REPORT NO. 20
September 3, 1969

national communicable disease center

SHIGELLA

surveillance

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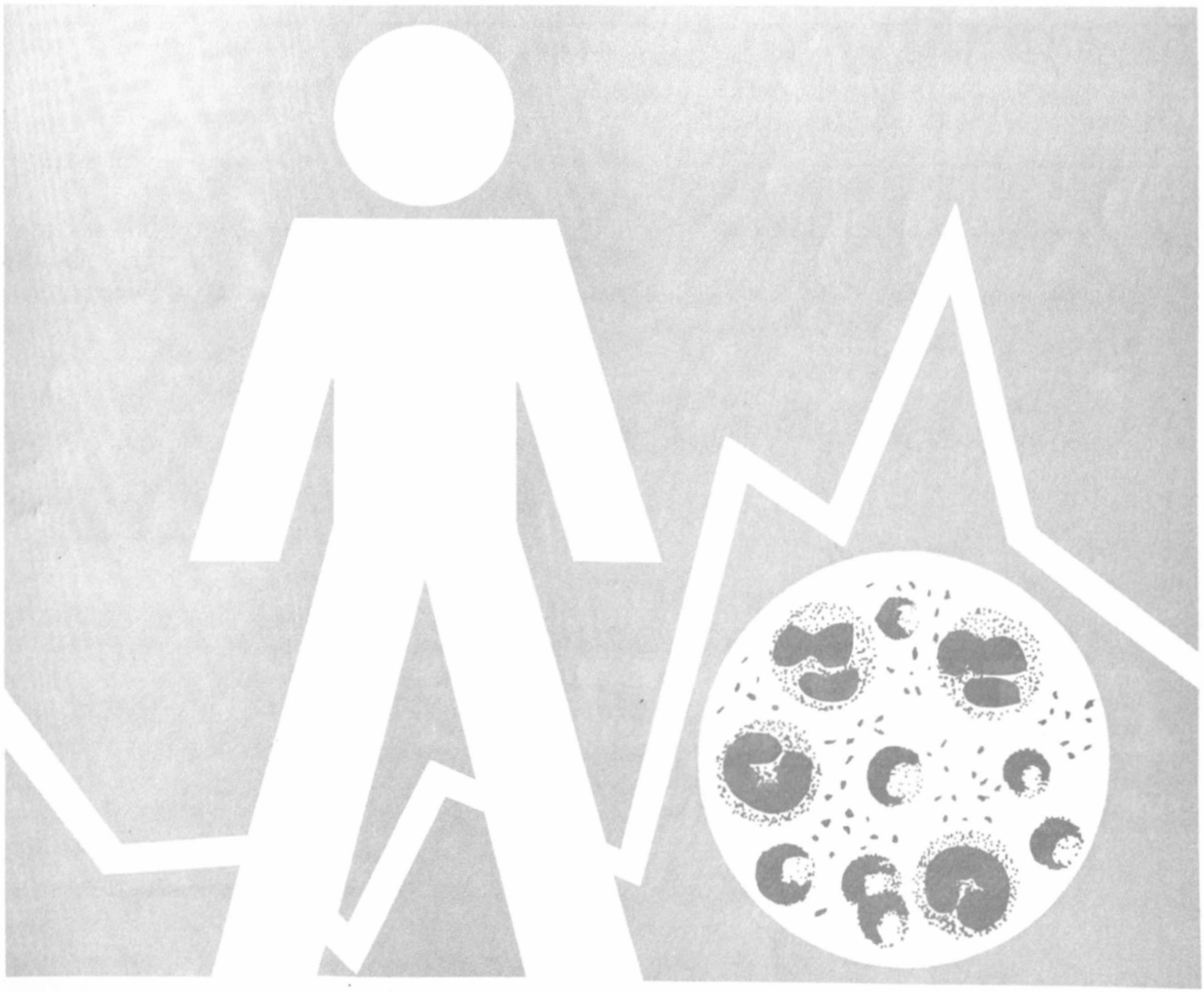
for the
Second Quarter 1969



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.

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I. Summary

In the second quarter of 1969, 1,836 isolations from humans were reported. This number represents an increase of 32 (1.8 percent) over the 1,804 isolations reported in the first quarter of 1969 and a decrease of 83 (4.3 percent) from the 1,919 isolations reported during the second quarter of 1968 (Table I).*

II. Reported Isolations

A. Human

1a. General Incidence

During the second quarter of 1969, 70.2 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[1]

During the first quarter of 1969, 129 cases of clinical shigellosis were reported from the eight administrative areas of the Indian Health Service (IHS) to the NCDC (Table IIIA). This number represents a decrease of 15.7 percent from the 153 cases in the first quarter of 1968.

In the second quarter of 1969, 167 cases of clinical shigellosis were reported to the NCDC by the IHS (Table IIIB). This number represents an increase of 33.9 percent over the first quarter of 1969 and a decrease of 10.7 percent from the 187 cases in the second quarter of 1968.

2. Serotype Frequencies

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

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

1. Editor's note: Future issues of the Shigella Surveillance Report (SSR) will include a quarterly summary of clinical cases of shigellosis reported to NCDC by the IHS. See Section III. Current Investigations (of this issue) for a discussion of the problem of shigellosis among the Indian population in the U.S.

Rank	Serotype	Number Reported	Calculated Number*	Calculated Percent	Rank Last Quarter
1	S. sonnei	1,010	1,014	55.2	1
2	S. flexneri 2a	131	270	14.7	2
3	S. flexneri 6	72	94	5.1	4
4	S. flexneri 3a	63	179	9.7	3
5	S. flexneri 4a	39	79	4.3	6
6	S. flexneri 2b	38	78	4.2	5
Subtotal		1,353	1,714	93.2	
Total (all serotypes)		1,836	1,837		

* from Table IV

Table IV and V, calculated from data compiled during the second quarter of 1969 and from data compiled since the beginning of the Shigella Surveillance Program in October 1963, respectively, show the relative frequency of isolations of the various serotypes. In these tables the isolations in each of the unspecified categories have been distributed in their subgroups in the same proportions as the completely specified isolations of that group. The resulting distributions in these tables are called the "calculated number," and from these are derived a "calculated percent" for each serotype. These provide approximate indices of the relative frequencies of the more common shigella serotypes in the United States. S. sonnei now accounts for slightly over half of all isolations, and S. flexneri 2a and b combined for slightly less than a quarter.

3. Geographical Observations

There were more reported cases of S. sonnei than S. flexneri in the United States except for Alaska and the southwestern section of the United States. The recent trend in the southeastern section of the United States toward more reported isolations of S. sonnei than S. flexneri persisted during the second quarter of 1969 (Figure 1). The seasonal distribution is depicted in Figures 2 and 3. Figure 4 portrays the number of reported isolations per million population by state for April-June 1969, utilizing population estimates for July 1, 1968. Approximately nine isolations per million population were reported during the second quarter of 1969. The same rate was observed during the first quarter of 1969 and is comparable to the rate of 1.0 per million population observed during the second quarter of 1968.

