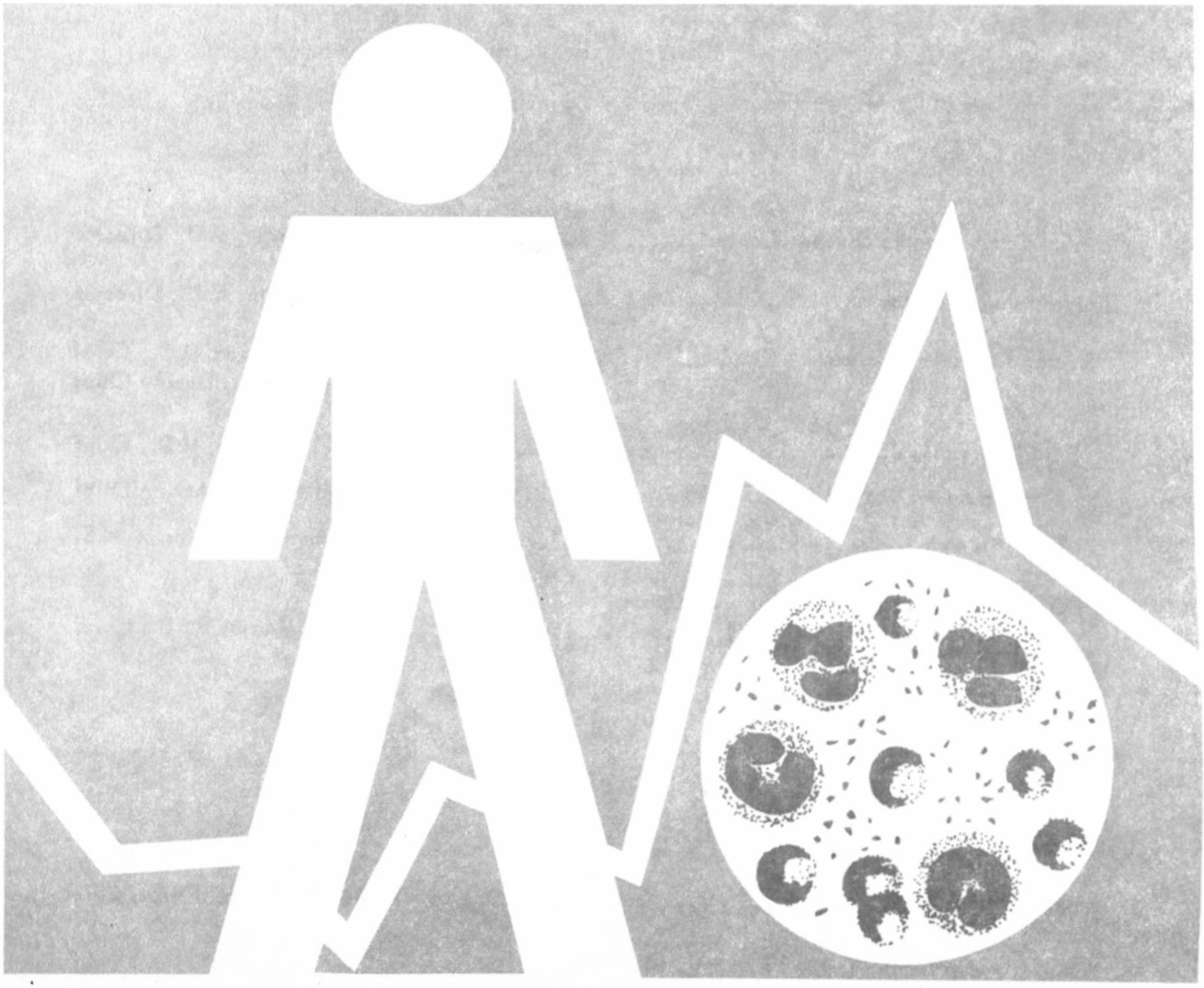
REPORT NO. 21
December 5, 1969

national communicable disease center

SHIGELLA

surveillance

TABLE OF CONTENTS
for the
Third Quarter 1969



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

PREFACE

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

National Communicable Disease Center ..... David J. Sencer, M.D., Director

Epidemiology Program ..... Alexander D. Langmuir, M.D., Director

Bacterial Diseases Branch ..... Philip S. Brachman, M.D., Chief
John V. Bennett, M.D., Deputy Chief

Enteric Diseases Section ..... Eugene J. Gangarosa, M.D., Chief

Shigella Surveillance Unit ..... L. Barth Reller, M.D., Acting Chief

Statistician ..... Stanley M. Martin, M.S.

Epidemiologic Services Laboratory Section
Salmonella – Shigella Unit ..... George K. Morris, Ph.D., Chief

Collaborators

Laboratory Division
Bacteriology Section
Enteric Bacteriology Unit ..... William H. Ewing, Ph.D., Chief

TABLE OF CONTENTS

I. Summary

In the third quarter of 1969, 2,499 shigella isolations from humans were reported. This number represents an increase of 663 (36.1 percent) over the 1,836 isolations in the second quarter of 1969 and a decrease of 113 (4.3 percent) from the 2,612 isolations in the third quarter of 1968 (Table I).*

II. Reported Isolations

A. Human

1a. General Incidence

During the third quarter of 1969, 68.5 percent of isolations were from children under 10 years of age (Table II); this is consistent with previous patterns. The highest attack rate was in the age group 1-4 years.

