REPORT NO. 29
February 1972

center for disease control

SHIGELLA

surveillance

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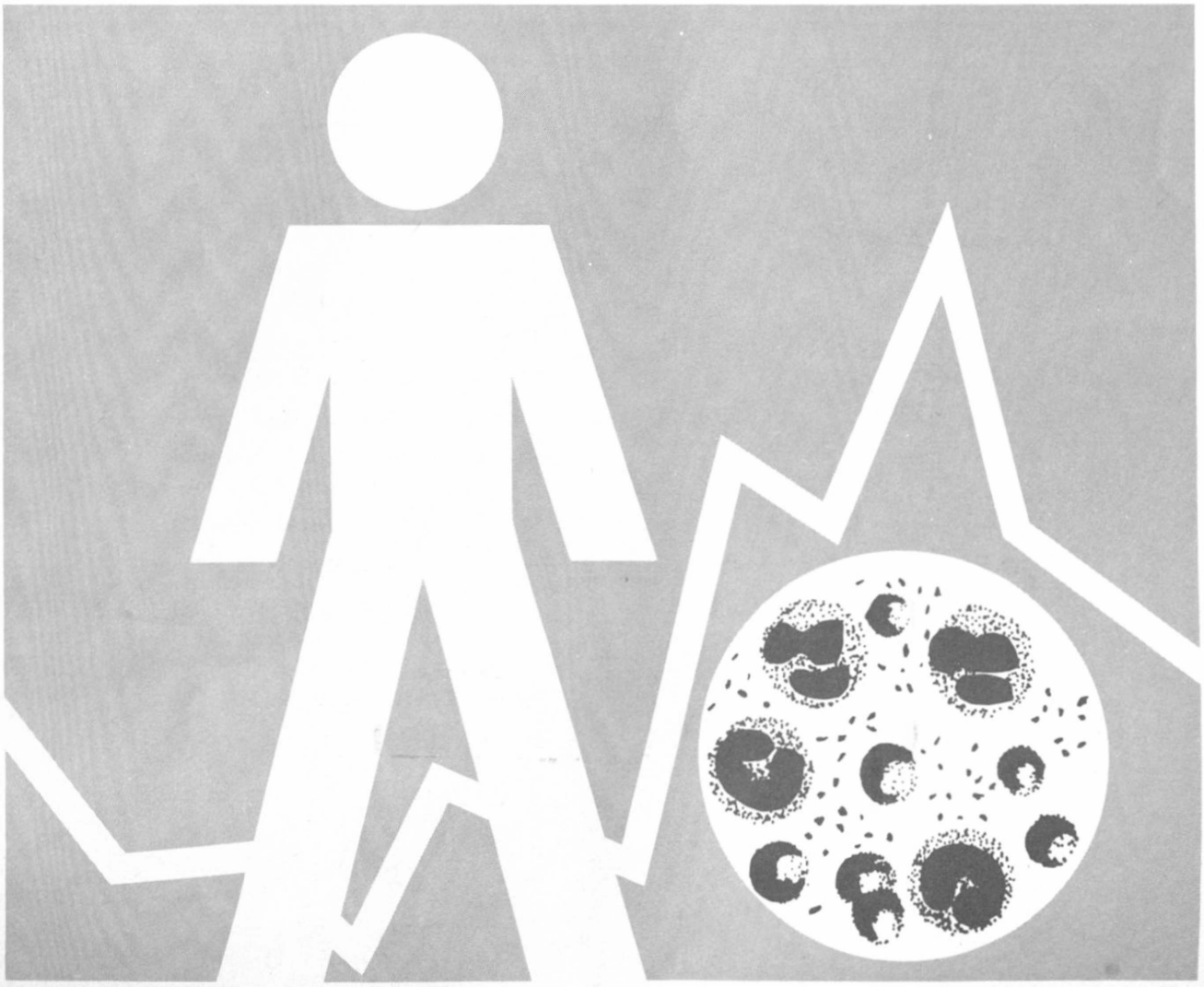
for the
Third Quarter 1971



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.

Contributions to the surveillance report are most welcome. Please address to:

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DHEW Publication No. (HSM) 72-8100

I. Summary

In the third quarter of 1971, 3,210 shigella isolations from humans were reported. This number represents an increase of 646 (25.2 percent) over the 2,564 isolations in the second quarter 1971 and a decrease of 1,226 (27.6 percent) from the 4,436 isolations in the third quarter of 1970 (Table I).*

II. Reported Isolations

A. Human

1. General Incidence

During the third quarter of 1971, 65.5 percent of isolations were from children under 10 years of age (Table II); this is consistent with previous quarters. The highest attack rate was in the age group 1-4 years.

2. Serotype Frequencies

Fifty of the 54 reporting centers participating in the Shigella Surveillance Program reported isolations of shigella. Twenty different serotypes were reported (Table I). The six most frequently reported serotypes during the 3-month period were the following (Table III):

Table 1

Rank	Serotype	Number Reported	Calculated Number **	Calculated Percent**	Rank Last Quarter
1	S. sonnei	2,256	2,278	70.9	1
2	S. flexneri 2a	167	327	10.2	2
3	S. flexneri 3a	89	163	5.1	3
4	S. flexneri 4a	47	112	3.5	6
5	S. flexneri 6	68	82	2.6	5
6	S. flexneri 2b	34	67	2.1	4
Subtotal		2,661	3,029	94.3	
Total (all serotypes)		3,210	3,212		

**From Table III

Table III is calculated from data compiled during the third quarter of 1971. This table shows the relative frequency of isolations of the various serotypes; the isolations in each of the unspecified categories are distributed in their subgroups in the same proportions as the completely specified isolations of that group. The resulting distribution in the tables is called the "calculated number," and from this is 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 accounted for approximately 70 percent of all isolations. Table IV shows the distribution of shigella serotypes reported from mental institutions.

