INTERNATIONAL JOURNAL OF LEPROSY

VOLUME 33, NUMBER 1 JANUARY-MARCH, 1965

NEW ORIENTATION IN THE CONTROL OF LEPROSY IN JAPAN

CURABILITY OF THE DISEASE[1]

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INTRODUCTION

A persistent concept of leprosy as an incurable malady has given rise to extreme fear of the disease. In Japan isolation of leprosy patients has been the chief measure in leprosy control. But the question remains if leprosy is as nearly incurable as ever. The author has investigated the present status of leprosy and especially its curability on the basis of data collected in the Aisei-en National Leprosarium.

Leprosy is a specific infectious disease of man caused by *Mycobacterium leprae* ([6]). Efforts directed toward its artificial cultivation in the laboratory have been unsuccessful. More success has attended experiments on the transmission of the disease to experimental animals ([2]). The Madrid ([1]) and Rio de Janeiro ([3]) International Congresses of Leprology have defined the polar types, lepromatous (L), in which the specific mycobacteria are present in great number, the tuberculoid (T) type, in which they are difficult to detect, and two intermediate types, borderline (or dimorphous) and indeterminate.

In the Aisei-en Leprosarium the status of patients is as follows:

Total number of patients in 1961	1,652
Ratio of male: female	1.7
Lepromatous type	69.4%
Tuberculoid type	30.6%

Study by age distribution shows a high proportion in advanced age.

TREATMENT

From 1949 to the present day, treatment in Aisei-en has been through the use of Promin, a derivative of diaminodiphenyl sulfone, which is reported as active bacteriostatically without secondary effects such as anemia ([10]). Treatment is carried out on the basis of collaborative researches under the Japanese Ministry of Welfare.

[1]Received for publication October 28, 1964.

The antileprotic effect of Promin is evident in the disappearance of disease symptoms ([11]), and the drug has made possible the cure of residual lesions, e.g., secondary deformity due to neural involvement, although no effect is shown on the neural symptoms. On the other hand, physiotherapy and orthopedic measures have made progress. For example, in the absence of lepromatous disease in the anterior part of the eyeball, iridectomy has been made feasible. So too has cataract operation. In recent times no instance of a need for tracheotomy has been observed, because of the disappearance of lepromata from the mucous membrane of the upper part of the trachea. Another characteristic of sulfone treatment is the infrequency of resistance in the majority of patients, even after more than 10 years of sulfone administration.

CRITERIA OF CURE

In 1956 the Japanese Ministry of Welfare decided informally on temporary provisions for the discharge of patients from leprosaria. Since 1957, in 11 leprosaria, arrested cases have been registered for discharge. Strictly speaking, the definition of cure of leprosy is not clearly established, and the term "arrested" is customarily used as signifying clinically cured. In simple terms the objectives of these temporary provisions are as follows: (1) observation for more than one year before permission for discharge of patients as arrested; (2) disappearance of all clinical symptoms of the disease; (3) inability to detect leprosy bacilli bacteriologically or histologically; and (4) development of a positive lepromin test. In the case of each item of these provisions much attention has been directed toward revision. The present report is intended to exemplify actual results in the discharge of arrested cases on the basis of the aforesaid provisions.

RESULTS IN THE DISCHARGE OF CASES AS ARRESTED

1. *Number of discharged cases.*—As shown in Table 1, in Japan from 1957 to June 1961, 606 cases were discharged in the quiescent state from 11 national leprosaria, i.e., up to 5.7 per cent of the total number of patients institutionalized in 1960. In succeeding years the discharge of arrested patients has shown an annual increasing trend. In one leprosarium the rate of discharge of patients was 1.5 per cent (minimal) and in another 15.3 per cent (maximal). The difference in these rates was presumably attributable not to the character of the disease, but mainly to the living conditions in each leprosarium. In the Aisei-en National Leprosarium one of 37 discharged patients was readmitted for relapse, i.e., a rate of 2.7 per cent. This will be discussed later.

2. *Investigation of cases discharged as arrested.*—(a) Period from onset to treatment: As seen in Table 2, 28.9 per cent of the discharged patients had been institutionalized and treated medically within one year after onset of the disease. A sharp decline occurred in those ad-

TABLE 1.—*Number of arrested patients by year in leprosaria.*

Institutions	1957	1958	1959	1960	1961 6 months	Total	%[a]
Matsugaoka Hoyoen	—	3	4	8	4	19	2.63
Tohoku Shinseien	5	2	2	29	3	41	6.56
Kuryu Rakusseien	4	7	9	11	10	41	4.03
Tama Zenseien	38	27	30	30	17	142	11.97
Suruga Ryoyojyo	8	9	16	25	11	69	15.26
Nagashima Aiseien	—	—	5	19	13	37	2.19
Oku Komyoen	7	11	13	10	8	49	5.05
Oshima Seisyoen	12	2	6	8	3	31	4.41
Kikuchi Keifuen	5	13	50	53	29	150	8.80
Hoshizuka Keiaien	5	2	—	9	2	18	1.54
Amami Wakoen	3	3	1	2	—	9	2.74
Total	87	79	136	204	100	606	5.74

[a] Ratio was based on numbers of patients in April 1960.