Figure 1

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

UNITED STATES, APRIL – JUNE 1969

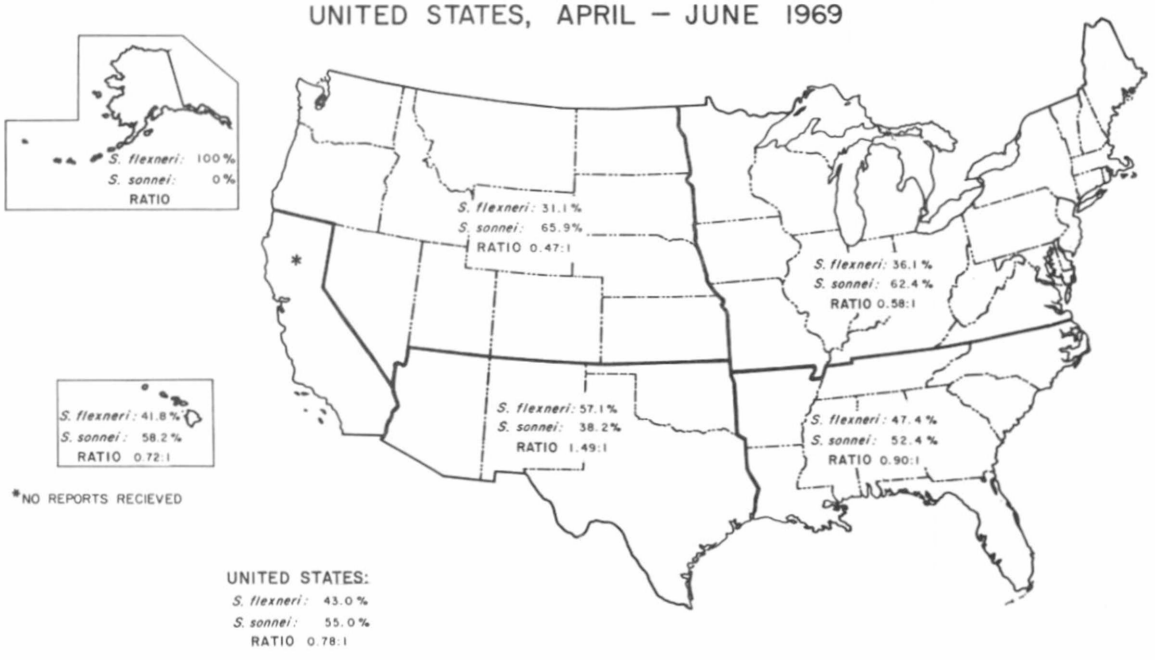
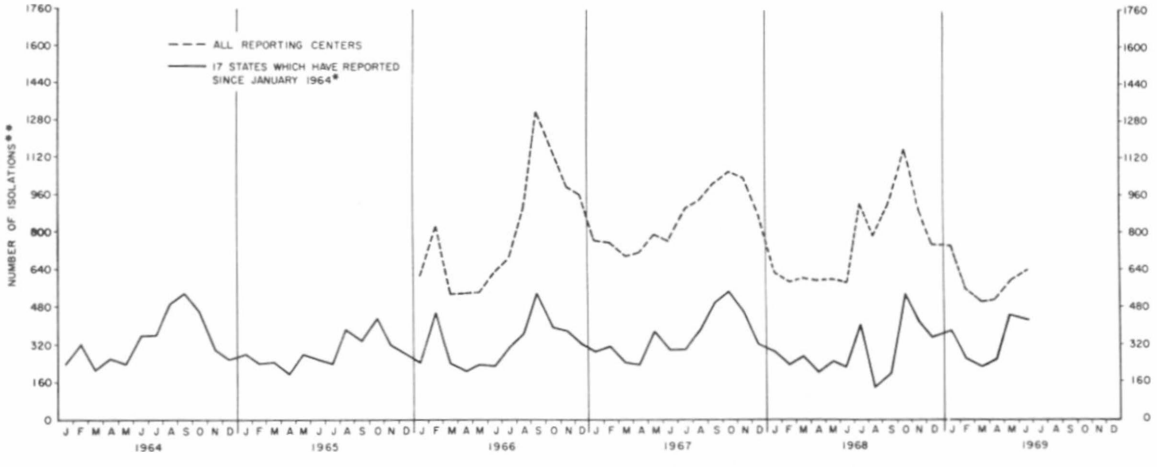


Figure 2

REPORTED ISOLATIONS OF SHIGELLA IN THE UNITED STATES



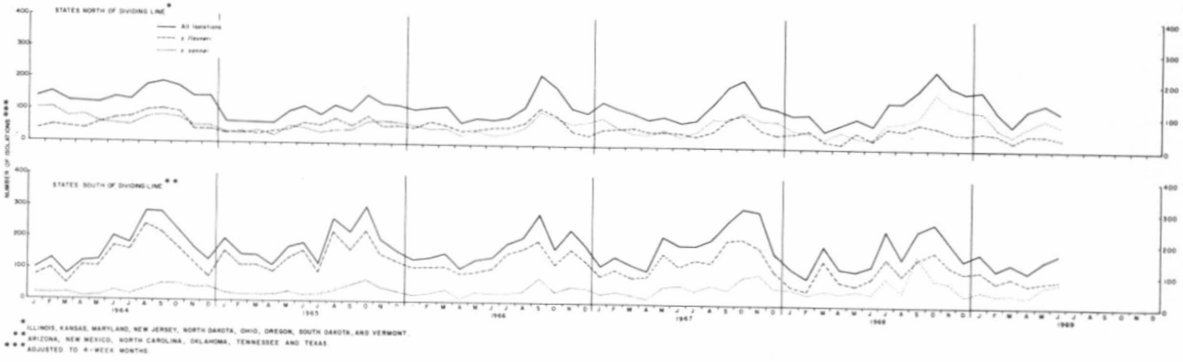
*ALASKA, ARIZONA, HAWAII, ILLINOIS, KANSAS, MARYLAND, NEW JERSEY, NEW MEXICO, NORTH CAROLINA, NORTH DAKOTA, OHIO, OKLAHOMA, OREGON, SOUTH DAKOTA, TENNESSEE, TEXAS AND VERMONT

