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EPIDEMIOLOGIC STUDY OF LEPROSY IN THE REPUBLIC  
OF EL SALVADOR, CENTRAL AMERICA

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INTRODUCTION

I was initiated into this important branch of dermatology some 15 years ago when, one morning, I visited the dermatology clinic of the Rosales Hospital and saw for the first time a patient with leprosy. Three years later I published my first paper on the subject, a doctoral thesis entitled "Leprosy in El Salvador, Epidemic Areas and the Medico-Social Problem" (<sup>1</sup>). Unexpectedly, I found myself deeply interested in the matter and in the patients attending that clinic—patients who were timid, despised by society and even by the persons charged with their care. More and more I became entangled in the net of leprology, to the extent that I could not free myself from it in spite of the costs, sacrifices and handicaps that it entailed.

An epidemiologic study of this nature cannot be made from a desk or from an office room. One has to go out to the country to seek and look out for the leprosy patients, to arouse in them faith and confidence, to convince them that today there is a cure for their disease and that if they cooperate they can be cured in months or a few years.

Presented here is an epidemiologic study of leprosy in El Salvador based on 153 cases diagnosed and treated from August 30, 1943 to January 31, 1959, with data taken from the records of the Rosales Hospital and of my private clinic.

GEOGRAPHIC DATA OF EL SALVADOR

The Republic of El Salvador is the smallest of the American nations, since its area is only 21,158 square kilometers. It has a population of 2,434,430, with an average of 115.1 inhabitants per square kilometer.

Geographically El Salvador is located between parallels 13° 8' and 14° 24' north latitude, and between meridians 87° 39' and 90° 8' west longitude, Greenwich meridian. It is bounded to the south by the Pacific Ocean, to the east and north by the Republic of Honduras, and to the west by the Republic of Guatemala.

The surface is rough, containing heights of various altitudes. Hence the climate is also variable, according to the altitude and season of the year, the temperatures ranging more or less between 19° and 30°C. The land is highly cultivated, producing almost all kinds of fruits and cereals. Coffee, sugar cane, cotton and corn are the principal sources of income.

Politically, the country is divided into 14 departments, namely: Santa Ana, Ahuachapán, Sonsonate, La Libertad, San Salvador, Chalatenango, Cuscatlan, La Paz, San Vicente, Cabañas, San Miguel, Usulután, Morasán and La Unión. The capital of the republic is San Salvador, with a population of around 250,000. The government is democratic and representative, consisting of three branches: executive, legislative and judicial.

#### HISTORY OF LEPROSY IN EL SALVADOR

From the verbal accounts of several of my professional colleagues it appears that during the period 1915 to 1943, roughly, various patients who were given the diagnosis of leprosy presented themselves at the Rosales Hospital in San Salvador and the San Juan de Dios Hospital in San Miguel. Most of them were from San Alejo, Department of La Unión, where perhaps the disease had been introduced by Negro slaves working in mines and dye factories located in that region.

In 1946, in my doctoral thesis referred to, mention was made of 18 cases that had been studied. In 1947, I elaborated on this interesting topic with three more articles, one on the atypical, uncharacteristic form (<sup>2</sup>), another pointing out the gravity of the leprosy problem in the country (<sup>3</sup>), and the third one dealing with the medico-social aspects (<sup>4</sup>).

In 1949 our group of collaborators, Reyes *et al.*, published in the *Archives of Dermatology and Syphilology* our experience with severe lepra reaction resembling shock in patients following administration of Diasone (<sup>6</sup>). In 1953 the same group prepared a report on leprosy in El Salvador intended for the Madrid congress, but because it did not arrive in time for publication in the congress Memoria it was published in this country (<sup>7</sup>). Awaiting publication now is a clinical, epidemiologic and statistical study of leprosy in El Salvador and other countries of Central America, including Panama (<sup>8</sup>).

In addition, since 1953 no less than seven conferences, lectures and papers have been given by me (two in collaboration with Oswaldo Ramirez C.), one of them by invitation in Mexico City. The topics ranged from general considerations of the leprosy problem in this country, or in this entire region including Mexico and Panama, to the local medico-social aspects and to bizarre cases of the disease.

#### STATUS OF THE LEPROSY PROBLEM

As can be seen from the accompanying map (Fig. 1), the 153 cases of leprosy that have been found during the period since August 1943 have come from 41 foci in 10 of the 14 political divisions of the country. These foci are indicated by black stars on the map.

The departments in which cases have been found are listed in Table 1. The departments in which the disease has not been found are Sonsonate, La Libertad, Cuscatlan, and San Vicente. These four departments contain 568,100 inhabitants, or about 23 per cent of the population of the country.

