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national communicable disease center

SHIGELLA

surveillance

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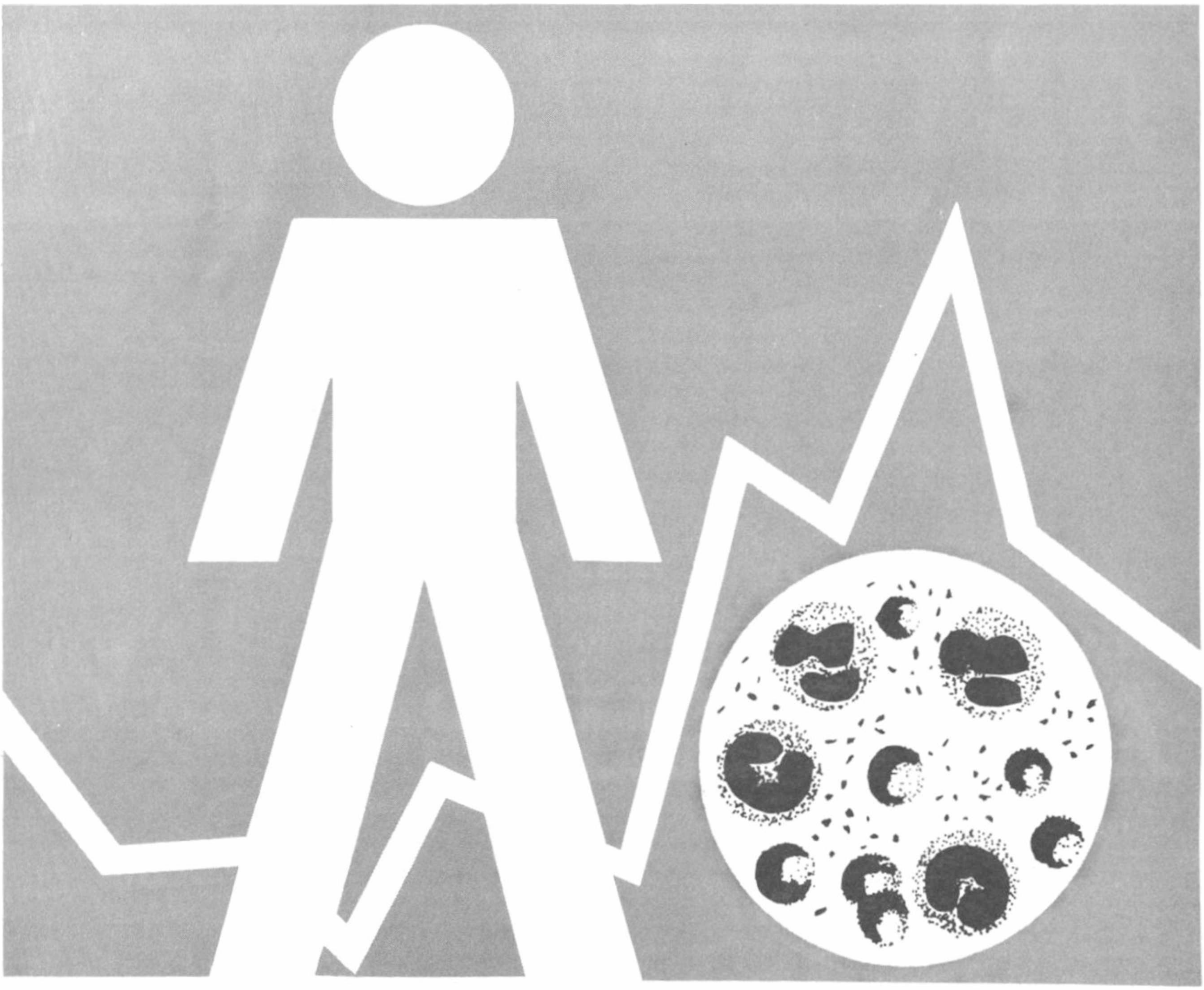
for the

Third and Fourth Quarters 1967



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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I. Summary

A total of 6,556 isolations of shigella from humans were reported by the 53 reporting centers during the last 6 months of 1967 (Table I). This number was a 35.2 percent increase over the 4,849 isolations reported during the first 6 months of 1967 and a 1.7 percent increase over the 6,448 isolations reported during the last half of 1966.

II. Reported Isolations

A. Human

1. General Incidence

The seasonal pattern (Figures 1 and 2) continued as in past years; these figures are based on reports from centers which have been reporting since January 1964.

During the last half of 1967, 68.8 percent of isolations of shigella were from children under 10 years of age (Table II); this is consistent with the distributions of previous reports. There was the same apparent sex predilection as seen in previous years, i.e. a preponderance of isolates in 1) male infants compared to females of the same age, and 2) adult females in the childbearing years compared to males of the same age.

2. Serotype Frequencies

Fifty-two of the 53 reporting centers now participating in the Shigella Surveillance Program reported isolations of shigella; 23 different serotypes were reported.

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

Rank	Serotype	Number Reported	Calculated Number*	Calculated Percent	Rank Last Half
1	S. sonnei	3432	3456	52.7	1
2	S. flexneri 2a	601	1121	17.1	2
3	S. flexneri 3a	188	563	8.6	3
4	S. flexneri 6	359	417	6.4	5
5	S. flexneri 2b	183	341	5.2	6
6	S. flexneri 4a	155	326	5.0	4
Subtotal		4918	6224	95.0	
Total (all serotypes)		6556	6555		

* from Table III

Tables III and IV, calculated from data compiled during the last half of 1967 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: Attack Rates for the General Population

Figure 3 and figure 4 portray attack rates per state per semiannum, utilizing population estimates for July 1, 1967. The overall U.S. attack rate was 3.3 cases per 100,000 for the last 6 months of 1967, as compared to 2.5 cases per 100,000 for the first half of 1967, and 3.3 cases per 100,000 for the last half of 1966.

Since the last reporting period there has been a change in the proportion of *S. flexneri* to *S. sonnei* in the Southeast (Figure 5). In the past, there has been a predominance of isolates of *S. flexneri* over *S. sonnei* in both the Southeast and Southwest, while the opposite was true in both northern quadrants of the country. However, during the last 6 months of 1967, the frequency ratio of *S. flexneri* to *S. sonnei* in the Southeast reversed. Thus, *S. sonnei* was the most prevalent serotype in three of the quadrants of the country, while in the Southwest *S. flexneri* remained most prevalent.

An analysis of isolates from individual southeastern states reveals that the reversion of the *S. flexneri* to *S. sonnei* ratio was due entirely to an absolute increase of *S. sonnei* and a simultaneous fall in *S. flexneri* in both Georgia and Florida, while the proportion of group B/D from the other seven states of the Southeast remained essentially unchanged from the first half of 1967. In Georgia, *S. sonnei* increased from 37.3 percent to 72.1 percent, and *S. flexneri* decreased from 62.7 percent to 27.9 percent of combined group B and D isolates. In Florida, *S. sonnei* increased from 35.4 to 66.7 percent, and *S. flexneri* decreased from 64.6 to 33.3 percent during the time period. The cause for these changes is now being investigated.