TABLE 2.—*Period from onset of disease to start of treatment of arrested patients.*

Period in years	Male	Female	Total	%
0 - 1	60	31	91	28.9
1 - 2	42	18	60	19.0
2 - 3	29	10	39	12.4
3 - 4	21	10	31	9.9
4 - 5	4	3	7	2.2
5 - 6	15	6	21	6.7
6 - 7	10	1	11	3.5
7 - 8	8	5	13	4.1
8 - 9	7	2	9	2.9
9 - 10	4	1	5	1.6
10 - 15	16	3	19	6.0
15 - 20	2	—	2	0.6
20 & over	5	2	7	2.2
Total	223	92	315	100.0

TABLE 3.—*Treatment period of arrested patients (from admittance to discharge).*

Period in years	Male	Female	Total
0. - 1	6	—	6
1.1 - 2	15	6	21
2.1 - 3	24	17	41
3.1 - 4	32	11	43
4.1 - 5	26	8	34
5.1 - 6	18	10	28
6.1 - 7	21	3	24
7.1 - 8	21	6	27
8.1 - 9	13	8	21
9.1 - 10	10	7	17
10.1 - 15	24	9	33
15.1 - 20	12	6	18
20. & over	1	1	2
Total	223	92	315

mitted after this period. This shows the importance of treatment at an early stage.

(b) Period of treatment: As shown in Table 3, 54.9 per cent of all the discharged patients were those who had been treated for six years.

(c) Period of treatment for new cases and older ones: The designation "new cases" indicates patients who were admitted within one year after onset of the disease; "older cases" were those of patients who had been ill for more than five years. In the comparison of these periods of treatment, as shown in Table 4 and Figure 1, it will be noted that 60.4 per cent of the new case group were discharged within six years, and 54 per cent in the older group.

(d) Period of treatment according to the disease type: In the L and TN (neuritic tuberculoid) types the discharged patients had under-

TABLE 4.—*Comparison of treatment period of new and old cases among arrested patients.*

Years	Admission after onset	
	New cases	Old cases
	1 year	5 years
1	1	
2	6	7
3	11	12
4	12	4
5	13	7
6	12	4
7	5	7
8	7	11
9	6	7
10	5	3
15	8	9
20	5	5
Total	91	76

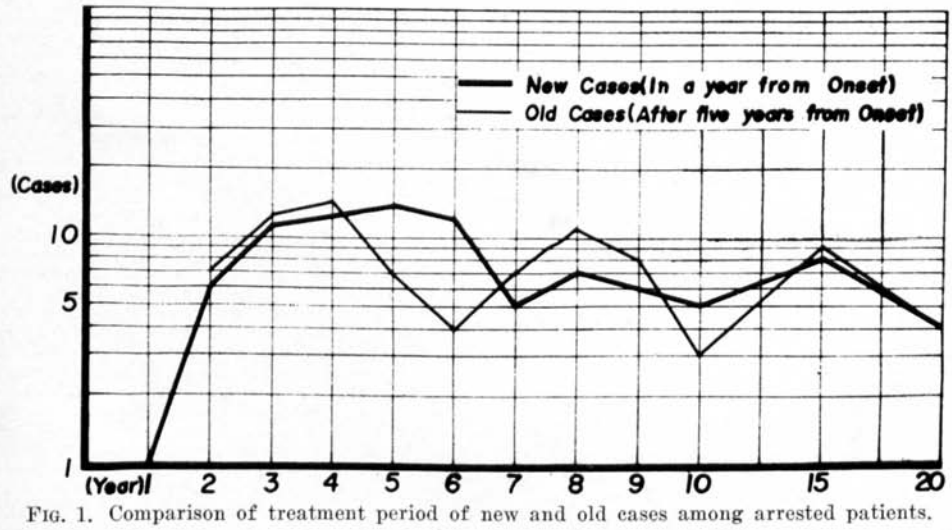

FIG. 1. Comparison of treatment period of new and old cases among arrested patients.

gone the same period of treatment. The period was much shorter in the TM (macular tuberculoid) type. Table 5 and Figure 2 show three peaks corresponding to the 4th, 8th and 15th year respectively after admittance to leprosaria. Patients discharged in the 15th year, at the highest peak, are presumed to have been in a favorable position in respect to their family situation and other social factors, as well as having had beneficial treatment. To summarize: at present the number of the discharged patients represents 5.7 per cent of all patients admitted to the national leprosaria in 1960. The value of early treatment is emphasized. The great majority of the discharged patients has been made up of patients subjected to treatment for as long as six years. No definite difference is seen among the new cases, older ones, and disease types in relation to the duration of treatment, a fact which is due to the policy of institutionalization over an unlimited period. Henceforth, it will be necessary to determine the period of treatment on the basis of disease types.

PRESENT STATUS OF PATIENTS IN THE AISEI-EN LEPROSARIUM

It is epoch-making in Japan that leprosy patients, once believed incurable, have come to be discharged as arrested after treatment. For this reason the author has wished to report the present status in the leprosaria. In classifying the disease, the classification drawn up at the Madrid International Congress on Leprosy in 1953 ([1]) was employed in Japan in 1959; the Japanese classification ([8]) was settled by the Leprosy Research Committee. It is tabulated in Table 6. The L type and T types are classified as the main types and one atypical group is attached. The T type is further divided into two subtypes, i.e., a TM (macular) type and a TN (neural) type. The grades and character of the disease as settled by the Japan Leprosy Research Committee ([8]) are as follows: In determining the grade of the disease attention is

TABLE 5.—*Treatment period of arrested patients (comparison by types).*

Year	Lepromatous	Tuberculoid		Total
		Neural	Macular	
1	1	3	2	6
2	5	8	7	20
3	15	15	11	41
4	17	14	12	43
5	13	16	5	34
6	12	8	8	28
7	10	8	6	24
8	12	10	5	27
9	9	8	4	21
10	8	4	5	17
15	17	16	....	33
20	4	12	2	18
21	1	1	....	2
Total	124	123	67	314