TABLE 1.—*Geographic distribution of 153 leprosy cases in El Salvador, with indices of prevalence by population and of density by area of the 10 affected departments.*

Department	No. of foci	No. of cases	Population	Index/100,000	Area (km <sup>2</sup> )	Index/100 km <sup>2</sup>
Santa Ana	4	12	264,837	4.53	1,988	0.60
Ahuachapán	1	1	122,682	0.82	1,222	0.08
Chalatenango	11	81	137,257	59.1	2,117	3.82
San Salvador	1	4	395,284	1.01	871	0.46
La Paz	2	2	128,525	1.6	1,202	0.17
Cabañas	3	3	102,103	2.9	1,094	0.27
Usulután	4	4	210,012	1.9	1,975	0.20
San Miguel	7	17	224,888	7.6	2,167	0.78
Morazán	1	2	126,717	1.6	1,724	0.12
La Unión	7	27	150,405	18.0	1,995	1.35
	—	—	—	—	—	—
Total	41	153	1,862,710	8.2	16,355	0.99

An interesting feature of Table 1 is that from each of 6 of the 10 infected departments less than 5 cases have been seen. Three of these 6 departments have only 1 focus each. In sharp contrast with all the others is Chalatenango Department, with 81 cases in a population of 137,257, or an index of 59.0 per 100,000.

The prevalence rate per 100,000 inhabitants for the whole country, calculated in July 1958 for the total of 2,434,430 inhabitants, is 6.28. For the 1,862,710 inhabitants of the 10 affected departments it is 8.2. The corresponding leprosy rates per 100 square kilometers are 0.72 and 0.931.

*Foci of origin.*—The names of the leprogenic foci in the several departments affected, and the numbers of cases from each focus, are here listed. Santa Ana: Santa Ana city (2), Metapán (6), Candelaria Frontera (2), Santa Rosa Guachipilín (2). Ahuachapán: Apaneca (1). Chalatenango: Chalatenango city (1), La Reina (17), La Palma (2), San Ignacio (6), Citalá (12), Agua Caliente (4), San José Canasque (13), San José Sacare canton (23), San Lorenzo canton (1), Las Flores canton (1), San Isidro Labrador (1). San Salvador: San Salvador city (4). La Paz: Barahona canton (1), Hacienda Antonio (1). Cabañas: Sensuntepeque (1), Ilobasco (1), El Caracol canton (1). Usulután: Santiago de María (1), Ozatlán (1), Hacienda San Juan Gozo (1), Nueva Granada (1). San Miguel: San Miguel city (2), Hacienda Miraflores (3), El Brezo canton (4), Tecomatal canton (3), Las Delicias (1), Sesori (3), Uluazapa canton (1). Morazán: San Francisco (2). La Unión: La Unión city (5), San Alejo (10), Valle El Ciprés (1), Pasaquina (3), El Sauce (3), Santa Rosa de Lima (4), San José Chahuíte (1). The island of Meanguera should also be listed as a focus.