Shigella flexneri has an apparent seasonal pattern which is more evident in the southern states as is shown in Figure 2. This figure was prepared from data from only 15 states in order that comparison could be made with 1964, 1965, and 1966 data, when only 17 states were reporting.

4. Shigellosis on Indian Reservations and Mental Institutions

Table V indicates the sources of reported isolations of shigella strains by residence of patients at the time the first culture was taken or the time of onset of illness. Of the 6,556 isolations reported, only 2,346 were reported by type of residence. Seventy-six percent of strains came from a variety of sources, primarily private homes and hospitals. Twenty percent came from mental institutions and 4 percent derived from Indian reservations.

Supplemental data have been made available by the Division of Indian Health, U.S. Public Health Service, concerning cases of shigellosis on Indian reservations. These reports are preliminary and should not be quoted without permission of the Division of Indian Health. Cases and attack rates for various reservations are presented in Table VI. Population estimates for 1967 were used for the denominators. Figure 6 portrays attack rates by reservations.

There is a discrepancy between isolates from cases on reservations reported by the states (88 isolations - Table V) and cases reported by the Division of Indian Health (668 isolations - Table VI). Apparently many cases of shigellosis which occur among Indians are not reported to the states or are not specified as being among Indians on the state reports to the National Communicable Disease Center.

The overall reported attack rate among Indians, 171.5 per 100,000, is 52 times the reported attack rate for the whole U.S. population, 3.3 per 100,000, for the last 6 months of 1967.

The relative importance of different serotypes reported from mental institutions is shown in Table VII. *S. flexneri 2* accounted for 58 percent and *S. sonnei* for 28 percent of all isolates reported during the year 1967. Together, these two serotypes accounted for 86 percent of all institutional shigellosis.

B. Nonhuman

Emphasizing the host specificity of shigella strains for man, there were only five nonhuman isolations of shigella reported during the last 6 months of 1967:

Serotype	Number	Source	State
S. flexneri 1a	1	monkey	Connecticut
S. flexneri 3	2	unknown	Texas
S. flexneri 4a	1	monkey	Texas
S. sonnei	1	monkey	Illinois
Total	5		

III. Current Investigations

Preliminary analysis of data from the National Survey of Shigellosis Experience in Mental Institutions.

Late in 1967 a survey of shigellosis experience in mental institutions was started in collaboration with State epidemiologists. Questionnaires were sent to 245 institutions in 39 states. This is a preliminary analysis of the survey.

At the time of this writing, 117 forms had been returned. Of these 117, 102 institutions indicated that shigellosis was not a problem. Fifteen institutions reported that shigellosis is or has been a problem of serious magnitude. Four institutions reported that *S. flexneri 2a* was alone responsible for all shigellosis; five reported disease caused by unspecified *S. flexneri*; five indicated both group B and D strains caused outbreaks, and one reported that group D alone was responsible for outbreaks.

IV. Reports from the States

A. Common-source outbreak traced to apple cider. Reported by Dr. W. D. Schrack, Jr., Director, Division of Communicable Diseases, Pennsylvania Department of Health, and Dr. Theodore H. Weinstein, EIS Officer, Harrisburg, Pennsylvania.

On October 12, 1967, 30 adults attended a meeting in Pennsylvania, at which apple cider and doughnuts were served. Subsequently, all 30 developed symptoms of acute gastroenteritis. They all drank the cider, but only 20 ate doughnuts. In addition, 24 family members, all of whom drank the cider after the meeting, became ill. Further surveillance revealed at least 30 others in the community who became ill after drinking the cider, bringing the total to at least 84.

The illness was characterized by nausea, vomiting, abdominal cramps, diarrhea, and fever. Most cases sought medical aid, but none were hospitalized. Mean incubation period was $2\frac{1}{2}$ days, and the duration of illness averaged 5 days. Stool cultures were positive for *S. sonnei* in 36 individuals.

The suspect cider was produced by a family concern; a couple, their son, and two part-time employees. Stool cultures obtained from the mother and son grew *S. sonnei*. In addition, the son became ill with gastroenteritis at about the time of the first community cases.

Inspection of the plant revealed inadequate sanitary conditions. No enteric pathogens were isolated from multiple samples of cider, although one sample did reveal E. coli, suggesting fecal contamination. No subsequent cases of shigellosis have been reported from the area.

Editor's comment: Although shigella does not rival salmonella, staphylococcus, or Clostridium perfringens as a leading cause of food poisoning in this country, common-source food or waterborne outbreaks do occur from time to time. The fact that S. sonnei could not be recovered from the implicated cider may be due to the inhibition of shigella organisms by the lowering of pH which occurs as cider ages.

In addition to this outbreak, there have been 12 other confirmed food or waterborne, common-source outbreaks of shigellosis reported to the NCDC since 1964.

Year	Serotype	No. Ill	No. at Risk	Attack Rate (%)	Location	Food	Ref.
1964	S. flexneri 4a	100	300	33	California	Potato salad	SSR*# 4
1964	S. flexneri	17	-	-	N. Carolina	Water	SSR# 5
1964	S. flexneri 6	220	526	42	Georgia	Unidentified	SSR# 5
1964	S. sonnei	22	-	-	N. Carolina	Unidentified	SSR# 5
1964	S. flexneri 2a	13	25	52	Hawaii	Potato salad	SSR# 5
1965	S. sonnei	67	96	69	Iowa	Water	SSR# 6
1965	S. sonnei	230	-	-	Kansas	Unidentified	SSR# 7
1965	S. flexneri 4a	196	320	61	Texas	Potato salad	SSR# 7
1965	S. flexneri	250	-	-	New York	Shrimp salad	SSR# 9
1965	S. flexneri 2a	20	21	95	Hawaii	Macaroni salad and/or rice	SSR# 9
1966	S. flexneri 2a	201	326	62	Hawaii	Unidentified	SSR# 11
1966	S. flexneri 2a	99	-	-	Florida	Milk	SSR# 13

* Shigella Surveillance Report

B. Shigellosis in a camp. Reported by Dr. Linus J. Leavens, Director, Division of Communicable Disease Control, and Mr. F. Lee Szynskie, USPHS, Public Health Advisor, Vermont Department of Health, Dr. Paul M. Stanilonis, University of Vermont Medical School, Mr. George Mallison, Chief, Biophysics Section, NCDC, Mr. Don Mackel, Bacteriologist, Biophysics Section, NCDC, and a team of EIS officers.

Between July 1 and July 28, 1967, approximately 140 persons were affected by acute gastroenteritis in a Vermont girls' camp of of 460 residents. The illness was mild with a duration of 48-72 hours and symptoms included nausea, malaise, abdominal cramps, diarrhea, fever, dizziness, and headache. Both campers and staff were affected. The outbreak occurred in two waves, the first from July 4 to 7 (28 cases), and the second from July 13 to 18 (96 cases). The remaining cases were thought to be secondary. A total of 53 rectal swab cultures were positive for S. sonnei.

