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Topic 26: THE PROBLEM OF LEPROSY IN THE AMERICAS

"The Problem of Leprosy in the Americas" was included for discussion on the agenda of the IX Meeting of the Directing Council by decision of the Executive Committee at its 28th Meeting in June 1956. The Director accordingly submits the present report on this topic. Although there has not been sufficient time to complete and bring up to date all the information on the leprosy problem, or to consult with specialists and public health administrators in the various countries, the Director believes that this document contains sufficient data to serve as the basis for the discussion of this topic, during which further information can be gained to add to that presented here.

I. INTRODUCTION

Leprosy is a problem whose importance cannot be ignored. It has profound social, economic, and psychological repercussions and is a source of great concern to the public health and welfare services of the affected countries.

In the Americas there are a number of foci of the disease, and although generally speaking the prevalence rates are not as high as in some parts of Africa or Asia, forceful measures are required to solve the problem in this Hemisphere.

Before any systematic program for the control of leprosy can be planned in the Americas, at either the national or the international level, more precise knowledge must be gained of the extent and epidemiological characteristics of the problem. Many countries have yet to undertake leprosy censuses, and in others such censuses have been only partial or incomplete.

II. THE PROBLEM AND EXISTING RESOURCES

The number of leprosy cases reported in 37 countries and territories in the Americas in the period 1950-1953, according to the governments' reports to the XIV Pan American Sanitary Conference, are shown in Table 1, below.(1)

Table 2 summarizes the information it has been possible to obtain on the prevalence of leprosy in the Americas and the existing facilities for its treatment and control.

TABLE 1
Number of Reported Cases of Leprosy, 1950-1953 (1)

<u>Political Entities</u>	<u>1950</u>	<u>1951</u>	<u>1952</u>	<u>1953</u>
<u>Countries</u>	<u>Number of cases</u>			
Argentina	323	552	404	288(a)
Bolivia(b)	53	10	8	36(c)
Brazil (d)	4,690	4,829	5,044	5,306(e)
Canada (f)	—	3	—	2
Colombia (b)	498	635	705	903
Costa Rica	59	31	25	8
Cuba	127	72	99	...
Dominican Republic	...	37	35	...
Ecuador	10	6	—	...
Guatemala	5	7	3	...
Haiti	8	10	2	...
Mexico	—	301	248	...
Nicaragua	...	...	...	11
Panama	—	2	4	9
Paraguay(b)	317	375	340	...
Peru (b)	86	79	92	91(g)
United States	44	57	57	60
Uruguay	6	10	13	10
Venezuela (a, b)	912	923	616	836
<u>Other Areas</u>				
British Guiana	6	9	10	15
French Guiana	...	72	5	48
Jamaica	28	24	24	10
Martinique	139	110	98	112
Puerto Rico	2	14	14	12
Trinidad and Tobago	371	438	420	...
Other Caribbean islands (h)	19	18	21	26

Notes to Table 1, Page 2

- ... No information
- ___ There were no cases.
- (a) Provisional.
- (b) For reporting areas.
- (c) Revised report.
- (d) Cases from the national territory and reported to health authorities of the Federal District and state capitals.
- (e) Incomplete.
- (f) Excluding Yukon and Northwest Territories.
- (g) Through November.
- (h) Includes: Barbados, Bermuda, Guadeloupe, Bahama Islands, Antigua, Montserrat, Saint Kitts and Nevis, Virgin Islands, Dominica, Grenada, Saint Lucia, and San Vincent.

