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Abstracts

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We are publishing in the following pages abstracts of papers presented at the 27th Biennial Conference of the Indian Association of Leprologists (IAL), New Delhi held at Post Graduate Institute of Medical Education and Research and Dr RML Hospital, New Delhi, India from 2nd to 4th October, 2009.

Abbreviations : I - Invited talk, L - Lead talk, A - Award oral presentation, O - Oral presentation, P - Poster presentation

Note : These abstracts are printed without any editorial changes – *Hony Editor*

I-1 **Global scenario of leprosy & vision beyond 2010**

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Though there has been substantial reduction in the disease burden of leprosy due to registered prevalence brought about by a well-designed strategy and unified effort, new cases will continue to appear, possibly in smaller numbers, for many more years or even decades to come. Today, the diagnosis and treatment of leprosy is simple and is available free of charge at the nearest health centre. There are expectations that persons affected by leprosy and their families do not have to carry the devastating burden caused by the disease without hope.

Our challenge is to sustain the quality of leprosy services and to ensure that all persons affected by leprosy, wherever they live, have an equal opportunity to be diagnosed and treated by competent health workers without unnecessary delays and at an affordable cost. To achieve this goal, the major thrust of our efforts must focus on integrating leprosy into the general health services. Health workers at all levels must be taught the simple methods required to diagnose and manage leprosy. This will improve access to leprosy services and reduce the stigma and discrimination faced by persons affected by the disease.

The World Health Organization's *Enhanced Global Strategy for Further Reducing the Disease Burden Due to Leprosy: 2011-2015* focuses on sustaining the gains made so far and on reducing the disease burden further in all endemic communities. At the same time, particular attention should be given to ensuring that the quality of services is not compromised. Every person affected by leprosy should have easy access to diagnosis and free treatment with multi-drug therapy. We need to ensure that sustainable activities are carried out and quality services provided within an integrated set-up that includes an effective referral network to manage leprosy-related complications effectively.

The implementation of the *Enhanced Global Strategy* through these updated *Operational Guidelines* will require renewed commitment from all partners, notably the of endemic countries and the NGOs working towards the common goal of a world without leprosy. Together, we can further reduce the disease burden due to leprosy and ensure that the physical and social consequences of the disease continue to decline in magnitude throughout the world.

I-2

Combination of immunotherapy with MDT to reduce the incidence of new cases of leprosy

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Continuing high incidence of new cases of leprosy is indicative of persisting foyer of *M.leprae* in the community. As Man is the presumable host (and not armadillos), he must be rendered inhospitable for replication of *M.leprae*. Luckily 99% have immunity to resist infection. Amongst those vulnerable,only a small percentage have requisite immune deficit and inability to react to key *M.leprae* antigens. They are also the individuals persistingly negative to Mitsuda. The proposition is to invigorate their immunity by giving a low cost, DCGI approved vaccine. Many years back we reported a non-pathogenic mycobacteria (coded as *Mw*),which shares antigens with *M.leprae* and *M.tuberculosis*. Given alongwith the standard MDT, it expediated bacterial clearance and brought about faster clinical recovery. It also rendered over 60% of Mitsuda negative multibacillary patients to Mitsuda positive status. No serious side-effects of repeat immunization at 3 months interval were seen. *Mw* is approved by the Drugs Controller General of India for use in humans and is commercially available. It is proposed that Immuvac(autoclaved *Mw*) may be employed not only to treat patients as adjunct to chemotherapy, but also given at 3 or 6 months interval to contacts as prophylactic,specially if they are Mitsuda negative. This strategy can help achieve the goal of leprosy elimination/ eradication. A team of Scientists in laboratories of Prof. S. Hasnain, Anil and Akhil Tyagi have sequenced the genome of *Mw*. Being a hitherto unlisted microorganism in the Data Bank,it has been named as *Mycobacterium indicus pranii* (Saini et al.PLoS One 2009,volume 4, July issue),which besides giving credit,also avoids confusion with the Beijing Drugs resistant strain w of tuberculosis. The old *Mw* or the newly named MIP has been found to be a potent adjuvant generating IL 12 and gamma interferon. It has been found effective for preventing and regressing some cancers. Its ability to cure nasty looking anogenital warts due to HPV has also been reported(Gupta *et al*. J. Eur. Acad. Dermatol. Venerology 2008).

I-3

Future research in leprosy

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Twentieth century will be remembered for many landmarks which have resulted in elimination of leprosy as a public health problem from most parts of world by reducing the prevalence to <1/10,000). India achieved this target more than three years ago. The demonstration of multiplication *Mycobacterium leprae* in mouse foot pad, identification of highly effective drugs in the mouse foot pad & subsequent designing of multi-drug treatment (MDT) regimens and determination of genome sequence of *M.leprae* are among these significant landmarks. MDT has been accepted to be an effective way of managing leprosy and campaigns to actively detect and treat leprosy cases with MDT have helped in drastic reduction in the patient load among communities all over the world. Due to this reduced patient load, the vertical programme has been integrated with public health services. This integration has changed the style of management of disease at community level. It would be most appropriate to now focus on new challenges so that we could think of doing better towards better management of leprosy and ultimately succeed in eliminating this dreaded disease. These research issues are related to diagnosis, treatment, transmission, operational research specially focused on health systems. In the new scenario the goal should be diagnosed as early as possible so that dreaded nerve damage is prevented. This would require the establishment of diagnostic algorithms which would diagnose even the atypical cases early and efficiently. While re-introduction of slit smears can help in diagnosing diffuse infilterating

lepromatous disease, diagnosis of paucibacillary cases can be improved by usage of molecular probes & gene amplification methods, antigenic detection methods, immuno-histochemistry and in-situ hybridization/ amplification approaches. As the patients with high bacillary load are fewer and uniform MDT which is undergoing trials in several countries appears to be an attractive option for future. Rapid detection of drug resistance by molecular methods is another important area to explore as mouse foot pad is time consuming and insensitive. It would be very important to investigate reasons for continued high transmission in areas where incidence continues to high. Genotyping methods to identify strain differences developed in India as well as other countries can help in identifying sources of infection. In-depth studies using established epidemiological approaches and molecular/ immunological markers are necessary to gain better understanding of dynamics of transmission. With the change in profile of disease, confidence generated by effective MDT campaigns and now integration intense research efforts on psycho-social aspects are required to understand new challenges in the changing scenario**.** Sequencing of complete human genome and of *Mycobacterium leprae* had provided opportunities to biologists to launch major research initiatives to understand host-pathogenic interactions. However, obviously due to decreased glamour there have very few studies using genomic and proteomic tools. Thus there is a lot of unfinished research agenda pertaining to basic as well as applied aspects. It would be important to continue the drive so as to reach the ultimate goal of world without leprosy.

I-4 Immunology of Leprosy- Newer trends

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Immunology of leprosy has been central to our understanding of the leprosy spectrum as well as the emergence of leprosy reactions during the natural course of the disease. Moreover, nerve damage which leads to morbidity and is the main cause of stigma appears to also have an immunological basis. However, immunology has led to conflicting findings in various countries with reference to the underlying mechanisms partly due to the fact that immune responses are can only be investigated when the subject has already manifested with symptoms and signs. This has made the dissection of early events from those that are a result of the immune response has been difficult to investigate. Moreover, there is evidence that genetic predisposition and polymorphism of genes that affect the immune response are being reported. In addition, T cells that regulate the immune response are being defined using transcription factors that seem to define Foxp3 and Th17 cells. These cells appear to have opposing effects, one being a negative regulator whereas the Th17 plays an important role in promoting inflammation. Current research is focussed on how these subsets of CD4+ cells divert during their development. Furthermore, the cytokine network has taken a different shape with our ability to screen multiple cytokines concurrently using arrays. These studies point to the network as well as which group of cytokines are important during inflammatory processes that mark leprosy reactions and nerve damage. Parallel imaging studies using high resolution ultra sonography identify neural inflammation in a non invasive manner and help to monitor the progression of nerve damage. In our as well as other studies a chemokine IL10 was found to be an unique marker for leprosy reactions.

I-5 Diagnosis of difficult cases of leprosy in the absence of cardinal signs

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Leprosy is not always an easy disease to diagnose and patients can remain undiagnosed for long not only at the peripheral clinics but even at places with higher medical facilities.

The accurate diagnosis of leprosy is of fundamental importance to all aspects of leprosy epidemiology, case management and the prevention of disability. Under-diagnosis will allow

the continued transmission of disease and needless suffering, whereas over diagnosis will involve overtreatment and stress and stigma for some people; both will also lead to misleading epidemiological statistics.

The diagnosis and classification of leprosy have traditionally been based on the clinical examination, palpation of nerves and frequently with additional information from skin smears. Histopathological examination, immunohistology inoculation of the mouse foot pad, serologic tests, and PCR have been largely confined to research studies. Attempts are being made to develop new tools that will make the tasks of diagnosis and classification easier and more reliable especially in the field.

The ideal diagnostic test would be simple, would identify all cases (100% sensitivity), and would be negative in people who do not have leprosy (100% specificity). Combining various tests may improve the precision of a diagnostic procedure. Using the 'OR' connector sensitivity is increased at the expense of specificity, whereas using the 'AND' connector (a combination of two or more signs must be present for the diagnosis) increases specificity at the expense of sensitivity. The sensitivity and specificity of a test can be determined only by comparison with another reliable test, -a so-called 'gold standard', if it exists. The histopathological examination may be the most reliable method for confirming a diagnosis of leprosy, it is by no means a perfect test in itself. Similarly, many practical problems affect the reliability of skin smears.

What are the sensitivity and specificity of the diagnosis of leprosy based solely on various combinations of clinical signs, using biopsy as the gold standard? What contribution can skin smears make to the sensitivity and specificity of the diagnosis?

Three cardinal signs remain the basis for the clinical diagnosis of leprosy.

● Anaesthetic skin lesions; ● Enlarged peripheral nerves; and ● Acid-fast bacilli in the skin smear

Any one of these signs has been regarded as sufficient for the diagnosis of leprosy (the OR connector), so that sensitivity is high. Each sign is also quite specific in itself, so that specificity is high. The most important potential source of error is the reliability of the examination of the individual patient, referred to as inter-observer variation.

A case of leprosy is a person having one or more of the features (enumerated earlier) and who has still to complete a full course of treatment. When looking at an established lesion with hypo/total anesthesia the diagnosis is quite clear and the concordance in diagnosis is quite high as confirmed by experienced PMWs and leprologists. As the clinical management of leprosy becomes integrated into general health services majority of the patients will be diagnosed by non- specialists – so using a single sign – 'skin patch with definite impairment of sensations' – would be appropriate in more than 70% of the cases (confirmed on histopathology). The figures from Bangladesh and Ethopia have varied between 49%-70%. Interpreted in reverse, 30% patients can be missed employing this criteria and most of them unfortunately are smear positive and a potential source of infection.

Thickened nerves generally appear after the skin lesions. The thickening of one or more nerves is generally seen more often in MB than in PB disease. Depending on the reporting of the patients early or late, the figures for nerve thickening have varied from 23% to 68%, and for MB and PB disease have varied from 96% (MB) to 20% (PB) in Bangladesh, Ethiopia and India. False positive findings may occur due to poor examination technique.

Slit skin smears have traditionally represented one of the cardinal signs of the disease and when positive for *M.leprae* have 100% specificity. The sensitivity is low because smear positive patients never form more than 50% of the total number of patients. So low degree of positivity combined with low reliability of the technique may make reliance on them more difficult.

So, it is apparent that any single sign is inadequate as a diagnostic test. If we combine all the 3 cardinal signs- the sensitivity can reach upto 97%. Skin smear does not seem to add greatly to the sensitivity of the diagnosis.

Biopsy to study histpathology, immunohisto-pathology, PCR and culture in mouse foot pad are very helpful tests but available only in few centres. Moreover the distinction between reaction and relapse may still be difficult. However biopsy and immunohistology will help in differentiating many chronic granulomatons conditions which can mimic leprosy viz. Lupus vulgaris, sarcoidosis, PKDL, syphilis (secondary or tertiary) and other atypical skin lesions.

The present system of diagnosing PB and MB based on the lesion count has yielded varying results in various studies. However, it must be recognized that the system will lead to a small but significant number of smear positive MB cases being treated with PB regimen. The problem is

also of finding the likely high smear positives (who are more likely to relapse) in the absence of skin smears in the present system of classification based on the number of lesions.

All of the above – has implications for training of the PMWs and general duty medical officers to be able to diagnose leprosy with a degree of certainty.

There is little doubt that the progressive simplifications of diagnosing and treatment has enlarged the reach of leprosy services to more and more patients. However, it has also added to the problems - as the quick fix method does not fit in all, all the times and everywhere. So more care is needed in special situations to arrive at the correct diagnosis to save embarrassment to all.

I-6 Relapse in leprosy, case definition, prevalence and causes

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A patient who successfully completes an adequate course of multidrug therapy (MDT) but who subsequently develops new signs and symptoms of the disease either during the surveillance period or thereafter is considered to have relapsed (WHO 1988).

In the sulphone monotherapy era, it was being noticed after complete inactivity. But with MDT, paucibacillary (PB) MDT is stopped after 6 months and multibacillary (MB) MDT stopped after 1 year even when lesions are still active, difficult to define relapse.

To detect relapse, PB patients surveillance is required for at least 3 years and MB patients surveillance for at least 9 years, then only majority of relapses could be detected.

Predisposing cause for relapse is persisters who have capacity to survive in the host despite adequate chemotherapy in nerves, muscles, lymph nodes, bone marrow, and liver.

Precipitating factors for relapse in leprosy are :

1. Inadequate therapy.
2. Irregular treatment.
3. Cases treated with dapsone monotherapy.
4. Patients with high BI (2 or more).
5. Shorter duration of rifampicin administration.
6. In PB, risk increase with widespread involvement of skin and nerves.
7. HIV, pregnancy and lactation.

Clinical features in PB leprosy are :

- Subsided skin lesions become active.
- Extension of the lesions.
- Increase in number of lesions.
- Fresh nerve thickening and tenderness.
- There may be a change in the type on relapsing.

Clinical features in MB leprosy are :

- Very often the first manifestation of relapse in LL is the occurrence of bacteriological positivity in negative for long.
- Localized areas of infiltration over forehead, lower part of the back, the dorsum of the hands and feet and upper buttocks.
- Soft pink papule or nodule or several such lesions appear over posterior aspect of arms and anterolateral thighs.
- Papular or nodular lesions may appear over hard palate, inner aspects of the lips and glans penis.
- Iris pearls or rarely leproma.
- Thickening and tenderness of nerves, with insidious loss of function, nodular lesions along the course of nerve.
- Relapse occur anywhere along the spectrum.

I-7 Reaction treatment : Facts or fiction

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Leprosy would be an innocuous disease, were it not for the nerve damage which often is the consequence of reactions, either Type 1 (RR) or Type 2 (ENL). The treatment of the Type 1 reaction seemed properly established in the seventies of the previous century. But the effort of WHO to shorten treatments and overrating of the so-called Cochrane evidence let to shorter treatments and not well planned trials.

The problem with the Type 2 leprosy reaction is that most of the reactions are self-limiting, leading to wrong assumption that certain treatments are effective. However there is a substantial number of patients who develop chronic Type 2 reactions and get hooked on steroids with all the problems attached.

The presentation will analyze the facts and the fallacies and misconceptions about treation treatment.

I-8 Protein biomarkers in leprosy

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Clinical biomarkers specific for diseases, particularly for cancer, are already in advanced stages of development. In these cases validation of disease markers using simpler and less expensive approaches that could be used in hospital settings are being developed. Unlike cancers the field of infectious disease specific biomarkers is less well developed. Clinical proteomics is gaining importance in disease monitoring, prediction, determination of treatment efficacy, establishment of disease stages and early diagnosis. However, particularly in India, infectious diseases such as tuberculosis, malaria and other enteric diseases are major causes of human suffering and there are other equally important diseases, which also need careful proteomic analysis to develop biomarkers. In my lab we are using proteomic approaches to discover and develop biomarkers for leprosy and the infectious fungal keratitis. Our approach mainly involves separation and quantification of the total proteome of serum and tear using DIGE analysis. This is followed by protein identification using MALDI TOF mass spectrometry and Nano LC MS/MS. We are mainly focussing on the identification of post translational modifications and isoform variations under disease specific conditions. The importance of high abundance proteins as biomarkers will be discussed.

I-9 Drug Resistance and Molecular Techniques in Leprosy

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The standard treatment for multibacillary leprosy was life-long monotherapy with dapsone, which led to the selection of dapsone-resistant *Mycobacterium leprae* and subsequent therapeutic failure. Multidrug therapy (MDT) was recommended by the World Health Organization (WHO) in 1982. Current recommended control measures for treating leprosy with MDT are designed to prevent the spread of drug-resistant *M.leprae*. Ofloxacin and some newer fluoro-quinolones also displayed bactericidal effect against *M.leprae* and became important components of regimens to treat rifampin-resistant leprosy. Drug resistance has been reported since 1964 for dapsone, 1976 for rifampin and 1996 for ofloxacin. Conventionally drug resistance is monitored using Mouse Footpad

(MFP) technique. This in-vivo method is cumbersome, time-consuming and requires large number of viable bacteria. It also requires expensive facilities and expertise, and its success is largely dependent on the biopsy containment and the time lapsed, until Mouse Footpad inoculation. To prevent the emergence and transmission of multidrug resistant (MDR) leprosy and to identify and treat existing cases of MDR leprosy, it is necessary to establish rapid methods for detection of drug resistance in *M.leprae.* The progress in molecular biology offers an unprecedented opportunity for understanding the mechanism of drug resistance in Mycobacteria. Resistance to dapsone, rifampicin and ofloxacin, evolves by amino acid substitution at the site of action of these drugs. As a sulfonamide derivative, dapsone is a competitive inhibitor of dihydropteroate synthase (DHPS). Recent studies have identified point mutations in the *folP1* gene that encodes DHPS in dapsone-resistant *M.leprae*. The rifampin resistance is observed to be associated with mutations in the *rpoB* gene that encodes the a subunit of RNA polymerase. Resistance to ofloxacin is known to be associated with mutation in *gyrA* gene encoding the A subunit of DNA gyrase of *M.leprae*. Further molecular studies allowed the development of molecular tools for identifying resistance to dapsone, rifampicin and ofloxacin in *M.leprae.* Detection of susceptibility of *M.leprae* strains to these drugs is now made possible by rapid DNA based molecular methods, which involves the amplification of the target genes by PCR, followed by detection of mutations in the PCR products by either of the molecular techniques like Direct DNA Sequencing, Single Strand Conformation Polymorphism (SSCP), Line Probe Assay (LiPA) (or) Heteroduplex Detection. Studies undertaken in many countries, including India, to examine the feasibility of employing these molecular methods offer a potential hope for the rapid detection of drug-resistance in M.*leprae*.

I-10 Leprosy - Targets for the future

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For public health programmes in general and leprosy in particular targets are necessary to secure political and professional commitment, to provide accountability, to monitor progress, and facilitate resource mobilization.

The leprosy elimination target of attaining a prevalence of less than one case per 10,000 enabled India to make tremendous progress in reducing the leprosy burden by over 95%.

The current need is to set targets utilizing more robust indicators other than the traditional prevalence, such as detection of new cases with Gr. II disability over calculated population.

Monitoring new cases with Gr. II disability serves to focus attention on two activities (i.e.) reducing the occurrence of new cases, and detection of new cases early so that there are less number of cases with disability.

In consonance with the above refined approach WHO has recently set a target by 2015 of reduction of 35% using a new indicator of rate of new cases with Gr. II disability calculated over population. Similarly the NLEP in India has set a target of 25% reduction by 2012.

There is a clear need to further intensify anti-leprosy activities in India so that leprosy elimination is not only attained at the district level in every district in the country, but also that the core problem of occurrence of disability among new cases is drastically reduced.

I-11 Impaired chemokine response dissociate DTH from Immunity : Lessons from cured lepromatous leprosy patients

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Delayed Type Hypersensitivity (DTH) and protective immunity is thought to be tightly linked. Remarkable similarity exists between their cellular and immune mechanisms. However, their dissociation has also been recorded. Here we investigated the immunological mechanisms

relevant for their dissociation in a group of non relapsing cured lepromatous leprosy (CLL) patients. In these patients Lepromin skin reaction was used as a model system for DTH and tissue chemokine response. Using this model we report that DTH and synchronous chemokine response are tightly linked phenomena. The results indicate that elevation of threshold of tissue chemokine induction dissociate DTH from protective immunity in lepromin negative CLL patients. We also show that the DTH anergy in these subjects is not an absolute one but depends on the strength of the antigen (Lepromin) stimulus. Our data provide insights into the intricate relationship among DTH and immunity and highlight the persistent presence of effector immune mechanisms involving these two pathways in apparently unresponsive lepromatous leprosy patients.

I-12 A brief perspective of TLM thrust to NLEP

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The Leprosy Mission (TLM) started in India in 1874 as a response to the evident and pressing needs of leprosy-affected outcasts from their communities. The organisation has been a pioneer in a wide range of leprosy services since the beginning, and was involved as an NGO partner in NLEP since the 1960s. The current range of activities of TLM in India, primarily within the NLEP-ILEP partnership, are described. A number of challenges as TLM perceives them, and strategies in response, are outlined. TLM's role is summarised as being both supplementary and complimentary to national efforts in sustaining leprosy control activities and to continue to meet the needs of people affected by leprosy in the are as of disability care and socio-economic rehabilitation on a larger scale.

I-13 Fixed duration of MDT & newer anti-leprosy drugs in leprosy from dermatologists point of view

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I-14 WHO/TDR multicentric international trial on "Uniform MDT regimen for all types of Leprosy"

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Background and Rationale : In the Strategic Plan for the Final Push for Elimination of Leprosy, WHO enunciated the policy, to rapidly increase the multi-drug therapy (MDT) coverage and to encourage the local health services and communities to take on the responsibility of sustaining leprosy case detection and management facilities. At a low level of leprosy prevalence, vertical leprosy programme would no longer be cost effective. Currently there is an urgent need to involve the general health services for detecting and managing leprosy patients to sustain leprosy control. To fulfill this challenge, further simplified MDT and demonstrating its effectiveness by implementing the same in larger areas in programme conditions can prove to be the key. Accumulated scientific data over the past three decades demonstrate that such a possibility exists. This is the time to make treatment regimens much more patient friendly and easy for integration and administration by the general health services. This treatment should be as short and cost effective as possible. Side effects and toxicity for the three drugs, which constitute this combination, are rare, widely known and hence, all types of leprosy patients can be provided with safe MDT. In keeping with these principles, it is possible to propose a common or U-MDT for all

leprosy patients, which is essentially the 6-month MDT for MB leprosy consisting of Clofazimine, Dapsone and Rifampicin. MB – MDT has been used for several years worldwide, and we have adequate information on its efficacy. However, in the context of UMDT implementation, two issues need to be elucidated: one is to reduce the duration of treatment for MB patients from 12 months. Evidence from experimental studies suggests that 2 -3 months' MDT is capable of killing almost all viable bacilli in mouse foot pad model.The second issue is the addition of Clofazimine for Pauci- Bacillary patients.

Review of MDT drug regimens for PB leprosy : Study on efficacy of PB MDT plus clofazimine has proved better than WHO PB regimen in terms of reduction of clinical activity in patches, reactions and relapses. Clofazimine was well accepted by patients, pigmentation was minimal and rapidly disappeared after stopping treatment.

Review of MDT drug regimens for MB leprosy : Based on low relapse rate and reactions, the duration of treatment has been shortened to 12 months, without increasing the risk of developing drug resistance.

Effects of incomplete treatment with MDT regimen : In retrospective analysis of one study, it has been found that fifteen out of 37 defaulters had no history of taking treatment after defaulting. Six patients, who had taken the treatment for 12 to 18 months before stopping, had clinical and bacteriological worsening. In a second study, out of 301 defaulters, 41 MB cases were retrieved and examined, 1 to 6 years after stopping MDT, all 41 patients showed clinical improvement. At the time of retrieval 71% were skin smear negative and only 12% showed the same BI as before MDT. In third retrospective study of defaulters, the patients who received 12 or fewer monthly doses of MDT performed as well as those who received a 24 – month course.

Smear positive cases under control programme conditions : Of the total 556,982 patients detected from the major endemic countries at that time about 26% were MB, 13% were skin smear positive and 4% had the BI beyond 3. In the present day context, one can expect smear positivity rates to be even lower and the proportion amongst them with BI of 4 or greater to be negligible.

Can MB MDT be shorter than 12 months? : Supporting evidence is available informing the quick loss of infectivity of *M.leprae* in a shorter period after MDT. It thus appears that a large number of MB patients get longer treatment than necessary and a negligible fraction of MB patients would perhaps need treatment longer than 6 months. All patients are expected to respond to 6 months MB MDT, but a limited number of them may relapse. These relapsed patients could be easily retreated with the same MDT, since there is virtually no risk of drug resistant mutants emerging. It is logical to expect better compliance from the patients, if treatment is reduced by further 6 months.

