BOOK OF ABSTRACTS

Unfinished Business:

- Stopping Transmission
- Preventing Disability
- Promoting Inclusion
ILC1.1-001
Effect of Capacity Building in Leprosy for Medical Officers
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Background & Objective: The Training Unit of The Leprosy Mission Hospital Naini, Allahabad has been actively involved in capacity building in leprosy for medical and paramedical professionals since 1980. During the period 2011 – 2015, 146 medical officers (47 from The Leprosy Mission (TLM), 48 Non-TLM, and 51 Government) from different states of India and neighboring countries attended a 5 days ‘Certificate course in Leprosy for doctors’. The curriculum focuses on topics such as Diagnosis, Classification, Differential Diagnosis, Treatment, Early detection and management of Reaction & Neuritis, Eye involvement and Relapse. It also includes an overview of nerve function assessment, prevention of disability, reconstructive surgery, splints, ulcer care, podiatry, occupational therapy and community based rehabilitation. The training methods used are practical demonstrations, case presentations, interactive discussions, hands on techniques and Audio-visual aids. This study aims to determine the effectiveness of capacity building in leprosy for medical officers through a 5 day training program. Methodology: Analysis of an objective examination designed to cover all core knowledge of clinical leprosy & rehabilitation which was carried out before and after the course. Descriptive statistics and Paired samples t-test were used to analyze pre and post test scores of all who have attended this course during the period of 2011-2015.

Results: The knowledge level in terms of mean test score of the trainees increased from 61.9 ± 14.6 in pre-test to 82.6 ± 11.8 in post-test and the difference was statistically significant (P < 0.001). The improvement (between mean of pre & post score) in knowledge level on leprosy was consistent across different groups like Government (59.3 – 80.5), TLM (67.0–86.3) and other organizations (59.6–81.0).
Conclusion: The overall knowledge level on leprosy of all trainees improved significantly following 5 days Certificate course in Leprosy for Medical Officers.

Keywords: Leprosy, Capacity Building, training, Medical Officers
ILC1.1-002
Reliability of lesion counting system for classification of multibacillary leprosy
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This is a retrospective, descriptive research to study reliability of lesion counting system for classification of 100 multibacillary leprosy (MB) with positive skin smears.

Patients were classified according to the Ridley and Jopling classification and divided into case of 13 Borderline Tuberculoid (BT), 12 Mid Borderline (BB), 37 Borderline lepromatous (BL) and 38 lepromatous (LL) and using system of counting number of lesions in patients with > 5 lesions to be classified as multibacillary leprosy. Overall results, when using dichotomous statistical test, revealed sensitivity and overall agreement value of 69 percent and positive predictive value of 100 percent for MB classification according to lesion counting criteria while 31 percent of misclassification was found. Further discussion and recommendation were made on the short coming so that this lesion counting system should be performed only for preliminary screening for health care system and further refer such suspicious cases under very low endemic condition to tertiary health care system established for providing diagnosis, classification and multidrug therapy implementation.

Keywords:Reliability, Numbers of lesions, Multibacillary Leprosy
ILC1.1–003
Contact tracing of new leprosy patients with high Bacillary Index (4 and above) from Allahabad district, Northern India
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Background & Objectives: Healthy contact examination of all new leprosy patients is one of the difficult activities in any leprosy program especially in a resources constrained set-up like The Leprosy Mission Hospital, Naini. Screening for leprosy of all healthy contacts of new leprosy patients with BI 4+ and above, from Allahabad district of Uttar Pradesh, was undertaken, to assess the need of ensuring family screening.

Methods: The study was conducted at The Leprosy Mission (TLM) Hospital, Naini a unit of The Leprosy Mission Trust India. This hospital is a 150 bedded specialized Leprosy Referral Centre in North India with over 2500 new Leprosy registrations each year. All new leprosy patients registering for treatment at this hospital with BI 4+ and above at the time of diagnosis were included in the study. During their hospital visit all these patients were explained about the importance of examination of contacts and encouraged to bring all the family members for screening of leprosy. All healthy contacts reported to hospital were examined by body charting, nerve palpation and nerve function assessment and slit-skin.
smear testing. Patient’s homes were visited when they did not bring family members to the hospital for screening. Suspected contacts were called to hospital for further examination and slit–skin smear testing. Any contacts found to have leprosy were registered for treatment and put on treatment.

Results: In 2014, a total of 113 patients from Allahabad district were BI positive at the time of registration for treatment at this hospital. Of this 51 (45%) patients had a BI of 4+ and above and mapping was done according to the eight Tehsil (taluk) of Allahabad district. Totally 215 healthy contacts were examined at patient’s homes for anaesthetic patch, nerve thickening or impairment. Out of all the healthy contacts examined 18 (8.4 %) number were found to have leprosy.

Conclusions: Healthy contact examination of all new leprosy patients is one of the difficult activities in leprosy program especially in a resource constrained set-up. Prioritizing family screening based on patients with high bacillary load helps to direct and utilize the resources efficiently to identify new cases from healthy contacts of the patients.