**ADJUSTED TO FOUR-WEEK MONTHS.

Figure 3

SEASONAL DISTRIBUTION OF SHIGELLA ISOLATIONS BY SEROTYPE AND REGION

15 STATES WHICH HAVE REPORTED SINCE JANUARY 1964

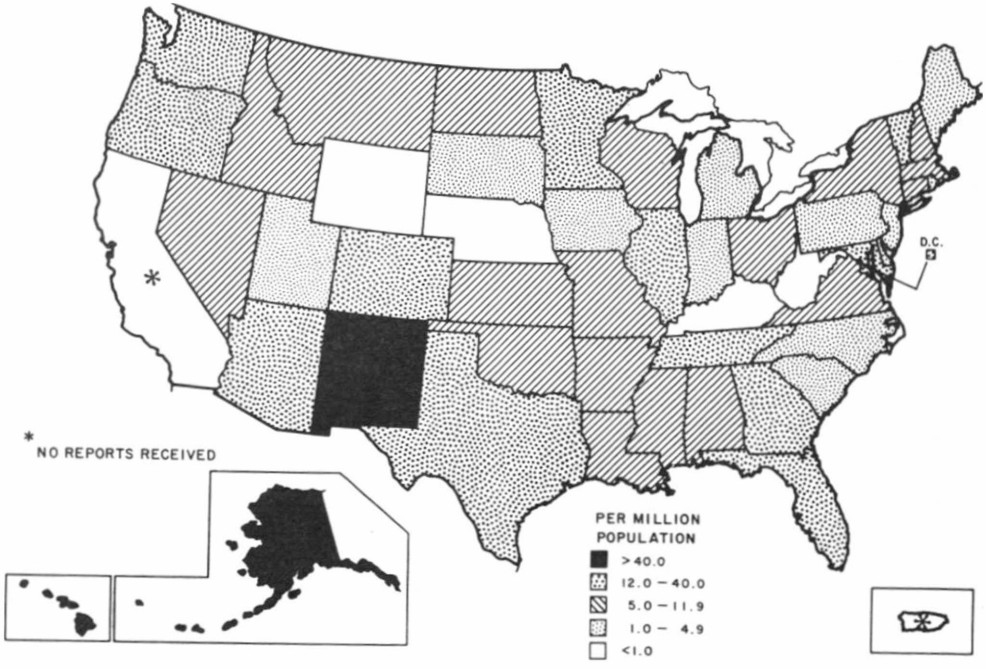


* ILLINOIS, KANSAS, MARYLAND, NEW JERSEY, NORTH DAKOTA, OHIO, OREGON, SOUTH DAKOTA, AND VERMONT.

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

*** ADJUSTED TO 4-WEEK MONTHS.

Figure 4 ATTACK RATES OF SHIGELLOSIS BY STATE, JULY – SEPTEMBER 1968



B. Nonhuman

During the second quarter of 1969, nine nonhuman isolations of shigella were reported:

Serotype	Number	Source	State
S. flexneri 1a	1	Monkey	Illinois
	1	Baboon	Illinois
S. flexneri 4a	1	Monkey	Louisiana
	1	Monkey	Illinois
S. flexneri 4b	2	Monkey	Illinois
S. flexneri (unspec.)	1	Water	Virginia
S. sonnei	1	Monkey	Texas
	1	Well Water	Oregon

III. Current Investigations

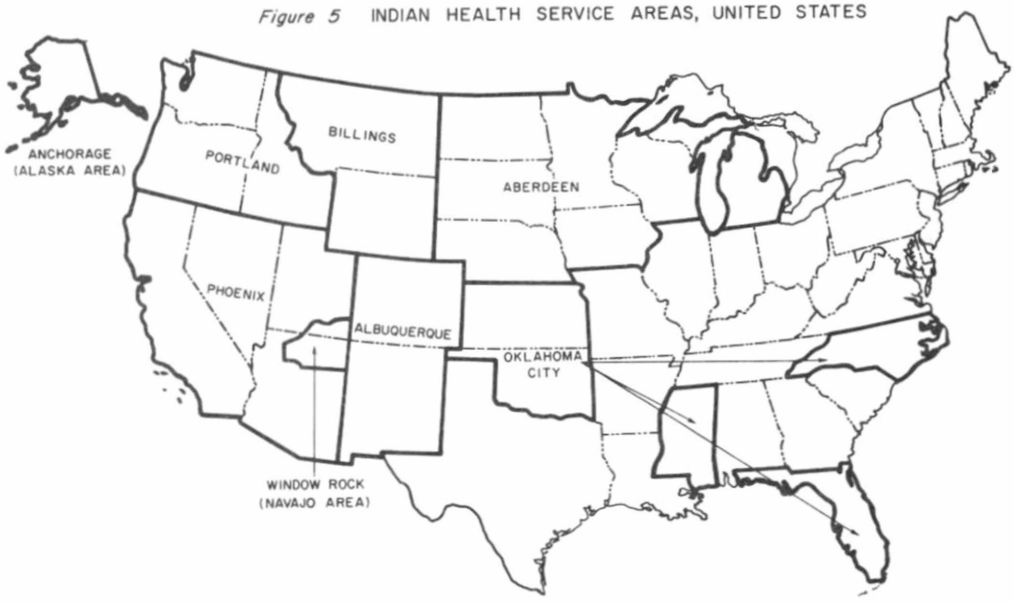
Shigellosis among Indians.[1] Reported by Shigella Surveillance Unit, Enteric Diseases Section, Bacterial Diseases Branch, Epidemiology Program, NCDC, and Mozart I. Spector, Chief, Program Analysis and Statistics Branch, Indian Health Service, Washington, D. C.

As of July 1, 1968, 402,000 Indians were receiving health care from the Indian Health Service, U.S. Public Health Service, and are included in notifiable disease reporting. About 353,000 live on or near Federal reservations in the United States, and 49,000 are Alaska natives (Aleuts, Eskimos, and Indians). The incidence and types of communicable diseases among Indians and Alaska natives is a significant index of the health status of these people. An orderly system for reporting communicable disease among Indians has been established.

New cases of notifiable diseases, including shigellosis (bacillary dysentery), seen in Division of Indian Health hospitals, health centers, and other field facilities are reported monthly to headquarters through the Division's area offices. The locations of the eight administrative area offices of the Indian Health Service (IHS), and the geographical areas they serve along with the estimated population and attack rates per 100,000 population for each health area are shown in Figure 5.

1. The data concerning shigellosis among Indians and population estimates have been made available by the Indian Health Service, U.S. Public Health Service. These reports are preliminary and should not be quoted without permission of the Indian Health Service.

Figure 5 INDIAN HEALTH SERVICE AREAS, UNITED STATES



Clinical Shigellosis among Indians
Attack Rates per 100,000 Population, 1968
(Indian Health Service Data)

Indian Health Area	Population*	Attack Rate per 100,000
Aberdeen	56,725	234.5
Albuquerque	27,600	318.8
Anchorage	48,800	96.3
Billings	24,500	269.4
Oklahoma City	73,500	83.0
Phoenix	52,100	148.8
Portland	22,200	423.4
Navajo (Window Rock, Arizona)	95,500	297.4
Total	401,925	212.2
United States**	199,861,000	4.6

* Based on 1968 Population Estimates of Indians receiving health care from the Indian Health Service, U.S. Public Health Service.

** Based on provisional data from Population Estimates, Series P25, No. 414, July 1, 1968, and shigella isolates reported to NCDC Jan.-Dec. 1968.

The reported cases of shigellosis from each area for 1968 are tabulated by month in Table A and by quarter in Table B.