The exact cause of the outbreak could not be determined, although its explosive nature suggested a common source. Intermittent contamination of the camp's unchlorinated water supply seemed to be the most likely source of infection since fluorescein dye studies demonstrated several cross-connections between drinking water and the sewage systems. However, potentially contaminated milk could not be conclusively excluded as a source. In no case did culture of environmental, food, or water specimens reveal shigella organisms.

Appropriate sanitary measures were introduced, and no cases were reported after July.

Editor's comment: The epidemic characteristics strongly suggest a common-source exposure similar to the outbreaks described in A, above. This epidemic demonstrates the potentially explosive character of shigellosis which may affect all socioeconomic levels. In contrast, endemic shigellosis usually affects the lower social strata, where person-to-person transmission usually occurs in the context of an unsanitary environment.

C. Ampicillin-Resistant Shigellosis in a State School. Reported by Dr. Louis Belinson, Superintendent, and Mr. Stephen Bellack, Clinical Laboratory Supervisor, Lincoln State School, Department of Mental Health, Lincoln, Illinois.

Lincoln State School is a large mental institution in Lincoln, Illinois, which has had a chronic problem of endemic shigellosis. One nursery building, which houses 146 severely retarded youngsters, has recently experienced shigellosis resistant to ampicillin therapy. Ampicillin resistance was confirmed by laboratory tests.

On September 11, 1967, a cultural survey of this building revealed 11 asymptomatic children infected with S. flexneri. Subsequently, all 146 patients were treated with ampicillin 100 mg/kg/day for 7 days. Two of the 11 patients with positive cultures developed acute dysentery on the 3rd day of treatment.

All 146 patients were recultured after ampicillin therapy and 11 additional isolates of S. flexneri were made. Consequently, all but four patients were treated for 7 days with a combination of oxytetracycline 250 mg four times daily and furazolidone 100 mg four times daily. Proportionately, smaller doses were used for small children. The four exceptions received sulfisoxazole due to a possible allergic reaction to the tetracycline-furazolidone combination. After therapy, only these four were positive for S. flexneri. They were treated with chloramphenicol following which two of the four continued to excrete shigella.

The two patients with persistently positive cultures were thought to be responsible for subsequent transmission of disease to 15 other patients not previously infected. Because of this new spread of shigellosis, all residents were again treated with the oxytetracycline-furazolidone combination during the last week of January 1968. Sixty hours after the initiation of therapy, two of the 17 patients were still positive.

Intensive surveillance, chemoprophylaxis and chemotherapy using the oxytetracycline-furazolidone combination have made possible a degree of control never before achieved in this institution. Nevertheless, the problem persists.

Editor's comment: The persistence of shigellosis in spite of intensive drug treatment in mental institutions is a common phenomenon. Ampicillin-resistant organisms further complicate an already difficult situation. The development of multiple-resistance patterns in shigella organisms commonly correlates with the degree of use of various antibiotics. This outbreak emphasizes the need for routine antibiotic-sensitivity testing to guide therapy.

D. Importations of a Rare Shigella Serotype.

1. Report by Dr. I. F. Gratch, In charge, Epidemiology Section, Pennsylvania Department of Health, Harrisburg, Pennsylvania.

On October 4, 1967, an American family traveling in Asmara, Ethiopia, ate a meal in a local restaurant. The following day the 11-year-old son became ill with diarrhea.

Shortly thereafter the family returned to the home of the boy's grandparents in Pennsylvania. There he became more seriously ill and was admitted to a local hospital. A stool culture grew group A shigella, later serotyped as A 1 by the Enteric Bacteriology Unit, Laboratory Program, NCDC. Exact details of treatment are unknown, but the boy was discharged after three negative stool cultures.

2. Report by Dr. Philip K. Condit, Chief, Bureau of Communicable Diseases, Dr. Peter A. Gross, EIS Officer, California State Department of Public Health, Berkeley, California, and Dr. G. A. Heidbreder, Health Officer, Los Angeles County Health Department, Los Angeles, California.

Between December 20, 1967, and January 1, 1968, a 25-year-old California university student visited Sanblas, Mexico. Following his return to Los Angeles, He developed fever and diarrhea on January 3. Three days later, he noted bloody diarrhea and was admitted to a hospital, where stool culture revealed *Shigella dysenteriae* type 1. He was treated for 7 days with kanamycin and discharged in good health on January 16. None of his fellow travelers developed diarrhea.

Editor's comment: These two cases are examples of the importation of an organism, which has become extremely rare in this country; there were only three isolations of this serotype in 1967. *S. dysenteriae* type 1, Shiga's bacillus, is one of the very few strains of shigella whose serotype can serve as a distinctive epidemiological marker, strongly suggesting a foreign source. With the ever increasing availability of rapid means of transportation to larger numbers of people, it behooves physicians and public health officials to be alert for such cases.

V. Current Trends and Developments

Shigella surveillance and the control of shigellosis in high-risk groups

The surveillance of shigellosis has revealed that this disease occurs among three different segments of the population. 1) The largest consists of the endemic problem in the lower socioeconomic stratum. 2) Persons residing in mental institutions and on Indian reservations constitute a special high-risk group prone to both endemic and epidemic shigellosis. 3) Persons in any socioeconomic strata are affected from time to time in common-source outbreaks. This is a spill over of the endemic problem usually related to 1 and 2 above.

The control of endemic shigellosis in the lower socioeconomic stratum will probably come about without a concerted shigella control effort as the standard of living and education of these people improves. At this time there appears to be no other way to interrupt the person-to-person fecal transmission which perpetuates the problem.

Shigellosis in the high-risk groups, i.e. persons residing in mental institutions and on Indian reservations accounts for about a quarter of the shigellosis problem in the country. Predominantly children are affected. In institutions, *S. sonnei* and *S. flexneri 2* account for 86 percent of the isolates. *S. flexneri* (subtype often not known) accounts for most shigellosis on Indian reservations. Conventional methods of control using isolation and antibiotics often fails. The perpetuation of transmission in these groups in spite of these measures is illustrated by the present report from Lincoln State School and past reports from other institutions and reservations. Clearly more potent control devices are needed. Hopefully, a shigella vaccine will prove to be the answer for the prevention of shigellosis in these groups.

The third segment of the shigellosis problem is that portion which, from time to time, spills over from the endemic problem and manifests itself in any socioeconomic group in the form of common-source outbreaks. Because of the host specificity of shigella strains, man plays the essential role in the contamination of food and water which causes these explosive outbreaks. As the general level of health and sanitation improves and as shigellosis is controlled in high-risk groups, these common-source outbreaks will become increasingly rare.

