

Leprosy Elimination Monitoring in Brazil 2003

in collaboration with

Lauro de Souza Lima Institute – Bauru – São Paulo
Alfredo da Mata Foundation – Manaus – Amazonas

Preface

The present publication is a contribution of the Pan American Health Organization/World Health Organization (PAHO/WHO), in conjunction with the Brazilian Ministry of Health, which aims to improve and promote access to nationwide leprosy information.

The reported data resulted from a Leprosy Elimination Monitoring (LEM) exercise that was undertaken in the 27 Brazilian states during June and August 2003 by technicians from two PAHO/WHO Collaborating Centers in Brazil - Lauro de Souza Lima Institute and Alfredo da Mata Foundation.

LEM exercises are based both on a cross - sectional study carried out at health care facilities selected at random and interviews with patients and health care personnel. LEM is an independent and formal assessment method using standard indicators established by the World Health Organization (WHO). Data collected during these exercises supplements the routine information system, making it possible to obtain detailed information on the performance of health services, quality of health care services offered to leprosy patients, Multi-drug therapy (MDT) access and coverage at state, regional and municipal levels. These indicators enable us to measure specific aspects of leprosy elimination goals as it provides information that will help managers in the decision-making process and implementation of action plans such as:

- Internal validation of data on prevalence and detection rates (crude and specific);
- Integration of MDT services in the general health care system by means of MDT blister packs supply;
- Widen geographic coverage of MDT services; and
- Assessment of the quality of MDT services in accordance with cohort analysis.

The coordination for implementing the exercise and elaborating reports in each state of North and Northeast Regions was under the responsibility of the Alfredo da Mata Foundation; the initiative in the Southeast, South and Central Regions was carried out by the Lauro de Souza Lima Institute.

The elaboration and systematization of indicators fulfill WHO guidelines to provide an understanding of the country's leprosy epidemiological and operational profile. It is hoped that the efforts of every professional involved in this work will contribute mainly to enhance and promote access to diagnosis and treatment services provided for the population so as to reach the goal of eliminating leprosy as a public health problem in Brazil.

Acknowledgments

On behalf of Dr. Marcos Virmond and Dr. Maria da Graça Cunha, directors of PAHO/WHO Collaborating Centers for Leprosy in Brazil – Lauro de Souza Lima Institute and Alfredo da Mata Foundation - we thank the invaluable collaboration of all professionals and monitors who made it possible to undertake the LEM exercise.

We acknowledge the support of the state and municipal health Secretaries for promoting the best possible work environment to monitors and the valuable assistance and support of state and municipal Coordinators for facilitating visits and data collection.

We gratefully acknowledge the dedication and strive of Luiz Carlos Mello, Marcos Virmond, Valderiza Pedroza, Megumi Sadahiro and Felicien Gonçalves Vasquez in the various stages of the exercise.

We also would like to thank Dr. Denis Daumerie (WHO), Dr. D. Lobo, Dr. S. Mancourt (WHO-India), Dr. Rosa Castalia F. Ribeiro Soares, Dr. Clovis Lombardi, Eliane Ignotti and Prof. Manuel Bayona for their technical support in the process of writing and elaborating this report.

Thanks are due to the PAHO-Brazil personnel, in particular Dr. Luis Gerardo Castellanos for his dynamic leadership and technical contribution that enabled to coordinate and conclude this task timely.

We express our gratitude to the Brazilian Government for facilitating and supporting the monitoring of the progress of leprosy elimination in Brazil.

Pan American Health Organization/ World Health Organization – Brasília,
January 2004

EXECUTIVE SUMMARY OF THE LEPROSY ELIMINATION MONITORING EXERCISE (LEM), BRAZIL 2003

In cooperation with the Pan American Health Organization, the World Health Organization, and the Brazilian Ministry of Health, the Leprosy Elimination Monitoring (LEM) Exercise – Brazil 2003 was carried out simultaneously and in a standardized way in all 27 Brazilian states from June through August 2003. It was coordinated and executed in the Northern and Northeastern states by the PAHO/WHO Collaborative Centers of Alfredo da Matta Foundation and, in the Southern, Southeastern and Midwestern states by the Lauro de Souza Lima Institute.

The LEM 2003 Brazil exercise was based on a randomized cross sectional study on primary health care units (PHU) and on interviews with patients and health care professionals nationwide. The 29 LEM monitors collected data on a set of key indicators in the following areas:

- Analysis of elimination indicators: validity of information on prevalence and detection rates (crude and specific) and trend analyses based on evaluation of existing information on the revision of leprosy case files;
- Status of MDT blister packs and the extent of geographical coverage of MDT services based on a randomized cross sectional study of the selected health care units involved; and .
- Quality of patient care: Evaluation of routine procedures involving diagnosis, regularity of treatment, and updating of patient files and registration forms. The quality of MDT services was analyzed according to cohort analyses.

In terms of field visits, the monitors covered 153 municipalities, visited 247 primary health care units and examined 11,765 (38%) of all patient files examined were newly detected cases in 2002.

The monitors reviewed 13,974 blister packs and registered their expiration dates and storage conditions. Moreover, 952 patients and more than 200 health care professionals were interviewed in an effort to more adequately evaluate MDT services.

The principal findings of this effort are presented as follows:

I. Elimination Indicators

The difference between the official (Brazilian Ministry of Health) prevalence rate (4.17) and the standardized WHO rate (2.98) for 2002 was 1.19, which represents an excess of 27,340 leprosy cases. This difference increases the current prevalence rate in Brazil for 2002 by 28%.

With the exception of Espírito Santo State (Southeastern Region) with 4.92 and Paraná State (Southern Region) with 1.2, the prevalence rates in other Southern and Southeastern states were inferior to 1/10,000 inhabitants, indicating the possibility of reaching the elimination goals (1 case for each 10,000 inhabitants) by 2005 at a national level.

Ministry of Health data indicated that 10 states presented a prevalence rate higher than 5/10,000, which characterizes a condition of *hyperendemicity* in most of the country. On the other hand, according to this report results (WHO prevalence rate), only seven states (Rondônia, Acre, Roraima, Pernambuco, Sergipe, Espírito Santo, and Mato Grosso) fell into this category.

Leprosy prevalence rates Brazil - Brazilian Ministry of Health, WHO,
and LEM 2003

| | ATDS(*) <i>Ministry of Health</i> | Brazil (Standard. WHO) | LEM (&) | LEM (Standard. WHO) |
|----------------------------|--|------------------------|---------|------------------------|
| BRAZIL | 4.17 | 2.98 | 2.67 | 2.20 |
| Northern Region | 7.43 | 6.00 | 5.90 | 5.09 |
| Roraima | 9.41 | 8.16 | 11.23 | 10.23 |
| Acre | 5.71 | 5.25 | 10.53 | 9.13 |
| Amazonas | 6.51 | 4.86 | 5.89 | 4.69 |
| Roraima | 14.53 | 10.47 | 12.79 | 11.80 |
| Northeastern Region | 6.04 | 5.37 | 4.89 | 3.45 |
| Ceará | 5.70 | 3.86 | 5.92 | 0.70 |
| Paraíba | 4.84 | 2.68 | 2.70 | 2.22 |
| Pernambuco | 8.51 | 7.85 | 8.91 | 4.87 |
| Alagoas | 2.00 | 0.99 | 3.65 | 3.17 |
| Sergipe | 3.42 | 5.56 | 3.25 | 3.24 |
| Bahia | 4.36 | 1.50 | 2.82 | 2.62 |
| Southeastern Region | 2.41 | 1.64 | 1.17 | 1.16 |
| Minas Gerais | 2.98 | 1.83 | 0.78 | 0.74 |
| Espírito Santo | 5.84 | 5.57 | 4.92 | 4.76 |
| Rio de Janeiro | 3.86 | 1.93 | 0.74 | 0.71 |
| São Paulo | 1.29 | 1.10 | 0.19 | 0.19 |
| Southern Region | 1.42 | 0.82 | 0.57 | 0.55 |
| Paraná | 3.13 | 1.58 | 1.25 | 1.20 |
| Santa Catarina | 0.63 | 0.61 | 0.88 | 0.85 |
| Rio Grande do Sul | 0.22 | 0.22 | 0.38 | 0.37 |
| Midwestern Region | 11.77 | 4.77 | 4.78 | 4.60 |
| Mato Grosso | 24.81 | 11.39 | 6.71 | 6.22 |
| Mato Grosso do Sul | 4.05 | 3.61 | 2.81 | 2.61 |
| Goiás | 12.65 | 3.73 | 8.35 | 7.94 |
| Federal District | 1.49 | 0.41 | 0.98 | 0.95 |

Excluding Amapá, Tocantins, Pará, Piauí, Maranhão, and Rio Grande do Norte due to lack of data on defaulters in these states

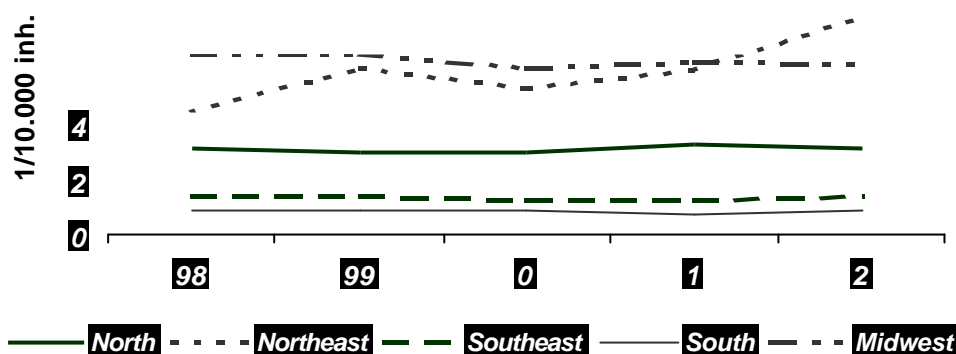
SOURCE: () Área Técnica de Dermatologia Sanitária (ATDS) – Secretaria de Vigilância em Saúde – Ministry of Health.*

(&)No. of patients registered for treatment at time of visit – Form 7, as provided by FUAM & ILSL monitors – July 2003/ Resident municipal population when visited by LEM x 10,000

LEM/standard WHO – (No. of patients registered for treatment at time of visit – Form 7, as provided by FUAM & ILSL monitors – defaulters – municipal resident population when visited by LEM x 10,000

While detection rates in the North, South, Southeast, and Southwest have remained stable over the last five years, they have risen exclusively in the Northeast. Midwest and Northeast rates were three times higher than those in the South and Southeast.

Leprosy detection rates according to region Brazil 1998-2002



SOURCE: LEM 2003 REGIONAL REPORTS – the Lauro de Souza Lima Institute and the Alfredo da Matta Foundation.

