

Report of the Ninth Meeting of the WHO Technical Advisory Group on Leprosy Control

Cairo, Egypt, 6–7 March 2008

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1. Introduction

The Ninth meeting of the WHO Technical Advisory Group (TAG) on Leprosy Control was held in Cairo, Egypt on 6th and 7th March 2008. The meeting was chaired by Professor W.C.S. Smith and attended by national leprosy programme managers from Brazil, the Democratic Republic of Congo, Cambodia, Egypt, Iran, India, Nigeria and Thailand. In addition, several experts and members of the Technical Commission of the International Federation of Anti-Leprosy Associations (ILEP) also attended the meeting.

2. Message from Dr Hussein A. Gezairy, Regional Director, WHO Eastern Mediterranean Region

In his message (presented by Dr Zuhair Hallaj, acting WHO Representative, Egypt), Dr Gezairy expressed his gratitude to the staff of the Global Leprosy Programme for the excellent coordination with the Regional Office in facilitating the organization of the meeting. He attributed the continued decline in new case detection and high population coverage with leprosy control services to fruitful collaboration between national programmes, national and international partners and WHO. He underscored the challenges related to civil conflict and economic turmoil with resultant severe damage to the infrastructure in several countries and in the Eastern Mediterranean Region in particular. He was optimistic that the joint efforts of leprosy control and primary health care systems would lead to re-establishment of services in the affected areas. He reiterated the need to implement the WHO Global Strategy for further reducing the disease burden and sustaining leprosy control activities with emphasis on providing quality patient care that is equitably distributed, affordable and easily accessible.

3. Report of the eighth meeting of the TAG

The report of the Eighth TAG meeting held in Aberdeen, Scotland on 21st April 2006 was approved. After approving the agenda, the members appointed Dr Yasin Al-Qubati from Yemen as the co-chairperson and Dr H.J. S. Kawuma from Uganda as the rapporteur for the meeting.

4. Leprosy situation Globally and in the Regions

4.1 Current global leprosy situation

A summary of the global situation was presented by Dr V. Pannikar of the Global Leprosy Programme. The reported global registered prevalence of leprosy at the beginning of 2007 was 231,361 cases. The number of new cases detected during 2006 was 265,661 (see Table 1). This number reflected a further decline of 33,375 cases (11.2%) when compared to 2005.

Table 1: Leprosy situation by WHO region at the beginning of 2007 (excluding Europe)

WHO Region	No. of countries/ areas reporting	Registered Prevalence at beginning of 2007	Cases detected during 2006
Africa	38/46	36 124	34 480
Americas	26/35	64 715	47 612
Eastern Mediterranean	17/21	3986	3261
South-East Asia	10/11	116 663	174 118
Western Pacific	33/37	9 873	6190
TOTAL	124/150	231 361	265 661

Sixteen countries (Angola, Bangladesh, Brazil, China, the Democratic Republic of Congo, India, Indonesia, Madagascar, Mozambique, Myanmar, Nepal, Nigeria, Philippines, Sri Lanka, Tanzania and Ethiopia) reported over 1 000 new cases and in total accounted for 94% of global new cases during 2006.

Regarding the profile of new cases, it was reported that the proportion of MB among new cases ranged from 90.5% in Kenya to 56.1% in the Democratic Republic of Congo. The proportion of female cases ranged from 60% in Uganda to 16% in Somalia. The child proportion ranged from 19.2% in Central African Republic to less than 1% in Cuba. The proportion of new cases with disability grade 2 ranged from 23.0% in China to 0.66% in Micronesia (Federated State of Micronesia). This demonstrated the wide variation observed among countries in all the regions regarding the indicators and the importance of interpreting these indicators within the context of each programme with emphasis on looking at its trends.

The main challenges for leprosy control activities at country level are as follows:

- Sustaining quality; with the emphasis on a shift to sustaining quality of services and improving the care of patients in order to prevent disabilities and provide rehabilitation.
- Reducing the burden; coverage of leprosy control services to be maintained or improved in some areas to ensure further reduction of disease burden. Burden

should be regarded in terms of disabilities, cases among children and leprosy-related stigma and discrimination.

- Capacity building; maintenance of expertise among health care workers particularly in countries where endemicity of the disease is relatively low.
- Referral systems; establishing integrated referral facilities and strengthening referral networks in order to support integration services.
- Drug resistance; WHO will address the threat of the emergence of rifampicin and dapsone resistance through establishing a global surveillance system to monitor the situation. This will be implemented in collaboration with various national programmes, research laboratories and partners.
- Commitment; continued support from partners is essential to ensure that leprosy remains on the health agenda and that success does not lead to complacency.