Keywords: Leprosy, Healthy Contacts, India, Endemic Bacteriological Index
ILC1.1–004
Urbanization and Leprosy: Situation analysis in Dhaka City Corporation Area, Bangladesh
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Abstract: Urbanization and Leprosy: Situation analysis in Dhaka City Corporation Area, Bangladesh. Dhaka City Corporation (DCC) is one of the most densely populated cities of the world, with a population density of almost 16,000 people per sq. km. The National Leprosy Elimination Programme (NLEP), Bangladesh and partners are running 21 MDT Centers in DCC area. One Leprosy Control Assistant working in each center. Out of 21 MDT Centers 15 were visited. Diagnosis and treatment is provided by medical graduates.

Objectives: To analyze current situation and trend of leprosy indicators for the period of 2010 to 2014 in DCC, and to review performance of the NLEP and Partners, in implementing leprosy services.

Methods: This was a cross-sectional study across DCC. Two team consisting of leprologist, PO, LCS and TLCA took interviews for disease burden, conducted case validation study, facility assessment, providers’ survey, in-depth interview (IDI) with managers and supervisors, exit interview and survey with people affected by leprosy, in selected 15 facilities.

Results: In Bangladesh, the number of newly detected leprosy cases was 3621 during 2014, and 4/1 of them were detected from DCC area. The prevalence rate
(PR) was 0.21/10,000 population with Grade 2 Disability (G2D) 11% nationally and that of DCC were respectively 0.78/10,000 and 11.50%. From 2010 - 2014 MB new case detection ranges from 546 to 354, and PB ranges 721 to 436 and child cases (< 15 years) ranges from 08 to 100 while female cases from 423 - 249. Among 134 cases rechecked, 26 (24.84%) were initially referred by an MBBS physician followed by 15 (20.1%) by the health workers. About 2/3 (67.41%) PABL resides within 5 km of the MDT Center. Regarding awareness about leprosy, it was noted that one quarter of the PABL did not know about Leprosy, although could remember the diagnosis and treatment. 30 (61.2%) of the PABL were treated by MBBS doctor at the facility and 16 (32.41%) by LCA. Out of 34 PB 7 (21%) were wrongly diagnosis as MB cases and out of 100 MB, 8 (8%) were wrongly diagnosis as PB cases.

Conclusions: DCC have excess number of cases than other parts of the country, while served with limited facilities. It was also noted that identification of the leprosy typing was not correctly being practiced. It is deemed necessary to conduct training on leprosy diagnosis for LCAs in those areas. NLEP should consider this fact and address these issues immediately.

Keywords: Urbanization, Leprosy, Situation, System, Dhaka
Introduction: Bangladesh continues to be one of the high leprosy burden countries in the world (Reported more than 1000 cases per year/WHO 2014). In 2014 the country reported 3621 new cases with a high disability rate of about 11% and about 4000 new cases with high disability 12% in 2015 as per annual NLEP report 2015. In Bangladesh we have 171 tea garden among them 110 are situated in Moulavibazar district with total day labor male 2,81,661, male 1, 42, 850 and female labor 1, 38,811.

Objectives: To assess current situation and trend of leprosy burden for the duration of 2010 to 2015 in selected Tea Gardens and to find out the gaps of the service providers and to make bridge with GoB service of leprosy with tea garden workers, and tea garden authority.

Methods: This was a cross-sectional study across the 20 Tea Garden of Moulavibazar district. Activities included data collection, interviews with PABL, identification of gaps in leprosy services, conducted case validation study, facility assessment, provider’s survey, in-depth interview (IDI) with managers, supervisors and disease burden.
Results: In Moulovibazar district from 2010 to 2015 new case detection were 194, 70, 105, 25 and 193, 253. WHO were stop support for conduction of skin camp as well as HEED Bangladesh have no field activities as a result new case detection were fall down in 2011, 2012 and in 2013. As Health System Strengthening project was implemented in Moulovibazar as pilot district the new case detection are gradually increased in 2014 and 2015 as HEED Bangladesh give appointment TLCA and NLEP conducted case detection campaign in 2014. This study detected 97 new cases within 07 days from 20 tea garden of the district, where G2D were only 03. From 2011–2015, out of 840 new cases, MB were 447, PB were 393. Child was 13 with 0 disabilities. Out of 840 cases G2D were 23.

Conclusions: Tea Garden has huge undetected cases which were remain unidentified. Local NGO, Tea Garden workers, Tea Garden authority and the National Programme are very much reluctant about leprosy. Implementing partner had no fund to conduct regular programme on leprosy, It is extremely necessary to conduct training on leprosy for LCAs and tea garden health workers and make a good communication with tea garden authority, their medical officer and HEED, NLEP should consider this fact and address these issues immediately and need some special crush programme on leprosy in tea garden areas of Bangladesh.

**Keywords:** Situation, Analysis, Leprosy, Tea Garden, Bangladesh
ILC1.1–006
Costing of Tertiary Level Leprosy Clinical Services
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Objective: Specialized Leprosy services will continue to be required as long as complications of Leprosy occur. Services such as specialized footwear, tendon transfer surgeries, complicated ulcer treatment, management of intractable Lepra reactions and neuritis are offered at tertiary Referral Hospitals. These are expensive due to the prolonged in-patient care required for their management. Funding is always an issue and donors, government agencies need to put a cost to each therapy package. Therefore, the objective of this paper is to present a costing of secondary and tertiary level leprosy clinical services.