An analysis of the 11,765 new case files revealed that, at diagnosis, 19% presented a single lesion. Except for Pará and Roraima, more than 25% of all new cases in the Northern states, Rio de Janeiro, Piauí, Alagoas, Sergipe, and Paraíba had a single lesion at diagnosis. Ideally, this indicator could be viewed as a sign that the health care system has been successful in making early diagnoses more frequently than before but it might also be viewed as an indirect alert that an excess of false-positive cases is being tallied in some areas of the country.

The fact that 56% of all new cases were Multibacillary (MB) and that, in the Midwest Region, for example, MB constituted 70%, indicates the need for a study of the reliability of these data, reinforced by the finding that 10% of MB-classified new cases in 2002 presented a single lesion at diagnosis. In most states, diagnosis continues to be made approximately one year after the first symptoms have appeared.

The proportion of patients with disabilities (Disability Grade DG= 2) among new cases was 5%. The highest percentages of late diagnoses were found in Rio Grande do Sul (13, 00 %), Mato Grosso (12, 50- %), and Santa Catarina (11, 36 %).

The data regarding children provided by the state coordinators were coincident with LEM data in that children (0-14 years of age) with leprosy corresponded to 7.7% of all new cases. The calculation of the specific rates

related to age, sex, and clinical form are epidemiologically because they might express a differential risk of exposure and be directly related to the local endemic level. The Northern and Northeastern Regions were found to have surpassed the 10% margin of childhood cases of leprosy.

Regarding gender, males outnumbered females in four of the five regions, which is a common phenomenon in other countries as well.

II. Status of Integration of MDT Services within General Health Services

In 2002, of the 3,521 Brazilian municipalities, 60% had at least one case of leprosy among its residents. In August 2002, the overall coverage of MDT services was a mere 16%. Only the State of Rio Grande do Norte was able to achieve the recommended ($\geq 85\%$ of all Primary Health Care - PHC). The Northern Region presented the widest coverage, i.e., 32% of all their PHCs with provided MDT services. In the other four regions, coverage was less than 30%. To a state level, twenty-one presented a coverage below 50% and nine others showed less than 10%.

Status of MDT services by state and capital cities – LEM 2003 Brazil

| STATES | % w/MDT Services | Capital Cities | % w/MDT Services |
|---------------------|------------------|----------------|------------------|
| Acre | 6.58 | Rio Branco | 1.30 |
| Alagoas | 28.74 | Maceió | 20.99 |
| Amazonas | 26.98 | Manaus | 30.50 |
| Bahia | 25.83 | Salvador | 11.34 |
| Ceará | 23.55 | Fortaleza | 17.05 |
| Federal District | 19.12 | Brasília | 17.57 |
| Espírito Santo | 21.33 | Vitória | 21.33 |
| Goiás | 6.17 | Goiânia | 4.12 |
| Minas Gerais | 3.06 | Belo Horizonte | 3.06 |
| Mato Grosso do Sul | 57.78 | Campo Grande | 80.00 |
| Mato Grosso | 50.33 | Cuiabá | 71.08 |
| Pará | 7.27 | Belém | 6.06 |
| Paraíba | 22.01 | João Pessoa | 9.03 |
| Pernambuco | 25.36 | Recife | 12.57 |
| Piauí | 2.13 | Teresina | 1.20 |
| Paraná | 1.76 | Curitiba | 18.18 |
| Rio Grande do Norte | 96.55 | Natal | 100.00 |
| Rio de Janeiro | 21.97 | Rio de Janeiro | 21.97 |
| Rondônia | 18.37 | Porto Velho | 23.33 |
| Roraima | 43.88 | Boa Vista | 52.38 |
| Rio Grande do Sul | 3.75 | Porto Alegre | 0.43 |
| Santa Catarina | 2.58 | Florianópolis | 2.02 |
| Sergipe | 48.68 | Aracajú | 20.30 |
| São Paulo | 7.15 | São Paulo | 7.15 |
| Tocantins | 54.55 | Palmas | 90.24 |

SOURCE: State/Municipal Coordinators, Form 4 - LEM.

(*). No. of states w/MDT Services/No. of states x 100. Except for Amapá, PHC w/complete MDT services

Among the 2,189 of the municipal Family Health Units (FHU) visited nationwide, 22% (485) carried out leprosy diagnosis and treatment; and most of these were in Rio Grande do Norte, Bahia, Ceará, and Tocantins. On the other hand, many of the FHUs did not do so, including those located at the capital cities of Acre, Minas Gerais, Paraná, Santa Catarina, Rio Grande do Sul, Mato Grosso do Sul, and Brasília.

MDT Coverage in Family Health Units according to State and Capital Cities
– LEM 2003 Brazil

| | Primary Health Care Units (PHC) | Family Health Care Units (FHU) with complete MDT Services | FHU with % MDT of Services (%) |
|----------------------------|---------------------------------|---|--------------------------------|
| Brazil | 2,189 | 485 | 22.16 |
| Northern Region | 386 | 105 | 36.27 |
| Rondonia | 26 | 15 | 57.69 |
| Acre | 45 | 0 | 0.00 |
| Amazonas | 192 | 30 | 15.63 |
| Roraima | 60 | 26 | 43.33 |
| Pará | 11 | 1 | 9.09 |
| Tocantins | 52 | 33 | 63.46 |
| Northeast Region | 727 | 311 | 41.19 |
| Maranhão | 3 | 1 | 33.33 |
| Ceará | 71 | 53 | 74.65 |
| Rio Grande do Norte | 20 | 20 | 100.00 |
| Paraíba | 167 | 44 | 26.35 |
| Pernambuco | 165 | 49 | 29.70 |
| Alagoas | 84 | 30 | 35.71 |
| Sergipe | 183 | 84 | 45.90 |
| Bahia | 34 | 30 | 88.24 |
| Southeastern Region | 529 | 8 | 1.51 |
| Minas Gerais | 486 | 0 | 0.00 |
| Espírito Santo | 14 | 4 | 28.57 |
| Rio de Janeiro | 54 | 2 | 3.70 |
| São Paulo | 29 | 4 | 13.79 |
| Southern Region | 300 | 0 | 0.0 |
| Paraná | 8 | 0 | 0.0 |
| Santa Catarina | 181 | 0 | 0.0 |
| Rio Grande do Sul | 111 | 0 | 0.0 |
| Midwestern Region | 219 | 26 | 11.87 |
| Mato Grosso | 46 | 22 | 47.83 |
| Mato Grosso do Sul | 22 | 0 | 0.0 |
| Goiás | 130 | 4 | 3.8 |
| Federal District (D.F.) | 21 | 0 | 0.0 |

Except for Amapá and Piauí.

SOURCE: Form 4/Monitors - LEM 2003 Brazil.

MDT Accessibility

Throughout the country, the distances a patient had to cover to reach the nearest PHU with MDT services from and his/her home varied enormously. While in states such as Rondônia, Roraima, Pará, and Alagoas, where accessibility was rated the highest, where covered distances were generally under 5 Km. In Amazonas, distance was 10 Km and, in Pernambuco, 16 Km. However, in Amapá and Ceará, the distance between a unit and a patient's residence was, on average, over 25 Km. The shortest average distance (5 Km) between residence and PHU was found in the Northern and Northeastern Regions. No correlation was found in the distance between unit/residence and transportation costs. Generally speaking, patients spent an average R\$3.00 (three reais, or US \$1.00) to and from each supervised visit. Small differences in transportation costs were observed among the various regions. Patients spent more than R\$10.00 in only four states, namely: Amapá, São Paulo, Paraná, and Mato Grosso. The highest transportation costs were paid by residents in São Paulo (R\$18.00) and Paraná (R\$16.00).

In almost 80% of the PHUs visited, leprosy diagnosis and treatment were available whenever the unit was open to the public. In Mato Grosso do Sul, MDT was available only 30% of the time, in contrast with the 100% of the time in São Paulo, Rondônia, Amazonas, Roraima, Tocantins, Maranhão, Bahia, Mato Grosso, and Goiás.

Professional Responsible for Diagnosing and Prescribing Treatment
according to State – LEM 2003 Brazil

| STATES | HEALTH CARE PROFESSIONAL | |
|---------------------|--------------------------|-------------|
| | DIAGNOSIS | TREATMENT |
| Acre | md/n/pmw | md/n/pmw |
| Amapá | md/n | md/n |
| Amazonas | mdn/pmw | md/pmw |
| Pará | md/n/pmw | md/n/pmw |
| Rondônia | md | md/n |
| Roraima | md | md/n |
| Tocantins | md | md |
| Alagoas | md | md/e |
| Bahia | md | md/n |
| Ceará | md | md |
| Maranhão | md | md |
| Paraíba | md | md/n |
| Pernambuco | md/n | md/n |
| Piauí | md/pmw | md/pmw |
| Rio Grande do Norte | md/n | md/n/pmw |
| Sergipe | md | md |
| Minas Gerais | md/n | md |
| Espírito Santo | md | md |
| Rio de Janeiro | md | md/n |
| São Paulo | md/n | md/n |
| Paraná | md/n/pmw | md |
| Santa Catarina | md | md |
| Rio Grande do Sul | md/n | md/n |
| Mato Grosso | md/n/pmw | md/n/pmw |
| Mato Grosso do Sul | md/n/sw/pmw | md/n/sw/pmw |
| Goiás | md/n/pmw | md/n |
| Federal District | md/n | md/n |

md = medical doctor; n = nurse; pmw = paramedical worker; sw = social worker

SOURCE: Form 10/Monitors - LEM 2003 Brazil.

Eighty-five per cent (85%) of the total number of health care units visited treated reactional episodes. While there was 100% coverage in the Southeastern and Midwestern Regions, this was not the case for the Northern Region, especially in Amapá (74%) and Roraima (54%). In the Northern Region, not all units had steroids available and less than half treated reactions. In Rio Grande do Sul, Tocantins, Alagoas, and Rio Grande do Norte, the percentage of units prepared to treat reactions was less than

the national average. In some units, the medical doctor was not the only health care professional allowed to distribute steroids to patients undergoing reactions.

Disabilities were cared by physical therapists, nurses, and assistant nurses, but, for the most part, nurses and assistant nurses were in charge of taking care of these patients.

LEM 2003 data also showed that medical doctors were primarily responsible for diagnosing and prescribing medication in Tocantins, Ceará, Maranhão, Sergipe, Espírito Santo, and Santa Catarina, while, these activities were likewise carried out by nurses, social workers, and paramedical personnel. Moreover, specialized health care units were predominant in the South (84%) and Midwest (67%).