1b. Shigellosis among Indians

During the third quarter of 1969, 315 cases of clinical shigellosis were reported from the eight administrative areas of the Indian Health Service (IHS) to the NCDC (Figure 1). This number represents an increase of 88.6 percent over the 167 cases for the second quarter of 1969 and a decrease of 7.6 percent from the 341 cases in the third quarter of 1968:

Figure 1 INDIAN HEALTH SERVICE AREAS, UNITED STATES

Indian Health Area	July	August	September	Total Third Quarter	Attack Rate per 100,000**
Aberdeen	2	12	4	18	31.7
Albuquerque	-	2	1	3	10.9
Anchorage	2	1	2	5	10.2
Billings	3	6	9	18	73.5
Oklahoma City	7	5	2	14	19.0
Phoenix	8	6	7	21	40.3
Portland	-	2	9	11	49.5
Window Rock	50	86	89	225	233.2
All areas	72	120	123	315	78.4

**Based on 1968 population estimates of Indians receiving health services from the Indian Health Service, U. S. Public Health Service.

*No laboratory reports were received from California and the Virgin Islands; a summary of clinical cases reported to California is found on page 5.

2. Serotype Frequencies

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

Rank	Serotype	Number Reported	Calculated Number*	Calculated Percent	Rank Last Quarter
1	S. sonnei	1,508	1,512	60.5	1
2	S. flexneri 2a	178	361	14.4	2
3	S. flexneri 3a	81	201	8.0	4
4	S. flexneri 6	74	95	3.8	3
5	S. flexneri 2b	53	107	4.3	6
6	S. flexneri 4a	48	100	4.0	5
Subtotal		1,942	2,376	95.1	
Total (all serotypes)		2,499	2,499		

*from Table III

Table III is calculated from data compiled during the third quarter of 1969, and Table IV is compiled from data collected since the beginning of the Shigella Surveillance Program in October 1963; these tables show the relative frequency of isolations of the various serotypes, and 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 less than two-thirds and S. flexneri 2a and 2b combined for about one-fifth of all isolations. Table V shows the distribution of shigella serotypes reported from mental institutions.

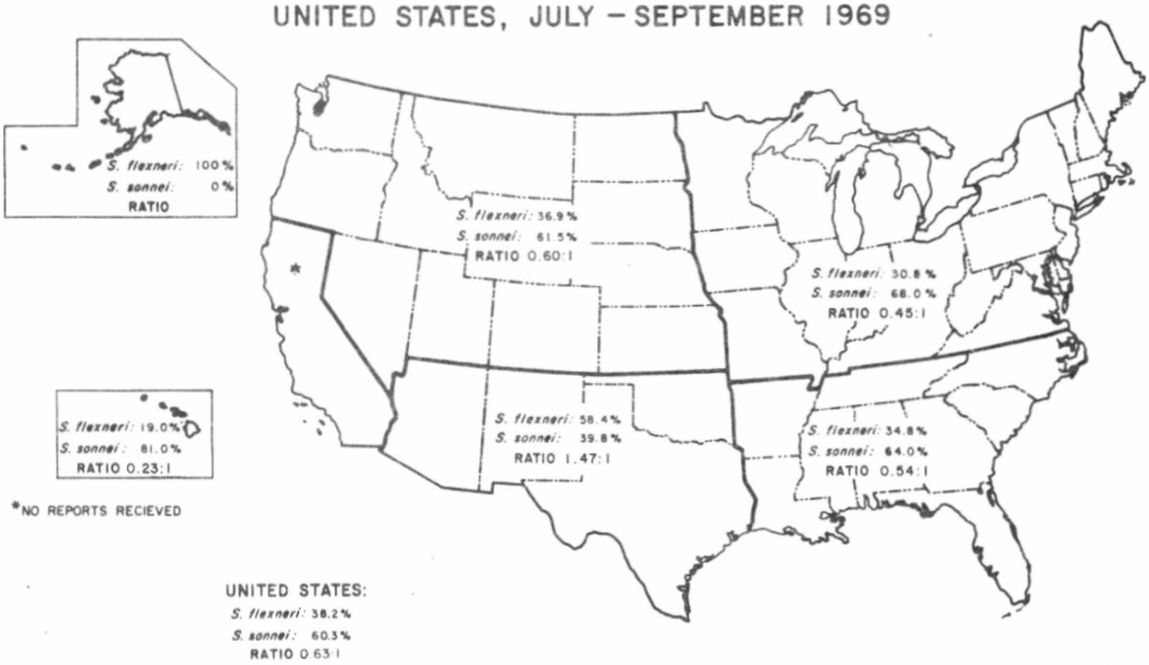
3. Geographical Observations

There were more reported isolations of S. sonnei than S. flexneri in every region of the United States except for Alaska and the southwestern region of the United States. The trend toward more reported isolations of S. sonnei than S. flexneri in the southeastern United States continued during the third quarter of 1969 (Figure 2). The seasonal distribution is depicted in Figures 3 and 4. Figure 5 shows the number of reported isolations per million population by state for July-September 1969, utilizing population estimates for July 1, 1969. Approximately 12.3 isolations per million population were reported during the third quarter of 1969. Table VI shows the residence of those patients from whom shigella was isolated.