The members of the TAG stressed the continued need to closely monitor the trends of the disease especially in countries where new case detection is showing wide fluctuations (in situations reporting a sudden decline as well as huge increases). National programmes are to be encouraged to review their own data, focusing on the trends of the disease. Support is to be provided to the national programme to review the situation in each country so as to understand the operational and epidemiological factors that are in play when interpreting the trend of the disease. WHO should continue to provide technical support to the national programmes in carrying out programme reviews to ensure that quality of the leprosy control services are being maintained in addition to validating the reported data.

The need to encourage national programmes to collect information on “cure rate” as an indicator for quality of care was also highlighted.

4.2 Leprosy situation in the African Region

Dr L. Bide presented the following situation of leprosy in the African Region.

- The new case detection is decreasing in the Region. National programme managers have expressed difficulties in deciphering between actual decreases or the result of under-diagnosis and the need to develop systems for confirming diagnosis.
- Two countries, namely Democratic Republic of Congo and Mozambique had not reached the goal of leprosy elimination at the beginning of 2008.
- Seven countries were detecting more than 1,000 new cases every year. They are: Angola, Democratic Republic of Congo, Ethiopia, Madagascar, Mozambique, Nigeria and Tanzania.

- Countries have developed annual plans to target the reduction of leprosy burden at district level. The need to concentrate on “pockets” e.g. among the Pygmy populations in Central Africa, was pointed out.
- Countries in the Region are still facing many challenges in implementing the strategy for further reducing the leprosy burden and sustaining leprosy control activities. Among others, there is a great need to re-define leprosy-related advocacy in order to sustain political interest and resources.

The regional situation is summarized in Table 2 below. It was also emphasized that the Regional Office has been collecting and publishing information received from official government sources from the countries and in some instances/reports submitted to the regions are not timely and consistent.

Table 2: Summary of leprosy situation in the African Region at the end of 2007

	Number of cases	Rate/proportion
Prevalence	35 852	0.54 / 10 000
Detection	34 703	5.3 / 100 000
New MB	24 750	71%
New cases disabled grade 2	3185	10%
New cases in children	3061	9%

4.3 Leprosy situation in the American Region

The regional report was not presented. Instead, a brief presentation was made on the current situation of Hansen’s disease in Brazil by Dr M. Leide, the National Programme Manager. The presentation included the following highlights:

- Hansen’s disease was one of the priority diseases on the Ministry of Health’s agenda.
- Brazil was ranked the country with the second highest number of new cases in the world.
- An average of 47,600 new cases have been detected annually in the last five years.
- Children represented 8% of new cases.
- About 53% of new cases detected were MB.
- Of the new cases, 6% were detected with disability grade 2.

4.4 Leprosy situation in the Eastern Mediterranean Region

In his presentation, Dr N. Neouimine indicated that the annual new cases detected in the Region had decreased from 5,565 in 2000 to 3,261 in 2006 with a corresponding decrease in new case detection rate from 1.21 per 100 000 population to 0.6 per 10,000 population respectively. Five countries (Egypt, Pakistan, Somalia, Sudan and Yemen) have the most significant leprosy burden in the Region. Seventeen other countries reported few or no new cases.

During the period 2000 to 2006, the majority of new cases notified were MB while 5% to 8 % were children and about one third females. A declining trend of new case with grade 2 disabilities was also observed from 20.1% of new cases in 2000 to 11.7% in 2006. A large number of new cases are being reported from Southern Sudan. Leprosy control activities are being gradually expanded in Southern Sudan with support from various NGOs working in this area. Reports are now being received regularly and the quality of the data is improving. Table 3 below summarizes new case detection between 2003 and 2007 in the priority countries.

Table 3: Detection of new leprosy cases in Eastern Mediterranean Region selected countries in 2003–2007

Country	Year				
	2003	2004	2005	2006	2007
Afghanistan	15	20	31	21	26
Egypt	1412	1216	1134	945	887
Iran	51	73	79	64	25
Morocco	50	62	43	62	38
Pakistan	751	655	551	476	496
Somalia	300	183	62	390	414
Sudan	906	722	782	884	777
Southern Sudan	2139	1944	1498	1060	929
Yemen	413	415	395	358	434

Leprosy control activities have largely been integrated into the general health care services leaving the remaining leprosy centres and clinics with mostly referral and supervisory functions. In some instances, leprosy control work has been integrated with other disease-specific programmes e.g. dermatology (in Egypt, Morocco and Pakistan) and TB control (Saudi Arabia).

National programmes face major challenges in sustaining the achievements and to further reduce the disease burden. The presenter underlined particular challenges

posed by the need to sustain integration of essential components of leprosy control in the existing primary health care system and the importance of developing integrated referral facilities especially in countries where leprosy has become a relatively rare disease.

