

Leprosy control in a Bombay slum— a general assessment

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Summary During the course of a medical student elective period, the author collected data from one of the largest leprosy control projects in the slums of Bombay, where the disease is hyperendemic. Particular attention was given to case-detection rates over a period of 5 years, drop-out rates, disability–deformity, stigma and socio-economic conditions. In this retrospective study, carried out during a limited period of time in one project, it seems that compliance, regularity of attendance and utilization by the patients of the excellent services offered all run at a level which is often disappointingly low. The current priority is for improved case-holding and some of the factors needed to bring this about are discussed.

Introduction

Originally leprosy in India was considered largely a rural problem but increasing urbanization caused the emergence of the disease as a major public health problem of the cities. The significance of endemic and hyperendemic city slums as reservoirs of infection, with overcrowding and unhygienic living conditions ideal for the spread of leprosy, has been recognized and quantified by various authorities.^{1,2}

In Bombay a number of voluntary field-based units carry out leprosy control work; free treatment clinics are held in hospitals and municipal dispensaries, many of which are situated within the slum areas. Considerable resources are also devoted to large-scale surveys and health education work.

The intention of this study was to examine the impact of these activities in a hyperendemic slum. The results are interpreted in the light of the particular obstacles to effective leprosy control in a slum environment.

Bharat Nagar, the area chosen for the study, is a large slum in North Bombay. It is relatively isolated; its boundaries are limited by surrounding water.

A census in 1978 estimated its population as 15,000. By 1981 it had risen to over 18,000 and it is probably still growing with a population of around 20–24,000.

Overcrowding is severe and facilities are poor. Most inhabitants have no access to latrines and drinking water must be bought from the owners of the few taps.

Most of the original inhabitants are Harijans who work as sweepers and scavengers for the

* This study was conducted under the auspices of Dr R Ganapati, Director, Bombay Leprosy Project (BLP) and on a student sponsorship with LEPR, the British Leprosy Relief Association.

Municipal Corporation, Railways and Housing Societies. The large Muslim population works at a variety of unskilled jobs and provides workers for the Deonar slaughter house. Locally, the slum has a 'bad image' as a place of 'smuggling, gambling, illegal liquor trade, prostitution and crime'.³

Leprosy control work started in 1978 with the opening of 2 weekly clinics in the slum. Between this time and the beginning of 1981 extensive health education involving film shows, slide shows, group talks and an exhibition was carried out. Then, during 1981, an intensive survey of the area was completed. By the end of this year 347 cases had been detected; 184 being voluntarily reported and a further 163 detected by the survey which covered 80% of the enumerated population.⁴ For the past five years multidrug therapy has been used where practicable; case detection and treatment continue with a fortnightly clinic.

As a result of this work, the prevalence rate for the area had been calculated as 24 per thousand, twice as high as the average slum prevalence rate for Bombay.¹

Those cases detected up to the end of the survey year were followed up by examination of patient records and, where possible, examination and interview of patients was carried out to confirm classification and to obtain additional information. Cases were classified by mode of detection, type of disease, treatment status and outcome of treatment.

A year-wise analysis of cases detected since the time of the survey was also done and the source of these cases considered.

The 'tile test' was used to establish the level of compliance amongst patients taking dapsons.

As this was a retrospective study, its scope was limited by record availability and accuracy. Where records were occasionally incomplete, inconsistent or unavailable, those cases for which definite information could not be obtained were excluded from the figures given.

Results

During the 5 years since the end of the mass survey 106 further cases were detected. Figure 1 shows the total cases detected in the area since the start of leprosy control work.

Over the 5 years since the survey, during which only 1 school survey (yielding 5 cases) was conducted there was an average annual case detection rate of 1.06 per 1000, with a gradual decline in detection over the last 3 years (see Figure 2 and Tables 1 and 2). The majority (65.1%) were detected by voluntary reporting, the others by school and contact surveys.

The proportion of new cases which were found to be new immigrants to the slum, arriving since the survey, time is shown in Figure 3 (and Table 3). In total 23.6% of patients were recent arrivals in the slum.

The origins of 8 of the 10 smear positive cases were determined. Four were individuals who also had moved into the slum since the survey. Two were from amongst the 20% of the population who had not been examined during the survey period. One other case had been missed by the survey and 1 case had been declared healthy during the survey period, 2 years prior to detection. This suggests that this is a genuine example of early detection of an infectious case.