TABLE 2
Prevalence of Leprosy and Existing Facilities for its Treatment and Control in the Americas (*)

Political Entities	Estimated Population for Mid-Year 1953(2)	L e p r o s y c a s e s			Leprosaria and Colonies		Dispen-saries	Date of Informa-tion	References
		Total Known	Segre-gated	Total esti-mated	Number	Capacity			
<u>Countries</u>									
Argentina	18,379,000	8,975	...	16,000	5 (h)	2,785	4	1954	5,6
Bolivia	3,127,603(a)	610	35	1,400	2	...	3	1954	7
Brazil	55,211,268	60,967	22,954	...	38(i)	24,000	93	1950	8,9
Canada	14,756,000(b)	16	10	17	...	...	...	1952	10,11
Chile	6,024,981	37(g)	13	37	1	40	...	1954	19,20
Colombia	12,107,810	9,155	6,507	12,000	2(j)	...	11	1950 and 56	12,47
Costa Rica	881,313	211	164	...	1	200	1	1950	13,14
Cuba	5,394,396(c)	3,623	736	6,000	2	...	10	1952	15,16,17,18
Dominican Republic	2,290,805	268	188	...	...	...	...	1950	31
Ecuador	3,439,000(d)	150	...	...	2	...	1	1955	12,21,22
El Salvador	1,929,779	62	...	...	...	...	...	1953	23
Honduras	1,555,664	40	5	...	-(k)	-	-	1955	20
Mexico	28,052,513	11,378	...	50,000	1(l)	...	19	1953	28
Paraguay	1,504,246	979	394	10,000	1(m)	...	1	1954	12,29
Peru	8,591,300	1,127	...	3,400	3	550	7	1951	30
United States	158,306,000	...	400	1-2,000	6	...	...	1955	24,25
Uruguay	2,523,000(d)	...	62	500-1,000	-(n)	...	...	1954	35
Venezuela	5,377,508	8,648	866	...	...	...	171	1956	36,37,38

TABLE 2 (Cont.)

Prevalence of Leprosy and Existing Facilities for its Treatment and Control in the Americas(*)

Political Entities	Estimated Population for Mid-Year 1953(2)	Leprosy Cases			Leprosaria and Colonies		Dispensaries	Date of Information	References
		Total known	Segre-gated	Total esti-mated	Number	Capacity			
<u>Other areas</u>									
Bahama Islands	85,000	14	14	...	—(o)	—	—	1954	27
Barbados	221,000	66	28	...	1	175	1	1953	27
British Guiana	441,000(e)	1,292	268	...	1 (m)	400	8	1950-55	20,48
British Honduras	75,782	1	1	...	—	—	—	1955	20
French Guiana	29,555	1,304	120	...	1	160	3	1953	20,26
Guadeloupe	314,460	1,085	100	1,155	1	100	2(p)	1955	27
Leeward Islands:									
Antigua	48,953	96	32	131	1	49	1	1954	27
Saint Kitts and Nevis	52,023	50	30	150	1	54	—	1953	27
Martinique	292,435	1,348	148	1,548	2	254	1	1954	27
Netherlands Antilles	161,000(f)	13	13	...	1	32	—	1955	27
Surinam	219,000(f)	1,270	599	...	3	735	...	1954	32,33
Trinidad and Tobago	678,300	884	229	...	1	...	5	1953	34
Windward Islands:									
Dominica	57,000	15	15	...	1	24	—	1953	27
Grenada	82,794	7	7	...	1	16	—	1955	27
Santa Lucia	83,905	22	14	...	1	14	—	1953	27
San Vincent	72,711	20	20	...	1	20	—	1953	27

Notes to Table 2, pages 4 and 5

- (*) No data obtained for Guatemala, Haiti, Jamaica, Nicaragua, and Panama.
- None.
- ... No information.
- (a) Revised report.
- (b) Excluding the Yukon and the Northwest Territories. Population as of 1 June.
- (c) Estimated population for mid-1952.
- (d) Estimated by PASB.
- (e) Excluding Amerinds.
- (f) Estimated population for mid-1950 (3).
- (g) There are no leprosy cases in continental Chile. These are found on Easter Island (population 800).
- (h) Plus 5 transit hospitals and 1 preventorium.
- (i) Plus 29 preventoria.
- (j) These are in fact "lazarets," having a mixed population of patients and healthy persons.
- (k) The Tegucigalpa Hospital has 8 beds for leprosy patients.
- (l) Plus 4 special wards in general hospitals with 105 beds. There are also 3 preventoria.
- (m) Plus 1 preventorium for healthy children of leprosy patients.
- (n) Patients are interned in a general hospital.
- (o) There are 25 beds for leprosy patients in the Nassau Hospital.
- (p) Treatment is provided also in 34 general polyclinics.