Methods: The Leprosy Mission Community Hospital Naini is a 150 bedded specialized Leprosy Referral Centre in North India with over 2500 new Leprosy registrations, 425 Tendon Transfer surgeries, 543 ulcer admissions and 489 medical complications admitted each year. While the non-leprosy outpatient services help to generate income, the specialized Leprosy services are funded through donations to The Leprosy Mission.

Time appropriation study was conducted for all categories of staff. Computerized Hospital Management System (HMS) was used to verify the time spent by staff on each service, apportion medicine & supplies used for patients, income generated
and expenditure incurred on a daily basis. The HMS is in use since 2007. This was consolidated on an excel sheet and expenses of maintenance, food added to ensure that the gross hospital budget was included. Based on the appropriation costing of several specialized services was obtained.

Results: Costing for various specialized Leprosy services in a Referral centre are $318 for each Tendon Transfer procedure including Surgery and Physiotherapy with in-patient stay; For Complicated Ulcer management this is $345; for Medical complication management (Intractable Type 2 Lepra Reaction) as in-patient is $318 per admission. Costing of other services like MCR footwear, cataract surgery for leprosy patients are also presented along with details on each costing head.

Conclusions: Costing will help government and voluntary organizations to allot funds or develop projects for the much needed Specialized Leprosy Services at Referral Centres. While costs will vary at different centres and countries, the principle and guidelines remain the same. This also will help in monitoring and evaluation of program for specialized leprosy care to effectively utilize the funds.

Keywords: Leprosy, Health Economics, Costing, Tertiary Hospital, India
ILC1.1–007
Emphasizing the relevance of Specialized Leprosy Centres: 11 year trend of admissions for Leprosy Complications at a Tertiary Leprosy Referral Centre in North India
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Objective: To analyze the trends in pattern of admissions for management of leprosy related complications at a referral hospital for leprosy in Northern India

Methods: The study was carried out at The Leprosy Mission Community Hospital Naini. This hospital is a 150 bedded specialized Leprosy Referral Centre in North India with over 2500 new Leprosy registrations, 405 Tendon Transfer surgeries, 543 ulcer admissions and 365 medical complications admission each year. In this paper all the patients admitted for management of various leprosy related complications during the period 2005 to 2015 were reviewed based on medical records to study the pattern of reasons for admissions. The year 2005 was treated as a baseline against which future years were compared to study the trends. The reasons for admission were broadly classified as complicated Ulcer, Medical admission includes reactions, Reconstructive surgery (RCS) and other reasons.

Results: There were a total of 15,626 admissions during the study period. The admission for ulcers and for reconstructive surgery increased gradually with a marked since 2010. The rate of increase in medical related admissions is less than the other admissions.

Conclusions: The increase in RCS admission was both due to government referrals and awareness of the facility through previously benefitted patients. The increase in RCS is no match to the disability rate and a greater effort should be made to refer patients with correctable deformity in time. The increase in ulcer admissions is partly due to a lack of awareness of self care and neglect by patients due to inadequate Prevention of Disability (POD) training. Effort should be directed to reduce the preventable ulcers by emphasizing on POD and innovative self care education. This would diminish loss of wages of the patient from recurrence of ulcers, better integration into the society and reduce the financial burden on institutions that manage ulcers.

Keywords: Reconstructive Surgery, Leprosy Complication, Tertiary Hospital, Inpatient care, India
ILC1.1–008
Concept Paper: Health Management System of The Leprosy Mission Trust India as a Prototype for Central Leprosy Database for Surveillance of Leprosy
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Objective: To demonstrate a model central leprosy database as surveillance system for leprosy and to discuss the strategies to implement and monitor the information system.

Methods: Health Management System (HMS) has been used as e-medical records for both leprosy and general patients since 2007 in The Leprosy Mission Community Hospital Naini, along with 13 other hospitals of TLMTi. This database was created based on the HMS used in this hospital. The variables included in the database are based on Simple Information System (SIS) used by Government to monitor the progress of National Leprosy Eradication Program. In this paper we have included patients registered for treatment at this hospital during the year 2015 to calculate various epidemiological indicators of leprosy. The database was used by the existing staff and no separate staff was appointed to update the database. The hypothetical population value was used to calculate the different rates to demonstrate the purpose of utilization of this database.

Results: There were 1388 new leprosy patients registered for treatment at this hospital during the period April 2014 to March 2015. The following epidemiological indicators were calculated based on the hypothetical population of 14 million to match the current national new case detection rate to get the reports similar to current situation of leprosy in India. The Annual New Case Detection Rate (ANCDR) was 9.9 cases per 100,000 population. Comparison of Hospital figures with National Leprosy Eradication Programme 2014–2015 NLEP data was done. Proportion of female cases 34.8% (NLEP is 37%), Proportion of Multibacillary cases was 75.1% (NLEP is 53%), Proportion of Child Cases is 6.7% (NLEP is 9%) and Proportion of Grade II disability was 22.6% (NLEP is 5%).

Conclusions: The database can be used with the existing staff with minimum computer knowledge. The various indicators can be obtained by state, district, block and health centre wise. The database can give accurate information on leprosy situation of a given area if updated regularly. This database can be used as prototype to develop a database for leprosy in India.

