62	4	123			1	22	9	745			174	848
Untypable																																								
Unknown			4								1														7	12														12
Grand Total	22	1	17	214	10	11	5		98	128	73	59	25		15	102	1	129	29	54	1		8	1	104	1,107	88	5	747		2	12	40	27	1869			315	1,422

TABLE I (Continued)
SHIGELLA SEROTYPES ISOLATED FROM HUMANS
THIRD QUARTER 1966

SOUTHEAST										SOUTHWEST						OTHER							PREVIOUS QUARTER		1966 CUMULATIVE		SEROTYPE
Ala	Ark	Fla	Ga	La	Miss	NC	SC	Tenn	Southeast Total	Ariz	NM	Okla	Tex	Southwest Total	South Total	Alaska	Calif	Hai	Virgin Islands	Other Total	Total	Percent Total	Total	Percent of Total	Total	Percent of Total	
						7			7		1	1		2	9						10	.3	7	.4	19	.3	A. S. dysenteriae Unspecified
			1						1						1		3			3	6	.2	8	.4	30	.4	1
													1	1	1						1	.03	3	.2	9	.1	2
																											3
																											4
																											5
																											6
																	1			1	1	.03			1	.01	7
																											8
																											9
																											10
																											3573-50 Variant R
			1			7			8		1	1	1	3	11		4			4	18	.6	18	1.0	59	.8	Total
12	6				36	21	8		83	2	7	22		31	114	30			1	31	304	9.7	142	7.6	569	8.0	B. S. flexneri Unspecified
		1	9					5	15	2	7			9	24		1			1	26	.8	15	.8	58	.8	1 unspecified
				2					2	7			2	9	11		6			6	37	1.2	19	1.0	80	1.1	1a
										3			3	6	6		6			6	18	.6	14	.8	68	1.0	1b
	2	22	71				1	36	132	3	33		1	37	169						260	8.3	147	7.9	612	8.6	2 unspecified
	9			14					23	51			59	110	133		105	67		172	425	13.5	279	15.0	1,130	15.9	2a
										3			7	10	10		6			6	24	.8	38	2.0	88	1.2	2b
		12	58					17	87	6	50		1	57	144		42	7		49	253	8.1	229	12.3	628	8.9	3 unspecified
	7			5					12				38	38	50						54	1.7	42	2.3	155	2.2	3a
													6	6	6						6	.2	4	.2	14	.2	3b
			11						11						11						13	.4	2	.1	18	.3	3c
			7	5				14	26		6		4	10	36						76	2.4	51	2.7	163	2.3	4 unspecified
	4			6					10	25			25	50	60		25	1		26	94	3.0	56	3.0	206	2.9	4a
																							1	.05	8	.1	4b
				1				1	2	11			5	16	18						29	.9	8	.4	48	.7	5
	1	53	19	6				7	86	10	35		18	63	149		32			32	204	6.5	128	6.9	415	5.8	6
																											Variant X
																											Variant Y
																											Variant R
12	29	88	175	39	36	21	9	80	489	123	138	22	169	452	941	30	223	75	1	329	1,823	58.1	1,175	63.3	4,260	60.0	Total
					1				1		2			2	3		1			1	4	.1	3	.2	9	.1	C. S. boydii Unspecified
																					1	.03	1	.05	2	.03	1
			1					2	3	1				1	4		3			3	11	.4	8	.4	30	.4	2
																											3
																					1	.03	2	.1	6	.08	4
																							2	.1	3	.04	5
																											6
																									1	.01	7
																											8
																									1	.01	9
																							2	.1	11	.2	10
																									1	.01	11
																											12
																	1			1	1	.03			2	.03	13
																											14
																											15
																											3615-53
																											2710-54
																											1621-54
																											2044-54
																											Variant R
			1		1			2	4	1	2			3	7		5			5	18	.6	18	1.0	66	.9	Total
3	6	49	62	17	4	13	2	18	174	12	28	10	66	116	290	1	89	31		121	1,259	40.1	640	34.5	2,672	37.7	D. S. sonnei
																	1			1	1	.03	2	.1	4	.06	Untypable
					2		3		5				2	2	7		1			1	20	.6	3	.2	33	.5	Unknown
15	35	137	239	56	43	41	14	100	680	136	169	33	238	576	1,256	31	323	106	1	461	3,139		1,856		7,094		Grand Total