Figure 2

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

UNITED STATES, JULY – SEPTEMBER 1969

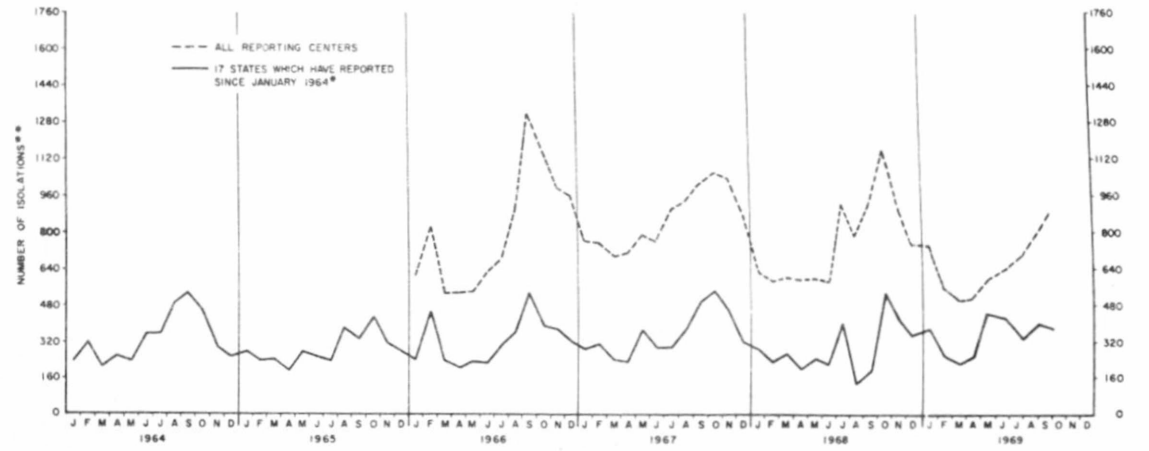


*NO REPORTS RECIEVED

UNITED STATES:
S. flexneri: 38.2%
S. sonnei: 60.3%
RATIO 0.63:1

Figure 3

REPORTED ISOLATIONS OF SHIGELLA IN THE UNITED STATES



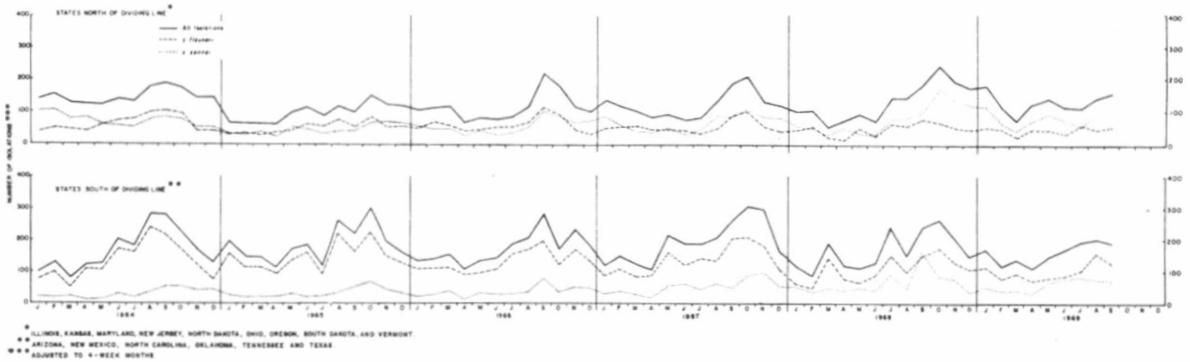
*ALASKA, ARIZONA, HAWAII, ILLINOIS, KANSAS, MARYLAND, NEW JERSEY, NEW MEXICO, NORTH CAROLINA, NORTH DAKOTA, OHIO, OKLAHOMA, OREGON, SOUTH DAKOTA, TENNESSEE, TEXAS AND VERMONT

**ADJUSTED TO FOUR-WEEK MONTHS

Figure 4

SEASONAL DISTRIBUTION OF SHIGELLA ISOLATIONS BY SEROTYPE AND REGION

15 STATES WHICH HAVE REPORTED SINCE JANUARY 1964

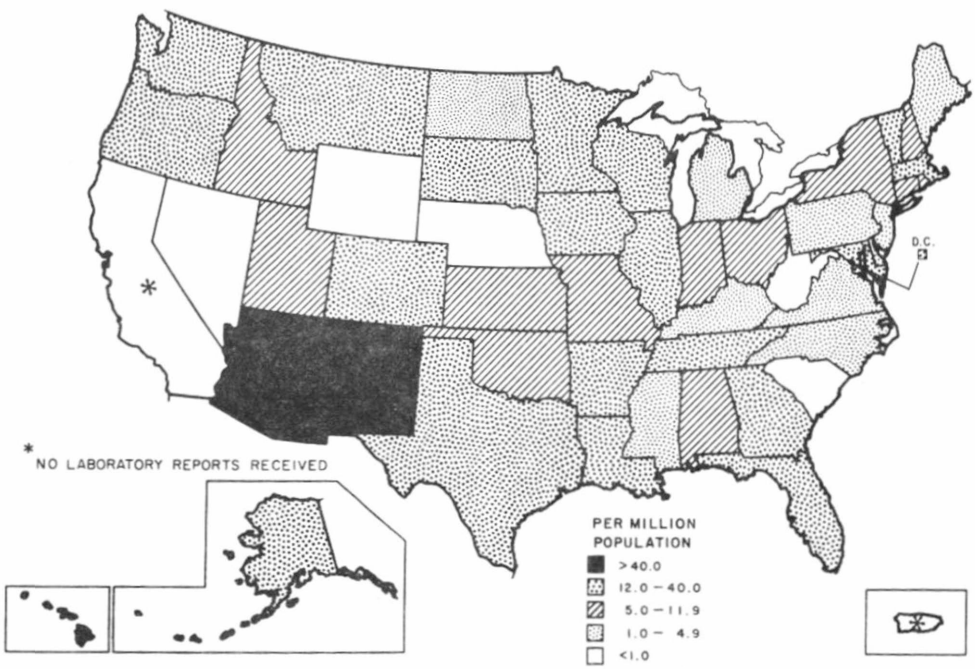


* ILLINOIS, KANSAS, MARYLAND, NEW JERSEY, NORTH DAKOTA, OHIO, OREGON, SOUTH DAKOTA, AND VERMONT.