After reviewing earlier work conducted in India, WHO Technical Advisory Group (TAG) recommended the implementation of 6 months MB MDT regimen for all leprosy patients (PB and MB) on the condition that the outcome will be closely and rigorously monitored through standardized procedures. A uniform regimen based on 6 months MDT blister packs will be of great benefit to patients and health services. This will facilitate integration and demystify the disease. MDT has been proved to be robust in terms of treatment efficacy and safety. Relapse rates are very low (less than 1%); the same MDT can still cure relapsed cases, since resistance to MDT is virtually non-existent.

Study Design : PB leprosy patients constitute the substantial majority of these cases arid for them the question of interest is only addition of clofazimine. The second issue to be addressed for this group is one of acceptability and can be tackled in an open study design. With respect to MB cases, the risk of possible inadequate treatment might exist for about 2% of the total newly diagnosed leprosy cases. Even in this group it is not certain whether the observed high relapse rates are on account of reactivation or reinfection. In the event of relapse, the episode can easily be managed by administering an additional course of uniform MDT. If a randomized controlled trial needs to be conducted at all, it could be justified in this small fraction of highly bacteriologically positive patients. It will need a control group of patients receiving 12 months MB MDT. The sample size calculations will have to be based on the principle of equivalence and size will be enormously large. Such a trial is not a practical proposition. The study is being conducted in six centers in India and two centers in China with the objective to assess the efficacy of a 6-month MB-MDT (Uniform MDT regimen) for all types of leprosy under programme conditions. Main outcome measure is cumulative level of relapse rate not exceeding 5% after 5 years. The study is conducted as an open design requiring 2500

newly detected, previously untreated patients each in MB and PB groups. Standardized clinical criteria are used to assess skin lesions in the field.

Current status : The study enrolled 3396 patients as on November 2008 (India: 3230; China: 166). Of the 3396 patients, 38% were MB and 4% had grade 2 disability. During follow-up, 53 patients developed new lesions. Of these, 47 were on account of reactions. Six patients had clinically confirmed relapse. Clofazimine related skin pigmentation was short-lived and was acceptable to patients. Totally 230 patients were lost to follow-up as on November 2008. Of the 3396 patients, 2930 completed treatment. Of the 2930 patients, in 472 (16%) skin lesions were inactive. PB patients responded better than MB patients (23% Vs. 6%). At the end of first (n=2424), second year (n=1945) and third year (n=1265) of follow-up post-U-MDT, in 1082 (45%), 1121 (58%) and 975 (77%) patients, lesions were inactive respectively (51%, 65% and 83% in PB, 35%, 47% and 66% in MB).

Observations: U-MDT appears to be promising with respect to clinical status of skin lesions. Only few relapses are reported. Mild pigmentation due to clofazimne disappeared over a period of time after stopping the treatment. Compliance to the treatment is good.

I-15 Nerve damage and treatment

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Nerve damage is the main reason that leprosy is still a feared disease. Most of this damage occurs during reactions. The mechanisms of this damage is not yet fully understood, being different during Type 1 and Type 2 leprosy reaction and damage may even occur without clinically obvious reaction. Different mechanisms of damage may require different treatment approaches. The mechanisms, the monitoring and the treatments will be discussed.

L-1 Problems in diagnosing clinical relapse in leprosy

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In leprosy, the relapse of disease after adequate treatment could be classified under one of the following types :

1. Clinical relapse, 2. Bacteriological relapse, 3. Histological relapse.

However, there are several limitations in identifying relapse in leprosy. Bacteriological relapse – can only be observed in smear positive patients. Histological relapse – by definition needs an initial and follow-up skin/nerve biopsy records. Clinical relapse – *in theory* could be observed in all patients, if looked for carefully, when it occurs.

Variety of clinical signs and several definitions have been proposed for relapse in leprosy. One of the important definitions mentioned in the 'Guide to Leprosy Control (WHO 1988)' is "A patient who successfully completes an adequate course of MDT, but who subsequently develops new signs and symptoms of the disease either during the surveillance period or thereafter."

The signs and symptoms considered by various workers in their published works on relapse in leprosy are wide ranging. Some of the signs and symptoms considered for PB leprosy were: appearance of new skin lesions or increase in size of old lesions, return of active disease, extension of existing lesion, erythema & thickening of old lesions, new paralysis and reversal reaction, gradual reappearance of activity and reappearance of disease.

For MB leprosy some of the signs considered were: return of active disease including neuritis, iritis, RR, new lesions, positive smear, presence of active skin lesions and new NFI and reappearance of new lesions in person cured of leprosy.

It would not be far from truth if it is said that there is no gold standard to diagnose clinical relapse in leprosy. The recent WHO 'Operational Guidelines for Enhanced Global Strategy for Further Reducing the Disease Burden due to Leprosy (2011-2015)' defines relapse as appearance of definite new skin lesions and/or an increase in the bacterial index.

The problems and pitfalls in applicability of these varied definitions of clinical relapse in various clinical settings would be discussed.

L-2 Histopathological aspects related to clinical progression and relapse in leprosy

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The distinction between reactional episodes in leprosy and relapse has been at the centre of much debate over the years. Various clinical definitions of relapse or reaction have evolved in an attempt to clearly demarcate these two entities. In spite of this, there still remain individual variations in the clinical interpretations of these definitions, resulting in very real dilemmas in diagnosis and differentiation. Reactions warrant approaches involving the use of immunosuppressive agents, whereas the approach to relapse involves treatment with MDT.

Given this situation, histopathological examination holds promise as a potential tool to differentiate reaction from relapse. This presentation analyses the histological features of lesions that were labeled as 'Relapse' or 'Suspected Relapse', and identifies features that point in favor of a definitive diagnosis of relapse. These features are contrasted with a more recent inter-observer study among histopathologists that outlines more definitive features of a reaction on histology.

L-3 New paradigms in NLEP

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In view of the need to sustain leprosy services for many years to come, there has to be a shift from a campaign like elimination approach, towards the long term process of sustaining integrated high quality leprosy services, which in addition to case detection and treatment with Multi Drug Therapy, also include prevention of disability and rehabilitation. There is an opportunity for this process to build on the gains made by the elimination campaigns, such as increased awareness of leprosy, political commitment and involvement of general health services.

To get the programme move in the desired direction, the new paradigms in NLEP have been developed which covers the aspects of burden of leprosy, improving the quality of services, integration of leprosy services with primary health care system for sustainability, referral services and long term care, prevention and management of impairments and disabilities, Improving community awareness and involvement, support of National Rural Health Mission, rehabilitation and indicators for monitoring and evaluation.

The new paradigms in NLEP started from the year 2007-08, made the programme objective shifted from reducing case load in the community, to the broader aspects of quality leprosy services carried out through involvement of all partners including communities under the overall umbrella of the National Rural Health Mission. The services also includes care after cure and community based rehabilitation to the persons affected by leprosy.

L-4 Quality and sustainability of National Leprosy Eradication Program

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National Leprosy Eradication Program (NLEP) is a well established & deep rooted national health program of world repute. Special emphasis on quality and sustainability of NLEP services during 11th 5year plan has further improved and given boost.

New paradigm shift in program has lead to expansion of DPMR (Disability Prevention & Medical Rehabilitation) services and initiatives to reduce stigma & discriminations. Monitoring of quality is being done by regular collection and analysis of data on treatment completion rates, proportion of defaulters, number of relapses and number of new disabilities developed during MDT and also by review meeting. Concurrent training and supervision is done to improve the quality of services. New indicator-rate of disability grade 2 in new cases per lakh population has been added to monitor the quality of services.

Various quality-indicators at national level in 2008-09 are treatment completion rate 91.35, relapse cases 328 and new disability developed during MDT in 215 cases.

New leprosy cases are going to emerge in next few decades. Integration of NLEP services into General Health Care System is the key to sustainability of program activities. Free MDT services are available at all PHCs and Government hospitals, thus increasing the accessibility and converting the program more cost effective.

Specialized services like Reconstructive Surgery and rehabilitation measures are also being integrated for its sustainability.

L-5 DPMR-services through National Leprosy Eradication Program

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After achieving 'Leprosy Elimination' i.e. Prevalence Rate below 1 / 10,000 population, at national level, more emphasis is given to disability prevention and provide services to disabled persons affected by leprosy. Disability Prevention & Medical Rehabilitation (DPMR) plan was circulated in 2006 to the states and the same has been incorporated in 11th plan of the national health program.

Disability Prevention & Medical Rehabilitation is a major component of National leprosy Eradication Program (NLEP). DPMR services being given by General Health Care System, are grouped into 3 and to be delivered from all 3 levels. Early new case detection & identification of reactions with their management, prevention of secondary impairments by self care & protective aids, at primary & secondary level and Reconstructive Surgery at tertiary level-constitute DPMR services. Removal of stigma and discrimination which is the main barrier in voluntary reporting, self care and community participation is being addressed by convergence into National Rural Heath Mission (NRHM) so that community based rehabilitation is promoted. DPMR services are further enriched by deeply involved NGO partners.

Sixty nine hospitals, 33 government & 36 by NGO, are presently recognised to deliver RCS services. Rs 5000 incentive to person operated, Rs 5000 cash assistance for each major surgery, to government hospital providing RCS services, increased funds for protective foot wear are some of the new initiative taken to promote DPMR services. Regular monitoring at central level has improved implementation, quality and sustainability of DPMR services.

During the year 2008-09, 11805 cases of Lepra-Reactions were treated, 2962 deformed cases have undergone reconstructive surgery, 39325 foot wears given to needy cases, 28058 ulcer cases were treated and given ulcer care kits.

Implementation of the Referral System & linkages, better follow up of operated cases, better counselling techniques and data base to monitor each case, are some of the challenges to be dealt.

L-6 Disability prevention and medical rehabilitation : N.G.O's perspective

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Disability Prevention and Medical Rehabilitation (DPMR) is an essential arm of the NLEP program. It identifies different layers of the integrated structure that are vested with the responsibility of the DPMR activities. It is obvious the level of skills increases from the primary level to the tertiary level. These skills need to be imparted to the integrated health personnel to enable them to implement the activities. The two fold methodology to empower the integrated health staff for DPMR activities would be :

1. To train "trainers" who within the system can transfer the skills involved to the concerned personnel or NGO's to take on the responsibility of related training.
2. Where NGO's are available create models in a public/private partnership for implementing the program which then can be used to train personnel.

The presentation discusses strategies for implementation and sustaining of DPMR activities at various levels and also training of the personnel. Since NGO's possess the knowledge and skills for various activities of DPMR they should take a pro-active approach in a partnership with the Government.

L-7 NLEP : Orissa perspective

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National Leprosy Eradication Programme has been under implementation in Orissa since 1983 with introduction of Multi Drug Therapy (MDT) with the support of GOI, WHO and many national and International level organizations. Due to successful implantation of the programme, Orissa became the first state amongst very high endemic states of the country to achieve the national objective "Elimination of Leprosy" as on 31st July, 2006. Since then Orissa is retaining leprosy elimination status but recently the prevalence rate of leprosy has increased from 0.65/10000 in March, 2007 to 0.87/10,000 population as on 31st March 2009.

Leprosy elimination target has also been achieved in, as many as, 20 out of 30 districts of the state. Total 6381 new cases detected in the State during 2008-09. The Quarterly New Case Detection Rate of leprosy in the state is showing an increasing trend from 13.57 to 15.78 per lakh population from March, 2008 to March, 2009 due to conduction of good innovative IEC activities in outreached and difficult areas, involvement of 43000 ASHAs at village level in case referral activity and re-introduction of house hold contacts examination. Further involvement of ASHA and village health & sanitation committee (VHSC) under NRHM will help in detection of all undetected cases of leprosy from Orissa. In Orissa the VHSC has been named as Gaon Kalyan Samitee (GKS). It has been planned to sensitize all 52000 GKS in Orissa in leprosy to make their village free from leprosy in next 5 years. Involvement of GKS has helped in ensuring 100% treatment completion.

During 2008-09, the Multi Bacillary (MB) proportion was 49.74%, Child proportion was 8.88%, Gr.I Disability proportion was 4.52% & Gr-II Disability proportion was 3.21%.

30000 leprosy cure disabled persons have already been screened in Orissa and out of which 2500 cases are fit for RCS. The Disability Prevention and Medical Rehabilitation programme has been started in the State to provide disability care services to leprosy cured from all PHCs of the State. Reconstructive surgery has been started in all 3 Govt. medical college hospitals in a regular basis. It has been planned to start RCS in private hospitals and private medical colleges through PPP model. The DPMR activities have been integrated with the activities of rogi kalyan samiti (RKS) at every health institutions. Logistic requirement like provision of Prednisolone, MCR footwear, goggles, splints, crutches, dressing materials, transportation of patients for DPMR

services are being done out of RKS funds. AYUSH doctors posted at PHCs under NRHM have been trained in DPMR programme and now in many districts the DPMR activities are being carried out by these doctors in better manner.

100% validation of new leprosy cases before registration and hands on training of MO PHC during validation has improved the quality of diagnosis of leprosy and its complications at PHCs by Medical Officers. It has created a great degree of confidence amongst patients.

Availability of full course of MDT at PHCs for leprosy cases in Orissa, as it has been adopted in RNTCP, has improved the treatment compliance to almost 100% and nil expiry of MDT drugs.

L-8 Can the current health delivery system in India manage the leprosy burden ?

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Integration of Leprosy into general health system was necessitated by the reasonable decline of transmission of the disease in endemic countries. An overenthusiastic race to reach the target date of "Elimination" even gave rise to a serious suspicion whether the figures were manipulated. Health administrators and bureaucrats in India developed an euphoria and were boastful of the saving of the enormous costs in maintaining a "vertical" program. The overzealous program managers who felt secure in pleasing the bureaucrats in spite of their medical background hardly realized the need for the expertise so badly needed to address the clinical problems faced by the patients. Even the little clinical knowledge available at the time of integration dwindled very fast. With official statements proclaiming that leprosy is a "rare disease" a feeling of complacency has been created among the health planners.

This presentation deals with the current scenario of leprosy management in 23 Health Posts of the Municipal Corporation in an adopted population of about 2 million by Bombay Leprosy Project (BLP) in the metropolis of Bombay. Out of 573 new leprosy cases only about 15.8% sought treatment at these health posts, remaining reporting to BLP's clinics.

Observations in a rural population of about 4,76,970 harboring an identified 1,294 leprosy-disabled (grade 2) are also presented. In an area covered by 11 PHCs such visible disabilities were present to an extent of about 27 per 10,000.

In our experience in both urban and rural locations, care available at the primary level leaves much to be desired.

Considering the unlikely possibility of reversal in the policy decision on integration introduced as early as 1997, the progress in the management of leprosy burden in India in the hands of the already over-taxed general health system calls for a serious review. The claims made by the government of the initial success of well meaning schemes like DPMR, NRHM and NUHM, however attractive they are should be viewed with cautious optimism.

L-9 The eye in leprosy - 1965 to 2009

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To study the prevalence of ocular complications among the leprosy patients longitudinal study since 1983 has been done including; vision recorded anterior segment examination with slit lamp, posterior segment with direct ophthalmoscope. Periodic screening was done once in six months. The eye records done by ophthalmologists for all patients from 1965. Totally 149,827 patients were reviewed of whom 12,450 patients underwent cataract surgery. Blindness and eye complications were very frequent before 1960, From 1960 to 1980 there was a very marked reduction in the eye complication and minimal blindness. Post 1980, the eye complications were very minimal and no blindness. Early detection of leprosy and its

treatment prevented eye complications and blindness. Adequate management of lagophthalmos will prevent the complication. All leprosy patients must have access to latest ophthalmic procedures all the results of cataract surgery are almost equal to that of normal person. The eye is the last organ to be involved. Once involved it is the last to subside. Pre 1980 uveitis lasted for 20 to 40 years. Post 1980, uveitis lasted upto 6 years. Most of the eye complications are insidious, routine periodic ophthalmic examination is mandatory to detect and treat them early to reverse/minimize ocular morbidity particularly in Lepromatous Leprosy.

L-10 Histoid Hansen: an update and its impact in post leprosy elimination era

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Histoid leprosy is an uncommon multibacillary form of disease with unique clinical, bacteriological, immunological and histopathological features. The term "histoid leprosy" was first coined by Wade in 1960 as a histologic concept of bacillary rich leproma composed of spindle-shaped cells along with an absence of globus formation. Since then few case series have been published mostly from India. Histoid leprosy, including its clinical presentation and pathogenesis, still remains a riddle to the leprosy workers. The interplay of genetic factors, immune response, and treatment received in a given patient seems to influence the manifestations of histoid leprosy. The clinical peculiarities of histoid lepromas are characteristic enough to delineate this entity with certainty in most patients. Slit skin smear and histopathological examination of histoid leprosy are mandatory for final confirmation of diagnosis.

Patients with histoid Hansen generally remain undetected for long time and are often confused with other dermatoses. Its occurrence in the post leprosy elimination era raises serious epidemiological concern for spread of infection among contacts. As the bacillary load is very high in these patients, they can form a potential reservoir of the infection in community. Contrary to the earlier belief in dapsone era, majority of the patients manifest disease denovo without any history of antileprosy therapy or suggestive of drug resistance. A high index of suspicion is required for diagnosis of such cases in current scenario when leprosy management is being integrated with general health services and the expertise for the disease is becoming extinct.

L-11 Current concepts in Systemic involvement in Leprosy

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Leprosy is a systemic disease, with multi-organ involvement occurring more commonly towards the lepromatous pole. There is increased AFB and cellular infiltration in various organs towards this end of the spectrum. However this does not produce organ dysfunction. Organ dysfunction is due to increased infiltration, concomitant infection, leprosy reactions or as a side-effect of anti leprosy drugs. Various factors aid in the dissemination of bacilli to different organs. Lepra bacilli have a predilection for cooler body sites. Certain systems such as the skin, peripheral nerves, eyes, liver, kidney, nasopharynx etc are significantly involved, organs like tongue, spleen, adrenals, peripheral vasculature show mild to moderate involvement while CNS, CVS, GIT, lungs, breast, female internal genitalia, endocrine and urological system are minimally or not affected. The various clinical, structural and laboratory alterations occurring in these organs are described.

L-12 Study of leprosy in children

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Introduction : Leprosy among children is a public health problem reflecting disease transmission in the community and efficiency of control programmes. Childhood leprosy is an indication of endemicity of leprosy.

Material & methods : The study was undertaken on children with signs & symptoms suggesting leprosy attending Dermatology OPD of Gandhi Hospital, from 2004 to 2009.

The diagnosis was established on the basis of clinical examination and slit skin smear. Skin biopsy was done in 12 children.

Results : Results were analysed. There were 32 children with leprosy among total of 280 leprosy patients who attended the leprosy clinic. There were 23 male children and 9 female children with male to female ratio of 1 :2.5. A positive family/contact history was obtained in 18% of children. Most of the children presented with hypopigmented and hypoanaesthetic patches. 37.5% (12 patients) presented with single lesion and 62.5% (20 patients) presented with multiple lesions, common site of patch being the extremities (81 %). BT was the commonest spectrum (75%) followed by BL (15.62%) and LL (9.38%). Multiple nerve involvement was seen in 59.38% and single nerve involvement in 40.62%. Positive clinico pathological correlation was observed in 37.5%. Type 1 and Type 2 reactions were seen in one case each. Deformity was seen in one case. 26 cases were on PBMDT and 6 cases were on MB-MDT.

Conclusion : There is increase in incidence of childhood leprosy. Any hypopigmented macule in pediatric age group should arouse suspicion of leprosy. The family members of newly diagnosed patients should be screened regularly for leprosy. Regular school surveys & early detection of cases is an important tool which will go long way in achieving goal of elimination of leprosy.

L-13 Human rights and leprosy

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Leprosy is an ancient disease, confined to man. Man is a social animal so, there are social dimensions to this disease. Societal attitudes, legal prescriptions and cultural perceptions are blended together to make social aspects. The disease itself has variegated forms and is on the decline. Unfortunately, there is social stigma attached to the disease on account of misconceptions and deformities that are associated with the disease at times. Stigma impacts negatively on early diagnosis and treatment leading to increase in transmission of the disease and prevalence of deformity. In fact, almost all the Human Rights are violated on account of social stigma which is fortified by legal provisions that are existing in India and Nepal. The dictum of religious books and traditional social codes or attitudes are more severe than any law. Societal attitudes are set in laws. The attitudes have roots in the religious books thus religion and law give the legitimacy for such a behavior.

For social assimilation of leprosy patients, the retrograde legislation needs changes in the light of modern concepts of leprosy. All derogatory acts adversely affecting the fundamental rights of a leprosy patient as a citizen should be repealed, where needed, without any delay, as continuation of the provisions in the acts and laws amounts to their acceptance.

Gloomy picture of leprosy is becoming rosy but we have to offer roses without thorns to leprosy sufferers. The walls are crumbling, clappers of leprosy patients are replaced by clapping with them by the people. Repealment of leprosy acts in proper direction could change quality of life of leprosy patient. Early detection and regular, complete MDT has answered all the questions raised in the legal context about **incurability, infectivity and deformity.**

Human Right Commission of the world has appointed a sub-commission to look into the

matter. International Leprosy Union, SASAKAWA Memorial Health Foundation and the law society of the Pune have published their report on the said subject during 2007.

International Organisations like IDEA and MORHANS of Brazil are struggling to get justice for the leprosy sufferers. In India, a petition has been forwarded to the speaker of Rajyasabha on this vary subject. A petition committee is already actively acting on the petition and the recommendations will be tabled on the floor of the Rajyasabha.

L-14 Interesting clinical presentations in leprosy

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Introduction : It is well known that Leprosy is not only a great mimicker of several diseases but also known to have varied manifestations. As the endemicity of the disease is declining, clinical manifestations appear to be changing and pose a challenge for the clinicians. In the last three years we have encountered cases presenting with predominantly neural manifestations with no cutaneous manifestations. We share our experience related to few such cases that we observed in these three years.

Bombay Leprosy Project is running a Main Referral Centre along with satellite clinics in the project area covering a population of two million. In the main referral centre, patients with clinical problems are seen who are referred not only from Bombay but outside Bombay. We present our observations with reference to nine patients who were referred basically for diagnostic reasons.

Of nine cases six were males and three females their age ranging from 11 to 63 years. Eight of these patients had tingling numbness and/or decreased sensations in one or more of the extremities for a period ranging from three months to six years and two amongst them had non healing plantar ulcers. Three out of nine patients complained of pain and/or burning sensations in the extremities for a period of four to six months while one reported mainly with non healing ulcer. One case reported with blisters on the right upper extremity and tingling numbness in right upper and lower extremity. In one patient the diagnosis was not done for six years despite several higher investigations like MRI etc.

All were subjected to detailed clinical examination and bacteriological examination while eight were subjected to electromyography/nerve conduction studies and in seven patients nerve biopsy had to be done. In one case ultra sonography of the nerve was also done. The diagnosis of leprosy could be confirmed in seven out of nine of which six were diagnosed by nerve biopsy alone.

Conclusions : The interest in these cases was due to the fact that the diagnosis of leprosy on clinical grounds was truly challenging and one had to resort to further investigations like nerve conduction studies and more importantly nerve biopsy to confirm diagnosis. However this was possible at our centre in view of facilities available in a collaborative institute.

It is possible therefore that many such patients are likely to be seen and diagnosis either could be delayed or missed resulting in nerve damage and its consequences if not thought of or investigated to confirm leprosy.

L-15 Leprosy and pregnancy

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Leprosy is a disease whose clinical manifestations are largely determined by the immunological status of the host rather than the load of infection. Women put up a stronger immunological response against *M.leprae*, which is one of the reasons why leprosy is less common in women. The issue of leprosy in woman deserves special focus and needs to be addressed separately from leprosy in men. Women with leprosy run a greater risk of developing complications especially during pregnancy and the peurperium . Pregnancy and leprosy are mutually interactive as both affect the

course of each other. Alterations in the hormonal milieu of a woman with Hansen's disease during pregnancy precipitates many hazardous events. Various studies in the past have shown that pregnant women report the development of symptoms of the Hansen's disease for the first time during pregnancy. Reactivation of the cured disease, lepra reactions (ENL) and relapse are triggered off during pregnancy, most commonly in the last trimester of pregnancy when the CMI is at its lowest. During post partum period , rise in the CMI switches on the inflammatory attack against the nerves which results in reversal reactions and neuritis with their resultant deformities. These events are likely to happen in all pregnant women irrespective of the status of treatment. It is not only the mother with Hansen's disease who is at risk of complications , but the foetus also gets affected by the disease. The newborns of these mothers tend to have low birth weight, and can be born preterm. They are at a greater risk of developing leprosy. Moreover, drugs (MDT) for the treatment in the mother endanger the safety of the foetus.

My talk would focus on the pregnancy related aspects of the Hansen's disease with a special emphasis on health education of women with Hansen's disease , creating awareness among the treating physicians towards a long term active surveillance of these patients.

L-16 Atypical presentations in leprosy

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Though reliability of the cardinal signs of leprosy (hypopigmented or reddish patches with definite loss of sensation, thickened peripheral nerves, and positive skin smears or biopsy material) has been widely accepted, most of us (even trained dermatologists and leprologists) have more than occasionally been foxed not only by patients with atypical presentations of leprosy but also by patients diagnosed to have leprosy but eventually found to have some other disorder- the clue to search for an alternate diagnosis coming usually from non-responsiveness to specific (or sometimes empirical)therapy.

