

# An Epidemic of Acute Anterior Poliomyelitis in El Salvador, C. A.

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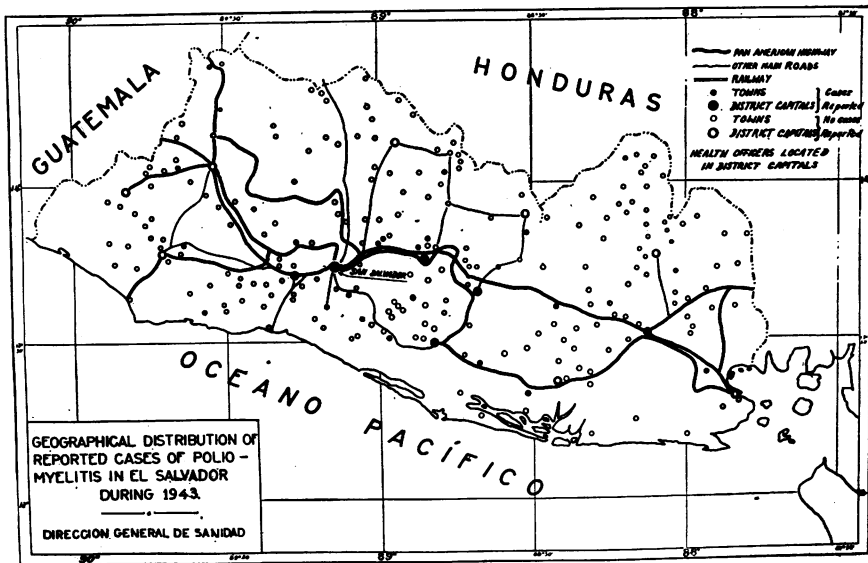
DURING the past year, 1943, a definite outbreak of poliomyelitis occurred in this country, El Salvador, a total of 64 paralytic cases being reported. Diagnostic spinal fluid examinations were done on only 6 cases but the clinical symptoms and signs were checked in all cases except 10 by two or more physicians, and often by four or five. In addition, 17 cases were seen by a consultant in orthopedics. The number of cases given is undoubtedly not absolutely complete because most of the physicians of this country are located in the larger cities; however, it is our belief that practically all paralytic cases were known because the small total area of the country, the density of population (232.5 sq. mile) and the distribution of the health officers, made it possible for the latter to visit or see all the paralytic cases and also visit all suspicious cases which came to their knowledge either through physicians' reports or through indirect channels or even hearsay (see Map. No. 1).

It might be noted that the physicians of this country have considered poliomyelitis a rare disease and the great majority of them acknowledge that they have never seen a case, but there is no doubt that the disease has occurred here because occasional individuals of various ages are seen at times who exhibit the typical sequelae of infection with the virus of poliomyelitis.

In considering the reported cases, only 61 have been used, as there is a little doubt about the other 3. There is no question that the incidence of this disease was well above the usual average, although it is true that this year added impetus to interest in the disease was given by the fact that a child in a rather influential family was among the first ones to become ill and had some residual paralysis. The figures for case incidence during the previous 5 years are not dependable because of the obvious low numbers, and were secured from local hospital records. They follow: 1938—1 case (Hospital Bloom); 1939—0 cases; 1940—7 cases (2 Hospital Bloom, 5 Hospital Rosales); 1941—1 case (Hospital Rosales); and 1942—1 case (Hospital Bloom). It is possible that a small epidemic may have occurred in 1940 when 7 cases were seen in the local hospitals, but we can only surmise that other cases may have occurred and been unattended.

In 1943, 3 cases were seen before the month of May, namely, 1 in January in San Salvador, 1 in February in Quezaltepeque, and 1 in April in Mejicanos, a small village in San Salvador. In this same village a case was reported on May 29, in a house on the 8a. Calle Oriente. This was a child of 5 who died in 4 days with pharyngeal paralysis. Eight days later a second case appeared in the same neighborhood in a girl of 2 years. This was the

MAP 1



daughter of a man who had returned from California 13 days before. Seven days later a 3 year old sister of the 5 year old child was reported to have the disease. This case and one observed in July were the only ones reported in which more than one case occurred in any one family. The fourth case occurred in a child of 4 months, being at N. 24th Ave. at a considerable distance from the other cases. From this time on no apparent continuity of spread of cases could be determined.