3. Geographical and Seasonal Observations

There were more reported isolations of S. sonnei than S. flexneri in all but 11 states--Alabama, Arkansas, Tennessee, Arizona, Oklahoma, Colorado, Montana, North Dakota, South Dakota, Utah, and Wyoming (Figure 1). The seasonal distribution is depicted in Figure 2. Figure 3 shows the number of reported isolations per million population by state for July-September utilizing population estimates for July 1, 1969. Approximately 15.9 isolations per million population were reported during the third quarter of 1971. Table V shows the residence of those patients from whom shigella was isolated.

*No laboratory reports were received from California and the Virgin Islands.

Figure 1 PERCENTAGE *S. flexneri* AND *S. sonnei* OF TOTAL SHIGELLA ISOLATIONS REPORTED FROM INDICATED REGIONS UNITED STATES, JULY – SEPTEMBER 1971

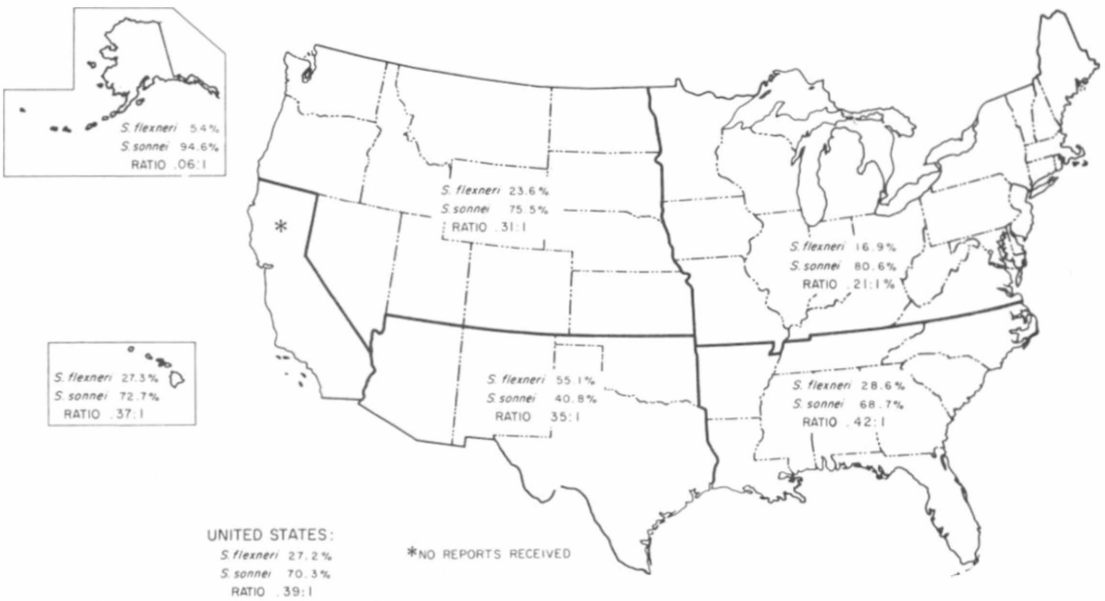
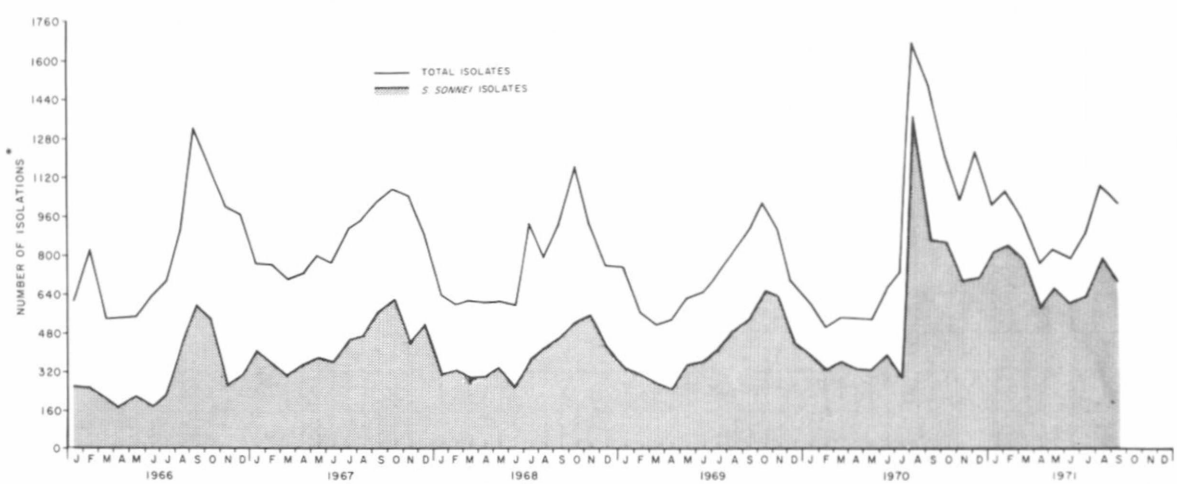
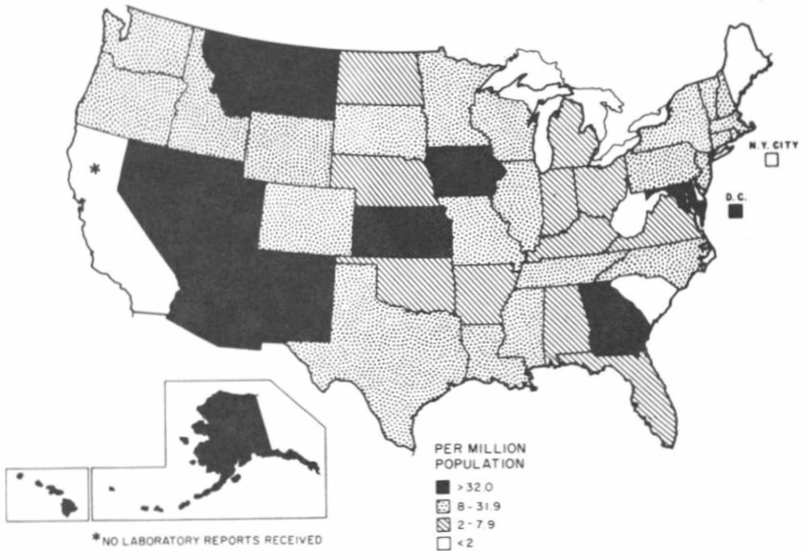