Keywords: Leprosy Programme, India, Surveillance, Database, Health System
ILC1.1-009
Validating the benchmark costs of 2013: FAIRMED’s experience of supporting leprosy tertiary care hospitals in India
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Validating the benchmark costs of 2013: FAIRMED’s experience of supporting leprosy tertiary care hospitals in India
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Objectives:
• Review and validate the benchmark costs evolved in 2013.
• Check the applicability of current inflation rates on budgets for the following years.
• To decide upon the frequency of conducting the Benchmark exercise.

Methodology: FAIRMED (FM) supports leprosy tertiary referral hospitals in India, which is supported through a funding mechanism called as Output Based Aid (OBA). As a part of the OBA, the hospitals are providing 11 services which were divided into 8 in-patient and 3 out-patient categories and all the direct and indirect cost incurred at the hospitals are considered while evolving the costs. In 2013, these costs were bench marked and standardized for all the hospitals for supporting clinical services for the next 3 years. However, annual inflation based increments were passed on annually to the bench marked costs of 2013. A similar exercise was undertaken in 2015, to validate the benchmark costs derived in 2013. A technical team comprising of a cost accountant, project staff, technical & finance team from FM India was formed.
The team visited all the hospitals to re-examine the cost applicable against all the 11 categories. The hospitals were evaluated on four parameters which includes financial, customer feedback, internal business process, and learning & growth perspective. Based on these four parameters the cost for each service was derived and was compared with the prevailing inflation rate.

Result: The new derived costs of 2015 is significantly robust with marginal differential costs against individual categories. The number of patients under eye surgery is relatively less when compared to other categories. Therefore, eye surgery will not affect the overall individual project budgets considerably and will not be taken into account while analyzing the cost. It’s also observed that in 2 outpatient categories i.e., for general and ulcer patient the costs are higher than benchmark costs of 2013, since patients were transferred out to the government primary health centers (PHC) as clinical leprosy services are now being provided as a result of implementing the comprehensive district leprosy control project.

Conclusion: It was concluded that average variation between the benchmark cost for 2013 and 2015 was 5.3% which is less than the inflation based increment of 2015 being passed on to the projects. Further the frequency of benchmark exercise should be once in 3 years.

Keywords: Benchmarking, Validation, Tertiary Hospitals, Output Based Aids, Inflation
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Objectives: Early diagnosis and adequate therapy permit to escape damages of peripheral nerves and, hence, resulting complications. In order to prevent lesions of involved peripheral nerves from the very first admittance to the hospital all the patients are administered, alongside with specific drugs, vitamins of B group, angioprotectors, and agents improving nerve conduction. In case of damaged peripheral nerves additionally corticosteroid hormones, massage, mechanical therapy and exercises are given. Special attention given to orthopedic aid. New methods of diagnosis and treatment of leprosy complications are being develop. The study some immunological serum markers in the treatment of leprosy patients with neuritis thiotic acid.

Methods: A combine method of intratissue electrophoresis with intravenous injection of thiotic acid for treatment of chronic neuritis in leprosy patients used. General course of treatment consists of 10−15 procedures. The results of treatment of 24 patients with leprosy presented. In reaction ELISA neopterin, serum amyloid A protein (SAP) were investigated. Circulating immune complexes were determined in blood with spectroscopy method.
Results: Clinical positive results were observed in 9 patients Neopterin concentration decreased after treatment in 77.3% of cases (p <0.05). The concentration of SAP in leprosy patients before treatment was significantly higher than the control values. After a course of treatment in 7 patients with SAP concentrations decreased in 5 patients did not change significantly, and in 12 -increased. Apparently, in some case of long-existing inflammation, macrophages are unable to accomplish the total degradation of the SAP, which affects the metabolism of cholesterol and lipoproteins, promotes the chronic inflammation. We found significant positive correlation between the level of the SAP and circulating immune complexes, which then can used as an indicator of neurotrophic disorders.

Conclusion: These results demonstrated the possibility of using and informative such immunological parameters such as neopterin, SAP and circulating immune complexes for monitoring treatment of neuropathy in leprosy patients.

Keywords: neuropathies, neopterin, circulating immune complexes, serum amyloid A protein
ILC1.1-011
Identification of Mycobacteria species from trophic ulcers of leprosy patients
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Objectives: One of the most serious complications of leprosy patients in the stage of clinical regression are neurotrophic disorders, in particular, neurotrophic ulcers. Identification of microflora of often-recurrent ulcers can help in the search for new approaches to their prevention and treatment. Detection of mycobacteria species from trophic ulcers of leprosy patients.

Methods: A molecular genetic identification of the contents of trophic ulcers of 15 leprosy patients was used polymerase chain reaction (PCR) and hybridization. DNA extraction performed using reagents GXT DNA/RNA GenoExtraction Kit on the automatic station GenoXtract. Amplification of DNA carried out using kits of reagents GenoType Leprae DR, GenoType Mycobacterium CM (Common Mycobacteria), GenoType Mycobacterium AS, based on DNA-STRIP technology. Hybridization of the amplified DNA performed on automated instrument GT-Blot-48. The results analyzed in an automated scanning device GenoScan. All equipment and reagents for PCR and hybridization produced of company Hain Lifescience (Germany). Also all patients performed bacteriological research content trophic ulcers.
Results: Bacteriological sowing of ulcers in leprosy patients in 89.3% of cases were found Staphylococcus aureus and Pseudomonas aeruginosa. 13.3% of all cases of leprosy patients were detected M.leprae and M.scofulaceum, M.avium were occurred in 20.0% of cases and M.kansasii – in 6.6% of cases.

