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Leprosy and the Community

EVALUATION OF THE CAMPAIGN AGAINST LEPROSY IN THE WEST LAKE REGION, TANZANIA

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Introduction

In accordance with an agreement between the Government of Tanzania and the Swedish Norwegian Save the Children Organizations (RB), RB in 1962 undertook a leprosy eradication programme in the West Lake Region of Tanzania.

Before 1962 the Government and voluntary agencies were treating about 450 leprosy patients in different localities in the region, but no comprehensive programme was established. The 450 patients were taken over by RB and the organization established a programme encompassing all 4 districts of the region.

In January 1973 the programme was taken over by the Government, and RB sponsored one expatriate doctor who has worked in the capacity of Regional Leprosy Officer (RLO).

The RLO has undertaken an evaluation of the project, the results of which are presented in this report

Leprosy Work in Tanzania

Undertaken by the Government and a number of voluntary agencies, leprosy control work is co-ordinated through the National Leprosy Advisory and Co-ordinating Committee (NLACC). The country is divided into 19 regions, in each of these there is a Regional Leprosy Officer working under the Regional Medical Officer (RMO) if the RMO is not the RLO himself. National reports are available from NLACC since 1972.

THE WEST LAKE REGION

This is situated in the north-western corner of the country bordering Rwanda, Burundi to the west, Uganda to the north and Lake Victoria to the east.

Northern border along 1° southern latitude, southern border 3° southern latitude. Elevation 1100 to 2000 m above sea level. It covers an area of 28,750 km^2. Population 1974: 764,000 to 807,000 (estimated). Density varying between 9 and 55/km^2. People mainly Bantu. Rainfall in the different districts varies between 870 and 2280 mm per year. Mean temperature 20°-26°C. There is only one township in the region, Bukoba, with a population of 14,000. Industries: sugar, coffee, tea. Main products: bananas, maize, coffee and in

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Biharamulo, cotton. Main income per capita per year (gross domestic product): T. Shs. 300 = US $60.

ADMINISTRATIVE STRUCTURES

The smallest unit is the 10-house cell, each having its 10-house chairman (XHC). This system, which includes each and every person in the area, greatly facilitates tracing of patients. Without this well-functioning structure the work of evaluation would have been much more difficult. The region is divided into 4 districts, two of which are divided into 2 sub-districts.

HEALTH SITUATION AND HEALTH SERVICES

The main problems include different forms of malnutrition in children, endemic malaria and foci of sleeping sickness. There are 9 hospitals (Govt and VA), 5 health centres (Govt), and about 100 dispensaries (mostly Govt). With no general practitioners, different forms of indigenous treatment are widely used.

THE CAMPAIGN AGAINST LEPROSY

The methods used have been *intensive case finding* and domicilary treatment. Two small hospitals (Kagemu, 52 beds and Katoke, 32 beds) have been maintained for the treatment of acute, contagious and complicated cases. Because of this policy the problem of rehabilitation has been small compared with many other projects. Most patients maintain themselves or are taken care of by their families. Only about 10 patients have to be taken care of by the authorities (old, blind or otherwise handicapped and without relatives).

Patients are treated in the local dispensaries or other suitable treatment centres where they are seen by a Medical Officer or other supervisor. During the years of the campaign all patients were seen by a Medical Officer each month. During later years the scheme has gradually been changed into a scheme for continued control, where patients are treated by the dispensaries and these are visited by a supervisor (Medical Officer, Medical Assistant or Rural Medical Aid) at bi- to 4-monthly intervals. Standard treatment has been dapsone 200 mg twice weekly for adults.

Case sheets have been kept for all patients treated and comprehensive yearly reports on the activities have been published. This material has been used for the evaluation, supplemented by surveys for the assessment of present status, together

TABLE 1

District	1948	1957	1962	1967	1974	Population density 1974 /km^2
Bukoba	254	308	343	383	444	55
Biharamulo	50	41	61	82	97 (140)	9 (14)
Karagwe	48	63	80	97	125	18
Ngara	105	102	98	94	98	35
The region	457	514	585	656	764	26

The figures for 1948, 1957 and 1967 are taken from the official census figures from those years. The figures for 1962 are interpolations. The figures for 1974 are the estimates made by the Central Statistical Bureau.

with estimation of the number of patients remaining undiagnosed in the region.