TABLE A

Cases of Clinical Shigellosis Reported by Month and Indian Health Service Area, 1968

Area	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Area Total 1968
Aberdeen	39	8	4	9	8	6	15	5	13	6	8	12	133
Albuquerque	0	2	4	1	3	8	9	27	15	11	7	1	88
Anchorage	1	4	2	2	2	2	2	5	21	3	2	1	47
Billings	3	2	9	2	3	7	12	5	10	6	5	2	66
Okla. City	5	0	2	5	3	4	5	21	6	2	7	1	61
Phoenix	1	0	2	0	15	8	14	6	11	9	5	6	77
Portland	6	3	2	17	11	1	10	6	16	6	12	4	94
Navajo (Window Rock, Arizona)	19	15	20	19	27	24	43	20	34	15	12	29	287
Total	74	34	45	55	72	60	110	105	126	58	58	56	853

TABLE B

Cases of Clinical Shigellosis Reported by Quarter and Indian Health Service Area, 1968

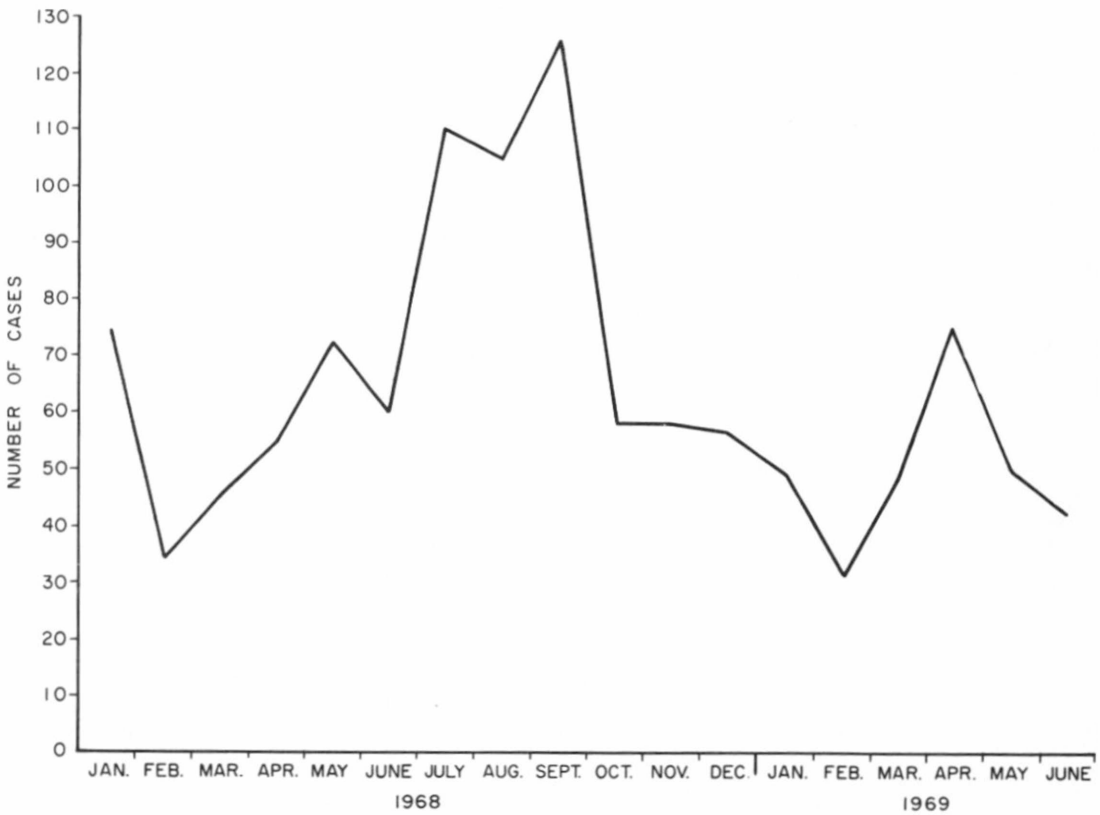
Area	First qtr.	Second qtr.	Third qtr.	Fourth qtr.	Total
Aberdeen	51	23	33	26	133
Albuquerque	6	12	51	19	88
Anchorage	7	6	28	6	47
Billings	14	12	27	13	66
Okla. City	7	12	32	10	61
Phoenix	3	23	31	20	77
Portland	11	29	32	22	94
Navajo (Window Rock, Arizona)	54	70	107	56	287
Total	153	187	341	172	853

The overall reported incidence of shigellosis among Indians for 1968 was 212.2 cases per 100,000 compared with 4.6 cases per 100,000 population in the entire United States.

The largest number of cases has consistently been in the 1-4 year age group, which accounted for 424 of 961 (44.1 percent) cases in 1966. The same age group, viz. 1-4 years, accounted for 38.3 percent of all isolations of shigella in the United States during 1964-1968.

The largest number of reported cases of shigellosis in Indians occur during the months of July, August, and September (Figure 6). This corresponds exactly to the annual peak incidence of shigellosis in the United States during the late summer.

Figure 6 SEASONAL DISTRIBUTION OF CASES OF SHIGELLOSIS ON INDIAN RESERVATIONS, UNITED STATES, JAN. 1968-JUNE 1969



Since the reporting of shigellosis to the Indian Health Service is based on clinical diagnosis, which is sometimes confirmed bacteriologically, no figures are available as to the distribution of shigella serotypes among Indians. The decision as to whether diarrheal illness is reported as gastroenteritis, amoebic dysentery, or shigellosis depends upon the clinical judgment of the physician caring for each patient. In general, febrile diarrhea with blood, pus, and/or mucus, is classified as shigellosis, although persistent febrile diarrhea without these signs may also be called shigellosis.

During the fourth quarter (Oct.-Dec.) of 1968, 57 isolates were reported by the states from persons residing on Indian reservations yielding an incidence rate of laboratory isolates of 14.2 per 100,000 population compared with 2,776 isolates reported from the general population or 1.4 per 100,000. For the corresponding period of time, 172 cases of clinical shigellosis were reported to the Indian Health Service.

Discussion: The national system of shigella surveillance is based on laboratory reports of shigella isolations sent to the National Communicable Disease Center (NCDC). In contrast the Indian Health Service data are comprised of clinically diagnosed cases of shigellosis, not all of which are confirmed bacteriologically. Thus the data from these two sources are not strictly comparable. Although some illnesses called shigellosis on the basis of a typical clinical picture of febrile diarrhea with mucus, pus, and/or blood in the stool are due to other agents, there are also many cases of shigellosis in the general population which are never cultured and therefore not reported to the NCDC. Thus there may be some over-reporting of shigellosis among Indians and gross under-reporting of shigellosis among the general population as reflected in the incidence rates of laboratory isolates. Even considering that at best one-third of clinically diagnosed and reported cases of shigellosis among Indians are supported by reported laboratory isolates, the number of isolations is nonetheless 10 times higher among Indians than in the general population in the corresponding fourth quarter of 1968.

The Indian population differs in many characteristics from the general population in the United States. It is almost exclusively rural in nature, highly mobile in some areas where season off-reservation jobs are important to the economy and extremely youthful in its overall age composition. The median age of the population served by the Indian Health Service in 1960 was about 17 years compared with a median age of 30 years for all people in the United States served by other health services. The disproportionate number of youths is due primarily to two factors: a crude birth rate that is greater than double (37 per 1,000 population in 1967) that for the country as a whole and the losses from emigration as the working ages are reached. Thus the Indian population is heavily weighted with the age groups at greatest risk for shigellosis. Furthermore, the sanitary and socioeconomic conditions in which most Indians live are well below those of the general population.