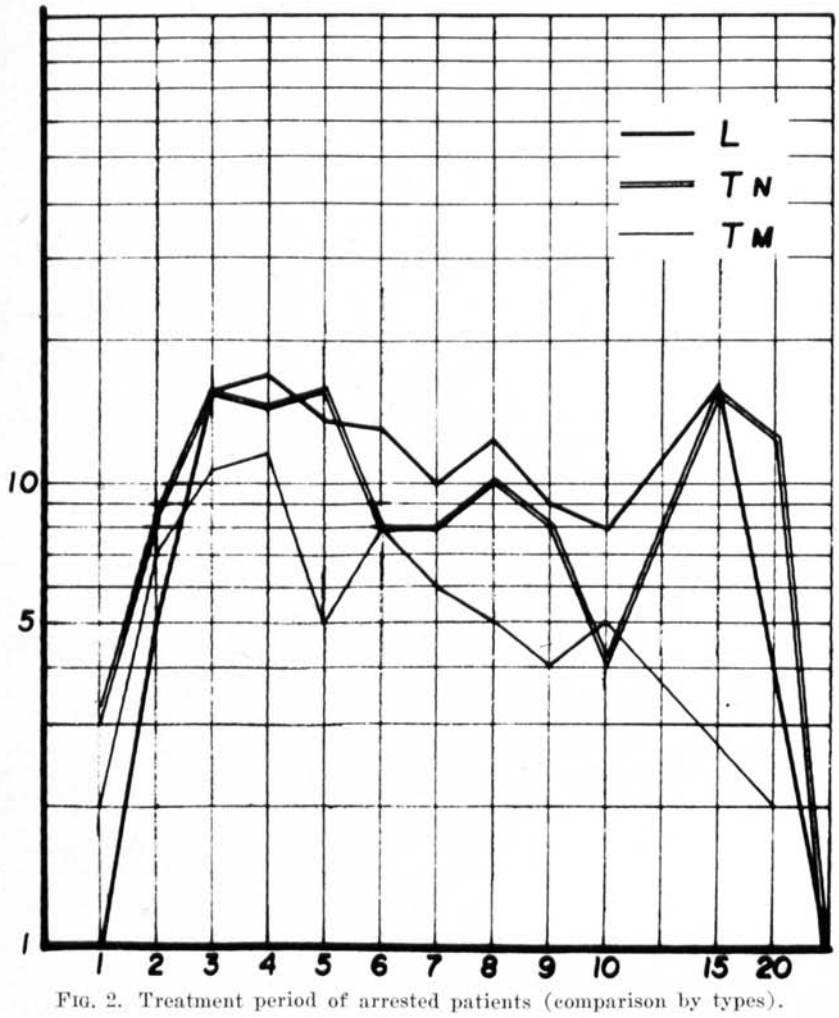

FIG. 2. Treatment period of arrested patients (comparison by types).

focused chiefly on the degree of extension of the lesion on the surface area of the patient's body, with indication of the neural symptoms by respective symbols. Judgment of the character of the disease condition is made chiefly by the clinical appearance of the skin; an objective evaluation is then centered in bacteriologic activity. Generally bacilli disappear later than the exanthemata evanesce. In the light of the bacteriologic activity, the patients placed in the leprosaria were classified as follows:

1. *Number of patients with bacteriologic negativity in 11 national leprosaria.*—On bacteriologic test according to a report by the Japanese Leprosy Research Committee, 46.3 per cent were found negative consecutively for five years, and 11.2 per cent positive.

2. *Number of bacteriologically negative patients in Aisei-en.*—Patients were grouped according to bacteriologic activity as an A group of positives (65.4%) and a B group of negatives (34.6%). The B or

TABLE 6.—*Leprosy classification. Japanese adaptation.*

	Lepromatous type	Tuberculoid type		Atypical group
Abbreviation	L	TM	TN	A
Madrid	Lepromatous	Tuberculoid, macular	Tuberculoid, neural	Borderline Dimorphous Indeterminate
Smear for leprosy bacilli	Many bacilli; globi	Bacilli (−)	Bacilli (−)	Bacilli (+) or (−)
Skin manifestations	Nodules; loss of eyebrows	Exanthemata	No skin symptoms; sensory and motor disturbance	Mixed or unclassified
Lepromin reaction	(−)	(+)	(+)	(+) or (−)
Cellular infiltration	Lepra cells	Lymphocytes; epithelioid cells; Langhans' giant cells	Lymphocytes; epithelioid cells	Mixed

negative group was further divided into a B1 subgroup (7.3%) without deformity, and a B2 subgroup (27.3%) with much deformity. In the A group the 65.4 per cent were distributed as follows: an A1 subgroup of 27.1 per cent belonging to a younger generation, an A2 subgroup in which 5.1 per cent were clinically progressive, an A3 group labelled "atypical," without a case, and an A4 subgroup amounting to 33.2 per cent, in which there were complications with tuberculosis, mental illness, or other disease causing invalidism.

3. *Present state of accumulated population of patients with bacteriologic negativity.*—The negatives, constituting 34.6 per cent, were reluctant to leave the leprosarium. Their reasons included: adaptability to life of seclusion; resignation to supposed incurability of leprosy; incompetence in social life because of prejudice and feelings of alienation. According to a rehabilitation survey carried out in the

TABLE 7.—*Investigation of social rehabilitation at Aisei-en with respect to leaving institutions*

	Willing		Not willing		No reply		
Group	No.	%	No.	%	No.	%	Total
A 1	142	47.2	134	44.5	25	8.3	301
A 2	24	32.4	44	59.4	6	8.2	74
A 3 [a]	—	—	—	—	—	—	—
A 4	52	13.4	319	82.0	18	4.6	389
B 1	23	29.6	50	64.1	5	6.4	78
B 2	33	10.0	279	85.1	16	4.9	328
Total	274	23.5	826	70.5	70	6.0	1,170

[a] No case in 1961 when investigation was made.