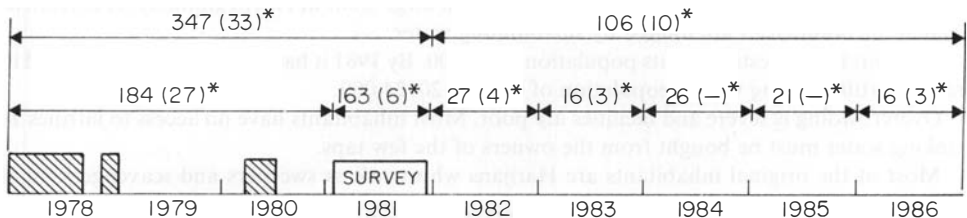


Figure 1. ■, intensive health education programme; *, smear positive cases.

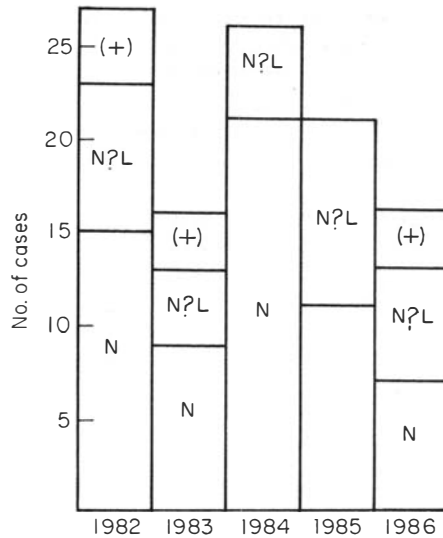


Figure 2. Case detection 1982–86. Cases are classified as smear positive (+), smear negative intermediate, i.e. indeterminate and borderline (N?L) and non-lepromatous, i.e. tuberculoid and pure neuritic (N). Despite a gradual decline in the case detection rate over the last 3 years, all types of cases are still occurring.

Table 1. Case detection year-wise 1982–86

	Adults		Children		N	N?L	(+)	Case no./ deformity (1, 2, 3)	Total
	M	F	0-4	5-14					
1982	13	8	—	6	15	8	4	4	27
1983	6	5	—	5	9	4	3	2	16
1984	9	5	1	11	21	5	0	0	26
1985	4	10	—	7	11	10	0	1	21
1986	5	4	—	7	7	6	3	2	16
Total	37	32	1	36	63	33	10	9	106

Table 2.

	Voluntary cases	Contact cases	School survey	Total case detection	Case detection/ 1000 p.p. per annum (population estimated = 20,000)
1982	16	11	—	27	1.35
1983	9	7	—	16	0.80
1984	16	6	4	26	1.30
1985	14	7	—	21	1.05
1986	14	1	1	16	0.80
Total (+) cases	8	2	—	10	0.10
					(Average rate over 5 years)
Total cases	69	32	5	106	1.06

Table 3. Proportion of cases new in slum since mass survey completed

	%
1982	33.3
1983	22.2
1984	5.0
1985	36.4
1986	30.8
Average	23.6 (over 5 years)

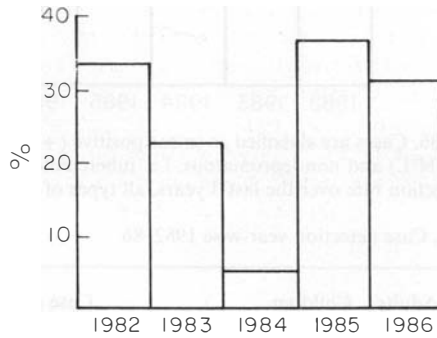


Figure 3. Proportion of cases arriving in slums since mass survey. Over 5 years since the mass survey, 23.6% of patients are recent arrivals to the slum who were not living there at the time of the survey.