During the first week of July when there had already been 5 cases in San Salvador, the first of 2 cases was seen in the village of Mejicanos, and a week later the first of 4 cases in Villa Delgado. The proximity of these towns to San Salvador might suggest some relationship.

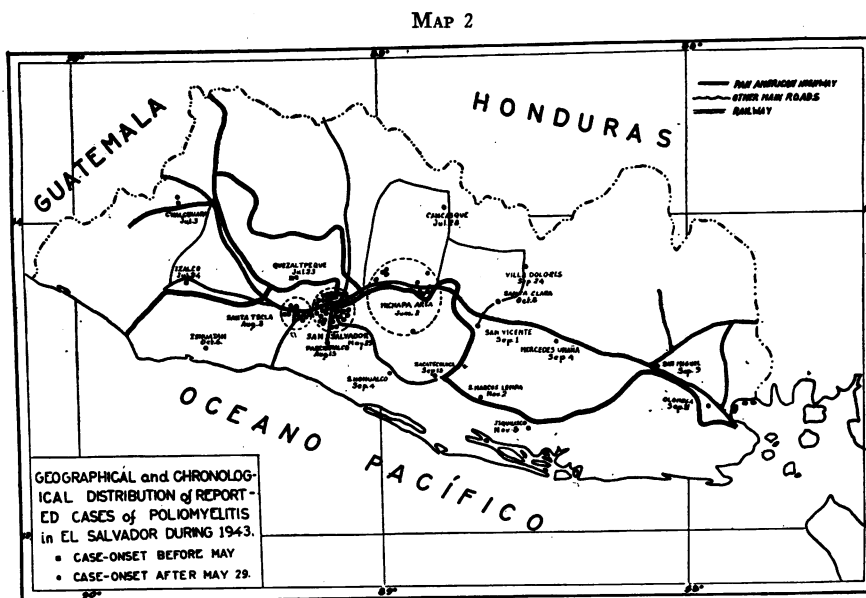
The time sequence and distribution of paralytic cases (see Map No. 2) might suggest that the epidemic showed a radiation from San Salvador (the capital city) as a center, and followed some of the principal routes of communication, viz., the Pan-American Highway, the Highway to Zacatecoluca,

the railway to the East. Of course, the number of cases is not sufficient to draw definite conclusions in regard to this supposition.

The following chart shows how the cases seemed to radiate from San Salvador as a center.

Date	Locality	Cases
<i>Toward the East:</i>		
July 2	Santa Cruz Michapa,	1
July 8	Cojutepeque,	3
Sept. 1	San Vicente,	1
Sept. 4	Mercedes Umaña,	1
Sept. 9	San Miguel,	1
Sept. 11	Olomega,	1
<i>Toward the South:</i>		
Aug. 15	Panchimalco	1
<i>Toward the Southeast:</i>		
Sept. 4	Santiago Nonualco,	1
Sept. 15	Zacatecoluca,	1
<i>Toward the West:</i>		
Aug. 3	Santa Tecla,	8
<i>Toward the Northwest:</i>		
July 23	Quezaltepeque,	1

Five more cases: 1 in Chalchuapa July 10, 1 in Izalco July 24, 1 in Cancasque July 28, 1 in Ishuatán October 6, and 1 in Villa Dolores September 4,



show a more sporadic distribution and are probably related to the normal endemic crop.