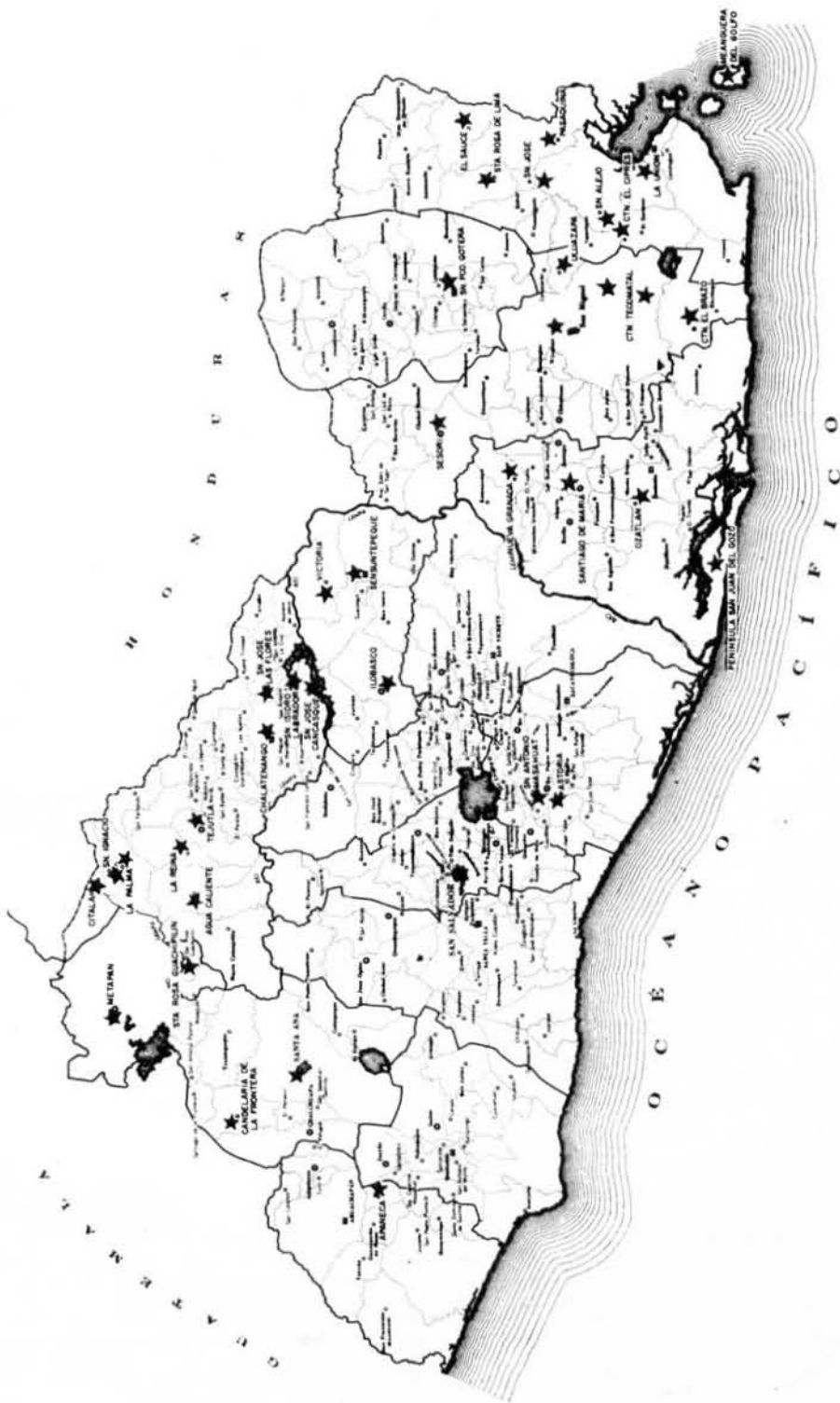


Fig. 1. Map of the Republic of El Salvador, Central America, showing (indicated by stars) the endemic foci of leprosy.

*Altitude of the leprosy foci.*—The elevation above sea level of the leprosy foci from which the 153 cases came are shown in Table 2.

TABLE 2.—Distribution of 153 leprosy cases in El Salvador according to the elevation above sea level of the foci of origin in the 10 departments affected.<sup>a</sup>

Altitude (meters)	Departments										
	Santa Ana	Ahuachapán	San Salvador	Chalatenango	La Paz	Cabañas	Usulután	San Miguel	Morazán	La Unión	Total
0 to 300					2		2	13		16	33
301 to 600	7					1	1	4	2	11	26
601 to 900	5		4	37		2					48
901 or more		1		44			1				46
	—	—	—	—	—	—	—	—	—	—	—
TOTALS	12	1	4	81	2	3	4	17	2	27	153

<sup>a</sup> From the records of the Hospital Rosales.

*Age and sex.*—Table 3 shows, first, the distribution by age and sex of the 153 cases recorded. Only 7, or 4.6 per cent, of them were under 15 years, while 89, or 58.1 per cent were in the 25-44 year groups.

In total, males predominated heavily over females, 109:44 (2.5:1). There is no sex difference evident in the few cases younger than 15; the sex differential began abruptly above that age (3.3:1 in the 15-24 group).

*Type of disease.*—The type distribution was as follows: lepromatous type, 83 cases, or 54.3 per cent of the total; tuberculoid type, 27 cases, or 17.6 per cent; and indeterminate group, 43 cases, or 28.1 per cent.

There was something of a sex difference with respect to frequency of the lepromatous type as shown in Table 3. These cases constituted 58.7 per cent of those among the males, and 43.2 per cent among the females. The compensation is not seen in the figures for tuberculoid cases, for they were of practically the same proportion in both sexes, but in the indeterminate cases, which were relatively more numerous among the females.

#### CONCLUSIONS

1. The existence of leprosy cases has been demonstrated in 10 of the 14 departments of the Republic of El Salvador.

2. The most heavily infected department is Chalatenango, with a morbidity rate of 59.0 per 100,000 inhabitants. A large majority of

TABLE 3.—Age and sex distribution of 153 leprosy cases in El Salvador, and of the types of the disease.

