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SHIGELLA

surveillance

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for the
Fourth Quarter 1969

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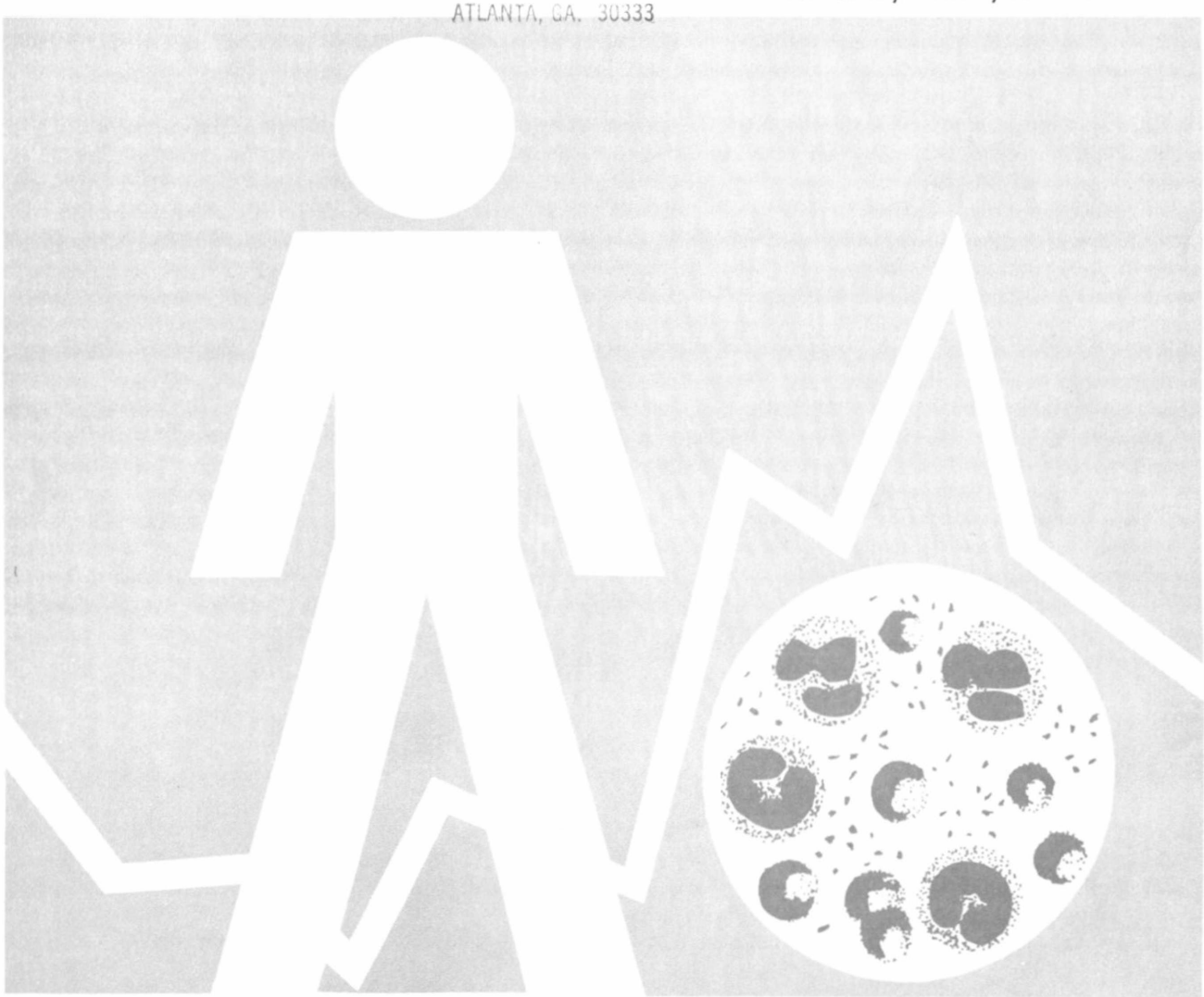

U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE : PUBLIC HEALTH SERVICE
HEALTH SERVICES AND MENTAL HEALTH ADMINISTRATION

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

For the fourth quarter of 1969, 2,915 isolations of shigella from humans were reported. This number represents an increase of 416 (16.6 percent) over the 2,499 isolations in the third quarter of 1969 and an increase of 139 (5.0 percent) over the 2,776 isolations in the fourth quarter of 1968 (Table I).*

II. Reported Isolations

A. Human

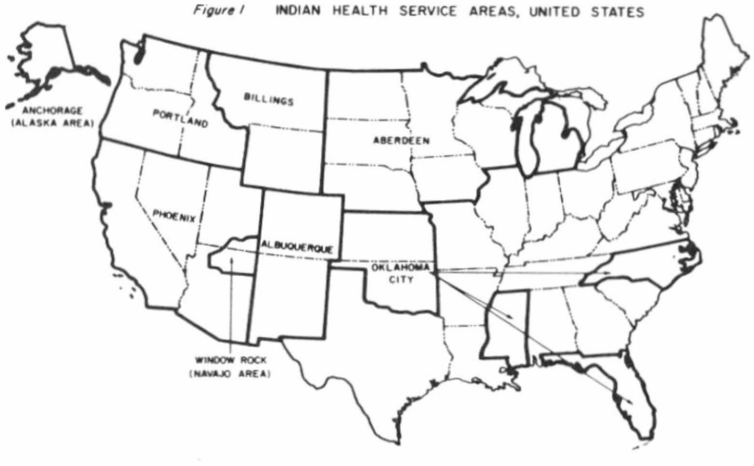
1a. General Incidence

For the fourth quarter of 1969, 71.2 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 1-4 age group.

1b. Shigellosis among Indians

One hundred sixty-seven cases of shigellosis were reported from the eight administrative areas of the Indian Health Service (IHS) to the NCDC (Figure 1). This number represents a decrease of 148 (46.9 percent) from the 315 cases for the third quarter of 1969 and a decrease of 5 (2.9 percent) from the 172 cases reported for the fourth quarter of 1968.

Figure 1 INDIAN HEALTH SERVICE AREAS, UNITED STATES



Indian Health Area	October	November	December	Total Fourth Quarter	Attack Rate per 100,000**
Aberdeen	6	7	3	16	28.2
Albuquerque	1	0	5	6	21.7
Anchorage	2	2	0	4	8.2
Billings	6	4	5	15	61.2
Oklahoma City	2	4	3	9	12.2
Phoenix	9	2	2	13	25.0
Portland	5	0	4	9	40.5
Window Rock	53	19	23	95	98.4
All areas	84	38	45	167	41.6

**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 6.

2. Serotype Frequencies

Forty-seven 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 for the 3-month period were the following (Table III):

Rank	Serotype	Number Reported	Calculated Number*	Calculated Percent	Rank Last Quarter
1	S. sonnei	1,981	1,991	68.3	1
2	S. flexneri 2a	200	324	11.1	2
3	S. flexneri 3a	99	209	7.2	3
4	S. flexneri 6	102	122	4.2	4
5	S. flexneri 2b	51	83	2.9	5
6	S. flexneri 4a	42	61	2.1	6
Subtotal		2,475	2,790	95.7	
Total (all serotypes)		2,915			

*from Table III

Table III is calculated from data compiled in the fourth quarter of 1969. This table shows the relative frequency of isolation of the various serotypes; the isolations in each of the unspecified categories are distributed in their subgroups in the same proportion as the completely specified isolations of that group. The resulting distribution in the table 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 now accounts for approximately two-thirds of all isolations and S. flexneri 2a and 2b combined for about one-fifth of all isolations. Table IV shows the distribution of shigella serotypes reported from mental institutions.

