The Leprosy Trend in Brazil: Limited Detection Rate

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Objective: To analyze the magnitude of leprosy in Brazil by the speed of the fall in the detection rate, in view of operational changes occurring between 1987 and 2006. Material and Methods: Ecological study of the secular trend of new leprosy cases diagnosed in Brazil from 1987 to 2006. A linear trend was used to analyze the detection rate in two different moments of endemic manifestation. The cut-off point was the year with the greatest detection rate coefficient: 1997. To analyze the potential increase in accessibility to diagnosis and treatment, we used a comparison of the proportion of cases diagnosed with the health services and municipalities, over four five-year periods over one twenty-year period, within the time span of the study. Results: The leprosy detection rate in Brazil from 1987 to 1996 has a positive slope coefficient (α1=0.165), characterizing an average increase estimated at 11.7% per year. From 1997 to 2006 a negative slope coefficient (α1=0.075), was verified. The number of health services increase continuously during every period described by more than 100%. The number of municipalities presented an important increase during the third period, from 1997 to 2001, with 100% growth compared to the period five years before. Conclusion: Brazil seems to have passed through the transition period to its target of a constant decline in the detection rate. The increase in diagnostic capability shows that the country is on its way to eliminating leprosy as a public health problem.

Keywords: leprosy, trend, Brazil. Andrade, Ignotti.

AIDS in Leprosy Cases, Leprosy in AIDS Cases, Low Prevalence in Brazil

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Objective: The occurrence of leprosy-HIV co-infection is becoming more and more frequent throughout the world, with an epidemiological profile that may not follow the same path as TB/HIV where these diseases are still a public health problem, as is the case in Brazil. Although the frequency of TB/HIV co-infection has been well studied in Brazil, for leprosy/HIV there is a need to further explore the topic. The main aim of this study is to show the number of leprosy/HIV cases co-infection registered in the official Brazilian Information Systems (Sinan). Material and Methods: Probabilistic linkage was carried out based on similar variables available in the databases (e.g., name, sex, date of birth, place of residence) from the HIV/leprosy co-infection database with individual data from a leprosy database in Brazil. Results: This study shows less than 1% similar records. The low level of concordance of leprosy patients identified in the HIV/AIDS database examined in the study can be explained in several ways. First, mistakes might have happened in the linkage process. Some pairs could have been erroneously classified as true matches (false matches), whereas some true matches could have been missed (false non-matches). Second, the low number of pairs observed can also be explained by a non-recording of other pathologies (i.e., failure to record). Showing the potential advantages and disadvantages of the use of the probabilistic record linkage methodology would require a field validation of reported cases to confirm the low prevalence of leprosy/HIV co-infection (regardless of which disease occurred first). Keywords: Information Systems; Data Comparability; Acquired Immunodeficiency Syndrome; Epidemiology, leprosy; leprosy/HIV co-infection.
Changing Epidemiology of Leprosy in Agra: Public Health Implications

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Background: Leprosy is caused by M.leprae and still endemic in many countries. Current figures indicate that 0.6 millions cases occur annually and about 75% cases come from India and Brazil. Worldwide 2 million people have disabled by the consequence of leprosy. Though disease is aimed to be eradicated from world scenario but endemic pockets present a challenge to public health in low resource settings, where not only the treatment but many other things would be needed to control the diseases. This study using data from Agra Leprosy Project (ALP) reveals important facts that must count on public health decision making. Methods: This study uses data from projects from field and OPD. ALP examined 361321 persons from randomly selected 300 villages, 11 towns and 6 areas of city. 42272 persons resurveyed for incidence estimation of disease. Using logistic models hints on determinants of disease and disability prevalence, estimates relapses from long term follow up after variable drug regimens and also indicate on defaults and its causes. Results: The Prevalence (PR) of leprosy was found to 16.4/10,000 in ALP; high in towns than in rural or city. Analysis suggests that factors like clean living, sufficient sun exposure, Pueca house-type, healthy environment at work reduces the risk of leprosy significantly. Incidence study suggest that normal persons (No case in family) has incidence of 4.6/10K PY, in comparison to 4.1 in paucibacillary and 13.1 in multibacillary Contacts (p<.0001). Visible paralytic disability was 7.9%; 3.8% in PB and 16.9% in MB patients. Disability was significantly increased with increased nerve thickening and delay in starting treatment among neuritic patients and no of thicken nerves in patients with anesthetic skin lesions. Relapses occur more (p<.05) in MB patients given fix duration therapy than among those given therapy till smear negativity. About 20% defaulted from treatment in a cohort of PB patients and main cause of default has been intolerance to leprosy drugs. Conclusion: There are many things to learn from leprosy epidemiology: being a slow mycobacterial disease. Hurried efforts may result in failure and affected world may face emerging threats in future. Improved socioeconomic status, increased awareness and better drug regimens would ultimately help to eradicate this disease from the Globe. Detail results would be presented.

Health Seeking Behaviour of Leprosy Affected Persons, Utilizing Services of Hospitals in Delhi

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Mycobacterium leprae has low pathogenicity and leprosy affected persons do not feel sick till the disease is well established. More over, skin lesions due to leprosy do not hurt the affected person. The social environment, the so called stigma also inhibits self reporting by the affected person. All this leads to late reporting of leprosy affected person for treatment and by the time they report for treatment, disabilities and deformities already start developing. In urban areas especially big cities because nearly 40 % of the population in these cities is migratory and health behavior of urban dwellers is obscure and this affects the effective control of the disease in urban areas. Interview of leprosy affected persons was conducted. This paper deals with the health seeking behaviour of leprosy affected persons, reporting or referred to hospitals in Delhi so as to help policy makers and programme managers to develop strategies for urban areas for control of the disease and prevent development of the disability in leprosy affected persons.