In most states, however, 100% of the blister packs examined were found to be in good condition; and no Children-MB complaints were registered in that regard. Nonetheless, some capital of the Southern units had outdated blister packs in stock at the time of the exercise. Overall, the availability/status of Adult-MB blister packs in patient-months was less than 2 and of Children-MB was more than 5. The availability of Adult-MB in patient-months was higher than or equal to 3 (as recommended) in Rio de Janeiro, Espírito Santo, Paraíba, and Alagoas. However, In Rio Grande do Sul, Mato Grosso, and Amazonas, more than six Adult-MB blister packs were found. In Rio Grande do Sul, no Children-MB were encountered while an excess of Children-MB was observed in most of the rest of the country.

Adult-Paucibacillary (PB) blister packs were more widely available than the MB ones. In most states, this situation most probably resulted in a shortage of Adult-MB blister packs throughout 2003.

Forty per cent (40%) of all health care units visited did not have a minimum 3 months' supply of MDT in all categories. MDT stocks varied from the availability of one blister pack in Ceará and Santa Catarina to more than 25 in Amazonas. The percentage of health care units with at least 3 months' MDT in stock corresponding to the number of registered leprosy cases was 34.6% for Adult-MB, 84.2% for Children-MB, 67.7% for Adult-PB, and 50.8% for Children-PB.

III - QUALITY OF MDT SERVICES

More than 20% of the new cases detected among PHUs visited in Alagoas, the Federal District, and Pernambuco continued to receive treatment beyond 12 doses, the same being true with regard to PB cases in the Federal District and Amapá with respect to the 6 standard doses.

Except for Amapá, whose defaulter rate was 24%, no other state presented defaulter rates above 12%.

In the country as a whole, the cure rates were found to be slightly below 80%.

In conclusion, the overall results of the LEM 2003 survey highlighted both the positive and negative aspects of the current status of leprosy control in Brazil. Significantly, however, the sheer quantity, quality, and reliability of the information placed at our disposal has provided us with a unique opportunity to assist the Ministry of Health in a meaningful way to re-examine and, hopefully, expand and reorganize the scope the agenda of the National Leprosy Elimination Plan now underway.

The Pan American Health Organization and the World Health Organization
Brazil
January 2004

LEPROSY ELIMINATION MONITORING (LEM) - BRAZIL 2003

Introduction

The Leprosy Elimination Monitoring (LEM) exercise is the standardized WHO methodology used to collect and analyze complementary data besides the routine information system. In order to more precisely (accurately) understand how well local, state, regional, and national health care services are performing in the leprosy elimination process, as well as to determine the effectiveness and degree of accessibility of these services to leprosy carriers. Since these data make it possible to measure specific aspects of leprosy elimination strategies, decision-makers and health care personnel gain access to reliable, wide-ranging information that can be used to more efficiently implement plans of action in the field.

Under the joint support of the Pan American Health Organization (PAHO), WHO, and the Brazilian Ministry of Health, a national LEM exercise was launched between June and August 2003 in cooperation with all 26 states plus the Federal District (Brasília) to assess the efforts made to date toward eliminating leprosy nationwide. Independent monitors from PAHO/WHO collaborating centers (the Lauro de Souza Lima Institute and the Alfredo da Matta Foundation) collected and presented specific information to aid health care authorities and program managers in evaluating the current status of leprosy disease in the country based on the following criteria:

1. Reliability of data on prevalence and detection rates (general and specific);
2. Logistics of MDT stocks and MDT integration performance with respect to availability of MDT blister packs within the health care system;
3. Geographical coverage of MDT; and
4. Effectiveness of MDT, using cohort analyses.

The Leprosy Elimination Monitoring (LEM) exercise was based on a cross-sectional survey carried out in a randomly-chosen health care units sample through interviews with leprosy patients and health care professionals. The Alfredo da Matta Foundation was responsible for the reports carried out in all of the Northern and Northeastern states and the Lauro de Souza Lima Institute for the Southern, Southeastern, and Midwestern states.

This report presents tables and figures showing the status of leprosy in Brazil by states or regions. To delineate the operational and epidemiological

leprosy profile the data elaboration and standardization in accordance with WHO recommendations. In the way toward elimination, it is hoped that this contribution will lead to the ever-widening availability of leprosy care services to the general population. The purpose is to facilitate the monitoring of leprosy elimination policies by making these data readily available nationwide.

Specific Objectives

- ✍ ✍ Evaluate strategies and activities of elimination by key indicators in all 26 states and Brasília;
- ✍ ✍ Evaluate the status of MDT services integration of elimination procedures within the general health care services;
- ✍ ✍ Evaluate the effectiveness of MDT services ; and
- ✍ ✍ Identify potential obstacles to implementation and
- ✍ ✍ Make recommendations for improvement

Methodology

Twenty-nine university graduates with background in public health and leprosy control were selected and trained as monitors in the collaborating centers, the Alfredo da Matta Foundation (FUAM) and the Lauro de Souza Lima Institute (ILSL). The programs coordinators of all participating governments were visited and invited to participate in the survey. A checking was made to see if the sample selection of the municipalities was adequate in terms of the official existing patient registry and if the baseline detection and prevalence rate data had been collected. The visits to the capital cities in each state were made after the work in all of the municipalities selected.

The MB and PB patients cohorts were composed by new patients in 2001 and 2002.

The municipal samples were randomly-chosen and stratified. Except for the Southern states, that reported less than 10 new cases in 2001 - 2002 were not included. A minimum of three municipalities in each of state were chosen by draw at least 200 new cases (100 MB + 100 PB). The capital city of all the states plus Brasília was also included. In this way, the sample size to guarantee data reliability was achieved. It was also determined that at least 200 patient files would be examined, and 50 patients in each state and the Federal District (FD) would be interviewed.

The selection of health care units to be chosen by draw was determined after the state coordinators provided the total number of units in each of the sample municipalities. Stratification was made based on a table of random numbers of the total units proportionally to the total number of patients included in each treatment regimen.

Standardized forms (WHO version, 2000) were adapted to the Brazilian context. The required state and municipal data were gathered from the leprosy program coordinators, from patient files, notification cards, and interviews with patients and local health care teams.

Results

The data collected from the 26 states plus the FD (esta sigla é estranha – fica melhor Federal District mesmo) is composed by made a set of standard indicators. The monitors visited 153 municipalities, 242 health care facilities, and examined 37,879 cases, of which 11,765 were newly detected in 2002; the patient files of these cases represent 28% of the total of cases detected in 2002. The monitors counted 13,974 blister packs and reported on their expiration dates and storage conditions. In these municipalities, 902 patients and 125 health care professionals were interviewed for the purpose of evaluating the quality of the MDT services being administered (Table 1). The total population of the sample municipalities is 58 million; therefore, the LEM 2003 survey reached more than 30% of the nation's inhabitants.

Table 1: Simple size of the Leprosy Monitoring Elimination (Brazil, 2003).

| Brazil State/Region | Visit | | Exam | | | | Interviews # Patients |
|-----------------------------|----------|-----|---------------|--------|--------|----------|--------------------------|
| | Municip. | PHC | Patient Files | | | Blisters | |
| | | | NC | RC | Cohort | | |
| Brazil | 153 | 247 | 11.765 | 14.804 | 4.489 | 14.080 | 952 |
| Northern Region | 36 | 68 | 2.836 | 3.298 | 1.957 | 3.710 | 227 |
| Rondônia | 4 | 5 | 675 | 616 | 252 | 106 | 34 |
| Acre | 6 | 6 | 322 | 466 | 312 | 811 | 49 |
| Amazonas | 7 | 9 | 670 | 1043 | 304 | 765 | 43 |
| Roraima | 6 | 13 | 338 | 348 | 270 | 800 | 11 |
| Pará | 4 | 10 | 179 | 444 | 111 | 773 | 50 |
| Amapá | 5 | 15 | 345 | 251 | 335 | 244 | 17 |
| Tocantins | 4 | 10 | 307 | 130 | 373 | 211 | 23 |
| Northeastern Region | 46 | 78 | 5.213 | 6.937 | 2.278 | 3.002 | 308 |
| Maranhão | 4 | 6 | 612 | 844 | 216 | 772 | 29 |
| Piauí | 4 | 4 | 480 | 417 | 273 | 170 | 50 |
| Ceará | 4 | 5 | 1.117 | 1.469 | 300 | 156 | 52 |
| Rio Grande do Norte | 6 | 9 | 231 | 125 | 152 | 30 | 18 |
| Paraíba | 5 | 9 | 375 | 340 | 208 | 242 | 29 |
| Pernambuco | 6 | 9 | 1.060 | 2.229 | 296 | 191 | 43 |
| Alagoas | 6 | 19 | 325 | 448 | 339 | 1.188 | 37 |
| Sergipe | 7 | 12 | 266 | 278 | 248 | 158 | 12 |
| Bahia | 4 | 5 | 747 | 787 | 246 | 95 | 38 |
| Southeastern Region | 21 | 29 | 1.337 | 2.242 | 69 | 4.541 | 164 |
| Minas Gerais | 5 | 7 | 338 | 208 | 18 | 477 | 46 |
| Espírito Santo | 5 | 6 | 380 | 356 | 10 | 77 | 48 |
| Rio de Janeiro | 5 | 9 | 483 | 561 | 23 | 2.125 | 55 |
| São Paulo | 6 | 7 | 136 | 222 | 18 | 1.862 | 15 |
| Southern Region | 33 | 38 | 507 | 307 | 48 | 1.343 | 96 |
| Paraná | 4 | 6 | 236 | 281 | 29 | 458 | 40 |
| Santa Catarina | 12 | 13 | 132 | 176 | 14 | 393 | 10 |
| Rio Grande do Sul | 17 | 19 | 139 | 131 | 5 | 492 | 46 |
| Midwestern Region | 17 | 34 | 1.872 | 2.020 | 137 | 1.484 | 157 |
| Mato Grosso | 4 | 15 | 328 | 510 | 60 | 1.010 | 23 |
| Mato Grosso do Sul | 5 | 10 | 190 | 223 | 19 | 321 | 23 |
| Goiás | 4 | 4 | 1.110 | 1.077 | 14 | 65 | 58 |
| Federal District (Brasília) | 4 | 5 | 244 | 210 | 44 | 88 | 53 |

SOURCE: LEM forms provided by the monitors (FUAM & ILSL) in July 2003. NC = new cases in 2002; RC = N° of patients/cases registered for treatment at the time of visit; Cohort = MB Cases diagnosed in 2001 and PB in 2002.