In past issues of surveillance reports, progress in the development and safety testing of a shigella vaccine has been reviewed. Instability of two tested strains, a colonial mutant of S. flexneri 2a and a hybrid-mutant S. flexneri 2a has led to consideration of other vaccine strains.

Currently, attention is being given to the development of a vaccine which employs nonpropagating, streptomycin-dependent mutant strains. The results of safety testing of these strains have been encouraging. These strains have been shown to be effective in the control of shigellosis (Bull. WHO 32:647-655, 1965). Several field trials have clearly shown a high degree of protection of adults in endemic areas. A field study is scheduled to begin late this year in Yugoslavia to determine the protective value of lyophilized strains in children. These studies have important implications for the control of shigellosis in high-risk groups in the U.S.

Since S. sonnei and S. flexneri 2a account for the majority of the shigellosis in institutions, and also probably for the majority of shigellosis on Indian reservations, a bivalent S. sonnei and S. flexneri 2a vaccine is being prepared and tested.

In the U.S., such a bivalent vaccine may become available within a year or two for efficacy testing and epidemic control. It is, therefore, especially important that institutions and other groups with high rates of shigellosis be identified. Their shigella problem should be well defined. These groups are strongly urged to report their shigella isolates to the state laboratories so that the isolates can be serotyped and reported to the NCDC. Hospital infection committees should also be alerted to this problem, and all efforts should be made to improve case finding. The NCDC is always available for laboratory and/or epidemiologic assistance.

TABLE I
SHIGELLA SEROTYPES ISOLATED FROM HUMANS
JULY THROUGH DECEMBER 1967

	NORTHEAST																								NORTHWEST													
SEROTYPE	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	North Total
A. S. dysenteriae																																							
Unspecified			1											1	1							1			4													0	4
1																			1						1													0	1
2				9																					9													0	9
3				1																					1													0	1
9																									0													0	0
Total	0	0	1	10	0	0	0	0	0	0	0	0	0	1	1	0	0	0	1	0	0	1	0	0	15	0	0	0	0	0	0	0	0	0	0	0	0	0	15
B. S. flexneri																																							
Unspecified		2	13		16	5	12		5	1	1		12			9	140		2			6		22	246	3	1		7				9	14		3		37	283
1 Unspecified									2	1	2		3											1	9				1						4			5	14
1A				4																					4	6			9			2						17	21
1B				2							2														4	10												10	14
2 Unspecified									22	1	7	3	5					16	9			1	4		68				3		5	1			7	7	2	25	93
2A	7			100							4		3	1	1										116	13		3	8			8						32	148
2B				96											1										97	8	1											9	106
3 Unspecified									5	1	1		6					4	3				1		21	1		2			1				2	4		10	31
3A				65											1										66													0	66
3B																									0													0	0
3C											2														2													0	2
4 Unspecified									3		4	33	5												45										3	2		5	50
4A	1			5							1		1		1										9	28												28	37
4B																									0													0	0
5				1																					1	6												6	7
6				18					9		1		1		1				1						31	22			18						3			43	74
Variant X																									0		1											1	1
Total	8	2	13	291	16	5	12	0	46	4	25	36	36	1	5	9	140	20	15	0	0	7	5	23	719	97	3	5	46	0	6	11	9	14	19	16	2	228	947
C. S. boydii																																							
Unspecified																									0		1								1			2	2
1																									0													0	0
2				5																					5													0	5
3																									0													0	0
4																									0				1									1	1
5																									0													0	0
6																									0													0	0
7																									0													0	0
9																									0													0	0
14																									0													0	0
Total	0	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	0	1	0	1	0	0	0	0	0	1	0	0	3	8
D. S. sonnei	76	0	110	181	17	48	9	1	126	148	46	117	79	2	24	41	148	73	114	7	68	39	6	105	1,585	102	21	23	26	3	2	16	36	0	18	141	7	395	1,980
Unknown	0	0	20	0	0	0	0	0	0	0	1	0	0	0	0	0	3	0	0	0	0	0	0	8	32	0	0	0	0	0	0	7	0	0	0	0	0	7	39
TOTAL	84	2	144	487	33	53	21	1	172	152	72	153	115	4	30	50	291	93	130	7	68	47	11	136	2,356	199	25	28	73	3	8	34	45	14	38	157	9	633	2,989

TABLE I (CONTINUED)
SHIGELLA SEROTYPES ISOLATED FROM HUMANS
JULY THROUGH DECEMBER 1967

SOUTHEAST										SOUTHWEST						OTHER							PREVIOUS HALF		
Ala	Ark	Fla	Ga	La	Miss	NC	SC	Tenn	Southeast Total	Ariz	NM	Okla	Tex	Southwest Total	South Total	Alaska	Calif	Hawaii	Virgin Islands	Other Total	Total	Percent of Total	Total	Percent of Total	SEROTYPE
									0		3			3	3					0	7	0.1	7	0.1	A. <u>S. dysenteriae</u> Unspecified
								2	2					0	2					0	3	0.0	0	-	1
		2		1		3			6				2	2	8		3			3	20	0.3	26	0.5	2
						1			1	2			1	3	4		1			1	6	0.1	2	0.0	3
									0					0	0		1			1	1	0.0	1	0.0	9
0	0	2	0	1	0	4	0	2	9	2	3	0	3	8	17	0	5	0	0	5	37	0.6	36	0.7	Total
14	12	1			48	1		1	77		19	1	4	24	101	11			2	13	397	6.1	406	8.4	B. <u>S. flexneri</u> Unspecified
		9	6		1			5	21		18			18	39				1	1	54	0.8	38	0.8	1 Unspecified
									0				4	4	4		10			10	35	0.5	33	0.7	1 A
	1			1					2	3			8	11	13		10			10	37	0.6	31	0.6	1B
	2	50	82		3	76		62	275	5	93	7	1	106	381					0	474	7.2	258	5.3	2 Unspecified
	13			40					53	37		10	146	193	246		145	62		207	601	9.2	592	12.2	2A
	1			6					7	1			25	26	33	7	37			44	183	2.8	88	1.8	2B
3		15	86			7		58	169		51	1	1	53	222	4	60	5		69	322	4.9	253	5.2	3 Unspecified
	6			23					29	8			85	93	122					0	188	2.9	156	3.2	3A
									0				13	13	13					0	13	0.2	11	0.2	3B
				1					1					0	1					0	3	0.0	3	0.1	3C
	1	5	8					2	16	1	60		1	62	78					0	128	2.0	93	1.9	4 Unspecified
	4			7					11	15		1	35	51	62		55	1		56	155	2.4	150	3.1	4A
				2					2	1				1	3					0	3	0.0	4	0.1	4B
	1							1	2	4	2		1	7	9		12			12	28	0.4	38	0.8	5
	1	6	15	5		1		6	34	31	103		42	176	210	26	49			75	359	5.5	219	4.5	6
									0					0	0					0	1	0.0	0	-	Varient X
17	42	86	197	85	52	85	0	135	699	106	346	20	366	838	1,537	48	378	68	3	497	2,981	45.5	2,373	48.9	Total
	1				2			2	5		8			8	13		1			1	16	0.2	12	0.2	C. <u>S. boydii</u> Unspecified
									0				1	1	1		3			3	4	0.1	1	0.0	1
	3	3						3	9	1			7	8	17		4			4	26	0.4	19	0.4	2
									0					0	0					0	0	-	1	0.0	3
									0	5				5	5		3			3	9	0.1	8	0.2	4
									0					0	0		3			3	3	0.0	0	-	5
									0					0	0					0	0	-	1	0.0	6
									0				2	2	2					0	2	0.0	0	-	7
									0					0	0					0	0	-	1	0.0	9
									0					0	0		1			1	1	0.0	1	0.0	14
0	4	3	0	0	2	0	0	5	14	6	8	0	10	24	38	0	15	0	0	15	61	0.9	44	0.9	Total
18	7	166	495	56	13	32	0	60	847	26	74	68	176	344	1,191	3	149	104	5	261	3,432	52.3	2,360	48.7	D. <u>S. sonnei</u>
0	0	0	0	0	4	0	0	0	4	0	0	0	0	0	4	0	2	0	0	2	45	0.7	36	0.7	Unknown
35	53	257	692	142	71	121	0	202	1,573	140	431	88	555	1,214	2,787	51	549	172	8	780	6,556		4,849		TOTAL