IV. Reports from the States

A. Shigellosis acquired outside of the United States: Importations from Mexico:

1. Reported by D. S. Fleming, M.D., Director of Disease Prevention and Control, Minnesota State Department of Health, Minneapolis, Minnesota.

A 61-year-old Minnesota man developed sudden onset of abdominal pain, cramps, and diarrhea, on a trip to Mexico in March 1969. On March 27, 1969, the Minnesota Division of Medical Laboratories isolated *Shigella dysenteriae* 1 (Shiga's bacillus) from this traveler's fecal specimen. The identity of the isolate was confirmed by NCDC. No details concerning treatment were available.

2. Reported by Ronald Altman, M.D., Acting Director, Division of Preventable Diseases, New Jersey State Department of Health, Trenton, New Jersey.

In early April 1969 an 18-year-old coed from New Jersey developed clinical dysentery while in Mexico. On her return S. dysenteriae 3 was isolated from a fecal specimen and confirmed at NCDC. Further information was not available.

B. Shigellosis among pediatric staff, New Jersey. Reported by Ronald Altman, M.D., Acting Director, Division of Preventable Diseases and Charles M. Janeway, M.D., EIS Officer located at the New Jersey State Department of Health, Trenton, New Jersey.

During March and April 1969, an outbreak of gastroenteritis occurred among personnel on the pediatric service of a New Jersey medical center. A total of 17 of 116 staff members surveyed had experienced an illness characterized by diarrhea (82 percent), vomiting (70 percent), abdominal pain (65 percent), nausea (65 percent), anorexia (53 percent), fever (47 percent), and blood in the stool (24 percent).

Shigella sonnei was isolated from the stools of six staff members. Four patients also had stool cultures positive for S. sonnei with the same antibiotic sensitivity pattern, viz., sensitive to chloramphenicol, tetracycline, kanamycin, polymixin B, colistin, and nalidixic acid. Three of these patients were infected with S. sonnei in the 3 months prior to the first staff case and only one was infected following the outbreak among personnel.

No common vehicle could be incriminated to account for all the illnesses. There was ample opportunity for person-to-person spread between patients and personnel. The outbreak was curtailed through educational measures and rigid adherence to high standards of personal hygiene.

C. Outbreak of shigellosis related to catered parties, Jersey City, New Jersey. Reported by Ronald Altman, M.D., Acting Director, Division of Preventable Diseases, and Charles M. Janeway, M.D., EIS Officer located at the New Jersey State Department of Health, Trenton, New Jersey.

In mid-May 1969 an investigation of foodborne outbreaks of gastroenteritis in Jersey City, New Jersey, revealed that all persons ill had attended four of six separate parties catered by the same restaurant. A bacteriological and questionnaire survey was undertaken.

Of 117 completed questionnaires, 61 persons with an illness characterized by diarrhea (94 percent), abdominal pain (77 percent), nausea (61 percent), and anorexia (57 percent) were detected, yielding an attack rate of 52 percent. The onset of illness occurred 5 hours to 8 days after consumption of the catered food. The average incubation period was 2 days. Symptoms lasted 6 hours to 10 days with an average duration of 5.5 days. No one required hospitalization.

A difference in the attack rates for those eating versus those not eating specific food items suggested potato salad or shrimp and macaroni salad as possible vehicles. These two salads as well as other leftover food specimens were negative for enteric pathogens. Eight of 43 stool cultures from persons consuming the foods grew S. sonnei. Furthermore, the same food served the following day in a neighboring city also resulted in an outbreak of gastroenteritis among those who ate the catered food.

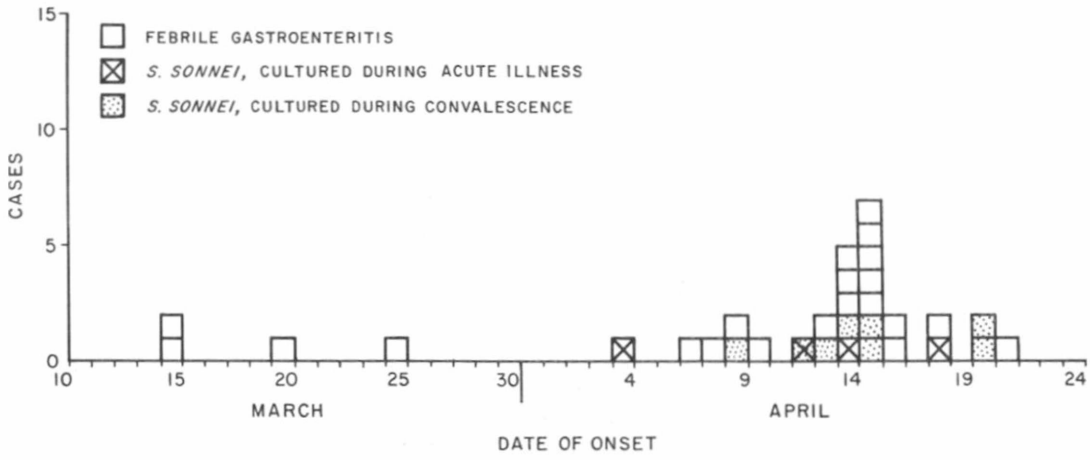
Control measures were aimed at correcting sanitary deficiencies in the caterer's operation.

Editor's comment: The topic of foodborne shigellosis in the United States 1964-1968 was reviewed in the Fourth Quarter 1968 Shigella Surveillance Report No. 18. The importance of salads, and frequency of potato salad in particular, in foodborne shigellosis was noted. The requisites for a foodborne outbreak of shigellosis were summarized as follows: 1) a human carrier who has poor sanitary habits and handles liquid or moist food that is not thoroughly cooked; 2) a storage area where the food is left at a temperature conducive to replication of the organisms, and 3) people to ingest the food or liquid thus contaminated, completing the cycle of transmission.

D. Outbreak of waterborne shigellosis, Prineville, Oregon. Reported by Gatlin Brandon, M.S., M.P.H., Director, Oregon State Public Health Laboratory; Ken Ashbaker, District Sanitary Engineer, Oregon State Board of Health; Dick Clark, Sanitarian, and Helenmarr Wimp, Public Health Nurse, Crook County Health Department; Enteric Diseases Section, Bacterial Diseases Branch, and Statistics Section, Epidemiology Program, NCDC; and Roger Rochat, M.D., EIS Officer located at the Oregon State Board of Health.

During March and April 1969, 31 of 36 residents in seven houses of a new housing development near Prineville became ill with acute febrile gastroenteritis (Figure 7). The illnesses lasted from 1 to 7 days (median 3 days) and were characterized by diarrhea (97 percent), fever (71 percent), nausea (65 percent), cramps (48 percent), headache (45 percent), vomiting (42 percent), and myalgia (19 percent). One man required hospitalization. S. sonnei was cultured from the stools of four persons with acute diarrhea, eight convalescent persons, and two of six visitors to the area.