Nagashima Leprosarium, 70.5 per cent of the negatives did not wish to leave (Table 7). In the B1 subgroup only 29.6 per cent wished to leave, and in the B2 subgroup only 10 per cent. A study by age revealed that the greatest percentage of discharge (36.9%) was found in the teens. The study indicates a loss of hope with increase in age. Ninety-one per cent of the reluctant patients consisted of those who had been living in the institution for more than ten years. As noted above, although the number of bacteriologically negative patients was increasing in Aisei-en, many of them could not leave or would not rehabilitate. Herein lies the problem of the "reluctant negatives."

CURABILITY OF LEPROSY IN RELATION TO SPECIFIC FACTORS

Recognizing the situation outlined above, the author has reviewed the curability of leprosy as indicated in the following paragraphs:

1. *Bacteriologic investigation.*—Test by smear-staining is clinically important, but a parallel biopsy examination also must be made. No means are available for detection of bacilli hidden in peripheral nerves. Discovery is possible only when histologic preparations are stained after removal of tissue from the body. Table 8 shows the results of bacteriologic test after autopsies in Aisei-en.

TABLE 8. *Bacteriologic examination after autopsy at Aisei-en (from July 1959 to September 1962).*

Type of disease	Total patients	Positive for *M. leprae*		Negative for *M. leprae*	
		No.	%	No.	%
L	53	40	75.5	13	24.5
TN	22	1	4.5	21	95.5
Total	75	41	54.7	34	45.3

In 75 autopsies, after 1959, specimens were negative in 45.3 per cent. Areas examined included skin, ulnar nerves, lymphatic glands and other reticulo-endothelial organs. In the L type 24.5 per cent were negative, and in the T type 95.5 per cent. According to Lie (9) in 1935, in the Bergen Leprosarium results were negative in 18 per cent in the L type, and 53 per cent in the T type. Lie defined these negative cases as examples of spontaneous or natural cure.

2. *Immunologic reactions.*—The Mitsuda test is applied in order to learn the resistance of a host to the bacillus. For the past thirty years this skin reaction has been employed widely to confirm the L type. Using the standard reading of the reaction adopted by the International Congress of Leprosy (4), the author, in 1930, found 91.7 per cent of cases negative, and 6.7 per cent positive, and in 1957 48.1 per cent negative and 46.1 per cent positive (Table 9). Thus the cases with negative reaction have decreased and those with positive reaction have increased. The increase of bacteriologic negativity might be an expression of a pronounced tendency toward recovery. Immunologically it is important to investigate the true cause of the positive transition

TABLE 9. *Transition in lepromin reaction.*

Year	Positive [a]		Doubtful [b]		Negative [c]		Note
	No.	%	No.	%	No.	%	
1930	9	6.7	2	1.6	114	91.7	Hayashi-Zensei-en
1955	980	66.3	21	4.9	124	28.8	Aisei-en
1957	198	46.1	25	5.8	207	48.1	Aisei-en

[a] Distinct induration of 3 mm. or more.
[b] Induration under 3 mm. diameter.
[c] No reaction in the site.

by the Mitsuda reaction.

3. *Histopathologic investigation.*—Low capacity for recovery in the L type of disease in comparison with the T type, is evident from a histopathologic point of view. In the L type enormous masses of bacilli grow in phagocytic cells; so-called lepra cells soften and degenerate, and many of them become vacuolized, with fatty degeneration. In short, the phagocytic cells do not have the property of provoking fibrous tissue growth and durable scarring. Lepra reaction and occurrence of erythema nodosum leprosum (ENL) are due to reaction to degenerated products from bacillary bodies or histiocytes; i.e., they represent antigen-antibody reactions. The author ([7]) has described a necrotizing vasculitis induced by hypersensitivity in an angiitis in the skin and other organs of predilection. An allergic process concerned in the shift of the leprosy types has been described. The development of macules and their progress and disappearance have been explained by Davey ([5]) as clearly based on an allergic process. If high resistance to the leprosy bacillus signifies hypersensitivity, the tissue of the L type will be weak in allergic reaction as well as tissue resistance. In the T type, on the other hand, allergic reactivity is high and tissue resistance correspondingly high. Accordingly in the T type the tissues have a strong capacity for response, thus leading to spontaneous cure, while in the L type the tissues are weak or nil in their repair capacity. These phenomena are pathologically quite common.

However, analysis of the present trend in leprosy has revealed that

TABLE 10. *Years from onset to death. Comparison of chaulmoogra and Promin eras by type of disease.*

Type	Examination period		Total
	1931-1948	1955-1962	
	Chaulmoogra [a]	Promin [a]	
Lepromatous [b]	14.9 ± 8.2	22.1 ± 13.6	15.3 ± 8.6
Tuberculoid [b]	23.2 ± 15.5	34.0 ± 17.5	24.5 ± 16.1
Total	16.1 ± 10.4	25.8 ± 15.9	

[a] Chaulmoogra era : Promin era is significant
($\chi^2 = 856.1 < p = 0.001$)
[b] Lepromatous type : tuberculoid type is significant
($\chi^2 = 351.4 < p = 0.001$)

patients may expect years of life after onset of the disease, and that the causes of death have changed greatly in comparison with those in previous years. The average life expectancy of patients is ten years longer than in the chaulmoogra era, as shown in Table 10. In the T type the average life expectancy was 34 years, i.e., longer than in the L type group. In the T type, the disease has never influenced years of life expectancy. The main causes of death at present are compared with those in the chaulmoogra era in Table 11. Death from tuberculosis has diminished, while the mortality from cancer, cerebral hemorrhage, and senility has increased markedly. Rare instances of death have been recorded for tracheotomy and/or leprosy asthenia. Bacteriologic negativity in cases studied after autopsy, cited in Table 8, has proved that leprosy had been extinct as a contagious disease, although a high degree of deformity remained. From these results it is concluded that curability of leprosy signifies immunologic cure from a bacteriologic point of view. Pathologically spontaneous cure is understood. Immunologically cure is proved to augment resistance of the tissue. However, because of deformity from the disease, the program for rehabilitation remains an unsolved medico-social problem for leprologists and social workers in Japan.