Figure 2 REPORTED ISOLATIONS OF SHIGELLA IN THE UNITED STATES



* ADJUSTED TO 4-WEEK MONTH

Figure 3 ATTACK RATES OF SHIGELLOSIS, BY STATE, JULY – SEPTEMBER 1971



B. Nonhuman

During the third quarter 1971, five nonhuman isolations of shigella, all in primates, were reported:

Table 2

Serotype	Number	Source	State
S. flexneri (unspec.)	1	monkey	Pennsylvania
S. flexneri 3	1	monkey	Georgia
S. flexneri 4a	1	monkey	Illinois
S. sonnei	1	monkey	Illinois
S. sonnei	1	monkey	Wisconsin

III. Current Investigations

Characteristics of Shigella sonnei Cases in the United States.

In the third quarter of 1971, S. sonnei was reported at a greater rate than in previous years (Figure 2). There were 2,256 isolates reported for the quarter compared with an average of 1,639 for the third quarters of the 5 preceding years. Shigella Surveillance Report No. 28, November 1971, discussed S. sonnei isolates in Georgia, Maryland, and New Mexico, and showed that in each of these states there was a much higher incidence in the largest city than in the remainder of the state. In this report the relationship of urban residence to the incidence of S. sonnei infection is explored, and attempts are made to relate this to variation in socio-economic parameters within the cities.

Shigella isolates are reported to the Center for Disease Control by county of patient's residence. All states except California are included in this reporting system. The 62 counties in the United States (excluding California) with 1970 populations greater than 500,000 were selected for analysis. The total population of these counties was 62.2 million, and 1,009 isolates were reported for the third quarter of 1971, an attack rate of 16.2 isolates per million population. This was 1.6 times the rate of isolations observed in counties of less than 500,000 population ($X^2 = 114$) as is shown in Table 3.

Table 3

Attack Rates of S. sonnei and S. flexneri Infection, United States (except California), Third Quarter, 1971

	Attack Rate/Million Population	
	S. sonnei	S. flexneri
Counties of population greater than 5×10^5	16.2	4.5
Counties of population less than 5×10^5	10.3	4.9

Although the reporting of S. flexneri infection is presumably the same as for S. sonnei, the rates of S. flexneri infection from large and small counties were nearly the same, while those for S. sonnei were markedly different. The higher incidence in more populous areas appears to be a distinctive feature of S. sonnei.

In the 62 large counties studied, there was a wide range of different attack rates of S. sonnei for the third quarter, from 0 to 178 cases per million population. Several socioeconomic characteristics of the counties were examined in an attempt to show whether variations in these parameters might correlate with attack rates. County-specific measurements of educational level, family income, and adequacy of housing were available from the 1960 census.* For each parameter, counties were divided into those above or below the median level for the 62 counties. Attack rates were then calculated for the high and low groups, as shown in Table 4.

Table 4

S. sonnei Attack Rates Compared With County Socioeconomic Levels,≠ 62 Counties, Third Quarter, 1971

		Attack Rate / 10^6 Population	X^2
Mean family income	Counties ≥ $6,500	10.1	158
	Counties < 6,500	22.9	
Percent sound housing with adequate plumbing	Counties ≥ 83%	13.4	33.6
	Counties < 83%	19.3	
Median years education of persons ≥ 25-years old	Counties ≥ 11.3	13.4	20.7
	Counties < 11.3	18.2	

In 1960 the median family income for the United States was $5,660; 74 percent of houses were sound with adequate plumbing, and persons 25 years old and above had completed a median of 10.6 school years. The rate of S. sonnei isolations for the third quarter for the country as a whole was 12.3 per million. For each of these socioeconomic variables, urban counties lower on the scale had higher attack rates of shigellosis. It was not possible to analyze these variables independently, as counties low in one category tended to be low in the others as well. Neither was it feasible to compare counties of less than 500,000 population with respect to these variables.