Figure 7 FEBRILE GASTROENTERITIS, PRINEVILLE, OREGON, 1969



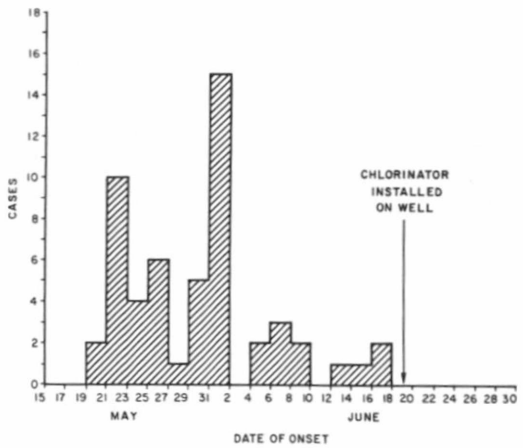
The epidemic curve was compatible with a common-source outbreak, and the epidemiologic investigation suggested the water supply as the vehicle of infection. Water for the residents of all seven houses came from a common well, 30 feet in depth, and sealed with cement grout to a depth of 20 feet. The soil strata showed 1 to 3 feet of topsoil and then mixed clay and gravel to a depth of 30 feet. Sewage disposal was provided by individual household septic tanks. On April 23 water from the well was cultured and grew S. sonnei and coliform organisms. The presumed contaminating link between sewage and the well could not be demonstrated by fluorescein dye and the sodium chloride tracer techniques. The primary control measure employed was the drilling of a new deep well for the housing development.

Because of known visitors to the affected area and reports of similar illnesses in persons residing in houses contingent to these seven houses, a random sample survey of 252 housing units was conducted on May 6 and 7 in Prineville and environs. Approximately 15 percent of the sampled population had experienced diarrheal illness between January 1 and May 7. No statistically significant difference in the incidence of diarrheal illness could be demonstrated between persons having private wells and those receiving their water from the chlorinated municipal water supply. Twenty-two stool cultures obtained from persons recently ill with diarrhea in the survey population were all negative for enteric bacterial pathogens.

E. Waterborne outbreak of gastroenteritis, Frederick County, Maryland. Reported by Charles G. Spicknall, M.D., Deputy State Health Officer, Frederick County, Maryland; Carl Margrabe, Sanitarian, Environmental Health Services, Frederick County, Maryland; Howard J. Garber, M.D., M.P.H., Chief, Division of Communicable Diseases, Maryland State Health Department; and Harold Mellin, M.D., EIS Officer located at the Maryland State Health Department, Baltimore, Maryland.

In Frederick County, Maryland, 54 of 114 residents (47 percent) interviewed in 26 occupied dwellings of a new housing development became ill with acute febrile gastroenteritis in May and June 1969 (Figure 8). The illnesses lasted from 1-9 days and were characterized by diarrhea, abdominal cramps, fever, and, less frequently, nausea and vomiting; two persons were hospitalized briefly. The ages of the patients ranged from 11 months to 50 years. S. sonnei was isolated from 9 of 17 persons in four different households who submitted stool specimens for culture; no other bacterial pathogens were recovered.

Figure 8 FEBRILE GASTROENTERITIS BY DATE OF ONSET
FREDERICK COUNTY, MARYLAND, MAY 15 – JUNE 30, 1969



Except for their common water supply, no other factors of similar exposure could be found to account for this sizeable outbreak. The water supply for all houses in the new development was derived from an unchlorinated drilled well located about 100 feet from a septic-tank sewerage system. In late May and early June, residents complained of a foul odor in the area, possibly due to sewage overflow. In mid-June, water samples from the houses and from the well demonstrated high fecal coliform counts.

Control measures included altering of the nearby sewerage system and installing, on June 19, a chlorinator on the well supplying water to the housing development. No further cases of febrile gastroenteritis occurred after June 19. On June 20 the chlorine content of water from the well was 0.8 parts per million, and no coliforms could be demonstrated in water from household taps.

Editor's comment: There is a striking similarity between this outbreak and the recent waterborne outbreak of shigellosis near Prineville, Oregon, reported above (IV. D.). Both point up the need for chlorination of private water supplies in suburban housing developments as well as in incorporated cities.

F. Shigellosis in an Arkansas day care center. Reported by Mrs. Inez Newton, Public Health Nurse II, and Mrs. Hazelle Thrasher, Public Health Nursing Supervisor, Pope County Health Department; Douglas H. Lowery, M.D., David William, M.D., William E. King, M.D., and Brooks Teeter, M.D., private physicians, Russellville, Arkansas; J. T. Herron, M.D., State Health Officer, and Bryant Swindoll, M.D., Acting Chief, Communicable Disease Control, Arkansas State Department of Health, and Alan Hendin, M.D., EIS Officer located at the Arkansas Department of Health, Little Rock, Arkansas.

On March 17, 1969, one of three staff members of a day care center for children of working mothers in Russellville, Arkansas, developed abdominal pain, cramps, diarrhea, and fever. A stool culture grew S. sonnei. Over the ensuing 3 weeks, 9 of 30 (30 percent) children aged 3-6 years who attend the center became ill with mild abdominal cramps, diarrhea (up to eight stools per day) and fever (up to 102°F). Symptoms lasted 1 to 10 days with a mean duration of 3 days. Eight of these children as well as three family contacts were found to harbor S. sonnei in their feces. Transmission of the organism in this outbreak was attributed to person-to-person spread.

Control measures consisted of removing affected children from the center for the duration of their diarrhea and fever as well as treatment with ampicillin in most instances. Efforts to maintain high standards of personal hygiene were increased. With employment of these measures, the outbreak abated.

G. Household shigellosis, Portland, Oregon. Reported by John Donnelly, M.D., Multnomah County Health Officer; Mr. William Lee, Director, Multnomah County Public Health Laboratory, and Roger Rochat, M.D., EIS Officer located at Oregon State Board of Health.

Between February 18 and March 1, 1969, five young children who had contact within the same household in the Model Cities area of Portland, Oregon, developed acute shigellosis characterized by fever, diarrhea, and vomiting. Four, aged 2 months to 2 years, required hospitalization.

Shigella flexneri was recovered from the stools of all five children; two isolates were further characterized as S. flexneri 2a. Despite its small size, the outbreak was of interest because of its severity and the infrequency of S. flexneri isolates in Portland. Only three such isolates were reported in 1968 and none in 1967. It was postulated that this Portland household acquired its infections from house

guests from California who were ill with diarrhea prior to their Portland visit and who may have been convalescent carriers of shigella.

H. Household shigellosis, Cleveland, Ohio. Reported by Miss Ivy Wadsworth, R.N., Assistant Director of Nurses, Cleveland Department of Health, and Stephen J. Lerman, M.D., EIS Officer located at Cleveland Metropolitan General Hospital, Cleveland, Ohio.

On March 29, 1969, an 86-year-old great grandmother was hospitalized in Cleveland because of the sudden onset of abdominal pain, fever, and blood-tinged diarrhea on March 27. A stool culture grew out S. flexneri. She was treated with ampicillin; recovery was uneventful.