Predictive Factors in the Evolution Disability Grade of Leprosy Patients Attended in the Health Center/Belo Horizonte – MG, from 1993 to 2003

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The aim of the present study was to determine the predictive factors which contributed to change in the WHO disability grade of leprosy patients attended by the physiotherapists of Barreiro Health Center /Belo Horizonte-MG, from 1993 to 2003. The retrospective cohort involved 595 patients. Methodology: A descriptive analysis of the sample was made. Later a univariate analysis, and a multivariate analysis, through the ordinal logistic regression model, to verify the predictive factors of disability at diagnosis. Finally the disability grade at diagnosis and release from treatment were compared using the marginal homogeneity test, followed by a univariate analysis, and a multivariate analysis using the CHAID tree. Results: Gender, age and number of nerves involved were predictive factors for the disability grade at diagnosis. A positive dynamics was verified regarding change in disability grade, when comparing diagnosis to release from treatment. The disability grade at diagnosis is the main factors that predict the evolution of the disability. The present study showed the need for early diagnosis of neuropathy as well as an efficient association of pharmacological and non-pharmacological treatment.
The Use of Geographical Information Systems (GIS) to Improve Active Leprosy Case Finding Campaigns in the Municipality of Mossoró, Rio Grande do Norte State, Brazil

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LEPRA's programmes officer for Latin America

Introduction: This study was undertaken using geographical information systems (GIS) with the objective of defining low-cost, effective strategies to control leprosy. Methodology: Methodological tools used: Mossoró's land registry plan, Ikonos PSM satellite image, SINAN database (National Morbidity Notification Information System - data from 1998 to 2002), online postal codes, notification forms and registration books from the municipal health administration. Results: Between 1998 and 2002, 368 leprosy cases were diagnosed in Mossoró, from which 281 were geo-referenced. A density map was produced showing the highest concentrations of leprosy and areas with greatest risk of transmission. Four areas with leprosy greatest agglomeration were identified and active case detection campaigns organised. During those campaigns, 104 new leprosy cases were confirmed, increasing detection rate from 5.16/10,000 inhabitants in 2004 to 9.34/10,000 in 2005. 29 patients had a disability, with 17 with grade II disability. Conclusions: Even with continuous training of public health sector professionals, diagnosis continues to be late, demonstrating the need for targeted campaigns. Key Words: Leprosy, epidemiology, GIS, geo-referencing, ArcView, spatial analysis.

Hyper-Endemic Foci of Leprosy in Venezuela: Environmental Influence or a More Transmissible Strain of M. leprae?

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In Venezuela, during the last years, the prevalence of leprosy has remained relatively stable, at about 0.6 cases per 10,000 since 1997, being the detection of new cases about 500 per year. Nevertheless, epidemiological studies carried out in three states of central Venezuela where Leprosy has not been eliminated as a public health problem, reveal communities with a hyperendemic situation. We have detected communities with 40 to 5600 inhabitants where prevalence rates varied from 18.7 to 1294.3 per 10,000 with a new case detection rate up to 211.4/10,000 in a two year period. Furthermore, examination carried out in successive years have continued to reveal new cases in these hyperendemic areas, even though MDT was initiated immediately after diagnosis, revealing that MDT of newly diagnosed cases has not modified the pattern of transmission of the disease in these foci. Observations demonstrate also that over 80% of the cases in these areas are paucibacillary and that bacilli found in these patients also show different morphological and staining characteristics than those from non hyperendemic zones, exhibiting small bacterial populations of solid bacilli without significant degeneration. Preliminary results of a genetic survey performed in order to establish the SNP (single nucleotide polymorphism) type of pathogens among distinct geographical areas of the country, have shown that there is a difference in the distribution of SNP-type between endemic and hyperendemic regions, being SNP-type 4 in hyperendemic areas twice as frequent as in the non-hyperendemic regions.


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Introduction: A multi-arm leprosy vaccine trial was conducted in Tamil Nadu (TN), South India during 1991-2002. We described leprosy prevalence in the trial area and compared with prevalence reported by TN leprosy control programme. Methodology: We defined three cohorts from the trial area (1) vaccinated with any of four candidate vaccines (n=132,703) (2) placebo (n=38,697) and (3) unvaccinated (n=45,233). We calculated age and sex standardized prevalence for three follow-up surveys (1994, 1997 and 2001). Results: Overall crude prevalence at baseline (1991) was 254 per 10,000. Standardized prevalence (per 10,000) at the first (1994), second (1997) and third (2001) follow-up were: vaccinated: 44, 35 and 17; placebo: 44, 61 and 43; unvaccinated: 61, 62 and 34, respectively. Comparatively, prevalence per 10,000 for TN were 9 (1994), 8 (1997) and 4 (2001). Overall prevalence was higher for those aged above 55 years (86, 67 and 48) as compared to those aged 1-19 years (34, 37 and 17) and for men (52, 51 and 29) compared to women (42, 43 and 26) for the three surveys respectively. Conclusions: Prevalence showed moderate decline in both the trial area and in TN. Prevalence reflects cumulative effect and thus is not a sensitive indicator for assessing trends. Keywords: Leprosy vaccine trial, South India, prevalence trends.
Declining Trends in Incidence of Leprosy in South India
Leprosy Vaccine Trial, 1991-2002

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Introduction: A multi-arm leprosy vaccine trial was conducted in Tamil Nadu (TN), South India during 1991-2002. We described leprosy incidence in the trial area and compared with new case detection rates (NCDR) reported by TN leprosy control program.

Methodology: We defined three cohorts from the trial area (1) vaccinated with any of four candidate vaccines (n=132,703) (2) placebo (n=38,697) and (3) unvaccinated (n=45,233). We calculated age and sex standardized incidence for three follow-up surveys (1995, 1998 and 2002). Results: Standardized incidence (per 10,000 person-years) at the end of first (1995), second (1998) and third (2002) follow-up were: vaccinated: 24, 7 and 3; placebo: 24, 13 and 10; unvaccinated: 36, 13 and 7, respectively. Comparatively, NCDR per 10,000 for TN were 12 (1995), 7 (1998) and 5 (2002). Overall incidence was higher for those aged above 55 years (48, 13 and 8) as compared to those aged 1-19 years (19, 8 and 4) and for men (29, 10 and 6) compared to women (23, 9 and 5) for the three surveys respectively. Conclusions: Use of efficacious vaccines explained the drop in incidence in the vaccinated population. Drop in incidence rates in the placebo and unvaccinated population suggests indirect effect of vaccines and possibly multi-drug therapy. Keywords: Leprosy vaccine trial, South India, incidence trends.