Leprosy mimicking other disorders

Almost all of us have gone through the (at times a rather embarrassing) experience of (miss) diagnosing (*sic*) annular plaques of borderline leprosy as lupus vulgaris, cutaneous leishmaniasis, sarcoidosis and even granuloma annulare. Since all these conditions histologically manifest as presence of granuloma, the differentiation is often close. Similarly lepromatous (or borderline lepromatous) leprosy often needs to be differentiated from post kala azar dermal lesishmaniasis (PKDL) because both are characterized by nodules and hypo pigmented macules and both are endemic to same areas. Similarly 'histoid leprosy' by virtue of the presence of 'juicy' nodules is often incorrectly diagnosed as sarcoidosis especially in areas where leprosy has long been eliminated. This is more so because sometimes hypopigmented plaques may be present in sarcoidosis and histologically the granuloma may not always be naked.

In non endemic areas, patient with borderline lesions may be diagnosed as nodular syphilide being referred to the STI clinic. The diagnosis in such cases is suspected when serology for syphilis is negative, and the patient is re-evaluated. Often in difficult cases, the definitive diagnosis comes from histopathologic examination, which often depends on the experience of the pathologists working at referral centres.

There are reports of patients with leprosy presenting exclusively with rheumatalogical symptoms (to rheumatologist), with neurological symptoms (to neurologist) deranged liver functions (to hepatologist), with nasal symptoms (to otolaryngologist) and to so so many other departments.

And in reactions

Reactions in leprosy are no less mimickers. Dermatologists (almost from all over the globe) have gone through the experience of being referred patients with 'lymphoma associated with erythema nodosum' only to find them to have lepromatous leprosy with erythema nodosum leprosum (ENL). Atypical evolution of borderline leprosy as well as a Type-2 lepra reaction predominantly involving multiple nerves rather than skin has been recognized. There are anecdotal reports of other unusual variants of ENL - clinically presenting as urticarial vasclJlitis; or as

large bullous lesions mimicking pemphigus vulgaris; or as lesions of Sweet's syndrome. An episode of ENL involving the orbit, causing vasculitis of the orbital apex, leading to orbital apex syndrome and ocular ischemia in a lepromatous leprosy patient with recurrent ENL has been described

Leprosy in era of HIV infection :

According to most pre-HAART studies, the clinical spectrum of leprosy seems to be preserved in HIV-positive and AIDS patients. However, with arrival of ART and recognition of immune reconstitution syndrome some atypical presentations have been observed.

To conclude

So leprosy continues to be an occasional diagnostic challenge because of its propensity to be a great imitator, giving us the opportunity of putting our clinical acumen to test and on success the pleasure of shouting an 'Archimedian eureka'

L-17 Leprosy & HIV

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Leprosy and HIV are endemic in many countries including India. Contrary to *Mycobacterium tuberculosis*, HIV co-infection does not have profound effects on the clinical presentation, rate of reactions and relapse, and disease management outcomes in Leprosy. Theoretically predominance of Multibacillary (MB) leprosy and a faster clinical evolution is to be expected in patients with dual infection, because of reduced cell mediated immunity in HIV-1 positive individuals. HIV positivity has been identified as a risk factor for various complications of leprosy. A significant increase in the incidence of type I reaction and development of acute neuritis has been observed in HIV seropositive MB patient as compared to HIV seronegative. No significant difference was observed in the incidence of these complications in seropositive and seronegative PB patients. The clinical evolution, response to treatment with MDT and side effect profile is reported to be similar in both HIV positive and HIV negative leprosy patients without the need for prolonged treatment courses in the former. It has been recommended that co-infected patients should be treated with standard MDT together with HAART. However, a specific condition immune reconstitution inflammatory syndrome (IRIS) following initiation of highly active antiretroviral therapy (HAART) has been reported to develop in patients with Leprosy-HIV co-infection due to restored immunity.

Clinically leprosy as IRIS usually presents as type I reaction with the development of erythematous, odematous skin lesions which may develop unusual ulceration, neuritis with nerve paresis/paralysis. Patients with low baseline CD4+ counts at the time of starting HAART are at highest risk of developing IRIS. Treatment of IRIS includes anti-inflammatory drugs, steroids, and specific antimicrobial agents along with the continuation of HAART.

As access to HAART is increasing in leprosy endemic countries including India, the numbers of IRIS cases due to leprosy are likely to increase in future. Hence, recognition of leprosy as an IRIS associated entity is important in order to institute timely intervention.

L-18 Nine years (2000 – 2008) leprosy scenario in a semi urban clinic - BPRC

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Background : Cases registered at BPRC from 2000 to December 2008 are 842. Case registration has shown gradually decline from 2000 to 2007. Cases registered at BPRC are farely advanced and with Grade II deformities because of nonreporting at initial stages.

In 2008 more number of cases registered has shown upward move. Gradual reduction in no. of case registration probably is the indication of awareness and ability of PHC Medical Officer to treat cases of leprosy after proper classification. It is also possible there has been a gradual decline of

leprosy in the community because of low transmission. Cases have declined from 144 in 2000 to 43 in 2007. Total percentages of cases in MB (60%) and PB (40%). Ours being an institution and referral service provider MB preparation is found more than the field observation. However in 2008 new case registration through referrals and reactions has shown an upward trend. The referral cases are mainly lepra reactions & relapses after mono & multidrug therapy. The analysis indicates males suffer from leprosy (60%) than females (40%). With regards to the age distribution 20-40% age group is at high risk and has contributed maximum no. of cases.

Conclusion : Short term training to MO, PHC and staff especially new recruits are to be arranged and it should be continuous process. Vertical leprosy staff that used to support MO, PHC is seen disappearing due to retirements & other reasons. Case detection at PHC might have suffered because of non-availability of vertical staff. Management of reaction/relapse & ulcer care must be done at PHC/ Districts Head Quarters hospitals.

L-19 Leprosy trends in Kenya

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Introduction : Kenya achieved the WHO leprosy eliminated target in 1987. However the true prevalence and incidence of leprosy remains unknown. The most reliable indicators to monitor the extent and trends of leprosy disease burden are the registered prevalence of cases currently on treatment, and notification of new cases. We reviewed existing leprosy data notified to the Ministry of Health between 1986 and 2008 to determine the trends of new cases notified and treatment outcomes.

Methods : This study entailed a desktop review of all data existing at the National office, notified between 1986 and 2008, and analysis of data using Microsoft excel.

Results : The number of registered leprosy cases decreased from 6558, in 1986 to 201 in 2008.

New cases also decreased from 630 in 1986 to 167 in 2008. Children below 15 years accounted for 2% and 8% of new cases. The proportion of MB cases increased from about 25%, before 1990, to 92% in 2008. The proportion of patients with disabilities remained between 35% and 40% in the last 10 years, while those released from treatment has remained between 70 and 80%.

Conclusion : Significant strides have been made in Leprosy control. However there is need for intensified case finding to detect cases early, reduce transmission and disabilities. Improving clinical care and strengthening the surveillance system will improve treatment outcomes.

L-20 Management of leprosy reactions : Facing the realities

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The clinical course of leprosy is altered by repeated reactions adding significantly to the disease morbidity and occasional mortality. Continuing episodes even after 'release from treatment' and nerve impairment related deformities are challenges in management. Recurrent leprosy reactions necessitate long-term treatment, often for indefinite period.

Mainstay of treatment for both type 1 and 2 reactions is systemic corticosteroids, prolonged use of which is associated with life-threatening side effects. Though thalidomide is a specific drug for type 2 reaction, its use in India is restricted by high cost and difficulty in availability. The current expenditure for an optimal dosage of thalidomide (approximately Rs.17, 550 / 3 months) is unaffordable by most Indian leprosy patients, who are below poverty line. Long term use of thalidomide may result in distressing pedal edema, restricting patient mobility.

In a tertiary hospital in south India, 136 leprosy patients (March, 2006, to date) were followed up. Occurrence of type 1 (among 117 TT, BT, BB, BL patients) and type 2 reactions (among 64 BL, LL

patients) were recorded to be 24.78% and 14.06% respectively. These patients required prolonged treatment with systemic steroids and following situations were encountered:

- Non-compliance and treatment failure: a vicious cycle;
- High cumulative cost of treatment;
- Severe side effects, sometimes leading to mortality;
- Lack of facilities and high cost involved in corrective surgery for deformities;
- Immense psychological impact resulting in loss of faith and doctor-shopping.

Even after *'cure'* of leprosy, reactions are *'not cured'*. Perhaps *'cure'* of this debilitating disease lies in effective management of reactions.

L-21 Granulomatous lesions in leprosy verses tuberculosis

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Leprosy, caused by *Mycobacterium leprae*, is a chronic infectious disease inflicting human beings since the ancient times. The disease is manifested in different forms in a spectrum with two polar forms, tuberculoid (TT) and lepromatous (LL). The clinical and pathological manifestations are determined by number of factors including the host's immune response, the mode of infection and certain genetic factors. Tuberculoid spectrum of leprosy is characterized by the formation of epithelioid cell granulomas, which reflects delayed-type cellular immunity. Granulomatous inflammation in leprosy needs to be distinguished from the many other granulomatous dermatitides. Amongst the various granulomatous lesions of skin, it is difficult to distinguish leprosy from tuberculosis of skin. There are various characteristic features described which help to distinguish the two diseases. In tuberculoid leprosy there is vertical perineurovascular distribution of granulomatous inflammation and involvement of sweat glands, selective involvement and destruction of nerves, lack of fibrosis, absence of caseous necrosis (except at nerve centres in type 1 reaction) and often epidermal atrophy. In cutaneous tuberculosis, on the other hand, in addition to tuberculous granuloma, there is often a proliferation reaction of the epidermis, areas of ulceration, absence of nerve destruction, marked increase in the reticulin, significant fibrosis and occasionally caseous necrosis. The presence of acid fast bacilli in nerves is conclusive proof of leprosy, as is the demonstration of intaneural granuloma or the nerve elements within the granuloma. Since *Mycobacterium leprae* are rarely demonstrable in the tuberculoid spectrum of leprosy, a confirmatory diagnosis of leprosy can be made on the basis of finding active destruction of cutaneous nerves by granulomatous inflammation in a skin biopsy. Immunostaining with S-100 may highlight this phenomenon, which at times is difficult to demonstrate on routine hematoxylin and eosin. Also, the use of PCR for identifying *M. leprae* in skin sections and tissues has been described. Inspite of characteristic clinical and histological features with use of ancillary tests, at times it is difficult to assign the etiology as leprosy or tuberculosis.

L-22 PGL-1 cross reacts with leishmanial antigens

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We earlier reported(1998) by a complement fixation test that PGL-1 of *M.leprae* cross reacts with the soluble antigens of Leishmania donovani. Recently we were able to collect lyophilized preparations of PGL-1, anti PGL-1 mAb and polyclonalAb. ELISA test(following the protocol as described by P.Brennan) and western blotting were done with the antigens and antibodies of both *M.leprae* and Leishmania. It was interestingly found that our initial publication with

the help of CFT holds good. The results of our recent experiments as mentioned above with Western Blotting, revealed the fact that mAb against PGL-1 shows three distinct bands while reacting with leishmania antigens. Polyclonal antigens also gave an identical result with higher number of bands cross reacting with leishmania antigens. Adequate controls were taken to compare the results. It therefore appears that the claim regarding the PGL-1 as a specific antigen of *M.leprae* does not hold good at all and this PGL-1 very much cross reacts with leishmanial antigens. Many laboratories are trying hard to evaluate diagnostic tests for the detection of early leprosy with the help of PGL-1 and its specific IgM and IgG antibodies and these tests if any come out for practical application may not be beyond criticism.

L-23 Management of tropic ulcers in leprosy

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L-24 Thickened nerves at registration - A follow-up

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Mycobacterium leprae has a strong affinity to parasitize peripheral nerves. Considerable number of leprosy patients with nerve involvement registering for MDT have nerve thickening without any impairment. The programme has inadequate scope for recording and treating new impairments developing after RFT. This is due to lack of follow-up. Disease regression seems fairly different in skin and in nerves. Hence how the thickened nerves resolve after MDT remains a matter of some curiosity. There is a need to assess the affected (thickened) nerve after completion of treatment.

The objective of this paper is to present the follow-up findings on 175 cases with thickened nerves at the time of registration that have completed 5 years post RFT. It will also present ancillary findings such as reactivation of disease and reaction as well as disease in the contacts.

The study was conducted at a LEPRA managed project (BOLEP) at Sonepore district, Orissa. One hundred seventy five (MB-104 and PB-71) were personally contacted and examination findings recorded. Number of males and females were 111 and 64 respectively. A total of 336 nerves were thickened at the time of registration. During the study 171(51%) trunk nerves were found to be thickened, 15 (4.5%) nerves had functional impairment. There were 21 episodes of lepra reaction in 20 cases during MDT and 5 episodes in five cases after RFT. Skin lesions regressed during MDT in 21 cases and in 149 cases after RFT. One case developed collapse of nose after 6 months of RFT.

Regression in nerves is much slower compared to skin lesions. Re-pigmentation is fairly common with treatment. Small percentage of thickened nerves develops functional impairment in course of time.

L-25 Cellular dynamics as reflections of immune reactions

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Leprosy like other diseases has three strata of expression-clinical, cellular and immunological or biochemical. The collections of cells lying under the clinical lesions of diffuse infiltration, plaques and nodule of skin are granulomas; a collection of mononuclear phagocytes or their derivatives. For *M.leprae* the prominent mononuclear phagocytes in the tissue are macrophages and dendritic cells.

These cells have biphasic action in the immune reactions. Successful macrophages have bactericidal enzymes in their lysosomes to kill and process antigens; display MHC II molecule and a co-stimulator like B 7 on their surface to present antigen to naïve CD 4+ T lymphocytes. The latter generate further subsets of lymphocytes, one set to function as memory cells and the other to secrete an array of cytokines. The cytokines expand macrophages by recruit and multiplication and arm them. Result is effective elimination of the *M.leprae*. The job thus completed, the macrophages retire as epithelioid cells and giant cells accompanied by densely populated T cell partners.

In this process of containing the disease by macrophages, the damage may be extensive to cause function loss and that complicates the granuloma with DTH. Immune reactions mostly go with inflammation-acute, sub-acute to chronic and further compound the picture. Neutrophils and plasma cells join the granuloma. Mediators are cytokines, vasoactive amines, adhesive molecules, clotting factors all vitiate the scene and flood the tissue with edema fluid. That is reacting epithelioid cell granuloma.

In the absence of immunity phagocytosis is suicidal for the macrophages. *M.leprae* multiply unchecked and draw more and more macrophages. Bacilli laden cells pile up with a macrophage granuloma. Immunity is not an all or non phenomenon. Depending on its strength, dose and route of *M.leprae,* epithelioid cells transformation fluctuates as seen in borderline cases. All cases considered together, leprosy lesions are seen reflecting either hyper-active, partially active or inactive immunity mixed DTH. The pure protective component remains un-appreciated.

Though the pathogenesis in nerve and skin are similar, the presence of basement membrane and absence of lymphatic make nerves protected sites and Schwann cells with long life span behave as sanctuary to the bacilli. Once detached from the basement membrane these cells behave as professional phagocytes and APCs to amplify immune reaction. The adjuvant like myelin makes DTH induced inflammation more explosive to strangulate the nerve fibers. All these make caseation which is a sign of intense DTH, not only common but smouldering in nerves.

L-26 Role of Human Leukocyte Antigens (HLA) and Protein tyrosine phosphatase non-receptor type 22 (PTPN22) in differential manifestations of leprosy

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Inspite of the infectious agent being the same i.e. *Mycobacterium leprae,* different people present different forms of leprosy. While on one pole of the spectrum are paucibacillary (PBL), tuberculoid leprosy (TT) patients, on the other pole are multibacillary (MBL) lepromatous leprosy (LL) patients. Immunologically, humoral immunity is observed throughout the spectrum, however, cell mediated immunity (CMI) is observed only in the paucibacillary form. These differential immune responses to the same infectious agent suggest that host factors may have a role to play in determining the outcome of the infection. Since MHC class-II molecules have a role in antigen presentation, we studied them in both multibacillary as well tuberculoid patients and observed a much stronger association of Human leukocyte antigen (HLA) allele DRB1*1501 with the multibacillary form than tuberculoid leprosy and a significant decrease of DRB1*0701 in MBL as compared to tuberculoid form and controls. However, DQB1*0503 was selectively reduced in tuberculoid patients as compared to controls. These results suggest that HLA alleles might play a role in modulating the immune responses (due to their functional role in antigen presentation) that determines the form of leprosy. However there may be other genes involved in the immune responses that may have significant roles to play in immune response against the infectious agent.

Since the T cells are anergic to *M.leprae* antigens in leprosy patients, it is possible that genes involved in T cell signaling may have an additional role to play in leprosy. Hence we also studied Protein tyrosine phosphatase non-receptor type 22 (*PTPN22*) that encodes a protein called lymphoid tyrosine phosphatase (LYP) which has been shown to negatively regulate T cell signaling. A single nucleotide polymorphism (SNP) in the codon 620 (nucleotide position 1858 C T) results in an amino acid change from arginine to tryptophan which has been shown to be more potent negative regulator of T cell responses. Hence, we have studied C1858T SNP in both multibacillary and paucibacillary patients. The T allele and CT heterozygosity are significantly increased in both multibacillary as well as paucibacillary leprosy patients, suggesting that LYP-Trp620 allele may have a pathogenic role in hyporesponsiveness of T cells to *M.leprae* antigens due to anomalies in early T cell signaling resulting in clinical manifestations of leprosy.

L-27 Bioavailability and antimicrobial activity of Clofazimine : Current status and future prospects

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Clofazimine (CAS 2030-63-9), 3(p-chloroanilino)-10-p-chlorophenyl 2,10-dihydro-2-isopropy-liminophenazine and its analogues are being tried with varying degrees of success in the treatment of leprosy, tuberculosis and *Mycobacterium* a*vium* complex (MAC) disease. In higher doses clofazimine exerts an anti-inflammatory action which has been found useful in treating leprosy patients in reaction There are also reports on the usefulness of clofazimine as a potent antistaphylococcus agent.

Oral absorption of the drug is slow and dose-dependent. Single-and multiple-dose studies have shown a plasma half-life of about 10 days. Uneven distribution and prolonged retention in the tissues are special features of clofazimine. One conjugated and 2 conjugated metabolites have been detected in urine, with urinary excretion of both the parent compound and its metabolites around 1% of the dose. Clofazimine crosses the placental barrier and is excreted in breast milk, but does not cross the blood-brain barrier.

Our studies on metabolic disposition of the drug have shown interesting observations such as – presence of drug in nerve tissue in experimental mice, significant increase in faecal excretion of the drug ranging from about 50% with single dose of 600 mg to 30% with 50/100 mg; accumulation of the drug in ichthyotic sites of leprosy patients, interaction of the drug with vitamin A and simultaneously administered isoniazid, attainment of steady-state with 15-30 daily doses of 50 mg drug, intracellular accumulation of clofazimine in murine peritoneal macrophages and effect of the drug on *de novo* synthesis of macrophage lysosomal enzymes as one of the possible mechanisms of antimicrobial action of the drug.

The biochemical mechanism of action of clofazimine has not been clearly determined and remains elusive. Possible mechanisms reported by other workers are **:** Generation of intracellular hydrogen peroxide may contribute to the antimycobacterial activity; reduction of anti-MAC activity of the H_20_2-Fe^{2+}-NaI system, primarily by inhibiting the generation of hypohalite ions and in part by interfering with the halogenation reaction of bacterial cell components due to the H_20_2-Fe^{2+}-NaI system; inhibition of multiplication of organisms by binding to the guanine bases of DNA; stimulation phospholipaseA_2 (PLA_2) activity leading to accumulation of lysophospholipids, which in turn cause inhibition of Gram-positive bacteria; and modification of the function of lysososmal apparatus-enhancement of the phagocytic capacity of neutrophilic leucocytes and macrophages. Disruption of the membrane and hence disruption of potassium transport has been ascribed as a probable mechanism for the antistaphylococcus acivity of the drug. Anti-inflammatory property of clofazimine has been ascribed to its scavenging chlorinating oxidants generated by the Myeloperoxidase (MPO)-Cl(**.**)-H_20_2 system. Clofazimine is, thus, a potential lead molecule which can be improved further for

antimycobacterial /antimicrobial potency with approaches of medicinal chemistry. Efforts have already been made to look for structural analogues of this magic bullet which will have enhanced antimicrobial/antimycobacterial activity as well as minimum side effects such as pigmentation of the skin and mucosa.

L-28 Current concepts in reconstructive surgery in leprosy

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Considering the fact that only 20% of disabled cases need RCS, and among those who need RCS need 2 to 3 operations, it is imperative that simple surgery, which can be performed at the district level, be considered a priority in the current concept.

With Government of India providing Rs. 5000 to each individual as loss of wages, hospitalization costs and ancillary treatment there cannot be any doubt that number seeking the reconstruction will increase. There is also strengthening of the RCS activity with provision of grant for instruments and Rs. 5000 per operation to any government institution performing the RCS.

Thus, in author's opinion, camp and workshop approach needs to be adopted for each district, along with beefing up referral centers for pre and postoperative care. Training of general physiotherapist in leprosy RCS will naturally need to be a part of the RCS as much depends on result if initiative has not to get a bad name. The real integration of reconstructive surgery can only be achieved through the involvement and support of medical colleges and district institutions.

Simple techniques of reconstructive surgery for claw hand, plantar ulcer, lagophthalmos and facial deformities as practiced and taught by the author over years are depicted in the presentation.

Finally, whether for cosmetic reasons or restoring function, reconstructive surgery helps to remove stigma, elevates self-esteem for self-employment and rehabilitates a person in the society.

Economic rehabilitation as offered through NCLCA to a reconstructed patient should be an integral component of the leprosy program so that surgeon is in charge of rehabilitating an individual rather than just correcting the deformity.

L-29 Comprehensive care approach for rehabilitation of leprosy affected persons

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Comprehensive care entails making a significant and sustainable difference in the quality of life of persons affected by leprosy through their treatment, as also their physical, economic and social rehabilitation.

MDT was introduced in project areas in 1989 even before the WHO announced the "elimination" goal. Through CLCP, the treatment with Blister Calendar Pack was initiated in 1991. Moreover, CLCP approach included inserts providing health education to patients and micro-cellular rubber footwear to patients with grade 1 disability to prevent their progression in to grade 2.

For all disabled cases, comprehensive care included the key modalities as hand and foot splints, empowering patients with domestically possible physiotherapy exercises and use of self-care kit to dress their ulcers and heal them. Patients with advanced deformities of hands also got grip-aids like Instant Grip-Aids to improve activity of daily living and epoxy resin grip-aids for application on tools of occupation.

Reconstructive surgery has been supported as "Camp and Workshop" approach. Mega-camps have been followed up with smaller camps and training of surgeons has been strengthened with DPMR initiative of Government of India. Economic rehabilitation to needy cases with articles of income generation has improved not only self-esteem but also the social acceptance.

L-30 Empowerment of people affected by leprosy

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India has the largest number of leprosy affected people in the world. About 12 million leprosy patients have been cured. Majority of them are still living in the community and in the leprosy colonies. Because of stigma and discriminations people affected by leprosy have been abandoned by their families and community. They started to live as groups and these places became leprosy colonies. In 2005 IDEA India with the support of The Nippon Foundation conducted a national survey and found nearly 700 leprosy colonies in 23 States.

The children of leprosy affected parents need help for their proper education. If the second generation is uplifted through education and employment the poverty circle of the family would be broken and their quality of life will improve. The people who are ready to do some economic activity need socio economic rehabilitation help. Economic independence of a person will boost his social status and stigma and discriminations will automatically disappear. "Nothing for us without us" should be the approach.

A good networking of people affected by leprosy has been developed. A National organization in the name of NATIONAL FORUM of people affected by leprosy, started in 2005. A Petition was given to the Parliament Rajya Sabha Petition Committee. The report was submitted on 24th October 2008 in the Parliament. The UNHRC have passed a resolution on discriminations in June 2008. People need opportunities to enter into the process of empowerment.

L-31 Issues related to leprosy control : Our experience in a special selective drive (SSD) in the state of Maharashtra

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Introduction : As per the request of Joint Director Health Services (Leprosy & TB), Maharashtra, a team from FMR with some staff support from Kusthrog Nivaran Samiti (KNS), carried out a selective special drive (SSD) for leprosy in select villages covered by 6 PHC areas of Karjat taluka and 45 PHC areas in Gadchiroli district. The SSD activities were carried out in coordination with all the concerned district and PHC level officers.

Main objectives : 1. To train and deploy community level workers to create awareness and ensure early case detection and timely treatment. 2. To promote case detection and timely treatment through intense house to house campaigning.

Sub objectives : (a) To assess the burden of undetected cases of leprosy in the community, (b) To identify problems if any in accessing health care.

Findings : A large number of suspects and undetected cases of leprosy were recorded in both the areas. The estimated average NCDR in Karjat and Gadchiroli was 14/10000 and 12/10000 respectively, both of which are much higher than the state average of 1.1/10000. High number of child cases (25%) and grade 2 deformity (18% & 14%) indicate recent transmission and delay in diagnosis.

A casual inquiry into the access to health care revealed;

a) Poor availability of drugs,

b) Poor diagnostic skills and lack of interest among the PHC staff,

c) Some compulsive reasons to keep the PR / NCDR low,

d) Poor accountability and supervision,

e) Poor transport facility.