Statistics in the report which follows need to be read against the background of population development in the different districts. This is given in Table 1.

The figures are uncertain in the case of Biharamulo, where there has been considerable immigration in recent years. The figure in brackets (140) is a cautious estimate by the Regional Planning Team.

PLAN OF THE INVESTIGATION

In order to assess to what extent control of the spread of leprosy has been attained in the West Lake Region evidence is presented in answer to the following questions:

1. How many potentially contagious cases have been diagnosed in the region during the period in question, and what has been their fate?
2. How many potentially contagious cases are under control, and how efficient is this control?
3. How many contagious or potentially contagious cases are left undiagnosed in the region?
4. How many patients are under treatment out of the total estimated number of patients requiring treatment (diagnosed and undiagnosed), and how many are under regular treatment?
5. Incidence and prevalence rates during the years of the campaign.
6. Relapses of leprosy.
7. Proportion of cases released from control.

1. *How many potentially contagious cases have been diagnosed in the region during the period in question, and what has been their fate?*

In order to illustrate this *all case sheets in the archives* from 1962 to 1974 have been counted. Table 2 gives the results.

TABLE 2

	I	T	BT	BL	L	uncl.	Total
Died	16	380	9	10	118	21	554
Discharged cured	86	2265	35	2	30	24	2442
Disappeared	118	2211	100	39	152	14	2766
On treatment end 1974	1	430	186	132	285	–	1034
Total	221	5286	330	183	585	191	6796

Disappeared stands for: lost sight of, out of control, struck from the register for other reasons than cure or death.

In a number of case sheets classification has been given as *Borderline or Dimorphous* only. These have been listed as BT when skin smears were negative and BL when skin smears were positive.

Uncl. are those case sheets where no classification is given (old case sheets from the beginning of the campaign, mostly taken over from other agencies).

Patients known to have died after discharge or "disappearance" have been entered as died.

The potentially contagious cases are those within the frame. What is known about their fate? How many of them do still represent a danger of spread of the disease in the region?

In order to ascertain this all case sheets have been scrutinized, and where information in the case sheets has been insufficient the patients have been traced by leprosy scouts. The results are given in Table 3 below.

TABLE 3

Fate of BT, BL and L patients 1962-1974

	BT	BL	L	Total
Disappeared before 1962	1	2	36	39
Died	9	10	118	137
Discharged after 4-13 years treatment	33	—	6	39
Old, inactive cases, struck	1	—	6	7
Left district	57	30	93	180
Sought, not found	4	1	13	18
Refused treatment	19	4	9	32
Insufficient address in case sheet	3	2	3	8
Misdiagnosed or doubtful diagnosis	7	1	15	23
Returned to treatment 1975	1	1	1	3
Defaulted end 1974 not yet found	9	—	—	9
On register end 1974	186	132	285	603
Total	330	183	585	1098

Comments. Disappeared before 1962: the case sheets were taken over from other agencies in 1962 but the patients did not reappear. No attempt has been made to trace them.

Discharged: only 6 discharged lepromatous patients remain in the region, they are controlled occasionally.

Left district: most of these are known to have left the region, others have left for an unknown destination.

Sought, not found: these were unknown in the villages where they used to get their treatment. They have probably left the district.

Refused treatment: these either have refused to take medicine or they have failed to come for control after having been called, many of them several times.

Doubtful diagnosis: no signs of leprosy and no evidence in the case sheet to support the diagnosis.

There is a discrepancy between the figures for discharged patients in Tables 2 and 3. The reason is that some case sheets are marked "discharged" but should have been marked "left district", "mis-diagnosed", "refused treatment" or "insufficient information". They have been entered as such in Table 3.

In Table 4 are summarized *all BL and L cases* diagnosed since 1962 and known still to be *present in the region* plus estimated undiagnosed cases calculated as 20% of the estimated total number of undiagnosed cases–see Table 10 and page 228.

Conclusion: Only few of the cases classified as BT, BL and L might still represent a danger of spread of the disease in the region.

Most of the BL and L cases discharged, those struck off as old, inactive and those who have refused treatment are controlled occasionally. None of these have positive skin smears.