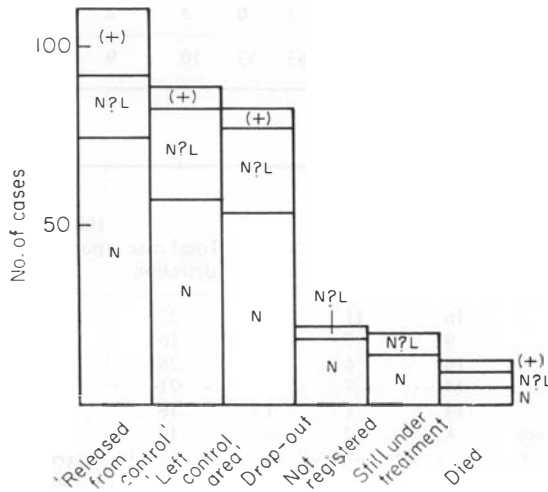


Figure 4. Outcome for cases detected 1978-81. Of all cases detected, 32.8% completed treatment and were released from control as inactive cases.

The outcome of cases detected up to the end of the survey are represented by Figure 4 and Table 9.

Almost one third of cases (32.8%) had been treated and released from control, a quarter (26.6%) had left the area without completing treatment and a further quarter (24.5%) 'dropped out' from treatment.

Figure 5 (and Table 4) shows the changes in deformity grading over the period (minimum 5 years) since detection. Of 34 cases with anesthesia, 5 patients recovered sensation, while 4 cases developed visible deformities. Two cases with grade 2 deformities progressed to grade 3.

Ten patients who had initially been registered with a deformity grading were interviewed. The changes in deformity status were compared with treatment (Table 5).

Seven patients had foot anesthesia; only 1 had received suitable footwear; 5 had been referred for concessionary footwear but had not attended. The hands of 8 patients were affected; 1 had been recommended for operation and 5 could repeat appropriate advice and exercises which had been taught. The total number of cases which had received physiotherapy is indicated in Table 6.

Detailed smear records were available for 21 cases; of these 15 (71.4%) had completed 24 doses. Their bacteriological assessment gave an overall conversion rate of 80% (Table 7).

Analysis of paucibacillary cases is given in Table 8. 52.6% of dapsone treated cases and 61.4% of cases receiving MDT were declared inactive.

There were 47.8% of positive 'tile tests' amongst patients collecting only dapsone, a considerably higher compliance rate of 71.4% was found amongst patients receiving multidrug therapy. These compliance rates are comparable to those found overall in the slum clinics (52.1% for patients on monotherapy, 77.4% for patients on MDT).

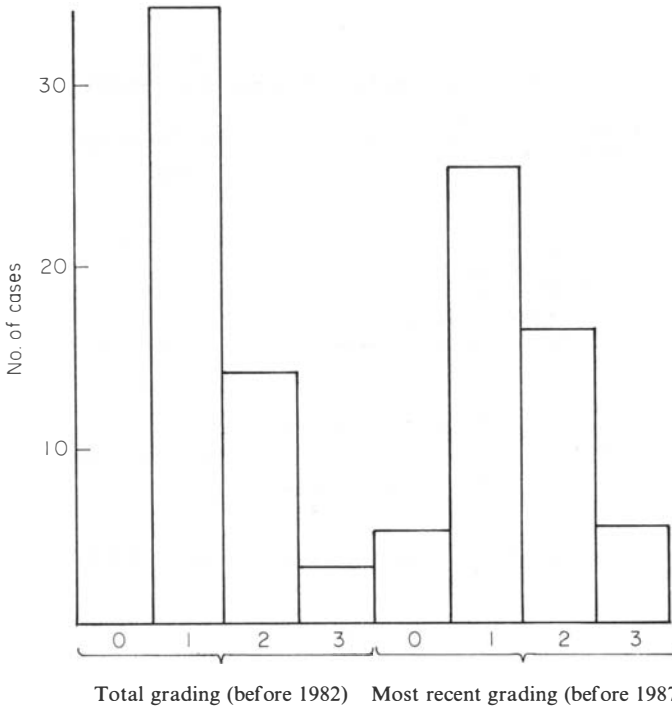


Figure 5. Comparison of current deformity grading with deformity grading at time of detection (up to the end of 1981). 0, indicates no deformity or disability; 1, anesthesia, altered sensation; 2, ulcers, clawing, footdrop, slight absorption; and 3, wrist drop, severe absorption, contracture, blindness. Cases are graded according to most severe deformity.