TABLE II

Age and Sex Distribution of Individuals Infected with Shigellae in the United States During the Third Quarter of 1966

Age (years)	Male	Female	Unknown	Total	Percent	Cumulative Percent
Under 1	98	87	1	186	9.2	9.2
1 - 4	417	416	5	838	41.6	50.8
5 - 9	196	201	1	398	19.8	70.6
10 - 19	114	129		243	12.1	82.7
20 - 29	49	104		153	7.6	90.3
30 - 39	25	49		74	3.7	94.0
40 - 49	18	25		43	2.1	96.1
50 - 59	16	17		33	1.6	97.7
60 - 69	6	16		22	1.1	98.8
70 - 79	8	7		15	0.7	99.5
80 +	6	2	-	8	0.4	99.9
Total	953	1053	7	2013		
Child (unspec.)	28	22		50		
Adult (unspec.)	5	15	1	21		
Unknown	499	475	81	1055		
Total	1485	1565	89	3139		
Percent of Total	48.7	51.3				

TABLE III

Relative Frequencies of Shigella Serotypes
Reported During Third Quarter 1966

	Serotype	Number Reported	Calculated Number*	Calculated Percent	Rank
A.	*S. dysenteriae*				
	2	6	14	0.45	11
	3	1	2	0.06	12
	9	1	2	0.06	12
	unspecified	10			
B.	*S. flexneri*				
	1a	37	66	2.11	7
	1b	18	32	1.02	10
	1 unspecified	26			
	2a	425	810	25.84	2
	2b	24	46	1.47	8
	2 unspecified	260			
	3a	54	291	9.28	3
	3b	6	32	1.02	10
	3c	13	70	2.23	6
	3 unspecified	253			
	4a	94	205	6.54	5
	4 unspecified	76			
	5	29	35	1.12	9
	6	204	246	7.85	4
	unspecified	304			
C.	*S. boydii*				
	1	1	1	0.03	13
	2	11	14	0.45	11
	4	1	1	0.03	13
	14	1	1	0.03	13
	unspecified	4			
D.	*S. sonnei*	1259	1267	40.41	1
	untypable	1			
	unknown	20			
	Total	3139	3135		

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

TABLE IV

Relative Frequencies of Shigella Serotypes
Cumulated from Fourth Quarter 1963 to Present Quarter

Serotype	Number Reported	*Calculated Number	*Calculated Percent	Rank
A. S. dysenteriae				
1	1	1	0.00	22
2	59	88	0.40	13
3	19	28	0.13	15
6	1	1	0.00	22
9	1	1	0.00	22
unspecified	39			
B. S. flexneri				
1a	242	513	2.33	7
1b	177	375	1.70	8
1 unspecified	316			
2a	2293	5867	26.63	2
2b	305	780	3.54	6
2 unspecified	2905			
3a	373	2272	10.31	3
3b	36	219	0.99	10
3c	61	372	1.69	9
3 unspecified	1900			
4a	557	1358	6.16	5
4b	34	83	0.38	14
4 unspecified	602			
5	91	110	0.50	12
6	1182	1428	6.48	4
variant y	17	21	0.10	16
unspecified	2202			
C. S. boydii				
1	3	5	0.02	19
2	80	128	0.58	11
4	10	16	0.07	18
5	3	5	0.02	19
6	1	2	0.01	21
7	1	2	0.01	21
8	1	2	0.01	21
9	1	2	0.01	21
10	11	18	0.08	17
11	1	2	0.01	21
12	1	2	0.01	21
14	2	3	0.01	20
unspecified	68			
D. S. sonnei	8262	8326	37.79	1
untypable	5			
unknown	164			
Total	22,027	22,030		