An investigation of 10 household contacts consisting of a daughter, five grandchildren (aged 13-21 years), the wife of one of the grandchildren and three great grandchildren (ages 1-6 years) revealed that two grandchildren had developed abdominal pain, fever, and diarrhea on March 29 and April 1, respectively. S. flexneri was isolated from stool cultures; they were treated with oral ampicillin. Three stool cultures obtained from each of the eight remaining relatives showed two more persons infected with S. flexneri. One of these persons had mild diarrhea and the other was asymptomatic. The times of onset of these cases pointed to person-to-person spread as the mode of transmission.

Control measures included instruction of the family in the need for scrupulous personal hygiene, particularly handwashing after defecation. Also, persons with positive cultures were treated with an appropriate course of ampicillin. Follow-up stool cultures on family members 1 to 10 weeks after treatment revealed no evidence of persistent infection.

Editor's comment: These last two reports illustrate the urban low socioeconomic community as a high-risk population for shigellosis. Furthermore, the value of the following procedures in increasing the reported incidence of shigellosis is amply demonstrated: 1) more thorough investigation of index cases for contacts who might be ill, 2) culturing of patients with diarrhea prior to antibiotic therapy, 3) multiple stool cultures in cases of diarrhea, and 4) more complete local reporting to the respective state department of public health.

V. Current Trends and Developments

Comparison of media for direct isolation and transport of shigella from fecal specimens. Reported by George K. Morris, Ph.D., Chief, and Judith A. Koehler, Technologist, Salmonella Shigella Unit, Epidemiologic Services Laboratory Section, and the Enteric Diseases Section, Bacterial Diseases Branch, Epidemiology Program, NCDC.

Three commonly used plating media for direct isolation and five enrichment and transport media were evaluated in order to determine the optimal method for the recovery of shigella from fecal specimens. The material studied included 4,228 specimens, mostly rectal swabs, collected from 1965-1969 by the NCDC in the course of institutional surveys, primate studies, and epidemiologic investigations of outbreaks of shigellosis.

Xylose-lysine-deoxycholate agar (XLD) was found to be more efficient than Salmonella-Shigella agar (SS) or MacConkey agar for the isolation of shigella from fecal specimens. Direct plating of fecal specimens in the field resulted in a much greater

yield of shigellae as compared with transporting specimens to the laboratory either in holding media or enrichment broth. The combination of XLD agar and SS agar is recommended for direct isolation of shigella and, whenever possible, these solid media should be taken to the bedside and inoculated directly for optimal results.

TABLE I
SHIGELLA SEROTYPES ISOLATED FROM HUMANS
SECOND 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																									0													0	0
1				1								1													2													0	2
2				2								1													3													0	3
3															1										1													0	1
9																									0													0	0
Total	0	0	0	3	0	0	0	0	0	0	0	2	0	0	1	0	0	0	0	0	0	0	0	0	6	0	0	0	0	0	0	0	0	0	0	0	0	0	6
B. S. flexneri																																						
Unspecified			4		4				1	2							91				1	13		13	129							3	3					6	135
1 Unspecified									1			1													2		1									2		3	5
1A	3			2							1														6				1									1	7
1B																									0	3												3	3
2 Unspecified									13	1		1	1												16										1	6		7	23
2A	2			21							2	13	1		2			2					1		44	1	1	5	2									9	53
2B	1			22												1									24	1												1	25
3 Unspecified									1				7					15							23	2										1		3	26
3A				28							1					1									30													0	30
3B				3																					3													0	3
3C											1														1													0	1
4 Unspecified											1														1													0	1
4A				2											2										4	3		2										5	9
4B																									0													0	0
5																1									1	6	1											7	8
6	1			6					5			1						4							17	6										1		7	24
Variant Y																									0													0	0
Total	7	0	4	84	4	0	0	0	21	3	6	16	9	0	4	3	91	21	0	0	1	13	1	13	301	22	3	7	3	0	0	3	3	0	1	10	0	52	353
C. S. boydii																																						
Unspecified																1					1				2													0	2
2				1																					1	2									1		3	4
3																									0													0	0
4																									0													0	0
12																									0	2												2	2
Total	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	3	4	0	0	0	0	0	0	0	0	0	1	0	5	8
D. S. sonnei	16	1	13	82	19	7	2	3	68	42	25	47	17	4	28	10	41	32	22	2	10	14		15	520	32	4	10	2		3	3	21	1	1	33	0	110	630
Unknown			3																					1	4													0	4
TOTAL	23	1	20	170	23	7	2	3	89	45	31	65	26	4	33	14	132	53	22	2	12	27	1	29	834	58	7	17	5	0	3	6	24	1	2	44	0	167	1001

TABLE I (CONTINUED)

SHIGELLA SEROTYPES ISOLATED FROM HUMANS

SECOND 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. S. dysenteriae
									0				1	1	1					0	1	0.1	1	0.1	Unspecified
									0					0	0					0	2	0.1	1	0.1	1
									0				3	3	3					0	6	0.3	4	0.2	2
									0				1	1	1					0	2	0.1	0	—	3
									0				1	1	1					0	1	0.1	0	—	9
0	0	0	0	0	0	0	0	0	0	0	0	0	6	6	6	0	0	0	0	0	12	0.7	6	0.3	Total
																									B.S. flexneri
13	4				11		2		30		7		1	8	38	9				9	182	9.9	134	7.4	Unspecified
		4	1					3	8		2			2	10					0	15	0.8	14	0.8	1 Unspecified
				1					1					0	1					0	8	0.4	8	0.4	1A
								1	1				1	1	2			2		2	7	0.4	9	0.5	1B
		16	24			7		8	55		19	1		20	75					0	98	5.3	154	8.5	2 Unspecified
				6					6	5		4	42	51	57			21		21	131	7.1	159	8.8	2A
				2					2	1		3	7	11	13					0	38	2.1	28	1.6	2B
	1	4	31					7	43		18			18	61					0	87	4.7	96	5.3	3 Unspecified
				7					7				26	26	33					0	63	3.4	60	3.3	3A
									0				5	5	5					0	8	0.4	2	0.1	3B
	1			1					2					0	2					0	3	0.2	5	0.3	3C
		2	1					6	9		9	3		12	21					0	22	1.2	24	1.3	4 Unspecified
									0	2			28	30	30					0	39	2.1	25	1.4	4A
									0			1		1	1					0	1	0.1	2	0.1	4B
									0	3			3	6	6					0	14	0.8	4	0.2	5
		5	6	3				2	16	5	11		14	30	46	2				2	72	3.9	61	3.4	6
	1								1					0	1					0	1	0.1	0	—	Variant Y
13	7	31	63	20	11	7	2	27	181	16	66	12	127	221	402	11	0	23	0	34	789	43.0	785	43.5	Total
																									C. S. boydii
									0		1		1	2	2					0	4	0.2	2	0.1	Unspecified
									0		1		7	8	8					0	12	0.7	1	0.1	2
									0					0	0					0	0	0.0	1	0.1	3
									0					0	0					0	0	0.0	4	0.2	4
									0					0	0					0	2	0.1			12
0	0	0	0	0	0	0	0	0	0	0	2	0	8	10	10	0	0	0	0	0	18	1.0	8	0.4	Total
8	16	81	46	17	1	3	1	27	200	4	34	3	107	148	348			32		32	1010	55.0	985	54.6	*D. S. sonnei*
								1	1		1	1		2	3					0	7	0.4	20	1.1	Unknown
21	23	112	109	37	12	10	3	55	382	20	103	16	248	387	769	11	0	55	0	66	1836		1804		TOTAL