Conclusion : There are a large number of undetected leprosy cases and several road blocks in access to health care that need attention.

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A-1 A study of erythema nodosum leprosum and the role of thalidomide in its management

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Aims and Objectives : Leprosy remains a public health problem and episodes of reaction are acute inflammatory events occurring during the chronic course of the disease. Erythema Nodosum Leprosum (ENL) occurs before, during and after MDT mainly in lepromatous patients. The aim was to study the various presentations of ENL and the role of thalidomide in the same.

Methods : Thirty three patients with moderate to severe ENL visiting the out patient department were enrolled for the study. Patients were explained the side effects and teratogenicity of thalidomide. All females were subjected to two pregnancy tests. Written, informed consent was taken. Type of leprosy, anti leprosy treatment, details regarding reaction episodes and use of steroids were taken. Patients with severe reaction were admitted. After thorough clinical examination and baseline investigations they were given thalidomide in dose of 100 to 300 mg daily. Concomitant use of other drugs was noted. Patients were followed up at 15 days initially and then monthly/ two monthly for 1 to 2 yrs as required.

Results : ENL occurred after the completion of Multi-drug therapy in 57% of the patients. Neuritis was present in 84% of patients. 63%of patients showed marked improvement with thalidomide in 7 to 14 days. Drowsiness was the most common side-effect. Neuritis attributable to thalidomide was detected in one patient.

Discussion and conclusion : Moderate to severe ENL is usually associated with neuritis and other conditions requiring the concurrent use of steroids. Thalidomide as monotherapy can be recommended in very few patients. Response to therapy is good; however recurrent episodes require re-introduction after weaning. Teratogenicity, prohibitive cost and lack of availability prevent routine use of thalidomide in ENL in India.

A-2 A rare case of BL with type 2 reaction presenting with annular vesiculobullous crusted eruptions over the existing lesions : A revisit of leprous exaggeration

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We are reporting an untreated case of BL with unusual presentation of type 2 reaction(T2R) confirmed by histopathology. The case is an 18-year old female with borderline lepromatous leprosy who developed annular patterned vesiculobullous eruptions over the pre-existing plaques along with fever and severe neuritis after a short course of ofloxacin intake prescribed for diarrhea. In addition to vesiculobullous lesions, some of the existing lesions were also erythematous, tender and swollen. This case can be considered as an example of leprous exaggeration, as described in older literature.T2Rs are common in lepromatous leprosy, and not so uncommonly are observed in borderline lepromatous leprosy. The vesiculobullous and crusted lesions developing over the existing lepromatous lesions, some of them presenting in an annular pattern or in the form of exaggeration have been reported rarely in the literature.

A-3 Reversal reactions

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Objective : The objective was to find out the key features of reversal reactions (RR), in particular the prevalence of reversal reactions in the declining prevalence rate scenario of leprosy.

Design : In this prospective study all untreated newly diagnosed cases of leprosy that attended the hospital from January 2004 to August 2006 were examined for RR at the time of diagnoses as well as during the course of their treatment.

Results : RR was recorded in 12% (36/300) of patients, of these 6.3% (19/300) presented in RR at the time of diagnoses, while another 5.6% (17/300) developed it during the course of MDT. Majority of RR were seen in multibacillary (MS) cases where the incidence was 15.9% (33/207) in comparison to paucibacillary (PS) where it was only 3.2% (3/93). 8.2% (17/207) of MS patients presented in reaction at the time of diagnoses, while another 7.7% (16/207) developed it during the course of MDT. Multibacillary cases & MDT were found to be the two key features associated with reversal reactions.

Conclusion : Does the relatively low incidence of RR in the present study indicate that along with the decrease in the prevalence rate of highly bacillated cases of leprosy the prevalence of reversal reactions are also decreasing ?

A-4 The epidemiological trends of leprosy in an urban leprosy centre of Delhi : A retrospective study of 15 years

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Retrospective data from 1993 to 2008 was collected from the urban leprosy centre attached to the department of dermatology, STD & leprosy of P.G.I.M.E.R & Dr. R M L Hospital, New Delhi and was analysed according to age, sex, type of leprosy, leprosy reactions, deformity, and relapse.

Results : The data analysed show a gradual fall in new case detection rate with initial shift towards more paucibacillary cases but after 2005 onwards, the percentage of multibacillary cases are on rise. The proportion of cases among children showed a declining trend with more children presenting with tuberculoid type of leprosy but no significant change in sex preponderance was observed. Over the years a declining trend in grade II deformity among new cases was noted. The relapse rate is decreasing gradually, but incidence of relapse has been found to increase in paucibacillary cases in contrast to multibacillary leprosy cases as was observed earlier. Incidence of leprosy reaction showed an increasing trend with more reversal reactions being found in multibacillary cases. Defaulter rate has shown a remarkably declining trend.

Conclusion : The study concludes that with early detection and proper institution of MDT, patients are more readily rendered non infectious leading to decrease in transmission in community & hence incidence of leprosy. Many clinically PB patients with bacteriological & histological multibacillary status are being given PB MDT at PHC as per WHO operational classification might be the cause for increase in relapses in PB cases. Also, early diagnosis & easy availability of MDT along with better surveillance of patient are the reasons for reduction in grade II deformity & defaulter rate.

A-5 Scenario of leprosy in a tertiary care hospital of Delhi : In the decade of elimination

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Introduction : Leprosy once a major scourge worldwide has been eliminated from most of the countries. India achieved elimination in the first five years of the new millennium. However, it still remains a lurking problem in a few states and districts, even in Delhi. The present study was done in a tertiary care hospital of Delhi, which also serves a large migrant population.

Aims and objectives : Trends in number of cases and leprosy disease indicators were retrospectively assessed for the last 10 years, when elimination was achieved, by reviewing the demographic and epidemiological data of 1790 patients who attended the leprosy clinic between 1999-2008. These were co-related with changes in the state leprosy control effort, to identify the effect of operational changes on the epidemiologic parameters.

Methods : 1790 cases administered anti-leprosy treatment in the last 10 years (1999-2008) were included in the study. Parameters like the total number cases per year, age distribution, sex ratio, childhood prevalence, contact history, migrants or residents of Delhi, MB:PB ratio, SSS positivity, spectrum of cases on Ridley Jopling Scale were assessed. The incidence of disease and of reaction, deformity, patients requiring immunosuppression were evaluated. The percentage of patients released from treatment and the drop out rate were also estimated.

Results : In the 1790 cases included in study, M:F ratio was 2.2 (1.9 in India). Maximum number of cases were recorded in 2006 (n=223) and minimum in 2008 (n=132). However, the decline in number of cases was statistically insignificant ($p<0.5$). Childhood prevalence was 11.7%. BT leprosy cases were the most common. SSS was positive in 12% and positive contacts in 3%. 76% cases were administered MB treatment (versus 47.2% all over India), the incidence of reaction(s) was <20%, type II deformity was observed in <10% of the registered cases (a significant decreasing trend was observed). More than 75% cases were released from treatment (compared to 80.34% nationally in 2007-2008). These parameters were further statistically compared and appropriately correlated.

Conclusion : A review of the epidemiology and the above assessed parameters indicate that the control of leprosy through chemotherapy has been highly successful by decrease in the deformity and disability. The improvement in the child case detection, female case detection rate, and decrease in the incidence of deformity and disability is probably due to the IEC campaigns, improved drug distribution and involvement of mass media. However, the absence of a significant decline in the total number of cases registered is not in correlation with the national figures.

A-6 To study the utility and practicality of USG for measuring thickness of nerves in leprosy

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Objectives : (i) To measure thickness of clinically thickened nerves in leprosy, (ii) To identify echotexural changes in the nerves and nerve pathologies in leprosy e.g. nerve abscess, neuritis and (iii) To follow up change in the thickness after treatment.

Materials and methods : Fifty six leprosy patients were included in the study. Ultrasound of maximally thickened nerve was performed using 7-10 MHz linear probe with doppler facility. Cross sectional area (CSA) of a nerve on particular side was compared with that of opposite side. Thickness of ulnar and greater auricular nerves in patients was compared with those of age and sex matched normal individuals. A follow up study was performed before and after treatment.

Results : Out of total 58 patients studied 48 were males and 8 were females with maximum patients belonged to third decade. Borderline tuberculoid leprosy was the most common type and ulnar nerve was most commonly affected nerve. Out of 52 patients with clinically thickened ulnar nerves 36 showed CSA more than the cut off value in normal subjects. Out of 104 clinically thickened ulnar nerves 64 showed increase CSA on USG while 40 showed normal CSA. Out of 11 patients of neuritis only 3 patients were clinically symptomatic while 8 were completely asymptomatic. Four patients were diagnosed to have ulnar nerve abscess. Twenty nine of fifty two patients showed decrease in CSA on follow up.

Conclusions : USG of the nerves is the excellent tool for measuring nerve thickness in leprosy, for picking up asymptomatic neuritis and nerve abscess.

A-7 Histoid Hansen : A 9 year clinico-epidemiological study

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Introduction : Histoid Hansen is rare, but a well-defined entity with specific clinical, histopathological and bacteriological features. The incidence has been reported to vary from 1-2% amongst total leprosy patients. This study was taken up to delineate the clinico epidemiological profile of Histoid Hansen patients.

Method : We performed a retrospective analysis of the records of patients labeled as "Histoid Hansen" on the basis of clinio-histopathological criteria, who attended Hansen clinic from 2000-2008.

Observation : A total of 862 leprosy patients attended the Hansen clinic from 2000-2008. 9 (1.04%) were diagnosed as histoid Hansen. 8 of 9 patients were males. Youngest patient on record was 14 years of age. All (100%) had involvement of face in the form of histoid facies. Nearly 70% patients were untreated and the rest were on MDT before development of histoid lesions. One patient showed ENL reaction.

Conclusion : Histoid Hansen is one of the rare forms of leprosy. There have been various case reports of this variant of leprosy, with variable presentations. Considering its rarity, variable appearance and uncertainty regarding its etiopathogenesis, we reviewed the data of histoid patients over 9 years. Our study shows that Histoid Hansen has a male preponderance. Histo'd facies was is a common presentation. This form of Hansen's disease can also affect children. If tends to involve mainly untreated cases and is relatively immunologically stable. There are few reactional episodes.

A-8 Investigation of possible reservoir of viable *M.leprae* strains in Ghatampur, Kanpur region by Real-Time RT-PCR

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Techniques such as reverse transcription PCR and real time RT-PCR have the potential to detect and quantify RNA, which indirectly indicates the viability status of the organism. In order to trace the possible reservoir for transmission of leprosy in a leprosy endemic area of Ghatampur (Kanpur, India), environmental samples including soil, drainage and drinking water (n=100 each) were collected from fifty villages in winter (n=50) and summer (n=50) seasons. The area was stratified and patients with more than 3 patients in the street were labeled as "patient area". Streets with no patients residing along it were labeled "no-patient" areas. RNA was isolated from these samples by a modified method previously developed by us. Isolated RNA was used in the Real Time RT-PCR targetting 16S rRNA gene region to detect viable lepra bacilli present in the environmental samples. Soil samples showed equal positivity i.e. 25/100 (25%), in winter as well in summer seasons in patient and no-patient area. On the other hand, drainage and drinking

water samples have much low positivity of *M.leprae* in summer as compared to winter season. Whereas drainage showed 16/100 (16%) real time RT-PCR positive samples in winter and 7/100 (7%) in summer, 4/100 (4%) drinking water samples were positive in winter and nil (0%) in summer. As *M.leprae* in soil are supposed to be protected from sun rays, soil may have a vital role in transmitting viable *M.leprae* strains and can act as a potential environmental reservoir for *M.leprae* strains.

A-9 Role of leucotreine inhibitors in leprosy reactions

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Introduction : Reactions in leprosy continue to be a major challenge in leprosy. Though steroids are the drug of choice in managing reactions there are patients suffering from recurrence needing alternative drugs. Although there is little information available about the mechanism of action in leprosy, it appears that leucotreine inhibitors such as zafirlukast and montelukast are good candidates for consideration where a second line drug (other than thalidomide or c1ofazimine) is needed for reaction management. Leucotreine inhibitors were first recommended as alternative drug in the Bangkok Workshop on Leprosy (1996) as it was already used in other inflammatory disorders like asthma and respiratory illness. We share our preliminary observations on the role of montelukast in reactions in leprosy.

Patients of type I and type II reactions in leprosy attending the Referral centre of Bombay Leprosy Project (BLP) were included. Nineteen patients were recruited (17 males and 2 females). Ten were having type I reaction and 9 with type II reaction. Age ranged from 15 to 55 years. Detailed clinical, bacteriological and neurological examination was done. Clinical photographs taken to document the progress. Patients divided in two regimens montelukast only (five patients) and montelukast with Prednisolone (fourteen patients). Eight patients of type I reaction treated with montelukast and Prednisolone and two patients treated with montelukast only while six patients with type II reaction were treated with montelukast and Prednisolone and three patients with montelukast only.

Results : Twelve (65%) out of nineteen patients showed satisfactory to good response as seen by regression of lesions and no appearance of lesions. In two patients, montelukast was withdrawn as there was no response even after eight weeks of treatment while in two patients there was remarkable improvement with montelukast. No major adverse effects observed necessitating withdrawal of the drug.

Conclusions : The preliminary observations indicate that montelukast along with Prednisolone seems to have a role in controlling reactions and reduce the requirement of steroids. We need to confirm the observations in a larger group of patients as patients are under treatment and follow up.

A-10 2D-DIGE analysis of *M. leprae* infected mice plasma proteome : A search for disease specific markers

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Introduction : Plasma proteome analysis combined with the establishment of animal models for human diseases could demonstrate disease specific changes more accurately. The objective of our study is to analyze the plasma proteome of *M.leprae* infected mice, using highly sensitive 2D-DIGE technique, to identify the disease specific changes thereby predicting the candidate biomarkers for the infection.

Methods : Plasma sample from *M.leprae* infected Balb/C mice were collected at different timepoints and compared with healthy mice plasma proteome. Albumin was removed using IgY

columns. The samples were prelabeled with cyanine dyes and separated on the same gel along with a pooled internal standard. The gels were scanned using multichannel laser scanner and the digitized images were matched and analyzed using OeCyder 2D software. The spots showing significant variations were identified from a preparatory 2D gel by MALDI- TOF mass spectrometry.

Results : OeCyder 2D software compared the fold change in expression levels and carried out one-way ANOVA to predict the significant changes. Restricting the threshold fold change to ±1.5, this retrieved a list of 65 proteins showing upregulation and 46 proteins showing down regulation on *M.leprae* infection. It was observed that the isoforms of many of the high abundant proteins are significantly regulated on infection. For example, the acidic isoforms of haptoglobin and apolipoprotein AI were downregulated whereas transthyretin expression was upregulated on infection.

Conclusion : 2D-DIGE and image analysis demonstrated that experimental infection of *M.leprae* in the mice footpads can regulate the expression of plasma acute phase proteins and its isoform patterns. This study proposes that even high abundant proteins may provide valuable information on the disease state of the organism.

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A-11 Studies on molecular mimicry between mycobacterial and host components

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Introduction/objectives: Autoantibodies against various components of host tissue are known to occur in TB and leprosy. Present study was designed to explore the level of autoantibodies against cytoskeletal proteins in leprosy patients and identifying, characterizing the mimicking epitope/s. To find out that if *M. leprae* inoculation in mice can induce the autoantibody level against these proteins in experimental mice.

Methods: A total of 152 leprosy patients and 74 healthy controls (HC) were included in this study. Autoantibodies against cytoskeletal proteins were measured by ELISA. Those epitopes were further characterized by 1D, 2D gel electrophoresis and WB. Cross-reactive spots were identified by MALDI-TOF/TOF. 3-dimensional structure of mimicking protein of *M. leprae* was modeled by CPH server. BALB/c mice were subcutaneously inoculated with MLSA and immune cells of these animals were adoptively transferred to naïve mice.

Results: Level of anti-cytoskeletal proteins were significantly higher in leprosy patients compared to HC. It was found that cytokeratin-10 and HSP-65 of *M. leprae* are cross-reactive proteins. It was observed that 7 B cell epitopes of both the proteins were similar. It was also observed that the autoimmunity raised in mice is adoptively transferred.

Conclusions: Our findings suggested that cytokeratin-10 and HSP-65 of *M. leprae* are mimicking proteins and 7 B cell epitopes may be responsible for the autoantibody production in leprosy patients. Autoimmune response is adoptively transferrable to naïve mice by immune cells.

A-12 Role of nucleotide binding oligomerization domain (NOD2) in leprosy

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Introduction/objectives : NOD2, intracellular pattern recognition receptors, play a major role in regulation of proinflammatory signaling through NF-kB, in response to distinct mycobacterial ligands. NOD2 is known to be prominently expressed in circulating monocytes. However, the expression level of NOD2 in leprosy is unexplored. So, the aim of this study is to investigate the NOD2

expression in skin lesion of leprosy patients in various clinical spectrum.

Method : Leprosy patients (5 LL, 4 BT and 3 BL), attending the OPD of NJIL&OMD, Agra, were included in the study. All the patients were clinically diagnosed and prominent lesions were biopsied. Initially, sections from all the samples were stained with both Hematoxylin & Eosin stain and Fite-Faraco stain for acid-fast bacilli (AFB). Subsequently, Variation in NOD2 expression was evaluated by immunohistochemistry in lesional skin biopsies. Total numbers of positive spots in all the immunostained sections were counted and their mean intensity was calculated.

Result : Differential expression of NOD2 level was observed in all the patients. It was observed that the expression level of NOD2 in patients of lepromatous pole was higher than in patients of tuberculoid pole.

Conclusion : NOD2 is variably expressed in skin lesions of leprosy patients, suggesting that NOD2 might modulate the local immune response in skin lesions.

A-13 Childhood leprosy : A reappraisal

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Introduction : Childhood leprosy case detection rate remains one of the most robust indicators of disease burden in the community. Evaluation of various disease parameters at regular interval in this age group reflects the efficacy of the national control program.

Method : Present study is a retrospective analysis of demographic, epidemiological and clinical profile of leprosy in pediatric population (age 16 years or less) who attended leprosy clinic of a tertiary care hospital in Delhi in last 10 years (1999-2008). The parameters assessed were: age, sex, history of contact, disease spectrum by Ridley-Jopling and WHO classification, skin lesions, pattern of nerve involvement, slit skin smear positivity and corroboration with skin biopsy. The incidence of lepra reactions, neuritis, deformities, and patients requiring steroids and completing MDT were also evaluated.

Results : During 10-year period, 211 new cases of childhood leprosy were registered representing 11.79% of total leprosy patients. Majority fell in 11 to 16 years age-group (75.8%). Males were more often affected than females, with M: F ratio of 2.2:1. A history of contact, mostly intrafamilial was elicited in 16.6%. Borderline tuberculoid (BT) disease was commonest (69.2%). Indeterminate disease was seen in 4.7% while pure neuritic in 6.6% patients. Exposed regions of limbs were most commonly involved followed by face and less often trunk. Nerve thickening was present in 70% cases, mostly as asymmetric multiple nerve involvement. Clinically a high percentage of patients qualified for multibacillary (MB) disease (53.6%), but smear positivity was seen in 19.4%. Incidence of lepra reactions was about 20%, most of them being type 1 reaction. Oral steroids were required in 7.6% for neuritis or impending nerve paralysis. Grade 2 deformity was detected in 14.2%; ulnar claw hand being commonest. 80% patients completed MDT and were released from treatment.

Conclusion : Pediatric leprosy amounts to significant proportion of total leprosy cases. Co-relation of aforesaid parameters in pediatric population with the changes expected in leprosy control program may help in the identification and subsequent amendment in operational changes required for attaining optimum outcome.

A-14 Relationship between social and disability grading among leprosy patients

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Leprosy patient are routinely graded for WHO physical disability grading under 0, 1 and 2 and followed up. However, the social grading of the disability can be equally if not more important

in maintaining the quality of life. Social grading can be simply classified as 0, 1, and 2 ranging from no dehabilitation to isolation from his family. Purulia leprosy Home and Hospital has been major leprosy referral hospital and we graded patient using disability grading and compared with WHO disability grading system.

We compared social and disability grading of RFT leprosy patients. The total of 133 leprosy RFT patients, 78(58.6%) male and 47(41.4%) female with the age between 14-70 years, 65(52.4%) of them less than and equal to 40 years and 59(47.6%) patients more than 40 years.

36(27.1 %) had WHO grade 0, 13(9.8%) WHO grade 1 and 84(63.2%) with WHO grade 3. There was 15(11.3%) had social grade 1 and 9(6.8%) had social grade 2. There were 2(5.6%) patients without any disability and 2(15.4%) patients with disability grade I had social grade 1. Among 11 (18.1 %) and 9(10.7%) patients with disability grade 2 had social grade 1 and 2 respectively.

The impact of stigma attached with leprosy deformity affects patient's family support even after completion of MDT therapy. Family support is being crucial for patients with leprosy for adherence to leprosy treatment and self care activities.

A-15 Participation and contribution of leprosy patients in society : A qualitative study in medical anthropology

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Introduction/Objective : Timely treatment and medication have definitely reduced the rate of deformity among the leprosy patients; yet they feel stigmatised and avoid participating actively in social life.

To assess the active participation and contribution of leprosy patients in the society along with the problems faced by them in their social life and daily chores.

Methodology : Structured interviews were conducted on a sample of 80 patients at various leprosy clinics and Kushtha Ashrams in and around Chandigarh. Participation Scale (Win Van Brakel et.al., 2006), Socio-economic Scale developed by Aggarwal et.al. (2005) were used.

Results : In the sample, 77.5% were males and 22.5% were females. 46.25% patients belonged to poor socio-economic status. Analysis revealed that 27.5% had mild participation; 10% moderate participation; 6.25% severe participation and 21.25% extreme participation. 35% were found to be having no significant participation in their social life.

Conclusions : Majority of the patients carrying out their daily personal chores like washing, eating, etc. with not much difficulty. They faced problems in doing physical labour for their livelihood. Female patients responded that it was difficult to cook meals. After getting the disease, patients were not interested in participating in various activities at society level. They were reluctant to go out or to participate in social gatherings. Patients did not feel comfortable to interact with newly entered members in their society.

A-16 Co-existent reactive perforating collagenosis (RPC) and lepromatous leprosy with erythema nodosum leprosum : Response to treatment

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Introduction : RPC is an uncommon, benign perforating dermatosis of multifactorial etiology. The latter is many times associated with various systemic disorders. Coexistent RPC with leprosy is a rare and has been reported previously on very few occasions.

Aims and objectives : We report a case of lepromatous leprosy (LL) with ENL along with RPC lesions. Initiation of anti leprosy treatment (ALT) and treatment of ENL led to subsidence of both types of skin lesions.

Methods : A 60 year old man was diagnosed on clinical as well as histological examination to have LL with ENL. Interspersed with these lesions were multiple pruritic, umbilicated papules with central keratotic plug suggestive of RPC, confirmed histologically. No history of trauma was elicited. Slit skin smear was positive for AFB. Patient was started on MB-MDT, high dose Clofazamine and NSAIDS. Two month following treatment, ENL lesions resolved completely and RPC healed with atrophic scars.

Results : Transepidermal elimination disorder is characterized by elimination of foreign material from the corium by upward movement of regenerating epithelial cells. Trauma in the form of intense pruritis and subsequent scratching appears to be the common inciting factor. It leads to release of MMP, serine proteases, inflammatory cytokines in surrounding tissue which may contribute to formation of perforating skin lesions. ENL is an immune complex phenomenon in which fibrinoid degeneration of collagen and elastic fibres occurs. Improvement and subsidence of these lesions following treatment further corroborates the aforesaid hypothesis.

Conclusion : The release of cytokines and other inflammatory mediators in genetically predisposed individuals in ENL may damage collagen initiating the development perforating skin lesions.

O-1 A study of MDT relapses in Purulia, West Bengal, India

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The spectra of MDT Relapse has been raised and can be a serious issue if true. The main problem in studying relapse cases is in the definition of what is a true relapse & how it can be distinguished from. Reactivation or Reaction or Reinfection. Further the question of whether all relapse cases are MDT relapse needs to be clarified.

The Leprosy Mission Hospital in Purulia,West Bengal established in 1888, is located in a hyperendemic area. During 2009 , 10 cases of suspected relapse were seen. Out of the 10 cases 9 were males, 1 was a female, 8/10 were within 40 - 50 yrs of age and the other 2 were 24 and 71years respectively. All of them had a history of regular MDT intake 10-15 yrs ago for a period of 1-2 yrs. All of them complained of appearance of new patches noticed within 5-6 months of reporting to the hospital. One patient had nodules over the face and extremities also. Each of the patients had a high bacteriological index. Those with only patches were treated as type 1 reaction first and then biopsy was done. Each biopsy reported active lepromatous leprosy.

In this paper a descriptive profile of these cases are given and a discussion on whether they were true relapses. The outcomes of current management are also presented.

O-2 Pure neuritic leprosy

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Introduction : Pure neuritic leprosy usually presents with signs and symptoms of a nerve deficit, either sensory or motor. It may be an early stage of leprosy in a number of instances.