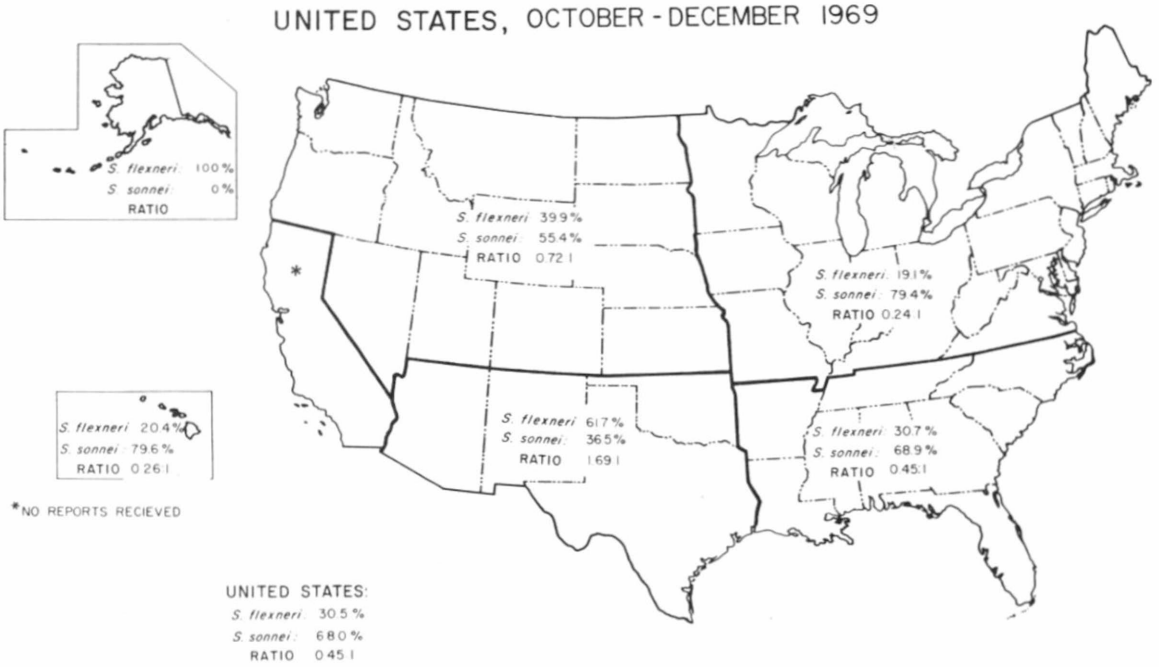
3. Geographical Observations

There were more reported isolations of S. sonnei than S. flexneri in every region of the United States except the Southwest and the state of Alaska, which had only 10 isolations of S. flexneri (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 October-December 1969, utilizing population estimates for July 1, 1969. Approximately 14.4 isolations per million population were reported during the fourth quarter of 1969. Table V 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

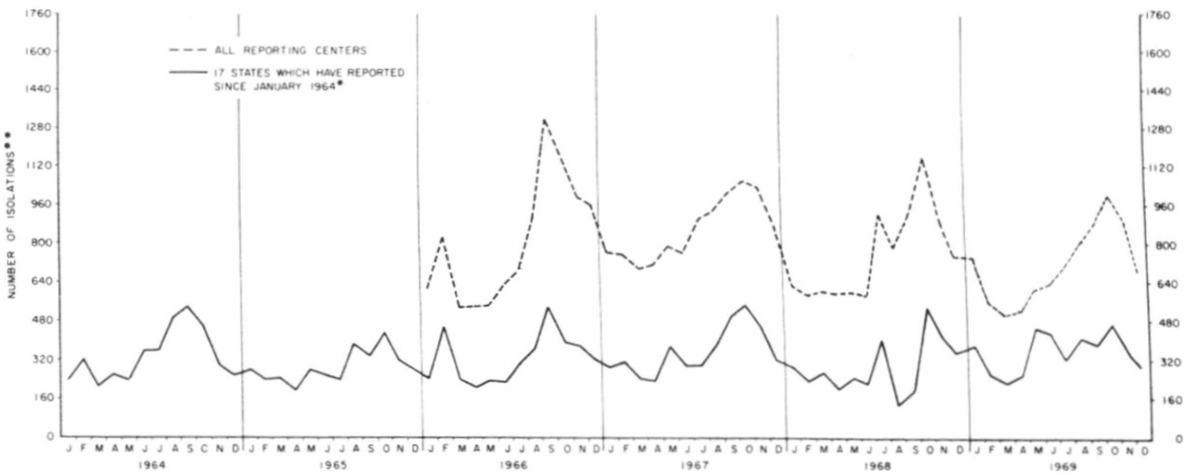
UNITED STATES, OCTOBER - DECEMBER 1969



UNITED STATES:
S. flexneri: 30.5%
S. sonnei: 68.0%
RATIO 0.45:1

Figure 3

REPORTED ISOLATIONS OF SHIGELLA IN THE UNITED STATES



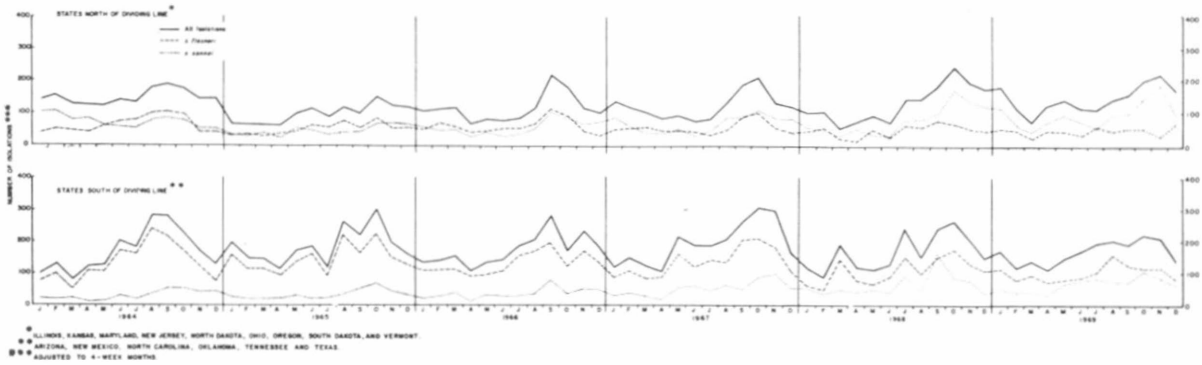
*ALASKA, ARIZONA, HAWAII, ILLINOIS, KANSAS, MARYLAND, NEW JERSEY, NEW MEXICO, NORTH CAROLINA, NORTH DAKOTA, OHIO, OKLAHOMA, OREGON, SOUTH DAKOTA, TENNESSEE, TEXAS AND VERMONT