I. Elimination Indicators

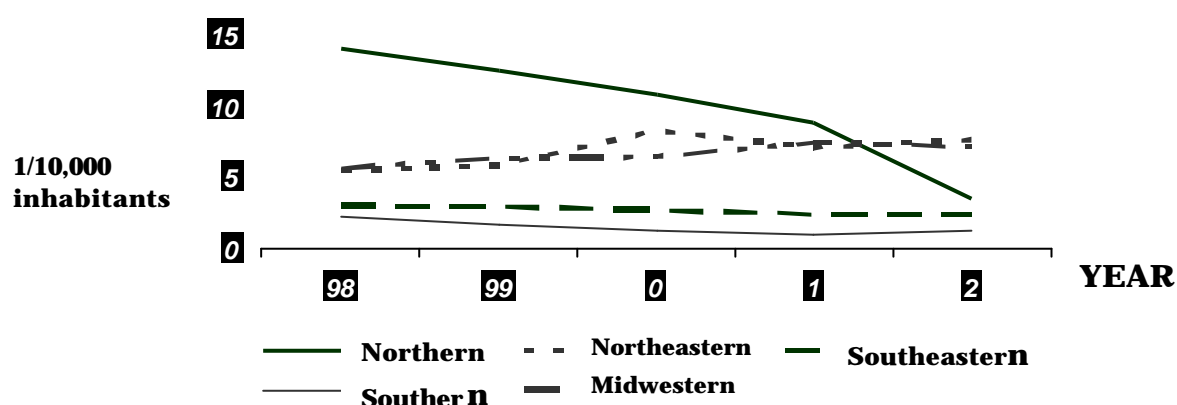
Prevalence Rates

Prevalence rates demonstrate the progress of the elimination process. The prevalence coefficient correlates the number of patients undergoing treatment per 10,000 inhabitants. In 2002, the Brazilian prevalence rate was 4.20 cases of leprosy per 10,000 inhabitants.

The data related to prevalence trends between 1998-2000 provided by the state coordinators show a trend of the stabilization in the Southeast, South, and Middle West and a 75% of reduction in the North. The only region showing increase in the prevalence rate (28.13%) among 2000-2002 was the Northeast. Moreover, the highest defaulter rate (25.4% in 2002) was also found in this region.

Figure 1

Leprosy - Prevalence rate coefficients by region –
Brazil 1998-2000



SOURCE: Regional LEM 2003 reports, the Lauro de Souza Lima Institute, and the Alfredo da Matta Foundation.

Brazilian Ministry of Health data showed that 69,711 cases were registered for treatment in 2002, not including Tocantins and Pará. On the other hand, the LEM reported 68,672 registrations. The reliability of the information provided by LEM regarding prevalence rates by regions and Brazilian states can be verified in the following table by different prevalence coefficients such as: a) published by the Ministry of Health ; b) calculated according to the WHO definition of leprosy; c) calculated using the data collected by LEM nationwide; and d) calculated according to WHO criteria.

The difference in the prevalence rate for 2002 between the official Brazilian and the official WHO is 1.19% (4.17% vs. 2.98%), or 27,340 cases. This was considered a significant difference because it results in an increase of the prevalence rate in more than 28%. Three factors may have contributed, separately or at the same time, to the maintenance of a prevalence rate pointing to a much higher number of cases than actually existed: 1) Interruption of treatment before a definition of clinical status was reached; 2) Inclusion of MB patients that received more than 12 and PB patients that received more than 6 doses; and 3) Inclusion of out-of-date records of cured/released patients (Table 2). On the other hand, in most states, the LEM prevalence rates based on municipal data and the standard WHO/LEM rates were quite similar, with the exception of Ceará and Pernambuco, both of which were found to have had a high number of drop outs. The discovery of a 30% plus prevalence rate emphasized how important it is for the national health responsible care agencies to henceforth require the systematic application of standard definitions and the updating of case registration information on the local, state, and national levels. The gap between health care data on the state and national levels in comparison with the local level suggests the ineffectiveness of government-sponsored health care information programs.

An analysis of state and regional prevalence rates showed that the rates of the states of the Southern and Southeastern regions were smaller than 1 per 10,000 inhabitants, except Espírito Santo with 4.92, and Paraná with 1.2 per 10,000, that demonstrated the potential of these Regions to reach the elimination target at 2005. The high number of cases found in the Northern and Midwestern Regions is consequence of the high average in the prevalence rates observed in Fredonia, Acre, Roam, Matos Grosse, and Goes (among 8 – 12 per 10,000 inhabitants). In the Northeast, the State of Pernambuco stands out with a similar endemic disease pattern at nearly 9/10,000 inhabitants. Consequently or therefore, the LEM 2003 Brazil survey confirmed a higher than 5/10,000 prevalence rate in at least 11 states, classifying the disease as *hyper endemic* throughout most of the country.

Table 2 – Prevalence rates of leprosy by Ministry of Health (MH), World Health Organization (WHO), and Leprosy Monitoring Elimination (LEM) . Brazil, 2003.

| Brazil Regions/States | MH (*) | Brazil (WHO) | LEM (&) | LEM (WHO) |
|-----------------------|--------|--------------|---------|-----------|
| Brazil | 4.17 | 2.98 | 2.67 | 2.20 |
| Northern | 7.43 | 6.00 | 5.90 | 5.09 |
| Rondônia | 9.41 | 8.16 | 11.23 | 10.23 |
| Acre | 5.71 | 5.25 | 10.53 | 9.13 |
| Amazonas | 6.51 | 4.86 | 5.89 | 4.69 |
| Roraima | 14.53 | 10.47 | 12.79 | 11.80 |
| Northeastern | 6.04 | 5.37 | 4.89 | 3.45 |
| Ceará | 5.70 | 3.86 | 5.92 | 0.70 |
| Paraíba | 4.84 | 2.68 | 2.53 | 2.22 |
| Pernambuco | 8.51 | 7.85 | 8.91 | 4.87 |
| Alagoas | 2.00 | 0.99 | 3.65 | 3.17 |
| Sergipe | 3.42 | 5.56 | 3.25 | 3.24 |
| Bahia | 4.36 | 1.50 | 2.82 | 2.62 |
| Southeastern | 2.41 | 1.64 | 1.17 | 1.16 |
| Minas Gerais | 2.98 | 1.83 | 0.78 | 0.74 |
| Espírito Santo | 5.84 | 5.57 | 4.92 | 4.76 |
| Rio de Janeiro | 3.86 | 1.93 | 0.74 | 0.71 |
| São Paulo | 1.29 | 1.10 | 0.19 | 0.19 |
| Southern | 1.42 | 0.82 | 0.57 | 0.55 |
| Paraná | 3.13 | 1.58 | 1.25 | 1.20 |
| Santa Catarina | 0.63 | 0.61 | 0.88 | 0.85 |
| Rio Grande do Sul | 0.22 | 0.22 | 0.38 | 0.37 |
| Midwestern | 11.77 | 4.77 | 4.78 | 4.60 |
| Mato Grosso | 24.81 | 11.39 | 6.71 | 6.22 |
| Mato Grosso do Sul | 4.05 | 3.61 | 2.81 | 2.61 |
| Goiás | 12.65 | 3.73 | 8.35 | 7.94 |
| Federal District | 1.49 | 0.41 | 0.98 | 0.95 |

This table does not include Amapá, Tocantins, Pará, Maranhão or Rio Grande do Norte due to lack of data regarding treatment interruption. SOURCE: () Ministry of Health – Area Técnica de Dermatologia Sanitária. (&) N° of patients registered for treatment at time of LEM visit Form 7, provided by the FUAM & ILSL monitors in July 2003. No. of residents in the municipalities visited by LEM X 10,000.*

Although of the high prevalence rates in most states, the time spent by patients, with the treatment was low (P/D ratio of 1.25). This shows that a significant reduction had occurred in the gap between the numbers of the cases newly-diagnosed leprosy and cured (Table 3).

This referred gap was most important in the States as Acre, Amazonas, Pará, Maranhão, Pernambuco, São Paulo, and Mato Grosso because, for the most part, patient records often remained on file way beyond the period of the treatment recommended. This situation can be explain by the large number of MB cases that continued treatment after completing the standard protocol

with 12 doses and/or the permanence of the records of patients who were not discharged after completing treatment.

Table 3 – Leprosy Prevalence and Detection Rates and P/D Ratio of LEM. Brazil, 2003.

| Brazil (Regions/States) | Prevalence Rate | Detection Rate | P/D Ratio |
|--------------------------|-----------------|----------------|-----------|
| <i>Brazil</i> | 2.67 | 2.14 | 1.25 |
| <i>Northern</i> | 5.90 | 5.21 | 1.13 |
| Rondônia | 11.23 | 12.31 | 0.91 |
| Acre | 10.53 | 7.27 | 1.45 |
| Amazonas | 5.89 | 3.78 | 1.56 |
| Roraima | 12.79 | 12.42 | 1.03 |
| Pará | 2.20 | 1.10 | 2.00 |
| Amapá | 5.58 | 7.7 | 0.73 |
| Tocantins | 3.95 | 9.3 | 0.42 |
| <i>Northeastern</i> | 4.9 | 3.9 | 1.33 |
| Maranhão | 8.07 | 5.85 | 1.38 |
| Piauí | 4.50 | 5.18 | 0.87 |
| Ceará | 5.92 | 4.50 | 1.32 |
| Rio Grande do Norte | 1.20 | 2.21 | 0.54 |
| Paraíba | 2.53 | 2.98 | 0.85 |
| Pernambuco | 8.91 | 4.24 | 2.10 |
| Alagoas | 3.65 | 2.65 | 1.38 |
| Sergipe | 3.25 | 3.11 | 1.05 |
| Bahia | 2.82 | 2.68 | 1.05 |
| <i>Southeastern</i> | 1.17 | 0.70 | 1.68 |
| Minas Gerais | 0.78 | 1.27 | 0.62 |
| Espírito Santo | 4.92 | 5.25 | 0.94 |
| Rio De Janeiro | 0.74 | 0.64 | 1.16 |
| São Paulo | 0.19 | 0.12 | 1.63 |
| <i>Southern</i> | 0.57 | 0.94 | 0.61 |
| Paraná | 1.25 | 1.05 | 1.19 |
| Santa Catarina | 0.88 | 0.66 | 1.33 |
| Rio Grande do Sul | 0.38 | 0.41 | 0.94 |
| <i>Midwestern Region</i> | 4.78 | 4.43 | 1.08 |
| Mato Grosso | 6.71 | 4.32 | 1.55 |
| Mato Grosso do Sul | 2.81 | 2.40 | 1.17 |
| Goiás | 8.35 | 8.60 | 0.97 |
| Federal District | 0.98 | 1.14 | 0.86 |

Detection

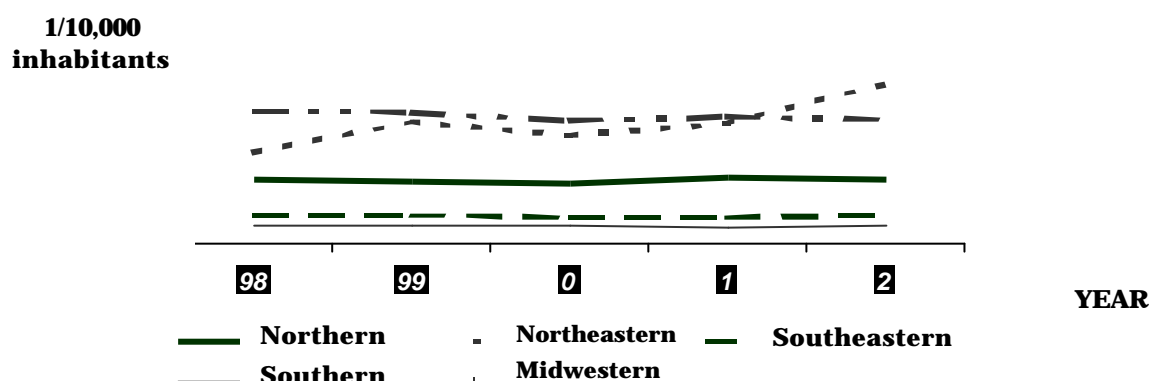
The data obtained from the samples of the 11,765 new case files were equivalent to 25% of the total number of all new cases reported by the Ministry of Health in 2002.