Conclusions: In some patients with leprosy in the stage of clinical regression trophic ulcers colonized by different mycobacteria species, including M.leprae. Bacteriological examination reveals separated ulcers usually wide spectrum of pathogenic microorganisms, both aerobic and anaerobic nature, and in most cases prevails concomitant microflora. Probably, it is the presence of various mycobacteria contents ulcers, among other trigger factors, creates difficulties in the treatment and contributes of chronic process. The study of the frequency and characteristics of the mycobacterial flora trophic ulcers of various etiologies is necessary to optimize antibiotic treatment.

Keywords: trophic ulcers, identification of microflora, polymerase chain reaction (PCR), hybridization
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BEST CLINICAL PRACTICE, HEALTH SYSTEMS, TRAINING AND REFERRAL OBJECTIVES
In order to meet the known and hidden challenges in NLEP
Introducing New Strategy and direction,
for the Organisational effectiveness, saving from fake stakeholders

METHODS
PATIENT’S ELECTRONIC MEDICAL RECORD WITH A PHOTO VIDEO
EVIDENCE OF Detection,
Management,
Education (IEC)
Follow-up,
Rehabilitation
Special Activities Plan Training

CLINICAL PRACTICE
A good clinical practice from grass root level to WHO level, a socially appropriate,
universally accessible, scientifically sound, first level care provided by a suitably
trained workforce supported by integrated referral systems and in a way that
gives priority to those most in need, maximizes community and individual self-
reliance and participation and involves collaboration with other sectors, bringing
intelligent support to the clinician and sharing information between the field and
office.

HEALTH SYSTEMS
Introducing INDIVIDUAL ELECTRONIC MEDICAL RECORD SYSTEM
A standard design, In which the clinical and statistical description, presentations,
conduct, performance, monitoring, auditing, recording, analyses, and reporting of
clinical based trials data and reported results are credible, accuracy, integrity, and
confidentiality and analyses are fully integrated into a single report.

SPECIALIZED TRAINING ON
APPROPRIATENESS
AVAILABILITY
ADEQUACY
ACCESSIBILITY
ACCEPTABILITY
AFFORDABILITY
ACCESSIBILITY
ACCOUNTABILITY
ADVOCACY
CARE OF THE SICK
COMMUNITY DEVELOPMENT
COMPLETENESS
COMPREHENSIVENESS
CONTINUITY
HEALTH PROMOTION
ILLNESS PREVENTION

REFERRAL
The GHC system at the primary level shouldered the basic task of providing MDT to all new leprosy affected people.

The secondary and tertiary level centers were expected and relied on to provide quality services to needy leprosy affected people through referrals.

Timely referral of cases requiring specialized services to the secondary and tertiary level centers for the management of recurrent reactions, non-healing ulcers, correction of deformities by reconstructive surgery (RCS) and specialized investigations such as skin/nerve biopsies and confirmation of diagnosis and relapse.

Hence, there is a direct need to create appropriate support structures and effective referral mechanisms within the GHC system, both to sustain quality leprosy services on a long term basis, and to ensure the rights of leprosy affected people.

Physiotherapy including provision of MCAL footwear, splints and other aids in prevention and management of deformities,
RESULTS

IEMR-Alerts, prompts and real-time data verification that helps improve collaboration by moving key clinical information between disparate systems and reducing redundant data entry

CONCLUSION

An Effective management of
Performance based quality,
Inventory,
Procurement,
Expenditure
Reporting and evaluation approaches
Referral
Fighting discrimination by raising awareness among human rights organizations,
Monitoring indicators, tools, data collection,
Strengthening public-private partnerships and NGO participation

Keywords: ABSTRACT, CP, HS, TR, REF
ILC1.1-013

Drug Sensitivity and the Changing Patterns of Bacterial Isolates of Infected Ulcers of Leprosy Patients in Central Leprosy Institute—Retrospective Analysis

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Objectives: To study the relative frequency of bacterial isolates cultured from infected trophic leprosy ulcers and assesses their comparative in vitro susceptibility to the commonly used antibacterial agents and to plan for the appropriate and rational usage of antibiotics.

Methods: This is a retrospective study with a review of the bacteriology results of specimens taken from 112 consecutive leprosy treated patients with non-healing ulcers at central leprosy teaching and research institute, Tamilnadu during the period February 2013 to February 2014. The specimens were cultured using optimal aerobic microbiologic techniques. Antimicrobial susceptibility testing to different agents was carried out using the disc diffusion method.

Results: A total of 112 microorganisms were isolated. The main gram negative isolation was Proteus mirabilis (39), followed by Proteus vulgaris (27) and Pseudomonas aeruginosa (18) and Staphylococcus aureus (5) in gram positive strain. In the total number of the isolated gram negative bacteria, the antibiotics with less resistance were amikacin (55), ceftriaxone (55), cefotaxime (53), ceftazidime (39) ciprofloxacin (33), imipenem (39) and piperacillin tazobactam (33). For gram positive amikacin, ceftriaxone and Chloramphenicol were found sensitive.