Table II

Age and Sex Distribution of Individuals Infected with Shigellae in the United States July through December 1967

Age (Years)	Male	Female	Unknown	Total	Attack Rate/Million Population*
< 1	202	160	4	366	103.4
1 - 4	873	925	9	1807	115.4
5 - 9	504	514	6	1024	49.0
10 - 19	271	331	3	605	16.1
20 - 29	138	270		408	15.4
30 - 39	83	104		187	8.3
40 - 49	38	69		107	4.4
50 - 59	26	40		66	3.3
60 - 69	15	27		42	2.9
70 - 79	14	11		25	2.8
80 +	5	9		14	4.2
Subtotal	2169	2460	22	4651	
Child (unspec.)	55	40	2	97	
Adult (unspec.)	14	23	7	44	
Unknown	698	803	263	1764	
Total	2936	3326	294	6556	33.1
Percent of Total	46.9	53.1			

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

Table III

Relative Frequencies of Shigella Serotypes
Reported July through December 1967

Serotype	Number Reported	Calculated Number*	Calculated Percent	Rank
A. S. dysenteriae				
1	3	4	0.06	18
2	20	25	0.38	12
3	6	7	0.11	15
9	1	1	0.02	21
unspecified	7			
B. S. flexneri				
1a	35	71	1.08	8
1b	37	75	1.14	7
1 unspecified	54			
2a	601	1121	17.10	2
2b	183	341	5.20	5
2 unspecified	474			
3a	188	563	8.59	3
3b	13	39	0.59	9
3c	3	9	0.14	14
3 unspecified	322			
4a	155	326	4.97	6
4b	3	6	0.09	16
4 unspecified	128			
5	28	33	0.50	11
6	359	417	6.36	4
variant x	1	1	0.02	21
unspecified	397			
C. S. boydii				
1	4	5	0.08	17
2	26	35	0.53	10
4	9	12	0.18	13
5	3	4	0.06	18
7	2	3	0.05	20
14	1	1	0.02	21
unspecified	16			
D. S. sonnei	3432	3456	52.72	1
unknown	45			
Total	6556	6555		

* 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 December 1967

	Serotype	Number Reported	Calculated Number*	Calculated Percent	Rank
A.	*S. dysenteriae*				
	1	6	8	0.02	21
	2	129	177	0.48	13
	3	31	42	0.11	16
	6	1	1	0.00	31
	9	3	4	0.01	24
	unspecified	61			
B.	*S. flexneri*				
	1a	334	689	1.88	6
	1b	262	541	1.47	7
	1 unspecified	427			
	2a	3807	8642	23.54	2
	2b	613	1391	3.79	8
	2 unspecified	3927			
	3a	789	3657	9.96	3
	3b	67	311	0.85	10
	3c	72	334	0.91	9
	3 unspecified	2650			
	4a	961	2174	5.92	5
	4b	44	100	0.27	14
	4 unspecified	887			
	5	171	206	0.56	12
	6	1884	2265	6.17	4
	variant x	1	1	0.00	31
	variant y	17	20	0.05	17
	unspecified	3260			
C.	*S. boydii*				
	1	10	15	0.04	19
	2	142	213	0.58	11
	3	1	2	0.01	27
	4	29	44	0.12	15
	5	6	9	0.02	20
	6	2	3	0.01	26
	7	3	5	0.01	23
	8	1	2	0.01	27
	9	2	3	0.01	25
	10	11	17	0.05	18
	11	1	2	0.01	27
	12	1	2	0.01	27
	14	4	6	0.02	22
	unspecified	105			
D.	*S. sonnei*	15707	15829	43.11	1
	untypable	5			
	unknown	277			
	TOTAL	36711	36715		

* see footnote Table II

Table V

Sources of Reported Isolations of Shigella by Residence at Time of Onset, July through December 1967

Source	July	Aug	Sept	Oct	Nov	Dec		Total	Percent of Subtotal
Mental Institutions	37	48	97	119	115	44		460	20
Indian Reservations	12	30	15	10	15	6		88	4
Other Residences	-	-	-	-	-	-		1798	76
							Subtotal	2346	100
Residences Unknown	-	-	-	-	-	-		4210	
Total	912	1173	1109	1170	1297	895		6556	

Table VI

Shigellosis on Indian Reservations
Attack Rates per 100,000 (Division of Indian Health Data*)
July - December 1967