As this information shows, the prevalence of the endemia varies widely in the different countries and in different parts of the same country. There is no uniformity, either, in the level of organization of the antileprosy campaigns, which in general have not yet attained the desired effectiveness.

The leprosy endemia in some countries is still limited to certain regions where the disease is relatively recent and takes a malign form, showing high prevalence rates. In other countries it is distributed over a large part of the national territory and the prevalence rates range from medium to high. Finally, in a small group of countries either leprosy does not exist or the number of cases is so small that the disease does not constitute a public health problem.

Wide variation, as stated, is also observed in the stage of development reached by the antileprosy services in the different countries. In some, the campaign, started only recently, is in an early stage of organization. In others, the existing services, although larger in scale, have not developed sufficiently as regards either volume or proper balance of activities. In a few countries the organization is adequate in relation to the size and importance of the problem; there is sufficient knowledge of the location, prevalence rates, and characteristics of the endemia; and there are modern isolation and control services, adequate in number and capacity and properly located. These services have the support of valuable social cooperation.

An essential factor in the antileprosy campaign is adequate legislation on the prevention of this disease.

Almost all the American countries have legislation on leprosy (4). In most cases, however, such laws were adopted before modern concepts and techniques were developed for the control of the disease. The strides made in leprosy therapy make it essential that legislation on the disease be changed so that antiquated methods, based mostly on control of an administrative and police nature, may be revamped to keep pace with modern knowledge and present-day social conditions.

To supplement the data given in the tables above, certain points of importance with respect to the individual countries are described below.

Argentina (5,6). The gravity of the problem in this country can be gauged by the rising number of leprosy patients shown in statistics from endemic leprosy regions and in the notification of new foci from areas previously considered leprosy-free.

A census of 30 December 1945 recorded 5,714 leprosy patients in the country, or a prevalence rate of 0.42 per thousand. The 1954 census recorded 8,975 patients and a rate of 0.56 per thousand.

These statistics show clearly the importance of endemic leprosy in Argentina, especially when one considers that reported cases represent probably only one half the actual figure. The increase could, on the other hand, also be taken as an indication of better cooperation on the part of the medical profession and of the public in the notification of leprosy.

In Argentina, 81 per cent of the leprosy cases originate from a zone comprising Buenos Aires, the Federal Capital, Santa Fé, Entre Ríos, Corrientes, Chaco, Formosa, and Misiones. There is a net predominance of less contagious forms (tuberculoid and indeterminate) over the lepromatous type.

A preventorium is operated in Buenos Aires for the protection of healthy children of leprosy patients. In early childhood the children are placed in the colony-home of the Leper Foundation.

Bolivia (7). According to the censuses taken since the launching of the antileprosy service in Bolivia, the disease has been observed only in the central valley and in the tropical region. The departments most affected are Beni (prevalence rate 2.32 per thousand), Pando (0.63 per thousand), and Santa Cruz (0.40 per thousand). Of the 610 known cases, 315 (52 per cent) are of the lepromatous type; the remainder are tuberculoid or indeterminate.

The capacity of the two existing leprosaria is insufficient for the isolation of all cases requiring segregation.

Brazil (8,9). Leprosy still constitutes a serious health problem in Brazil, although it is now largely under control. Of the 60,967 known patients, 22,954 were interned in leprosaria, 443 isolated at home, and 23,946 under the supervision of dispensaries; 13,624 remained outside the services' control.

The northern region, with a prevalence of 3.7 per thousand, is the most highly affected. The figures for the southern, central-western, and eastern regions are 1.5, 1.2, and 1.0, respectively. The least affected is the northeastern region, where the rate is 0.3 per thousand.