Discussion: Since the beginning of nationwide surveillance of shigellosis in 1965, rates of reported isolates of S. sonnei have increased steadily while S. flexneri rates have declined. A similar pattern has been noted in many other areas of the world;@ in general, countries that are less developed and in which drinking water is a more common vehicle of enteric disease have a higher proportion of S. flexneri infections.

* Not yet available for 1970 census

≠ 1960 census

@ See International Notes in this report

In 1965 S. flexneri was more common in the southeastern and southwestern United States, the northwestern states were mixed, and only the northeastern states had a majority of S. sonnei isolates. By 1971 S. sonnei predominated in all parts of the United States. It is unlikely that these two species compete directly with each other in the environment or in human intestines, as the two are rarely isolated together. It is more likely that there has been some change in the environment or in S. sonnei's adaption to the environment, producing conditions more favorable for the transmission of this organism. One possible explanation, though unlikely, is that the increase of S. sonnei reporting may simply be the result of better surveillance with either more cultures being taken, better media being used, or more isolates being reported to the state laboratories. The increase of S. sonnei isolates relative to S. flexneri is a real one in any case.

S. sonnei is reported much more commonly in urban than rural areas, in spite of the fact that these same urban areas have facilities of sewage disposal and water supply that are more advanced than the average for the United States. These data suggest that either person-to-person or foodborne spread favors this species over others. Compatible with this explanation is the fact that among urban areas those with a lower socioeconomic level have a higher attack rate. The rates of infection within these areas are inversely related to the adequacy of housing, income, and amount of education.

The data in this report are limited to the macrocosm of shigella surveillance; they cover only the overall attack rates and socioeconomic levels of whole counties. Much more detailed studies are possible and should be directed at the specific conditions in which endemic shigellosis arises in this country.

IV. International Notes

S. sonnei Versus S. flexneri Infection--Worldwide Prevalence

The emergence of S. sonnei as the predominant serotype in the United States and the decline of S. flexneri raises the question of the relationship between shigella serotypes in other parts of the world. A number of authors in other countries have written on the subject.[1-4] Figure 4 shows the predominance of S. sonnei or S. flexneri in different countries. The numbers superimposed on the various areas indicate the years in which most recent studies were published. Unfortunately, some of these data are quite old, so that many different areas cannot be adequately compared. Australia, for example, had more S. flexneri than S. sonnei in 1945, while the United States with more S. sonnei than S. flexneri in 1971 had a predominance of S. flexneri as recently as 1965.

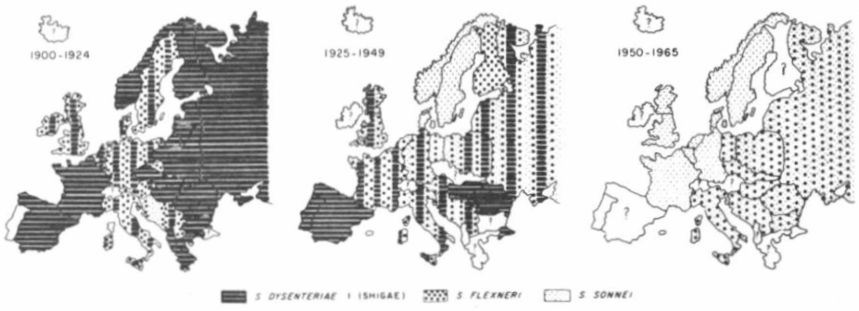
Kostrzewski and Stypulkowska-Misiurewicz[1] showed that Europe has witnessed a gradual change from 1900 when S. dysenteriae 1 was the most common serotype seen to 1965 when S. sonnei was the most common in many of the western countries (Figure 5). They described this as being a trend in favor of "less pathogenic" organisms with milder disease correlated with improving sanitary and socioeconomic conditions.

Some areas have been studied simultaneously. Elkin, Solodovnikov, and Padalkin described the incidence of S. sonnei and S. flexneri infections in the different territories of the Union of Soviet Socialist Republics in 1965. They included the incidence of typhoid in these same areas, suggesting that typhoid incidence is a good indicator of the prevalence of waterborne gastrointestinal disease. As can be seen in Table 5, seven areas with the highest rates of typhoid had more S. flexneri than S. sonnei, while in areas with low typhoid rates the opposite was true. They concluded that S. sonnei transmission relies primarily on person-to-person spread, while S. flexneri is more commonly transmitted by contaminated water.

Discussion: These reports by a variety of authors make an interesting comparison with the data and discussion presented in Current Investigations of this report. They demonstrate a correlation between increasing relative prominance of S. sonnei and improving socioeconomic conditions. They suggest but do not prove that delivery of safe drinking water and modern disposal of sewage are the most important factors in the changing pattern of shigellosis.