**ADJUSTED TO FOUR-WEEK MONTHS

Figure 4

SEASONAL DISTRIBUTION OF SHIGELLA ISOLATIONS BY SEROTYPE AND REGION

15 STATES WHICH HAVE REPORTED SINCE JANUARY 1964

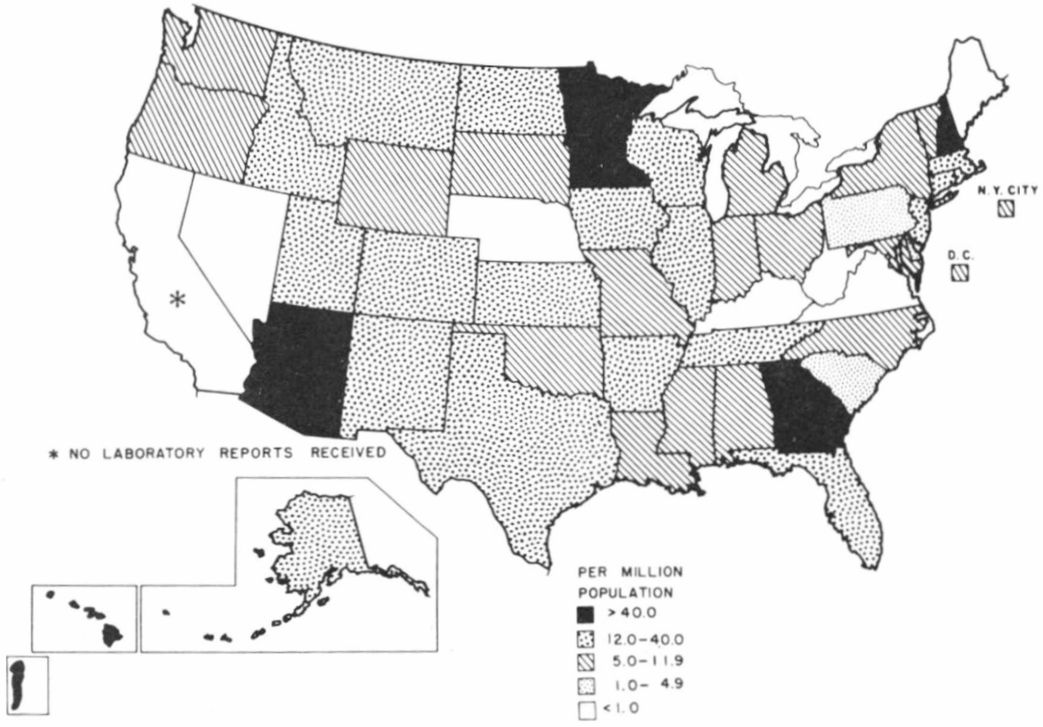


* ILLINOIS, KANSAS, MARYLAND, NEW JERSEY, NORTH DAKOTA, OHIO, OREGON, SOUTH DAKOTA, AND VERMONT.

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

*** ADJUSTED TO 4-WEEK MONTHS

Figure 5 ATTACK RATES OF SHIGELLOSIS BY STATE, OCTOBER-DECEMBER 1969



B. Nonhuman

For the fourth quarter 1969, 4 nonhuman isolations of shigella, all in primates, were reported:

Serotype	Number	Source	State
S. flexneri 3c	2	Monkey	Louisiana
S. flexneri 4a	1	Monkey	Illinois
S. flexneri 4b	1	Monkey	Illinois

III. Current Investigations

Epidemic of Shigellosis in Guatemala. Reported by Cesar Mendizabal Morris, M.D., M.P.H., Director of Epidemiology, Ministry of Public Health and Social Assistance of the Government of Guatemala; Leonardo J. Mata, Sc.D., Chief, Division of Microbiology, Institute of Nutrition of Central America and Panama, Guatemala; Eugene J. Gangarosa, M.D., Chief, Enteric Diseases Section, Bacterial Diseases Branch, and David R. Perera, M.D., EIS Officer, Epidemiology Program, NCDC.

In 1969, an increase in severe dysentery was reported from towns and villages throughout Guatemala. This increase was substantiated by an analysis of dysentery mortality data for the previous 2 years which revealed the existence of a recent widespread epidemic with high mortality in many communities. Clinical, bacteriologic, serologic, and autopsy studies identified the etiologic agent as Shigella dysenteriae type 1 (Shiga's bacillus). The epidemic has shown no signs of abating, with outbreaks occurring in many communities in November. There is also evidence that the neighboring countries of Honduras and El Salvador are also having excessive cases of dysentery.

Community and family common-source outbreaks were documented in Guatemala, but no single vehicle was found responsible for transmission over wide geographic areas. The importance of waterborne transmission in some communities has been documented. Person-to-person spread probably accounted for the introduction of new cases into communities as well as for cases preceding and following the explosive common-source outbreaks. The original source of the organism could not be proved. Serological surveys showed few persons had antibodies to S. dysenteriae 1 before this epidemic but that a high proportion of patients and contacts had demonstrable elevated titers after the organism passed through a village.

Patients often presented with severe colitis. The signs and symptoms were mucus and bright red blood in the stool and severe tenesmus, usually with only mild or no fever. The symptoms of colitis found in this form of shigellosis were frequently misdiagnosed as amebiasis. High case-fatality rates occurred where patients were treated with parenteral emetine and other antiamebic medications. In some patients in whom the true diagnosis was not suspected, palliative colostomy was performed to alleviate the severe colitis. Patients did not respond to the commonly used antibiotics because the organism was uniformly resistant to tetracycline, chloramphenicol, novobiocin, streptomycin, and sulfonamides. Empirically, large doses of penicillin seemed effective. In vitro these organisms have been sensitive to ampicillin, kanamycin, nalidixic acid, cephalothin, nitrofurantoin, gentamicin, and moderately sensitive to penicillin.

Surveillance and local epidemiologic studies are continuing. Importations of the

Shiga bacillus into the United States from the epidemic area have been documented, but so far there has been no evidence of secondary spread. (See also page 10 of this report: V. Current Trends and Developments. Importation of Shiga's bacillus into the United States).