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

*** ADJUSTED TO 4-WEEK MONTHS.

Figure 5 ATTACK RATES OF SHIGELLOSIS BY STATE, JULY – SEPTEMBER 1969



B. Nonhuman

During the third quarter 1969, nineteen nonhuman isolations of shigella, all in primates, were reported:

Serotype	Number	Source	State
S. dysenteriae 2	1	Monkey	Connecticut
S. flexneri 3b	9	Monkey	Illinois
S. flexneri 3c	1	Monkey	Louisiana
S. flexneri 4b	5	Monkey	Illinois
	1	Monkey	Connecticut
S. sonnei	1	Monkey	Louisiana
	1	Monkey	Illinois

III. Current Investigations

Shigellosis due to Shigella dysenteriae type 1 (Shiga's bacillus). Reported by Shigella Surveillance Unit, Enteric Diseases Section, Bacterial Diseases Branch, Epidemiology Program, NCDC.

In 1969 an increase in severe dysentery was reported from towns and villages throughout Guatemala. Subsequently, Shigella dysenteriae type 1 (Shiga's bacillus) was identified as the etiologic agent. An epidemiological investigation is in progress. (See Morbidity and Mortality Weekly Report Vol. 18, No. 42, October 18, 1969).

A review of S. dysenteriae 1 isolations in the United States since the beginning of nationwide surveillance disclosed 19 reported isolations between January 1, 1965, and September 30, 1969. There was one isolation in 1965, two in 1966, one in 1967, three in 1968, three in the first half of 1969, and nine in the third quarter of 1969. Travel histories are available for seven persons from whom this organism was isolated. Five acquired their infection in Mexico, one elsewhere in Central America, and one in Ethiopia in 1967.

The rarity of this organism and severity of the illness it produces have resulted in delayed diagnosis and prolonged illness due to colitis. Patients who develop diarrhea during or subsequent to travel in Mexico or elsewhere in Central America should be cultured to rule out S. dysenteriae infections. The severe form of the disease includes diarrhea with blood, pus, and/or mucus; tenesmus; dehydration; prostration; and fever. Milder forms of the disease cannot be distinguished from diarrhea due to a variety of other causes.

IV. Reports from the States

A. Shigellosis in California. Abstracted from California Morbidity: Reported Cases of Selected Notifiable Diseases, July - September 1969 (provisional).

	Shigellosis Cases Reported by Month			Total Shigellosis Cases Reported to Date		
	1969	1968	1967	1969	1968	1967
July	196	182	100	880	939	757
August	192	184	184	1,072	1,123	941
September	202	137	170	1,274	1,260	1,111
Third Quarter Totals	590	503	454			

Editor's comment: Shigellosis is among those diseases that must be reported to California health authorities. It is assumed that most, if not all, of these cases reported by practicing physicians have been diagnosed on the basis of a bacteriologic examination.

B. Shigella outbreak in Lexington, Kentucky. Reported by William R. Elsea, M. D., M. P. H., Director, Lexington-Fayette County Health Department, Lexington, Kentucky, and Wallace Guerrant, Field Investigator for Infectious Diseases, Division of Epidemiology, State Department of Health, Frankfort, Kentucky.

During a 16-hour period on July 15, 1969, 10 of 30 staff members of a religious institution working in impoverished neighborhoods in Lexington, Kentucky, became ill with acute febrile gastroenteritis. The illness was characterized by diarrhea (100 percent), fever (90 percent), headache (90 percent), chills (90 percent), nausea (80 percent), abdominal cramps (80 percent), vomiting (70 percent), myalgia (70 percent), and prostration (60 percent). Fever was pronounced and temperatures of 103°F were recorded in 9 individuals. The vomiting was severe and prostration averaged 3 days duration with lassitude persisting as long as 2 weeks. Despite the severity of the symptoms, none noted blood or mucus in the stools.

Shigella sonnei was isolated from eight of 14 fecal specimens obtained from the 10 ill individuals and 4 other staff members.

Because of the closely clustered times of onset, a foodborne outbreak was immediately suspected. The only source of food and drink common to all those affected was at their place of residence. Scrutiny of food histories during the approximate incubation period did not incriminate a particular food item. A combination of circumstances which could have accounted for the outbreak existed. Two days before the outbreak a large batch of sandwich spread was prepared and left unrefrigerated in the unscreened kitchen of the residence where the temperature was 80°F or above. There was a breakdown of municipal garbage collecting services and flys were abundant. Also, of the five household refrigerators in use for this and all other foods, none registered a temperature less than 55°F. Unfortunately, only mayonnaise remained for culture; this was negative.

Control measures included antibiotic therapy for those ill with diarrhea and scrupulous personal hygiene; no secondary cases occurred. In addition, in order to eliminate conditions conducive to foodborne disease, an adequate large institutional refrigerator capable of maintaining the temperature below 45°F in hot weather was purchased. The kitchen windows were screened. A thorough review of proper food preparation and storage was given.