Characteristics of New Leprosy Cases Detected Before and After Elimination Era in Shandong Province, P. R. China

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Objective: To describe the characteristics of newly detected cases of leprosy before and after elimination era, in particular relating to the disability. Method: Data of the newly diagnosed leprosy patients from 1983 to 2006 were abstracted from the national database of leprosy and crosschecked with the individual records. The characteristics of the patients diagnosed in the period of 1983-1994 were compared with those diagnosed in the period of 1995-2006. Results: Skin clinic was the main detection means in the two periods. On average the delay in diagnosis has a mean value of 51.2 months in the period of 1983-1994 compared to a mean value of 34.3 months in the period of 1995-2006. The proportion of new cases with WHO grade 2 disability was 24.2% in the period of 1983-1994 and slightly increased to 26.8% in the period of 1994-2006. The risk factors related to the disability at diagnosis were analyzed and compared between the two periods. Conclusions: Under the low endemic situation of leprosy, identifying the few incident new cases at earlier stage of the disease remains one of the priorities in leprosy control program in Shandong. Key words: Leprosy; new case detection; disability.

Change of Disability Status over A Period of Time

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Introduction: LEPRA Society started the leprosy project in Malkanagiri in 1992. POD and POWD services have been extended to all the cases as per the requirement. This paper presents the changes in disability status (both improvement and worsening) after appropriate interventions among the disability cases. Methodology: Since inception till December, 2005 the project has registered 3,771 cases for treatment of leprosy. All have been cured with MDT. Among them 674 (17.9%) cases were found to have disabilities; 310 (46%) Gr. I, 364 (54%) Gr.II at the time of registration. All were under chemo & physiotherapy depending upon the duration of onset of disability & clinical condition. Results: Among 674 disability cases, 49 (7.3%) improved, 17 (2.5%) worsened and the others remained static. The status of 18 was improved by RFT while the rest 31 took more time. 20 (40.8%) cases received steroids while the other 29 (59.2%) improved without steroids.

<table>
<thead>
<tr>
<th>Initial Disability status</th>
<th>Subsequent disability status</th>
<th>Total</th>
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<tr>
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<td>Gr-2</td>
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<tr>
<td>Gr2</td>
<td>0</td>
<td>3</td>
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<tr>
<td>Gr1</td>
<td>17</td>
<td>0</td>
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<tr>
<td>Total</td>
<td>17</td>
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8 (47%) cases worsened by RFT while the rest 9 (53%) progressively worsened. 8 cases developed motor paralysis and other 9 developed ulcers. Conclusions: The progression of disability in 674 cases of leprosy registered during 1992-2005 is noted and presented. Key words: Disability grade, Impairment, Paralysis.
Assessment of Knowledge and Skills in Early Diagnosis of Leprosy Among Skin Doctors in Shandong Province, P. R. China

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Objective : To assess the knowledge and skills in early diagnosis of leprosy among skin doctors in Shandong Province.

Methods: Skin doctors at prefecture and county levels around the province were invited to participate in a one-day training workshop on leprosy. As a pretest the knowledge and skills on early diagnosis of leprosy were assessed with a questionnaire, which included personal information of the participants, infectiousness, transmission, early signs/symptom of leprosy, attitude towards leprosy, and referral knowledge. The results of the pretest were compared with a posttest. Results: Of the 184 participants assessed 52 (28.3%) had the experience on leprosy patients. Thirty-six (19.6%) doctors had participated a previous training workshop on leprosy. Fifty-eight (31.5%) doctors had basic knowledge on early diagnosis of leprosy. All aspects on early diagnosis of leprosy and referral knowledge had been improved after the workshop. Conclusions: More efforts should be made to train skin doctors in order to find out the few incident leprosy cases timely under a low endemic situation of leprosy in Shandong province. Key words : Leprosy; early case detection; training.

Long-Term Effects of Chemoprophylaxis

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The population of five Indonesian islands was actively screened for leprosy before the intervention in 2000 and subsequently once yearly for 6 years. No chemoprophylaxis was given on one 'control' island. Chemoprophylaxis, consisting of two doses of rifampicin, was given to household and neighbour contacts of leprosy patients on one island ('contact') and to all eligible persons on three smaller islands ('blanket'). After 3 years the cumulative incidence was significantly lower in the blanket compared with the control group; there was no difference between the contact and the control groups. Blanket treatment was 75% effective; the number needed to treat (NNT) was 127. After 6 years the difference in cumulative incidence between the blanket and control groups was not statistically significant anymore. Effectiveness of blanket treatment was reduced to 57%; the NNT was 244. When leaving out the PB1 patients the effect was still significant. The relative risk of developing leprosy was lower among persons who took at least one supervised dose of rifampicin. In this high endemic area for leprosy, population-based chemoprophylaxis was associated with a reduced leprosy incidence in the first 3 years, but this reduction was not significant anymore after 6 years.

A 28 Year Cohort Study of Children Born to Mothers with Leprosy [1975-2003] : Are the Children at Risk?

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Purpose was to evaluate development of leprosy in children born to leprosy mothers. 120 children from leprosy and 36 from non-leprosy mothers were assessed at intervals, clinically from birth, and with nerve function tests from puberty, to age 26-28 years (A9 children). A second cohort of age-matched children, living in the same area was studied from 1991 (A9C exposed controls). A third age-matched cohort from an area of very low leprosy endemicity was studied in 2002/4 (A9UC unexposed controls). At puberty, 15/99 A9 children had very early leprosy. Two years later 13/15 of these showed new nerve damage despite MDT. 40% of the cohort with easily palpable/ slightly enlarged nerves (grade ≥3) with healthy skin showed early neurodysfunction. Detailed neurological studies were initiated, including tests of small nerve fibre function. Results from A9, A9C and A9UC, respectively, showed leprosy: 21%, 0%, and 0%; nerves: ≥3: 47%, 25% and 3%; nerve function impairment: 98%, 73% and 7%. These findings are indicative of a significant level of as yet undiagnosed leprosy among teenagers and young adults in villages where leprosy was highly endemic. Keywords : leprosy, children, nerve size, nerve function impairment, Ethiopia.
O-129  Future Prevalence of WHO Grade 2 Impairment in Relation to Incidence Trends in Leprosy: An Exploration

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Introduction: This study explored the relationship between leprosy incidence trends and the future prevalence of WHO grade 2 impairment. Methods: Three scenarios were defined to estimate incidences and prevalences of impairment beyond 2000, assuming 6%, 12% and 18% annual declines in case detection rate respectively and 6% impairment among new patients. Data from 1985-2000 were used for projecting leprosy incidences up to 2020. To estimate future grade 2 prevalences, the survival of existing and new impaired individuals was calculated. Results: The 6% scenario predicts 410,000 and 250,000 new patients in 2010 and 2020 respectively. The grade 2 prevalence in these years will be 1.3 million and 1.1 million respectively. The 12% scenario predicts 210,000 new patients in 2010 and 70,000 in 2020. The grade 2 prevalences will be 1.2 million and 0.9 million respectively. In the 18% scenario, the incidence will be 110,000 in 2010 and 20,000 in 2020, and grade 2 prevalences will be 1.1 million and 0.8 million respectively. Conclusions: The grade 2 prevalence decreases much slower than leprosy incidence and case detection in these scenarios. This implies that a substantial number of people will live with impairment and need support in the next decades. Keywords: leprosy, WHO grade 2 impairment, prevalence, future trends.