The State of São Paulo has the largest number of patients, although the highest rate is found in the State of Amazonas (4.2 per thousand).

Contagious forms for the entire country represent 57.8 per cent of the total, indicating that Brazil is still an active focus.

The Federal Government, the state governments, and private institutions participating in the campaign, work closely together in the administration of the antileprosy services.

Federal action is carried out through the National Leprosy Service, agency of the National Department of Health; its principal objectives are to guide and coordinate the activities of public and private services engaged in the antileprosy campaign; to give them technical and material aid; and to develop uniformity in the work methods. Through the Institute of Leprology, the National Leprosy Service also conducts studies and research on the pathology, therapeutics, and epidemiology of leprosy. The Federal Government has responsibility for planning, supervising, and expanding or installing leprosaria, dispensaries, and preventoria.

The states are responsible for executing the measures established by law, including the maintenance and operation of the leprosaria and dispensaries.

Social assistance to the patients and their families is provided by private institutions.

Brazil assigns relatively high percentages of its revenue to the antileprosy campaign. In 1950 the states spent an average of 1.2 per cent of their budgets on the campaign, and certain states, such as Amazonas, spent as much as 8.3 per cent. The Federal Government allots 0.2 per cent of its revenue for leprosy work.

Of the total expenditures for the antileprosy campaign, the state governments contribute 71 per cent, the Federal Government, 27 per cent, and private enterprise, 2 per cent. Municipal contributions are insignificant.

Preventoria in the state capitals or in the principal cities of the interior numbered 29 in 1953.

Courses for the training and specialization of leprologists to work in preventive and care services have been conducted regularly at various points in the country. From 1936 to 1950, 29 such courses were held and 398 physicians were graduated.

British Guiana (20,48). About 50 per cent of the cases in British Guiana are lepromatous, 40 per cent tuberculoid, and 10 per cent indeterminate. Search for new cases is made through regular surveys in the schools and in selected population groups.

Chile (19,20). There is no leprosy in continental Chile. On Easter Island, however, among a population of 800 inhabitants, there are 37 cases.

Colombia (12,47). The prevalence of the disease varies widely in the different regions of the country; 53 per cent of the cases come from the central-eastern region, 16 per cent from the southeastern region, and 10 per cent from the central-western region; the remaining 21 per cent are distributed throughout the rest of the country. The total number of cases is officially estimated at 12,000, although some specialists set the estimate as high as 20,000 or 30,000 (47).

There are no leprosaria, as such, in Colombia. The so-called "lazarets" (Agua de Dios and Contratación) contain a population of from 8,000 to 10,000 inhabitants, composed probably of equal numbers of leprosy patients and healthy individuals. These communities are intensive leprosy foci, where the individuals live under conditions highly conducive to infection.

Preventoria, nurseries, and school-homes are the three types of preventive establishments. The Government also maintains some children as boarders in private homes.

Of the total Health Department budget of 43,000,000 Colombian pesos, 7,000,000 are spent for leprosy work. The greater part of these funds is used to pay life-time benefits of 1.50 pesos daily to every leprosy patient, which are increased to 2 pesos daily when the individual is "sick" for any reason.

Colombia is planning the construction of a new center for training in leprosy work, to obtain the needed personnel to launch an effective control program. To this end, the Colombian Government has requested the assistance of the Pan American Sanitary Organization.

Costa Rica (13,14). Of the 211 known cases of leprosy in the country, 64.4 per cent were lepromatous, 17.1 per cent tuberculoid, and 18.5 per cent indeterminate.

Cuba (15,16,17,18). Although the endemia is more or less uniformly spread over the entire country, the heaviest incidence is observed in the eastern region of the island, where the foci also appear to be more active. The highest percentage of patients is found among persons under 30 years of age. The provinces with the greatest concentration of patients are Oriente, Habana, Las Villas, and Camagüey.