Objectives : A study was conducted in the department of Dermatology, Calicut Medical College during the period June 2003 to December 2004 to know the clinical pattern of pure neuritic leprosy and to determine the role of skin biopsy taken from the area of maximum impaired sensation in the diagnosis of pure neuritic leprosy.

Method : 36 new cases of pure neuritic leprosy were selected. Clinical diagnosis was made in patients with signs and symptoms of nerve deficit in the distribution of the thickened peripheral nerve . A nerve biopsy was done in all patients in

whom thickened sensory nerves were available. Skin biopsy was taken from the area with maximum sensory impairment. Biopsy specimens were stained with hematoxylin and eosin and Fite-Faraco stain to demonstrate acid fast bacilli.

Results : The mean age of occurrence was 38 years. Male female ratio was 2:1. Average duration of the disease was 1-6 months. Most of the patients were manual labourers. Only 50% had motor weakness. Among deformities foot drop was the commonest, next being claw hand. Majority (52.8%) showed single nerve trunk enlargement, the most common nerve involved being common peroneal. Sensory nerve enlargement was seen only in 13 patients (36%) and 1 patient developed type I reactions Histopathology showed features of HDBT in 30.5% of cases from the anaesthetic area. Sensitivity of nerve biopsy was 53.8% of which the commonest was HDBT (38.4%).

Conclusion : Skin biopsy may be considered as a useful tool in the diagnosis of pure neuritic leprosy.

O-3 Childhood Leprosy : Is leprosy really eradicated ?

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Introduction : Leprosy is on the verge of elimination, but it could just be the tip of the iceberg as the incidence of childhood leprosy does not show any downward trend. The study was taken up to delineate the clinico epidemiological profile of childhood leprosy in our hospital.

Method : A retrospective study of records of Hansen's disease patient who attended our hospital from 2004-2008 was done. A detailed analysis of the demographic profile and clinical data namely type and duration of disease, deformities and reactions was done.

Results : There were a total of 323 patients, of whom 18(6%) were below 14 years of age, with a male: female ratio of 17:1. Duration of the disease varied from 2 weeks to 5 years with an average duration of 15 months before presentation. Majority (72%) of children had borderline tuberculoid leprosy, single lesion paucibacillary being the most common presentation, seen in 54%(7 of 13) of BT patients. Intrafamilial exposure was present in 40%. An alarming 28% (5/18) children had deformities.

Conclusion : The prevalence of Childhood leprosy was 6% in our study, which is in sync with the national figure. The M: F ratio (17:1) was largely skewed towards boys, which could be due to greater outdoor exposure. 40% cases had positive family history. This emphasizes the need of screening all the childhood contacts of adult patient, for their early diagnosis and management. Deformity rate was very high which points towards their late diagnosis and inadequate management.

O-4 Motive behind disability certificate in leprosy patients

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Total number of 186 leprosy patients (male 124, female 62) of an identified leprosy colony in Delhi came for disability certificate in our hospital since November 2008. 31 (16.5%) having permanent disability where reconstructive surgery could be possible, but only 5 (2.6%) were motivated for reconstructive surgery successfully, rest 26 patients (13.9%) refused reconstructive surgery and insisted only for certificate for financial / material gain. Out of 155 patients, there were no permanent disability – only few skin patches, 33 (17.7%) had sure history of RFT, rest 122 (65.6%) have taken medicine irregularly and not willing for full pulse of MDT, they insisted for disability certificate only.

Conclusion : Majority of leprosy patients in an identified colony in Delhi are more interested in disability certificate.

O-5 Disability status of post - MDT paucibacillary (PB) leprosy patients after release from treatment (RFT) in South India

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Introduction : Leprosy prevalence has come down to elimination stage i.e less than 1 per 10,000 during post-MDT era. Public health administrators felt that in addition to identification of cases through integrated surveillance system, management and rehabilitation of disabled patients is necessary. The literature on development of disabilities in PB patients after RFT is scarce. Hence this study is carried out.

Objective : To assess the disability status among PB Leprosy patients more than 5 years after RFT.

Methodology : Experienced leprosy field investigators from NIE blinded for earlier status examined all the patients for current disability (Disability status was assessed based on WHO guidelines 1980). The information on disability was collected for 1084 patients. The current disability status was compared with disability status at RFT.

Results : It is observed that the crude incidence rate is 3.9%.

O-6 Knowledge about persons with disability (PWD) Act among health care professionals working with disabled persons

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To assess the level of knowledge about the different provisions of the Persons with Disability Act (PWD Act), 1995 among the health care professionals dealing with disabled persons, 160 Health Care Professionals were surveyed using a Questionnaire consisting of Multiple choice pattern. The results showed that 40% of respondents were aware of the nature of free education provided to the disabled children. 65.78% of respondents were aware of the employment schemes. 34.21% were aware of schemes in Affirmative Action, 63.81 % knew about traveling benefit and 61.25 % were aware of the poverty Alleviation Schemes. 53.75 % of Health care Professionals knew about facilities for persons with low vision and 33.55%% were aware of the provisions done to remove architectural barriers.48.75% of respondents knew about non-discrimination act and 43.75% were aware of unemployment allowance. Only 31.25% were aware of criteria for severe disability whereas 40% knew about least percentage for disability. The knowledge about Research and manpower development is as low as 26.87% and that of punishment for fraudulently avails or attempts the provisions of PWD Act is only 25%. The level of knowledge about PWD Act is also compared between different group of Health care Professionals such as Medical Officers, Physiotherapists, Occupational Therapist, Nurses, Social Workers, Counselors, Orthotic and Prosthetic Technicians. The difference in Knowledge was also compared between the professionals working in Rural and Urban areas. The study showed that there is a great need of Educational Interventions among the Health Care Professionals about PWD Act. The authors suggest regular workshops and inclusion of detailed subjects in the curriculum of medical schools about PWD Act will bring awareness which in turn will be much beneficial for the persons with disability.

O-7 Leprosy in Indian texts : An assessment of its social perception today

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Introduction/Objective : Leprosy is one of the oldest ailments known to the mankind. Many of the ancient texts and scriptures reveal that leprosy was not categorised as a specified disease but was grouped along with other skin diseases. However, in certain texts categorical mention of this disease does exist. The prime objective of this article is to highlight the age old traditional line of perception about this disease and examine whether those line of thinking still persist in the minds of patients suffering from this disease today or not.

Method : With this backdrop, an empirical fieldwork based study was conducted in various leprosy clinics of different central/state government hospitals in the Union Territory of Chandigarh. A sample of 70 patients has been considered for the present study. For primary data collection, a schedule and interview guide were used. Secondary sources of data cover religious and other texts.

Results and Conclusions : An analysis of the secondary sources of data, particularly the ancient texts reveals that in good old days, leprosy had been considered to be an infliction of wrong doings and sins. This view point has been significantly reflected in these texts. The finding of this study also suggests a similar view point. The study shows that the 80% of the patients suffering from leprosy today subscribe to this perception.

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O-8 Atypical presentation of leprosy in HIV

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Introduction : In the Era of HIV pandemic it was expected that the prevalence of leprosy would increase in HIV positive patients with change of clinical spectrum towards the lepromatous pole, this was based on the fact that the type of leprosy in an individual depends on the cellular immune response which is depleted in HIV. But contrary to the belief HIV does not affect the migration of *M.leprae* specific CD4 T cells to the lesion site or their response to the antigen.

Case report : We report a 28 year old male presenting with scaly, reddish plaques on upper extremities, face, back and crusted lesions over the neck and lower extremities since 6 months. On enquiry patient confessed high risk behavior. Cutaneous examination revealed discrete scaly erythematous plaques over face, trunk, upper extremity; verrucous lesions over elbows and necrotic lesions over the neck and lower extremities. Nerve examination showed grossly thickened greater auricular nerves and cord like thickening of ulnar and lateral popliteal nerves. His laboratory investigations were unremarkable except for anemia. ELISA for HIV was reactive with CD4 count of 400cell/cmm. USG Nerve revealed abscess of left ulnar nerve. USG of abdomen showed multiple shadows suggestive of splenic microabscess. Histopathology was suggestive of leprosy. Diagnosis of borderline tuberculoid leprosy in a newly diagnosed HIV positive patient was made. Patient was started on MDT-MB and oral steroids.

Our case highlights the atypical morphology of leprosy lesions and the unexpected protective cellular responce as suggested by formation of nerve abscess in a HIV positive patient.

O-9

Public awareness on integration of leprosy services at primary health centre

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The Government of India had decided to Integrate leprosy services into the general health in 1997. Since then the health services were upgraded and capacity built for diagnosis and management of leprosy at the PHC. Integration makes leprosy services more accessible and also reduces the stigma attached to this disease. However, even in 2009, it seems that the majority of public is still ignorant of this development or continues to seek care from leprosy hospitals. In order to determine the level of awareness about integration and its relationships to various socio-demographic factors, a representative random sample survey was done in UttarPradesh and Chhattisgarh states. A total of 1300 households in each state, taking into account the distance from the PHC, Sex, Age, Education and Occupational status were interviewed by a qualified investigator using an interview checklist.

The results show that 75% in Chhattisgarh but only 45.7% in UP are aware of the availability of leprosy treatment facilities at PHC and know that leprosy treatment is free. Among those who knew majority said MDT is available. A small proportion of them are also aware of other facilities viz. ulcer dressing, hospitalization and surgery available in PHC. For most, family members and health workers were the main source of information. Feedback from the community for the best methods of communication are also presented.

O-10

No impact of MDT on ANCDR in Assam

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Introduction : The ANCDR is the main indicator of the leprosy burden and disease incidence and its increase or decrease supported by level of community awareness, deformity and child percentage will indicate whether activities aimed at controlling the disease are effective. After integration all active case finding activities have been abandoned and new cases are voluntary reporting at health institutions which entirely depend on community awareness.

Methods : Analysis of main epidemiological data of Assam and finding of IEC evaluation conducted in 2005 and 2008.

Results : There has not been any significant change in ANCDR trend in Assam during MDT era. A person come to hospital for other problem and leprosy is accidentally detected as indicated by six years study of monthly new case detection trend. New cases with visible deformity stabilize at a very high level indicate late detection of cases. Child case among new cases shows an increasing trend indicating active transmission. MB proportion is gradually increasing which are potential source of infection and deformity. Evaluation report at the close of World Bank Second project shows only 25.45% of community in Assam was aware of early signs of leprosy and CMS study report 2008 indicates that 79.8% of respondents attributed deformity being the early sign of leprosy. The two high endemic pockets of pre MDT period still contributing 40% new cases of Assam.

Conclusion : New leprosy cases are under reported and appropriate IEC Intervention will increase ANCDR initially followed by steady fall. Active involvement of NRHM institutional mechanism will be effective. To conduct research by ICMR in the two pockets contributing 40% of new cases.

O-11 Is leprosy eliminated from Bombay ?

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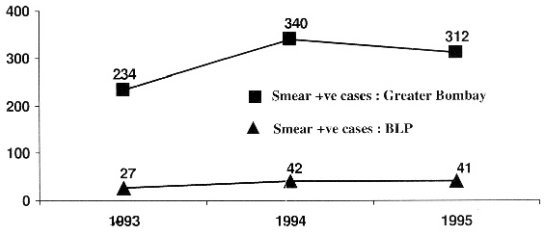
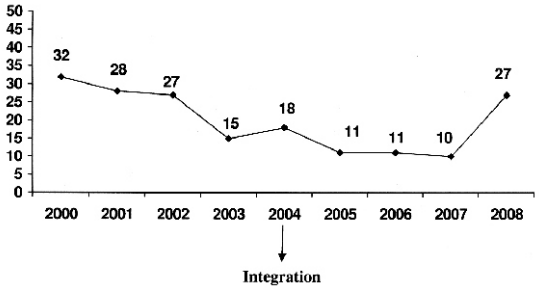
We attempted to quantify the reservoir of *M.leprae* in Greater Bombay some time after the implementation of multi drug therapy by computerizing all BI positive cases reported by 8 units in the city with a population of 12 million during 1993-1995 through a central registry.

Graph below shows the number of positive cases in Greater Bombay. This is compared with those reporting at the clinics of Bombay Leprosy Project (BLP). The latter represents the contribution to the total pool in terms of patients registered among BLP's adopted population (1.5 million). Most of the cases were detected by mass surveys which were in vogue.

The central registry was discontinued after 3 years. However, BI assessment of all patients attending BLP is continued.

Recently, similar analysis was done after leprosy was declared eliminated from the city. The trend of





new BI +ve cases in BLPs adopted population of 2 million is shown below:

The number of BI positive cases in the project area shows an increasing trend as most cases report voluntarily to BLP's referral clinics. The figures represent only new untreated patients brought to our knowledge. The actual numbers may be much more as many patients living in BLPs project might have sought treatment in other health facilities.

Conclusion : We have already documented that in the integrated set up management of leprosy in the health posts in the project area of BLP is far from satisfactory. It is clear that over the past five years integration of leprosy has failed. The reservoir of *M.leprae* as measured by the BI positive cases in Bombay is not controlled. The concerned officials of the government and the municipal corporation seem to be quite complacent.

O-12 Clinicoepidemiological trends of leprosy in Himachal Pradesh : A five year study

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Objective : To study the epidemiological and clinical profile of leprosy patients in a tertiary care referral centre, Indira Gandhi Medical College, Shimla. Knowledge and understanding of the epidemiological profile is an essential pre-requisite to assess and address public health needs in the country and to enable efficient programme planning and management.

Method : We undertook this retrospective study including patients registered with the leprosy clinic of our tertiary care referral centre from January 2004 to December 2008. Data regarding demographic details, clinical features, treatment, complications and course following treatment were extracted from the records of the leprosy clinic.

Results : 163 patients attended the clinic during this period with male to female ratio of 3: 1. Majority of patients (47.8%) were in the middle age group (20-40 years), 13.49% being the children of < 20 years age. In the clinical disease spectrum 53.98% patients were in the borderline spectrum followed by lepromatous leprosy (33.12%) and lastly in polar tuberculoid pole (5.52%). Pure neuritic and indeterminate accounted for 3.06% each. Histoid lesions were present in 7.4% of lepromatous leprosy patients. 9.2% patients gave definite history of contact in the family or neighborhood. 28.22 % patients were immigrants either from Nepal or adjoining states of Himachal Pradesh.

Conclusions : Epidemiological studies and contact tracing can decrease the disease burden and morbidity associated with the disease. Multi-drug therapy helps preventing and reducing the disease progression, severity and disabilities.

O-13 Utility of Thalidomide in Steroid Dependent Chronic ENL Patients

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ENL, an immune complex mediated problem, is seen in almost a third of lepromatous cases. Recurrent occurrence of these reactions not only calls for repeated administration of steroids. Attempts at reducing the steroid dose in many patients precipitates reaction/s with resultant steroid dependence and their side effects, which are too well known.

Thalidomide appears to be the answer for treatment of such patients. The drug has been found effective and had been in use earlier. How thalidomide should be used in practice, how long should the drug be given in patients who have become steroid dependent is not clearly established. An observational clinical study has been initiated to see the response to thalidomide in steroid dependent chronic ENL patients, the time required for steroid weaning off and to find how long does it take to reduce the dose of thalidomide and to assess the safety of thalidomide in both males and female in chronic ENL patients.

Forty two patients with chronic recurrent ENL and getting steroids for long were the subjects of the study. After due counseling and informed consent patients were put on thalidomide along with continued steroids and anti-leprosy therapy. After a week or so of introducing thalidomide, steroid dose was gradually reduced.

Of the 42 patients included, steroid with drawl was possible in all the cases. Both during the change over phase and during the follow-up period, all patients had been closely monitored for any steroid / thalidomide problems and /or side effects and for any recurrence of ENL problems. In contrast to several side effects seen in patients during steroid administration, very few problems were encountered after changing over to thalidomide.

In the follow-up of patients, after with drawl of thalidomide, 11 patients had break through ENL. Four of the 11 patients had more than one episode of ENL though in all cases the reaction was definitely milder than before. In half, other infections were the precipitating cause and their treatment abated the reaction. Detailed observations will be presented.

The work indicates not only the utility, safety and ease of thalidomide administration in with drawl / weaning of steroids in chronic recurrent steroid dependent ENL patients.

O-14 Severe form of type 2 reaction in patients of Hansen's disease after withdrawl of thalidomide

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Thalidomide, a racemic glutamic acid analogue, was first developed in 1954 and subsequently marketed in Europe, Australia and Canada as a sedative and anti-emetic. It was approved by the FDA in the USA in 1998 in the acute treatment of the cutaneous

manifestations of moderate to severe erythema nodosum leprosum (ENL) and suppression of the cutaneous manifestations of ENL recurrences. It is a good choice for management in patients who are dependent on corticosteroids. Common side effects of thalidomide are teratogenicity, peripheral neuropathy, sedation and constipation. In this paper we are presenting case reports of Hansen's patients with recurrent ENL, who were managed on thalidomide. On withdrawl of thalidomide, two patients relapsed with necrotic ENL and the other two relapsed with severe ENL.

O-15 Efficacy of prednisolone alone, thalidomide alone and a combination of thalidomide with prednisolone in type 2 leprosy reaction in 15 LL\BL patients : A preliminary report of an ongoing study

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There is no standard protocol available for management of type 2 leprosy reaction (T2R) including recurrent episodes. Therefore this study was initiated in 2008 in the department of Dermatology of Dr R M L Hospital, New Delhi with an aim to include 90 patients with T2R in coming three years.

Material & methods : A total of fifteen consecutive patients of type 2 reaction (T2R) were enrolled so far in this ongoing study. The patients were randomised into three groups namely prednisolone group, thalidomide group and thalidomide + prednisolone group. In the first two groups, cases who developed type 2 reaction for the first time were enrolled. In the first group, Prednisolone was started at 1 mg per kg body weight in single dose in the morning which was tapered to zero over 12 weeks time. In the second group, Thalidomide was given in a dose of 100mg TDS which was tapered by 100mg every month to zero in three months time. The third group consisting of cases with recurrent T2R particularly those who relapse when the prednisolone dose was tapered were administered thalidomide at the time when recurrence was observed without increasing the maintainance dose of prednisolone. After the control of T2R steroid was tapered to zero and thalidomide was tapered thereafter.

Results : In Thalidomide group all five cases were well controlled. In third group, complete tapering of steroid was possible with addition of thalidomide in all five cases. The recurrence was observed in 4 out of 5 cases in steroid group at tapered dose of 20 to 30mg prednisone in 2 cases and 5 to 10mg of prednisolone dose in another 2 cases. In all 4 cases the dose of steroids was increased to 1mg\kg body weight along with 300 mg of clofazimine, prednisolone was tapered to zero in 12 weeks time and then clofazimine was tapered by 100mg every three months with no recurrence.

Conclusion : It is too early to draw any conclusion. However, this preliminary results show good efficacy of either combination therapy (prednisolone + clofazimine) or thalidomide alone for management of T2R. Recurrent T2R can be controlled by adding thalidomide to the existing dose of prednisolone which can be tapered gradually.

O-16 The diagnostic utility of skin smears in leprosy

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Introduction/Objective : Slit skin smears have been traditionally used in leprosy for diagnosis, identification of relapse, classification for field therapy and in assessment of therapeutic regimens. Technically sensitive procedures like immunocytochemistry, *in situ* hybridization and *in situ* PCR have been applied on cell smear preparations in several diseases of infectious

origin. The present study tests the diagnostic utility of immunocytochemistry applied on cell smear preparations.

Method : Twenty-five clinically diagnosed and classified cases of leprosy were selected from the patients attending the OPD of the Institute. Thirteen cases were classified as Idt/BT and 12 cases belonged to BB and BL/LL group. Skin smears were performed from lesion peripheries/area of infiltration using the standard procedure but with the length and depth slightly (2mm & 1mm) extended. Two smears were prepared from each case – one for Ziehl-Neelson staining to detect acid-fast bacilli, and the other for immunocytochemical staining to demonstrate mycobacterial antigen.

Results : Of the 25 cases selected 5 (all in group BB/BL/LL) were positive for acid fast bacilli. Immunocytochemistry detected the presence of mycobacterial antigen in 13 cases, demonstrating the usefulness of the procedure in AFB negative cases in particular.

Conclusions : Immunocytochemistry, being both sensitive and easy to perform, can be performed on routine slit skin smears to detect antigen load at lesion sites in AFB positive and AFB negative specimens.

O-17 Characterization of mutation(s) in the *rpo*B and *fol*P1 gene loci in *Mycobacterium leprae* in relapsed cases of leprosy

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Introduction : The multidrug therapy (MDT) for leprosy control consisting of dapsone, rifampin and clofazamine is being used in other country since 1983 for leprosy control. Drug resistant cases has been reported from time to time from India as well as other parts of the world and can cause problem for control of leprosy. There is need to understand the molecular mechanisms of rifampicin and dapsone resistant in *M.leprae* for control leprosy**.**

Objective : Characterization of mutation (s) in the *rpo*B and *fol*P1 gene loci by DNA sequencing in *Mycobacterium leprae* from patients with leprosy

Materials & Methods : *M. leprae* DNA from biopsy samples from patients of leprosy (Mumbai, Kolkata, JALMA, Karigari) were amplified for 304 bp of *rpo*B and 388 bp of *folP*1 gene loci. Amplified products were sequenced by automated DNA sequencer ABI 310 Genetic analyzer. The generated sequences of *rpo*B and *fol*P1 gene loci were analyzed for mutation by MegAlign program of DNASTAR software (Madison, WI, USA).

Results : We have characterized the mutation in *rpo*B and *fol*P1 gene loci for 80 *Mycobacterium leprae* samples from patients with relapsed as well as non–responder refractory leprosy cases. Out of 80 samples, 67 were amplified and 13 samples could not be amplified for *rpo*B and *fol*P1 gene loci. The sequencing results of 67 samples for *rpo*B gene did not show any mutation. However the sequencing of *fol*P1 gene showed 2 point mutations (1- AAC ATC (Thr53Ile) and 1- CCC CTC (Pro55Leu).

Conclusion : Out of 67 samples for *rpo*B gene sequences showed no mutation, while for *fol*P1 gene showed 1(1.5%) AAC ATC(Thr53Ile) mutation and 1(1.5%) showed CCC CTC (Pro55Leu) mutation. There is need to analyze more samples for detection of novel mutations. So as to arrive at a statically valid conclusion.

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O-18 Evaluation of diagnostic role of *in situ PCR* on slit-skin smears in pediatric leprosy

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A large proportion of early cases of leprosy remain clinically suspected in children, they remain AFB negative in skin smears and histologically unconfirmed. Such cases required additional technique to confirm the diagnosis . In situ PCR on slit-skin smears is minimally invasive and less cumbersome as compare to skin biopsies in clinically suspected cases of pediatric leprosy. This study was initiated in our institute with the objectives to evaluate the diagnostic value of in situ PCR on slit skin smears in pediatric leprosy. A total of 35 cases of leprosy below 16 years of age were included in the study. After detail history and through clinical examination informed consent were obtained from the parents of children for slit skin smears from lesion site for AFB staining and for in situ PCR technique. Cases were clinically categorized according to IAL classification into Indeterminate (I), Tubarculoid (TT), Borderline Tuberculoid (BT), Borderline(BB), Borderline Lepromatous(BL)and Lepromatous (LL).Most of the patients 76% were between 9-16 year of age. Majority 64% of the cases had history of contact with a leprosy patients with in the family. Skin smears were negative for AFB in 80% of the cases only 20% were positive for AFB. On applying *in situ* PCR it was observed that 62.5% cases of I/TT/BT/BB category and 88.8% of BL/LL category were positive by *in situ* PCR. Overall *in situ* PCR confirmed the diagnosis in 72% cases while by slit smears diagnosis was confirmed in only 20% of cases. Further out of 20 skin smear for negative cases. 13 were confirmed by *in situ* PCR. This study support the potential usefulness of *in situ* PCR on slit skin smears of early clinically suspected pediatric leprosy cases. This strategy will be specially useful when histopathology is not confirmative, in cases where skin smears are negative and in those cases where skin biopsy can not be done either because of unusual locations of lesions or because of age of the patients.

O-19 High resolution sonography : A new technique to detect nerve damage in leprosy

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Background : Leprosy is the most common treatable peripheral nerve disorder worldwide with periods of acute neuritis leading to functional impairment of limbs, ulcer formation and stigmatizing deformities. Since the hallmarks of leprosy are nerve enlargement and inflammation, we used high-resolution sonography (US) and color Doppler (CD) imaging to demonstrate nerve enlargement and inflammation.

Methology/principal findings : We performed bilateral US of the ulnar (UN), median (MN), lateral popliteal (LP) and posterior tibial (PT) nerves in 20 leprosy patients and compared this with the clinical findings in these patients and with the sonographic findings in 30 healthy Indian controls. The nerves were significantly thicker in the leprosy patients as compared to healthy controls ($p < 0.0001$ for each nerve). The two patients without nerve enlargements did not have a type 1 or type 2 reaction or signs of neuritis. The kappa for clinical palpation and nerve enlargement by sonography was 0.30 for all examined nerves (0.32 for UN, 0.41 for PN and 0.13 for LP). Increased neural vascularity by CD imaging was present in 39 of 152 examined nerves (26%). Increased vascularity was observed in multiple nerves in 6 of 12 patients with type 1 reaction and in 3 of 4 patients with type 2 reaction. Significant correlation was observed between clinical parameters of grade of thickening, sensory loss and muscle weakness

and US abnormalities of nerve echotexture, endoneural flow and cross-sectional area ($p<0.001$).