4.5 Leprosy situation in the South-East Asia Region

Dr S. Barua's presentation covered updates on the leprosy situation, the implementation of the post-elimination strategy and the challenges ahead.

- The new case detection rate declined from 47.8 in 1998 to 10.51 per 100 000 population in 2006.
- Two of 11 countries in the Region (Nepal and Timor-Leste) have not yet achieved the elimination goal.
- There were six countries reporting more than 1000 new cases annually (Bangladesh, India, Indonesia, Myanmar, Nepal and Sri Lanka). Nepal had recorded a relatively higher number of cases in districts neighbouring India.

The leprosy situation in the Region at the beginning of 2007 is summarized in Table 4 below:

Table 4: Leprosy situation in SEA Region at the beginning of 2007

Country	Registered prevalence	No. of newly detected cases	No. of new MB cases	No. of new female cases	No. of new cases among children	No. of new cases with Gr 2 disability
Bangladesh	4969	6280	2393	2661	493	523
Bhutan		16				
DPR Korea	0	0	0	0	0	0
India	82 801	139 252	62 652	47 969	14 071	3130
Indonesia	22 175	17 682	14 232	311	1775	1388
Maldives	6	8	2	5	0	0
Myanmar	2790	3721	2345	1328	253	421
Nepal	3951	4253	2095	1968	225	127
Sri Lanka	1382	1993	874	885	205	107
Thailand	1157	665	454	253	30	95
Timor-Leste	222	248	161			
SEA Region	116 663	174 118	85 208	55 107	17 088	5791

The following remaining challenges were highlighted:

- Reaching the elimination goal in Nepal and Timor-Leste
- Sustaining political commitment and ensuring adequate resources
- Strengthening integration of leprosy into the general health care system
- Ensuring a wider coverage of leprosy services to include the currently underserved populations.

In a bid to support countries to implement the Global Strategy and Operational Guidelines, the WHO Regional Office for South-East Asia plans, among others, to organize inter-country workshops for managers in low endemic situations following the model developed by WHO and partners. The operational guidelines will be translated and widely circulated.

4.6 Leprosy situation in the Western Pacific Region

Dr Arturo Cunanan Jr. in his presentation provided the updates on the regional leprosy situation, future plans and the challenges ahead.

- There were 9,873 registered cases at the beginning of 2007. During 2006, 5959 new cases were detected (case detection rate: 0.34 per 100,000). Of those, 82% were MB cases and 7.7% children. Of the new cases, 11.3% had disability grade 2.
- Leprosy elimination had been achieved at national level in all but two countries (Micronesia and Marshall Islands). Six countries (Cambodia, China, Lao PDR, Papua New Guinea, Philippines and Viet Nam) accounted for 90.1% of new cases in 2006.
- The majority of countries (20 out of 37 in the Region) had 1 to 100 new cases, two countries (China and Philippines) had over 1000 new cases while five countries did not report any new cases.
- The Operational Guidelines had been translated into Cambodian, Chinese, Japanese and Vietnamese.

The regional leprosy situation is summarized in Table 5 below:

Table 5: Western Pacific Region: leprosy situation at the beginning of 2007

	Number of cases	Rate / proportion
Prevalence	9873	0.056 /10 000
New case detection	5959	0.34/100 000
MB among new cases	4886	82.0%
New cases with grade 2 disabilities	674	11.3%
Children	459	7.7%

The outstanding challenges are:

- Elimination of leprosy as a public health problem in the two remaining countries
- Technical and funding support for further reducing the leprosy burden in previously endemic countries.
- Sustaining quality leprosy services in the peripheral health centres
- Strengthening integration of leprosy services into general health services
- Establishment of referral systems
- Development of management information system for low prevalence situations
- Sustaining political commitment and support.

5. New case detection trends in Thailand

The presentation on new case detection trends in Thailand was made by Dr Krisada Mahotarn. It covered the history of the leprosy control programme in the country from early part of 20th century to the present day. Integration of leprosy control services into the general health services was implemented early in the programme during the 1970s and it led to improving the coverage of leprosy control services further. The programme has consistent data with detailed characteristics of new cases since 1984. The MB regimen in use is of 24 months duration.

The new case detection (both absolute numbers and rates) has been declining since 1981. The proportion of new MB cases with disability grade 2 stagnated (for over 20 years) between 16% and 18% while the overall numbers of leprosy cases and MB cases in particular showed a gradual decline over the years. The presenter attributed the declining trend to multiple factors including high coverage with BCG, socioeconomic development along with improved living conditions and improved access to diagnosis and treatment with MDT. However, the current situation (with low prevalence) is characterized by decreased awareness of leprosy among the health staff and general population which has resulted in increasing delays in diagnosis and treatment.