IV. Reports from the States

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

Shigellosis Cases Reported by Month				Total Shigellosis Cases Reported To Date		
	1969	1968	1967	1969	1968	1967
October	252	210	224	1,526	1,470	1,335
November	201	127	226	1,727	1,597	1,561
December	216	154	167	1,943	1,749	1,728
Third Quarter Totals	669	491	617			

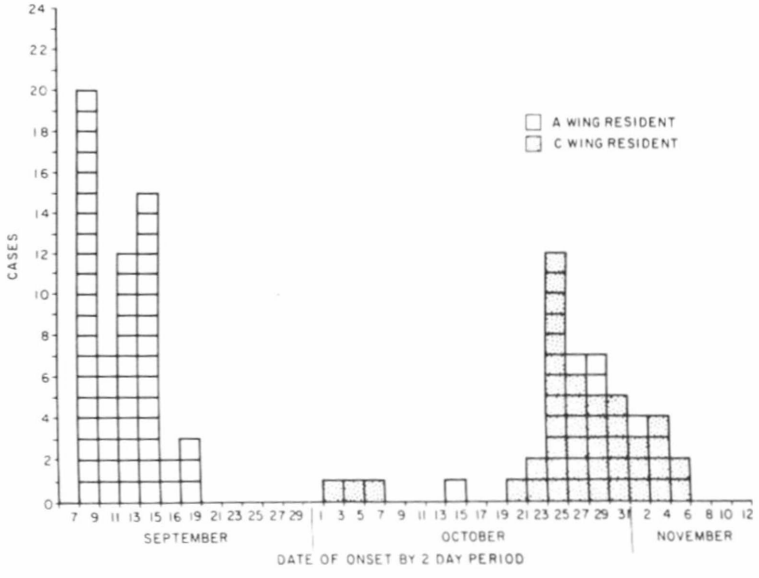
B. Institutional Outbreak of Shigellosis, New Jersey

Reported by Ronald Altman, M.D., Director, Division of Preventable Diseases; Martin Goldfield, M.D., Director, Division of Laboratories; Howard Rosenfeld, D.V.M.; Stephen M. Austin, M.D., EIS Officer; and Catherine Jaedynak, Bacteriologist, New Jersey State Department of Health, Trenton, New Jersey and Harry Yolken, M.D., Director of Pediatrics, North Jersey Training School, Totowa, New Jersey.

Between September and November 1969, a biphasic outbreak of febrile diarrhea occurred in two of three wings of the pediatric nursery of a New Jersey school for the mentally retarded. Figure 6 shows the precipitous onset of the outbreak on the A Wing in which

Figure 6

CASES OF DIARRHEA IN CHILDREN, BY ONSET, NEW JERSEY INSTITUTION, SEPTEMBER – NOVEMBER 1969



62 of 101 children (62 percent) developed diarrhea. The 86 children, aged 3 to 8 years, on B Wing were spared. Affected later was the C Wing in which 43 of 63 (68 percent) children developed diarrhea.

The illness was characterized by a temperature greater than 100°F in 81 of 105 children (77 percent), greater than 102°F in 37 children (35 percent), and greater than 104°F in 9 children (8 percent). Thirteen children (12 percent) had bloody diarrhea and 28 children (27 percent) had mucus in their stools. The mean duration of illness was 4.3 days (range 2 to 9 days); there were no deaths.

Shigella sonnei was isolated from stool specimens of 63 pediatric patients, four older inmates of the institution who work as aides in the nursery, and three attendants who are employed from the outside community. Antibiotic sensitivity testing, using the standardized disk technique, was performed on 39 isolations. The organisms were initially all sensitive to tetracycline, chloramphenacol, kanamycin, dihydrostreptomycin; they were resistant to sulfonamides, ampicillin, and neomycin. After October 17 the organisms were also uniformly resistant to tetracycline and dihydrostreptomycin. Tetracycline had been employed as the treatment of choice before October 17 in the first wave of the outbreak on A Wing.

Discussion: The initial outbreak had the characteristics of a common-source outbreak with 20 cases occurring abruptly in 1 day. However, a food or water vehicle could not be incriminated. Older inmates of the institution act as ward aides and help feed the children and change their diapers. It is possible that an asymptomatic child could have been the source from which one of the aides spread infection to numerous children over a short time span. This could not be proved. Nonetheless, it does seem most likely that the transmission of disease from A Wing to C Wing was due to the shifting of both inmates and attendants among the wards of the nursery. Illness was documented by a stool culture positive for S. sonnei in an individual who had been transferred from A Wing to C Wing.

The following control measures were recommended to contain the outbreak and prevent its occurrence on the unaffected B Wing: (1) Isolation of ill children and treatment with an adequate course of antibiotic therapy dictated by sensitivity testing (the large number of sick children made isolation procedures impractical in this outbreak). (2) Separate personnel (not inmates) thoroughly instructed in personal hygiene to care for ill and well children. (3) Dismissal from work of all persons with stool cultures positive for shigella until 1 week after therapy and three negative follow-up cultures on successive days. (4) Prohibition of the transfer of either attendants or children between wards on the nursery.

C. Outbreak of Dysentery in A Hippie Colony, New Mexico
Reported by Bruce Storrs, M.D., Director of Medical Services Division, Nancy McCaig, M.D., Director of Preventive Medicine Section, and Paul E. Pierce, M.D., EIS Officer, New Mexico Health and Social Services Department; Daniel Johnson, Ph.D., Director, New Mexico State Laboratories, Santa Fe, New Mexico; and William Kilgore, M.D. and Albert Rosen, M.D., private physicians, Taos, New Mexico.

In September and October 1969, an outbreak of dysentery occurred among residents of a hippie community outside the town of Taos, New Mexico. A total of 58 persons, ages 11 months to 48 years, (mean 23 years) received treatment at a free community clinic; 8 required hospitalization. Accurate denominator data was not available. The illness was characterized by the abrupt onset of abdominal cramps; bloody diarrhea with blood, mucus, and/or pus; malaise; and frequently fever. Stool specimens from 11 of 25 individuals were found to be positive for Shigella flexneri 6 at the state laboratory. Person-to-person spread was thought to be the mode of transmission. The majority of cases occurred in the commune with the poorest hygienic practices. Control measures

were focused on instruction in personal hygiene and proper procedures for the collection and use of food and water. In addition, efforts to provide reasonable sanitary facilities were begun.

D. Shigellosis Outbreak in a Center for Retarded Children, South Carolina. Reported by D. H. Robinson, M.D., Director, Bureau Preventive Health Services and John M. Wolff, M.D., EIS Officer, Preventive Health Services, South Carolina State Board of Health, Columbia, South Carolina, and Allan D. Lieberman, Medical Director, South Carolina Retarded Children's Habilitation Center, Ladson, South Carolina.

In November 1969, an outbreak of gastroenteritis due to Shigella sonnei occurred in a 364 bed, chronic care and training facility for the mentally retarded in rural South Carolina. Shigellosis had not been previously recognized in this institution. Initially the outbreak was confined to 3 of 12 separate one-story buildings (cottages) in which maximum personal care for severely retarded patients was required; there were 31 illnesses in this group. A culture survey of the 3 cottages 2 weeks after the onset of the outbreak detected 7 patients harboring S. sonnei. Subsequently other cottages were involved with secondary cases. A repeat survey of the remaining cottages disclosed 14 isolations of S. sonnei.

The gradual onset of illnesses over several weeks supported the hypothesis that person-to-person spread was the mode of transmission. It seemed likely that the organism was introduced into this previously spared institution by a child infected on a home visit. The interchange of personnel between cottages could have provided ample opportunity for spread during diaper changes and feedings as well as by direct contact between patients during recreation periods.