Conclusion: The bacteriological study of plantar ulcers of leprosy patients revealed the occurrence of mainly gram negative organism and Proteus species as the main pathogens involved in such infections. The results of this study may guide empirical therapy as well as the pattern of organism and various method of controlling the infections. It also helps for establishing a rational way of prescribing antibiotic in government sectors.

Keywords: Ulcer, Leprosy, Microbiology, Antibiotics, Rational
ICLC.1–014

Improving Quality of Care using Mobile Technology: Experiences from Urban Leprosy Project in Kolkata, India

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Objectives—Treatment completion rate (TCR), an indicator of quality of patient management was mere 40 percent in Kolkata during 2013–14. Delivery of quality care in urban set-up is fraught with challenges. Effective counseling is often inhibited by lack of time and space in hospitals despite availability of trained and well-meaning healthcare personnel.

Methods—We piloted a strategy called ‘aami achhi’ (meaning ‘I am there’ in Bengali) which entailed sharing of mobile numbers between leprosy trained supervisor and patient registered for MDT. Strategy was based on high mobile penetration, even among slums in Kolkata. The initiative which was part of a project by GLRA-India, in partnership with State Leprosy Cell, Government of West Bengal to lend support and coordination to urban leprosy activities in Kolkata, was started in August 2014. Until December 2015, mobile numbers were shared with 340 patients across three major hospitals. Patients were encouraged to give missed call on the ‘dedicated helpline’ at any time; following which supervisor would provide call back. Supervisors reported receiving an average 4 to 5 calls per day. In order to study utilization pattern of mobile counseling, a total of 105 patients who had accessed service were interviewed.
Results: Most common reasons for accessing service over mobile telephony by patient included ‘redness and swelling’, inquiry about availability of supervisor during visit to hospital, ‘forgotten the way to take MDT’, during stress due to discoloration and other side-effects and to allay anxiety about disease. Supervisors had also helped in disease disclosure to spouse and other relatives. All patients reported improved knowledge of disease and expressed satisfaction with personalized care provided. Supervisors were convinced about effectiveness of mobile counselling as it had led to early detection of reaction, enabled effective referrals and helped patients to tide over periods of anxiety and stress. Patients were receptive to their advice and had led to reduction in number of defaulters. Indeed TCR for Kolkata improved to 58 percent in 2014–15. The most challenging was to deal with several ‘unrelated health problems’ for which patients sought their advice over phone.

Conclusions: Mobile telephony had enabled improved adherence and early identification of reaction suspects. Systems that encourage ongoing communications and engagement with patients, such as through mobile telephony can improve adherence and lead to patient empowerment through information in a simple, cost-effective way.

**Keywords:** mobile telephony, helpline, treatment completion rate, counselling, adherence
ILC1.1-015
Quality Of Life In Paucibacillary And Multibacillary Leprosy Patients: A Comparative Analysis
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Introduction: The concept of “disease” and “health” may have different interpretations depending on the context and culture of each subject. The symptoms from one single disease can affect patients in different degrees, due to its relationship to emotional and social aspects. Leprosy is a disease that has a huge negative impact in patient’s life quality. Besides lesions, many patients complain about severe pain due to arthralgia and neuritis. Although there are peculiarities among the cases of paucibacillary and multibacillary leprosy, both have an impaired performance in daily activities.

Objective: The aim of this study was to evaluate and compare life quality in paucibacillary and multibacillary leprosy patients through the questionnaires Health Survey (SF-36) and Dermatology Life Quality Index (DLQI).
Methods: We selected 104 patients between 2007 and 2009 in outpatient clinic from Department of Dermatology – Universidade Federal de São Paulo. The patients were distributed in the paucibacillary and multibacillary groups according to number and characteristics of lesions. Subjects were also evaluated for the presence of reactions.

Results: No differences were found in the proportion of men and women among the groups. The paucibacillary group exhibited more individuals without reaction in comparison to the multibacillary group (p=0.04). The paucibacillary group presented higher score in comparison to multibacillary group in the components
“Physical Functioning” (p=0.01), “Pain” (p=0.01) and SF-36 total score (p=0.03). In DLQI, we found statistical significant differences in 2 questions: question number 3 which evaluates the interference of skin condition in routine activities (p=0.03), and in question number 5 which evaluates how skin affected social and leisure activities (p=0.04). In both, multibacillary group presented a higher score in comparison to paucibacillary. While evaluating the presence/absence of reactions no differences were found in both questionnaires. We also observed a negative correlation between some components and final score of SF-36 and DLQI, indicating an inversely proportional relationship between the questionnaires. Moreover, the linear regression model conducted between these 2 questionnaires demonstrated that 32% of quality of life alterations were related to the skin condition.

Conclusion: Taken together, these results demonstrate that paucibacillary leprosy patients have a better life quality in comparison to multibacillary patients, in which the skin lesions have a greater impact in daily activities. It is important to point that DLQI is an effective and fast tool which can be used in dermatological care, providing a reliable report of patient’s life quality due to its considerable correlation with SF-36.

**Keywords:** Quality of Life, DLQI, SF-36
Multibacillary Leprosy: Dietary and Nutritional Surveillance, An Experience In Brazil

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OBJECTIVES
Evaluate the nutritional status and dietary intake of people with multibacillary leprosy attended at a Sanitary Dermatology Reference Service in Minas Gerais, Brazil.