Conclusions/significance : We conclude that clinical examination of enlarged nerves in leprosy patients is subjective and inaccurate, whereas sonography provides an objective measure of nerve damage by showing increased vascularity, distorted echotexture and enlargement. This damage is sonographically more extensive and includes more nerves than clinically expected.

O-20 Toll like receptor 2 -196 to - 174 Del polymorphism in leprosy patients

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Introduction/Objective : Toll like receptors play important role in Mycobacterial recognition and signaling mechanism leading to effective immune responses. The -196 to -176 del polymorphism, which causes 22 bp deletion, affects the TLR 2 gene and alters its promoter activity. To investigate the frequency and influence of this polymorphism in Indian leprosy patients this study has been initiated.

Method : A case control study was designed. Leprosy patients (116) across the clinical spectrum and 97 healthy controls were included in this study. DNA was isolated from whole blood samples of these study subjects. The -196 to -176 del polymorphism was investigated using the allele specific polymerase chain reaction method.

Results : Twenty nine (25%) of leprosy patients were found to have ins/del genotype, 6(5.17%) were of del/del genotype as compared to 21(21.64%) ins/del and 3(3.09%) del/del genotype respectively observed in healthy controls.

Conclusion : The frequency of ins and del alleles are in Hardy Weinberg Equilibrium in the study population. As of now there is no significant difference between the frequency of ins/del and del/del genotypes in leprosy cases and controls. However, being an ongoing study, the influence of this polymorphism in leprosy is yet to be ascertained.

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O-21 IFN- R-1, TAP333 and TAP565 gene polymorphism in leprosy

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Introduction : Leprosy is a chronic infectious disease caused by *Mycobacterium leprae.* It is established that variations in host genetic components and rare mutations may influence clinical outcome of the disease. A number of single-gene mutations have been identified in the IFN- signaling pathway that predispose to severe mycobacterial disease. TAP (transport associated protein) genes polymorphism could influence the selection process that determines which antigen peptides play a role in the pathogenesis. TAP gene polymorphisms have been investigated in several MHC-associated diseases genes. The main aim of the study was to study the allele frequency of various polymorphic sites of *IFN R1* and TAP genes to determine genetic susceptibility to leprosy.

Methodology : DNA was extracted from samples of 100 leprosy patients and 100 asymptomatic controls. ARMS-PCR (Amplification Refractory Mutation System) was set up for the detection of single nucleotide polymorphism at the Interferon- receptor gene *IFN R1* and for TAP. For IFN R1, SNPs to cover the two exonic variants V14M and L467P were selected and for TAP, polymorphism within TAP1 at position 333 (Ile for Val) and TAP2 at position 565 (Thr for Ala) were selected. After amplification the products were resolved on 2% Agarose gel.

Results : No significant association of *IFN R1* polymorphism and TAP2 (565) was observed in leprosy when compared with controls. There was a significant association of TAP (333) SNP with leprosy.

O-22 Early mobilization after tendon transfers in paralyzed leprosy affected hands

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To restore function in paralyzed hand surgical correction is followed by immobilization in plaster cast for some period (3 to 4 weeks). Then the sutures are removal and post-operative physiotherapy is carried out. It takes on an average 7 to 8 weeks from the day of operation in a fully mobile uncomplicated claw hand.

Reports and outcomes are known for early mobilization after tendon repairs but reports on early mobilization after tendon transfers are scanty more so in leprosy. The emphases in these reports are either on the final outcomes or on comparatives with conventional protocols. The details about mobilization and exercise programs have not been given.

The present paper describes the protocol for early mobilization and physiotherapy after some popular procedures (like PL-4T and Lasso) for claw finger correction and (FDS and Extensor indicis) opponensplasties.

O-23 Flexor Digitorum Sublimis is unsuitable for donation in considerable number of cases for RCS in leprosy

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Leprosy is a chronic communicable disease caused by *M.leprae.* A very low proportion of patients develop deformities if left untreated or improperly treated. Of all the trunk nerves ulnar is the most commonly affected. Paralysis of Ulnar nerve gives rise to clawing of fingers and thumb. There are many procedures both static and dynamic for correcting the clawing of fingers. Dynamic corrections are preferable than static when comparing the outcomes. Using Flexor Digitorum Sublimis (FDS) of middle finger as donor for claw finger correction is one of the standard procedures.

LEPRA Society is pioneering in re-constructive surgery (RCS) in Orissa since 1994. Till 2006 a total of 2,995 surgeries have been performed in a vertical set-up. From 2006, RCS service has been integrated into general health care system and the Society is facilitating on behalf of ILEP.

From January 2006 to June, 2009, 662 surgeries were performed to correct various paralytic deformities. Of them, 274 surgeries were done to correct the clawing of fingers due to ulnar palsy. Amongst, middle finger FDS was used as donor in 227 (81%) cases. In the rest 47 (19%) cases, ECRL was used due to the weakness of FDS. This paper emphasizes the importance of thorough pre operative evaluation of FDS instead of using as a routine/standard donor. Besides this, the profile of other cases will also be discussed in detail.

The continuous guidance and support of Dr. Dinakar D Palande, is gratefully acknowledged. Hearty thanks are due to the efforts of visiting surgeons Dr. Vijay Kumar and Dr. Rajoo Dash. The technical support rendered by all the Physiotherapists of ILEP and LEPRA Society is highly appreciated.

O-24 Reconstructive surgery & rehabilitation of upper limb manifestations in leprosy cured patients

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Introduction : Even with the prevalence rate going below 1 per 10,000 populations by the end of 2008, large no. of leprosy cured patients with deformities still remain in India. Many of them

report to the Rehabilitation Department, Patna Medica! College, Patna for correctior) of their Claw Hand deformities.

Method : Such patients are subjected to detailed pre-operative assessment for the suitability of the cases before getting operated. Once selected, they are admitted, in the general ward of the PMR Department, along with the other category of patients. All of them undergo routine hematological investigations, sensory charting etc. A vigorous exercise therapy of 2 weeks is routinely given to each of them, depending upon whether they need to get thumb opposition movement or intrinsic position of fingers. After the tendon transfer operation, the patients are discharged on 5th day and are again called for admission on the 21st day of operation. Vigorous tendon re-education exercises and splinting are begun thereafter. And regular counseling is done.

Result : Patients were evaluated for hand functions at the end of 1 month, 3 month and 6 months. Patients are able to pinch, grasp and hook comfortably with their operated hand. They are able to oppose thumb and also able to hold articles, which is a great satisfaction to them.

Conclusion : All leprosy cured patients with their thumb or finger deformities must undergo the disability prevention and medical rehabilitation program (DPMR) to improve their quality of life (QOL)

Acknowledgment : ILEP, DFIT under collaboration with the MOHFW donated OT instruments, OT Lights and Hand Table to this department for RCS & Rehab. program. Medicines are supplied free to the patients by the Govt. and ILEP.

O-25 Modification of the surgical correction of lumbrical replacement : A long term follow up

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As introduction I like to mention that the 5- Tailed Palmaris Longus Transfer as well as 5- Tailed Sublimis Transfer used by us as lumbrical replacement in intrinsic minus fingers has been seen by Dr.H.Srinivasan and he has requested us in December, 2004 to do a long term follow up, so that our procedures become known widely.

We feel encouraged now to explain the value of the 5-tailed procedures, respectively the advantages of our modified methods and to present the results of these procedures done by us in the year 2005. The good success of our mentioned procedures has brought more and more cases to us by Health Workers and by satisfied patients.

O-26 Global magnitude of the leprosy disabilities

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Introduction : Leprosy is a public health problem and is feared by the community because it is known to produce impairments such as deformities. The best strategy for preventing the disabilities lies on detecting the disease at an early stage and treating it adequately with Multidrug Therapy (MDT). However, most control programmes do not maintain or possess information on these patients.

Objectives : (i) To review the available information on disabilities due to leprosy, and (ii) to estimate the overall importance of such disabilities and the likely impact of control programmes based on MDT.

Methods : For each major endemic country, the total number and the percentage of new cases presenting with disabilities as of beginning of 2007 is known. Using age specific incidence of the prospective study conducted in Malawi, the number of new cases with disabilities for each country was estimated. Using the Demographic and Social Statistics published by the United Nations, expectation of life at birth for each major endemic country for 2005-2010 was recorded. Global number of individuals with disabilities attributable to leprosy living at a given point in time is the sum of cases in each group, multiplied by the life expectancy (in years) for each group.

Results : The global estimated number of disabled can be 0.43 million with a range between 0.4 and 0.45 million.

Conclusion : The method described in this article gives some idea of the complexity of the problem, and will stimulate further work on the collection of reliable data on incidence of disabilities.

O-27 Sustaining leprosy services through referral centre

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Introduction : Subsequent to integration of leprosy in General Health Services, it has become necessary to sustain better quality services and care to leprosy patients with clinical problems, nerve damage and deformity. Several patients from the city and as well from adjoining districts of Bombay and beyond seek clinical expertise through the clinic of Bombay Leprosy Project(BLP). To cater to this, BLP has been making continuous efforts to strengthen the Referral Centre and satellite clinics since January 05. We share our experience relating to the management of disease burden through the Referral centre.

Observations : During the period from Jan 2005 to June 2009, cumulative total of referrals were 1499 patients referred for diagnostic problems and special opinion, 481 patients for advise on management of reaction and neuritis, 1579 patients were referred for care and management of deformity and 38 patients were diagnosed as relapse.

In view of the increasing number of referrals during last four years extension unit of the centre has been started at a suburban municipal hospital and in the Skin dept of a popular city municipal medical college and hospital, to enlarge the scope of services to more patients.

BLP also arranged with medical college for an Ophthalmologist to the Referral centre for screening of ocular problems.

To further improve upon the services to leprosy patients, and impart skills in clinical management, medical interns and post graduate students are posted from the city private medical colleges to assist in leprosy care services. So far 250 Interns have been trained and assisted in providing care and services to patients.

Conclusions : It is seen that the magnitude of the clinical problems seem to be a big burden from a management point of view. In the context of integrated scenario, this needs attention and with dwindling funds cost effective strategy needs to be availed to sustain the quality services.

O-28 Leprosy reactions following treatment with moxifloxacin based regimen

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Clinical trials in leprosy using a combination of Moxifloxacin 400 mg, Rifampicin 600 mg and Minocycline 200 mg. were reported for the first time recently (Ganapati et al 2009). Observations on 54 patients with MB and PB leprosy showed that the clinical response in all patients was quite striking over a short period of follow up. However, a few reactions were encountered. We concluded that longer period of observation is necessary to draw conclusion on the reactive episodes.

We report on the proportion of reactions encountered in a sample of 61 patients over a period ranging from 6 months to 12 months.

Proportion of reaction in patients followed up for a minimum period of 6 months. Clinical types No. of Patients Reactions

BI +ve (BB,BL,LL)	21	9 (42.9%)
BI -ve (I,TT,BT)	40	2 (5.0%)
Total	61	11 (8.0%)

Conclusion : Type 2 reaction in patients receiving Moxifloxacin based regimen is unacceptably high, though they ore all manageable due timely identification. Type I reactions ore not significantly high. Inclusion of an anti-inflammatory agent may be desirable. In the routine management with WHO-MDT, clofazimine due to its anti-inflammatory action might have played a beneficial role in reducing the incidence of reactions.

We therefore have instituted clinical trials with clofazimine as an additional component to the combined therapy with moxifloxacin, rifampicin and minocycline.

P-1 Nasal leproma

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A 31 yr old man came to ENT OPD with history of Anosmia and nasal-block of 4 months duration examination of the nasal mucosa reveled friable congested mass occupying the left nostril. Patient was provisionally diagnosed to have Rhinosclroma incidentally biopsy was reported to have acid fast bacilli. Patient was refered to Dept of Dermatology, Venereology, Leprology. On correlating the clinical presentation, including an isolated nodule on the left side of the nose, slit-skin smear report and biopsy findings, a diagnosis of lepromatous leprosy was made patient was started on anti leprosy treatment patient improved clinically. We report this case for it's unusual presentation.

P-2 Study of hormonal profile in female leprosy patients

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Objectives : A prospective study was done to see hormonal profile of female leprosy cases of different physiological groups and to compare the profile between cases with reactions and without reactions.

Materials and methods : Newly diagnosed 220 female patients in different physiological groups of all types of leprosy were included. After history/clinical -examination serum samples were sent to NIRRH for hormonal assays of LH, FSH, estradiol, progesterone and prolactin by ELISA method. Patients were treated with MDT as per disease -type with regular follow-up being done to see disease-aggravation/onset of reactions and further serum samples were taken as required.100 age-matched healthy females were included as controls.

Results : 55% cases of lactational group and 30% cases of pregnant group presented with reactions (mainly Type-I). In reproductive group (including pregnant and lactational cases) mean levels of serum FSH and Prolactin were significantly higher in reaction cases as compared to controls and non-reaction cases ($p<0.05$). No significant difference seen between hormonal levels in reactional and non-reactional cases of puberty-group. In menopausal group, mean levels of estrogen, progesterone and Prolactin were significantly higher in reaction cases as compared to non reaction cases. Larger numbers of patients are being included. Results will be presented in detail.

Tentative conclusion : In leprosy patients during pregnancy, lactation and menopause; hormonal derangement may be associated with reversal reactions.

P-3 Computerized management information system in urban leprosy control

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Leprosy services have been integrated into General Health Care System. Simplified Information System (SIS) is being followed under the program in rural and urban areas. Information required monitoring the progress of NLEP and progress in individual patient is beyond SIS. A database on computerized information system, named as COMLEP was used & tried in Delhi state.

Health workers & concerned health officers were trained to use the software. Primary data of 1869 leprosy cases from west district (1275) and south districts (594) was, entered and MPR & other analytic reports were generated.

It was found that use of COMLEP helps in avoiding delay in submitting reports, human errors are eliminated, COHORT studies to calculate treatment completion. rates & progress in EHF score become easy and action taken to improve patient's compliance could be possible in required time.

It is felt that COMLEP is useful in urban areas and will also prove useful in districts under national leprosy eradication program also.

P-4 An atypical presentation of a case of BT with type 1 downgrading leprosy reaction manifested as generalised nodular lesions with constitutional symptoms

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A rare case of 65yr old untreated male patient clinically presented with generalised, erythematous, nontender nodules and plaques histopathologically proven as BT leprosy with type 1 downgrading reaction. For last ten years the patient had two erythematous, hypoaesthetic plaques with central clearing. About five months back he gradually started developing few nodular lesions over face and neck. Fifteen days back suddenly new crops of nodules and plaques appeared which become generalised, erythematous and edematous within two to three days associated with low grade fever. However patient did not have any evidence of nerve thickening, neuritis or nerve function impairement. Histopathological examination of these nodules shows BT Hansen with type I downgrading reaction. Fite staining shows Acid fast bacilli (1+). This patient is a known case of nephrolithiasis with hydronephrosis and congestive heart which might be the precipitating cause of downgrading type I leprosy reaction.

Conclusion : Rarity of type 1 downgrading reaction presenting as generalised nodular lesions.

P-5 Camp approach for RCS brings about the up scaling the skills among the NLEP staff in pre and Post operative care of RCS cases

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Introduction : Reconstructive Surgery (RCS) plays an important role in restoring hope and dignity of leprosy affected persons. Though it has a greater role to play but due to lack of technical expertise many of the patients may not have opportunity to get RCS services.

Study design : The objective of this paper is to present the LEPRA Society's Technical Resource

Unit (TRU) experience in promoting RCS at district and state level in Madhya Pradesh.

Result: Reconstructive Surgery (RCS) was first started at LRPU at Medical College, Bhopal in 2000 but due to unavailability of trained surgeon and physiotherapy technician, this activity could not get a momentum. LEPRA society started promoting RCS by sending cases to Orissa but it proved to be very costly and decided to establish a unit for RCS at MP.

A surgical center started functioning from 2005 and till date about 560 RCS were done in the centre. The center had a capacity of only 12 beds, which would accommodate only 12 operations per month. It was a challenge in front of health administration in clearing the backlog deformity cases. TRU supported to take initiative by establishing few more centers where RCS could be done. First camp was organized in September 2008 with 7 operations. But the post operative follow up could not be executed in the desired fashion. It was decided to start RCS in the district expected to result in enhancing NLEP staff skills in RCS and subsequent follow-ups.

Conclusion : The local surgeons of the district hospital by assisting the RCS surgeon gained confidence and started surgeries independently. After Jabalpur, series of screening camps were held in districts like Chhindwada, Rewa, Balaghat, Narsingpur, Sagar and Damoh. A total of 90 cases with 110 procedures were done. This helped in developing a sustainable system.

P-6 Analysis of Streptomycin induced protein expression in mycobacteria by proteomic approach

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Mycobacterial diseases particularly tuberculosis (TB) remains a major challenge to the health providers as well as research workers worldwide. Streptomycin is a core drug for treatment of category II pulmonary TB cases. Resistance to SM has severely compromised the therapeutic options. Exploring/understanding the protein profile of a resistant strain in presence of drug could help in making a better decision for treatment. The goal of present study was to examine and compare the protein profile of streptomycin resistant *Mycobacterium tuberculosis* isolate grown in presence and absence of drug streptomycin (SM). Cell lysate of isolates was prepared by sonication and centrifugation. Two-dimensional (2D) gel electrophoresis was employed to study the protein profile. The selected proteins were finally identified by MALDI-TOF mass spectrometry. Our study revealed eight induced proteins (DnaK, fabG4, DNA-binding, hypothetical, two 14kDa antigen and two 10kDa chaperonin) that were upregulated in presence of drug. This study might throw light on the expression of some proteins which could generate some important information in developing better drugs, diagnostics and vaccines.

P-7 Detection of mutations associated with isoniazid and ethambutol resistance in *M.tuberculosis* isolates by Hybridization probe assay of real-time PCR

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Introduction : Drug resistance of *M.tuberculosis* is an increasing problem for tuberculosis control programes. Rapid detection of susceptibility of resistance is of crucial importance for determining correct regimen. As INH is active against several mycobacteria and may be used in case of emergence of resistance to other drugs. For leprosy, a chronic disease drug resistance poses a serious impediment at a stage when there is a dramatic decline in prevalence due to successfully implemented programme. Real Time PCR appears to be promising rapid, accurate, and inexpensive

way to detect resistance to mycobacteria.

Method : We have designed two pairs of probes and primer for 194 codon of *inhA* gene and 299 codon of *embB* gene of *M.tuberculosis* in phasic manner. The designed probes and primers were efficiently able to amplifiy the target and discriminate the mutant and wild type sequence by melting curve analysis. Total fourty seven *M. tuberculosis* culture isolates (resistant to Ethambutol and Isoniazid) and Twenty six clinical isolates were amplified by using above inhouse designed probes and primers. Fourty isolates were tested for isoniazid and Thirty three isolates were tested for ethambutol and we use refrence susceptible strain H37Rv as a control.

Results : Total 47-65% mutations in *embB* gene is responsible for ethambutol resistance in *M.tuberculosis* in which 16.6% mutation is found in 299 codon of *embB* gene and 42.8% mutation is found in *inhA* gene.

Conclusion : The designed assay is being evaluated for applicability of mutation detection directly from clinical samples which will enable us to identify the mutation at target sites rapidly without the need of performing culture. The detection of mutation with Real Time PCR is usually based on fluorescent probes that are optimized to detect specific mutation. Another advantage of this technique is that it can be applied directly to the clinical samples. Real time PCR assay enables monitoring of the amplification and detection of mutations, so that appropriate treatment regimen for patients can be selected early in course of infection and also in case of co-infection (leprosy + tuberculosis). As this technique can detect lower loads of organisms it can be very useful.

Acknowledgements : We acknowledge DBT for funding & student, colleagues & technical staff of NJIL&OMD, Agra for support.

P-8 Diagnostic efficacy of *Mycobacterium leprae* specific antibodies against Phenolic glycolipid -1 (PGL-1) and 35kD antigens in lymphocytes secretion of peripheral blood mononuclear cells (PBMCs) and in serum of leprosy patients

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In a recent study, it was found that, a quick diagnostic aid to facilitate a rapid detection of active pulmonary tuberculosis can be done by detecting antibodies specific to the *Mycobacterium tuberculosis* antigens, Bacilli Calmatte-Guerin (BCG) & Purified Protein Derivative (PPD) from the lymphocytes of peripheral blood mononuclear cells (PBMCs) of suspected cases of pulmonary tuberculosis patients. Keeping the above in mind, the present study has been initiated to find out whether antibodies specific to *Mycobacterium leprae* antigens, Phenolic glycolipid-1 (PGL-1) and 35kD antigens are secreted by the lymphocytes of PBMCs of leprosy patients and if so, its usefulness to facilitate the diagnosis of leprosy. 18 patients of both sex and two healthy controls were included in the study. The PBMCs were purified from the blood of the leprosy patients by density gradient centrifugation. PBMCs (0.5×10^6, 1×10^6, 5×10^6, 10×10^6 /ml were cultured in RPMI (1640) medium with 10% FCS in the presence of absence of MLSA (10µgm/ml) or PHA (5µgm/ml) at 37°C in 5% CO_2 atmosphere. Supernatant were collected at 24, 48, 72 & 96 hours intervals and stored at -20°C for antibody detection. Antibody detection was done by ELISA. In the serum, antibodies could be detected against PGL-1(IgM) and 35kD (IgG) in the LL and BB/BL, but not in BT and in lymphocytes secretions (culture supernatants) of the PBMCs, no antibody response could be detected in all types of leprosy patients and in the healthy controls.

P-9 Incorporation of radioactive substances into cell wall lipids of mycobacteria

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Objective : To evaluate the biosynthesis of phenolic glycolipids in mycobacteria using radioactive substances.

Method : *M.bovis* BCG, *M.microti* and *M.kansasii* were grown in Sauton's medium at 37°C till adequate growth (mid experimental phase,O.D at 450 app. 0.4-0.5).They were further incubated in the prescence of radiolabeled substrates 1^{14}C-palmitic acid(2µCi/ml, specific activity-23.3 mCi/mmol) 1^{14}C-sodium-n-valerate (1µCi/ml, specific activity-10.14 mCi/mmol); 1^{14}C-sodium acetate (2µCi/ml, specific activity-40 mCi/mmol); 1^{14}C-sodium propionate (2µCi/ml, specific activity-5-20 mCi/mmol).The cells were centrifuged at 10,000 rpm for 10 minutes at 37°C. Supernatant (medium) was collected in another centrifuge tube.

Results : *M.bovis BCG* and *M.kansasii* showed significant incorporation of 14C-labelled palmitate, valerate, acetate and propionate into PGLs, PDIMs and mycolates. The percentage of total radioactivity assimilated varied from 0.35% in the case of PGL to 1.2% in mycolates

Conclusion : The biosynthesis experiments using *M.microti* gave evidence of two phenolic intermediates phenol phthiocerol dimycocerosate (major) and phenol thiodiolone dimycocerosate (minor) whereas a similar study with *M.bovis* BCG gave evidence of only one intermediate substance, possibly phthiocerol dimycocerosate. The cell free extracts of the organisms supposedly containing glycosyl transferases and other sugar modifying enzymes could synthesize the mycoside B from these intermediate substances, thus giving a clue to steps in biosynthesis. Glycosylation may be the final step in the pathway. This finding could be useful in elucidating the pathway of biosynthesis of PGL-1 in *M.leprae.*

P-10 Micro study on healthy contact examine

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Objective : Our 2008-09 mission is to contact with leprosy affected people his/her family through health education and examine the suspected case.

Method : Selected total MB leprosy affected family were examined and imparted health education.

Major findings : Total 250 leprosy affected families were examined and health educated, total 34 patients detected; male MB 15 PB 8, female MB 9 PB 2, deformity child case 1, high risk case 17.

Result : Through this healthy contact examination we detected hidden cases. We detected high risk cases and were able to control deformity developed in them. We were able to control PB cases to convert in MB cases and one child of early grade II was converted to grade I.

P-11 Hospitalization of leprosy patients a cost analysis

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Can admitting leprosy patients in general hospitals be a cost effective strategy? We made an analysis of cost of management of patients admitted in

I. A 20-bedded leprosy hospital maintained by Bombay Leprosy Project (BLP) from 1979 to 2004, (the premises being available free of charge). Average cost in respect of 216 patients in a year is calculated.

II. A private hospital attached to a medical college since 2004. Average cost of 53 patients in a year is calculated

Comparative Cost

I (Leprosy Hospital)	II (General Hospital)
1) Experlses borne by BLP Remuneration of staff like doctors, PMW's, cook, attendant ppsted in the hospital, cost of food, laundering linen and bed clothes, general and supportive medicines and dressing materials and transport of raw materials for food from the near by market. *2) Expenses not borne by BLP* Water charges, municipal taxes, security charges and rentals	*1) Expenses borne by BLP* Registration and case paper charges, nominal charges for hospital stay, diet, investigations relevant to the management of leprosy, general and supportive drugs during hospitalization and transporting patients to hospital from BLP by vehicle. *2) Expenses not borne by BLP* Electricity, water charges, municipal taxes, security charges and rentals.