The following control measures were employed: (1) All patients with positive cultures for S. sonnei detected after the onset of febrile diarrhea or during surveys were isolated from well children and treated with ampicillin, to which the organism was known to be sensitive. (2) Staff members working in an affected cottage were not permitted to work in uninvolved cottages. (3) The use of disposable plastic gloves during diaper changes, a procedure started after the onset of the outbreak, was continued. (4) Surveillance and active case detection using bacteriologic cultures were continued in all cottages.

E. Outbreak of Shigellosis, Emmonak, Alaska. Reported by Donald K. Freedman, M.D., Director, Division of Public Health and T. Stephen Jones, M.D., EIS Officer, Alaska Department of Health and Welfare, Juneau, Alaska and Arnold R. Saslow, Senior Assistant Health Services Officer, Ecological Investigations Programs, Arctic Health Research Center, Anchorage, Alaska.

In mid-November 1969, Shigella flexneri was isolated from the stools of 5 patients, from the same small village, hospitalized at the Bethel Native Hospital, Bethel, Alaska. Four of these individuals were members of the same family living in one small household. An investigation in the village disclosed that 69 persons in 16 families interviewed had had symptoms compatible with shigellosis in the previous 6-week period. The illness was characterized by diarrhea (100 percent), abdominal cramps (81 percent), vomiting (57 percent), chills (48 percent), fever (42 percent), and blood in the stool (21 percent). The age distribution revealed that children under 10 years of age had the greatest number of illnesses.

The cause of the outbreak was thought to be due to the practice of obtaining drinking water through holes chopped in the ice on the Yukon River downstream from the village which has an inadequate sewage disposal system. The preventive control measures recommended were instruction in personal hygiene, provision of safe drinking water,

and proper sewage disposal.

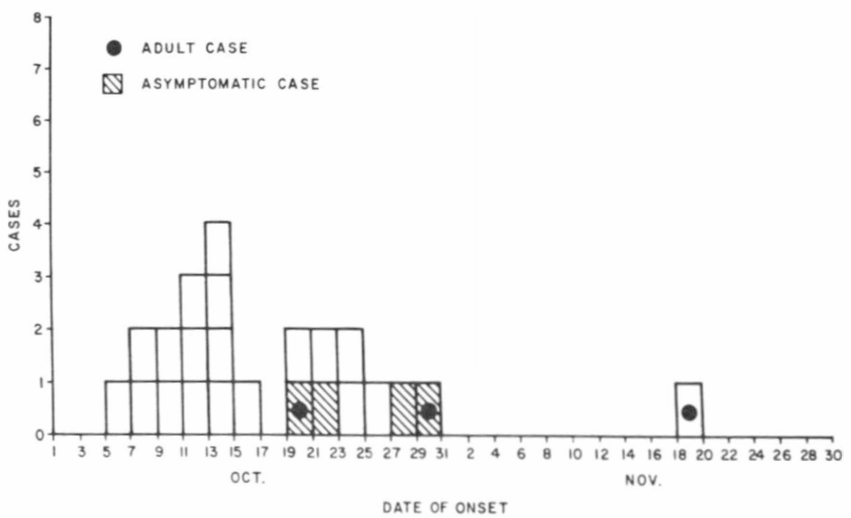
F. Shigella sonnei Outbreak, New York City. Reported by Vincent F. Guinee, M.D., Director, Bureau of Preventable Diseases, Tibor Fodor, M.D., Chief, Epidemiology Intelligence and Michael J. Specter, M.D., EIS Officer, New York City Health Department; Vincent J. Fontana, M.D., Director of Pediatrics, St. Vincent's Hospital, New York City; and the Shigella Surveillance Unit, Enteric Diseases Section, Bacterial Diseases Branch, Epidemiology Program, NCDC.

In October and November 1969, an outbreak of shigellosis occurred in New York City in an institution for homeless children. Shigella sonnei was isolated from the stools of 18 of 35 infants and toddlers (51 percent) and 2 of 25 student nurses (8 percent) who lived or worked on a single ward. One additional isolation of S. sonnei was obtained from a student nurse on another floor during a stool culture survey undertaken to determine if other wards were affected.

Figure 7 illustrates the time sequence of the dates of onset of symptomatic cases and dates of positive culture in asymptomatic persons. Two of three student nurses and 2 of 20 children were asymptomatic. Symptoms in the remaining persons included diarrhea (16), fever (10), bloody stools (6), vomiting (2), and convulsions (1). The age range of affected children was 6 months to 2 years and 7 months with a median age of 2 years. There were 15 girls and 5 boys. Two of the three female nursing students were 19 and the other was 20 years of age.

The antibiotic sensitivity patterns for all S. sonnei isolated in this outbreak were identical, viz., sensitive to ampicillin, nitrofurantoin, nalidixic acid, kanamycin, cephalothin, chloramphenicol, colistin, tetracycline, and cephaloridine, but resistant to penicillin, streptomycin, and erythoromycin. None of the 21 cultures from different individuals could be typed with available colicine indicator strains.[1]

Figure 7 SHIGELLOSIS OUTBREAK, NEW YORK CITY, 1969



1. Gillies RR: Colicine Production as an Epidemiological Marker of Shigella sonnei. J Hyg Camb 62:1-9, 1964

Control measures included immediate closure of the involved ward to new admissions once the first isolation of S. sonnei was reported. All those persons from whom S. sonnei was cultured were treated with antibiotics to which the organisms were sensitive. Because positive stool cultures initially reappeared after antibiotic therapy, those patients under treatment and awaiting three consecutive negative cultures were isolated from newly diagnosed cases to prevent reinfection. In addition close surveillance was maintained on the other unaffected wards. With these measures the outbreak remained contained with no further cases.

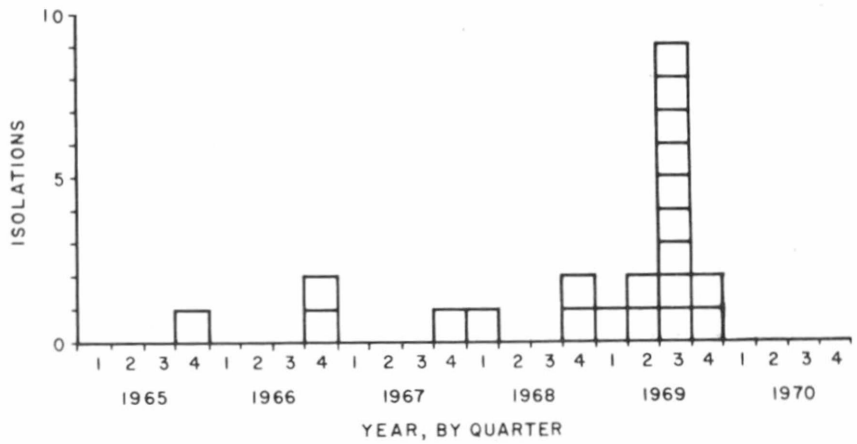
V. Current Trends and Developments

Importation of Shiga's bacillus into the United States. Reported by Shigella Surveillance Unit, Enteric Diseases Section, Bacterial Diseases Branch, Epidemiology Program, NCDC.