Of the 3,623 known cases, about 48 per cent are lepromatous, 16 per cent tuberculoid, and the remainder indeterminate.

The antileprosy campaign in Cuba is carried out under the Foundation for the Prevention of Syphilis, Leprosy, and Cutaneous Diseases.

Dominican Republic (31). The most affected region in the country is the south, where 80 per cent of the known cases are located. The disease is more frequent along the coast, the two principal foci being San Pedro de Macoris and the Santo Domingo District. The prevalence rate for the entire country is 0.14 per thousand inhabitants; in the San Pedro de Macoris Province it reaches 0.71. Case control is carried out through the medical personnel of the health units.

Ecuador (12,21,22). Few data are available for the country. It is known, however, that the disease is not widespread, being limited to the southern region, in El Oro, Loja, and Azuay Provinces, although small isolated foci are found in other sections. The highest prevalence, 1.1 per thousand, is in El Oro Province. Of the known cases, 72 per cent are lepromatous, 26 per cent indeterminate, and 2 per cent tuberculoid.

El Salvador (23). Of the 62 known patients in the country, 29 were concentrated in Chalatenango Department, which had the highest prevalence rate (0.26 per thousand).

French Guiana (20,26). Leprosy is an important problem in French Guiana, although active measures to combat it have been pursued for a considerable time.

Of the 1,056 new cases discovered from 1939 to 1953, 547 (54.5 per cent) showed the first signs of leprosy before the age of 16 years; 407 (39 per cent), before 10 years of age; and 102 (9.5 per cent), before 5 years of age. The high incidence in adolescents and children indicates the endemicity of the disease in French Guiana. The search for cases is very active and includes systematic examination of preschool and school-age children, examination of workers, public servants, etc.

The number of lepromatous cases is relatively low, accounting for 17 percent of the total in 1953, while the tuberculoid type reached 27 per cent and the indeterminate 55 per cent.

A nursery is maintained for children of leprosy patients isolated in the leprosarium, and plans are being considered for the construction of a more general type of school-home in Cayenne.

Children coming in contact with leprosy patients, particularly those under two years of age, are vaccinated with BCG.

Haiti (27). The disease is present in the country. Complete data, however, are not available. In 1954, 7 cases were reported among patients treated at medical institutions in the country.

Mexico (28) has published the results of four five-year censuses; the first (1930-1934) recorded 2,449 leprosy patients, and the fourth (1945-1949), 9,830. Cases officially registered in September 1953 numbered 11,378, and the prevalence rate for the entire country was 0.44 per thousand inhabitants. According to Núñez Andrade (28), "since no special investigations have been made in many regions where there are probably numerous leprosy cases, it can be estimated that the number of Hansen's disease victims in the United States of Mexico is at present over 50,000."

The disease is most prevalent in the Pacific coast states (Colima, Sinaloa, Jalisco, Michoacán, and Nayarit), in the central areas (Guanajuato, Querétaro, and Aguas Calientes), and in Yucatán and the Federal District. Patients from the rest of the country concentrate in the Federal District, raising the prevalence there to 0.37 per thousand.

Ninety per cent of the cases are found in adults. Sixty-five per cent are lepromatous, 20 per cent tuberculoid, and 15 per cent indeterminate.

Three preventoria are operated under private initiative; these have quarters for some 60 healthy children of leprosy patients.

Paraguay (12,29). According to estimates furnished by local physicians, there are approximately 10,000 leprosy patients in Paraguay, an extremely high figure that would give this country one of the highest of the prevalence rates.

The Government has expressed its interest in the problem and has requested international collaboration to improve the control services, which at present are insufficient to cope with the problem.

Peru (30). In this country, 80 per cent of the leprosy endemic is found in the northeastern sector, where prevalence rates range from 12 to 15 per thousand inhabitants.