Cost of maintenance per bed per patient under I ..... Rs. 2150 (US $ 45.00)

Cost of maintenance per bed per patient under II ..... Rs. 892 (US $ 19.00)

Ratio of I : II is 5 : 2, (not taking into account the escalation of cost over the period of observation).

This study indicates that in-patient services in an integrated manner in a general hospital may reduce the cost by about 60%.

As leprosy has been merged into general health services and NGOs find it difficult to raise funds, we recommend that it is cost-effective to offer in-patient care in general hospitals.

P-12 Transepidermal elimination of *Mycobacterium leprae* in histoid leprosy : possible participation of skin in leprosy transmission

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Introduction : Though supposed to be nearing elimination, the exact transmission route of leprosy is still unclear. The present report strongly suggests the role of skin in leprosy transmission.

Case report : A 56-year-old Indian male from Bhilai, Chhattisgarh state was seen with multiple skin lesions of histoid leprosy presenting *de novo* on the extremities and face for 3 months, with erosions and crusting. Histopathology confirmed the diagnosis, while Ziehl-Neelsen stain peculiarly revealed numerous solid staining acid fast bacilli arranged discretely and in clumps inside the epidermal cells, and also being liberated from the eroded epidermis of some nodules. Slit smear examination was highly positive. He responded to daily rifampicin and ofloxacin given for 2 months followed by regular MB MDT.

Discussion : *M.leprae* are very rarely demonstrated inside the epidermis and are seldom searched for. Okada *et al* suggested that these bacilli could be gradually transferred through phagocytic activity of young basal cells coming in contact with upper dermal bacilli, and finally eliminated,possibly from the intact skin. Namisato *et al*, described "Transepidermal elimination" (TEE) of *M. leprae* in lepromatous leprosy. The bacilli could remain viable on skin surface for several days or weeks, playing an important role in their spread.

This transepidermal exit of the *M.leprae* , alongwith author's previous reports suggesting their entry through traumatized skin, tattooing and vaccination , indicate that possibly in some, skin could offer a two-way ticket for the bacillus, and should be duly recognized for its contributory role in leprosy transmission.

P-13 Initiating RCS services in civil hospital, Jalandhar

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Punjab is a relatively low endemic state for leprosy. Leprosy cases are mainly in few districts e.g. Jalandhar, Ludhiana & Amritsar. DPMR services are being provided under NLEP Program. Reconstructive surgery in deformed cases was not available in the state. District Leprosy Society, Jalandhar supported by State Leprosy Society Chandigarh decided to start RCS services in Civil Hospital Jalandhar. It could be done in three steps.

1. Screening camp was organized - deformed PAL were contacted, counseled and brought to screening camp for examination assessment and detection. Selected persons fit for surgery were given preoperative care and instructions. Sixty four persons attended the screening camp. Seventeen cases were selected for RCS. Twenty four persons with ulcers were given training in self care and provided with self care kits. Five cases were provided with grip aids and needy cases with MCR footwear.
2. Six persons fit and willing for surgery were operated by senior visiting surgeons from Mumbai. Local surgeons were also trained so that RCS services could be sustained. Civil Hospital staff took the responsibility of post operative care of all the six operated cases.
3. Operated patients were advised to come for follow up and plaster removal on 14-8-2009 then they will be trained and acquainted for physiotherapy.

It is essential to provide RCS services at proper time and nearer to the patient's house so that post operative care and other rehabilitation services can be provided without delay.

P-14 Reconstructive surgery in district hospital, Kanker

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To sustain the Reconstructive Surgery (RCS) services and clear the backlog cases requiring reconstructive surgery near Persons Affected with Leprosy (PAL) residence, initiative was taken in district hospital Kanker involving RLTRI Raipur, which is the nearest tertiary care centre.

List of disabled cases requiring reconstructive surgery was collected from block medical officers from all seven blocks of the district. Then screening points were fixed depending upon number of disabled cases and cases were mobilized.

Surgeon and supportive staff from district hospital Kanker was sensitized & prepared to learn leprosy surgery and operation theater was equipped to perform reconstructive surgery (RCS) in persons affected with leprosy (PAL). During the year 2009-10,25 deformed PAL were examined & screened, 12 persons were found fit for surgery. 10 persons, out of 12 were operated. Local surgeon assisted and learned the surgical techniques used in RCS for PAL. Post operative care is being given by Physio technician from RL TRI Raipur.

Reconstructive Surgery in Persons Affected with Leprosy helps in regaining the functional ability and reducing the dependency on others thus mainstreaming them. Developing and sustaining RCS services in district hospital is another important function in DPMR program under NLEP.

P-15 Study of knowledge attitude and practice about leprosy amongst general population of Yavatmal district (M.S.)

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The research was conducted with a view to ascertain the knowledge, attitude and practice about Leprosy amongst general population of Yavatmal district, in the year 2008.

There were 117 respondents who were selected as representatives of general population for this research study, spread over the entire sixteen Tahsils of Yavatmal district.

Majority of the respondents from representatives of general population knew about the germ as a cause of Leprosy, infectivity of Leprosy; spread of the disease; early signs of leprosy and its curability. However, they didn't know that deformity due to leprosy could be corrected by physiotherapy and reconstructive surgery.

They didn't have any objection to leprosy affected persons staying at home while taking treatment and permanent stay and also their moving about freely on public places.

Majority of the respondents would employ even deformed leprosy affected persons. They would purchase the goods from the shops of leprosy affected persons. They showed readiness to take tea in their hotels.

Majority liked to encourage marriages between the leprosy cured and non affected persons. However percentage of response reduced to 50 % when it comes to marriages with their kin. They were of the view that couple should not seek divorce when anyone of them found suffering from leprosy. From the response it is seen that they didn't have objection to the participation of leprosy cured persons in the public functions.

Based on the findings, it could be concluded that knowledge, attitude and practice about leprosy are improved considerably, amongst general population.

P-16 A case study from St. Joseph's Leprosy Centre (SJLC), Madhya Pradesh

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Introduction : The most of rural areas literacy level are very low. The conventional print media is littrelly are of no value. Innovative methods of reaching out to the people through film show. The SJLC has got an IEC van with PA system. LCD Projector to exhibit film and different disease. The van is painted on all side pictorial messages on Leprosy, T.B. and HIV/AIDS. Where ever the van moves is attracts peoples and also provokes them to enquire more and more about the diseases. Success stories of the sufferers inspire people to come out with their own suffering.

The context : Nishar belongs to Muslim community and lives in village 5 km away from SJLC. She is very active and outgoing woman. She had patches on her hand and body but never cared or knew it as leprosy.

Our intervention : As part of our programme IEC van went around the villages with giving information to people about Leprosy, HIV/AIDS, T.B etc. the information given through film shows, group talks, group meetings, exhibition, distribution of pamphlets etc. One the IEC van reached in her village and the staff started to give information. After watching the film she want to confirm whether she has leprosy.

Outcome : The very next day of the IEC programme Nishar came to SJLC with her 32 years old son and her 7 years grand son who also had few patched on their body. After the examination they were diagnosed with disease of leprosy and immediately they were put under MDT. After that all the family members of Nishar were examined and one more grandson found symptom of Leprosy out of 7 members 4 members are under MDT. Nishar, her son and her two grandsons are very happy that through the IEC they could get the proper medication in right time before developing any deformities.

P-17 Leprosy status in tribal and non tribal areas of Chhattisgarh, India

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Introduction : Tribal population accounted for more than 33 percent of the total population of Chattisgarh (C.G.). The impact of National leprosy eradication programme (NLEP) implemented in the state were evaluated among tribal and non-tribal districts of C.G.

Method : The data of all leprosy cases of all tribal (6) and non-tribal (10) districts were analyzed from 01 April 2007 to 31 March 2008. Statistical analysis was interpreted with the objective to know the status of the disease of leprosy among tribal and non- tribal districts of C.G.

Results : The average prevalence rate of leprosy in tribal districts was 0.9/10,000 population in comparison to 2.94/10,000 in non-tribal districts of C.G. Annual new case detection of tribal districts were 1.27/10,000 population in comparison to 4.25/10,000 population in non-tribal districts. The proportion of females among the tribal districts of the state is higher (33.11%) in comparison to non-tribal districts (32.6%). There was higher proportion of children affected (7.35%), visible deformity (5.58%) and MB cases (54.6%) among newly detected tribal population than 64%,4.4% and 48.8% respectively among non-tribal population.

Conclusion : Above study revealed that there is an urgent need of intensified information, education and communication (IEC) facility in tribal districts to bring awareness in the tribal community about leprosy.

P-18 Changing scenerio of RCS for betterment of patient compliance

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Introduction : Reconstruction surgery for deformity at referral centre or at medical college is an established concept. Now we at Victoria Hospital (District Hospital) Jabalpur routinely performing R.C.S. camps at various District Hospital level for better patient compliance at their door step.

Method : Prior screening & patient selection investigation performed & suitable patient selected 3 to 7 Days before scheduled Dates of camps. Screening at Balaghat, Chhindwara, Jabalpur, Nursingpur ,Rewa, Damoh, Saugar were performed on 1 - 2 March, 30-31 March, 20-21 April, 1-2 May, 7-8 May ,13 July, 14 July respectively. Surgical camp organized at Balaghat, Chhindwara, Jabalpur, Nursingpur on 27-28 march 09, 2526 April, 17-18 May, 21-22 June.

Total operated cases : Ninty five standard corrective surgical procedure was performed by surgical team under guidance of Joint Director Dr. B.N. Chouhan & C.M.O. Dr. J.L. Mishra & Civil Surgeon Dr. Ajeet Dubey & D.L.O. Dr. G.K. Chaurasia.

Result : Follow up was done by Local Orthopedic Surgeon & by a team based at Victoria Hospital. Follow up Results were assessed as per standard norms.

Conclusion : Short comings of R.C.S. at referral Centre are many. Major are poor patient compliance & follow up, poor slow & less interest of leprosy worker. No active participation of field & Office staff at peripheral level. Better media support, public awareness are the positive byproduct of this new concept.

P-19 Trend in the decline of disability problems in a LEPRA operated project in Malkangiri district, Orissa

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LEPRA Society participated in NLEP and delivered MDT services in Malkangiri district until integration. The district reached elimination in the year 2003 and in the year treated only 87 cases. Leprosy is a peculiar disease in the sense that elimination does not indicate end of the problem due to considerable cured persons living with various disability. Though the percentage of disability has also declined with the case load, the cumulative load very slowly decreases only with death, migration and to some extent by healing. As a result updating the case load is difficult, more so due to passive service seeking by the affected. The objective of this paper is to find out the feasibility of retrospective updating from the information on deletion due to death and other reasons.

The cumulative disability load has been calculated year wise from the 1992, the starting year. From the patient card and follow up records annual deletion due to death and migration as well as conversion to normal was found out and its percentage was calculated to find out the rising and decline trends.

The population covered by the project is 5,56,245. Total number of cases treated so far is 3,888. A total of 624 cases (16%) have been registered for disability care services. Of them, 328 (53%) cases were deleted from the register and presently 296 (47%) are living with disabilities. It is interesting to note that the balance disability load shown rise from 1992 to 2001 (34 to 398) and from there the load is declined (398 to 296). Case deletions ranged from 0 to 19 in a year. The following table shows the year wise total cases and the deletions.

Updating the total disability load seems to be an useful exercise. This may be a better operational indicator than the disability rate in new cases.

Year	92	94	96	98	00	02	04	06	08
Cases	82	725	277	331	351	163	70	28	36
Deletions	34	273	328	374	396	387	364	325	296

P-20 Disability status of Hand and Foot in MB leprosy patients after release from treatment (RFT) in Poonamallee LCU in South India

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Introduction : Most of the control programmes did neither maintained nor possess the disability status of leprosy patients after RFT. Patients after RFT still continue to have further neurological deficit developing over a period of time. Grading of disability is often done at diagnosis ,but less frequently at the completion of treatment to monitoring the changes during the treatment. There is little information on the development of disability in MB patents after RFT. In this study we have discussed disability status at the time of RFT and at followup after 5-15 year with respect to body parts.

Objective : To assess the disability status of MB leprosy patients 5 to 15 years after RFT.

Methodology : It is a retrospective record based one with the component of follow-up. Experienced leprosy field investigators from NIE blinded with earlier status examined all the patients for current disability. (Disability status was assessed based on WHO guidelines 1980). The information on present disability status was collected for 370 patients out of 596 MB patients available at the time of RFT.

Results : Recovery from mild disability in both parts of the body ranges from 17 to 19.5%.Risk of developing new disability is from 18 to 24% in both hand and feet. Worsening is seen more in feet.

P-21 Integrating leprosy disability care services into GHS – An experience with ILEP supported TRU &SRS Project of Orissa

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ILEP supported technical resource unit & strengthening referral system project is operational in Orissa since 2007 and to be continued till 2012. This supports NLEP in the thematic areas. The strategic plan includes improving monitoring & supervision system within the NLEP, achieving a sustainable and efficient referral system for treatment of complicated cases of leprosy in the state through capacity building of the GHS.

The TRU at the state level strengthened technical capabilities and monitoring & supervision system, disease surveillance through routine process and operational research. The referral centers are responsible for improved quality services of POD/POWD through DPMR clinics and re-enable with functional ability through corrective measures. The progress and responses from different stakeholders reveal that the DPMR program seems sustainable.

Ten referral centers were established along with Medical Consultant & Physiotherapists. Physio and shoe-units are functional. These centers provided services to 10959 patients including management 1248 lepra reactions, 2353 ulcer cases and provision of 6682 foot-wears to needy. The project strengthened operation theatres at one pioneer leprosy hospital, one mission hospital, three medical colleges, one district hospital and performed 448 corrective surgeries in these institutions. The project has provided training to 3 Govt. surgeons in RCS and 6 PMWs on RCS related physiotherapy.

The DNTs are now able to assess & manage all reaction and disability cases, refer suitable cases for RCS and the disability cases are being handled at PHCs. ILEP supported TRU & SRS project is another successful project of Orissa bringing dramatic change in the attitude of GHS staff in managing disability cases.

P-22 What is cure in leprosy ?

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Introduction/Objective : Leprosy is still a peculiar communicable disease, which is though curable, but clinicians, microbiologist, histo-pathologist and social scientists differ in many occasions in defining "cure in leprosy". Recently a workshop on "cure in leprosy" was held at Konark, Orissa under IAL Banner to evolve common consciences on definition of cure in leprosy.

Methodology : 40 scientists from different disciplines participated in this 2 day's workshop from all over the country. Deliberations & presentations of 20 scientists and panel discussion have revealed many things regarding "cure in leprosy".

Results : Histo-pathologists define cured as reduction or elimination of granulomas in the specimen, Microbiologists define "cure" means absent of solid bacilli's in the skin/nerves, the Programme Managers define "cure" means completion of full course of WHO-MDT, Clinicians define "cure" of leprosy means arrest in disease activity and Social scientists define "cure" means community acceptance and integration of leprosy patients in the family & community.

Conclusion : After a brain storming discussion finally the definition of "cure in leprosy" remained inconclusive but most agreed that arrest of progression/ activity of disease after full course of MDT and patient's perception and clinician's observation should be given more importance in defining cure.

P-23 Incidence of leprosy in healthy contacts verses normal population in high & low endemic districts

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Objective : A study was conducted during 2008 in Orissa to know incidence of leprosy in healthy contacts vrs normal population in high & low endemic districts.

Methodology : Two districts were identified, one district (Bargarh) where prevalence rate of leprosy was above 2/10000 population and another district (Mayurbhanj) where prevalence rate was less than 1/10000 population. Healthy household contacts of all cases detected during last 5 years and 5 neighbouring families of the index cases were enlisted as contacts for examination by trained health workers supported by leprosy paramedical workers in the two randomly selected Blocks of each district and entire exercise was completed within 6 months.

Finding/Result : 10843 contacts in district-I & 6671 contacts in district-II were examined. 37 & 34 new leprosy cases were detected in the district I & II respectively out of total contacts examined whereas 41 & 11 leprosy cases were detected in the district I & II respectively in routine manner in the same period of study.

Conclusion : The analysis of finding reveals that the incidence of disease amongst healthy contacts in the low endemic district is considerably high in comparison to incidence of disease in normal population where as in high endemic district the difference in incidence of disease in healthy contacts vrs. normal population is not so much. This study indicates that in low endemic districts, 100% examination of healthy contacts is a very cost effective method of case detection.

P-24 Impact of institutionalization of DPMR activity with NRHM

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Introduction : Disability Prevention & Medical Rehabilitation (DPMR) programme under NLEP was launched in the entire country since 2007-08. The objective of DPMR programme is to provide disability care services to persons affected with disability/deformity due to leprosy through General Health Care System.

Objectives : To increase the utilization of DPMR services, an attempt has been taken to integrate DPMR activities with institutional set up, created under NRHM in Orissa.

Methodology : The NRHM institutions like Village Health and Sanitation Committee (VHSC), untied funds, Rogi Kalyan Samiti (RKS) and District and State level- FMG with flexi fund of NRHM have been established to provide health care services to people at their doorstep. Orissa has utilized this opportunity and integrated the activities of DPMR from village level to District level like identification of Person Affected with Leprosy with disability at village level with involvement of VHSC, their referral to PHC by meeting travel cost from untied funds, procurement of prednisolone tabs for reactions/neuritis cases, MCR footwears, splints, dressing materials, etc. have been identified as the activities of RKS by issuing financial guidelines including job descriptions, organizing sensitization meetings at different levels, building capacity of field level functionaries and paying field level supervisory visits.

Results : The interventions have resulted in increase in delivery and utilization of DPMR services from 15% of enlisted leprosy cured disability cases in 2007-08 to 78% in 2008-09 at Block PHCs and District HQ Hospitals.

Conclusion : 100% community ownership could be obtained through institutionalization of DPMR activities with NRHM.

P-25 Validation exercise has improved quality of leprosy services in Orissa

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Introduction : In 2004, the National Institute of Health & FW, New Delhi revealed after a study that 30-40% cases are wrongly diagnosed in Orissa.

Objective : To overcome this situation, State introduced 100% validation of cases by Medical Officer District Nucleus & Medical Officer I/C PHC jointly at PHCs in the year 2004-05.

Methodology : Guideline was prepared for validation of cases. The Medical Officer DN and MO I/C Block PHC of all districts were given 3 days training with 50% time spent for clinical demonstration. Subsequently the knowledge of MO DN & MO I/C PHC was upgraded by 16 DTST teams provided by ILEP. All the cases which were diagnosed by MO PHC and cases which were put under observation were jointly validated by MO DN with MO I/C PHC on a pre-decided date informed to local MO and patients also.

Results : By conducting 100% validation, 20-30% over diagnosed cases was excluded and 10-20% under diagnosed cases was included in the registers. This exercise has also improved the knowledge regarding leprosy diagnosis amongst MO PHC and para-medicals and resulted in reduction of wrong diagnosis below 5%, it also helped in diagnosis of disability, neuritis, reactions & difficult to diagnosis and relapse cases as well in improving the quality of record maintenance, report generation, logistic supply. Treatment completion rate and patient's confidence on leprosy services have also gone up.

Conclusion : 100% validation of cases has improved the quality of leprosy services in Orissa.

P-26 Erythema nodosum necroticans - successful management with Thalidomide

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A 30 yr old female presented with generalized pus filled and raised painful lesions associated with fever since 1 month. Patient had past history of multiple similar episodes since 18 months and was treated with steroids followed by recurrence after tapering. There was on and off history of edema feet and recurrent oral ulcerations. Cutaneous examination revealed multiple erythematous plaques, pustules, erosions and necrotic lesions over face, trunk, buttock and both upper and lower Etxtremities. Laboratory investigations were unremarkable except for anemia with raised ESR, pus swab culture sensitivity from the lesion revealed MRSA and swab for AFB showed abundant AFB bacilli. Slit skin smear was positive for AFB bacilli. Histopathology of the lesion revealed well defined granulomas in the dermis with presence of foamy macrophages. Final diagnosis of erythema nodosum necroticans was made. Patient was started on MDTMB, oral antibiotics, prednisolone and thalidomide in taperil 19 doses. Patient showed excellent response to this regimen with no recurrence till date.

P-27 Assessing burden of leprosy through populaion based registry methods

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Registries of health events, especially for chronic diseases have been useful in determining the burden and needs of affected persons. Cancer Registry is a good example. In the case of leprosy, the elimination target was reached in 2005. Subsequently vertical surveys were discontinued, and only voluntary cases are recorded This may underestimate the total case load of leprosy.

Therefore it is necessary to have alternate mechanisms to measure the burden of leprosy in India in terms of both old and new cases.

A major multicentric research project of the ICMR and the Leprosy Mission was initiated in 2007 in UP, W. Bengal and Chhattisgarh states to establish Population-Based Leprosy Registries on the model of Cancer Registry. In a population of 5-7 lakhs in each of the above states, trained field investigators visited private practitioners, PHC/CHC and other government health centres, and Private NGOs such as TLM hospitals periodically to collect basic details on each patient.

The process of establishing these registries and critical analyses of the findings are presented. Steps taken to prevent duplications and methods of quality control are mentioned with guidelines for future work on these lines.

P-28 Comprehensive care in leprosy rendered by lepra society in a tribal district of Orissa

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MAYURLEP is one of the LEPRA Society project working in Mayurbhanj district with head quarters at Baripada. It is the largest and biggest district in the state of Orissa with 26 blocks inhabited by 22,21,782 population. MDT has been introduced in the district in 1988.

The project is operational since 1998 when the PR was 24/10,000 in the district. Leprosy control activities were carried out in SET pattern till 2001. About 30,990 cases have been cured till 2005 with 23,203 MB and 7,787 PB. Of them, Gr. I were 1021 and Gr. II were 1574, male and female were 16,518 & 14,472 respectively. With this back ground, the project has implemented POD activities like identification and treatment of leprosy complications reaction & neuritis, early nerve function impairments, tropic ulcers, prevention of disabilities and worsening of the existing disabilities through various physiotherapy measures, referral of suitable cases for RCS, provision of suitable protective footwear and aids & appliances for the needy. Besides this, 960 persons have been benefited with socio-economic rehabilitation activities. This paper describes the outcome of comprehensive care rendered by this project from 2000 to 2008 with a special emphasizes on the post operative follow-up reports of RCS beneficiaries.

The project has treated 536 cases for reaction, neuritis/NFI, 405 for ulcer. 344 persons have undergone re-constructive surgery through 419 procedures. Of them, 228 (66%) found with good, 63 (18%) with fair, 34 (10%) with poor results. The rest 19 (6%) have died. A total of 2,970 MCR insole foot-wears were given for persons with Gr.I disabilities and 3211 foot-wears with podiatry orthosis were given to persons with Gr. II disabilities. About 1203 differently abled persons are using the protective/supportive aids and appliances to manage their livelihood. The project is successful to provide almost comprehensive care to the leprosy affected persons.

P-29 Organization of leprosy rehabilitation promotion unit a critical analysis

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Cases of Leprosy are not uncommon. Rendering proper care of Leprosy patient is a challenge. To improve the care of these patient a unit of LRPU was set up at Gandhi Medical College Bhopal in 1984; A critical analysis of functioning and confounding factor was done to see the efficacy of various steps taken to improve the functioning of this unit.

In last 5 years from 2004 to 2009 Total 3088 new & old cases were analysed. 166 cases undergone reconstructive surgery & 252 cases were operated for Nerve Decompression and Trophic ulcer management.

The paper discusses effect of administrative input, method & pattern of referral, dedicated operation theatre, incentive given to patient & health worker in rehabilitation of patient.

P-30 Renal involvement in leprosy patients after Multi Drug Therapy : Retrospective analysis of renal profile from 1993-2002

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A retrospective study was conducted using historical data obtained from sequential biochemical investigations of renal functional profile from 920 leprosy cases to test the involvement of renal function impairment. Of the 920 Leprosy cases 459 were multibacillary type, 380 cases were Paucibacillary leprosy and the remaining 81 cases had leprosy with reaction.

The data obtained from this study revealed possible involvement of renal functional impairment. Further analysis of the data suggest a statistically significant ($P<0.01$) renal involvement in 25% cases in the age group of 50-70 years. Hence it is observed that significant of renal involvement is noticed across the spectrum of the disease, irrespective of the disease severity and antileprosy chemotherapy (MDT).

P-31 Hyderabad Urban Leprosy Elimination Program before and after Integration

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Before Integration NLEP staff (vertical staff) was working under NLEP Program. They were working exclusively for Leprosy; later they involved HIV/AIDS Program. All the hidden cases from community were identified and registered by following various active search methods.

After Integration vertical staff were merged in General Health system working under Medical Officer Urban Health Posts. They are involved not only in leprosy, but all Health related programs under the supervision of Medical Officer UHP, namely Immunization program, family planning TB, Malaria HIV/AIDS to name a few.

At the same time General Health staffs are indulging in NLEP related programs like case detection, registration, treatment and other services.

Before integration case detection and registration was by active search method like surveys by vertical staff only. After Integration voluntary report is high. As per WHO guidelines there is no active search for leprosy case detection. The awareness program in the community has increased awareness levels of the community, schools, PMPs, CBO, AWWs and ASHA volunteers. From the community cases are being referred from the community to UHPs.

In the detailed paper analyses of the date before integration and after integration will be shared.