			Population	Jul	Aug	Sept	Oct	Nov	Dec	Total	Attack rate per 100,000
Alaska	Anchorage	Bethel	10,800	1	5					6	56
		Kotzebue	8,700	7		1				8	92
		Mt. Edgecumbe (Ketchikan)	10,350					1		1	10
		Tanana	5,200		1			1		2	39
Arizona	Window Rock (Albuquerque)	Chinle	12,500		2					2	16
		Ft. Defiance	13,200						1	1	8
		Kayenta	6,800					1	2	3	44
		Tuba City	10,300	28	43	38	24	12	5	150	1456
	Phoenix	Parker	1,400				1			1	71
		Peach Springs	1,500			14	2	3		19	1267
		Phoenix	7,600	4	1	12	2			19	250
		San Carlos	4,900		6	2	1			9	184
		Sells (Tucson)(Papago)	7,800	6		12	1	1		20	256
		Whiteriver (Cibecue)	5,300		6	2	1	1	1	11	208
California	Phoenix	Winter Haven	1,450				4			4	276
Idaho	Portland	Ft. Hall	2,400	2	1	2		1	1	7	292
		Northern Idaho	1,900			1				1	53
Minnesota	Bemidji(Aber)	Greater Leech L.(Cass L.)	2,500	3	2			8		13	520
		Red Lake	2,900	1	8	2	1		1	13	448
		White Earth	2,400			1			1	2	83
Mississippi	Okla. City	Choctaw(Philadelphia)	2,850	3	2			2	2	9	316
Montana	Billings	Blackfeet (Browning)	5,500	2	6	2		1	3	14	255
		Crow-N. Cheyenne	5,350		11	4	5	2		22	411
		Flathead	2,750			1				1	36
		Ft. Belknap-Rocky Boys (Harlem)	3,300	2			8	2		12	364
		Ft. Peck (Poplar)	3,500	1		1		1	1	4	114
Nevada	Phoenix	Schurz	4,650				1			1	22
New Mexico	Albuquerque	Jicarilla	1,500			3	1			4	267
		Mescalero	1,400	1				1		2	143
		Zuni-Ramah	5,200	8	13	5	2			28	538
		Laguna	5,700		2					2	35
	Window Rock (Albuquerque)	Crownpoint	8,100	5	11	9	5		2	32	395
		Gallup-Tohatchi	16,000	7	3	2	5	9	7	33	206
		Shiprock	19,300	1	12	7	8	7	3	38	197
N. Dakota	Aberdeen	Ft. Berthold	2,300				2			2	87
		Standing Rock (Ft.Yates)	4,200	3	2	5	5	1	1	17	405
		Turtle Mountain (Belcourt)	5,100	1	1	2				4	78
Oklahoma	Okla. City	Claremore	16,000			5c	1	5c	4c	1	6
		Tahlequah	10,600	1	1	1	1			4	38
		Talihina	10,650		2	4	1	1	2	10	94
		Pawnee	4,850		1					1	21
Oregon	Portland	Warm Springs	2,200			2	1	7	1	11	500

Table VI (continued)

Shigellosis on Indian Reservations
Attack Rates per 100,000 (Division of Indian Health Data*)
July - December 1967

			Population	Jul	Aug	Sept	Oct	Nov	Dec	Total	Attack rate per 100,000
S. Dakota	Aberdeen	Pine Ridge	8,350	6	7	20	7		8	48	575
		Sisseton-Wahpeton	2,400			1				1	42
		Yankton (Wagner)	2,000		1		1	1		3	150
Utah	Phoenix	Ft. Duchesne	1,900				3			3	158
Washington	Portland	Colville (Nespelem)	3,550	1						1	28
		W. Washington	3,800				1			1	26
Wisconsin	Bemidji(Aber)	Central Wisc.	600					50	15	65	10,833
		TOTAL (all reservations)		94	150	156	96	115	57	668	172

* Only reservations with reported cases are listed
c Consolidated

Table VII

Shigella Serotypes from Mental Institutions by State Reported During 1967 to the National Communicable Disease Center

SEROTYPES

State	A_2	B_1	B_2	B_3	B_4, B_4, B_6,	D	Subtotal
California			2	4		3	9
Connecticut						18	18
Florida	4		1	1	23	3	32
Georgia		4	5	2		1	12
Illinois	23		253	5	2	45	328
Maryland		1	8		1	7	17
Massachusetts				1		15	16
Michigan		1		10		73	84
Minnesota			1		16	24	41
New York			288			2	290
North Carolina	5		49	4		8	66
Oklahoma						40	40
South Dakota			1				1
Tennessee				37	3	23	63
Utah						9	9
Washington				1	1	23	25
TOTAL	32	6	608	65	46	294	1051

Figure 1

PERCENTAGE *S. flexneri* AND *S. sonnei* OF TOTAL SHIGELLA ISOLATIONS REPORTED FROM INDICATED REGIONS JULY — DECEMBER 1967

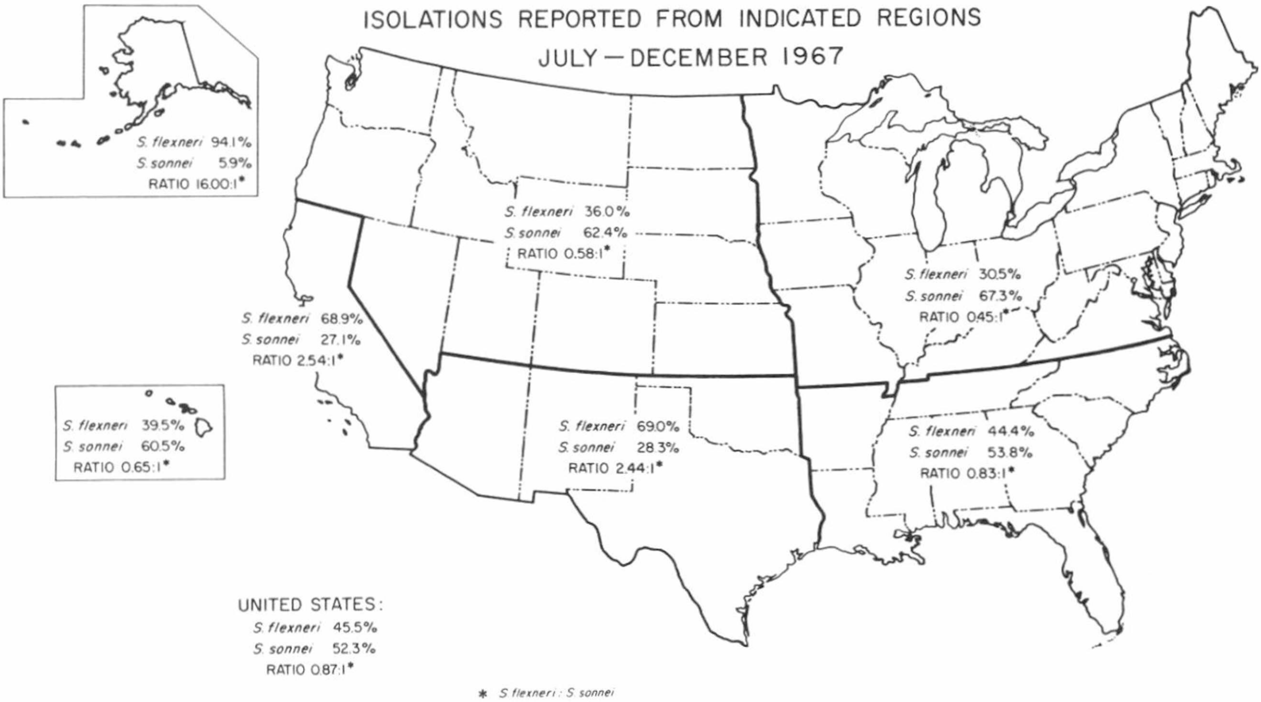
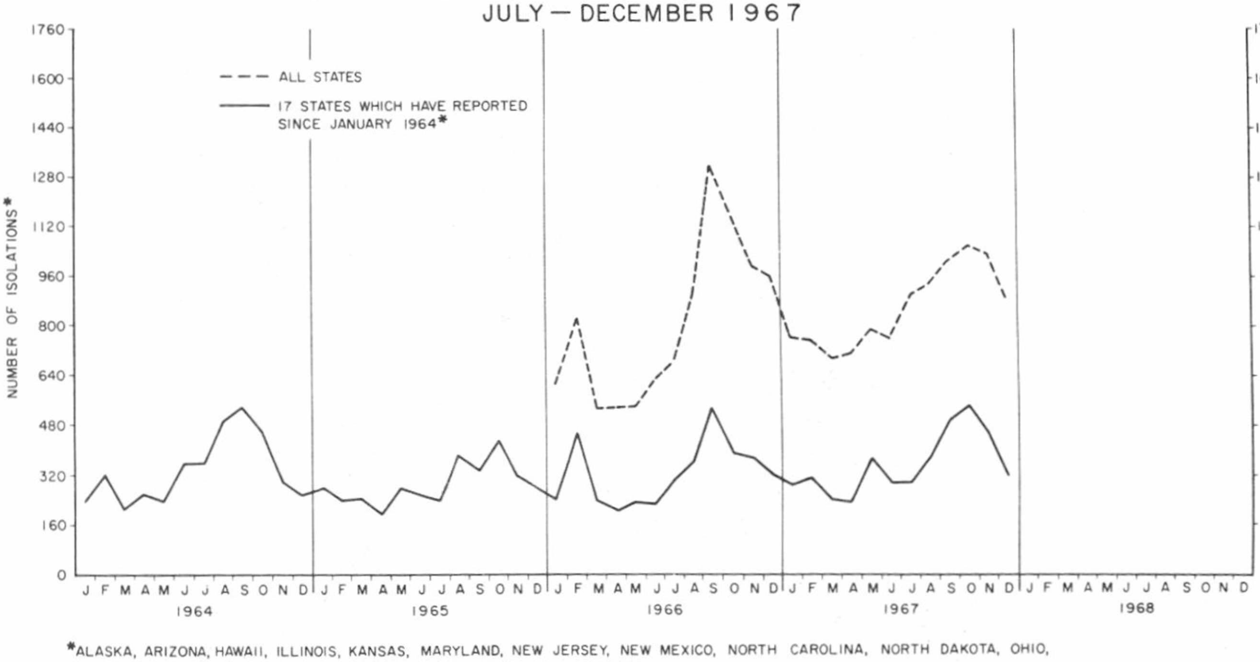