(See also page 5 of this report: III. Current Investigations. Epidemic Shigellosis in Guatemala.)

During the current epidemic of Shigella dysenteriae type 1 in Central America, isolations of this organism in the United States reported to NCDC were reviewed for possible association. Since the beginning of nationwide surveillance in January 1965 through December 1969, 21 isolations of S. dysenteriae type 1 have been reported. Nine of the 21 were reported in the third quarter of 1969 as shown in Figure 8.

Figure 8 ISOLATIONS OF *S. DYSENTERIAE* TYPE 1, UNITED STATES, JANUARY 1965 - DECEMBER 1969



Of these 21, Texas reported five; Illinois four; Massachusetts, Connecticut, and California two each; and Minnesota, Florida, Pennsylvania, Louisiana, Kansas, and New Jersey one each. Travel histories were obtained on 12 persons from whom this organism was isolated. One person acquired his infection in Ethiopia in 1967, one in Central America in 1969, and 10 in Mexico in 1969. The other nine persons could not be contacted. There were no reports of secondary spread among household contacts in this country.

> The following case is illustrative: On January 22, 1970, while vacationing in Mexico, a 64-year-old man from Peoria, Illinois, had onset of chills, fever (103°F), and nausea which was followed by watery diarrhea. The man and his wife had been in Acapulco since January 16. They had flown there by way of Chicago and Dallas and had eaten meals on the plane and in various places in Acapulco. After his onset of symptoms, the couple

returned to Peoria on January 24. The man consulted his physician who prescribed tetracycline and an antispasmodic drug. The patient continued to have 8-10 diarrheal stools each day with considerable tenesmus and was hospitalized on January 26 after 2 days of treatment.

On admission, he was weak and complained of lower abdominal cramps and tenesmus. His temperature was 100.2°F. There was tenderness over the lower abdomen, and hyperactive bowel sounds were heard. Laboratory studies revealed hypokalemia (K = 3.2 meq./L), and hypoalbuminemia (3.0 gm percent). The white blood cell count was normal. Two stool cultures grew Shigella dysenteriae type 1. The organism was sensitive to nitrofurantoin, colistin, kanamycin, cephalothin, neomycin, and ampicillin and was resistant to chloramphenicol, sulfonamides, naladixic acid, streptomycin, and tetracycline. Stool contained mucus with pus and was strongly guaiac positive; no ova or parasites were found.

The patient slowly improved after rehydration and treatment with tetracycline, cephalothin, and nitrofurantoin during 14 days of hospitalization. He was discharged improved after seven negative stool cultures although he was still weak and unable to work 1 week later. He lost 8 pounds during his illness. (Reported by Fred Long, M.D., City-County Health Commissioner, and Myron Wentz, M.D., Director of Pathology, Methodist Hospital, Peoria, Illinois; Norman Rose, M.D., Director of Communicable Disease, Illinois Department of Public Health; and an EIS Officer.)

The symptoms reported here are typical of patients with Shiga dysentery. Symptoms of severe enterocolitis with tenesmus, bloody diarrhea and mucus, fever, and prostration may last weeks, especially if diagnosis and appropriate therapy are delayed. In some cases the diagnosis has been confused with amebiasis and ulcerative colitis.

Treatment should include antibiotics to which the infecting strain is sensitive and should preferably consist of an agent that produces good tissue levels, because the organism extensively involves the lamina propria. The organisms isolated from patients with Shiga dysentery in Central America have been uniformly resistant to tetracyclines, chloramphenicol, streptomycin, and sulfonamides; these antimicrobials should not be used for treatment. Ampicillin in a dosage of 50 mg/Kg per day in 4 divided doses parenterally, at first, and then orally has proved most effective. The organisms from Central America have also shown in vitro sensitivity to gentamicin, kanamycin, nitrofurantoin, colistin, cephalothin, and nalidixic acid.

Patients who develop diarrhea during or after travel to Mexico or countries of Central America should be cultured to rule out S. dysenteriae 1 infections. This organism grows most readily on non-inhibitory media. In a recent study at NCDC, blood heart infusion, nutrient, and Tergital-F agar gave the best results; EMB medium gave intermediate results; and MacConkey, XLD, and SS agar gave poorest results for primary isolation.

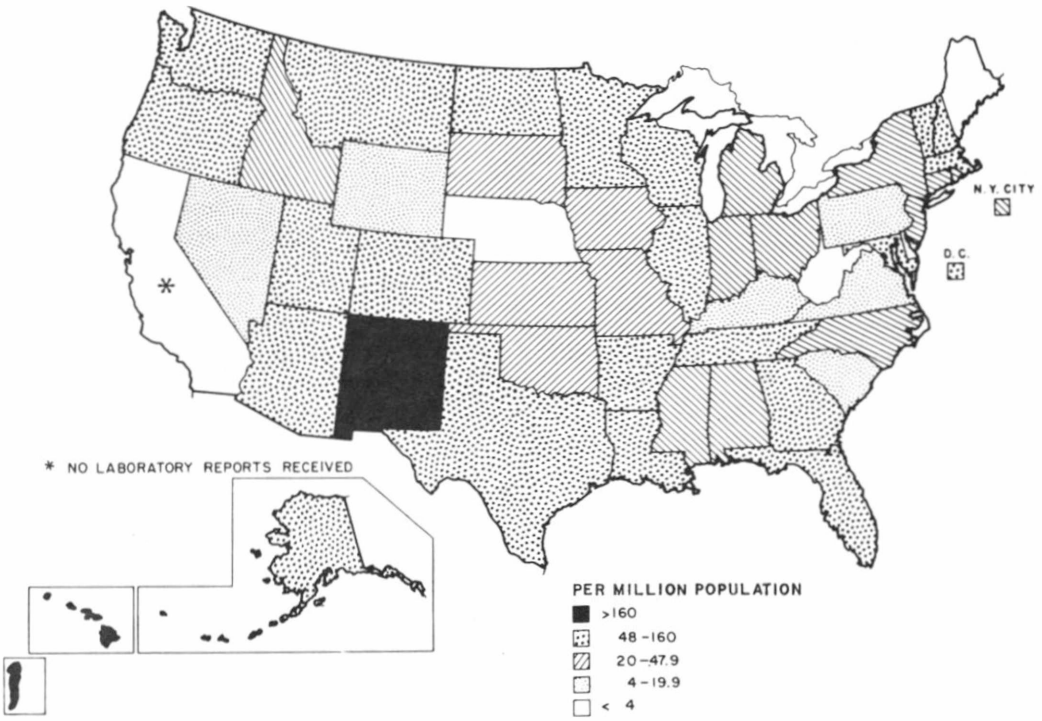
VI. Yearly Summary for 1969

In 1969, a total of 9,054* isolations of shigella were reported to NCDC. This was a decrease of 1.0 percent from the 9,146* reported in 1968. Utilizing the population estimates for July 1969, the overall U.S. attack rate was 44.8 reported isolations

*These totals do not include 131 isolations reported from California during January and February 1968 nor do they include 1,943 clinical cases reported from California in 1969.

per million population in 1969, compared to 46.1 reported isolations per million population in 1968. Attack rates by state are depicted in Figure 9.