P-32 Experiences of a referral centre in leprosy services

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Introduction : In the post-integration scenario, the responsibilities of diagnosis and prescription of MDT are entrusted to Primary health care, and treatment of complications and deformity care remains as a challenge. In this context defining need of an innovative approach – referral centres in integrated leprosy services

Methodology : An innovative approach to cater for the treatment needs of patients with complications is conceptualised and a referral centre was established in different locations by LEPRA Society in partnership with General health services in 2004. Data from Hyderabad referral centre is analysed. For the past 5 years i.e., 2004 to 2008.

Results : The centre catered to meet the treatment needs of patients from Hyderabad and its 3 surrounding districts. 811 new patients reported voluntarily at the centre. A gradual decline of new cases reporting for diagnosis is observed from 210(2004) to 114 (2008). 55.5% of these cases are Multi Bacillary. 25% of these cases presented with Type I reactions/neuritis and Type II or ENL reactions. The referral centres also helped general health care system in treating the complicated cases and providing appliances in disability care.

Conclusions : Referral centres play a significant role in meeting the treatment needs of patients with complications due to leprosy. The centres also function as a resource for training health staff. Referral centres are to be included as integral part of general health services to cater for treatment of complications and provide disability care.

P-33 New lesion in PB leprosy patients 5 to 15 years after release from treatment (RFT) in Trivellore district in South India

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Introduction : After RFT of PB and MB leprosy patients, new lesions either skin or nerve can occur at any point of time.The new lesions may be due to reaction, relapse, reinfection or reactivation. It is very difficult to differentiate among these four conditions either clinically or with laboratory parameters available at present. Due to lack of active surveillance after RFT, the exact proportion of relapses among them is not known. Hence National Institute of Epidemiology has conducted a survey to assess the disability status of PB leprosy patients 5 to 15 years after RFT. During this study it has been observed new lesions in two patients.

Methodology : 1084 RFT patients were examined by well trained senior leprosy field supervisors and recorded their finding about clinical and neurological status.

Results : It is observed that new lesions developed in two patients (Skin/Nerve). Further investigations will be carried out.

P-34 Importance of training laboratory technicians working in general health care at taluk level, in slit skin smear technique

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NLEP services are integrated all over India. General Health Care staffs participate in Leprosy diagnosis and treatment. Laboratory technicians play a pivotal role in laboratory diagnosis of leprosy by doing slit skin smear examination. Even now this is considered as gold standard Laboratory-diagnostic method.

In CLTRI, Chengalpattu we conducted Slit skin smear examination in-service training for48 technicians working at different district hospitals in Tamil Nadu in collaboration with German Leprosy and TB Relief Association India, Chennai and State Leprosy Officer, Tamil Nadu and also 11 persons serving in Govt. health laboratories of Goa and 1 candidate from Damien Foundation, Chennai during the period from November'07 to December'08.

About 95% of trainees were not exposed at all to this technique previously. The remaining 5% who have been exposed to it, were not performing the skin smear examination because their postings were in general health lab services.

In our experience, all of them showed much interest in learning the techniques. Post course evaluation proved improvement both in their theoretical knowledge and practical skill. This kind of training is very much required for technicians who have not been exposed previously and as a refreshing programme for those who served in NLEP before. At least two technicians trained at taluk level would help in the lab. diagnosis or prognosis of the disease. This activity may help to move one step forward towards the goal of eradication of leprosy.

P-35 The profile of leprosy cases in the Dhoolpet Referral Centre, Hyderabad In 18 months (January 2008 to June 2009)

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Dhoolpet Leprosy Research Centre in Hyderabad established on 1st January 1979, was a research centre of Victoria Hospital, Dichpally. It mainly worked with Medical Research Council, UK. In the year 1997 LEPRA Society took over the centre, started working for Leprosy, TB, Malaria and Vision care. Since 2008 it is functioning as Referral center it is recognized by state Government too.

Referral Centre : Offers comprehensive care to all affected persons through a network of Referrals, it works in collaboration with the Govt. Health care staff and ILEP partners for specialized services (like self care practices, provision of protective footwear, supplementary aids and pre & post operative management, reactions/neuritis management, ulcer management, outselling and capacity building).

For the study we are studying the cases who attended the Referral Centre during 2008 (January to December 08) and 6 months in 2009 (Jan to June 09). In this study we tried to analyze the cases reporting with Leprosy reactions/neuritis, deformities, complications and other services like ulcer dressing, protective footwear. The cases are referred from different districts of the Andhra Pradesh state and some neighbouring states.

Total new cases diagnosed during the period were 27 out of 96 referrals in the year 2008, and 32 out of 105 in the year 2009 (as on June 09) and old leprosy treated cases also reported. We are analyzing mode of referrals, type of cases reported, age, gender, deformities, and recommendations and outcome of the new cases and old treated cases, results and recommendations will be shared in the paper.

P-36 Changing profile of inmates in leprosy colonies

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Ganjam is the first district in Orissa where MDT has been started in 1982 along with other states in the country. ILEP supported referral center is functioning since 2007 in the campus of MKCG Medical College, Berhampur, district Ganjam.

This specialized center has an operational area of 3 districts namely Ganjam, Gajapathi and Kondhamal and caters the needs of the persons referred for leprosy related complications like reactions, nerve function impairments, complicated ulcers, disability management and supply of protective aids and appliances. The Physiotherapist and NMS of the centre took part in block and district level DPMR clinics to support the GHS. During the course of outreach activities, detailed data has been collected from 6 leprosy colonies from the above three districts. This paper analyses the findings and attempts to present the nature of self-care, govt. welfare measures, vocational activities and residual leprosy related problems.

Ganjam district has 4 colonies and the other two districts have one each. The total households are 179 with 364 inhabitants. Male and female population is more or less equal with 188 (51.6%) and 176 (48.4%) respectively including 96 (26.4%) children of which 70% (67) are going to school. It is interesting to note that majority population 213 (58.5%) is healthy and the rest 151 (41.5%) affected with leprosy. Almost all the affected 98.7% (149) have disabilities. Regarding their occupation, only 41% (149) persons go for begging and the majority 46% (168) are dependants. Dependants include children and female adults. Others 12.9% (47) are daily wage labourer. Twenty two households consisting of 83 persons do not have any family history of the disease but settled in colony as they got free house accommodation and doing small scale business.

The leprosy colonies are becoming attractive for healthy and co-settlement are likely to improve the situation further.

P-37 An indicator based comparison of urban & rural problems of leprosy

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KORALEP, one of the projects of LEPRA Society started MDT in the year 1991 and initiated POD activity in 1994. Though the project mostly caters to rural population considerable fraction reside in the urban pockets in small towns.

The elimination of leprosy seems to be mostly a rural phenomenon. The urban areas, neither has an effective hierarchy of health delivery structure nor a specific urban strategy of leprosy elimination. In spite of peculiar urban problems such as migratory population and mushrooming of slums, concrete steps to solve urban leprosy problem mostly remained a passing reference or at best barely inadequate. The objective of this paper is to compare various epidemiological indices of leprosy in the rural and urban population of Jeypore town with about 1.08 lakh rural and 80,000 urban population.

The study sorted out the reports and returns of last 17 years and carried out a retrospective analysis of important epidemiological indicators of leprosy. The information was segregated for both rural and urban fractions of the population. The indicators were calculated basing on the total mid year population in the respective year.

The PR and NCDR are high in Jeypore urban compared to the rural. Percentage of PB cases is higher than the MB cases. In rural area the MB & deformity proportion is high probably due to late detection, lack of awareness on disease and poor accessibility. The child rate is more in urban than rural areas indicating possibly early detection and continuing transmission and higher urban case load. Though there is drastic decline in the case load elimination is yet to be achieved in the urban pockets. The message is urban leprosy problem continues and requires more attention.

P-38 Creation of self support group among disabled at Villages level

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Introduction : India has 62 per cent of the world's leprosy patients, and Bihar 21 per cent of that. With its 1.2 lakh leprosy patients, Bihar alone is home to a larger number of leprosy patients than any country. LEPRA Society has been implementing a program on community health in 25 panchayats of Munger district. It has formed 293 self support groups in these panchayats

Objective : To improve the quality of life of people with functional disability by formation of Self Support Groups (SSG).

Methodology : The people suffering from Leprosy and Filariasis came under one umbrella due to the sustained efforts and of LEPRA and the willingness of people to fight jointly for a common cause. A group of 10 to 12 members were formed in each Panchayat. The group members are either people with Leprosy or with Filariasis foot disability. The group members meet once in a month to discuss on various issues relate to dissemination of knowledge to others, be socially accepted in the community and also visit the Government health centres (as and when required) to access the available health benefits.

Material : Record books, self assessment techniques,

Results : At the end one and half years of the project implementation, 80% of the groups are active. Due to the motivation by the SSG members, there has been a significant increase in the people who participate in the Health Camps (IPOD camp for people affected with leprosy and Lymphoderma) conducted by LEPRA Society at Block and Panchayat levels. The group motivates and supports other people suffering from Leprosy and filariaisis to visit Government health centers for diagnosis and treatment.

Conclusion : The concept of community based SSG was a unique concept in itself. It enhanced BCC skills of people suffering from Leprosy and Lymphedema, developed as an advocacy forum for policy level issues, and the process is self sustainable in nature.

Acknowledge : We are very thankful to LEPRA Society for giving this opportunity to work under this project.

P-39 "PAHAL" a sustainable approach - village health forum concept in Bihar

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Objective : To improve the health status and health seeking behaviour of the community by formation of Village based forum (VHF).

Introduction : LEPRA Society started a community health project covering Leprosy, TB, LF, Kalazar and HIV/AIDS with the support of Iris Aid in Bihar. The concept of this project to empower the community to identified their health need and gets benefitted from national health programme.

Methodology : A base line study carried out by the team. Village health register were designed and pilot test were made. After correction of certain column the Village health register were implemented. To maintain the register a Volunteer was identified. 100 villages were selected and implemented. 100 Village Health Forum were formed. The Village health consist 11-13 members from the same village. They were trained in all the said disease to suspect and refer.

Material used : Village Health registers, minutes of meeting, suspect referral register, report & records.

Results : All the 100 Village Health forum were formed with adequate no. of Member. The Office of this forum is in Panchayat Bhawan, ASHA House, and Community Building. They have every month meeting with agenda. Within period of 2 years 31879 beneficiaries (Leprosy, TB, LF, and Kalazar) were benefitted. More than 60% Village Health Forum is acting on their own.

Conclusion : This is very good model which sustainable in the community. It future course it will merge with Village Health & Sanitation committee. Community was now much more active and now benefitting by govt. Programme.

Acknowledge : We are very thankful to Iris Aid and LEPRA Society for giving opportunity to work with community Health project.

P-40 Comparative study of diagnosis of leprosy patient by slit skin smear AFB & PCR targeting RLEP gene

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Introduction : Leprosy is a communicable disease caused by *M. leprae.* It is characterized by disfiguring skin lesions, peripheral nerve damage and progressive debilitation. The new case detection has declined from a peak of 89/1000, 000 in 1999 to 12.27/100,000 in the year 2008.

Method : Fifty patients slit smear slides were collected from 2-2-09 to 31-5-09 of NJIL&OMDs OPD, AFB were done and scraping of smear from slides and DNA were isolated by standared protocol. A set of primers was selected on the basis of the nucleotide sequence of a gene encoding the proline-rich antigen of *M. leprae*-specific repetitive element (RLEP) based PCR capable of detecting *M. leprae* DNA in 73% of patients with a bacterial index (BI) of 0.

Results : Total 50 samples were included this study. We compare slit smear AFB and PCR sensitivity. The positivity of PCR is 21/50(42%) and the AFB of slit smear slide is 15/50(30%). Out of 35 AFB negative slit smear, six were found PCR positive. So we can say that PCR is more sensitive than AFB of slit smear slide.

Conclusion : There fore we found that PCR is more sensitive than AFB.Thus PCR holds promising tool for diagnosis of *M. leprae* infection, this assay has been found to be more sensitive than routine skin smear test so this study is further helpful in early diagnosis of leprosy patients.

Acknowledgements : We acknowledge ICMR for funding & students, colleagues & technical staff of NJIL&OMD, Agra for support.

P-41 Impact of DTST in Bihar

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Introduction : MDT is fully implemented in Bihar in 1996-97. LEPRA Society has been working in the DTST mode from 2001 to 2007 in nine district of Bihar. The goal for DTST was to support the NLEP program in terms of capacity building in Planning, Implementation, Monitoring/ Supervision, Documentation, drug channelization and evaluation. In 2007 (March) DTST support was withdrawn from the district.

Objective : To assess the impact of District Technical Support team after its withdrawal in Bihar.

Methodology : During of the implementation of BiHAP in 4 districts of Bihar (Samastipur, Begusarari, Bhagalpur and Munger), a community health project of LEPRA society, the impact of DTST program were assessed in 41 PHC in 4 said district. The team was interacted with I/C MO of PHC, verification of records & report. New and old cases were also examined by Team. ASHA /AWW /PRI/RMP were also interviewed.

Material : PHC Master registers, patient card, NLEP report & records, drug stock register,

Results : Referral of suspects from rural areas was very high and ratio of confirm cases were good. Since 2005 the case detection rate are similar in each year. Wrong diagnosis was observed only 1.7%. MDT stock was adequate for three months. Report and record were submitted timely. It was also observed the knowledge of suspect /referral was very satisfactory. The awareness regarding leprosy was 76% in the community.

Conclusion : Case detection rate were high. Still index (MB with highly positive) cases and child cases were coming from difficult /hard to reach area. Special action is needed in those areas of each district.

Acknowledge : We are very thankful to our organization for giving us opportunity to work under community health project.

P-42 IPOD programme in rural set up of Munger district, Bihar (India)

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Introduction : India is contributing more than 60% of Leprosy and 40% of Lymphatic Fialariasis of world. One-third population over 40 years age in India having diabetic disease. Bihar is contributing more than 30% of India caseload and 89% population lives in rural (villages). These diseases producing foot disability among individual. This reduces the function ability of individual, which leads to stigma, discrimination and separation from community.

Purpose : To improve the functional ability of individual having foot disability in order to reduce stigma & discrimination from the community.

Material : Assessment of individual with SALSA Scale, IPOD Kit, Protective proper Footwear, Podiatry appliances, Reports, Records.

Methods : IPoD camps were organized at the Primary Health Center with the support of District Health Society of Munger in January 2008. Before the camp IEC campaign were drives with the support of IEC mobile Van regarding the camp. IPC conducted through community health workers. 561 foot disabled (Leprosy- 165, Lymphatic Filariasis (Elephantiasis) – 303 and Diabetic ulcer- 03) persons were screened with structured format and received the techniques of Self care practices, IPOD Kit, Protective Footwear, Podiatry appliances, Exercise (Active & Passive). Self Support Group was formed among beneficiary and monthly monitoring system were introduced through community.

Results : Completion of one year, data was analyzed and found 94% ulcer were healed, only 2% recurrent of new ulcer, swelling of Elephantiasis were reduce 65% on average. Stigma in community, self-Stigma, and participation were increases

Conclusions : We found the techniques of IPOD

were well accepted by community, monitored by their own self-support group and sustainable.

Acknowledge : We thank full to our organization LEPRA Society for giving this opportunity to work under this project.

Abbreviations : IPOD – Integrated Prevention of Disability, IEC-Information Education, communication, IPC- Inter personal communication.

P-43 Role of referral centers in post integration in Adilabad district

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Introduction : The success of leprosy control program depends on early detection and prompt treatment with MDT. Reporting of new leprosy cases through referral centre activities is the only means of detecting doubtful and difficult new leprosy cases in the post integration. LEPRA society has implemented referral centers in selective places for delivering the specialized services in control of leprosy.

Methodology : The Society has worked intensively in creating awareness and confiscates misconceptions about the disease in the Adilabad district of Andhra Pradesh. The society used its knowledge, experience and expertise to prevent and treat worsening disabilities, nerve impairment, ulcers, and drug reactions to which usually the patients cannot access easily else where. The referral centers can function from a suitable location either at project base hospital or district headquarters hospital or any suitable health facility in the district to facilitate total integration of all health care facilities at one stop.

Results : This study indicates the significance of diagnosing of difficult cases from January to July 2009 among newly reported 27 cases. Out of the 27 new cases 15 difficult cases could only be diagnosed at referral center and the required treatment was advised thereof. The facilities existing in this referral center like Slit Skin Smear (SSS) examination and Nerve Function Assessment (NFA) have immensely helped in diagnosing, preventing or limiting the disabilities and promoting medical rehabilitation services.

Conclusions : The leprosy referral centers are playing an important role in detecting difficult to diagnose leprosy cases.

P-44 Post elimination leprosy situation in Kanpur dehat district of Uttar Pradesh

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Background : Leprosy is a chronic infectious disease caused by *Mycobacterium leprae.* India has achieved the target of leprosy elimination at the national level. But new cases are still being reported in various parts of the country. Highest prevalence 1.7 per ten thousand is reported in Kanpur district on the NLEP website (http://nlep.nic.in).

Material & Methods : A multi stage cluster sample of 50 villages was selected from all six blocks of the Kanpur Dehat districts (total population 15,63,338 Census 2001, http://censusindia.gov.in/) covers 92280 population was screened in door to doer survey by ASHA and other health workers for the signs & symptoms of Leprosy.

Results : Total 290 persons had some signs & symptoms pertaining to Leprosy 186 patients were confirmed for Leprosy, all cases were new cases except one who was a previously treated case. Patients belonged to the age group of 3-82 years, 36(19.35%) were child and 150(80.65%) were adult. Of the 186 patients 96(51.61%) were female and 90(48.39%) were male. Fourty nine (26.34%) were MB and 137(73.66%) were PB among PB patient more that 95% were BT type, and these 71(51.83%) patients had a single patch. At the time of diagnosis among 47(25.27%) of patients had nerve thickening. All patients were put on MDT. Twenty one PB patients were released from treatment. Among those patients, who have completed there treatmenUon treatment, no deformity & reaction was observed.

Conclusion : With little training & guidance ASHA and other health workers of the State can be utilized for detection and treatment of leprosy cases in the post elimination scenario.

P-45 Antibodies to myelin basic protein in leprosy and leprosy reactions

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Introduction : Leprosy is a chronic infectious disease that is caused by *Mycobacterium leprae.* MBP antibodies have been reported not only in autoimmune disorders but also in various infectious diseases. MBP as an antigen; its significance could be related to the pathogenesis of leprosy since liberation autoantibodies to myelin breakdown, which react with nerve MBP, suggests an autoimmune mechanism and nerve destruction in leprosy. Since nerve damage can also occur in uninfected tissue, inflammatory episode, severe pain, resulting; leprosy reactions.

Object : To determine the level of MBP antibodies in sera from leprosy and leprosy reactions.

Method : Leprosy patients attending the OPD of NJIL & OMD, Agra were included in this study after taking their informed consent. Blood sample were collected by antecubetal vein puncture. MBP antibodies were detected in leprosy and leprosy reactions along with healthy subjects as control group by enzyme-linked immunosorbent assay (ELISA).

Results : Sera of all patients showed significantly higher levels of MBP antibodies than those of normal healthy individuals. Antibodies to MBP were measured highest levels in reactional patients when compared with non-reactional patients and controls.

Conclusions : Although present study demonstrated the low frequency of these antibodies in sera from leprosy patients but further study may be helpful in understanding lepra reaction and autoimmune mechanism in leprosy.

P-46 Communitization of leprosy services in the state of Chhattisgarh

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NLEP services under the umbrella of NRHM are integrated into general health care System. There is no active case detection in the program. ASHA, (called MITANIN, in CHHATTISGARH state) from ALL districts are being imparted training to suspect leprosy and educate the people about facts of disease and treatment facility. Till July 2009, more than 22000 Mitanins have been trained out of approximately 64,000 and as many as 412 ASHA have suspected 433 leprosy cases and referred for confirmation & treatment. 157 suspected cases were confirmed as new cases of leprosy and put on treatment as per government guidelines, an incentive of Rs 100 per new case registration was given to 113 ASHA who detected that case.

ASHA will monitor the regularity of treatment and ensure the treatment adherence. After completion of treatment within stipulated period an incentive of Rs 200 for PB case and Rs 400 for MB case will be paid to respective ASHA.

"KUSHTH GYANI GRAM YOJANA" campaign was also started in village Kurrah. Mitanin have owned the responsibility of educating villagers (15-50 years old) about minimum 5 facts of leprosy which are as follow-

1. Leprosy is caused by a bacterium and not because of sin or curse of GOD.
2. Skin patch (s) with sensory loss, Tingling and numbness sensation in hands & feet, dryness and weakness in hands and feet AND nodules over skin may be DUE TO leprosy
3. Leprosy is curable by MDT
4. MDT is available free of cost in every government health facility
5. Patients who take regular and complete treatment do not transmit the disease and disabilities are also prevented.

Communitization for leprosy eradication through ASHA will prove boon in reducing the disease burden and to remove stigma and discrimination.

P-47 Magnetic gripaid belt and procurement in advance hand deformity

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Objective : Grip aid belt's uses in advance hand deformity for daily work e.g. eating food And drinking water.

Field trial : Successfully trial on Munna Singh (COMPLETE LOSS OF FINGER) in audio Video CD.

Result : These belt packs are distributed to 28 patients in Dhar and Harda dist. and are successfully using by them in there daily work.

P-48 Clear- Idea

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CLEAR : Community Leprosy Elimination Action Project by Rotary

IDEA : Integration Dignity and Economic Advancement for Leprosy Affected persons

It is a unique Project by Rotary Dist. 3200 established in 1999 for Physical and Socio-Economic Rehabilitation of Leprosy affected persons and their children. This Project could be implemented by Rotary Clubs worldwide to help Leprosy affected persons and their children. By this Project we have been able to transform Lives of Leprosy affected persons and elevate them from below poverty status. The first aim was to educate their children and prevent dropouts due to lack of finance and also to prevent child labour.

I. Educational Scheme :

Many of their childrens lives have been transformed and they have become software Engineers, Doctors, Nurses, Paramedical workers and vocational training in Electrical and Mechanical. Total no of children benefited 3091 and amount given Rs. 50 lakhs from 2000 onwards.

II. Socio-Economic Rehabilitation :

A. Micro Credit : By giving micro-credit without interest rate, we are able to prevent them from falling into the clutches of money lenders with exorbitant interest rates. Total no of beneficiaries 501 and amount given Rs 31 lakhs.

B. Sanitation and Hygienic : By providing bore wells, hand pumps, bathroom and toilets their living conditions have improved. Total no of 18 beneficiaries and amount given Rs. 3 lakhs.

C. Low Cost House : 18 Low Cost Houses have been provided in collaboration with Govt. Schemes. Amount spent Rs. 18 lakhs.

P-49 Relapses at urban leprosy referal centre in Kolkata

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A retrospective anaiysis of relapses reported during 1995 to 2003 at an Urban Leprosy referral centre in Kolkata, West Bengal was done to determine if there are any common characteristics which would explain the reasons for relapse such as the length of MDT, high bacillary index, etc. In this study, relapse was defined as the reoccurrence of signs and symptoms of the disease at any time after completion of a full course appropriate WHO recommended MDT. Relapses after Dapsone monotherapy were not included. A total of 29 patients suffered from relapse during this period Medical records of all patients with relapses according to the above definition were studied regarding their type, extent and type of lesions. Bacillary index, duration of MDT, incidence of reactions and interval between RFT and relapses.

We still need to learn more about relapse to know whether we should consider any modification in the duration of MDT for patients with high BI because though relapse in leprosy has decreased dramatically after the introduction of MDT, it does still occurs in patients who have completed their treatment regularly.

P-50

Management of clinical problems in leprosy : A cost analysis in urban and rural areas

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To answer this question, Bombay Leprosy Project (BLP) implemented a special scheme called **"Leprosy Patients Relief Fund".** Incentives to offered to supervisory staff and volunteers engaged in the program directly or indirectly were calculated. Special 'Cost Sheets' were prepared for each patient. A separate account was maintained for the expenses towards each patient and averages calculated from the consolidated figures. Administrative and establishment expenses including cost of surgery, rehabilitation, IEC activities and research were excluded.

Cost analysis relates to (1) patients attending the Referral Center in Bombay and (2) disabled patients in rural communities near Bombay receiving doorstep services.

Phase I (Mixed sample of urban and rural patients)

No. of patients recruited.....1170 (urban: 609; rural: 561)

Cost of Services ..... Rs. 1,62,646.00

Delivery cost ..... Rs. 7,39,196.00

Average cost of service delivery ..... Rs. **632.00 (US $ 17.00)**

Ratio of cost of services to cost of delivery of services ..... **1 : 5**

Phase II (Rural patients receiving door-step POD services like splints, footwear etc.)

No. of patients including those followed up (871) 1179

Service cost ..... Rs. 55,427.00

Delivery cost ..... Rs. 527,389.00

Average cost of service delivery ..... Rs. **494.00 (US $ 10.00)**

Ratio of cost of services to cost of delivery of services ..... **1 : 10**

Conclusion : The cost of delivery of service is much higher than that of service itself. If any NGO with satisfactory basic infrastructure aims exclusively to offer reasonable clinical services coupled with domiciliary care to disabled patients, leprosy management is not expensive. If however, the objective of the NGO is research. rehabilitation, surgery, social work and health education etc, cost will mount to higher levels.