In observing the distribution of cases it may be noted that 2 minor outbreaks occurred in 2 separate distinct areas (see Map No. 2). One of them we shall refer to as the outbreak in the Michapa Area and the other as the outbreak in the Santa Tecla Area. The Michapa Area includes the towns of Santa Cruz Michapa, Cojutepeque, San Martín, Perulapán, El Rosario, and Paraíso de Osorio and covers an area within a radius of 18 kilometers of Michapa. There were 10 cases in this area, 9 of which were visited, examined, and confirmed by the local health officer for that district.

The first case in this area was noted in Michapa on July 2, following 3 more in Cojutepeque (July 8, August 20 and 27), 3 in Perulapán (July 25, August 6 and 14), 1 in San Martín, and another in Paraíso de Osorio, August 21, and the 10th case in El Rosario, September 4. It has been suggested that these might be an aftermath of a fair held at Perulapán from June 25-29.

The outbreak in the Santa Tecla Area occurred in a locale about 2 km. wide and 6 km. long on the Pan-American Highway, between kilometer 8 and kilometer 14 to the west of San Salvador. Eight cases were observed and reported here. The first case appeared in the city of Santa Tecla, August 3, the 2nd on a coffee finca in the suburbs, to the west of the city on the Pan-American Highway, August 8, the 3rd and 4th in Santa Tecla on August 12 and 14. The 5th and 6th on a coffee finca 4 km. to the east of the city on the Pan-American Highway, September 3 and 4, the 7th in the city of Santa Tecla on September 9; and the 8th on the coffee finca "Santa Elena" 2 km. to the east and also on the Pan-American Highway. Because of the efficient coöperation between the local health officer and the physicians in this area it is believed that probably all cases here were reported.

As one may see in Table 1, the peak of the epidemic was reached in the San Salvador Area in the week ending July 24; in the Michapa Area, the week ending on August 14, and in the Santa

TABLE 1  
Distribution of Cases, by Location and Date of Onset

Week Ending	S. Salvador Area	Michapa Area	Sta. Tecla Area	Rest of Country	Total
Jan. 2	..	..	..	..	..
9	1	..	..	..	1
16	..	..	..	..	..
23	..	..	..	..	..
30	..	..	..	..	..
Feb. 6	..	..	..	..	..
13	..	..	..	..	..
20	..	..	..	1	1
27	..	..	..	..	..
Mar. 6	..	..	..	..	..
13	..	..	..	..	..
20	..	..	..	..	..
27	..	..	..	..	..
Apr. 3	..	..	..	..	..
10	..	..	..	..	..
17	..	..	..	..	..
24	..	..	..	..	..
May 1	1	..	..	..	1
8	..	..	..	..	..
15	..	..	..	..	..
22	..	..	..	..	..
29	..	..	..	..	..
June 5	1	..	..	..	1
12	1	..	..	..	1
18	2	..	..	..	2
26	..	..	..	..	..
July 3	1	1	..	..	2
10	3	1	..	1	5
17	4	..	..	..	4
24	6	..	..	2	8
31	2	1	..	1	4
Aug. 7	3	1	1	..	5
14	3	1	3	..	7
21	..	3	..	1	4
28	..	1	..	..	1
Sept. 4	..	1	2	3	6
11	..	..	2	3	5
18	..	..	..	1	1
25	..	..	..	..	..
Oct. 2	..	..	..	..	..
9	..	..	..	2	2
16	..	..	..	..	..
23	..	..	..	..	..
30	..	..	..	..	..
Nov. 6	..	..	..	..	..
Totals	28	10	8	15	61

Tecla Area, on August 25. The epidemic reached its apex for the whole country in the week ending August 7.

The localities of the first group are of a purely rural character, and therefore may be taken as an index of the rural incidence of poliomyelitis in El Salvador.

Table 3 indicates a high incidence in the localities of rural character, and also, in the City of San Salvador.