TABLE 4

	Under treatment	Discharged	Old, inactive struck	Refused treatment	Estimated undiagnosed
Bukoba	214	4	5	7	30-60
Biharamulo	150	2	1	2	85-123
Karagwe	31	—	—	2	7
Ngara	22	—	—	2	—
Total	417	6	6	13	122-190

2. *How many potentially contagious cases are under control and how efficient is this control?*

Numbers of patients concerned are recorded in the last line of Table 3 as follows

BT	BL	L	Total
186	132	285	603

Regularity of attendance is the commonly used measure for the efficiency of the control.

As regular are counted those patients who have received their medicine (dapsone) for at least 75% of the number of weeks during which they have been under treatment.

Table 5 gives the figures for 1974 for the different districts and sub-districts; per cent regular out of the total number of cases in each group.

TABLE 5

	BT cases	BL cases	L cases	All cases
Bukoba north	48% of 29	71% of 24	65% of 48	61% of 165
Bukoba south	71% of 41	65% of 37	75% of 105	69% of 267
Biharamulo	71% of 86	86% of 52	80% of 98	75% of 429
Karagwe	36% of 11	82% of 11	75% of 20	66% of 102
Ngara Bushubi	79% of 14	86% of 7	75% of 12	72% of 56
Ngara Bugufi	0% of 5	100% of 1	0% of 2	13% of 15
The region	67% of 186	77% of 132	75% of 285	69% of 1034

BT + BL + L: 440 = 73% regular out of 603.

The figures are fairly satisfactory.

It has not been possible to check to what extent the patients actually take their medicine as prescribed. This would require elaborate laboratory examinations (sulphonuria test) for which we do not have the facilities.

The ratio of BL and L cases having negative skin smears to the total number of BL and L cases is another measure of the efficiency of control.

Table 6 shows the distribution of cases by the end of 1974.

TABLE 6

	No recent smear	Smears negative	Smears positive	Total
All BL and L cases	20	270 = 68%	127 = 32%	417

Under regular treatment with dapsone it takes months or years before the positive skin smears become negative, some never do become negative.

Table 7 shows the ratio of positive skin smears to negative skin smears related to length of treatment in years.

TABLE 7

Length of treatment in years	0-2	3-4	5-6	7-8	9-10	11-12	12+	Total
Smear negative	15	28	18	26	39	48	96	270
Smear positive	33	13	14	19	13	13	22	127
Total cases	48	41	32	45	52	61	118	397
Cases with negative smears	31%	69%	56%	58%	75%	79%	81%	
Cases with positive smears	69%	31%	44%	42%	25%	21%	19%	

The figures are as good as can be expected under dapsone treatment. It is possible that they could be improved by the use of alternative drugs (Lamprene) if the persistence of positivity of skin smears is due to resistance to dapsone.

Do the patients come for treatment in the early stages of the disease? When leprosy patients start treatment sufficiently early in the course of their disease, the risk of spread of the infection is lessened and the risk of mutilating disabilities is greatly reduced.

In recent years it has not been possible to undertake active case finding campaigns in the West Lake Region, most patients report themselves or are referred from dispensaries or hospitals.

Table 8 shows the *duration of disease in years before reporting for treatment* for all new patients diagnosed in 1974.

TABLE 8

Years	0-½	½-1	1-2	2-3	3-5	5+	?	Total
No. patients	36	38	23	16	4	13	–	130

Table 9 shows the *disabilities in all new patients* diagnosed in 1974:

TABLE 9

Disability grade (WHO)	I	T	BT	BL	L	Total
0	–	53	17	12	3	85
1	–	24	9	3	3	39
2	–	2	3	–	–	5
3	–	–	1	–	–	1
No. patients	–	79	30	15	6	130

The figures are fairly satisfactory and show that the majority of patients come early for treatment.

The figures could be improved by continued health education of the public and further training of medical personnel.

Conclusion. The control of potentially contagious patients under treatment is satisfactory. A number of new patients still come too late to receive the full benefits of treatment.

3. *How many cases of leprosy are left undiagnosed in the region?*

This has been studied by examination of random samples of the population. As a check on these figures examination of school children has been undertaken.

Random sample surveys have been done in Bukoba, Biharamulo and Ngara districts. For Karagwe district Due Madsens figures from 1970 have been used.

Overall results are given in Table 10.