Over the last five years, detection rates show trend of the stabilization in the Northern, Southern, Southeastern, and Midwestern Regions but have shown a rising tendency in the Northeast. The rise in the detection rates, reflected also in the prevalence rates found in this Region, could be attributed to the more effective leprosy detection strategy in Alagoas, Bahia, Rio Grande do Norte, and Sergipe.

The prevalence coefficients observed in the Midwest and Northeast remained three times higher than those found in the South and Southeast. Extreme differences can be observed between the regions South and the Midwest (Figure 2).

Figure 2

Leprosy detection coefficients according to Region - Brazil 1998-2002



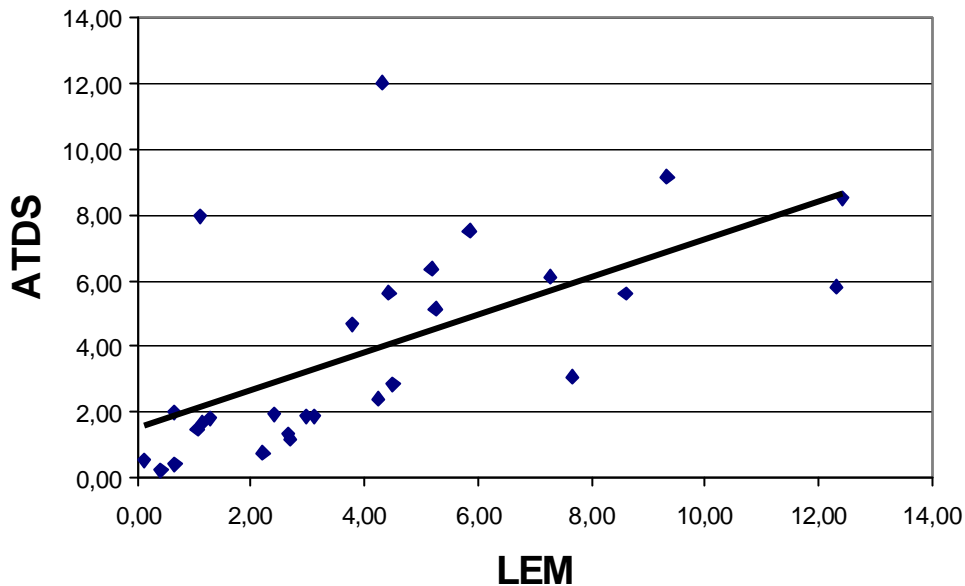
SOURCE: Regional LEM 2003 reports, the Lauro de Souza Lima Institute, and the Alfredo da Matta Foundation.

According to National Leprosy Elimination Program, 46,733 new cases were diagnosed in 2002; on the other hand, LEM monitors reported only 41,460 new cases in the same year. However, there is a positive correlation between the number of new cases diagnosed on the state level by LEM monitors and those published by Ministry of Health. Differently of the prevalence rate or not observed on the prevalence rates (Figure 3).

On the other hand, the detection coefficients calculated from local data collected by LEM monitors coincided in 16 of the 27 states surveyed, 12 of which were found to have exactly the same endemic level as the one reported by the Ministry of Health. The main disagreement observed was with the data from Amazonas and Pará, This states according to the MoH, are “hyperendemic” but, in accordance with LEM data, are “highly endemic”.

Similarly, by LEM estimates, these states were designated to be on a higher level of endemicity that measured by the Ministry of Health.

Correlation between ATDS and LEM

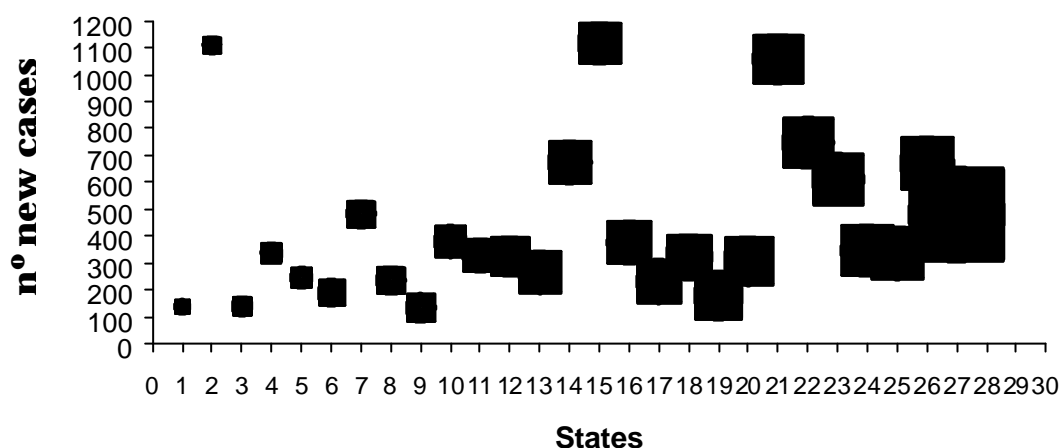


LEM 2002 data showed that less than 20% of new cases detected presented a single lesion at diagnosis in the whole country. Pará and Roraima, all Northern states plus Rio de Janeiro, Piauí, Alagoas, Sergipe, and Paraíba reported the existence of a single lesion in more than 25 % of new cases. Out of new MB cases, 10% had a single lesion in these states while the state of Minas Gerais State Health Services reported 20% while LEM monitors reported that approximately 20% of all newly-detected MB cases presented a single lesion at diagnosis. The 13 State Health Services Coordinators indicated that only 7.7% presented a single lesion at diagnosis (Tables 5 and 6).

The presence of a single lesion is a non-well studied indicator that ideally suggests that the health facilities are able to find early cases, at the risk of including false positive individuals.

There were important differences in the distribution of the distinct forms of new cases of leprosy younger than 15 years of age. This finding indicates the continued presence of active transmission. According to data provided by State Coordinators and LEM, 7.7% of new cases were children. In some Northern and Northeastern states, however, 10% of all new cases were children (Figure 4).

Figure 4 - **Proportion of children younger than 15 years of age among new cases of Leprosy in 2002 by state. LEM - 2003, Brazil.**



NOTE: The size of the circles illustrate the magnitude of the proportion of children among new cases.

SOURCE: Data provided by LEM 2003 monitors (FUAM & ILSL).

| Position | 1 | 2 | 3 | 4 | 5 | 6 |
|----------|----------------|-----------|----------------|----------------|------------------|------------|
| State | SÃO PAULO | GOIÁS | RIO G.SUL | MINAS GERAIS | FEDERAL DISTRICT | MATO G.SUL |
| | 7 | 8 | 9 | 10 | 11 | 12 |
| | RIO DE JANEIRO | PARANÁ | SANTA CATARINA | ESPÍRITO SANTO | MATO GROSSO | ALAGOAS |
| | 13 | 14 | 15 | 16 | 17 | 18 |
| | SERGIPE | RONDÔNIA | CEARÁ | PARAÍBA | RIO G. DO NORTE | ACRE |
| | 19 | 20 | 21 | 22 | 23 | 24 |
| | PARÁ | TOCANTINS | PERNAMBUCO | BAHIA | MARANHÃO | AMAPÁ |
| | | 25 | 26 | 27 | | |
| | | RORAIMA | AMAZONAS | PIAUI | | |

In 2002, multibacillary (MB) form was found in 56% of the new cases in the whole country. In the Midwest, 70% of new cases were MB; and in Goiás, 89%. In the Southeast, Minas Gerais registered 89% and in the South, Rio Grande do Sul had 77% of MBs. Mato Grosso (37%) reported the smallest percentage of MB patients according to LEM Monitors. On the other hand, data provided by State Coordinators showed that MB patients were 52% of all new cases in the country while Rio Grande do Sul (75%), Goiás (62%), and

Minas Gerais (66%) were the states reporting the highest percentage of newly-diagnosed MB patients in 2002.

Like in other countries, males were more numerous than females in Brazil. Male patients were predominant in four of the five regions. The women made up 46% of all new cases in the country, and predominated by a small margin among new cases in the Northeastern states of Paraíba (57%), Bahia (55%), and Ceará (51%). The variations reported in individual states ranged from 30% in Amapá to 57% in Paraíba.

According to the information from medical records at local levels, a GD assessment was carried out in more than 85% of the new cases, in the majority of the states. These data demonstrate the operational efficiency of the health care facilities involved. According to LEM 2002 data, 650 new cases presented some form of disability.

Late diagnosis was found by LEM to be most frequent in Rio Grande do Sul (13%), followed by Mato Grosso (12.5%) and Santa Catarina (11.36%). However, data from the individual state databases showed that Minas Gerais (9.41%) and Paraná (9.13%) were positioned immediately after Rio Grande do Sul.