#### Distribution by Sex

56 per cent males  
44 per cent females

#### Distribution by Age

Per cent	Age
6.5.....	Under 6 months
28.0.....	" 1 year
49.0.....	" 2 years
70.5.....	" 3 years
90.0.....	" 5 years

TABLE 2  
Distribution of Poliomyelitis Cases by Age, Sex and Locality

Age Groups	Males					Females					Grand Total
	I	II	III	IV	Total	I	II	III	IV	Total	
6 months	..	1	2	..	3	..	..	..	1	1	4
6 mo. to 1 year	..	1	5	2	8	2	1	..	..	3	13
1 to 2 yrs.	..	2	3	3	8	1	1	1	4	7	13
2 to 3 yrs.	..	4	..	2	6	1	2	2	2	7	13
3 to 4 yrs.	..	1	1	..	2	1	..	1	2	4	6
4 to 5 yrs.	1	1	..	2	4	..	..	1	1	2	6
5 and over	..	1	1	1	3	..	2	..	1	3	6
Totals	1	11	12	10	34	5	6	5	11	27	61

Distribution of cases and incidence by localities: The localities where these cases have been observed have been divided into 4 groups:

Group I	Group II	Group III	Group IV
Santa Clara	Mejicanos	Santa Tecla	San Salvador
Olomega	Villa Delgado	Cojutepeque	
Cancasque	Quezaltepeque	Izalco	
Ishuatan	Panchimalco	Chalchuapa	
Paraiso de Osorio	Mercedes Umaña	Zacatecoluca	
Michapa	San Martín	San Miguel	
El Rosario	Stgo. Nonualco	San Vicente	
Cuscatlan	San Pedro Perulapán		
	Villa Dolores		

TABLE 3  
Distribution of Cases by Class of the Localities Where the Cases Occurred

Localities by Class	Aggregate Pop. as of July 1, 1943	Number of Cases	Rate per 100,000
Group I—500 to 5,000	18,873	7	37.1
“ II—5,000 to 20,000	92,599	16	17.3
“ III—20,000 to 50,000	223,949	16	7.1
“ IV—More than 100,000	106,926	22	20.6
Total	442,347	61	13.7

In this respect the same proportion has been maintained, as has been reported in other epidemics of poliomyelitis.

The marked incidence in younger age groups is rather typical, apparently, of the age distribution of this disease in warm climates.<sup>1</sup> Attention might also be drawn to the fact that in New York City in 1916 70 per cent of the cases occurred in children under 5 years, and in 1915 only 34 per cent of the cases reported were in this age group: likewise the figures given for an epidemic in Cuyahoga County, Ohio, vary from 51.2 per cent in children under 5 years in 1930 to only 19 per cent in this age group in 1941.<sup>2</sup> These figures are typical of an apparent trend toward a higher median age in localities or coun-

tries where the disease has been reported for several decades. No definite explanation is given for this change.<sup>3</sup>

It is believed that the reporting of cases in El Salvador this year was sufficiently complete so that the age distribution given is a true one. (A similar high figure for this age group was reported by Dr. German Castillo of Nicaragua at the Fifth Congreso Medico Centroamericano held at San Salvador, El Salvador, in 1938. At this time he read a paper on the outbreak in Managua in the same year, 1938; in which epidemic 42 cases were reported to and seen by him in his capacity as special investigator for the Health Department. Of these 42 reported cases, 97 per cent were children under 5 years of age.)

Four deaths were reported as due

directly to the disease in children between 2½ and 5 years of age. This represents 6.5 per cent mortality of the entire series and 18 per cent in this particular age group. One case of unique interest occurred in a child only 23 days of age, reported by Dr. Miguel A. Luna of Santa Tecla, in which the diagnosis was later confirmed in consultation by five other physicians.

With the exception of the 4 cases which died and showed a bulbo-spinal type of involvement, the rest showed only spinal localization. Fever was the most constant symptom, accompanied in 47 per cent of the cases by coryza and/or pharyngitis. There was nausea and vomiting in 20 per cent of the cases, and diarrhea in 27 per cent. Some showed meningismus, and a few had brief periods of convulsions. Fifty per cent complained of muscular pain.