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

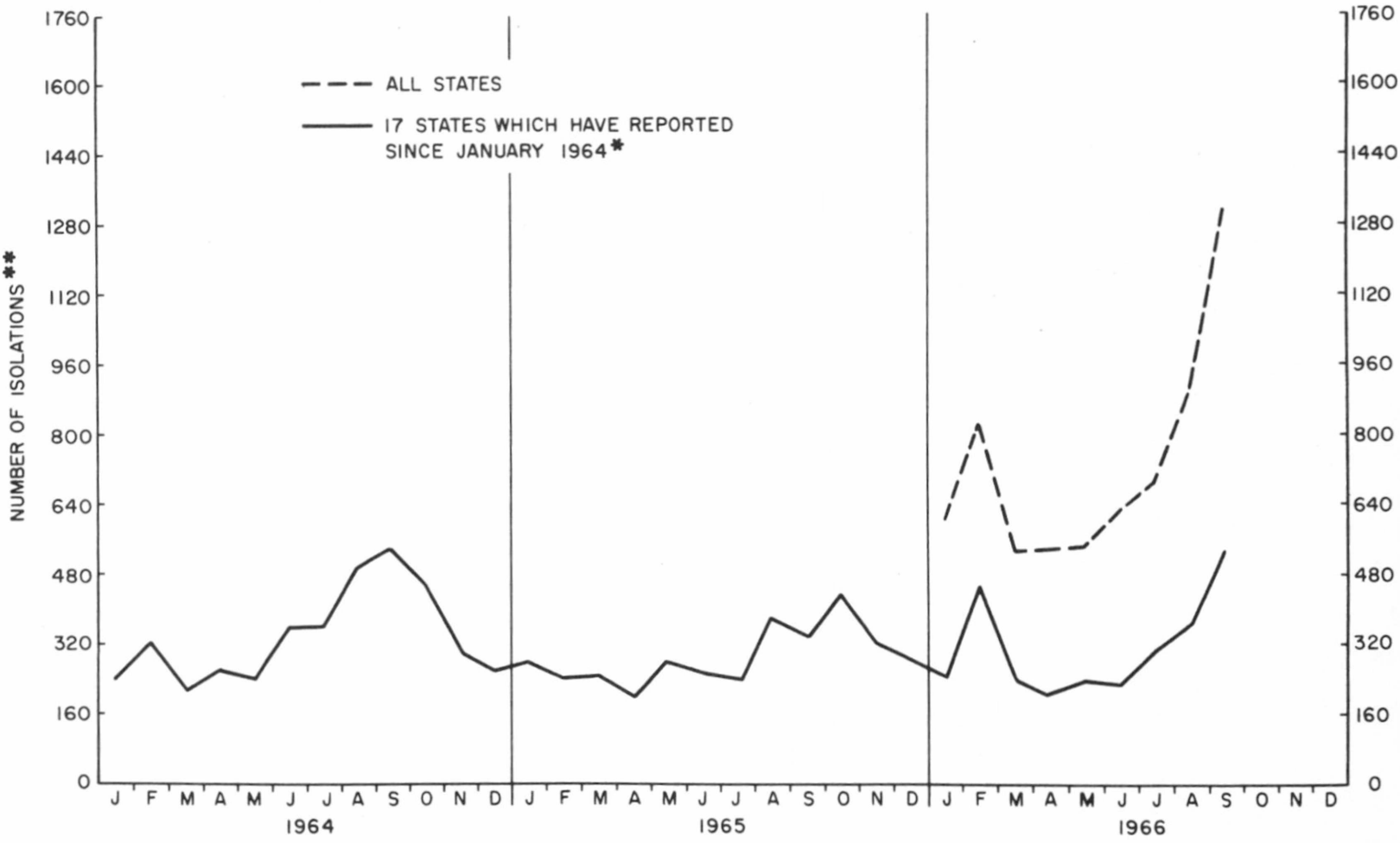
Figure 1.

PERCENTAGE *S. FLEXNERI* AND *S. SONNEI* OF TOTAL SHIGELLA ISOLATIONS REPORTED FROM INDICATED REGIONS THIRD QUARTER, 1966

1. RATIO OF *S. FLEXNERI* TO *S. SONNEI*

Figure 2.