Table 4. Changes in deformity grading

Grade	Initial grading (no. cases)	Most recent grading (no. cases)
0	—	5
1	34	25
2	14	16
3	3	5
Total	51	51

Table 5. Comparison of deformity changes with treatment given

Deformity grading	Treatment given	
	MDT	DDS only
Showed improvement	5	1
Stayed same	1	1
Got worse	0	2

Table 6. Physiotherapy and health education given compared to deformity grading

	Grading			Total
	1	2	3	
Health education/physiotherapy given	8	9	3	20
No physiotherapy	16	3	—	19
Hospitalization for treatment	—	2	1	3

Table 7. Changes in Bacterial Index of multibacillary cases

BI before MDT	No. of patients	Still (+) after 24 doses					(-) after 24 doses	
		0-1-0-9	1-1-0	2-2-9	3-3-9	4-4-9	No.	%
≥ 5	—	—	—	—	—	—	—	—
4-4-9	2	1	—	—	—	—	1	50
3-3-9	4	—	1	1	—	—	2	50
2-2-9	5	—	—	—	—	—	5	100
1-1-9	3	—	—	—	—	—	3	100
0-0-9	1	—	—	—	—	—	1	100
Total	15	1	1	1	—	—	12	80

Table 8. Clinical assessment of paucibacillary (smear negative) cases

Treatment	Clinical Status					Total
	I	MI	AR	S	A	
Less than 1 month Rx	8	—	—	—	83	91
DDS only	81	1	9	1	62	154
6 months MDT	50	6	7	—	12	75
9 months MDT	3	1	—	—	—	4
12 months MDT	1	—	2	1	2	6
12-24 months MDT	5	2	2	—	—	9
> 24 months MDT	3	—	—	2	2	7
Total	151	10	20	4	161	346

Table 9. Outcome of cases detected up to end of mass survey period

	N cases		N?L cases		(+) cases		Total	
	Voluntary	Survey	Voluntary	Survey	Voluntary	Survey	No.	%
Not registered	—	19	—	3	—	—	22	6.5
Left area	22	35	16	9	5	2	89	26.6
Still under treatment or observation	9	5	4	2	—	—	20	6.0
Released from control	32	43	11	6	15	3	110	32.8
Dropped out	28	26	13	10	5	—	82	24.5
Died	4	1	2	2	2	1	12	3.6
Total	95	129	46	32	27	6	335	100

Discussion

The benefits of multidrug therapy implementation are highlighted by the number of cases treated and released from control (33%). Generally, the cases still under treatment are those who have been too irregular in attendance to be considered for MDT.

The drop-out rate (24%) is comparable to that obtained in MDT trials in similar areas with no significant difference between voluntary and survey detected cases. However, it rises to 51% if those patients leaving the area are included in this total. Thus half the patients who stop attending the clinic apparently do so because they leave the area. The reasons for moving are not necessarily related to the individual's disease. Reasons given for leaving are similar to those reasons that patients move into the slum, principally the search for employment and changes in family circumstances such as marriage. Only in 1 case could it be confirmed that the patient had been expelled from his home and taken to begging.

It is of particular concern that despite a policy of active case-holding and repeated home visits, 7 infectious (smear positive) cases left the area still smear positive and 5 dropped out from treatment. Some of these claimed to be taking treatment elsewhere; due to the stigma associated with leprosy there is a tendency for patients to avoid the clinic conveniently situated in their home area. Such

patients may obtain drugs privately or attend clinics where they are less likely to be recognized. This makes it difficult for workers to keep accurate records of treatment especially as patient honesty cannot be relied upon.

A useful indication of effective treatment and effective patient education lies in changes in deformity grading. In principle grade 1 and 2 deformities can be reversed by a combination of drug treatment and physiotherapy. Occasionally surgery is necessary. It would seem significant that of 6 patients showing improvement, 5 had completed MDT, while neither of the 2 patients whose condition worsened had received a course of MDT.

Efforts had been made to make physiotherapy, ulcer dressing and corrective surgery available as well as making appropriate footwear available to patients at concessionary rates. The chief obstacle to success in this area seems to be the reluctance, often for practical reasons, of patients to take advantage of these facilities. Reasons vary from 'long queues at the hospital', lack of money or time, to the hope that the disability will improve without treatment. A particular problem for obviously deformed patients is caused by a refusal to allow them on public transport. Therefore, although considerable progress has been made in making available normal hospital facilities to leprosy patients, a large number of patients still cannot, or do not wish to use these facilities for dressings, physiotherapy and surgery. Additionally it is difficult to find trained physiotherapists in the city who are prepared to work with leprosy patients and to hold clinics in slum areas.