METHODS
Cross-sectional descriptive study of people with multibacillary leprosy attended at the outpatient unit of a Sanitary Dermatology Reference Service in Minas Gerais, Brazil. Data collection included sociodemographic (gender, age, marital status, schooling, family income and smoking), clinical (clinical type and presence of leprosy reaction), anthropometric (weight, height, body mass index – BMI) data, and dietary aspects derived from a food-frequency questionnaire (FFQ) that was validated and adapted for Brazilian culture to the following food groups: energetic, plastic and regulator. The ethical principles for conducting research with human participants and confidentiality of the information were assured with the signing of a written informed consent form.
RESULTS
The study of 69 MB patients showed that: 51(73.9%) of the participants were male, the average age was 51.2 ± 14.5 years; most of the individuals were married 37(53.6%); had an average schooling of less than 8 years 39(56.5%); a family income between 1 and 3 minimum wages (MW) 51(73.9%) – 1MW (R$880.00 - $220) and were non-smokers 56(81.2%). Regarding the type of leprosy, 35 (50.7%) were lepromatous, 22(31.9%) were borderline-borderline, 10(14.5%) were borderline-tuberculoid and 2(2.9%) were borderline-lepromatous. Leprosy reactions types 1 and 2 occurred in respectively 22(31.9%) e 20(28.9%) patients. Regarding the nutritional status 23(42.6%) of the adults and 11(73.3%) of the elderly were eutrophic, 22(40.7%) of the adults were overweight. Regarding daily intake: energetic foods: 62(89.9%) had a daily intake of grains, tubers and roots, besides oils and olive oil 51(73.9%); plastic: 67(97.1%) of meats and pulses 66(96.7%) and; regulators: 47(68.1%) of fruits, natural juices 28(40.6%) and vegetables 52(75.4%).

CONCLUSIONS
Regarding the nutritional status, the population studied was eutrophic and their dietary intake was in accordance with recommendations of the Dietary Guide for the Brazilian Population of the Ministry of Health.

Keywords: Leprosy, Nutrition, Dietary and Nutritional Surveillance
ILC1.1-018
Is “access denied” a cause of disability due to Leprosy in Sri Lanka?
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Accessibility to healthcare is a broader concept which include opportunity for people to obtain existing healthcare services to gain satisfactory health outcomes. Main objective of integration of leprosy services which occurred in 2001 in Sri Lanka was to provide easy accessibility to diagnostic and management services for suspected leprosy cases. However, due to many reasons leprosy services including medications were restricted solely to dermatology clinics with consultant dermatologists in major hospitals in districts. This became the national policy but as shown in this paper led to other implications.

This paper argues that such a system of case detection and treatment could be a major factor that affects timely accessibility for proper diagnosis and treatment of leprosy at early stages of the disease which is a must to prevent disabilities.

Retrospective cross sectional analysis of routinely collected data on disability status of the newly diagnosed individuals and on socio-demographic characteristics such as age, gender, ethnicity and on factors that determine the prognosis such as delay in presentation using SPSS showed following results.
Out of the 10,353 new leprosy patients registered for treatment during the 5 year period (2009–2013), 2965 (28.6%) had some form of disability (either Grade 1 or 2) at the time of diagnosis of which 790 (7.6%) had grade 2 deformities (G2D).

Out of the G2D at diagnosis, 75.4% were males and 83.2% were MB patients. Of the G2D, majority were Sinhalese (79%), followed by Tamil (12%) and Muslims (8.6%). Majority G2D (68.6%) were seen among 16–59 year age group category and 3.4% were children less than 15 years. Out of the total G2D, only 33.3% have a presented within 6 months and 29.2% have a delay of more than 24 months.

The results show that there is no disparity among the ethnic groups in their inclination to develop deformities. What this analysis show is that those who are in the work force who are likely to develop deformities as for some reason have not been able to access treatment before developing disabilities. Nearly one third of those who develop G2D has not received treatment until two years lapsed since observing a problem. Therefore, the Sri Lankan programme need to seriously consider other options to the type of leprosy services offered at present, although setting up a more effective system could be challenging.

**Keywords:** accessibility, disability, diagnostic services
ILC1.1-019
Evaluation of Drug Use Pattern in Central Leprosy Teaching and Research Institute as a Tool to Promote Rational Prescribing
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The present study was undertaken to evaluate the format, prescribing patterns and rationality of the prescriptions of the patients attending Central Leprosy Teaching and Research Institute (CLTRI) Out Patient Department for a period of six months. A total of 4748 prescriptions was analyzed in which 1,43,456 drugs were prescribed. Average number of antibiotic per prescription is 3.83. The patient’s name, age, gender, superscription, dosage form, duration of therapy and prescriber’s identity was written on all prescriptions. Out of all drugs, 95 % were from the National Essential Drug List of India. Multivitamins, Minerals and Other Supplements (38.53%) were the most common group of drugs used, followed by Corticosteroids (26.06%). Most of the drugs were given by the oral route (96.27%). Dosage and Dose schedule of drugs was written for all the drugs. The study showed a tendency towards polypharmacy and prescribing by generic names.