O-130  A Causal Model of Factors Related to Time Before Treatment Seeking Among Leprosy Patients at Buri Ram Province Thailand

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This study aimed to determine the factors related to time before treatment seeking among leprosy patients using path analysis based on phychosocial model; Health Belief Model. Samples of the study were 87 leprosy patients who received treatment from general hospital and community hospitals located at Buri-Ram province. The data were collected by structured interview during April 2-30, 2004. Then, descriptive statistic and path analysis were used to analyze the data. The results revealed that majority of samples were male (54%), time before treatment seeking 0-12 month (56.3%), and without disability (77%). Moreover, mean score (after adjusting to 0-100) of perceived threat of leprosy was found to be the highest (= 87.26). According to path analysis, the results are as followed: the variables which had direct effect to time before treatment were perceived threat, and perceived benefits minus barrier to disease prevention. While, the perceived threat had positive effect directly to time before treatment (b = 0.233), perceived benefits minus barriers to disease prevention had negative direct effect (b = -0.192). The household income had positive direct effect to perceived benefits-perceived barriers of disease preventive (b = 0.035). Regarding the perceived threat, the variables which had effect to it were cues to action, perceived susceptibility & perceived seriousness and household income. The cues to action and the perceived susceptibility and perceived seriousness had positive direct effect to perceived threat (b = 0.089, 0.291 respectively). At the same time, household income had negative direct effect to perceived threat (b = -0.074) and positive direct effect to perceived susceptibility & seriousness (b = 0.124). In addition, it had indirect effect to perceived threat via perceived susceptibility and perceived seriousness. Of all causal relationships of the path, the only relationship which had statistically significant was perceived susceptibility and perceived seriousness to perceived threat (P<0.05). The results of this study will be useful for the policymakers to plan leprosy control, prevention strategies, health education, and health media production emphasizing on leprosy patients’ perception of susceptibility and seriousness, perceived benefits, perceived barriers of disease preventive in order them to seek treatment earlier before disability occur.

O-131  Absence of Late Relapse in a Cohort of Patients with Multibacillary Leprosy

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Introduction: Relapse in multibacillary leprosy has been widely debated. The risk of relapse is greatest in those who start treatment with a high bacillary load, and that the occurrence is greatest ten years or more after completing treatment. Early relapses, in the first five years after treatment completion, must be distinguished from reactions, but probably reflect inadequate treatment. Up to now, it has not been possible to determine the underlying mechanisms of late relapse – whether it is the recurrsence of an infection that was never completely cleared, or re-infection from an external source. Patients and Methods: A sub-group of 141 patients, all with an initial average Bacteriological index (BI) of 3 or more, was identified from the original AMFES cohort of 660 patients in central Ethiopia. This sub-group was followed for between 10 and 15 years from completion of treatment (24 months MDT). Results and Conclusions: No cases of relapse were identified in this group of patients. The implications are discussed. Key words: leprosy, relapse.

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Detection of *M. leprae* in Soil and Other Environmental Sources so as to Determine Sources of Transmission and Spread of Leprosy

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In many countries still the incidence of leprosy is major concern in spite of successful implementation of multi drug therapy. There are speculations about sub-clinical infection and extra-human reservoir for *Mycobacterium leprae*. Possibility of presence of *M. leprae* in the environment has not been conclusively proved or disproved. Some reports suggest that *M. leprae* can survive in soil under experimental conditions. The potential of soil or water or environment to act as a reservoir for *M. leprae* has not been sufficiently explored as yet. Though these extra human sources may or may not facilitate the growth of *M. leprae* they could act as a potential reservoir. In the present study, we tested for different protocols to extract DNA from soil samples for which soil seeded with *Mycobacterium smegmatis* and *Mycobacterium phlei* was used. Subsequently, 50 soil samples were collected from different locations from a leprosy resettlement village. DNA was extracted from these samples and amplified using *M. leprae* specific primers to target the pra gene and 16s rRNA gene. It was found that out of 50 soil samples 9 samples gave positive results with *M. leprae* specific primers suggesting that there is likelihood of *M. leprae* contamination in the environment.

Steering National Leprosy Eradication Programme

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Many achievements have been credited to national Leprosy Eradication Program in India. This all is due to strong political commitments, available infrastructure, funds and other resources. Long association of national & international NGOs and partnership with ILEP agencies, WHO, Nippon foundation, Novartis has further strengthened the program. Basic services are integrated into general health care system. NLEP is still centrally sponsored program. Referral services are being strengthened by involving PMR departments of medical colleges. Opportunities of Village health & sanitation committee and Rogi Kalyan Samiti, under NRHM are being utilized. Quality of services is monitored by treatment completion rates and patient’s perspectives. New case detection rate is the main epidemiological indicator. Inter & intra departmental coordination and inter-ministerial links and periodic review meetings with state program officers helped in solving the problems. Decentralized district plans, flexi funds and logical approach will further help in steering the program in right direction.