The year-wise case detection rates indicate that there is probably still a relatively high incidence of leprosy in this slum. Case detection rates are approximately equal for males and females; a high proportion (34.9%) of cases are amongst children.

The detection of 65% of cases and 80% of infectious cases was by voluntary reporting. This is encouraging as such cases, if given sufficient encouragement, should be less likely to drop out, or refuse to accept treatment.

Over the last 3 years there has been a drop in total case detection. However, infectious cases are still arising. When the sources of these infectious cases were examined, it was found that 50% had arrived from outside the area since the mass survey of 1981. Bearing in mind the average incubation period, it seems likely that these patients are bringing the infection from other areas.

Moreover, 25% of infectious cases were found in individuals who had been living in the slum during the survey, but were amongst the 20% of the population not available for examination at that time. (As has been pointed out by other studies, the sector of the population likely to be missed (working adult males) is the same sector in which a high proportion of infectious cases are found.)

Considerable success in reducing the reservoir of infection represented by leprosy colonies has been achieved in Bombay by intensive programmes of multidrug therapy combined with health education.⁵ Yearly surveys of the healthy population of 1 leprosy colony have shown a reduction of the occurrence of new cases to 3 per 1000 (all non-infectious tuberculoid cases) since the administration of MDT for all multibacillary cases was started. This is despite a prevalence of 480 cases per 1000 population, 28% of which were lepromatous (LL) and 41% borderline.

This success has not been paralleled in the normal slum, where the disease is also hyperendemic. Although 166 cases have been declared inactivated, the incidence rate is still high. Several reasons for the differences may be suggested.

- 1 The leprosy colony concentrates a large number of infectious cases in a small population, in a small well-defined area, making treatment easier to administer.
- 2 The social stigma of the disease, high in a normal slum, is less likely to be an obstacle to the acceptance of diagnosis or treatment in a leprosy colony.
- 3 In the leprosy colony, various other facilities were provided including drinking water and washing places. Rehabilitation programmes were undertaken and education offered for the children. As well as drugs, dressing materials were provided in the colony. An additional result of these benefits may have been increased confidence in the drugs supplied, ensuring better drug compliance. The introduction of multidrug therapy has itself improved compliance in the slums, but even with a compliance rate of about 70% there is room for further improvement.

4 The poor socio-economic level of most slum dwellers, while providing ideal circumstances for the spread of infectious disease, means that health consciousness is low, and health care a very low priority for these people.

These results would seem to suggest a need for a shift of emphasis in leprosy control in the slums, if the dual aims of reducing the reservoir of infection and reducing the morbidity (chiefly caused by nerve damage) amongst patients, are to be achieved efficiently.

In the past considerable resources and enthusiasm have been put into mass surveys of endemic populations. However, there has been a certain degree of disillusionment with the results and their value has been widely questioned from the point of view of optimal use of manpower resources. These figures suggest particular limitations to the usefulness of surveys in slum areas. The principle behind the use of surveys is that by diagnosing virtually all the cases in a given area it will subsequently be possible to bring them under treatment, and so control the spread of the disease. This cannot be effectively applied if there is a continuous movement of infectious cases into, and away from, the area, and a high drop-out rate amongst cases. The survey component of control programmes serves only to emphasize the scale of the problem faced, unless the education of patients and of the general public and treatment of disabilities and psychological, social and economic problems (as well as infectivity) are intensified.

The success of multidrug therapy when properly implemented has been demonstrated; the number of patients benefiting will be increased by improving the social and psychological support offered, rather than by searching out more cases. The current priority would appear to be improving case holding and for this to be achieved more resources will have to be devoted to the practical, economic and social problems, which cause leprosy patients in such a community to regard the disease as the least of their problems and treatment as a low priority.

Acknowledgments

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References

- ¹ Ganapati R, Revankar CR, Dongre VV. Prevalence of leprosy in slums in Bombay including a leprosy colony. *Indian J Leprosy*, 1985; **57**, 383–8.
- ² Marshall JT, Amar DS, Ramesh HC. Prevalence of leprosy among slum dwellers *Lepr India*, 1981; **53**, 70–82.
- ³ Jha SS. *Structure of Urban Poverty—the case of the Bombay Slums*. 1986.
- ⁴ Ganapati R, Revankar CR, Bandkar KR, Dongre VV. Leprosy detection through non-survey techniques. *Indian J Leprosy*, 1984; **56**, 622–5.
- ⁵ Ganapati R, Naik SS, Revankar CR, Vartak RB, Desai AP, Panvalkar NA, Deshpande SS. Supervised Administration of Multidrug Therapy in Leprosy colonies. *Indian J Leprosy*, 1986; **58**, 86–80.
- ⁶ Ganapati R, Revankar CR, Dongre VV, Dharne LL, Madhukar Neet, Saroja Sheety. Multidrug therapy and the occurrence of new cases in a leprosy colony.