6. Workshop for Health Service Managers in charge of Leprosy Control Programme

The workshop guidelines were presented by Dr H.J. Kawuma who explained that the workshop is an attempt by WHO and partners to enable managers of integrated programmes to implement the new strategy in their countries based on informed decisions. The managers targeted were those in charge of leprosy control, with leprosy as only part of their responsibilities, with limited leprosy background and time to attend long leprosy training schedules.

The workshop schedule, presented in two manuals: the Participants Guide and the Facilitator's Guide, is based on the Global strategy and the Operational Guidelines. A brief outline of the training objective, its expected outcome and educational methodology used for each session were presented.

Further workshops are scheduled to be conducted in AMR, SEAR and AFR in 2008. There was a consensus that the workshop is an appropriate tool for addressing the needs of the selected target group. The need for incorporating mechanisms for both short-term and long-term impact assessment was emphasized.

7. I can do it myself: Self-care booklet

Dr Hugh Cross presented the self-care booklet which has been produced by WHO for people affected by leprosy. Essential facts that should be taken into account when introducing the booklet which is primarily intended for self-care by patients were presented. The discussion covered possible reasons/explanations for patients not to act on the advice given to them including the fact that behavioural change is facilitated primarily by a personal sense of control. The concept of "self-efficacy" was introduced as well as the relation between high self efficacy and behavioural change (as that expected from individuals carrying out self-care). Those intending to adapt or reproduce the booklet to meet local needs were advised to maintain the lay out in simple diagrams with minimal text and to print in colour.

Because of the complex situation underlying the behaviour expected in self-care, it is recommended that appropriate support be given to the patient through the first six months of practice.

The following important elements of self-care education should be noted:

- That people are assisted to learn problem-solving skills that are useful for them to understand from their own perspective. The skills should be developed and transferred so that people are able to address all three aspects of chronic illness: medical, social and emotional;
- People should be helped to set objectives on an ascending scale of difficulty (starting with easy and achievable goals)

The presenter underscored the importance of community participation in the form of moral support and encouragement. Advocacy for such support should be considered when planning self-care interventions.

8. Leprosy and HIV-1 Co-infection

In her presentation, Professor Diana Lockwood reviewed the clinical pathology of HIV infection and discussed the available information vis-à-vis earlier predictions of possible interactions between HIV and leprosy.

The available evidence suggests that:

- Being HIV positive does not increase the risk of developing leprosy.
- HIV infection does not preclude the usual range of immune responses to *M. leprae* as seen in skin biopsies.
- The prediction that HIV-infected patients would have more lepromatous disease is not favoured by the observation that the whole spectrum of leprosy disease types have been reported in HIV/leprosy co-infected patients.
- Current MDT regimens appear quite adequate also for HIV-infected leprosy patients.
- Leprosy/HIV patients appear to be at higher risk of Type 1 reactions.
- Prolonged immunosuppression may be needed for managing reactions in leprosy/HIV patients
- One of the ways in which leprosy / HIV co-infection can present is as an Immune Reconstitution Syndrome (IRS).

The presenter also reviewed several published reports on leprosy developing after starting Highly Active Antiretroviral Therapy (HAART). It was recommended that there is need to gather more information on the HIV/leprosy interaction including the presentation and management of reactions in such cases.

9. Report on progress of multicentric Uniform-Multidrug Therapy (U-MDT) study

The report was presented by Professor M.D. Gupte. Most of the information presented related to the period up to November 2007. The objective of the study was to provide six months MDT for all types of leprosy patients and assess the treatment response in terms of relapse rates (not exceeding a maximum acceptable cumulative level of 5% at the end of five years).

There are altogether seven centres participating (five in India and two in China). The enrollment status as of November 2007 was presented covering a total of 2960 patients of whom 1806 were PB. The stipulated trial size had been achieved mostly for PB cases and in only one centre in India for MB cases.

The presentation also provided interim summaries of the characteristics of the study patients, the clinical status at treatment completion, one and two years after treatment completion and the special events noted during the completed follow-up period (including those leading to exclusion from the study). Follow-up information at two years was only available for a total of 1098 cases out of the enrolled 2960. Of these 53% were described as "improved" and 46% as "inactive". Dissociation into disease types showed 58% and 30% as "inactive" in the PB and MB groups respectively.