Age	Total	Per cent	Males				Females			
			No.	Lepromatous	Tuberculoïd	Indeterminate	No.	Lepromatous	Tuberculoïd	Indeterminate
0-4	1	0.6	—	—	—	—	1	—	—	1
5-9	1	0.6	1	1	—	—	—	—	—	—
10-14	5	3.3	2	1	—	1	3	1	—	2
15-24	30	19.6	23	17	1	5	7	2	1	4
25-34	50	32.7	36	21	7	8	14	4	3	7
35-44	39	25.5	27	16	5	6	12	7	4	1
45-54	17	11.1	12	5	6	1	5	3	—	2
55-64	9	5.9	7	2	—	5	2	2	—	—
65 plus	1	0.6	1	1	—	—	—	—	—	—
	153	99.9	109	64	19	26	44	19	8	17
			(71.3%)	(58.7%)	(17.4%)	(23.8%)	(28.7%)	(43.2%)	(18.2%)	(38.6%)

Total lepromatous, 64 + 19 = 83, or 54.3%.

Total tuberculoïd, 19 + 8 = 27, or 17.6%.

Total indeterminate, 26 + 17 = 43, or 28.1%.

these cases come from three families of neighboring towns. Almost all are related, but many of them were not known to each other before their admission to the leprosy section of the Department of Dermatology and Infectious-Contagious Diseases of the Rosales Hospital.

3. Also relatively heavily infected are the departments of La Unión and San Miguel, with morbidity rates of 18.0 and 7.6, respectively, per 100,000 inhabitants.

4. Leprosy in El Salvador appears most frequently in the third and fourth decades of life, although we have under treatment two children below 6 years of age and several men of advanced age.

5. There is a higher proportion of males than of females among the leprosy cases, 109 and 44, respectively.

6. Leprosy is found mostly among people of low income; 98 per cent of the patients were laborers, undernourished and living in huts under deplorable unsanitary conditions.

7. All of the clinical types of the disease have been seen, but not the Lucio phenomenon as observed in Mexico and Costa Rica in the diffuse lepromatous type.

8. The predominant clinical type is the lepromatous, seen in 82 out of the 153 cases, or 54.3 per cent.

9. In the majority of our cases we have observed absence of the reflexes at the base of the tongue (pharyngeal, laryngeal and vomit reflex). This observation has not, to our knowledge, been reported by any other author.

10. In all, or nearly all, of the areas believed to be leprogenous in the country BCG vaccination has been carried out, at our suggestion.

11. All doctors and medical students should be made familiar with the main symptoms of leprosy, to provide for early diagnosis and judicious treatment.

12. In view of the 153 cases of leprosy that have been diagnosed, and calculating that there are at least 300 more cases undiagnosed and roaming around in the country, a systematic antileprosy campaign should be established.

#### CONCLUSIONES

1) Está demostrado la existencia de casos de lepra en 10 de los 14 departamentos de la República de El Salvador.

2) El departamento más atacado es el de Chalatenango, con una tasa de morbilidad por 100.000 habitantes de 59.0. La inmensa mayoría pertenecen a tres familias de ciudades vecinas. Casi todos parientes y muchos de ellos sin conocerse entre sí, sino hasta que fueron internados en la Sección de Hansenianos del Departamento de Dermatología e Infecto-Contagiosos del Hospital Rosales.

3) También los Departamentos de la Unión y San Miguel, con tasas de morbilidad por 100.000 habitantes de 18.0 y 7.6, son fuertemente atacados.



4) La lepra en El Salvador se manifiesta más frecuentemente en la segunda y tercera década de la vida, sin embargo tenemos en tratamiento a dos niños menores de 6 años y a varios ancianos.

5) La lepra prevalece con un porcentaje mayor en los hombres que en las mujeres, 109 y 44 casos respectivamente.

6) La lepra le encontramos predominantemente en gente de escasos recursos económicos, el 98 por ciento jornaleros mal alimentados y que viven en chozas en condiciones higiénicas deplorables.

7) Fueron encontrados todos los tipos clínicos de esta enfermedad, pero no hemos visto el Fenómeno de Lucio, observado en México y Costa Rica en el tipo lepromatoso difuso.

8) El tipo clínico predominante es el lepromatoso, 82 de los 153 casos diagnosticados.

9) En la mayoría de nuestros casos encontramos la abolición de los reflejos de la base de la lengua, faríngeo, caríngeo y del vómito, dato que no hemos visto publicado hasta hoy por ningún otro autor.

10) Todas o casi todas las zonas consideradas como leprógenas en el país, han sido vacunas con B.C.G. a insinuación nuestra.

11) Es necesario que todos los médicos y estudiantes de medicina, se familiaricen con los principales síntomas de la lepra, para poder hacer con certeza un diagnóstico precoz y poder instituir un tratamiento también precoz y juicioso.

12) En vista de estos 153 casos de lepra diagnosticados, y calculando que hay por lo menos otros 300 casos no diagnosticados que deambulan por el territorio nacional, creo conveniente que se nombre una comisión para lanzar las bases de una campaña antileprótica integral en nuestro país.

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