Of the known cases, 64 per cent are lepromatous, 8 per cent tuberculoid, and 25 per cent indeterminate; 3 per cent are undiagnosed as to type or form. The prevalence of the lepromatous type is more accentuated in the jungle regions and less frequent in the coastal or mountain areas.

The antileprosy campaign is under the responsibility of the Leprosy Department, central agency charged with planning and directing activities, and of the regional services, entrusted with the operating functions in their respective territories. In localities where there are well-developed health units, the latter take charge of the antileprosy activities, with the Leprosy Department maintaining supervision and technical direction. Some of the dispensaries maintain a Casa de Tránsito (transit house). There is one preventorium set up on a temporary basis.

Surinam (32,33). The leprosy service in Surinam is one of the most complete and is staffed with highly competent technical personnel. It operates directly under the Director of Public Health. The incidence of leprosy is high in Surinam. Of the 1,270 cases, 68.4 per cent were of the lepromatous type, 30 per cent tuberculoid, and 1.6 per cent indeterminate.

In addition to the three leprosaria, Surinam has a 10-bed infirmary for leprosy patients operated as an annex to the general hospital; a special school for children suspected of having tuberculoid or indeterminate leprosy and prohibited by law from attending regular schools; and a village constructed by the Government to shelter isolated patients from leprosaria, or those incapacitated or indigent.

Trinidad (34). The present status of endemicity in Trinidad cannot be evaluated accurately. From data available for 1953, the prevalence rate would be 1.27 per thousand, the annual incidence rate, 0.18 per thousand, and the percentage of lepromatous type in the annual incidence, 21.2 per cent.

The indications are that there is a relatively high incidence of leprosy in Trinidad, with a greater annual incidence than could be expected, although it is noted that the benign forms of the disease predominate in the annual incidence.

United States of America (24,25). The prevalence of leprosy, past and present, is difficult to determine in the United States. Among the known cases, the lepromatous type is the most common, the tuberculoid type being relatively rare.

The disease has been concentrated in limited areas of Florida, Louisiana, Texas, and California; Texas is now the principal leprosy focus in the country. In 1955, 24 new cases were reported, all of them in individuals living in the southern and southeastern part of Texas.

In addition to the national leprosarium at Carville, Louisiana, leprosaria are maintained in Hawaii, Puerto Rico, the Virgin Islands, and the Marianas. There is another in the Panama Canal Zone.

Leprosy is subject to compulsory notification in all the states and territories, with the exception of New York and Vermont. Thirty-five states and the District of Columbia require the isolation of patients in a leprosarium or in the home.

Venezuela (36,37,38). The Leprosy Division in this country has registered 8,468 known patients. Of these, 45 per cent are lepromatous, 26.5 per cent indeterminate, and 28.5 per cent tuberculoid.

There are 866 patients hospitalized in the national antileprosy sanatoria; the rest of the known cases are under the control of the 171 dispensaries of the antileprosy services, which in addition have 20,504 contacts of known leprosy cases under control and protection measures. Such measures include periodic examinations and repeated BCG vaccinations, applied preferably to those who are Mitsuda negative.

The antileprosy services have taken leprosy censuses principally in the rural areas of 12 states, covering 827,914 individuals, among whom 595,727 tuberculin tests have been given, with subsequent BCG vaccination of negative reactors.

The general public living in the foci areas are protected in two ways:

- (a) BCG vaccination every 5 years to all inhabitants in leprosy foci under control. At present some 200,000 vaccinations are given each year.
- (b) Yearly BCG vaccination to the population from 0-15 years of age for four successive years. Vaccinations are now being given at the annual rate of 250,000 persons aged 0-15 years.

Seven training courses for leprologists have been given and 35 physicians have completed the course. In addition, basic training is given to rural physicians residing in leprosy foci, and courses are conducted for nursing auxiliaries in the national antileprosy sanatoria.

III. ACTIVITIES OF THE PASO/WHO IN THE CONTROL OF LEPROSY

The Organization's activities in this field have thus far been directed toward obtaining a better knowledge of the extent and characteristics of the problem and of the human and material resources available in the various countries, as a basis for the organization of leprosy control programs.