C. Outbreak of Shigellosis traced to wading pool, Medford, Oregon. Reported by Erin Merkel, M. D., Health Officer, and Orie S. Moore, Chief Sanitarian, Jackson County Health Department; numerous private physicians, Medford, Oregon; Gatlin Brandon, M. S., M. P. H.,Director, Oregon State Public Health Laboratory, Monroe Holmes, D. V. M., Acting Director Epidemiology Section, and Michael R. Britt, M. D., EIS Officer, Oregon State Board of Health.

Between July 23 and August 17, 1969, 37 persons in Medford, Oregon, developed an acute illness characterized by abdominal cramps, diarrhea, fever, and headache. Two of the children presented with febrile convulsions. Six persons required hospitalization; there were no fatalities. Shigella sonnei was recovered from the stools of 15 patients.

The age and sex distribution of the cases are shown below. Eight family groups were

affected, and the index case in each of these families was always a child between the ages of 2 and 6 years.

Age and Sex Distribution, Shigella Outbreak,
Medford, Oregon, Summer 1969

Age, years	Male	Female	Total
< 1	0	0	0
1 - 3	1	5	6
4 - 6	5	3	8
7 - 12	4	5	9
13 - 21	1	1	2
> 21	3	4	7
Unknown	4	1	5
Total	18	19	37

The only factor common to all of the children was their wading in a municipal pool between July 20-25. This small wading pool was filled with chlorinated water from the large regular swimming pool and was drained at the end of each day. A water sample taken from the wading pool on August 14 had a chlorine level of 0.5 parts per million and was grossly contaminated with coliform organisms.

It could not be proved that the index cases acquired their infection at the pool, and no parents gave a history of their child's having waded while experiencing diarrhea. However, the gross coliform contamination despite chlorination makes such transmission very plausible. Factors contributing to such a possibility include 1) the small size of the wading pool with high concentrations of fecal inoculum, 2) the habits of children not yet toilet trained and uninhibited in their ingestion of pool water, 3) inactivation of chlorine by ultraviolet light in a shallow pool, and 4) lack of systematic measuring of chlorine levels in the satellite wading pool.

The primary control measure instituted in this outbreak was the closing of the wading pool for the remainder of the season to prevent recontamination by secondary cases in the community. Fluid and antibiotic therapy of individual cases were handled by private physicians. After these measures, the outbreak quickly abated with no further shigella isolations reported in subsequent months.

V. Current Trends and Developments

International notes: Shigellae in Canada - 1968. Abstracted with permission from the "Report of the National Enteric Reference Center for Canada - 1968", Laboratory of Hygiene, Ottawa, Canada.

There were 1,764 isolations of Shigellae in 1968 compared with 1,455 in 1967. This represents an increase of 21.2 percent. The types of Shigellae and distribution by province are tabulated below. *S. sonnei* was the most common serotype found with 1,091 isolations (61.8 percent). The incidence of *S. flexneri* 3 rose from 136 in 1967 to 197 in 1968 making this the second most common type. The number of isolations of *S. flexneri* 2 fell from 219 to 145 for the same period.

S. boydii which in the past had been confined to British Columbia was reported in the Province of Quebec (6 cases).

Distribution of Shigellae in Man
Canada - 1968

Shigellae		British Columbia	Alberta	Saskatchewan	Manitoba	Ontario	Quebec	New Brunswick	Nova Scotia	Prince Edward Island	Newfoundland	Total	Percent
S. dysenteriae	2						1					1	0.1
S. flexneri	1	2		1		4	1					8	0.4
	2	2	20	10	56	55	2					145	8.2
	3	6	169	18	2	1	1					197	11.2
	4	1	101	11	6	8						127	7.2
	5				2							2	0.1
	6	22	60	17		36	3					138	7.8
	x		10	2		1	1					14	0.8
	y		10	3	1	14						28	1.6
S. boydii	unspecified						1					1	0.1
	2						6					6	0.3
	4						4					4	0.2
	11						1					1	40.1
	15					1						1	40.1
S. sonnei		309	111	25	13	389	91	7	36	48	62	1,091	61.8
Totals		342	481	87	80	509	112	7	36	48	62	1,764	100.0

Additional information on some individual serotypes follows.

S. flexneri 2 — Over one third of the total isolations of this serotype from human cases were from Manitoba where several outbreaks occurred on Indian Reserves.

S. flexneri 3 — Over 85 percent of the total isolations of this serotype from human cases were identified in Alberta. An outbreak occurred in the hospital of a school for mentally retarded children.

S. boydii 15 — This serotype was isolated in Ontario from a Canadian student who spent two summer months on the Ivory Coast, French West Africa. He had a bout of diarrhea while there and three more bouts upon his return to Canada.

Editor's comment: A most interesting feature of these data from Canada is their striking similarity to those of the United States reported in 1968. In both countries S. sonnei has emerged as the most commonly reported such group--61.8 percent of 1968 isolates in Canada and 54 percent in the United States.

An appreciable number of S. flexneri isolations result from outbreaks of shigellosis in mental hospitals and among the Indian population in both countries.

S. dysenteriae and S. boydii are rare in these neighboring nations--each accounting for substantially less than 1 percent of isolations annually. There was but one isolation of S. dysenteriae and 13 isolations of S. boydii in Canada in 1968 out of 1,764 isolations. One of the S. boydii isolations was made from a Canadian student who acquired his infection in French West Africa. The association of these unusual isolations with foreign travel has been repeatedly documented in the United States.