Figure 4 RELATIVE PREVALENCE OF *S. SONNEI* AND *S. FLEXNERI*, 1937 – 1971

Figure 5
SHIGELLOSIS IN EUROPE, 1900-1965



* SOURCE: KOSTRZEWSKI ET AL, ARCHIVUM IMMUNOLOGIAE ET THERAPIE EXPERIMENTALIS 16: 429, 1968

Table 5

Incidence of Typhoid by Rank of Province
Compared with Etiology of Shigellosis, U.S.S.R., 1965

Territory	Rank typhoid fever incidence	Species of shigella (percent) sonnei	flexneri	Other
Ukranian SSR	15	81.7	18.1	0.2
Belorussian SSR	14	51.6	48.1	0.3
Moldavia	13	61.8	35.8	2.4
Russian SFSR	12	No combined data		
Latvia	11	84.6	15.2	0.2
Kazakhstan	10	51.0	47.2	1.8
Estonia	9	77.8	21.9	0.3
Lithuania	8	55.7	44.1	0.2
Georgia	7	22.6	75.4	2.0
Azerbaijan	6	23.4	73.6	3.0
Armenia	5	25.0	70.1	4.9
Turkmenia	4	17.8	79.8	2.4
Kirghizia	3	27.5	66.7	5.8
Tajikistan	2	12.8	83.4	3.8
Uzbekistan	1	27.3	71.3	1.4

1. Kostrzewski J, Stypulkowska-Misiurewicz H: Changes in the epidemiology of dysentery in Poland and the situation in Europe. Arch Immun Ther Exp 16:429, 1968

2. Aoki Y: Serological groups of shigella in Japan and neighboring countries. Trop Med 10:116, 1968

3. Krasheninnikov OA: Characteristics of the geographical distribution of shigella. IV. Changes in the etiological structure of dysentery in countries of Central and South America, Africa, and Asia. Zh. Mikrobiol 46:53, 1969

4. Elkin II, Solodovnikov YP, Padalkin VP: Acute intestinal diseases and typhoid fever. Epidemiologic parallels. Zh. Mikrobiol 46:119, 1969

V. Reports from the States

A. Waterborne Shigellosis Among Campers, New Jersey and New York. Reported by Emmett Landiak, Public Health Coordinator, Warren County Health Department, New Jersey; Alan R. Hinman, M.D., Director, Bureau of Epidemiology, New York State Department of Health; Michael A.

Gross, M.D., EIS officer located at the New York State Department of Health; Ronald Altman, M.D., Director of Epidemiology Services, New Jersey State Department of Health; and Todd A. Davis, M.D., EIS officer located at the New Jersey State Department of Health.

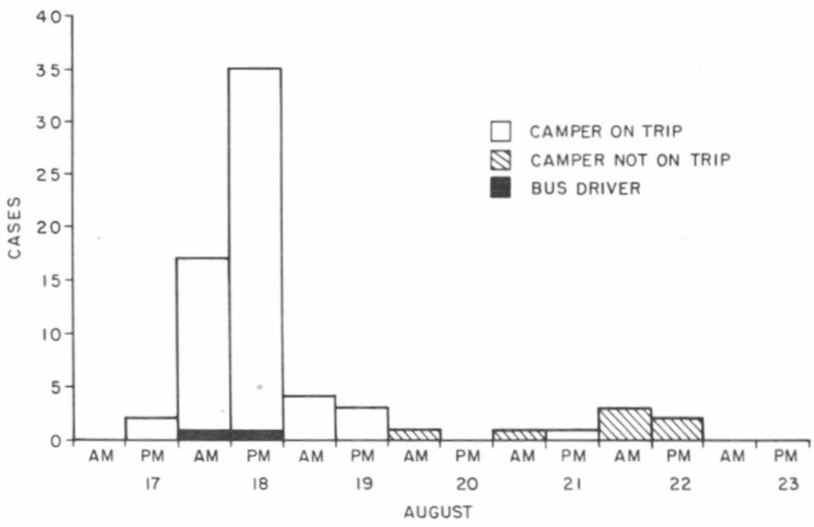
A common source outbreak of shigellosis due to S. sonnei affected a group of campers in New York after a 1-day visit to another camp in New Jersey in August 1971. Campers in residence at the New Jersey camp experienced elevated rates of gastroenteritis during the entire summer.

On August 17, 1971, 99 campers and staff from a New York summer camp went on a field trip to a nearby New Jersey camp to play basketball. They arrived in chartered buses at about 10:30 AM, played basketball, ate lunch, played another game of basketball, and returned that afternoon. Many of them drank water from drinking fountains both before and after lunch. Lunch consisted of material brought with the campers. It included bologna and salami, mustard, bread, punch, fresh peaches, and cookies. This food was eaten by those who went on the trip only. Dinner that night and breakfast the next day were eaten in common with the remainder of the New York campers.

Food and illness histories were obtained on August 23 from all but seven of the persons who went on the excursion. Samples of stool were obtained on August 22 and 23 from nine primary and secondary cases. The water supply at the New Jersey camp was tested by the New Jersey Department of Health.

The epidemic began in the evening, the day of the trip; but most cases occurred the following day, and a few appeared sporadically during the next week (Figure 6). The shortest incubation period was 10 hours, but 45 of the 62 ill persons from whom food histories were obtained became ill 19 to 36 hours after exposure. Symptoms included emesis and/or nausea, diarrhea, and cramps, and the illness lasted from 1 day to 1 week or longer. There was one case of bloody diarrhea. Fever was documented in several cases. The physician who saw many of the cases did not note any cases of hypotension, and treated most ill persons with paregoric, injectable penicillin, and oral Cleocin. Hospitalization was not required, and there were no deaths.

Figure 6 SHIGELLOSIS CASES BY ONSET, NEW JERSEY AND NEW YORK, 1971



Food specific attack rates were computed for the water and foods served at lunch (Table 6). Eighty-one percent of those who drank the water became ill; but none of the 16 who went on the trip and did not drink the water became ill ($p < 0.01$ by Fisher's exact test). Attack rates for other foods did not approach this level of significance.