Figure 2.

REPORTED ISOLATIONS OF SHIGELLA IN THE UNITED STATES JULY — DECEMBER 1967

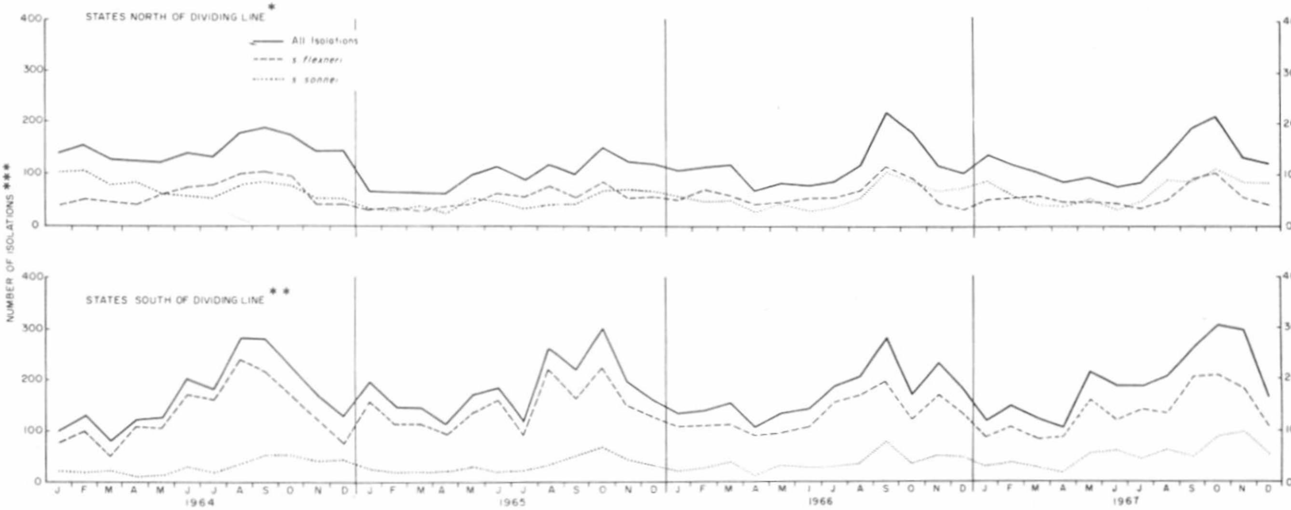


*ALASKA, ARIZONA, HAWAII, ILLINOIS, KANSAS, MARYLAND, NEW JERSEY, NEW MEXICO, NORTH CAROLINA, NORTH DAKOTA, OHIO, OKLAHOMA, OREGON, SOUTH DAKOTA, TENNESSEE, TEXAS AND VERMONT