Table 5 – LEM 2003 Brazil. Distribution by State and Region of the number of new cases, and percentages of single lesion, children, MBs, women, and patients with GD ≥ 2

| State/Region | New Cases (*) | % | | | | |
|---------------------|---------------|---------------|----------|-------|-------|--------|
| | | Single Lesion | Children | MB | Women | GD > 2 |
| <i>Brazil</i> | 11,765 | 19.10 | 7.70 | 56.97 | 46.01 | 5.52 |
| <i>Northern</i> | 2,836 | 30.18 | 9.40 | 52.54 | 41.33 | 5.99 |
| Rondônia | 675 | 28.90 | 6.96 | 54.37 | 42.67 | 6.57 |
| Acre | 322 | 26.71 | 8.07 | 65.84 | 42.86 | 4.48 |
| Amazonas | 670 | 38.96 | 10.90 | 45.52 | 39.25 | 9.18 |
| Roraima | 338 | 20.12 | 10.65 | 60.95 | 37.57 | 9.96 |
| Pará | 179 | 17.88 | 8.94 | 56.42 | 30.73 | 6.59 |
| Amapá | 345 | 33.91 | 10.43 | 50.14 | 46.67 | 6.88 |
| Tocantins | 307 | 31.60 | 9.12 | 41.04 | 45.60 | 4.35 |
| <i>Northeastern</i> | 5,213 | 16.34 | 10.78 | 53.46 | 50.07 | 4.68 |
| Maranhão | 612 | 15.52 | 9.97 | 61.93 | 40.03 | 6.42 |
| Piauí | 480 | 35.21 | 35.21 | 42.71 | 50.21 | 4.41 |
| Ceará | 1,117 | 7.07 | 6.98 | 63.47 | 51.12 | 6.89 |
| Rio Grande do Norte | 231 | 1.18 | 7.36 | 55.41 | 50.65 | 8.99 |
| Paraíba | 375 | 30.13 | 7.20 | 44.27 | 57.87 | 5.81 |
| Pernambuco | 1,060 | 1.42 | 9.25 | 50.85 | 49.25 | 3.97 |
| Alagoas | 325 | 2.46 | 6.15 | 43.69 | 49.54 | 6.90 |
| Sergipe | 266 | 27.44 | 6.77 | 46.62 | 46.99 | 8.78 |
| Bahia | 747 | 24.10 | 9.91 | 52.88 | 55.02 | 4.25 |
| <i>Southeastern</i> | 1,337 | 23.19 | 2.54 | 57.67 | 46.82 | 6.28 |
| Minas Gerais | 338 | 18.64 | 1.48 | 89.94 | 47.93 | 8.66 |
| Espírito Santo | 380 | 23.68 | 3.68 | 40.79 | 50.53 | 3.65 |
| Rio de Janeiro | 483 | 32.09 | 2.90 | 48.45 | 45.34 | 10.10 |
| São Paulo | 136 | 1.47 | 0.74 | 57.35 | 38.97 | 9.52 |
| <i>Southern</i> | 507 | 4.54 | 2.6 | 65.29 | 44.38 | 7.89 |
| Paraná | 236 | 0.85 | 2.97 | 58.90 | 42.37 | 4.39 |
| Santa Catarina | 132 | 10.61 | 3.03 | 63.64 | 46.21 | 11.36 |
| Rio Grande do Sul | 139 | 5.04 | 1.44 | 77.70 | 46.04 | 13.04 |
| <i>Midwestern</i> | 1,872 | 11.00 | 1.87 | 70.67 | 41.67 | 5.98 |
| Mato Grosso | 328 | 11.28 | 4.27 | 39.33 | 37.20 | 7.69 |
| Mato Grosso do Sul | 190 | 22.63 | 2.63 | 46.31 | 46.31 | 12.50 |
| Goiás | 1,110 | 6.49 | 1.08 | 86.67 | 41.44 | 5.03 |
| Federal District | 244 | 22.13 | 1.64 | 59.02 | 45.08 | 7.39 |

(*) Cases diagnosed in the primary health care units visited by LEM Monitors.

SOURCE: Data provided by the LEM 2003 Monitors from FUAM and ILSL.

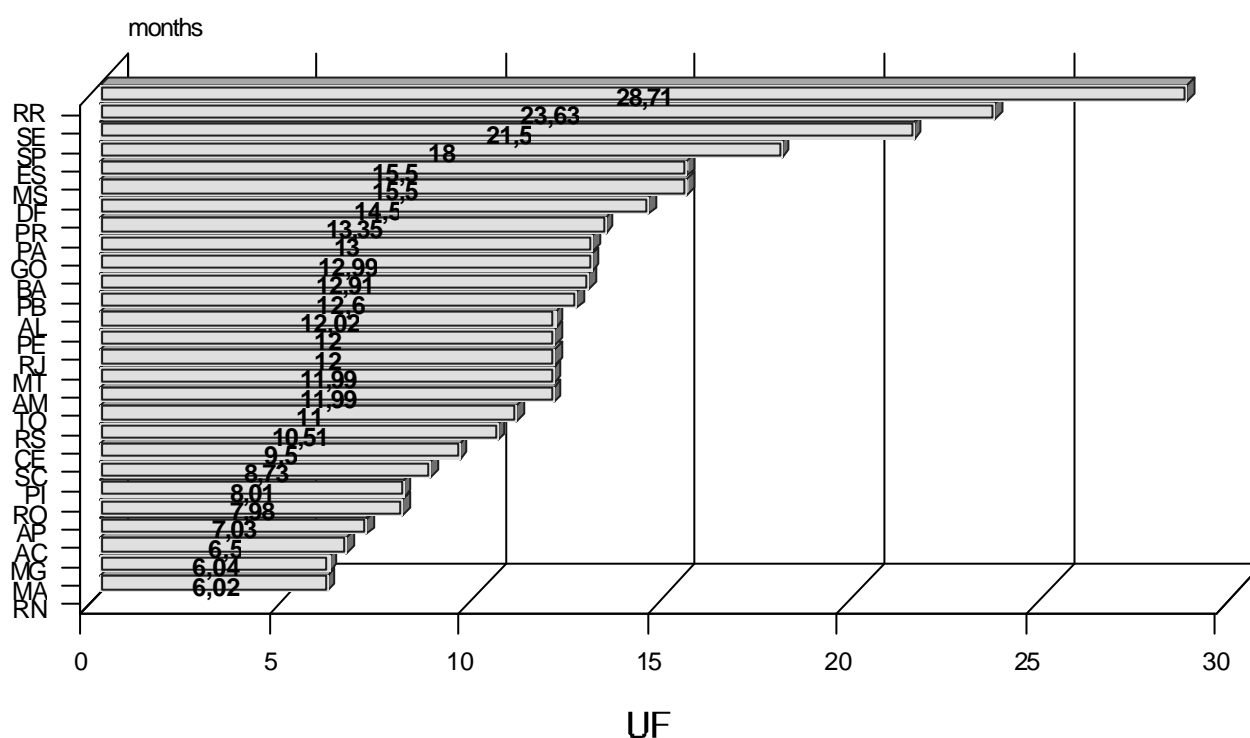
Table 6: LEM 2002 Brazil. Distribution by State and Region of the number of new cases, and percentages of single lesion, children, MBs, women, and patients with GD > = 2.

| State/Region | New Cases* | % | | | | |
|---------------------|------------|---------------|----------|-------|-------|--------|
| | | Single Lesion | Children | MB | Women | GD > 2 |
| <i>Brazil</i> | 47,026 | 7.89 | 7.70 | 52.69 | 45.46 | 4.94 |
| <i>Northern</i> | 10,441 | 2.06 | 10.74 | 51.21 | 40.19 | 4.45 |
| Rondônia | 1,171 | 1.11 | 7.17 | 48.68 | 42.19 | 4.78 |
| Acre | 359 | 37.05 | 8.08 | 60.72 | 42.34 | 3.62 |
| Amazonas | 1,384 | ... | 11.27 | 43.28 | 40.10 | 5.64 |
| Roraima | 295 | 24.43 | 11.19 | 59.61 | 40.72 | 6.84 |
| Pará | 5,967 | ... | 11.76 | 52.53 | 30.38 | ... |
| Amapá | 158 | ... | 9.49 | 54.83 | 39.44 | 4.18 |
| Tocantins | 1,107 | ... | 9.21 | 39.22 | 42.69 | 4.29 |
| <i>Northeastern</i> | 15,763 | 1.59 | 8.86 | 49.48 | 48.16 | 4.12 |
| Maranhão | 4,684 | ... | 12.02 | 50.43 | 43.41 | 4.84 |
| Piauí | 1,846 | ... | 7.96 | 40.50 | 4.02 | 3.66 |
| Ceará | 2,179 | ... | 6.06 | 55.58 | 49.80 | 5.33 |
| Rio Grande do Norte | 212 | ... | 7.55 | 61.16 | 53.72 | 4.96 |
| Paraíba | 823 | 14.79 | 8.14 | 51.07 | 51.33 | 4.80 |
| Pernambuco | 2,966 | ... | 9.24 | 49.28 | 51.72 | 4.11 |
| Alagoas | 387 | ... | 9.30 | 40.53 | 52.91 | 2.43 |
| Sergipe | 349 | 41.75 | 10.03 | 41.75 | 51.46 | 3.88 |
| Bahia | 2,317 | ... | 5.48 | 48.88 | 47.85 | 1.89 |
| <i>Southeastern</i> | 10,906 | 18.39 | 5.56 | 54.69 | 48.41 | 6.73 |
| Minas Gerais | 3,305 | 28.88 | 5.23 | 72.36 | 49.28 | 9.41 |
| Espírito Santo | 1,707 | 36.67 | 7.26 | 40.01 | 50.96 | 3.92 |
| Rio de Janeiro | 2,926 | 12.57 | 5.40 | 48.84 | 49.96 | 5.31 |
| São Paulo | 2,968 | 0.21 | 5.09 | 48.20 | 4.22 | 6.62 |
| <i>Southern</i> | 1,919 | 0.08 | 2.55 | 63.48 | 44.46 | 9.18 |
| Paraná | 1,461 | ... | 2.33 | 62.34 | 43.41 | 9.13 |
| Santa Catarina | 225 | 0.89 | 4.44 | 61.34 | 46.67 | 6.23 |
| Rio Grande do Sul | 233 | ... | 2.15 | 75.10 | 51.07 | 12.44 |
| <i>Midwestern</i> | 7,997 | 17.01 | 5.63 | 55.17 | 43.59 | 3.43 |
| Mato Grosso | 3,131 | 39.13 | 8.14 | 43.30 | 40.64 | 3.41 |
| Mato Grosso do Sul | 646 | ... | 3.72 | 48.10 | 43.51 | 4.19 |
| Goiás | 3,863 | ... | 3.93 | 66.21 | 46.03 | 3.06 |
| Federal District | 357 | 22.81 | 5.32 | 55.49 | 44.22 | 6.19 |

SOURCE: Ministry of Health (ATDS) (*) November 2002 data.

The time between the appearance of symptom(s) and confirmation of leprosy diagnosis is an important indicator to evaluate the effectiveness of case detection procedures. When analyzing decision-making strategies adopted by the health care system to improve case detection, it was seen that, in most states, diagnosis was routinely recorded a full year after the initial symptom appeared.

Figure 5 - Time period (in months) between the appearance of selected leprosy symptom(s) and confirmation of diagnosis: LEM 2003 – Brazil.



Source: dados coletados pelos monitores LEM, FUAM&ILSL.

Over the last five years, it has been impossible to collect information related to both the number of skin lesions detected and defaulters in the states of Pará, Amapá, Maranhão, Tocantins, Rio Grande do Norte, and Mato Grosso do Sul. Moreover, in most states it was impossible to collect data on MBs who received the standard 12-dose regimen and PBs who received the standard 6-dose treatment.