There was a brief recap of the definition of Uniform MDT as well as the characteristics used for assessment of clinical progress including the meanings of “inactive”, “improved”, “static”, “deterioration” and “relapse” in the study context. Dr Gupte also briefly discussed some existing literature on relapse rates reported in case series of both PB and MB cases that had been systematically followed up after standard MDT in different countries e.g. China, Ethiopia, India, Malawi and Thailand. In a related discussion, it was recommended that greater co-operation be established with similar study groups in Bangladesh and Brazil. This might help to widen the database and enhance the usefulness of the interim data analysis particularly for guiding the decision whether to continue the trial or not.

10. Progress with 12-month MB-MDT studies in Brazil

The presentation by Dr Maria Cunha was in two parts covering (a) 12-month MB MDT study and (b) Ofloxacin Multicentric Trial for MB leprosy.

The objective of the 12-month MB-MDT prospective study was to compare the effectiveness of 12-months versus 24 months WHO/MB-MDT regimens. The study involved follow-up of two groups of previously untreated MB leprosy cases with positive skin smears. One group comprised 128 patients recruited between 1998 and 2000 and treated with 12 months MB-MDT. The second group comprised of 85 MB patients recruited between 1995 and 1997 and treated with 24 months MB-MDT. At 36 months follow-up, there was no statistically significant difference between the two groups regarding bacillary index (BI) reduction, reactions and disability grading. At eight years after release from treatment (RFT), four relapses (one in group one and three in group two) had been observed.

The Ofloxacin Multicentric Trial, supported by Tropical Disease Research (TDR), had been set to study the therapeutic efficacy in terms of relapse, feasibility and tolerance of two new regimens containing Ofloxacin and comparing them with one year and two years of standard WHO/MB-MDT regimens. It was double-blind and involved 15 centres in eight countries and was to have a follow-up period of at least seven years after release from treatment.

The presentation described the four different regimens tested and provided information about only two Brazilian centres. The centres recruited (between 1993 and 1994) a total of 198 cases, of whom 183 completed treatment and 114 had active seven year follow-up. Summaries of clinical classification and regimen allocations were presented. Overall, there were 23 relapses (after a mean follow-up period of five years); Nine of them were subjected to mouse footpad inoculation and seven showed multiplication of *M. leprae*. The summary of relapse prevalence by MB study regimens was as presented in Table 6 below:

Table 6: Relapse prevalence by MB regimens

Regimens	f1/n	%	IC 95%
WHO MDT 12 months (A)	2/46	4.3	0.8–16.0
WHO MDT 12 months + Ofloxacin (B)	2/40	5.0	0.8–18.2
Ofloxacin + Rifampicin (C)	19/49	38.8	25.5–53.8
WHO MDT 24 months (D)	– /24	–	–
Total	23/169	13.6	8.9–19.9

According to the results presented in both sets of studies:

- There was no statistically significant difference when comparing 12 months with 24-month MB-MDT
- While Bacteriological Index (BI) remained positive at the end of treatment, this gradually declined during follow-up
- The results indicate a close correlation between relapse and high initial BI.

The TAG members agreed that (a) all patients belonging to the “C” group (ofloxacin and rifampicin daily for four weeks) that can be retrieved should be offered a standard course of MDT due to the observed high relapse rates and (b) WHO should continue with the process of collecting data from all 15 centres in the Ofloxacin Trial and to publish the data.

11. New Multi-drug regimens are needed for better leprosy control

As an introduction to this presentation, Professor Baohong Ji raised several reasons why new MDT regimens (especially for MB leprosy) are needed including:

- the fact that the current MDT regimen is still complicated as two types of drug administrations, *i.e.*, monthly and daily administration, are involved, and the daily treatment is self-administered. Should a patient fail to comply with self-administered daily treatment, he/she is virtually treated with rifampicin (RIF)-monotherapy. Therefore, the current MB regimen is not RIF resistance-proof.
- its duration is relatively too long.
- That, in any large-scale treatment of an infectious disease with microbial agents, emergence of drug resistance is virtually unavoidable. Some patients with rifampicin-resistant and multidrug-resistant leprosy have already been reported. A safe and effective alternative regimen should be developed for patients with RIF-resistance or who cannot tolerate RIF treatment.

He proposed that new regimens should be developed to simplify the treatment and facilitate supervision of drug administration and to treat rifampicin resistant leprosy or patients who cannot tolerate rifampicin. Whatever the objective, newer antimicrobial agents with powerful bactericidal activity against *M. leprae* should be incorporated into the new regimens.

He presented a summary of newer drugs displaying bactericidal activities against *M. leprae* as in Table 7 below.