NEWS AND NOTES

Leprosy for medical practitioners and paramedical workers:

Ciba-Geigy

The third, revised edition of this excellent booklet, written by R H Thangaraj and S J Yawalkar, published by Ciba-Geigy in 1988, is not available and copies may be obtained from the company, CH 4002, Basle, Switzerland.

Slide/script and audiotape sets on leprosy (English)

American Leprosy Missions now has available two slide-script and tape sets produced by Roy Pfaltzgraff. Details are as follows:

Leprosy in general practice—this set of 80 slides briefly covers the essentials of the diagnosis and management of leprosy for a medical practitioner who has had little or no previous experience with leprosy. It gives guidelines on the basic features of the disease, the treatment and the main complications that may arise during the active course of the disease, and what to do in case complications arise. (length, 32 minutes).

'Differential diagnosis of leprosy'—consists of 80 slides chiefly of African dermatological conditions that may be confused with leprosy. The emphasis is on making a definite diagnosis by clinical methods in a 'field' situation. It provides a good overview of tropical dermatology. (length, 22 minutes).

These sets are available at the subsidized price of US\$10.00 per set, including a tape and printed script. Apply to: American Leprosy Missions, One Broadway, Elmwood Park, New Jersey 07407, USA.

Questions and Answers on the Implementation of Multiple Drug Therapy (MDT) in Leprosy. Portuguese translation

This booklet of 35 pages is available, in English and Portuguese, from the Health Unit, OXFAM 274 Banbury Road, Oxford OX2 7DZ, England. It includes a number of questions, and *some* of the answers, relating to problems which may arise in the practical implementation of multiple drug therapy, using the regimens recommended by WHO. Attention has however been drawn, notably by readers in South America, to a number of defects in the Portuguese translation and these include the following: Certain words are inadequately chosen to describe the real meaning, for example: 'exame dos testes microscopicos do corte da pele,' should be 'baciloscopia de espregaco de corte de pele'. For 'pauci-bacilar' substitute 'paucibacilifero'; for 'multi-bacilar' substitute 'multibacilifero'; for 'reincidencia' substitute 'recidiva o recaida'; for 'sitio' substitute 'local o region'; for 'beneficial' substitute 'benéfico'. 'Leprosos' is a derogatory expression that should not be used, the correct term is 'paciente de lepra'.

Further comments on the quality of translation are being collected and a correction slip will be included in copies of the present edition, pending the possibility of a full revision.

International Disability Education and Awareness

Based at William House, 101 Eden Vale Road, Westbury, Wiltshire, BA13 3QF, England, this organization runs courses periodically on disability and rehabilitation. The broad description introducing a recent course ran as follows: 'We welcome anyone who is working or is about to work overseas with people with disabilities and those concerned with work in this field. Practical and theoretical sessions provide a forum for participants and tutors to share their experiences, skills and ideas and to look at some of the fundamental issues behind Disability and Development.'

Technical Guide for Smear Examination for Leprosy

The first edition in English (1983) is now virtually out of print and a second (reviewed) edition is due to be published by the end of 1987. This Guide has been translated into French, Thai, Arabic, Spanish, Turkish and Bengali. A translation into Portuguese has been done and is being prepared for the press. Hausa and Indonesian are in hand, but not yet translated. Distribution seems to have been fairly wide; for instance in the Eastern Mediterranean alone, Dr Wahdan, Director of Disease Prevention and Control for the Regional Office of WHO, has recently written to say that nearly 2000 copies were distributed to Arab-speaking countries in the Region—and the sales from distributing agencies in London and Oxford have been impressive. Addresses and method of application for the various translations will be published in the next issue of this journal. Meanwhile enquiries to Secretary, TALMILEP, DAHW, Postfach 348, D-8700 Würzburg, West Germany.