REPORTED ISOLATIONS OF SHIGELLA IN THE UNITED STATES



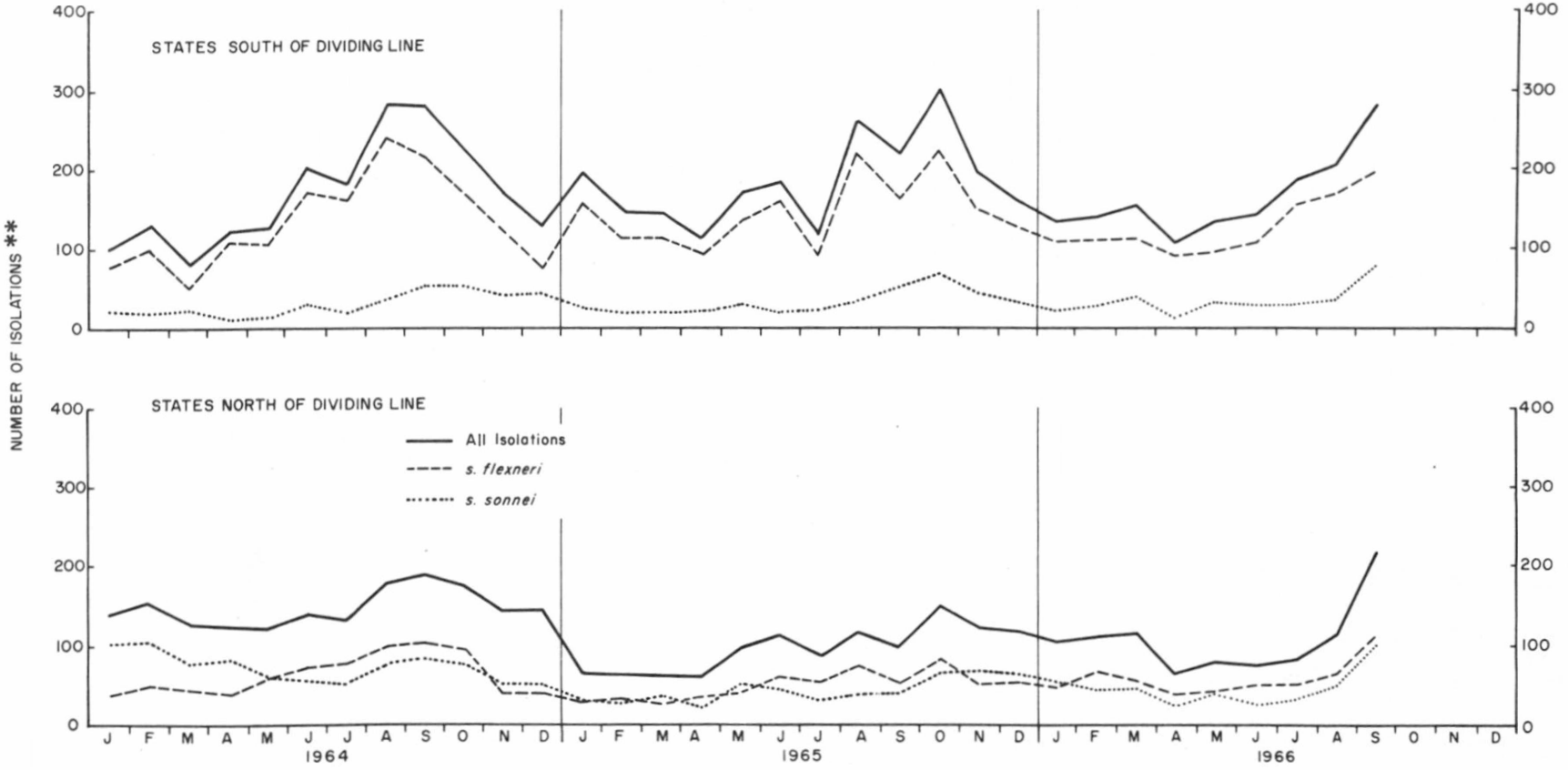
*ALASKA, ARIZONA, HAWAII, ILLINOIS, KANSAS, MARYLAND, NEW JERSEY, NEW MEXICO, NORTH CAROLINA, NORTH DAKOTA, OHIO, OKLAHOMA, OREGON, SOUTH DAKOTA, TENNESSEE, TEXAS AND VERMONT.

**ADJUSTED TO FOUR-WEEK MONTHS.

Figure 3.

SEASONAL DISTRIBUTION OF SHIGELLA ISOLATIONS BY SEROTYPE AND REGION

15 STATES WHICH HAVE REPORTED SINCE JANUARY 1964*



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

** ADJUSTED TO 4-WEEK MONTHS.

Figure 4

SHIGELLOSIS IN AN ATLANTA FAMILY