Table 6

Food Specific Shigellosis Attack Rates For Campers,
New Jersey and New York, August, 1971

	Ate			Did Not Eat		
	Ill	Well	Percent Ill	Ill	Well	Percent Ill
Water	59	14	81	0	16	0
Bologna	49	27	65	10	3	77
Salami	38	17	69	21	13	62
Mustard	48	28	63	11	2	85
Punch	58	30	66	1	0	100
Peaches	46	28	62	13	2	87

In addition to the cases described above, the two bus drivers, who drank water at the camp but did not eat any food, became ill with nausea, cramps, and diarrhea after an incubation period of 20-24 hours. There were no acute cases among campers who had not been on the trip. Of the eight sporadic cases which occurred on August 20 and the following days, only two had been on the trip.

The New York State Health Department Bacteriology Laboratory reported that four of the nine stools submitted from ill persons were positive for S. sonnei.

There were no unusual incidents of diarrhea at the New Jersey Camp during the 3 or 4 days following the basketball game. However, since the onset of the summer camping season, up to 12 percent of the New Jersey campers had visited the infirmary because of diarrhea on any given day. Girls had a higher attack rate than boys, and the greatest incidence of diarrhea occurred 2-3 days after a new group of campers arrived.

The water supply at the New Jersey camp came from two wells, A and B. The septic tanks were located approximately 50-100 yards downhill from well B. During the summer, most of the water had been supplied by well B because of a broken pipe from well A. A chlorinator had been attached to the water supply early in the summer but had not been functioning during most of the camping season. The New York campers recalled that the water had a "swamp-like" smell. Water specimens obtained from various sites in the camp revealed that the water coming from well B (water which was drunk by the New York campers) was heavily contaminated by fecal coliforms. As an immediate control measure, all drinking water was boiled and the following day adequate chlorination was obtained with the assistance of local sanitarians. The camp owners planned to drill a new well before next summer.

Editorial note: Of nine previous waterborne outbreaks of shigellosis reported to CDC since the beginning of 1967, seven were caused by S. sonnei and the other two by S. flexneri. There were a total of 840 persons affected, and attack rates ranged from 8 percent up to 86 percent. Shigella was recovered from the water involved in only one instance (an isolate of S. sonnei). All of these previous outbreaks occurred in the warmest months May through October; three occurred in summer camps. None of the water supplies were chlorinated, and when chlorination was instituted, it was effective in blocking this route of transmission.

B. Shigellosis in a Nursery, Washington, D.C. Reported by Walter Lawrinson, M.D., Pathologist, Washington Hospital Center; John R. Pate, M.D., Chief, Venereal Diseases and Communicable Disease Control, Community Services Administration, Washington, D.C.; and Robert Marier, M.D., EIS officer located in Washington, D.C.

In August 1971 S. sonnei was isolated from the stools of two infants in the nursery of a Washington, D.C., hospital.

Baby A was born on August 21 and admitted to the nursery. Twenty-four hours later, he developed fever and diarrhea. When his stool cultures grew S. sonnei,

he was transferred to an isolation unit. The organism was resistant to ampicillin and cephalothin. He was treated with oral neomycin and improved uneventfully, but was kept in isolation. His mother was reported to have had diarrhea on the day of delivery. Her stool cultures were negative on August 26 at a time when she was asymptomatic. Following delivery she returned to her room on the same floor as the nursery but on a different corridor. No one else in the family was ill.

Baby B was also born on August 21 and admitted to the same nursery. He was in good health until August 24 when he developed loose stools and fever. His stool culture also grew S. sonnei, resistant to ampicillin and cephalothin. It is unknown where he was placed in the nursery in relation to Baby A. No one else in his family was ill.

On August 26 Baby B was transferred to the isolation unit. At this time stool cultures were obtained from all babies in the nursery, and the nursery was temporarily closed to new admissions until it was learned that none of the cultures were positive. No diarrheal illness was reported by employees in the delivery room, nursery, or isolation unit.

It was hypothesized that Baby A contracted shigellosis from his mother at the time of birth. He became ill 24 hours later but was not isolated until the culture report was received the next day. During this time hand-to-hand spread to Baby B occurred, and he became ill 24-36 hours later. With isolation of affected infants, closing of the nursery to new admissions, and increased attention to handwashing by the staff, there were no additional cases.

Editorial Note: Shigellosis in newborn infants has rarely been reported. In contrast, salmonellosis is commonly recognized in the newborn and frequently traced to infection in the mother transmitted to the baby during delivery. The inoculum of shigellae required to infect adults is generally much lower than that required for salmonellosis; so the relative scarcity of neonatal shigellosis remains an unanswered puzzle.

Haltalin[1] published a review of neonatal shigellosis in which he described 16 cases seen at his own hospital and reviewed eight previously reported cases. Most of the infants first became ill after discharge from the hospital at ages up to 23 days. Maternal shigellosis was documented by isolation in only two cases, but many of the mothers had experienced diarrhea at about the time of delivery. Fourteen of the author's cases were caused by S. flexneri and only two by S. sonnei.

The clinical picture of these infections was unusual when compared to that seen in adults or older children. The most common presenting syndrome was simply failure to feed well. Diarrhea was not always present. The initial clinical impression in several infants was one of sepsis with bacteremia, but in fact no blood cultures were positive for shigellae. Fever was present in only half the cases and was of low grade. Convulsions were not described. Twelve infants were dehydrated but only two severely so. Mortality was 20 percent. The two deaths reported by the author were both attributed to peritonitis with "chronic adhesive" lesions seen at postmortem examination; perforation of the colon was demonstrated in one case.