TABLE 11. *Cause of death (%) at Aisei-en. Comparison of chaulmoogra and Promin eras.*

Year and era	Number of autopsies	Tuberculosis	Pneumonia	Cancer	Cerebral hemorrhage	Senility	Others
1931-1948 Chaulmoogra	1,583	49.9	11.0	1.5	1.3	....	36.3
1955-1962 Promin	142	14.8	17.6	16.2	8.5	9.8	33.1

STUDY OF ANTILEPROSY PROGRAM

In comparison with the leprosy control program of the World Health Organization it may be noted that in Japan the L type predominates and many cases are serious and difficult to cure. A countermeasure has been to isolate them, regardless of the disease type, for as long a time as patients wish to remain in institutions. Eventually the number of domiciliary patients has diminished, and negative patients have accumulated in the institutions. In contrast, in India and Africa, many leprosy patients are said to be of the T type, with mild disease. They are generally expected to recover from the disease through oral administration of DDS as outpatients. Institutionalization is provided only for the serious cases of L type, and deformity is prevented by physiotherapy or corrected by orthopedic operation. The ultimate aim is to increase the number of arrested patients. Doull ([6]) raised a controversial point, however, in that an essential factor in leprosy transmission may be the contagious character of the T type. A great majority of leprosy patients all over the world are proved to be of the TM type; this is an epidemiologic enigma awaiting answer. In Japan

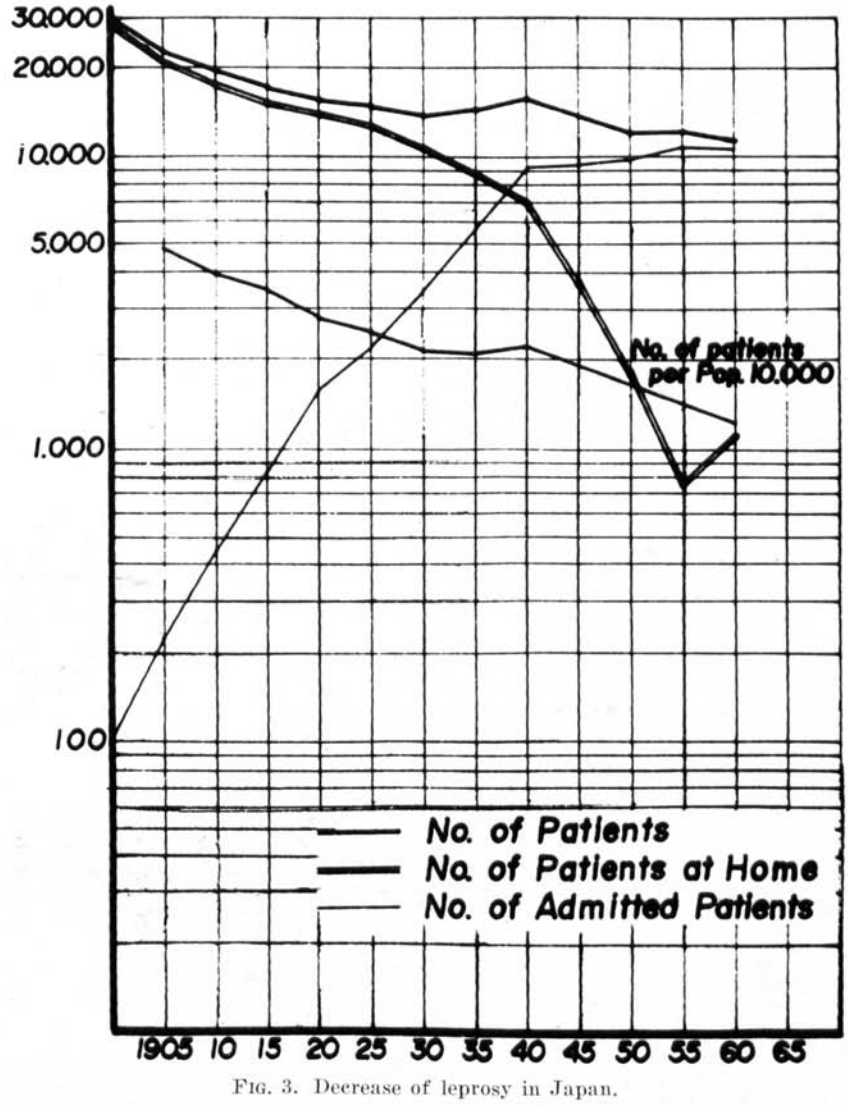

FIG. 3. Decrease of leprosy in Japan.

it is quite inconsistent from the administrative point of view that the period of institutional treatment is unlimited for patients admitted at present or expected in the future, and that Promin is provided only in leprosaria. In other words patients must be institutionalized to receive the best treatment. In further reflection on what must be done, it is evident that systematic counter-measures are necessary for the deformities and rehabilitation. Finally, criteria for discharge from leprosaria should be revised to meet today's requirements.

TREND OF LEPROSY IN JAPAN

The World Health Organization doubts the effectiveness of segregation and opposes control of leprosy by force ([13]), on the ground that isolation of patients does not prevent them from absconding from lep-

rosaria. In Japan, in such a system, many patients would be left unregistered. In this respect the results of our survey demonstrate the following:

1. *Number of leprosy patients.*—Leprosy cases have diminished to one-third of the number in 1900, while admissions have increased to more than 10,000 (Fig. 3). The number of domiciliary patients has been estimated at about a thousand. The prevalence rate per 10,000 population has decreased.

2. *Number of deaths.*—Statistics show that since 1900 the mortality has been decreasing.