TABLE 10

	Population 1974	New cases found	Size of sample	Estimated no. undiagnosed	Estimated undiagnosed per 10,000
Southern Bukoba, 4 wards	57,500	5	2724	104	18.0
Northern Bukoba, 36 wards	386,000	1	7886	(48)	(1.2)
Bukoba district, total	443,500	6	10,610	293	6.5
Biharamulo	97,300	18	4086	428	44.0
Same, other estimate	140,000	18	4086	616	44.0
Karagwe, 1970	101,000	22	41,042	33	3.3
Same, 1974	124,800			33	2.6
Ngara	98,200	—	3037	—	
				613-914	

Figures for Northern Bukoba are too small for calculation and are therefore put in brackets.
Figures for Karagwe 1974: if there is the same number undiagnosed cases as there was 1970.

Size of samples:

Bukoba	10,610 = 2.4% of the population
Biharamulo	4086 = 4.2% (2.9%)
Ngara	3037 = 3.1%
Karagwe, 1970	41,042 = 41.0%

School surveys. Overall results of sample school surveys are given in Table 11.

TABLE 11

	No. of schools in area	No. of schools surveyed	No. of pupils examined	No. of new cases discovered
Southern Bukoba	13	13	2501	0
Northern Bukoba	175	29	5228	0
Biharamulo	37	35	6831	7
Karagwe	56	14	2565	0
Ngara	57	42	7788	0

The figures confirm the impression obtained from the sample surveys that control has not been attained in Biharamulo.

4. *How many patients are under treatment out of the total estimated number of patients requiring treatment (diagnosed and undiagnosed), and how many of these are under regular treatment?*

The estimated number of undiagnosed cases (all types) is given in Table 10.

Estimation of number of undiagnosed L cases: total number of new cases 1965-1974: 3124 (Table 14). Of these L cases 210 = 6.7% of 3124. It would therefore appear reasonable to estimate the number of undiagnosed L cases at 7% of the total number of undiagnosed cases.

Estimation of number of undiagnosed BL + L cases: The BL + L rate for 1973-1974 is estimated from Table 14 at 20% of all new cases. It would therefore appear reasonable to estimate the number of undiagnosed BL + L cases at 20% of the total number of undiagnosed cases.

Figures are given in Tables 12 and 13 for:

1. Estimated total number of cases (all cases),
2. Estimated number of L cases,
3. Estimated number of BL + L cases.

(For Biharamulo estimates are based on a population figure of 97,300.)

Conclusion. The goal of regular treatment of 75% of all existing cases requiring treatment has not yet been reached. It has almost been achieved for the BL and L cases on the register (see Table 5).

Active case finding is required in all 4 districts.

Patients under treatment out of estimated total number:

TABLE 12

All cases	No. under treatment	Estimated no. undiagnosed	Estimated total no.	% under treatment
Bukoba	432	293	725	60
Biharamulo	429	427	856	50
Karagwe	102	33	135	76
Ngara	71	–	71	100
The region	1034	753	1787	58
L cases				
Bukoba	153	20	173	88
Biharamulo	98	30	128	77
Karagwe	20	2	22	91
Ngara	14	–	14	100
The region	285	52	337	85
BL + L cases				
Bukoba	214	58	272	79
Biharamulo	150	85	235	64
Karagwe	31	7	38	82
Ngara	22	–	22	100
The region	417	150	567	74

Patients under *regular* treatment out of estimated total number:

TABLE 13

All cases	No. under regular treatment	Estimated total no.	% under regular treatment
Bukoba	285	725	39
Biharamulo	323	856	38
Karagwe	67	135	50
Ngara	42	71	60
The region	717	1787	40
L cases			
Bukoba	110	173	64
Biharamulo	79	128	62
Karagwe	15	22	68
Ngara	9	14	64
The region	213	337	63
BL + L cases			
Bukoba	151	272	55
Biharamulo	124	235	53
Karagwe	24	38	63
Ngara	16	22	73
The region	315	567	56

5. *Incidence and prevalence rates during the years of the campaign.*

Annual incidence rates. There is no practical way of determining this.