TABLE I

SHIGELLA SEROTYPES ISOLATED FROM HUMANS

THIRD QUARTER 1969

SEROTYPE	NORTHEAST																								NORTHWEST															NORTH TOTAL
	CONN	DEL	DC	ILL	IND	IOWA	KY	ME	MD	MASS	MICH	MINN	MO	NH	NJ	NY-A	NY-C	OHIO	PA	RI	VT	VA	W. VA	WISC	NORTHEAST TOTAL	COLO	IDAHO	KANS	MONT	NEB	NEV	ND	ORE	SD	UTAH	WASH	WYO	NORTHWEST TOTAL	
A. S. dysenteriae																																								
Unspecified																					1			2	3														0	3
1	1			1						2															4													0	4
2																									0													0	0
3																									0													0	0
9																									0													0	0
Total	1	0	0	1	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	1	0	0	2	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7
B. S. flexneri																																								
Unspecified			3		10	3				1		1				7	84					16		21	146				7			3	11	5		1	27	173
1 Unspecified																		4							4				1							1	2	6
1A				1																					1												0	1
1B				1																					1												0	1
2 Unspecified									4	1	1														6									3	6		9	15
2A	1			19							2	10	2					22	2						58	2	1	3	3								9	67
2B				23																					23	2		1									3	26
3 Unspecified									3	2			13					9	1						28									1	1		2	30
3A	1			35											2										38												0	38
3B				3																					3												0	3
3C											1														1												0	1
4 Unspecified							1																		1										1	1	2	3
4A				9									1												10	2											2	12
4B																									0												0	0
5													2												2	3											3	5
6	1			12					1		1														15	3	2									2	7	22
Variant Y																									0												0	0
Total	3	0	3	103	10	3	1	0	8	4	5	11	18	0	2	7	84	35	3	0	0	16	0	21	337	12	3	4	11	0	0	3	11	5	5	12	0	66	403
C. S. boydii																																								
Unspecified																1	1								2	1								1				2	4
2																									0												0	0
4											1														1										1		1	2
12																									0												0	0
Total	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	1	0	0	0	0	0	0	0	3	1	0	0	0	0	0	0	0	1	1	0	0	3	6
Sonnei	19	2	14	119	25	38	12	2	26	79	34	118	15	7	20	18	62	39	24	9	9	5		49	745	20	4	8	1	1			36	3	6	31		110	855
Unknown			3																						3												0	3
TOTAL	23	2	20	223	35	41	13	2	34	85	40	129	33	7	22	26	147	74	27	9	10	21	0	72	1095	33	7	12	12	1	0	3	47	9	12	43	0	179	1074

TABLE I (CONTINUED)

SHIGELLA SEROTYPES ISOLATED FROM HUMANS

THIRD QUARTER 1969

SOUTHEAST										SOUTHWEST					SOUTH TOTAL	OTHER					TOTAL	PERCENT OF TOTAL	PREVIOUS QUARTER		SEROTYPE
ALA	ARK	FLA	GA	LA	MISS	NC	SC	TENN	SOUTHEAST TOTAL	ARIZ	NM	OKL	TEX	SOUTHWEST TOTAL		ALASKA	CALIF	HAWAII	VIRGIN ISLANDS	OTHER TOTAL			TOTAL	PERCENT OF TOTAL	
									0					0	0					0	3	0.1	1	0.1	*A. S. dysenteriae* Unspecified
		1		1					2				3	3	5					0	9	0.4	2	0.1	1
									0	6				6	6					0	6	0.2	6	0.3	2
									0				1	1	1					0	1	0.0	2	0.1	3
									0	1				1	1					0	1	0.0	1	0.1	9
0	0	1	0	1	0	0	0	0	2	7	0	0	4	11	13	0	0	0	0	0	20	0.8	12	0.7	Total
																									B. S. flexneri
17	1				8	1			27		7		1	8	35	2				2	210	8.4	182	9.9	Unspecified
		6	3					2	11		2			2	13					0	19	0.8	15	0.8	1 Unspecified
	1								1		1		1	2	3					0	4	0.2	8	0.4	1A
	4			1					5	3			4	7	12			1		1	14	0.6	7	0.4	1B
		21	44			9		16	90		23	5		28	118					0	133	5.3	98	5.3	2 Unspecified
	2			8					10	21		1	65	87	97			14		14	178	7.1	131	7.1	2A
									0	4		1	22	27	27					0	53	2.1	38	2.1	2B
		4	17					10	31		19		1	20	51			1		1	82	3.3	87	4.7	3 Unspecified
	3			5					8	9			26	35	43					0	81	3.2	63	3.4	3A
									0				2	2	2					0	5	0.2	8	0.4	3B
				1					1					0	1					0	2	0.1	3	0.2	3C
		6	3					5	14		13	1		14	28					0	31	1.2	22	1.2	4 Unspecified
									0	4		2	27	33	33			3		3	48	1.9	39	2.1	4A
	2								2					0	2					0	2	0.1	1	0.1	4B
	1							1	2	7			2	9	11	2				2	18	0.7	14	0.8	5
		2	5					6	13	13	8		15	36	49	3				3	74	3.0	72	3.9	6
									0					0	0					0	0	0.0	1	0.1	Variant Y
17	14	39	72	15	8	10	0	40	215	61	73	10	166	310	525	7	0	19	0	26	954	38.2	789	43.0	Total
																									C. S. Boydii
									0					0	0					0	4	0.2	4	0.2	Unspecified
				2					2	1			1	2	4					0	4	0.2	12	0.7	2
									0		1			1	1					0	3	0.1	0	0.0	4
									0						0					0	0	0.0	2	0.1	12
0	0	0	0	2	0	0	0	0	2	1	1	0	1	3	5	0	0	0	0	0	11	0.4	18	1.0	Total
14	13	168	90	38	2	12		58	395	11	46	7	113	177	572			81		81	1508	60.3	1010	55.0	*Sonnei*
		2					1		3					0	3					0	6	.2	7	0.4	Unknown
31	**27**	**210**	**162**	**56**	**10**	**22**	**1**	**98**	**617**	**80**	**120**	**17**	**284**	**501**	**1118**	**7**	**0**	**100**	**0**	**107**	**2499**		**1836**		**TOTAL**