Activity Status Amongst Registered Leprosy Cases in Nepal

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Under treatment cases, numbering 1260, were examined by dermatologists and WHO consultant to assess the activity status of the disease. A check list of signs and symptoms suggestive of the disease being active was prepared and were grouped into three groups. 1. History, 2. Findings in skin, 3. Findings in nerves. Presence or absence of these signs and symptoms were carefully elicited, recorded and analyzed. It was observed that in only 27 % of the cases registered sign and symptoms suggestive of active disease were found. This proportion of active cases did not vary significantly between male (26.1%) and female (28.6%) patients and also among different age groups (Children 26.7%, Adults 27.8% and old 23 %). However proportion of cases varied significantly between different districts. It showed a range from 6.3 % (Rupandehi) to 61 % (Morang). Similarly the proportion did vary significantly between MB (32%) and PB (20 %) cases. (P <0.05). Appearance of new patches found in 6.5 % (80 out of 1216 patients) of the cases was the most common symptom suggestive of active disease, elicited through history taking. History of reactions found in 3.8 % of (47/1227) patients was the second most common symptom suggestive of disease activity. In 1052 or 86 % of the cases there was no history suggestive of active disease. Erythematous skin patches was the most common finding observed indicative of active disease and was found in 10 % (130) of the cases. Second most common finding suggestive of activity status was infiltration and was seen in 68 (5. %) cases only. 1028 or 83.7% of the cases did not show any signs of activity in the skin barring patches. Tender nerve indicating that disease is active was observed in 88 or 7.2 % of the cases examined. New nerve involvement was found in 1.6 % only. Where as there was no positive signs in nerves indicating that disease is active in 1098 (90.8 %) of the cases. Three fourth of the cases registered were inactive in Nepal. Treatment apart there are other factors that are resulting in such a high percentage of inactive cases being on the register. Factors contributing to this will be enumerated and discussed.
A Socio Epidemiological Study of Registered Leprosy Cases in Nepal

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Data collected from interviewing, examining and perusal of records of 1260 leprosy patients registered for treatment in 8 districts of Nepal, was analyzed and the socio epidemiological factors found amongst them are being presented and discussed. Patients were from 839 different villages. Of these villages 131 had more than one case registered. In 5 villages/towns the number of cases registered was more than ten. Children constituted 10.5% and those aged 60 years or more accounted for 9.4% of the registered cases. Slightly over one third i.e. 37.7% were female patients. Half of our patients were illiterate and 81% had never attended any school. Illiteracy rate was significantly higher (64.6%) among female leprosy patients when compared to male patients (41.2%). Average family size was 7.2 with the mode and median being 6 and 7 respectively. Average duration of the disease before diagnosis was 16.8 months (SD 15.4). Median and mode was 12 months. 75th percentile was 24 months. The distance our patients need to travel to access MDT was 3 KMs on average with 1 KM being the mode. Leprosy patient spends around NRs 16 on travel while seeking treatment. Every patient had stated that treatment is provided free of cost. Fifty three percent of the cases were reporting voluntarily for diagnosis and treatment. Percentage of voluntary mode of detection varied from as low as 38.6% (Sarlahi) to as high as 80.4% (Morang) in the eight districts studied. Percentage of cases detected through Contact examination was only 1.5% with the range in different districts varying from 0 to 2.8%. However on enquiry 32.4% of the UT patients had confirmed the presence of another leprosy patient within the family. Positive family history was forthcoming in 36.8% of the female patients when compared to male patients (29.7%). The difference observed was statistically significant. (p=0.016) Each and every registered patient without any exception was living with their family and in their own community and village. Leprosy patients in Nepal are poorer, less well educated, come from relatively bigger families. Duration of the disease before diagnosis is considerable and NLEP has to initiate remedial steps. Very low yield of contact examinations coupled with the positive family history in 32% of the registered cases calls for a thorough review of prevailing practice of contact examinations.

Prevalence of Disability in New Leprosy Cases Diagnosed at ALERT During 2006-2007

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Introduction: Leprosy prevalence in Ethiopia is 0.9/10,000 but new cases and disability rate seem static. With stigmatization, patients stay long before seeking medical care. Delay worsens disability. ALERT as leprosy referral center, serves patients all over the country. Therefore, patient profile at ALERT represents leprosy in Ethiopia. Rationale behind study was to observe the prevalence of disability among new cases diagnosed at ALERT hospital. Objectives: To measure the degree of disability in the new cases. Method: Retrospective study of new leprosy cases diagnosed between November 2005 and November 2006. Results: New cases observed were 332 within the study period. Age range was 8 to 95 years. Mean age was 34.3 with standard deviation +/-15.8. Categorizing age, 10.5% (35/332) were below 15 years while 89.5% (297/332) were above 15 years. For gender, 70.1% (232/331) were males and 29.9% (99/331) females. A total of 63% with disability according WHO scoring was observed [0 was 37.0% (120/324), 1 was 36.1% (117/324), and 2 was 26.9% (87/324)]. Out of disability score of 2, 13.8% (12/87) were aged below 15 while 86.2% (75/87) were above 15 years; 73.6% were males and 26.4% were females. This means 34.3% (12/35) children are having WHO disability of 2. Discussion: General, disability of 63% WHO (1+2) is very high. The 34.3% grade 2 disability in below 15 years group is too high. Percentage of males with grade 2 disability is more than females; 27.6% compared to 22.3% however compared to ratio entering study, the difference is reasonable. Conclusion: The findings of this study calls for further investigation and intervention. Disability in new cases is still a problem in Ethiopia.
Comparison of Three Interventions Among Household Contacts of Leprosy Patients with a Microsimulation Model

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Introduction: Although the prevalence of leprosy has dropped dramatically in the last decades, the number of newly detected cases is still substantial. Undetected and sub-clinical cases transmit *M. leprae* before detection, thus maintaining the transmission cycle. Household and other close contacts are a risk group, and interventions targeted at them could have a substantial effect on the incidence of infection. In the absence of a suitable vaccine, several other strategies to break the transmission cycle can be adopted. Preventive treatment with rifampicin has shown to be effective in decreasing incidence among contacts and in some countries household contacts are revaccinated with BCG. Currently, T-cell based tests are being developed to identify sub-clinical infection with *M. leprae*. Methods: We developed a microsimulation-model for leprosy in a household-structured population. We calibrated the model on data from the COLEP chemoprophylaxis-trial. We compared the predicted number of avoided cases after introduction of chemoprophylaxis, BCG revaccination and early detection of sub-clinical infection. Results: We will present the most recent results of analyses and comment on the effectiveness of these interventions. We believe that these predictions will have an important contribution to the debate of which interventions should be advocated. Keywords: simulation, prediction of incidence, household, intervention.