Status of Integration of MDT with General Health Care Services

The status of integration of MDT is indicative of the availability of and accessibility to leprosy diagnosis, treatment, and release due to cure was

measured by the percentage of primary health care units with MDT services in the area that was included in the LEM.

The sample of municipalities includes 7,056 primary health care facilities (Primary health care and family health care units) 1,112 offered MDT services, i.e., diagnosis + treatment + release, covering 16% of the geographical area under consideration. This poor coverage is a result of several factors such as: a) a policy of distributing MDT blister packs only to certain primary health care units; b) insufficient number of qualified personnel; and/or slow integration procedures. It should be emphasized that, in 2002, at least one inhabitant in more than 3,521 (60%) of all Brazilian municipalities had leprosy.

Regionally, in 2003, the Outpatient Information System reported that the highest concentration of primary health care units offering MDT services was in the North (51%) and Northeast (35%). In the other Regions, MDT was available in less than 30% of the health care system units. The ideal coverage of 85% or more was only observed in the state of Rio Grande do Norte. Less than 50% coverage was found in 21 states while 10 of these states offered MDT in less than 10% of their health care units. This observation confirms the urgent need to improve the integration mechanisms without delay.

In the capital cities, a similar situation is seen. Only five state capitals offer above 50% health care coverage (MDT Services): Natal, Palmas, Cuiabá, Campo Grande, and Boa Vista (Table 7).

Out of the 153 municipalities that were visited, including a total of 2,189 Family Health Care Units (FHU), only 485 (22%) of them were capable of carrying out diagnosis and MDT treatment. Most of the FHUs in states like Rio Grande do Norte, Bahia, Ceará, and Tocantins was capable of conducting diagnosis and MDT treatment. On the other hand, several FHUs do not provide such services and only refer suspected cases of leprosy to specialized units. This phenomenon is seen in the capital cities of Acre, Minas Gerais, Paraná, Santa Catarina, Rio Grande do Sul, Mato Grosso do Sul, and the Federal District. Therefore, the Family Health Care Program should improve the level of importance to leprosy elimination via prompt diagnosis and treatment (Table 8).

Table 7 – MDT percent coverage* by state and capital city – LEM 2003 Brazil

| State | % State w/MDT | Capital | % States w/MDT |
|---------------------|---------------|----------------|----------------|
| Acre | 6.58 | Rio Branco | 1.30 |
| Alagoas | 28.74 | Maceió | 20.99 |
| Amazonas | 18.73 | Manaus | 30.50 |
| Bahia | 25.83 | Salvador | 11.34 |
| Ceará | 14.14 | Fortaleza | 17.05 |
| Espírito Santo | 21.33 | Vitória | 21.33 |
| Federal Distict | 19.12 | Brasília | 17.57 |
| Goiás | 6.17 | Goiânia | 4.12 |
| Minas Gerais | 3.06 | Belo Horizonte | 3.06 |
| Mato Grosso do Sul | 57.78 | Campo Grande | 80.00 |
| Mato Grosso | 50.33 | Cuiabá | 71.08 |
| Pará | 7.27 | Belém | 6.06 |
| Paraíba | 22.01 | João Pessoa | 9.03 |
| Pernambuco | 25.36 | Recife | 12.57 |
| Piauí | 2.13 | Teresina | 1.20 |
| Paraná | 1.76 | Curitiba | 18.18 |
| Rio Grande do Norte | 96.55 | Natal | 100.00 |
| Rio de Janeiro | 21.97 | Rio de Janeiro | 21.97 |
| Rondônia | 18.37 | Porto Velho | 23.33 |
| Roraima | 43.88 | Boa Vista | 52.38 |
| Rio Grande do Sul | 3.75 | Porto Alegre | 0.43 |
| Santa Catarina | 2.58 | Florianópolis | 2.02 |
| Sergipe | 48.68 | Aracajú | 20.30 |
| São Paulo | 7.15 | São Paulo | 7.15 |
| Tocantins | 54.55 | Palmas | 90.24 |

SOURCE: State/Municipal Coordinators - Form 4 - LEM 2003, Brazil.

(*) (No. of States with MDT/Total No. of States) x 100.

Table 8: MDT coverage in Family Health Care Units (*) by state and capital city – LEM 2003 Brazil

| State/Region | # of Family Health Care Units (FHU) | # of Family Health Care Units w/leprosy diagnosis and treatment | % of Family Health Care Units w/MDT |
|---------------------|-------------------------------------|---|-------------------------------------|
| Brazil | 2.189 | 485 | 22.16 |
| Northern | 386 | 140 | 36.27 |
| Rondônia | 26 | 15 | 57.69 |
| Acre | 45 | 0 | 0.00 |
| Amazonas | 192 | 30 | 15.63 |
| Roraima | 60 | 26 | 43.33 |
| Pará | 11 | 1 | 9.09 |
| Tocantins | 52 | 33 | 63.46 |
| Northeastern | 755 | 311 | 41.19 |
| Maranhão | 3 | 1 | 33.33 |
| Ceará | 71 | 53 | 74.65 |
| Rio Grande do Norte | 20 | 20 | 100.00 |
| Paraíba | 167 | 44 | 26.35 |
| Pernambuco | 165 | 49 | 29.70 |
| Alagoas | 84 | 30 | 35.71 |
| Sergipe | 183 | 84 | 45.90 |
| Bahia | 34 | 30 | 88.24 |
| Southeastern | 529 | 8 | 1.51 |
| Minas Gerais | 486 | 0 | 0.00 |
| Espírito Santo | 14 | 4 | 2.57 |
| Rio de Janeiro | 54 | 2 | 3.70 |
| São Paulo | 29 | 4 | 13.79 |
| Southern | 300 | 0 | 0.00 |
| Paraná | 8 | 0 | 0.00 |
| Santa Catarina | 181 | 0 | 0.00 |
| Rio Grande do Sul | 111 | 0 | 0.00 |
| Midwestern | 219 | 26 | 11.87 |
| Mato Grosso | 46 | 22 | 47.83 |
| Mato Grosso do Sul | 22 | 0 | 0.00 |
| Goiás | 130 | 4 | 3.08 |
| Federal District | 21 | 0 | 0.0 |

Except for Amapá and Piauí.

(*) SOURCE: Form 4 LEM Monitors. LEM.

MDT Accessibility

Treatment accessibility was evaluated by means of interviews with 902 patients based on three indicators: (1) arithmetic mean (average) distance covered in Kilometers (Km) to collect MDT; (2) average travel costs in Brazilian currency (R\$); and (3) percent of units providing flexibility to patients including practical options in collecting blisters. The results evaluated the extent patients had readily access to MDT throughout the country from the geographical, financial, and cultural view point.

Table 9 – MDT accessibility indicators by state and region – LEM 2003
Brazil

| State/Region | Average distance (Km) to get MDT | Estimated average patient's cost (R\$) | Estimated average patient's cost (US\$) | % Flexibility in providing MDT |
|---------------------|----------------------------------|--|---|--------------------------------|
| Northern | 5 | 3 | 1.00 | 85.70 |
| Rondônia | 3 | 3 | 1.00 | 77.78 |
| Acre | 8 | 3 | 1.00 | 100.00 |
| Amazonas | 10 | 5 | 1.67 | 67.86 |
| Roraima | 1 | 1 | 0.33 | 18.18 |
| Pará | 2 | 1 | 0.17 | 100.00 |
| Amapá | 35 | 10 | 3.33 | 100.00 |
| Tocantins | 3 | 0 | 0.00 | 77.78 |
| Northeastern | 5 | 5 | 1.67 | 37.80 |
| Maranhão | 6 | 0 | 0.00 | 92.86 |
| Piauí | 4 | 3 | 0.87 | 0.00 |
| Ceará | 26 | 3 | 0.93 | 3.85 |
| Rio Grande Do Norte | 3 | 2 | 0.65 | 100.00 |
| Paraíba | 7 | 4 | 1.33 | 50.00 |
| Pernambuco | 15 | 0 | 0.00 | 75.00 |
| Alagoas | 4 | 2 | 0.67 | 16.13 |
| Sergipe | 27 | 3 | 0.97 | 57.14 |
| Bahia | 7 | 2 | 0.67 | 96.15 |
| Southeastern | 9 | 3 | 1.00 | |
| Minas Gerais | 16.5 | 4 | 32.00 | 7.00 |
| Espírito Santo | 5 | 2 | 0.67 | 5.00 |
| Rio De Janeiro | 13 | 3 | 1.00 | 36.00 |
| São Paulo | 6 | 18 | 5.83 | 69.00 |
| Southern | 7 | 4 | 1.7 | |
| Paraná | 10 | 16 | 5.17 | 100.00 |
| Santa Catarina | 10 | 3 | 1.00 | 100.00 |
| Rio Grande Do Sul | 4 | 3 | 1.00 | 50.00 |
| Midwestern | 20 | 5 | 1.67 | |
| Mato Grosso | 6 | 12 | 4.00 | 65.00 |
| Mato Grosso do Sul | 10 | 0 | 0.00 | 18.18 |
| Goiás | 16.5 | 3 | 1.00 | 100.00 |
| Federal District | 56 | 5 | 1.67 | 100.00 |

SOURCE: Form 9. LEM Monitors. LEM 2003.

In order to calculate the arithmetic mean (average) zero was included as it is considered the basic value both for the distance covered to collect monthly MDT and the estimated transportation costs to their respective health care units.

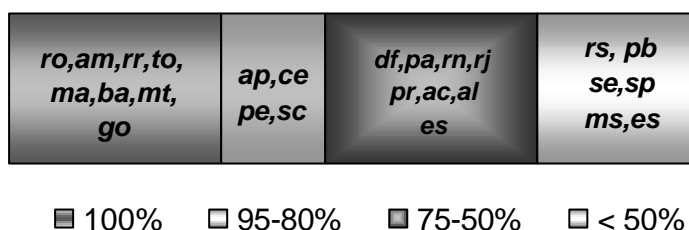
Throughout the country, there were large variations in the distances that a patient has to travel to reach his/her health care unit. For example, in Rondônia, Roraima, Pará, and Alagoas, the average distance did not exceed 5 Km. These states can boast of having the most convenient access. In contrast, in Amazonas, the average distance from a patient's residence to the nearest unit is 10 Km while in Pernambuco, it was 16 Km. Even farther distances (over 25 Km) were reported in the states of Amapá, and Ceará (Table 9).

The longest average distance was covered by patients residing in the Midwestern Region (20 Km), in which the average distance in the Federal District was 56 Km. Accessibility was considered the best in the North and Northeast (5 Km).

On average, patients spent less than R\$3.00 (three reals in Brazilian currency or US\$1.00 – the current exchange rate being a roughly 3-to-1) in transportation to and from the health care unit to collect a supervised dose of MDT. The cost differences between Regions were small. Patients spent more than R\$10.00 in only four states while those in Paraná and São Paulo paid the highest costs at R\$16.00 and R\$18.00, respectively. No correlation could be found between distance and transportation costs.