Table II

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

Age (Years)	Male	Female	Sex Unknown	Total	Percent	Cumulative Percent	Number of Reported Isolations/ Million Population*
< 1	58	62	1	121	7.1	7.1	35.3
1 - 4	338	315	1	654	38.3	45.4	43.3
5 - 9	218	177		395	23.1	68.5	18.9
10 - 19	117	107		224	13.1	81.6	5.8
20 - 29	55	94		149	8.7	90.3	5.2
30 - 39	31	43		74	4.3	94.6	3.3
40 - 49	9	19		28	1.6	96.2	1.2
50 - 59	8	14		22	1.3	97.5	1.1
60 - 69	8	12		20	1.2	98.7	1.4
70 - 79	4	9		13	.8	99.5	1.4
80+	4	4		8	.5	100.0	2.3
Subtotal	850	856	2	1,708			
Child (unspec)	11	6		17			
Adult (unspec)	1	8		9			
Unknown	378	382	5	765			
Total	1,240	1,252	7	2,499			
Percent of total	49.8	50.2					

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

Table III

Relative Frequencies of Shigella Serotypes
Reported, Third Quarter, 1969

	Serotype	Number Reported	Calculated Number*	Calculated Percent	Rank
A.	S. dysenteriae				
	Unspecified	3			
	1	9	11	.44	10
	2	6	7	.28	12
	3	1	1	.04	17
	9	1	1	.04	17
B.	S. flexneri				
	Unspecified	210			
	1 unspecified	19			
	1a	4	11	.44	10
	1b	14	37	1.48	7
	2 unspecified	133			
	2a	178	361	14.45	2
	2b	53	107	4.28	4
	3 unspecified	82			
	3a	81	201	8.04	3
	3b	5	12	.48	9
	3c	2	5	.20	14
	4 unspecified	31			
	4a	48	100	4.00	5
	4b	2	4	.16	16
	5	18	23	.92	8
	6	74	95	3.80	6
C.	S. boydii				
	Unspecified	4			
	2	4	6	.24	13
	4	3	5	.20	14
D.	S. sonnei	1,508	1,512	60.50	1
	Unknown	6			
	Total	2,499	2,499		

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

Table IV

Relative Frequencies of Shigella Serotypes
Cumulated from October 1963 to Present

	Serotype	Number Reported	Calculated Number*	Calculated Percent	Rank
A.	S. dysenteriae				
	1	21	27	0.05	17
	2	202	256	0.49	13
	3	38	48	0.09	16
	4	1	1	0.00	31
	6	1	1	0.00	31
	9	6	8	0.02	22
	unspecified	69			
B.	S. flexneri				
	1a	396	843	1.62	7
	1b	358	763	1.46	8
	1 unspecified	570			
	2a	4,961	11,222	21.53	2
	2b	906	2,050	3.93	6
	2 unspecified	5,073			
	3a	1,370	5,238	10.05	3
	3b	93	356	0.68	10
	3c	97	371	0.71	9
	3 unspecified	3,357			
	4a	1,231	2,751	5.28	5
	4b	58	130	0.25	14
	4 unspecified	1,086			
	5	229	278	0.53	12
	6	2,458	2,982	5.72	4
	variant x	1	1	0.00	31
	variant y	18	22	0.04	18
	unspecified	4,542			
C.	S. boydii				
	1	11	17	0.03	19
	2	185	279	0.54	11
	3	2	3	0.01	26
	4	41	62	0.12	15
	5	7	11	0.02	21
	6	2	3	0.01	26
	7	3	5	0.01	24
	8	1	2	0.00	29
	9	2	3	0.01	26
	10	11	17	0.03	19
	11	1	2	0.00	29
	12	3	5	0.01	24
	14	4	6	0.01	23
	unspecified	135			
D.	S. sonnei	24,186	24,369	46.74	1
	Unknown	391			
	TOTAL	52,127	52,132		

* See footnote Table III

Table V

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

State	flexneri unspecified	flexneri 2 unspecified	flexneri 2a	flexneri 2b	flexneri 3b	flexneri 6	sonnei	sonnei variant R	TOTAL
Ga	0	7	0	0	0	0	0	0	7
Ill	0	0	5	18	1	7	0	0	31
Iowa	0	0	0	0	0	0	20	0	20
Md	0	1	0	0	0	0	4	0	5
Mass	1	1	0	0	0	0	15	0	17
Mich	0	0	0	0	0	0	4	0	4
Minn	1	0	4	0	0	0	1	1	7
NY	70	0	0	0	0	0	23	0	93
NC	0	1	0	0	0	0	1	0	2
Va	4	0	0	0	0	0	0	0	4
Total	76	10	9	18	1	7	68	1	190

Table VI

Sources of Reported Isolations of Shigella
by Residence at Time of Onset
Third Quarter 1969

Source	Jul	Aug	Sep	Total	Percent of Subtotal	Percent of Total
Mental institutions	72	48	69	190	8	
Indian reservations	8	5	8	21	1	
Other residences	727	649	673	2,065	91	
Subtotal	807	702	750	2,276		91.1
Residences Unknown	49	82	92	223		8.9
Total	856	784	842	2,499		

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.