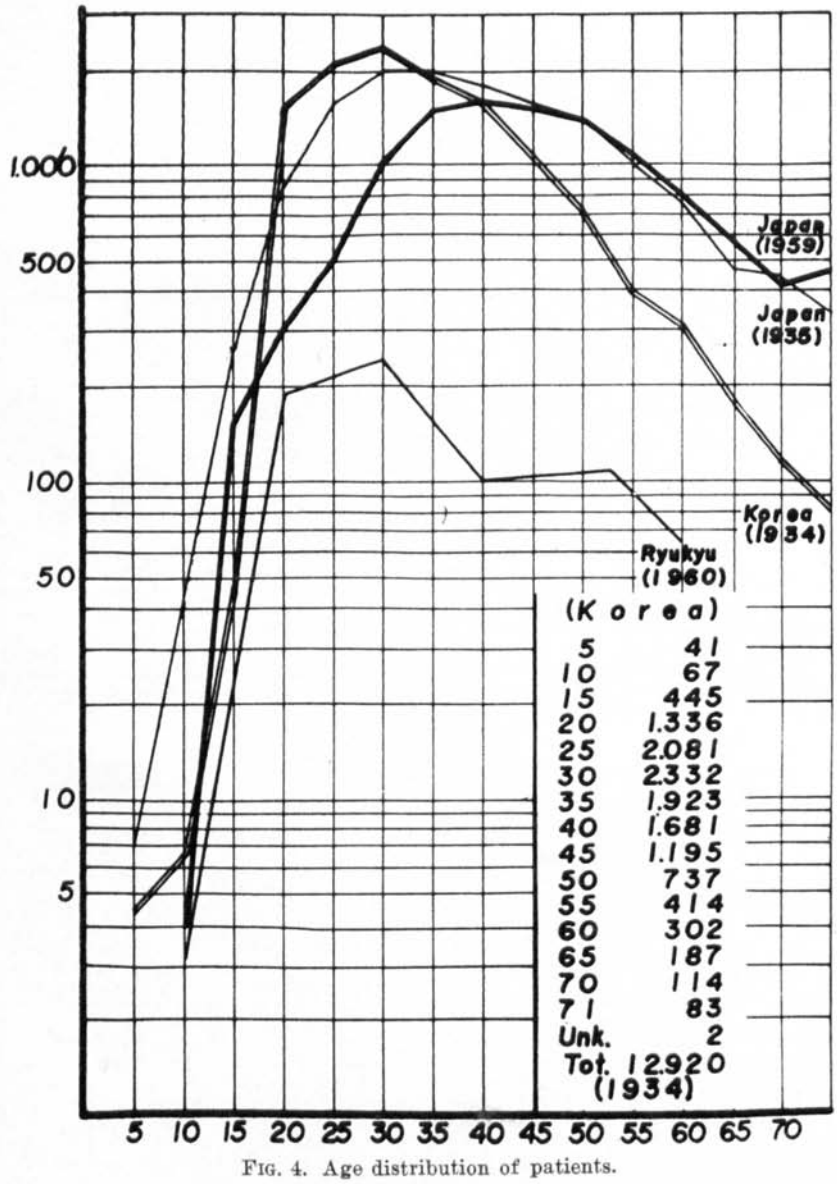

FIG. 4. Age distribution of patients.