In almost 80% of the sample of health care facilities, leprosy diagnosis and treatment were available on all working days of the month, ranging from 30% in Mato Grosso do Sul and São Paulo to 100% in Rondônia, Amazonas, Roraima, Tocantins, Maranhão, Bahia, Mato Grosso, and Goiás.

Figure 6 - Percentage of health care facilities in the states providing patient care 7 days a week – LEM 2003 Brazil



SOURCE: Form 10. LEM Monitors. LEM 2003 Brazil.

While it was possible to give more than one dose of MDT for some patients in need as recommended by the WHO, the majority of the health care units visited in some states such as Piauí, Ceará, Minas Gerais, and Espírito Santo, did not practice it regularly.

In order to obtain additional information on the quality of patient care interviews with and observation of the health care professionals on the job were carried out. The LEM survey instrument included questions about treatment of reaction episodes, administration of steroids, and the competence level of health care personnel dealing with disabilities (Table 10). Reactions were treated in 85% of the health care units surveyed. All participating facilities in the South and Midwest were fully capable to carry out these procedures. In the North, mainly in Roraima and Amapá, however, not all units had steroids at their disposal and less than a half of them treated patients with reaction. In Rio Grande do Sul, Tocantins, Alagoas, and Rio Grande do Norte, the percentage was less than the national average. Furthermore, in some facilities, the person responsible for distributing steroids to reactional patients was not a medical doctor. Disabilities were treated by physical therapists, nurses, and auxiliary nurses. Therefore, nursing professionals were the ones most likely to deal with this problem.

LEM researched the professional level of health care personnel that carried out diagnosis and treatment. The LEM report showed that, in the States of Pará, Tocantins, Ceará, Maranhão, Piauí, Sergipe, Espírito Santo, Santa Catarina, and Acre, these procedures were performed exclusively by medical doctors while, in the other states, these tasks were performed by medical doctors and/or nurses, social workers, and paramedical personnel.

Table 10: Professional level of the responsible personnel for diagnosis and treatment by state – LEM 2003, Brazil.

| State | Professional Category | |
|---------------------|-----------------------|-----------|
| | Diagnosis | Treatment |
| Acre | M/n/pm | M/n/pm |
| Amapá | M/n | M/n |
| Amazonas | M/pm | M/pm |
| Pará | M | M |
| Rondônia | M/n | M/n |
| Roraima | M/n | M/n |
| Tocantins | M | M |
| Alagoas | M/n | M/n |
| Bahia | M/n | M/n |
| Ceará | M | M |
| Maranhão | M | M |
| Paraíba | M/n | M/n |
| Pernambuco | M/n | M/n |
| Piauí | M | M |
| Rio Grande do Norte | M/n | M/n |
| Sergipe | M | M |
| Minas Gerais | M/n | M |
| Espírito Santo | M | M |
| Rio de Janeiro | M | M/n |
| São Paulo | M/n | M/n |
| Paraná | M/n/pm | M |
| Santa Catarina | M | M |
| Rio Grande do Sul | M/n | M/n |
| Mato Grosso | M/n/pm | M/n/pm |
| Mato Grosso do Sul | M/n/sw/pm | M/n/sw/pm |
| Goiás | M/n/pm | M/n |
| Federal District | M/n | M/n |

M = medical doctor; n = nurse; pm = paramedical professional; sw – social worker
SOURCE: Form 10. LEM Monitors. LEM 2003, Brazil.

In the South and Midwest, the health care units were predominantly leprosy specialized centers (87% and 67% respectively) (Table 11).

MDT - SERVICES

Table 11 – Type of specialized Health Care Unit/ Type of Health Care Center Specialized in MDT by Region – LEM 2003 Brazil

| Regions | No. Units Visited | MDT - SERVICES | |
|--------------|-------------------|----------------|-------|
| | | No. | % |
| Northern | 63 | 21 | 33.33 |
| Northeastern | 78 | 12 | 15.38 |
| Southeastern | 29 | 18 | 62.07 |
| Southern | 38 | 32 | 84.21 |
| Midwestern | 34 | 23 | 67.65 |
| Brazil | 242 | 106 | 43.80 |

SOURCE: Form 8. Monitors. LEM 2003, Brazil

STATUS AND AVAILABILITY OF MDT BLISTER PACKS

In order to identify excesses or shortages in MDT blister packs stock in the Health Care Units during the LEM visit, the indicator used to measure availability of blister packs was expressed in terms of amounts distributed monthly (patient-months) and the status was measured as the percent of expired or damaged drugs. The availability of MDT blister packs in patient-months was calculated by the number of blister packs for each blister category currently in stock divided by the number of registered cases treated for each category in children, adults, multibacillary (MB), and paucibacillary (PB). The availability of MDT stock was measured in patient-months in each of the health care units surveyed and categorized in “deficient” (less than one patient-months), risky (1-2 patient-months), “ideal” (3-6 patient-months), and “excess” (more than six months).

The evaluation of the status revealed that the only states in which the MDT stock was considered below 90% were Amapá and Paraíba. The overall availability of MDT stock in patient-months of MB-Adult was less than 2.0 and of MB-Children more than 5.0. The status of MB-Adult was higher than or equal to 3 patient-months in Rio de Janeiro, Espírito Santo, Paraíba, and Alagoas. In Rio Grande do Sul, Mato Grosso, and Amazonas, more than 6.0 patient-months MB-Adult blister packs were found. No MB-Children blister packs at all were found in Rio Grande do Sul while there was more than enough (in excess) in most of the rest of the country. Overall, the PB-Adult was more widely available than the MB-Adult.

Figure 7 – Status of MDT stock - LEM 2003 Brazil

| | Availability | MB-Adult | PB-Adult | MB-Children | PB-Children |
|-----------|--------------------|--|--|--|--------------------------------------|
| Deficient | Less than 1 month | CE. PE. BA | PA | | SP.CE.PE.SC.PR. ES.MA |
| | 1-2 months | MG. SC.MS.RO. PR.RR.PA. MA. DF. SE.GO.PI.AP. SP.AC.TO.RN | MG. SC.CE.PE. PI.GO.MS.AC. PR.DF | MG.SC | MG-PA.MS.BA. AM.PB.RS |
| | 3-6 months | RJ-ES-PB-AL | RO-AL-MA-BA. RN-RO-RJ-ES-AP | CE-PA-MA-RR | AL-RJ-RO |
| Excess | More than 6 months | RS.MT.AM | PB.SE.SP.MT. TO.RS.AM | DF.PE.TO.AM. PI.MS.RJ.PR. BA.SL.ES.SP. GO.AC.MT.RO. PB.SE.AM.RN. RS | PI.RO.MT.GO. TO.RN.SE DF.AP.AC |

SOURCE: Form 8. LEM Monitors. LEM 2003 Brazil.

Only in 60% of the 242 health care units surveyed was found at least three patient-months MDT stock in all four categories. Availability varied from less than one in Ceará and Santa Catarina to more than 25 in Amazonas. The proportion of the total sample health care units with less than three was 34.6% for MB-Adult, 84.2% for MB-Children, 67.7% for PB-Adult, and 50.8% for PB-Children. This last indicator was demonstrative of a worrisome situation in the health care systems of 13 states being unable to respond to a sudden increase in caseload that might occur as result of a national campaign or some other unforeseen reasons. Therefore, these results demonstrate that the supply of MDT stock was far from adequate.

In conclusion, the status of MDT stock is a barrier in the efforts to expand health care accessibility and in the efforts to decentralize the leprosy program. It is recommended that The Ministry of Health gives a high priority to solve this problem until the leprosy elimination goal has been successfully attained.

III - Quality of MDT Services

The quality of MDT services was measured by the proportion (%) of patients from the MB and PB cohorts that has been cured (treatment completion) as a result of treatment.

The overall cure rate in the health care units visited by the LEM Monitors was 74.1% for MB (at least 12 months) and 81.3% for PB (at least 6 months). On the other hand, the defaulter rate was 6.9% for both MB and PB patients.

At the time of the LEM visit, the proportion of PB patients whose treatment lasted longer than the WHO recommendation was 3.8% for PB, and 9.5% for MB patients. Goiás, Minas Gerais, and Paraíba presented the highest rates of cure. The rate of cure for MBs was over 75% in Acre, Rio Grande do Norte, and Rio Grande do Sul.

More than 150 patient files were examined in Rio Grande do Norte and 250 in Minas Gerais with no reported drop outs. In addition, in no state was the MB defaulter rate higher than 16% while Tocantins, Alagoas, and Pará all presented a 14% MB defaulter rate. Except for Amapá, that the PB defaulter rate was 24%, none of the states surpassed 12%.

In the Federal District, Pernambuco, and São Paulo, it was seen that large proportions of the MB and PB cases continue treatment after having completed the WHO recommended fixed-duration MDT. In Pará, Amazonas, and Minas Gerais, no PB cases were reported taking more than six doses, and no MB patients were found to have taken more than 12 doses in the state of Pará.

It is important to underline that more than 20% of the MB cases diagnosed in the state of Alagoas, Federal District, and Pernambuco in 2001 and the PB cases in the Federal District and Amapá in July 2003 continue receiving more than 12 and 6 doses respectively. However, it is important to carry out an evaluation of the cases referred to as “other situations” such as “transferred, deceased, and other” that in most states, surpassed the number of cases in treatment.

The rate of cure in the country as a whole is slightly below 80%.

Table 12 – Percentage of Cure (Completion of Treatment) among MB and PB Cohorts - LEM 2003 Brazil

| State/Region | % cured |
|---------------------|---------|
| Brazil | 77.15 |
| Northern | 74.55 |
| Rondonia | 77.38 |
| Acre | 86.54 |
| Amazonas | 79.61 |
| Roraima | 71.11 |
| Pará | 71.94 |
| Amapá | 66.67 |
| Tocantins | 65.68 |
| Northeastern | 75.07 |
| Maranhão | 77.78 |
| Piauí | 74.36 |
| Ceará | 75.67 |
| Rio Grande do Norte | 82.24 |
| Paraíba | 83.65 |
| Pernambuco | 71.62 |
| Alagoas | 67.55 |
| Sergipe | 76.21 |
| Bahia | 74.39 |
| Southeastern | 73.28 |
| Minas Gerais | 83.76 |
| Espirito Santo | 67.24 |
| Rio de Janeiro | 69.37 |
| São Paulo | 75.00 |
| Southern | 78.19 |
| Paraná | 75.21 |
| Santa Catarina | 72.66 |
| Rio Grande do Sul | 90.00 |
| Midwestern | 84.22 |
| Mato Grosso | 70.90 |
| Mato Grosso do Sul | 81.34 |
| Goiás | 93.15 |
| Federal District | 62.57 |