STATE	STATE EPIDEMIOLOGIST	STATE LABORATORY DIRECTOR
Alabama	Frederick S. Wolf, M.D.	Thomas S. Hosty, Ph.D.
Alaska	Donald K. Freedman, M.D.	Ralph B. Williams, Dr.P.H.
Arizona	Philip M. Hotchkiss, D.V.M.	H. Gilbert Crecelius, Ph.D.
Arkansas	J. T. Herron, M.D.	Robert T. Howell, Dr.P.H.
California	Philip K. Condit, M.D.	Howard L. Bodily, Ph.D.
Colorado	C. S. Mollohan, M.D.	C. D. McGuire, Ph.D.
Connecticut	James C. Hart, M.D.	Evelyn Hibbard (Acting)
Delaware	Floyd I. Hudson, M.D.	Irene V. Mazeika, M.D.
District of Columbia	William E. Long, M.D.	Gerrit W. H. Schepers, M.D.
Florida	E. Charlton Prather, M.D.	Nathan J. Schneider, Ph.D.
Georgia	John E. McCroan, Ph.D.	Earl E. Long, M.S.
Hawaii	Ira D. Hirschy, M.D.	Henri Minette, Dr.P.H.
Idaho	John A. Mather, M.D.	Darrell W. Brock, Dr.P.H.
Illinois	Norman J. Rose, M.D.	Richard Morrissey, M.P.H.
Indiana	Hermann E. Rinne, D.O.	Josephine Van Fleet, M.D.
Iowa		W. J. Hausler, Jr., M.D.
Kansas	Don E. Wilcox, M.D.	Nicholas D. Duffett, Ph.D.
Kentucky	Calixto Hernandez, M.D.	B. F. Brown, M.D.
Louisiana	Charles T. Caraway, D.V.M.	George H. Hauser, M.D.
Maine	Dean Fisher, M.D.	Charles Okey, Ph.D.
Maryland	Howard J. Garber, M.D.	Robert L. Cavenaugh, M.D.
Massachusetts	Nicholas J. Fiumara, M.D.	Geoffrey Edsall, M.D.
Michigan	John L. Isbister, M.D.	Kenneth R. Wilcox, Jr., M.D.
Minnesota	D. S. Fleming, M.D.	Henry Bauer, Ph.D.
Mississippi	Durward L. Blakey, M.D.	R. H. Andrews, M.S.
Missouri	E. A. Belden, M.D.	Elmer Spurrier, Dr.P.H.
Montana	Mary E. Soules, M.D.	David B. Lackman, Ph.D.
Nebraska	Arnold M. Reeve, M.D.	Henry McConnell, Dr.P.H.
Nevada	Walter Ward, M.D., Ph.D. (Acting)	Margaret Williams (Acting)
New Hampshire	Walter Kaupas, M.D.	Robert A. Miliner, Dr.P.H.
New Jersey	Ronald Altman, M.D.	Martin Goldfield, M.D.
New Mexico	Paul E. Pierce, M.D.	Daniel E. Johnson, Ph.D.
New York City	Vincent F. Guinee, M.D.	Morris Schaeffer, M.D.
New York State	James O. Culver, M.D.	Donald J. Dean, D.V.M.
North Carolina	Martin P. Hines, D.V.M.	Lynn G. Maddry, Ph.D.
North Dakota	Kenneth Mosser	C. Patton Steele, Ph.D.
Ohio	Calvin B. Spencer, M.D.	Charles C. Croft, Sc.D.
Oklahoma	R. LeRoy Carpenter, M.D.	F. R. Hassler, Ph.D.
Oregon	Monroe A. Holmes, D.V.M. (Acting)	Gatlin R. Brandon, M.P.H.
Pennsylvania	W. D. Schrack, Jr., M.D.	James E. Prier, Ph.D.
Puerto Rico	Henry Negrón Aponte, M.D.	Angel A. Colon, M.D.
Rhode Island	H. Denman Scott, M.D. (Acting)	Malcolm C. Hinchliffe, M.S.
South Carolina	Donald H. Robinson, M.D.	Arthur F. DiSalvo, M.D.
South Dakota	G. J. Van Heuvelen, M.D.	B. E. Diamond, M.S.
Tennessee	William H. Armes, Jr., M.D. (Acting)	J. Howard Barrick, Ph.D.
Texas	M. S. Dickerson, M.D.	J. V. Irons, Sc.D.
Utah	Paul R. Ensign, M.D.	Russell S. Fraser, M.S.
Vermont	Linus J. Leavens, M.D.	Dymitry Pomar, D.V.M.
Virginia		W. French Skinner, M.P.H.
Washington	Byron J. Francis, M.D.	W. R. Giedt, M.D.
West Virginia	N. H. Dyer, M.D.	J. Roy Monroe, Ph.D.
Wisconsin	H. Grant Skinner, M.D.	S. L. Inhorn, M.D.
Wyoming	Herman S. Parish, M.D.	Donald T. Lee, Dr.P.H.