Table 7: Newer drugs displaying bactericidal activity against *M. leprae*

Drugs	Class	Bactericidal activity in mice*	Bactericidal activity in humans*	Unit cost
Pefloxacin	Fluroquinolone	++	++	Moderate
Ofloxacin		++	++	Moderate
Moxifloxacin		+++	+++	High
Clarithromycin	Macrolide	++	++	Moderate
Minocycline	Tetracycline	++	++	Moderate
Rifapentine	Rifamycin	+++	Not done	High
R207910	Diarylquinoline	+++	Not done	Not commercially available
Linezolid	Oxazolidinone	+	Not done	High

* Based on the activity of (+) for dapsone and (+++) for Rifampicin

It was pointed out that whereas there were scientific data on the bactericidal activity of a number of the newer drugs, there was no information regarding their sterilizing effect; the latter is the indicator of the deciding factor for preventing relapse.

The proposed regimen for simplifying MB treatment on a trial basis are:

Rifapentine 900mg (or Rifampicin 600mg) – Moxifloxacin 400mg – Clarithromycin 1000mg (or Minocycline 200mg) administered once monthly under supervision for 12 months.

Similarly, for treatment of Rifampicin-resistant leprosy, he recommended a fully supervised regimen in two phases to be carried on a trial basis.

An initial six months intensive phase followed by an 18-month continuation phase.

The intensive phase: Moxifloxacin 400mg – Clofazimine 50mg – Clarithromycin 500mg – Minocycline 100mg all taken daily.

The continuation phase: Moxifloxacin 400mg – Clarithromycin 1000mg – Minocycline 200mg all taken once monthly.

The presenter warned that none of the two regimens described above should be used in routine programmes until its efficacy and safety has been fully established with carefully conducted clinical trials among patients with MB leprosy. He described the important elements of such clinical trials.

It was also expressed that in order to accelerate the development of new MDT regimens, it would be important to:

- develop rapid and simple methods for screening new compounds with powerful bactericidal activity against *M.leprae*;
- find more rapid and precise tests for measuring bactericidal activity against *M.leprae* than with mouse foot pad technique; and
- identify simple and reliable surrogate markers for measuring the sterilizing activity against *M. leprae* of the treatment used; this would provide an important indicator to justify reducing the duration of treatment.

12. Guidelines for Global Surveillance of Drug Resistance in Leprosy: Document for review

Dr M. Matsuoka made a presentation on the current methodologies for detection of drug-resistant leprosy cases. He re-affirmed that cases of rifampicin-and dapsones-resistant leprosy have been reported in his laboratory from samples received from Indonesia, Myanmar and Philippines.

Close monitoring of the occurrence of drug resistant isolates of *M. leprae* needs to be maintained for evaluation of efficacy of chemotherapy and to prevent spread of drug resistant mutants.

Monitoring drug susceptibility patterns using mouse footpad (MFP) method is no longer practical as it can only handle a very limited number of samples and will yield results only after about 12 months. Molecular biological techniques for detecting drug resistance to dapsones, rifampicin and ofloxacin are now available and have been accepted to be as reliable as MFP method.

A system of sentinel surveillance aimed at detecting resistance among MB patients who relapsed after completing a full course of MDT has been planned in collaboration with various national programmes, reference laboratories and WHO. Samples collected from sentinel sites in the field will be subjected to molecular biological analysis and the results are to be systematically sent back to the sentinel sites and as well as to WHO's Global Leprosy Programme.

The presenter recommended longitudinal monitoring of the trend of drug resistance in order to ensure that the current leprosy control strategy based on MDT remains effective.

13. Stigma, discrimination and leprosy control

In a presentation titled, "The Road to Advocacy," Mr José Ramirez, Jr. defined stigma as an act of rejection, labeling or unexplained fear of a person. Mr Ramirez referenced the 30 centuries of stigma and described the various ways in which stigma has impacted the quality of life of persons affected by leprosy. Some of these included the practice, among all societies, of silence (refusal to object to others using offensive and archaic terminology), exclusion, and the use of the word "patient" for anyone affected by leprosy regardless of their treatment or cured status. Among others, he suggested measures that can be taken to prevent national leprosy control programmes and organizations from becoming part of the stigma. WHO and other agencies should use all available opportunities to promote positive images of persons affected by leprosy.

The following recommendations formed his concluding remarks: to have one unified world leprosy day; to attack stigma through empowerment (training, partnerships, consultants on leprosy-related programmes/literature, and appointments to boards and advisory groups), to have one unified definition of stigma, and to attack leprosy-related myths by showcasing the successes of persons affected by leprosy as demonstrated via oral histories.

In a related discussion, TAG acknowledged the negative impact of stigma on leprosy control e.g. leading to delays in detection and non-compliance to treatment. Further research is required in developing indicators for measuring the degree and impact of stigma and discrimination. The indicators may be useful for the evaluation of interventions to reduce stigma.