Figure 9 ATTACK RATES OF SHIGELLOSIS BY STATE, 1969



The age and sex distribution of individuals from whom shigella was isolated in 1969 is presented in Table VI. Children 1-4 years of age were at greatest risk with an attack rate of 154.1 per million during 1969. (Table VI).

The seasonal distribution persisted; the greatest number of isolates have been reported each autumn. (Figures 3 and 4).

The six most frequently reported serotypes during 1969 were the following:

Rank	Serotype	Reported Number	Calculated Number	Calculated Percent	Rank in 1968
1	S. sonnei	5,484	5,513	60.9	1
2	S. flexneri 2a	668	1,308	14.4	2
3	S. flexneri 3a	303	768	8.5	3
4	S. flexneri 6	309	386	4.3	4
5	S. flexneri 2b	170	333	3.7	6
6	S. flexneri 4a	154	295	3.3	5

Table VII shows the relative frequency of all shigella serotypes reported in 1969.

The trend toward an increasing proportion of all isolations being S. sonnei continued as it has since the fourth quarter of 1966. In 1969, 60.9 percent of all shigella isolations were S. sonnei versus 54.0 percent in 1968, and 50.8 percent in 1967. Concomitantly S. flexneri has progressively decreased in proportion of total isolations. S. boydii and S. dysenteriae each continued to account for less than 1 percent of all reported isolations, although there was a marked increase in S. dysenteriae type 1

(see below).

During 1969, 16 outbreaks of shigellosis were reported in the quarterly Shigella Surveillance Reports. There were four common-source outbreaks attributed to water and food; two were the result of contaminated well water in suburban housing developments, one occurred in a wading pool, and the other involved catered parties in which salads were incriminated. Person-to-person spread was thought to be the mode of transmission in the other 12 reported outbreaks. Five of these occurred in low socioeconomic neighborhoods in cities; three in institutions for the mentally retarded; and one each in a hospital, hippie colony, foundling home, and an Eskimo village.

Surveillance of rare serotypes in the United States disclosed 14 isolations of Shigella dysenteriae type 1 (Shiga's bacillus). Eight of these isolations were from individuals who had acquired their infection in Mexico and another in Central America. The other 5 persons could not be contacted. These imported cases of Shiga dysentery are related to a regional epidemic of S. dysenteriae 1 first recognized in 1969 in Central America. (See Sections III. Current Investigations. Epidemic of Shigellosis in Guatemala, page 5 and V. Current Trends and Developments. Importation of Shiga's bacillus into the United States, page 10 of this report).

TABLE I

SHIGELLA SEROTYPES ISOLATED FROM HUMANS

FOURTH 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. dysenteriae																																						
Unspecified																									0													0	0
1				1											1										2													0	2
2				2														1							3													0	3
3																									0													0	0
Total	0	0	0	3	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	5
B. flexneri																																						
Unspecified			2		6						1					2	53					1		4	69	8			2				3	2			1	16	85
1 Unspecified									2	2		1													5										1			1	6
1A	2			7																					9			5										5	14
1B				1								1													2													0	2
2 Unspecified							1		4		1		1											3	10				1									1	11
2A	2			27							3		2					25	1						60		1	5	14			4		1				25	85
2B	1			20								1	1					1							24													0	24
3 Unspecified										5			5					17						2	29										2	1		3	32
3A	6			40												1									47													0	47
3B				3																					3													0	3
3C											2	1													3													0	3
4 Unspecified															1			1							2													0	2
4A				1								1													2													0	2
4B											1														1													0	1
5				1								1													2										1			1	3
6				9			1		1		2	1												1	15		10		3						1	11		25	40
Variant Y																		1							1													0	1
Total	11	0	2	109	6	0	2	0	7	7	10	7	9	0	1	3	53	45	1	0	0	1	0	10	284	8	11	10	20	0	0	4	3	3	5	12	1	77	361
C. boydii																																						
Unspecified																				1				1	2								1			1		2	4
2				1												1								1	3											7		7	10
4																									0													0	0
Total	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	2	5	0	0	0	0	0	0	0	1	0	0	8	0	9	14
D. Sonnei	31	1		204	46	73	12		16	88	39	159	45	30	161	45	88	37	25	19	3	2		58	1182	22	3	19				19	11	2	12	18	1	107	1289
Unknown			4								1					3	1							4	13													0	13
TOTAL	42	1	6	317	52	73	14	0	23	95	50	166	54	30	163	52	142	83	26	20	3	3	0	74	1489	30	14	29	20	0	0	23	15	5	17	38	2	193	1682

TABLE I (CONTINUED)

SHIGELLA SEROTYPES ISOLATED FROM HUMANS

FOURTH 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	
																									A. dysenteriae
			1						1					0	1					0	1	0.0	3	0.1	Unspecified
									0					0	0					0	2	0.1	9	0.4	1
									0	1				1	1					0	4	0.1	6	0.2	2
									0		1		1	2	2				1	1	3	0.1	1	0.0	3
0	0	0	1	0	0	0	0	0	1	1	1	0	1	3	4	0	0	0	1	1	10	0.3	20	0.8	Total
																									B. flexneri
17	1				18				36		10		1	11	47	7				7	139	4.8	210	8.4	Unspecified
		1	2						3		6	1		7	10	1				1	17	0.6	19	0.8	1 Unspecified
	1		1	1					3				1	1	4			1		1	19	0.7	4	0.2	1A
	1			2					3				2	2	5					0	7	0.2	14	0.6	1B
		16	20			7		18	61		17			17	78				1	1	90	3.1	133	5.3	2 Unspecified
	6			3					9	13		4	74	91	100			15		15	200	6.9	178	7.1	2A
				5					5	1			20	21	26	1				1	51	1.7	53	2.1	2B
		3	10					17	30		20	3		23	53			2		2	87	3.0	82	3.3	3 Unspecified
	8			13					21	7			24	31	52					0	99	3.4	81	3.2	3A
									0				4	4	4					0	7	0.2	5	0.2	3B
	2	1		1					4					0	4					0	7	0.2	2	0.1	3C
		2	2						4		3	1		4	8					0	10	0.3	31	1.2	4 Unspecified
	1			2					3	4			32	36	39			1		1	42	1.4	48	1.9	4A
									0	2			1	3	3					0	4	0.1	2	0.1	4B
		1		1					2		2			2	4					0	7	0.2	18	0.7	5
		2	3			3		3	11	8	21		21	50	61	1				1	102	3.5	74	3.0	6
									0					0	0					0	1	0.0	0	–	Variant Y
17	20	26	38	28	18	10	0	38	195	35	79	9	180	303	498	10	0	19	1	30	889	30.5	954	38.2	Total
																									C. boydii
					1				1					0	1					0	5	0.2	4	0.2	Unspecified
									0		1		1	2	2					0	12	0.4	4	0.2	2
									0		4			4	4					0	4	0.1	3	0.1	4
0	0	0	0	0	1	0	0	0	1	0	5	0	1	6	7	0	0	0	0	0	21	0.7	11	0.4	Total
16	20	99	170	16	5	30	6	76	438	14	52	21	92	179	617		0	74	1	75	1981	68.0	1508	60.3	*D. Sonnei*
					1				1					0	1		0			0	14	0.5	6	0.2	Unknown
33	40	125	209	44	25	40	6	114	636	50	137	30	274	491	1127	10	0	93	3	106	2915		2499		TOTAL