Analysis on Causes of Death Among Active Leprosy Patients in China

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Summary: Background Analysis on causes of death among active leprosy patients could help us in understanding the disease and improving the quality of services. Objectives: To analyse the causes and characteristics of death among active leprosy patients. Methods: A retrospective survey was carried out in 24 provinces in China at the beginning of 2006. The special form for collecting information of died leprosy patients was designed. Information about patients with leprosy who died before clinical cure between 1 January 2000 and 31 December 2005 were collected by professional workers at country level. All forms were carefully checked up for reliability and then input the computer for analysis using soft ware SPSS version 10.0 at the national center. Results: A total of 524 deaths were analysed. The top leading cause of death was suicide. About 86 patients (16.4%) died with a mean interval of 20.8 ± 19.1 months from starting MDT to death. The second and third leading cause of death was cardiovascular diseases and organ failure to old age, respectively. About 221 patients (42.2%) died within one year after starting MDT. The second month of MDT was the risky month for new patients on treatment. About 20% of patients with liver function impairment, 33.4% of patients with DDS allergy and 27.3% of patients with renal function impairment died during this period, respectively. Among 143 deaths related to leprosy, 37 deaths (25.9%) occurred within 3 months of MDT. Conclusions: Five causes of suicide, liver function failure, renal function failure, DDS allergy and leprosy reaction increased the risk of the life of patients during leprosy control activities. Strengthening relationship between the health workers and the patient is very important during the first year of MDT to avoid unnecessary severe events.

The Spatial Distribution of Leprosy in a District in Northwest Bangladesh

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Introduction: Leprosy has an uneven spatial distribution indicating heterogeneity in underlying risk factors or detection intensity. A study of the spatial and temporal distribution of new case detection can help to understand these epidemiological patterns. Methods: A retrospective study is conducted in which the spatial distribution of leprosy in a high endemic district in Bangladesh is determined. We traced back the houses of 11,060 patients detected between 1989 and 2003. The space-time permutation test was used to identify high incidence clusters of leprosy. The risk of proximity to towns, leprosy clinics, water, and roads was estimated. Results: Several high new case detection clusters were identified. Six clusters were found for a higher rate of voluntary reporting, and other clusters were found for population and contact surveys. There was no difference in age, proximity to geographic objects or fraction of multibacillary leprosy for cases within or outside the clusters. The proximity to towns was associated with the occurrence of leprosy. Conclusions: Active and passive case finding found leprosy cases distributed non-uniformly over the district and in time. Cases tended to occur closer to towns, which suggests that, in predominantly rural areas, leprosy is a disease of towns. Key words: spatial distribution, Bangladesh, geography, voluntary reporting, active case finding.
Effectiveness of BCG Vaccination Among Leprosy Contacts: A Cohort Study

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The study assessed the effectiveness of BCG vaccination against leprosy among the contacts of 1161 leprosy patients at the FIOCRUZ Leprosy Outpatient Clinic from June 1987 - December 2006. Following National Leprosy Program guidelines, the Clinic has administered 1-2 doses to all healthy contacts since 1991. Among the 5680 contacts, 304 (5.4%) were co-prevalent while 3536 of the 5376 eligible healthy contacts were vaccinated, 30 of whom were excluded due to previous/current tuberculosis or HIV. In 18 years of follow-up, 122 (2.15%) incident cases were diagnosed (58 vaccinated and 64 not), 28 occurring in year 1 of follow up (21 vaccinated - 16 with no scar). The protection conferred by BCG was 56% and was not substantially affected by previous BCG vaccination (50% with a scar and 59% without). The risk of tuberculoid (BT+TT) leprosy during the initial months was high among the vaccinated with no scar. However, it had substantially declined by the first year and the following years, when the protection rate in this group reached 80%. Since Brazil is endemic for leprosy and the detection rate is not declining satisfactorily, vaccinating all contacts could be an effective means of substantially reducing leprosy. Keywords: BCG, leprosy, vaccine effectiveness, contact tracing, Brazil.

Cost Factors in Leprosy Management – A Preliminary Study

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Leprosy NGOs have always felt it is difficult to raise funds. Is leprosy an expensive disease to treat? To answer this question we calculated approximately (I) Cost of clinical services offered including hospitalization in respect of each patient attending Referral Centre of Bombay Leprosy Project and (II) Cost of offering only physical care to disabled patients at the doorstep in an adopted rural population near Bombay. Only the cost of (A) actual services initially offered to patients and (B) incentives to volunteers and planners were considered for calculation. Maintenance and administration expenses including cost of surgery, rehabilitation and research were excluded. Observations: No. of patients under I and II-534 (recruited so far) Service cost (A) Rs 53,782.00, Delivery cost (B) Rs 2,91,715.00, Average cost of service delivery Rs 647.00 (US $16.00) Ratio of cost of services to cost of delivery of services... Conclusion: The cost of delivery of service is much higher than the service itself. If any NGO aims exclusively at running referral centers and offering domiciliary care to disabled patients leprosy service is inexpensive. If however, the objective of an NGO is research, rehabilitation, surgery, social work and health education activities etc, cost will mount to high levels.

HIV - M. leprae Interaction: Can HAART Modify the Course of Leprosy?

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It has been speculated that HIV and M. leprae co-infection may exacerbate the pathogenesis of leprosy lesions and/or lead to increased susceptibility to leprosy, as seen with tuberculosis. However, so far, HIV infection does not appear to increase susceptibility to leprosy. In contrast, initiation of anti-retroviral treatment (ART) has been reported to be associated with anecdotal activation of M. leprae infection and exacerbation of existing leprosy lesions. In order to determine whether ART is associated with worsening of the manifestations of leprosy, a cohort of leprosy patients recruited from 1996 to 2006, was studied longitudinally. HIV/leprosy co-infection was associated with tuberculoid type, paucibacillary disease and lower bacillary loads. CD4 lymphocyte counts were higher among HIV/leprosy at the time of leprosy diagnosis, while viral loads were lower compared to the time of HIV diagnosis. We concluded that ART and immune reconstitution were critical factors driving the development of new leprosy lesions. Keywords: HIV, leprosy, anti-retroviral treatment, co-infection.
Incorporation of Statistical Modeling and Web-Based Data Collection to Provide Foundational Parameters for Correlating Laboratory and Clinical Classification

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Variations in diagnosis and mis-diagnosis of leprosy patients are a relatively common occurrence. This contributes to a delay in or missed treatment, both of which can result in increased severity, complication and impairment. Coupling a minimum clinical set of patient demographics including age, sex, voluntary muscle testing (VMT) and monofila ment testing (MFT) with leprosy classification (MB, PB, TT, BT, BL, LL) and treatment regime/duration by statistical modeling to a predetermined research laboratory minimum data set including serological Western blot/ELISA using applied statistical regression yields probability prediction of conversion rates and improve accuracy in patient classification, whether TT, BT, BL or LL. Statistical modeling for clinical features as compared with sera reactive patterns using Western and ELISA pilot data is presented. The ability to compare and contrast research laboratory findings to clinical field diagnostics utilizing statistical regression analysis provide an avenue to assist in the expeditious diagnosis and appropriate treatment; thereby facilitating effective utilization of resources. The incorporation of an online database is presented as a pilot means to facilitate the accurate classification, collection and documentation of leprosy lesions including number, size, location, BI, stage, VMT, MFT and an associated minimum patient data set that is clinically relevant.