14. Leprosy eradication – A discussion of meaning, feasibility and implications

As a background to his presentation, Professor Paul Fine cited several published definitions of "eradication" and discussed them alongside definitions of related concepts like control, elimination and extinction.

He then discussed the feasibility of eradication in the context of the current leprosy situation from the perspectives of technical feasibility, economic implications and the availability of political will and popular support.

Several arguments indicate that leprosy eradication is not feasible: including the evidence for at least one animal reservoir of *M leprae* (the armadillo), the absence of any test for infection, the very long incubation period and our current ignorance of basic

aspects of the natural history of leprosy (e.g. the role of sub-clinical “carriers” in transmission). The single argument in favour of “eradication” was that such a declaration might be justified as a purely aspirational goal and in order to attract resources for leprosy work. It was noted that there has been no economic analysis of the risks and benefits involved.

The presentation concluded that leprosy eradication is not possible technically and that an unrealistic eradication declaration would devalue the definition of eradication as a term and lead to embarrassment. Eradication as a target with a time-bound goal would be inconsistent with integration and the current global strategy.

It was noted that the 1993 International Task Force for Disease Eradication and the 1998 WHO supplement on eradication both considered leprosy not to be eradicable. Considering all the provided evidence the TAG members resolved not to consider leprosy to be an eradicable disease at this point in time.

15. Research priorities for leprosy and current opportunities

Professor Cains Smith presented a review of the priority areas for research for the current Global strategy 2006–2010. These are: prevention and management of nerve function impairment and reactions, improving chemotherapy, developing and improving diagnostics to identify individuals in the community who are at high risk of developing leprosy and operational research to improve sustainability and integration of leprosy services. An analysis of the criteria for eradication was presented in terms of the current evidence and ongoing research to identify gaps and research needs to meet these criteria.

The research priorities identified by this analysis were a test for infection, understanding of transmission and the development of a protective immune response, and development of an effective, safe, acceptable and inexpensive intervention.

16. Conclusions and recommendations

- (1) The TAG noted that while leprosy appears to have declined in many populations, the disease remains endemic in the large majority of countries. It is recognized that the interpretation of routine data is difficult because of the important influence of operational factors which differ greatly between countries.

Further efforts are needed to improve the quality of routine case detection data at the national level, based on standardized methods, to ensure consistency and comparability within and between countries and to show trends over time. Reporting should focus on new case detection and should include breakdowns by age, sex, type of disease and disability grade, as well as treatment completion rates.

- (2) After an in-depth review of available information, the TAG does not consider leprosy to be an eradicable disease. The evidence of an animal reservoir in armadillos, gaps in current understanding of epidemiology, transmission,

immunology and the lack of effective tools to reduce incidence, mean that it would not be appropriate or credible to embark on an eradication strategy at this point in time.

- (3) The workshops for health service managers and the accompanying training guides, developed for the implementation of the Global Strategy and its Operational Guidelines, are endorsed by the TAG, and their use in strengthening and sustaining capacity in national programmes is strongly recommended.
- (4) National Programme Managers should be aware of the clinical problem of HIV/leprosy co-infection. These patients are at risk of severe reactions and may present with Immune Reconstitution Syndrome after starting Highly Active Anti-retroviral Therapy (HAART). The TAG noted that research in this area may improve our understanding of the immune response in leprosy.
- (5) Longitudinal monitoring of drug resistance in leprosy is critically important to ensure the continued effectiveness of the leprosy control strategy based on MDT. In this regard, annual reporting of the number of relapses and their verification will be an important activity as part of the national surveillance for drug-resistant leprosy.
- (6) Future research in leprosy chemotherapy should focus on simplified regimens. Appropriate treatment regimens need to be developed for patients with Rifampicin-resistant leprosy and those who cannot tolerate Rifampicin.
- (7) Further action is needed to improve patients' access to currently available interventions for early detection and management of leprosy neuritis and reactions. The TAG also noted that research is needed for the development of improved tools for leprosy prevention, diagnosis and chemotherapy.
- (8) The TAG reiterated the principle that self-care is an important component of disability prevention and rehabilitation initiatives. The TAG recommends that persons affected by leprosy be routinely provided information on self-care such as that recommended in the WHO booklet *"I can do it myself"*.
- (9) The TAG recognizes that stigma associated with the disease has had a negative impact on all aspects of the Global Strategy for Leprosy Control. Social action is required at all levels to reduce stigma. Further research is required in developing indicators for measuring the degree and impact of stigma and discrimination. The indicators may be useful for the evaluation of interventions to reduce stigma.