Table II

Age and Sex Distribution of Individuals Infected wtih Shigella in the United States, Second Quarter, 1969

Age (Years)	Male	Female	Sex Unknown	Total	Percent	Cumulative Percent	Number of Reported Isolations/ Million Population*
< 1	48	36	2	86	6.7	6.7	25.1
1 - 4	231	218		449	35.2	41.9	29.7
5 - 9	191	169	1	361	28.3	70.2	17.3
10 - 19	98	74		172	13.5	83.7	4.5
20 - 29	32	69		101	7.9	91.6	3.6
30 - 39	25	22		47	3.7	95.3	2.1
40 - 49	18	11		29	2.3	97.6	1.2
50 - 59	5	5		10	0.8	98.4	0.5
60 - 69	7	4		11	0.9	99.3	0.7
70 - 79	3	4		7	0.5	99.8	0.8
80 +	1	1		2	0.2	100.0	0.6
Subtotal	659	613	3	1,275			
Child (unspec)	5	7		12			
Adult (unspec)	6	6		12			
Unknown	242	272	23	537			
Total	912	898	26	1,836			
Percent of total	50.4	49.6					

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

Table III

Cases of Clinical Shigellosis Reported by Month and Indian Health Service Area

A. First Quarter 1969

Area	Jan.	Feb.	Mar.	Total First Qtr.	Attack Rate per 100,000*
Aberdeen	8	3	5	16	28.2
Albuquerque	4	-	4	8	29.0
Anchorage	4	1	1	6	12.3
Billings	3	-	1	4	16.3
Oklahoma City	1	2	5	8	10.9
Phoenix	1	3	4	8	15.4
Portland	5	2	3	10	45.0
Navajo (Window Rock, Arizona)	23	20	26	69	71.0
All areas	49	31	49	129	32.1

B. Second Quarter 1969

Area	Apr.	May	Jun.	Total Second Qtr.	Attack Rate per 100,000*
Aberdeen	1	2	4	7	12.3
Albuquerque	8	7	4	20	72.5
Anchorage	3	1	2	6	12.3
Billings	1	5	1	7	28.6
Oklahoma	2	2	5	9	12.2
Phoenix	2	5	9	16	30.7
Portland	-	1	1	2	9.0
Navajo (Window Rock, Arizona)	58	27	15	100	104.7
All areas	75	50	42	167	41.6

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

Table IV

Relative Frequencies of Shigella Serotypes
Reported, Second Quarter, 1969

	Serotype	Number Reported	Calculated Number*	Calculated Percent	Rank
A.	*S. dysenteriae*				
	1	2	2	0.11	14
	2	6	7	0.38	12
	3	2	2	0.11	14
	9	1	1	0.05	15
	unspecified	1			
B.	*S. flexneri*				
	1a	8	21	1.14	8
	1b	7	18	0.98	9
	1 unspecified	15			
	2a	131	270	14.70	2
	2b	38	78	4.25	6
	2 unspecified	98			
	3a	63	179	9.74	3
	3b	8	23	1.25	7
	3c	3	9	0.49	11
	3 unspecified	87			
	4a	39	79	4.30	5
	4b	1	2	0.11	14
	4 unspecified	22			
	5	14	18	0.98	9
	6	72	94	5.12	4
	variant y	1	1	0.05	15
	unspecified	182			
C.	*S. boydii*				
	2	12	16	0.87	10
	12	2	3	0.16	13
	unspecified	4			
D.	*S. sonnei*	1,010	1,014	55.20	1
	Unknown	7			
	Total	1,836	1,837		

* 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 V

Relative Frequencies of Shigella Serotypes
Cumulated from October 1963 to Present

	Serotype	Number Reported	Calculated Number*	Calculated Percent	Rank
A.	S. dysenteriae				
	1	12	15	0.03	18
	2	196	249	0.50	13
	3	37	47	0.09	16
	4	1	1	0.00	29
	6	1	1	0.00	29
	9	5	6	0.01	22
	unspecified	66			
B.	S. flexneri				
	1a	392	830	1.67	7
	1b	344	728	1.47	8
	1 unspecified	551			
	2a	4,783	10,867	21.90	2
	2b	853	1,938	3.90	6
	2 unspecified	4,940			
	3a	1,289	5,033	10.14	3
	3b	88	344	0.69	10
	3c	95	371	0.75	9
	3 unspecified	3,275			
	4a	1,183	2,652	5.34	5
	4b	56	126	0.25	14
	4 unspecified	1,055			
	5	211	255	0.51	12
	6	2,384	2,886	5.82	4
	variant x	1	1	0.00	29
	variant y	18	22	0.04	17
	unspecified	4,332			
C.	S. boydii				
	1	11	17	0.03	18
	2	181	272	0.55	11
	3	2	3	0.01	22
	4	38	57	0.11	15
	5	7	11	0.02	21
	6	2	3	0.01	22
	7	3	5	0.01	22
	8	1	2	0.00	29
	9	2	3	0.01	22
	10	11	17	0.03	18
	11	1	2	0.00	29
	12	3	5	0.01	22
	14	4	6	0.01	22
	unspecified	131			
D.	S. sonnei	22,678	22,855	46.05	1
	Unknown	385			
	TOTAL	49,628	49,630		

* See footnote Table IV

Table VI

Sources of Reported Isolations of Shigella
by Residence at Time of Onset

Source	Apr	May	Jun	Total	Percent of Subtotal	Percent of Total
Mental institutions	92	83	62	237	14	
Indian reservations	4	0	2	6	0	
Other residences	448	411	524	1,393	85	
Subtotal	544	494	588	1,636		89.1
Residences unknown	74	92	34	200		10.9
Total	618	586	622	1,836		

Table VII

Shigella Serotypes from Mental Institutions
Number at Isolations by State
Second Quarter 1969

State	dysenteriae 2	flexneri unspecified	flexneri 2 unspecified	flexneri 2a	flexneri 2b	flexneri 3a	sonnei	sonnei variant R	TOTAL
Del	0	0	0	0	0	0	1	0	1
Fla	0	0	1	0	0	0	2	0	3
Ga	0	0	7	0	0	0	0	0	7
Ill	2	0	0	12	19	4	7	0	44
Kan	0	0	0	0	0	0	1	0	1
Md	0	1	10	0	0	0	14	0	25
Mass	0	2	1	0	0	0	25	0	28
Mich	0	0	0	0	0	0	4	0	4
Minn	0	0	1	11	0	0	5	3	20
NY	0	80	0	0	0	0	14	0	94
NC	0	0	3	0	0	0	0	0	3
Va	0	7	0	0	0	0	0	0	7
Total	2	90	23	23	19	4	73	3	237

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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