**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 1 – JUNE 30, 1967

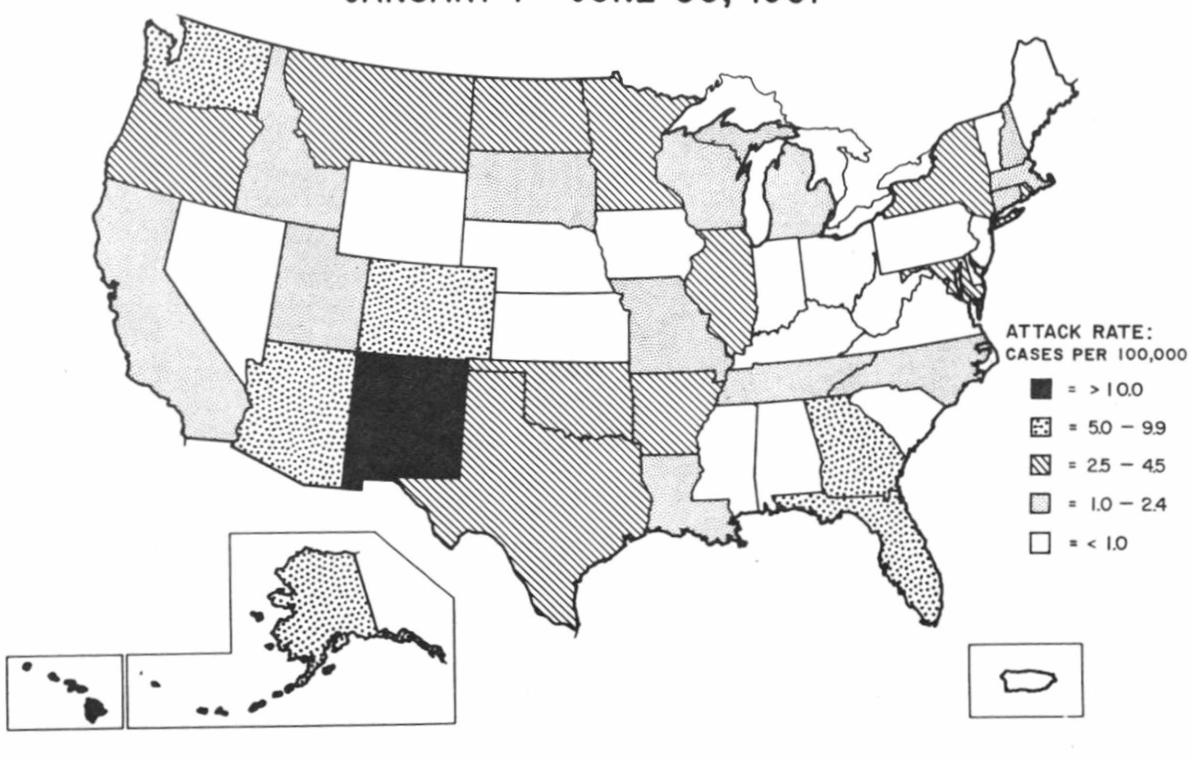


Figure 5

ATTACK RATES OF SHIGELLOSIS BY STATE
JULY 1 - DECEMBER 31, 1967

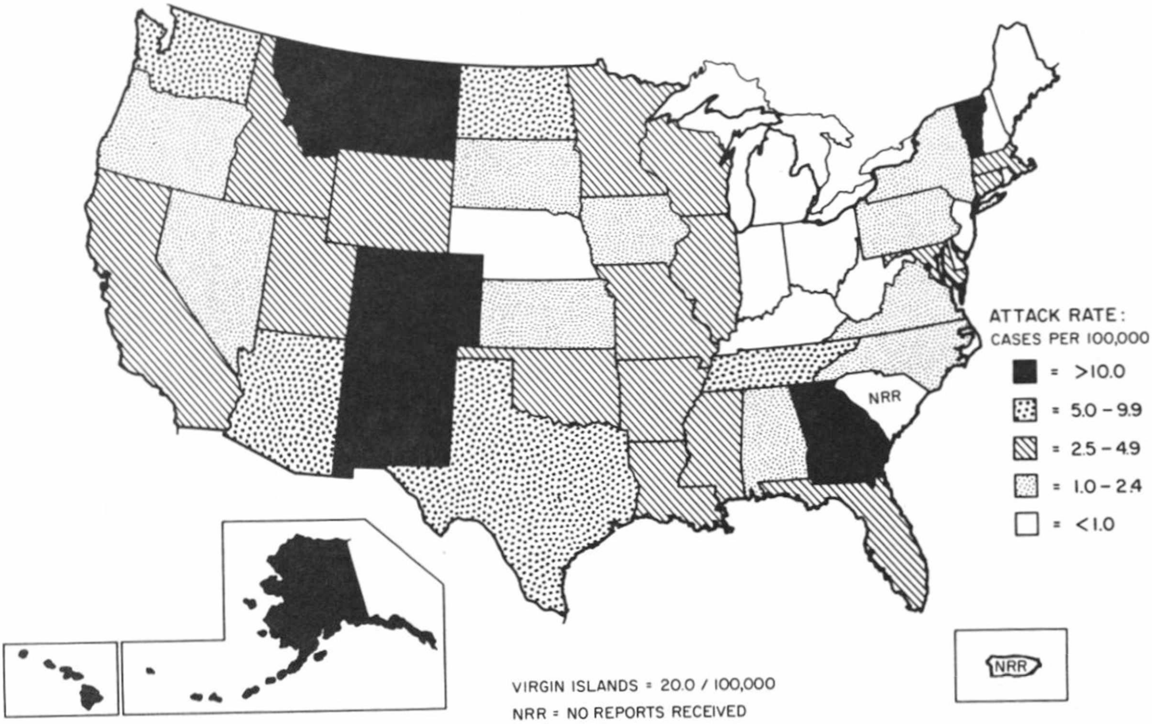
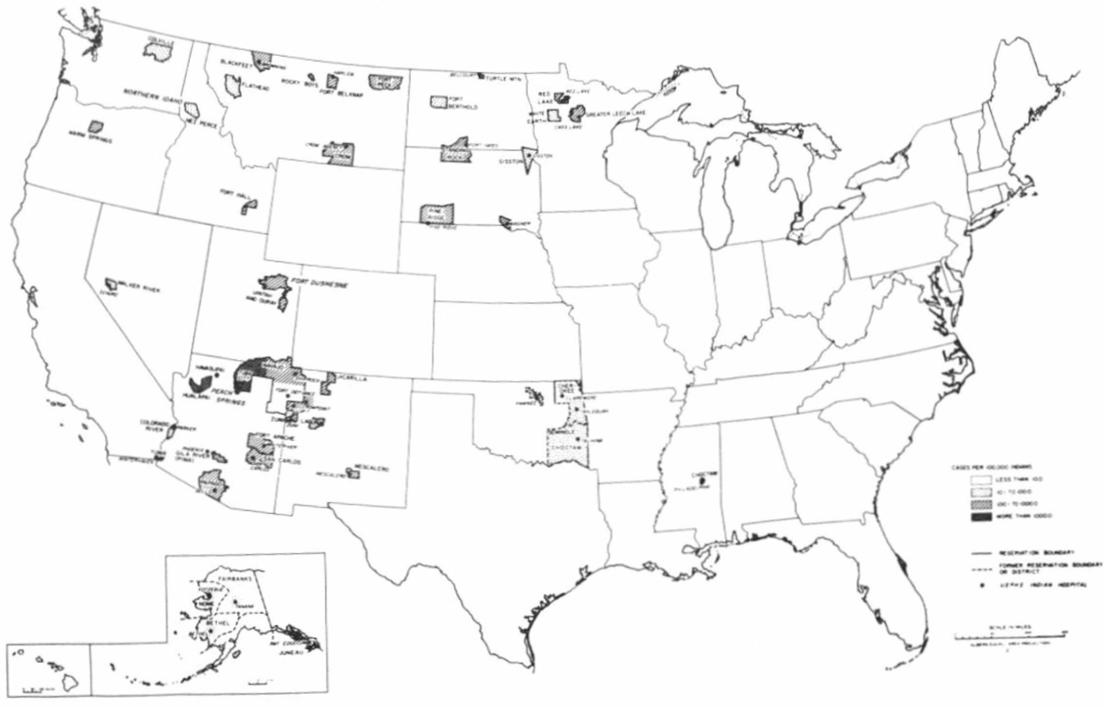


Figure 6

ATTACK RATE OF SHIGELLOSIS ON INDIAN RESERVATIONS
UNITED STATES, JULY - DECEMBER 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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