Annex 1

Terms of Reference of the WHO Technical Advisory Group on Leprosy Control

The WHO Technical Advisory Group on Leprosy Control is composed of experts who are independent of WHO. Members are chosen for their expertise in leprosy and programme management with particular reference to public health, epidemiology, community mobilization and advocacy, operational research, and disability prevention. They form a strong team with a good technical balance and geographical representation.

The members of this advisory body are selected and appointed by WHO and meet at least once a year. The period of membership is two years, with the possibility of extension.

The Technical Advisory Group's deliberations are open to representatives of national and international partners as observers to encourage open debate.

In addition, the Group may invite, as necessary, representatives from selected leprosy endemic countries and other experts to its meetings.

The terms of reference are:

- To review and monitor the implementation of the Global Strategy for further reducing the leprosy burden and sustaining leprosy control activities.
- To advise WHO on new strategies and approaches if necessary.
- To monitor progress in further reducing the leprosy burden.
- To give technical advice and guidance on sustaining leprosy control activities.
- To identify and facilitate implementation of a research agenda in order to improve the quality of leprosy control activities, including prevention of disabilities and rehabilitation.
- To support efforts related to reducing stigma and discrimination against individuals and families affected by leprosy.

Annex 2

Programme

Thursday, 6th March 2008

- 09.00–09.30
- Message from Dr Hussein A. Gezairy
Regional Director, WHO Eastern Mediterranean Region
(Dr Z. Hallaj, A/WR, Egypt)
 - Welcome by Chairperson of TAG (*Professor Cairns Smith*)
 - Introduction of participants (*Dr V. Pannikar*)
- 09:30–10:00
- Coffee break*
- 10:00–10:15
- Selection of co-chairperson and rapporteur
 - Approval of report of 8th TAG meeting
(Aberdeen, Scotland, 21 April 2006)
- 10:15–12:30
- Current leprosy situation (10 minutes)
- Global leprosy situation (*Dr V. Pannikar*)
 - Leprosy situation in African Region (*Dr L. Bide*)
 - Leprosy situation in Brazil (*Dr Maria Leide W. Oliveira*)
 - Leprosy situation in Eastern Mediterranean Region
(*Dr Riyadh Ben-Ismaïl and Dr N. Neouimine*)
 - Leprosy situation in South-East Asia Region (*Dr S. Barua*)
 - Leprosy situation in Western Pacific Region (*Dr Arturo Cunanan Jr.*)
 - Discussion
- 12:30–14:00
- Lunch break*
- 14:00–14:30
- New case detection trends in Thailand 1964 to 2005 (*Dr Krisada Mahotarn*)
 - Discussion
- 14:30–15:00
- From Global Strategy to National Action: Workshop for Health Service Managers
in charge of Leprosy Control Programme (*Dr H.J.S. Kawuma*)
 - Discussion
 - I can do it myself: Self-care Booklet (*Dr Hugh Cross*)
 - Discussion

- 15:00–15:30 ➤ Leprosy and HIV-1 Co-infection (*Prof. Diana Lockwood*)
 ➤ Discussion
- 15:30–16:00 *Coffee break*
- 16:00–16:30 ➤ Report on the progress of multicentric Uniform-Multidrug Therapy (U-MDT) study (*Prof. M.D. Gupte*)
 ➤ Discussion
- 16:30–17:00 ➤ Progress with 12-month MB-MDT study in Brazil (*Dr M. G. Cunha*)
 ➤ Discussion

Friday, 7th March 2008

- 09:00–11:00 Stigma, discrimination and leprosy control
 ➤ Social experience as a hidden burden (*Mr Jose Ramirez Jr.*)
 ➤ Discussion
- 11:00–11:30 *Coffee break*
- 11:30–12:00 ➤ Research Priorities for leprosy and current opportunities (*Prof. W.C.S. Smith*)
 ➤ Discussion
- 12:00–12:30 ➤ Guidelines for Global Surveillance of Drug Resistance in Leprosy: Document for review (*Dr M. Matsuoka*)
 ➤ Discussion
- 12:30–13:00 ➤ New Multi-drug Regimens are Needed for Better Leprosy Control (*Prof. Baohong Ji*)
 ➤ Discussion
- 13:00–14:00 *Lunch break*
- 14:00–15:00 ➤ Leprosy eradication – a discussion of meaning, feasibility and implications (*Prof. E.M. Paul Fine*)
 ➤ Discussion
- 15:00–15:30 ➤ Discussion on conclusions and recommendations
- 15:30–16:00 *Coffee break*
- 16:00–16:30 Conclusion and Recommendations

Annex 3

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