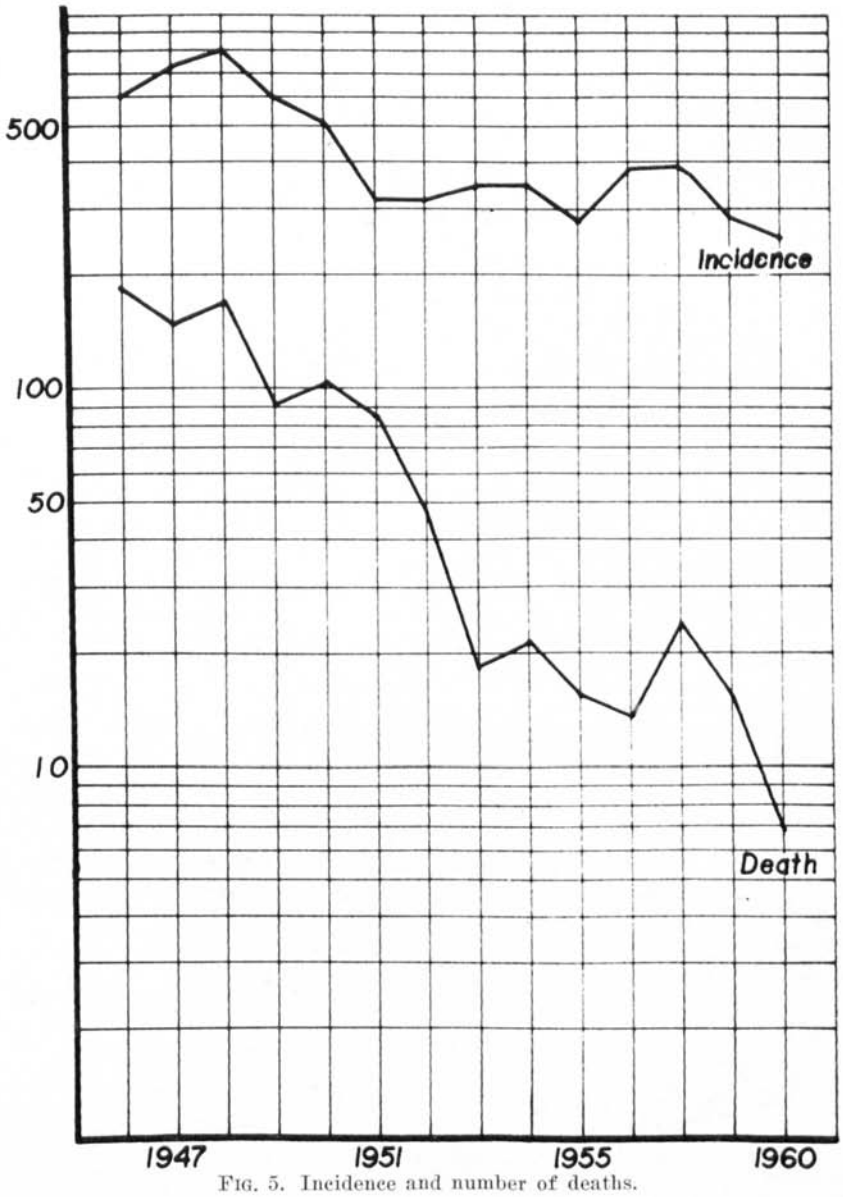

FIG. 5. Incidence and number of deaths.

3. *Number of leprosy cases in army service.*—Since 1897 leprosy cases have been diminishing in army service. The mortality curve has paralleled the decrease in actual number of leprosy cases in army service.

4. *Age distribution.*—The age distribution of leprosy patients is shown in Figure 4. Comparisons were made in Japan in 1935 and 1959, in Korea in 1934, and in Okinawa in 1960. Distribution increased, in each curve, with years of age, reaching its highest peak in Japan at 30 years in 1935, and 40 years in 1959. In Okinawa the curve of age distribution was like that of Japan. In Korea ([12]), it was significantly dif-

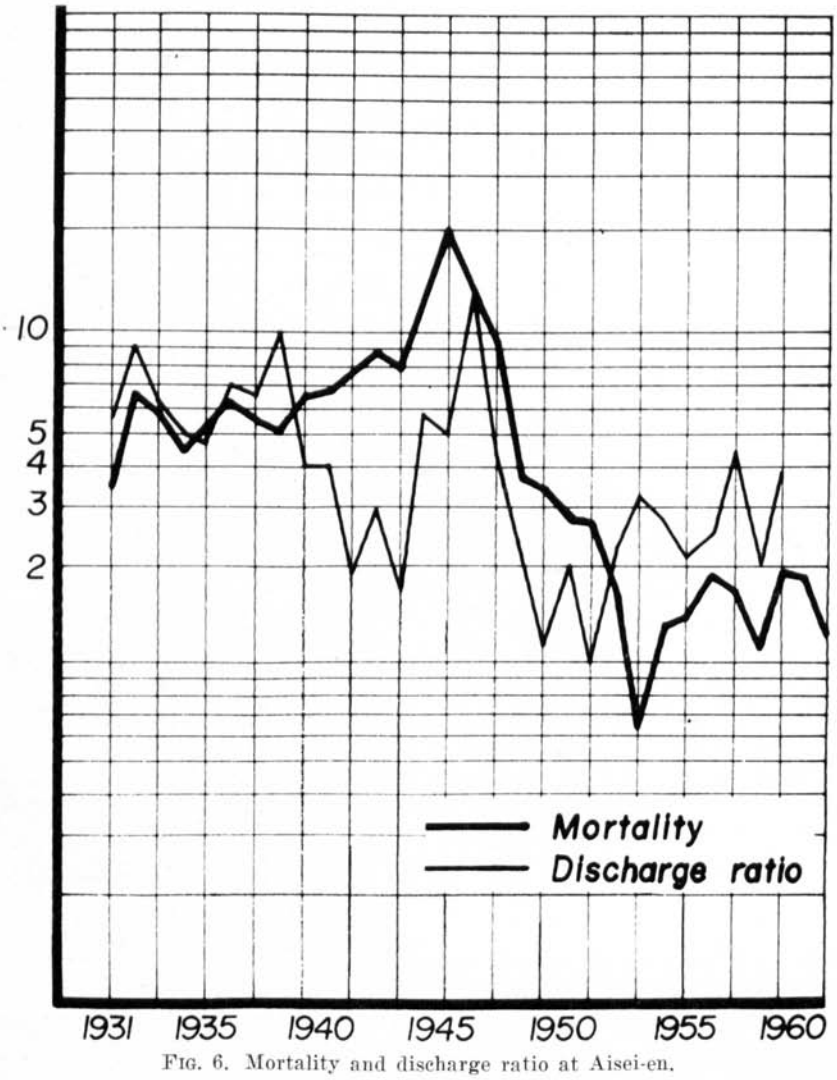

FIG. 6. Mortality and discharge ratio at Aisei-en.

ferent from both. Steep rise was evident during the age period from 10 to 20 years. A survey made by the World Health Organization in 1958 ([14]) estimated 100,000 to 150,000 cases in Korea.

5. *Number of onsets and mortality after 1947.*—New onsets and mortality from leprosy diminished yearly, as shown in Figure 5. Since 1954 the mortality rate has become very low.

On summarizing these statistical data it is concluded that in Japan leprosy is on the threshold of extinction. As almost all patients have been placed in leprosaria, the control of leprosy is, so to speak, a matter of steering patients into the leprosaria.