In 1951, a consultant of the Organization visited Paraguay, Bolivia, Peru, Ecuador, and Colombia and his report on the status of the problem in those countries was later transmitted to the respective governments. Similar surveys were made in 1955 in Trinidad and Surinam, and in 1956, in French Guiana, British Guiana, Guadeloupe, Martinique, Saint Lucia, and Grenada.

At the request of the Government of Paraguay, and following another visit by the consultant, a plan of operations was drawn up in 1954 for the control of leprosy in that country, where the problem is especially serious. UNICEF has agreed to collaborate by providing equipment, drugs, and other necessary items. Fellowships have been awarded to Paraguayan physicians for training in leprology and the services of a consultant are to be provided for a period of one year, beginning in September 1956.

It is planned to intensify the Bureau's activities in the important field of leprosy control, and to this end provision is made in the 1958 proposed program and budget, to be considered by the Directing Council, for programs of collaboration to four countries (Bolivia-12, Peru-24, Ecuador-18, and Colombia-19) and for broadening and expanding the regional program already in operation (AMRO-58).

Serving as a guide for these programs are a series of general basic principles which it is deemed desirable to submit to the Directing Council for consideration. These were prepared on the basis of the recommendations made by the WHO Expert Committee on Leprosy at its meeting in November 1952 (39).

1) General Principles

Leprosy is not a disease apart, since in the countries where it is endemic it is a general public health problem, one to be considered along with the others present in the country. Any measures that will raise the general public health standards are likely to help in the control of leprosy, whether they be directed against specific diseases or concern the improvement of nutrition, personal hygiene, sanitation, or housing.

Experience has shown that the raising of living standards results in a gradual disappearance of disease. It is probable that the specific antileprosy measures applied until recently have not, so far as we know, played an important role in this trend. However, the specific antileprosy measures available today can help greatly in the control of this disease, particularly in countries where a rapid improvement in the general living standards is not expected.

Specific leprosy control work must be undertaken by staffs working within the general framework of the health administration of a country, and must conform with the generally accepted public health principles. Public health, not public fears and prejudices, should determine the policy with regard to leprosy control.

2) Surveys

Before a control program can be planned, data must be obtained, for each region, on the incidence of leprosy, the distribution of cases by sex, age, and racial groups, and on other epidemiological factors of importance. Through such information can be determined the status of the disease: whether the endemia is increasing, decreasing, or stationary. For example, a high incidence, especially in children, indicates that leprosy is increasing in the community and that resistance to the disease is comparatively low.

Such information can be obtained by means of leprosy surveys. Three types of surveys are recommended:

- (a) Preliminary survey, also called extensive survey (49): determining, through a rapid investigation of population samples, whether leprosy is present and, if so, to what degree;
- (b) Patient census: determination of the exact number of patients in a given community, their distribution by age, sex, race, marital status, occupation, clinical type, etc.
- (c) Intensive survey (49): a more detailed study of particular aspects of the leprosy endemia.

The type of survey selected will depend on local factors and on the resources available in the country.

3) Control Measures

(a) Early diagnosis

Early diagnosis is essential to the success of any control program, and the need for it is greater today than ever before. When leprosy cases are diagnosed early, treatment is much easier and shorter and one can confidently expect recovery of the patient without residual incapacity or deformities. Through surveys, many early cases of the disease can be detected.

(b) Treatment

Modern treatment with the sulfones, properly organized and supervised, considerably reduces the infectiveness of the patients and now constitutes the most important measure for control of the disease.

Great progress has been made in recent years in the chemotherapy of leprosy, but it must be recognized that, even though present treatment measures are much superior to those previously applied, they still suffer from limitations. There is an urgent need to find a more rapid and sure therapeutic agent than those now available, one capable of controlling the acute phases of the disease.