The annual rate of newly registered cases gives an approximation. One difficulty is that the international nomenclature has changed during the period under review with different definitions of Indeterminate, Borderline, Dimorphous

TABLE 14

Year	I	T	B	L	Total	% L
1962	311	1734	–	245	2290	10.7
1963	58	530	–	42	630	6.7
1964	2	701	–	17	720	2.3
		T	I + B	L		
1965		501	7	34	542	6.2
1966		262	33	27	322	8.4
1967		374	57	30	461	6.5
	I	T	B	L		
1968	8	312	7	24	351	6.8
1969	4	292	28	13	337	3.8
1970	7	248	55	21	331	6.3
1971	3	167	51	21	242	8.7
1972	9	101	69	11	190	5.8
	I	T	BT BL	L		
1973		102	51 23	14	190	7.4
1974	–	81	44 18	15	158	9.5
Total	402	5405	443	514	6764	7.6

and Intermediate cases. Some cases earlier diagnosed as Tuberculoid now would be called Borderline Tuberculoid.

Lepromatous has been the most uniformly defined type during the period.

Table 14 shows the annual numbers of newly registered cases–quoted from annual reports–and the lepromatous rate in %.

In order to get comparable figures the numbers for 1973 and 1974 include patients transferred from other regions or countries as such patients have been included in the figures for earlier years.

The BL + L rate for 1973 + 1974 is 70 = 20% out of 348. The rate for former years cannot be calculated.

Annual rates of newly diagnosed cases in selected groups. Figures for school children (from annual reports):

TABLE 15

Year	No. examined	No. new cases	New cases per 1000
1962	3732	5	1.3
1963		No surveys	
1964	8604	72	8.3
1965	5557	13	2.3
1966	3330	10	3.0
1967	32,525	12	0.4
1968	10,700	12	1.1
1969	21,692	10	0.5
1970	19,434	12	0.6
1971	5941	19	3.2
1972		No surveys	
1973	6831	7	1.0
1974	8474	0	0.0
1975	9608	0	0.0

1975: figures for surveys done January to April 1975.

Up to 1970 no distinction was made between the districts. All of the 26 new cases diagnosed between 1971 and 1975 were found in Biharamulo district.

Prevalence rates. Unfortunately no survey was undertaken immediately before the project was started in 1962. For political reasons it was found not feasible at that time.

Prevalence in 1951. In that year Ross Innes did a survey of 5 localities in Northern Bukoba (Kyaka, Kabale, Maruku, Kalema, Kamachumu) partly in the same places as our sample surveys, and one locality in Southern Bukoba (Rubungu in Muleba Ward).

His findings were:

Northern Bukoba	4617 persons examined,
	40 cases found = 8.7 per 1000
Southern Bukoba	1181 persons examined,
	23 cases found = 19.4 per 1000
Average for the district	5798 persons examined
	63 cases found = 10.8 per 1000

Prevalence in 1967. In 1967 a general census was made giving population figures for each district.

The total number of patients diagnosed during the 5 years period before 1967 and the 5 years period after 1967 are known from the yearly reports:

TABLE 16

	Population 1967	New patients diagnosed 1962-72	New patients per 1000 population
Bukoba	382,708	3510	9
Biharamulo	81,854	1768	22
Karagwe	97,221	414	4
Ngara	94,312	724	8
The region	658,095	6416	10

The figures for new patients diagnosed include approximately 450 patients taken over from other agencies in 1962. It is not known how many from each district.

The figures in the last column give a good approximation to the prevalence rates for leprosy in 1967.

Prevalence rates 1974. The number of patients on treatment is known from the yearly report for 1974. The number of undiagnosed cases is estimated in Table 10.

TABLE 17

	Population	On treatment	Undiagnosed	Total patients	Prevalence per 1000
Southern Bukoba 4 wards	57,500	92	104	196	3.4
Northern Bakoba 36 wards	386,000	340	(48)	(388)	(1.0)
Bukoba district	443,500	432	293	725	1.6
Biharamulo	97,300	429	428	857	8.8
Same, other estimate	140,000	429	616	1045	7.5
Karagwe 1970	101,000	196	33	229	2.3
Same, 1974	124,800	102	33	135	1.1
Ngara	98,200	71	–	71	0.7

Northern Bukoba. The figures are too small for calculation—only one patient was found among 7886 persons examined.

If the figures for the whole of Bukoba district (including the four wards in Southern Bukoba) are used, the figure for prevalence becomes 1.6.

The prevalence for Northern Bukoba therefore is calculated as 1.0-1.6.

Biharamulo. There are different estimates for the size of the population.