The interval between the onset of the disease and the development of paralysis varied within rather wide limits. As a rule it was observed between the 3rd and 8th days. In 3 cases it was not noticed by the original attending physicians. In 1 case paralysis was not discovered until the 20th day.

In the primary examination given to 17 patients (this was given anywhere from 16 to 30 days after the onset of the disease, depending on when the consultant was called) by Dr. León Avila Jr.,\* orthopedic consultant, the following localizations were found:

Location	No.
Left lower limb.....	5
4 limbs and trunk.....	2
4 limbs.....	2
2 inferior limbs.....	2
Lower right limb.....	2
Lower left limb and trunk.....	1
Upper and lower right limbs.....	1
Upper right limb.....	1
Upper right limb and lower left limb.....	1

Of the 45 muscles, or muscular groups affected, those that were most frequently affected are as follows:

#### Group I

(70% of the cases)

External flexors of the left leg

#### Group II

(64% of the cases)

Medius and minor left glutei muscles

#### Group III

(59% of the cases)

Left major gluteus muscles

Internal flexors of the left leg

#### Group IV

(53% of the cases)

Left quadriceps

External rotators of the left thigh

#### Group V

(47% of the cases)

Right major gluteus

Major and minor right glutei

Left posterior tibial

#### Group VI

(41.1% of the cases)

Internal rotators of the left thigh

Left tensor fascia lata

External flexors of the right leg

Adductors of the left thigh

Left anterior tibial

Left peroneus longus

Left peroneus brevis

Left flexor digitorum longus

The first case that was known to the Direccion General de Sanidad was one that occurred during the 2nd week of July. It might be noted that 10 cases had occurred prior to this but had not been reported at that time. However, the Sanidad promptly made contact with the Chief of the Consultorio Infantil of the Hospital Rosales where there is a satisfactory register of morbidity, and it was discovered that there was an obvious rise in the number of cases that had been observed during that same week. Consequently, the physicians of the country were notified to be conscious of the possibility of the presence of an epidemic, the authorities of public education and sports were also

\* The aid of Dr. León Avila, Jr., as orthopedic consultant was made possible by the financial assistance of the Servicio Cooperativo Inter-Americano de Salud Pública, an agency of the Direccion General de Sanidad and the Institute of Inter-American Affairs, Division of Health and Sanitation, El Salvador.

notified and the schools and swimming pools were closed. As soon as possible a small pamphlet giving the essential known data and urging medical attention in all suspected cases was prepared and distributed through various channels to the general public.

An interesting sidelight on the promptness with which a physician was called to see such cases before and after this program of education was begun is given in Table 4.

TABLE 4

*Number and Percentage of Cases Seen by the Physician in the Indicated Number of Days After the Onset of the Disease, in the Cities of San Salvador, Santa Tecla, Cojutepeque, San Vicente and San Miguel, Before and After Warning the Public*

<i>Lapse Between the Onset and the Doctor's Visit</i>	<i>Before July 21</i>		<i>After July 21</i>	
	<i>No.</i>	<i>Per cent</i>	<i>No.</i>	<i>Per cent</i>
0-2 days	2	11.1	1	4.8
3-6 "	5	27.8	11	52.4
7-9 "	2	11.1	4	19.0
10-12 "	4	22.2	3	14.3
13-15 "	0	....	0	....
16 and more days	5	27.8	2	9.5
Total	18	100	21	100
Visit before the 10th day	9	50	16	76.1
Visit after 15th day	5	27.3	2	9.5

#### CONCLUSIONS

1. The 1943 poliomyelitis epidemic occurring in El Salvador involved 61 known patients.

2. Analyses are given showing geographical distribution, seasonal occurrence, age distribution, and known main symptoms.

3. The age incidence of reported cases, 90 per cent occurring in children under 5 years of age, is unusual; but no definite explanation for this can be given, although the observation has been made several times that with this infection the median age is often very low when cases first begin to be reported from a given locality.

4. Public warning of the presence of this epidemic was followed by definite shortening of the time lapse between onset of the disease and first medical attention.

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