Treatment may be given in dispensaries, in isolation institutions, or in the patient's home. Until recently, domiciliary treatment was possible only if the patient's home was in a locality that had a treatment center. Since the introduction of the sulfones, however, domiciliary treatment can be given by visiting nurses, even in localities at a considerable distance from the dispensary.

Effective domiciliary treatment, with isolation in the home when necessary, and hospitalization and institutional treatment in selected cases, helps eliminate one of the greatest obstacles to leprosy control: the element of fear. It is a measure that will help attract patients to come forward for treatment and win their cooperation in the campaign against the disease.

Treatment must be of long duration, not only to obtain clinical results but, especially, to make the case "bacteriologically negative," so that the patient will cease to be a source of infection. The drug may have to be administered for years, and some authors even suggest that it be given indefinitely. Fortunately, the parent drug, diamino-diphenyl sulfone (DDS), is very low in cost and can be administered orally every day, bi-weekly, or weekly. The injection of a suspension of DDS in oil can be administered as seldom as twice a month.

Some relapses occur after treatment with sulfones, and patients receiving such treatment must therefore be carefully surveilled. The possibility of the development of resistance to the drug must also be taken into account (40).

(c) Isolation

Despite the limitations described above, modern leprosy treatment is a powerful weapon in controlling the disease in the community. It can, moreover, provide a strong incentive for establishing a rational basis for isolation of open cases, a measure that will become much more acceptable than it was in the past, owing to better prognosis and reduction of the required period of isolation, made possible by modern drugs.

In theory, isolation of all infectious cases should break the chain of infection and eventually result in the eradication of the disease. Many cases, however, are infectious for years before they are diagnosed and isolated, and the fear of compulsory segregation makes patients hide their condition as long as they can, precisely during the period it would be most curable. Consequently, institutional isolation alone has not given the results expected of it as a control measure, even when applied rigorously and on an adequate scale. When applied with discrimination and in combination with education and effective treatment, however, it retains an important place in the fight against leprosy.

Isolation should be selective and temporary, that is, limited to infectious cases and maintained only until such time as lesions become negative. Isolation measures should be inspired by a humane spirit, so that hospital-colonies and sanatoria will not be thought of as prisons.

Although the dispensaries should be the most important factor in leprosy control, institutional isolation must be maintained for infectious cases, as well as for those of the non-infectious cases who are mutilated, vagrant, or demented, and for those who represent a danger to the community because of the conditions under which they live or their refusal to submit to health measures.

(d) Protection of infants and children

The opinion is generally held that in endemic countries leprosy is more commonly acquired during infancy and childhood. Special care should therefore be taken to prevent contact of children with infectious relatives, either by isolating the patients or removing the child to a preventorium or similar institution.

Various Latin American authors have furnished indirect evidence of the protective value of BCG against leprosy (41,42,43,44,45) and even the Third Pan American Leprosy Conference recommended its generalized use in leprosy-endemic regions, particularly for children (46). However, the Expert Committee on Leprosy (39) could not find sufficient justification to recommend BCG officially as a control measure until adequate large-scale trials have been made and until such trials are properly coordinated with tuberculosis services.

(e) Health education

One of the main difficulties in controlling leprosy is the ignorance of the public regarding the nature of the disease. In endemic countries, every means should be employed to educate the public and, particularly, the patient and his contacts.

(f) Legal requirements

Legislation on leprosy control should include only general principles and the necessary authorizations in conformity with the present concepts and techniques of control. Details of the program should be left to regulations, prepared by experts and reviewed periodically, as further knowledge of the disease is gained.

(g) Scientific investigation

The favorable results obtained with the chemotherapeutic methods now used against leprosy should not obscure the great need to seek new therapeutic agents of more rapid and efficacious action. There is an urgent need for therapeutic trials of certain drugs already available and of others that may appear, trials that should be planned with the greatest care and conducted on a wide scale.

There is also need for research in other areas, such as M. leprae culture media, transmission to experimental animals, and field studies on the value of BCG in preventing leprosy.

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