ACTIVITY OF LEPROSARIA

In Japan, from about 1900 to 1925 vagrants were held in public infirmaries, and from about 1940 to 1942 nearly all the patients who

were clustered around Hommyoji village and Yunosawa, and Kasatsu-spa, were institutionalized in leprosaria. After that, field medical examination for leprosy was carried far into remote villages, with resultant institutionalization of patients found. Decrease of domiciliary patients followed. Since the end of World War II, the incidence of the disease has dwindled more rapidly. It is taken for granted that leprosaria have played an important part in diminution of the disease, at least in Japan. Much study, however, is needed to determine if the decrease of leprosy in a nation can be achieved only by the segregation of patients. It would be much too hasty to say, for example, that positive transition of the Mitsuda reaction is due to segregation. Factors aug-

TABLE 12. *Mortality and discharge at Aisei-en.*

Year	Number of deaths	Mortality %	Number of discharges	Discharges %	Number of patients
1931	15	3.3	24	5.3	453
1932	35	6.6	45	9.0	500
1933	45	6.0	51	6.8	750
1934	46	4.6	52	5.2	1,008
1935	60	5.2	56	4.9	1,143
Average		5.1		6.2	
1936	79	6.5	80	6.6	1,212
1937	80	6.0	86	6.4	1.338
1938	71	5.1	137	9.8	1,391
1939	91	6.2	55	3.8	1,453
1940	119	7.7	60	3.9	1,533
Average		6.3		6.1	
1941	138	7.7	33	1.8	1,184
1942	167	8.9	56	3.0	1,883
1943	163	8.1	33	1.6	2,009
1944	227	12.2	106	5.7	1,851
1945	332	22.5	74	5.0	1,478
Average		11.4		3.4	
1946	183	12.5	157	12.1	1,299
1947	121	9.9	51	4.2	1,216
1948	50	3.6	30	2.2	1,380
1949	52	3.5	16	1.1	1,487
1950	43	2.9	30	2.0	1,496
Average		6.2		4.3	
1951	44	2.8	16	1.0	1,580
1952	24	1.5	36	2.2	1,606
1953	11	0.6	51	3.1	1,640
1954	21	1.3	44	2.7	1,646
1955	24	1.4	35	2.1	1,707
Average		1.5		2.2	
1956	32	1.8	41	2.4	1,727
1957	27	1.6	75	4.4	1,728
1958	19	1.1	34	2.0	1,738
1959	34	1.9	30	1.7	1,715
1960	29	1.7	27	1.6	1,675
Average		1.6		2.4	
1961	21	1.3	25	1.5	1,645

menting the immunologic resistance of a nation have not yet been clarified, but it might be presumed that the development of national economics and maintenance of leprosaria at full activity have helped as a background.

A decrease in patients admitted to the Aisei-en Leprosarium in relation to death and discharge, is shown in Table 12 and Figure 6. In Aisei-en, an actual survey of mortality during the period from 1931 to 1961 has revealed that the chaulmoogra era, or the period before the highest peak in 1945 as a boundary line, can be separated from the Promin era, or later period. The former had a higher mortality rate, viz., 7.6 per cent as compared with 2.6 per cent. The same tendency was seen in the discharges, viz., 5.2 per cent in the former and 2.6 in the latter. It is noteworthy that the discharge of 5.2 per cent of patients in the chaulmoogra era had no influence in diminishing the incidence of leprosy in Japan.

Estimation of relapses.—Since 1957, of 232 patients discharged, 45 were readmitted, or 19.4 per cent, a figure corresponding closely with the 15 per cent in Bergen, Norway, already reported (9). Of the 45 patients 22 relapsed, and the remaining 23 proved to be disabled. Thus the final rate of relapse was 9.5 per cent. It is important to investigate relapses, and to study and make a systematic follow-up of discharged patients.

SUMMARY

The author has reported on (1) arrested and discharged patients, (2) bacteriologic, pathologic and immunologic criteria of curability, (3) comparison with respect to antileprosy programs of the present course in Japan and that of the World Health Organization, and (4) the trend of leprosy in Japan.

1. The curability of leprosy was found to be higher than expected, quite in contrast to socially prevalent opinions and also the general medical view.

2. The curability of leprosy has been acknowledged as proven from the bacteriologic, pathologic and immunologic points of view.

3. In Japan, hereafter, leprosy control is to be directed to countermeasures among institutionalized patients, for antileprosy measures have been nearly completed for domiciliary patients in the communities.

4. Still further study is needed to bring about an increase in the resistance of a nation against leprosy and promote curabiltiy of leprosy.

RESUMEN

El autor ha communicado sobre (1) pacientes detenidos o descargados, (2) criterio de curabilidad bacteriológica, patológica e inmunológica, (3) comparación con respecto a los programas antileprosos de curso presente en el Japon, con aquellos de la Organización Mundial de la Salud y (4) el curso de la lepra en el Japón.

1. La curabilidad de la lepra se encontró que fué mayor de lo esperado, en evidente

contraste con las opiniones sociales prevalentes y también los puntos de vista médicos generales.

2. La curabilidad de la lepra ha sido reconocida como probada desde los puntos de vista bacteriológicos, patológicos e inmunológicos.

3. En Japón, en el futuro, el control de la lepra deberá ser dirigida a contra medidas en los pacientes internados, porque en las comunidades las medidas antileprosas para pacientes domiciliarios han sido aproximadamente completadas.

3. Todavîa son necesarios estudios futuros para aumentar la resistencia de una nación contra la lepra y promover la curabilidad de la lepra.

RESUMÉ

L'auteur a communiqué sur les malades (1) arretés ou deschargés (2) criterion de guérison bacteriologique, pathologique et immunologique (3) comparaison avec des programmation antilepreux des cours présents dans Japon avec ceux de l'Organization Mondiale de la Santé et (4) le cours de la lèpre dans le Japon.

1. La guérison de la lèpre on a trouvé qui a été plus nombreux que ce qu'on attendant, en evident contraste avec des opinions sociales prévalent et aussi des points des vues medico-générals.

2. La guérison de la lèpre a été reconnue comme prouvé du point de vue bacteriologique, pathologique et immunologique.

3. Au Japon, dans le future, le control de la lèpre devra être dirigée à contre mesures, dans les malades internés, parceque dans les communités les mesures antilepreuses pour les malades domiciliaires ont été aproximativement completées.

4. Encore il est nécessaires des études futures pour atrayer un augmentation de la résistance d'une nation contre la lèpre et encourager de guérison de la lèpre.

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