Shigellosis, though apparently rare in the newborn, should be considered in infants who are not feeding well or are septic. A stool culture should be obtained even if diarrhea is not a prominant symptom. A history of maternal diarrhea and a stool culture from the mother are also of value in making the diagnosis.

1. Haltalin KC: Neonatal shigellosis. Amer J Dis Children 114:603, 1967

TABLE I

SHIGELLA SEROTYPES ISOLATED FROM HUMANS

THIRD QUARTER, 1971

SEROTYPE	NORTHEAST																										NORTHWEST												NORTH TOTAL
	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	CQLO	IDAHO	KANSAS	MONT	NEB	NEV	ND	ORE	SD	UTAH	WASH	WYO	NORTHWEST TOTAL	
A. *S. dysenteriae*																																						
Unspecified																										0	1											1	1
1																										0												0	0
2				4											1											5			1									1	6
3											1															1												0	1
4				1																						1											0	1
9																										0												0	0
Total	0	0	0	5	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	7	1	0	1	0	0	0	0	0	0	0	0	0	2	9
B. *S. flexneri*																																						
Unspecified			4		5					1			9		5	1	1	18		3	1		1	1		50	20	1					2	7	17		2	3	52	102
1 Unspecified									3																	3				2					4			6	9
1A	2			2							3															7												0	7
1B				3						1	1	1														6												0	6
2 Unspecified							2		2	11	2		5													22				8					16	2		26	48
2A	1			17							3	8														29		2	1	2			1					6	35
2B				13															1							14												0	14
3 Unspecified									3				2		16										6	27									3			3	30
3A	2			37											7											46												0	46
3B																										0												0	0
3C											2	1														3												0	3
4 Unspecified									14				11												3	28				2					1			3	31
4A				4								4														8									1			1	9
4B																										0									1			1	1
5				8					1																	9												0	9
6	1			9															1							11		1		6								7	18
Total	6	0	4	93	5	0	2	0	23	13	11	14	27	0	28	1	1	18	2	3	1	0	1	1	9	263	20	4	1	20	0	0	3	7	17	26	4	3	105	368
C. *S. boydii*																																						
Unspecified																										0	1											1	1
1																									1	1												0	1
2				2								2														4												0	4
4																										0												0	0
10				1																						1											0	1
14																									1	1												0	1
Total	0	0	0	3	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	2	7	1	0	0	0	0	0	0	0	0	0	0	0	1	8
D. *S. sonnei*	62		65	138	20	91	7		139	92	39	31	42	9	60	37	18	155	30	99	7	4	11	1	94	1,251	16	16	136	3	7	28	1	47	1	15	65		335	1,586
Unknown			20											1				2			1					24	1											1	25
TOTAL	68	0	89	239	25	91	9	0	162	105	51	47	69	10	89	38	19	175	32	102	9	4	12	2	105	1,552	39	20	138	23	7	28	4	54	18	41	69	3	444	1,996

TABLE I (CONTINUED)

SHIGELLA SEROTYPES ISOLATED FROM HUMANS

THIRD QUARTER, 1971

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	
					4				4					0	4					0	5	0.2	2	0.1	A. *S. dysenteriae* Unspecified
									0	2	1		2	5	5					0	5	0.2	1	0.0	1
						1			1				2	2	3					0	9	0.3	7	0.3	2
									0				2	2	2					0	3	0.1	—	—	3
						1			1	1			2	3	4					0	5	0.2	1	0.0	4
									0	1				1	1					0	1	0.0	—	—	9
0	0	0	0	0	4	2	0	0	6	4	1	0	8	13	19	0	0	0	0	0	28	0.9	11	0.4	Total
																									B. *S. flexneri*
12		1			17				30	1	1	7		9	39	2		1		3	144	4.5	114	4.4	Unspecified
								1	1		12			12	13					0	22	0.7	6	0.2	1 Unspecified
								5	5	3			5	8	13					0	20	0.6	8	0.3	1A
									0				1	1	1					0	7	0.2	1	0.0	1B
		8	24			3			35		41			41	76					0	124	3.9	64	2.5	2 Unspecified
	5			12				8	25	47			51	98	123			9		9	167	5.2	120	4.7	2A
								1	1	5			14	19	20					0	34	1.1	32	1.2	2B
		1	5			1			7		14			14	21			3		3	54	1.7	29	1.1	3 Unspecified
				5				12	17	12			14	26	43					0	89	2.8	68	2.6	3A
								1	1	9			2	11	12					0	12	0.4	12	0.5	3B
									0	2				2	2					0	5	0.2	2	0.1	3C
			3						3		15			15	18					0	49	1.5	10	0.4	4 Unspecified
				3				4	7	23			6	29	36			2		2	47	1.5	24	0.9	4A
									0	3				3	3					0	4	0.1	1	0.0	4B
									0	14			4	18	18					0	27	0.8	10	0.4	5
	1	1		3				4	9	11	10		20	41	50					0	68	2.1	34	1.3	6
12	6	11	32	23	17	4	0	36	141	130	93	7	117	347	488	2	0	15	0	17	873	27.2	536	20.9	Total
																									C. *S. boydii*
					1				1					0	1					0	2	0.1	1	0.0	Unspecified
									0					0	0					0	1	0.0	2	0.1	1
									0	4			3	7	7					0	11	0.3	6	0.2	2
									0	4			1	5	5					0	5	0.2	1	0.0	4
									0	1				1	1					0	2	0.1	3	0.1	10
									0					0	0					0	1	0.0	3	0.1	14
0	0	0	0	0	1	0	0	0	1	9	0	0	4	13	14	0	0	0	0	0	22	0.7	16	0.6	Total
12	4	35	171	26	23	38		29	338	24	105	5	123	257	595	35		40		75	2,256	70.3	1,983	77.3	D. *S. sonnei*
					1		5		6					0	6					0	31	1.0	18	0.7	Unknown
24	10	46	203	49	46	44	5	65	492	167	199	12	252	630	1,122	37	0	55	0	92	3,210		2,564		TOTAL