Molecular Epidemiology of Leprosy and Applications in Endemic Situations

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To better describe and compare the factors that lead to continued occurrence and transmission of leprosy the backdrop of local and global multi drug therapy (MDT) being implemented for nearly 25 years, we have consolidated a collaborative international research program involving endemic countries in Asia (Philippines, India, Thailand and China) and S. America (Colombia and Brazil). Observations will be presented regarding the identification and distribution of patients and the Mycobacterium leprae genotypes in various settings to discern transmission patterns and linkages, and on the surveillance of M. leprae resistance to MDT in new and relapsed patients. Strain typing of M. leprae is currently achieved by mapping alleles at a minimum of 15 short tandem repeat (STR) loci and three known single nucleotide polymorphisms (SNPs) using DNA extracts from clinical specimens and for DNA sequencing analyses and other DNA sequencing independent techniques. Variations in the patterns of alleles and their frequencies in M. leprae strains within and between geographically separated populations indicates that STR loci can be suitable for short range transmission, while also separating long range dispersion events. For detection of drug resistance to rifampicin and dapson, selected regions of the target genes, rpoB and folP1 respectively, are subjected to PCR and DNA sequencing. During the year 2006, rpoB mutations were not detected in patients presenting in a skin clinic in Cebu, Philippines, while 2 cases were found in relapsed patients in a Colombian leprosarium. Common and novel folP1 mutations have been detected in India and China. These efforts are aimed for delivery into the clinical community for routine diagnosis, patient care and effective leprosy control. This research is supported by grants from the National Institute of Allergy and Infectious Diseases, NIH, and the Heiser Program for Research in Leprosy and Tuberculosis through IDEAL

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Transmission of Leprosy: A Study of Skin and Nasal Secretions of Household Contacts of Leprosy Patients Using PCR

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It is generally held that dissemination of *M. leprae* is from nasal mucosa and not through the skin of infected patients. This widely held notion is based on recent findings of *M. leprae* DNA in nasal secretions vis-a-vis earlier studies in which acid-fast bacilli were demonstrated frequently in the skin of leprosy patients. In this study we evaluated *M. leprae* in the unbroken skin of lepromatous patients using a new method for collecting skin specimens including PCR evaluation for *M. leprae* DNA. A defined area (312 cm²) of the skin from the posterior surface of both upper arms and the back of both sides of the chest was washed with a sterile cotton swab and the washings collected in sterile saline. The sediment obtained from the washings was examined by direct microscopy and PCR for *M. leprae* DNA. Biopsies of the skin were also obtained to further evaluate the location of bacilli in the skin. Results showed that 6 out of 10 untreated lepromatous leprosy patients examined histologically had acid-fast bacilli in the keratin layer. By PCR studies it was found that 8 of 10 patients had *M. leprae* DNA in skin washings and 6 of 10 had *M. leprae* DNA on swabs obtained from the nasal mucosa indicating that both anatomical sites may contribute to transmitting leprosy. Ninety-three contacts of the untreated lepromatous cases were also tested for exposure to *M. leprae* by analyzing skin washings and nasal secretions by PCR. PCR analysis showed significant skin (17% positive) and nasal mucosal (4%) exposure in contacts prior to instituting treatment of the index cases. After one month of MDT, 6 of 93 (6%) contacts tested positive for *M. leprae* by PCR from nasal secretions while 1 of 93 (1%) remained positive for *M. leprae* in skin washings. After 2 months of treating the index cases all contacts tested were negative for *M. leprae* DNA. These data suggested that 1) both skin and nasal epithelia of untreated multibacillary leprosy patients may contribute to the shedding of *M. leprae* into the environment, 2) following one month of treatment with MDT patients did not continue to shed bacilli from either the nose or skin at rates equal to that observed prior to treatment and 3) contacts of untreated multibacillary cases are at risk for contact with *M. leprae* through both the nasal mucosa as well as exposed surfaces of their skin.

Maintaining Surveillance for Drug Resistant M. leprae Using the Mouse Footpad (MFP) Assay

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Introduction: Although clinical resistance to leprosy drugs remains rare, it is necessary to maintain surveillance, in order to detect the trends of drug resistance patterns among patients being treated for leprosy. Methods: At Anandaban hospital in Nepal, skin biopsies are taken from all suitable new smear positive patients, and *M. leprae* isolated for testing in the mouse footpad (MFP) assay. Three concentrations of Dapsone and two of Rifampicin are routinely assayed. Results: Surveillance of drug resistant *M. leprae* has been maintained for the period 1987-2006, during which time a total of almost 500 patients have been tested. Details of numbers of drug resistant strains detected by MFP will be presented; while no rifampicin resistant strains have yet been detected by us, an increasing trend in Dapsone resistance at all concentrations tested is detected. It is recommended that surveillance of drug resistance in leprosy be maintained, especially among patients relapsing following MDT. Key words: surveillance, drug resistance, leprosy.