Karagwe. There are no figures for estimated numbers of undiagnosed cases 1974. If the same figure as that for 1970 is used, the prevalence in 1974 becomes 1.1.

Ngara. In order properly to estimate the number of undiagnosed cases a much larger number of people would have to be examined.

TABLE 18

Summary of prevalence rates (per 1000)

	1951	1967	1970	1974
Southern Bukoba, 4 wards	19.4	} 9		3.4
Northern Bukoba, 36 wards	8.7			1.0-1.6
Biharamulo		22		7.5-8.8
Karagwe		4	2.3	1.1
Ngara		8		0.7

It is noted that the figures for different years are calculated in different ways.

6. *Relapses of leprosy*

Table 19 shows the number of relapses in 1973 and 1974 analysed by classification. For comparison is given the total number of patients under treatment at the end of each year and the number of BL + L cases out of these.

TABLE 19

	I	T	BT	BL	L	Relapses total	All cases	BL + L cases
1973								
Bukoba	–	–	1	5	5	11	483	220
Biharamulo	–	–	–	2	5	7	433	130
Karagwe	–	–	1	1	–	2	106	30
Ngara	–	–	–	–	1	1	109	28
The region	–	–	2	8	11	21	1131	408
1974								
Bukoba	–	2	3	4	11	20	432	214
Biharamulo	–	–	5	4	11	20	429	150
Karagwe	–	–	–	1	1	2	102	31
Ngara	–	–	–	1	–	1	71	22
The region	–	2	8	10	23	43	1034	417

Patients counted as relapses are those who, after a period of apparent cure, again get signs of active disease–new patches or nodules, negative skin smears again becoming positive.

For BL and L cases the number of relapses correspond to 4.6 and 7.9% respectively of the number of cases of these types under treatment.

7. *Proportion of cases released from control*

Related to (a) patients under treatment, and (b) patients under treatment and out of control cases.

Table 20 gives the figures for 1974 for the two categories.

TABLE 20

		I	T	BT	BL	L	Total
(a)	No. of patients	1	433	186	132	285	1034
	Patients released	1	129	10	0	0	140
	% Released	100	30	5	0	0	13
(b)	No. of patients	1	488	207	137	289	1122
	Patients released	1	129	10	0	0	140
	% Released	100	26	5	0	0	12

SUMMARY OF RESULTS

Of all contagious and potentially contagious (BL and L) cases diagnosed since 1962 very few of those remaining in the region are out of control.

The control of those BL and L cases who are on the register is satisfactory.

There are few undiagnosed BL and L cases left in Ngara, Karagwe and Bukoba districts with the exception of the southern-most part of Bukoba. In Biharamulo the number of undiagnosed BL and L cases is high.

Southern Bukoba (Ngote, Muleba, Mubunda, Rushwa wards). Population about 60,000 = 14% of the population in Bukoba district. BL and L cases under treatment: 40. Estimated number of BL and L cases left undiagnosed: 20.

Biharamulo district. Population 97,300-140,000. BL and L cases under treatment: 150. Estimated number of BL and L cases left undiagnosed: 100 (86-123).

The disease is under control in the region with the exception of the two areas mentioned.

Both areas are characterized by a higher prevalence than the rest of the region. The high prevalence is (at least partly) due to immigration from more heavily infected areas to the south of them. The campaign has not hitherto been correspondingly intensified in these regions.

MEASURES WHICH SHOULD BE TAKEN

1. *Control measures* should be maintained in all 4 districts at least at the present level; if possible, improved. All patients failing to report for treatment should be traced immediately by dispensary personnel or—if they fail—by Health Home Visitors.
2. *Sample surveys* for further clarification of the situation in Bukoba district in:
   (a) Lubale, Kabilizi ward which is situated between Southern Bukoba and Northern Bukoba as defined in this report.
   (b) Kishanje ward, Bugabo and Kyaka ward, Missenye—in both Ross Innes did surveys in 1951.
3. *Case finding campaigns* in all districts starting in Southern Bukoba and Biharamulo. This should be done by:
   (a) contact survey of all known cases of leprosy.

(b) tracing through co-operation with Ward Executive Officers and Ten-house Chairmen.

4. *Cases with persistently positive skin smears* should be treated with alternative drugs or a combination of drugs.
5. *Records* should be kept in order to continue yearly operational assessment.
6. Each year definite *Targets* should be set for the activities.