Table II

Age and Sex Distribtuion of Individuals Infected With Shigella in the United States, Third Quarter, 1971

Age (Years)	Male	Female	Unknown	Total	Percent	Cumulative Percent	Number of Reported Isolations/ Million Population*
< 1	63	63	2	128	6.0	6.0	36.6
1-4	454	390	3	847	39.4	45.4	58.6
5-9	231	199	2	432	20.1	65.5	20.7
10-19	173	186		359	16.7	82.2	9.2
20-29	64	150	1	215	10.0	92.2	7.4
30-39	32	47		79	3.7	95.9	3.5
40-49	13	19		32	1.5	97.4	1.3
50-59	8	9		17	.8	98.2	0.8
60-69	7	15		22	1.0	99.2	1.5
70-79	6	6		12	.6	99.8	1.3
80 +	2	5		7	.3	100	1.9
Subtotal	1,053	1,089	8	2,150			
Child (unspec)	7	10	2	19			
Adult (unspec)	5	5		10			
Unknown	527	462	42	1,031			
Total	1,592	1,566	52	3,210			
Percent	50.4	49.6					

*Based on provisional data from Population Estimates, Series P25, No 428, (August 19, 1969) and No. 441 (March 19, 1970)

Table III

Relative Frequencies of Shigella Serotypes
Reported, Third Quarter, 1971

	Serotype	Number Reported	Calculated Number*	Calculated Percent	Rank
A.	S. dysenteriae				
	Unspecified	5			
	1	5	6	.19	15
	2	9	11	.34	12
	3	3	4	.12	16
	4	5	6	.19	15
	9	1	1	.03	18
B.	S. flexneri				
	Unspecified	144			
	1 unspecified	22			
	1a	20	44	1.37	7
	1b	7	15	.47	10
	2 unspecified	124			
	2a	167	327	10.18	2
	2b	34	67	2.09	6
	3 unspecified	54			
	3a	89	163	5.07	3
	3b	12	22	.68	9
	3c	5	9	.28	14
	4 unspecified	49			
	4a	47	112	3.49	4
	4b	4	10	.31	13
	5	27	33	1.03	8
	6	68	82	2.55	5
C.	S. boydii				
	Unspecified	2			
	1	1	1	.03	18
	2	11	12	.37	11
	4	5	6	.19	15
	10	2	2	.06	17
	14	1	1	.03	18
D.	S. sonnei	2,256	2,278	70.92	1
	Unknown	31			
	TOTAL	3,210	3,212		

*Calculated number is derived by distributing the unspecified isolation in each group to their subgroup in the sam proportion as the distribution of the specified isolations of that group.

Table IV

Shigella Serotypes from Mental Institutions
Number of Isolations by State.
Third Quarter, 1971

State	dysenteriae 2	flexneri unspecified	flexneri 2 unspecified	flexneri 2a	flexneri 2b	flexneri 3 unspecified	flexneri 3a	flexneri 4 unspecified	flexneri 4a	flexneri 5	flexneri 6	sonnei	Total
Florida	0	0	0	0	0	0	0	0	0	0	0	5	5
Georgia	0	0	19	0	0	0	0	0	0	0	0	1	20
Illinois	4	0	0	5	12	0	12	0	0	8	2	0	43
Kansas	0	0	0	0	0	0	0	0	0	0	0	77	77
Maryland	0	0	0	0	0	1	0	14	0	0	0	0	15
Massachusetts	0	0	7	0	0	0	0	0	0	0	0	5	12
Minnesota	0	0	0	5	0	0	0	0	1	0	0	1	7
Missouri	0	0	5	0	0	0	0	0	0	0	0	1	6
New Jersey	0	5	0	0	0	16	7	0	0	0	0	4	32
New York	0	7	0	0	0	0	0	0	0	0	0	0	7
North Carolina	1	0	0	0	0	0	0	0	0	0	0	0	1
South Dakota	0	1	0	0	0	0	0	0	0	0	0	0	1
Tennessee	0	0	0	0	0	0	0	0	0	0	0	1	1
Utah	0	0	6	0	0	0	0	0	0	0	0	0	6
Wisconsin	0	0	0	0	0	0	0	0	0	0	0	51	51
TOTAL	5	13	37	10	12	17	19	14	1	8	2	146	284

Table V

Sources of Reported Isolations of Shigella
by Residence at Time of Onset
Third Quarter, 1971

Source	Jul	Aug	Sep	Total	Percent of Subtotal	Percent of Total
Mental institutions	92	120	61	284	20	
Indian reservations	1	9	12	22	2	
Other residencies	305	362	431	1147	79	
Subtotal	398	491	504	1453		45
Residencies unknown	478	592	634	1757		55
Total	876	1083	1138	3210		

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The State Epidemiologists are the key to all disease surveillance activities. 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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