Childhood Leprosy: Profiles From A Leprosy Referral Hospital in West Bengal

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Incidence of leprosy in children is an important epidemiological parameter, and also an opportunity to treat effectively if reported early. In this paper, a profile of children diagnosed with leprosy at a Leprosy Referral Hospital in West Bengal during 2004 to 2006 is given and the implications discussed. 151 children below 15 years of age, 84 males and 67 females were studied. The sex ratio was 1.25:1 and closer to 1:1 in the younger ages 36% were below 10 years. There were 18(12%) multibacillary cases (LL, BL, BB), 42% were BT and 44% TT by RJ classification. 15(30%) of 50 MB cases had positive BI, of which 6(12%) had BI=2.00. 16% already had grade 2 disability. 25% had one nerve involved, mostly ulnar. It was surprising to see more than 5 skin lesions (nearly 40%) even in younger children 43% gave a family history of leprosy; it was 55% in the younger age-group. Leprosy in children should be urgently detected through contact surveys and promptly treated to avoid life-long suffering. Key words: childhood leprosy.
Is Leprosy Integration into General Health Care System successful?  
- A Study in Bombay

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Leprosy program was integrated with the Health Posts (HP) of the General Health Care (GHC) System in Bombay in July 2004. We analyzed the new case detection for a period of three years in Bombay Leprosy Project's (BLP) adopted population of about 19.5 lac wherein there are 23 HPs. Following intensive and repeated training of HP staff on the “simplified information system”, MDT blister packs etc were handed over to the health facility. It was expected that the GHC staff will diagnose, confirm and treat the patients. Our paramedical workers offered guidance in diagnosis, maintaining records, follow-up of patients. No surveys were conducted and IEC activities were practiced to promote voluntary reporting as per the govt. guidelines. **Observations:** From July 2004 to June 2007, a total of 352 new cases were detected in the project area, 56 cases (15.9%) first reported to the HP at an average of 1.5 new cases per month. Most of 319 cases reported directly to leprosy referral centres & teaching medical colleges and a few practicing dermatologists and general practitioners.

**Conclusion:** There is a rising trend in detection by the GHC over the study period. However, to meet the objective of integration in making the GHC deal with all problems related to leprosy far more planning is needed.

Common Issues and Problems of Urban Leprosy

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Urban leprosy elimination is a problem because of absence of uniform general health care infrastructure and multiplicity and complexities of urban issues. Urban areas are governed by Local Self Governments which have constraints like inadequate resources, absence of urban primary health care, lack of awareness and political commitment. Multiplicity of providers,Multiplicity of systems and Migration. Population consists of various Social, Cultural and Economic groups. Different economic classes with varying degree of affordability and choices of access to health facilities influences the treatment seeking behavior. Unreached or uncovered peri-urban unregulated population concentration bordering the coverage areas of urban and rural health care delivery systems commonly observed around small and medium industrial towns. Integration of leprosy care in GHC has been a successful strategy in the rural areas. In the urban context, integration needs to be perceived as “building partnership” between various stakeholders to get them into NLEP network. Stakeholders should develop partnership and coordination mechanism leading to improved urban leprosy care for eliminating leprosy as a public health problem.

New Paradigms in National Leprosy Eradication Programme

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Even after achieving the goal of leprosy elimination at national level there is need to maintain the achievement made so far and further to reduce the burden of disease by expanding the scope of leprosy services. To accelerate NLEP activities and to move the programme in desired direction, certain new initiative have been taken by Government of India. These paradigms changes focus on various programme components. For measuring burden of leprosy “case detection rate” is the most relevant epidemiological indicator. Emphasis is on improving the quality of leprosy services through active involvement of General Health Care System and strengthening of referral services at secondary & tertiary level. More emphasis is being given on Disability Prevention and Medical Rehabilitation services to be provided with an integrated approach. Services of ASHA, Village Health & Sanitization Committees and Rogi Kalyan Samitis formed under National Rural Health Mission are being utilized for improving health care delivery services. A comprehensive approach in the form of Community Based Rehabilitation is emphasized to maximize the benefit of rehabilitation.
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Evaluation of Programmatical Actions Leprosy
Decentralization: A Case Study

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Leprosy, is an endemic disease in Brazil, that constitutes a public health problem, although in the last year it has presented an important reduction in the number of cases. To revert this picture, strategies have been adopted for its elimination as a public health problem. Amongst these strategies it is stressed the decentralization of the programmatical actions of leprosy for all the basic health services of the country. An evaluation model was constructed using the Logical Model, based 1 a theoretical-methodological revision of evaluation in health, which essence use of matrices according to the studied object. A Descriptive Matrix, a Matrix of Analysis and a Matrix of Judgment had been created. This Logical Model of Evaluation was applied in the city of Nova Iguaçu, Rio de Janeiro state, for the evaluation of the process and the results obtained with the intervention.

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Telemedicine in Leprosy: My Experience

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Introduction: Leprosy is problem of public health in Brazil and decentralization of the new attendance to the patient strategies of education in the health will have to appear. Most modern, then, it is the sprouting of the telemedicine promote equity to the health. Methods: Participation of the Telemedleprosy Project of the department of telemedicine and dermatology of the university of São Paulo- (FMUSP) - the 2005 - 2006. Results: The suspicious patient to be with leprosy was examined in the clinic* and the digital data of the clinical fiche and photographs were repassed to the computer and later envoy to the site of the project. The patient was evaluated in the FMUSP and the people who orientates repassed its virtual and actual evaluations to the clinical fiche on line. The quarrels were kept daily. It had acceptable correlation between the diagnostic virtual and actual. Conclusion: Although very laborious, the training on line it was important for my auto-esteem and without a doubt it is the ideal for the qualification of the professionals who are participating of the program of leprosy.

Key words: Telemedicine - leprosy.

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Methodology of Concurrent Monitoring of New Leprosy Case Detection in India

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Introduction: India has achieved the elimination of leprosy in 2005. Majority of states have achieved the elimination of leprosy and the remaining states on the verge of elimination in near future. The new case detection rate is 2-3 times of prevalence rate of the state. However there is wide variation on clinical profile of new cases reported across the country. The Leprosy Elimination Monitoring carried out at different interval of time covered mostly on aggregate data and a fraction of cases cross-examined for diagnosis and obtaining social data. It reveals that there are considerable number of wrong-diagnosis and re-registration. Further, the epidemiological features of leprosy are also ambiguous. It is essential to have a system converging the potential of Information Technology for studying the profile of new leprosy cases as well as its epidemiological features so as to sustain the elimination of leprosy and progress towards eradication. Methodology: A Methodology for concurrent monitoring of new leprosy case detection in India is proposed by means of internet web based system. Data on individual patient from districts of sentinel states will be entered into a web based system every month. The independent evaluators will collect the list of new cases reported from web system and cross-examine the new cases for diagnosis including the impairment, delay in diagnosis etc. The evaluator’s data will be entered into the other module of the system and necessary tables generated yearly. This proposed system strengthen and promote accuracy of micro level data at National level and enhance our knowledge on leprosy.

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