Table II

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

Age (Years)	Male	Female	Unknown	Total	Percent	Cumulative Percent	Number of Reported Isolations/ Million Population*
< 1	79	81	1	161	8.3	8.3	47.0
1 - 4	422	349	3	774	39.7	48.0	51.3
5 - 9	233	219		452	23.2	71.2	21.6
10 - 19	141	96		237	12.2	83.4	6.2
20 - 29	52	95		147	7.5	90.9	5.1
30 - 39	31	51		82	4.2	95.1	3.6
40 - 49	13	26		39	2.0	97.1	1.6
50 - 59	9	15		24	1.2	98.3	1.2
60 - 69	9	7		16	.8	99.1	1.1
70 - 79	4	6		10	.5	99.6	1.1
80 +	3	5		8	.4	100.0	2.3
Subtotal	996	950	4	1,950			
Child (unspec)	1	10	2	13			
Adult (unspec)	13	12		25			
Unknown	411	470	46	927			
Total	1,421	1,442	52	2,915			
Percent	49.6	50.4					

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

Table III

Relative Frequencies of Shigella Serotypes
Reported, Fourth Quarter, 1969

	Serotype	Number Reported	Calculated Number*	Calculated Percent	Rank
A.	S. dysenteriae				
	Unspecified	1			
	1	2	2	.07	16
	2	4	4	.14	14
	3	3	3	.10	15
B.	S. flexneri				
	Unspecified	139			
	1 unspecified	17			
	1a	19	37	1.27	7
	1b	7	14	.48	10
	2 unspecified	90			
	2a	200	324	11.11	2
	2b	51	83	2.85	5
	3 unspecified	87			
	3a	99	209	7.17	3
	3b	7	15	.51	9
	3c	7	15	.51	9
	4 unspecified	10			
	4a	42	61	2.09	6
	4b	4	6	.21	12
	5	7	8	.27	11
	6	102	122	4.18	4
	variant y	1	1	.03	17
C.	S. boydii				
	Unspecified	5			
	2	12	16	.55	8
	4	4	5	.17	13
D.	S. sonnei	1,981	1,991	68.28	1
	Unknown	14			
	Total	2,915	2,916		

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

Table IV

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

State	dysenteriae 2	flexneri unspecified	flexneri 1a	flexneri 2 unspecified	flexneri 2a	flexneri 2b	flexneri 3 unspecified	flexneri 3a	flexneri 4 unspecified	flexneri 5	flexneri 6	sonnei	sonnei variant R	TOTAL
Alabama	0	0	0	0	0	0	0	0	0	0	0	1	0	1
Florida	0	0	0	5	0	0	0	0	1	0	0	30	0	36
Illinois	1	0	0	0	16	18	0	3	0	1	7	2	0	48
Iowa	0	0	0	0	0	0	0	0	0	0	0	49	0	49
Kansas	0	0	5	0	0	0	0	0	0	0	0	1	0	6
Maryland	0	0	0	0	0	0	0	0	0	0	0	1	0	1
Massachusetts	0	0	0	0	0	0	1	0	0	0	0	6	0	7
Michigan	0	1	0	0	0	0	0	0	0	0	0	2	0	3
Minnesota	0	0	0	0	0	0	0	0	0	0	0	5	2	7
Mississippi	0	3	0	0	0	0	0	0	0	0	0	0	0	3
New Jersey	0	0	0	0	0	0	0	0	0	0	0	55	0	55
New York	0	36	0	0	0	0	0	0	0	0	0	16	0	52
North Carolina	0	0	0	3	0	0	0	0	0	0	0	3	0	6
TOTAL	1	40	5	8	16	18	1	3	1	1	7	171	2	274

Table V

Sources of Reported Isolations of Shigella
By Residence at Time of Onset
Fourth Quarter 1969

Source	Oct	Nov	Dec	Total	Percent of Subtotal	Percent of Total
Mental Institutions	108	98	64	274	11	
Indian Reservations	8	5	7	22	1	
Other Residencies	907	680	579	2,214	88	
Subtotal	1,023	783	650	2,510		86
Residencies Unknown	202	83	119	405		14
Total	1,225	866	769	2,915		

Table VI

Age and Sex Distribution of Individuals Infected with Shigellae in the United States, 1969

Age (Years)	Male	Female	Unknown	Total	Percent	Cumulative Percent	Number of Reported Isolations/ Million Population*
< 1	227	222	5	454	7.3	7.3	132.5
1 - 4	1,215	1,107	4	2,326	37.5	44.8	154.1
5 - 9	814	720	1	1,535	24.7	69.5	73.4
10 - 19	468	358		826	13.3	82.8	21.5
20 - 29	183	319		502	8.1	90.9	17.5
30 - 39	112	143	1	256	4.1	95.0	11.4
40 - 49	49	70		119	1.9	96.9	4.9
50 - 59	30	51		81	1.3	98.2	3.9
60 - 69	26	26		52	.8	99.0	3.5
70 - 79	12	24		36	.6	99.6	4.0
80 +	11	12		23	.4	100.0	6.6
Subtotal	3,147	3,052	11	6,210			
Child (unspec)	21	25	2	48			
Adult (unspec)	22	30		52			
Unknown	1,281	1,373	90	2,744			
Total	4,471	4,480	103	9,054			
Percent	49.9	50.1					

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

Table VII

Relative Frequencies of Shigella Serotypes
Reported 1969

	Serotype	Number Reported	Calculated Number*	Calculated Percent	Rank
A.	S. dysenteriae				
	Unspecified	6			
	1	14	16	.18	15
	2	20	23	.25	13
	3	6	7	.08	17
	9	2	2	.02	19
B.	S. flexneri				
	Unspecified	665			
	1 unspecified	65			
	1a	39	90	.99	7
	1b	37	86	.95	8
	2 unspecified	475			
	2a	668	1,308	14.44	2
	2b	170	333	3.68	5
	3 unspecified	352			
	3a	303	768	8.48	3
	3b	22	56	.62	9
	3c	17	43	.47	11
	4 unspecified	87			
	4a	154	295	3.26	6
	4b	9	17	.19	14
	5	43	54	.60	10
	6	309	386	4.26	4
	variant y	2	2	.02	19
C.	S. boydii				
	Unspecified	15			
	2	29	39	.43	12
	3	1	1	.01	20
	4	11	15	.17	16
	12	2	3	.03	18
D.	S. sonnei	5,484	5,513	60.87	1
	Unknown	47			
	Total	9,054	9,057		

*See footnote Table III

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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