Keywords: Leprosy, drugs, utilization, rational, prescription
ILC1.1–020
The use of nerve ultrasound as a diagnostic test for leprosy
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Objectives
An enlarged peripheral nerve is a cardinal sign of leprosy, but in recent years the reliability of nerve palpation has been questioned so that it is no longer emphasized as an important clinical feature. Examination of nerves by ultrasound has, however, become more and more sophisticated and it is now possible to accurately measure the cross-sectional area of each peripheral nerve, for comparison with the normal range. The objective of this study is to determine whether the measurement of 8 nerves (4 on each side) could be a sensitive and specific test for clinical leprosy.

Methods
New cases and suspects were recruited for examination at the Nireekshana Clinic in Hyderabad, and underwent ultrasound examination of all 8 peripheral nerves (ulnar, median, lateral popliteal and posterior tibial, on both sides). The radial cutaneous and sural nerves are also often enlarged in leprosy, but it was found that these nerves are too small to visualize easily in normal subjects for them to be included. Routine examination takes about 20 minutes. The normal size of all these four nerves in both sexes and all age groups is between 6 and 9 mm², but accurate cut-off values between normal and abnormal have not been precisely defined.
Results
Preliminary results suggest that around 90% of leprosy cases have one or more enlarged nerves on ultrasound examination. It is important that the largest nerve is taken for comparison with normal values, not the average size of the nerves, as most nerves may be normal. Further results will be presented in more detail.

Conclusions
Ultrasound measurement of nerves has the potential to be a useful diagnostic test for clinical leprosy, although normal values need to be further defined. It is also important that many more early cases are seen, especially early PB cases, and cases found by active methods such as contact examination. It is expected that very early cases will have less obvious nerve enlargement; on the other hand, nerve enlargement is a known risk factor for subsequent neuropathy, suggesting that those at greater risk will be more easily identified.

Keywords: leprosy, diagnosis, ultrasound, nerve, enlargement
ILC1.1–021
Analysis of Problems on Applying ICD–10 Coding Rules to the Medical History Management of the Hansen’s Disease Patients/Ex–patients and Proposal of the Revision
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Objectives: Because there is a limit in the current International Classification of Diseases ICD–10 to encode complications and aftereffects of Hansen’s disease, we tried to revise the rules to classify the condition of the patients/ex–patients of Hansen’s disease based on ICD–10.

Methods: We analyzed problems when we classified complications, aftereffects of Hansen’s disease according to the current International Classification of Diseases ICD–10 and led a revised coding rule of the Hansen’s disease related conditions, with the support of the health information managers.

Results: We can point out the following problems in managing the medical history of Hansen’s disease in current ICD–10: Though the symptom of Hansen’s disease appears in various organs, it is encoded by a single (or collective) code and therefore it is hard to support the statistics according to the specialized field (ophthalmology or dermatology etc.) where a symptom appears and statistics by the classification of the disease. In addition, there is not an item encoding “leprosy reaction” that is an important condition of the disease.
In order to solve these problems, we suggest that we adopt the method of the double coding system to write (↑: A30.♦ / B92.♦) and (*: symptom) jointly, and we also propose to add a code of A30.6 and A30.7 to type 1 and type 2 “leprosy reaction” respectively.

Conclusions: The International Classification of Diseases (ICD–10) is the standard diagnostic tool for epidemiology, health management and clinical purposes, however, it is not adequate to manage the medical history of Hansen’s disease. The revised rules that we suggest will contribute to improvement of the quality of medical history management and care of Hansen’s disease patients/ex–patients.

Acknowledgements: This study was supported by Japanese Ministry of Health, Labor and Welfare as the National Hansen’s Disease Sanatorium Study Group in 2014.

Keywords: medical history management, ICD–10, coding, complications
Mobile Clinic Initiative At Leprosy Settlement In Lagos State In South West Nigeria; A Proactive Approach To Disability Prevention And Ulcer Care

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Introduction:
With an annual new case detection of 4000 people, a Grade 2 disability rate of 12%, and nearly 10% child ratio among new cases, leprosy remains a disease of public health importance in Nigeria. Lagos state has two Leprosy settlements with a population of 318. Since stigma is highly associated with the disease and denial of community, persons affected by leprosy delay seeking proper care until they develop physical deformities. The quality of life of such persons declines rapidly and almost all leprosy patients are not able to access the public health services and that due to stigma, attitude and behavior of general health workers who are not welcoming them in the their facilities.

Setting: Lagos State, South West Nigeria.

Objective:
To provide touch point care and patient-centered medical care to persons affected by leprosy within the settlements in order to decrease morbidity, prevent disability and deformity and to ensure that appropriate actions are taken.
Methods:  
In this retrospective cohort study, we reviewed the mobile clinic consultations records between January 2015 and December 2015. The Mobile clinic as a novel initiative holds monthly. The medical team consists of a Medical Doctor, Nurse, Leprosy Programme coordinator and logistic personnel carry out the following: Screening for active leprosy cases, Health education on prevention of disability and further nerve impairment, Ulcer care, treatment of leprosy reactions and treatment of other minor medical ailments.

Result:  
Overall 240 persons affected by leprosy and some of their children have been attended during 12 mobile clinics with sex proportion of Male 196(82%), Female 44(18%) and children

Conclusion:  
The mobile clinic initiative is an approach that is effective in preventing disability, deformity and morbidity among, therefore making it a patient-centered approach. The reported morbidity and physical impairment after release from treatment justifies ongoing clinical monitoring to facilitate early prevention and ulcer care.

Keywords: mobile clinic, Lagos Leprosy Settlement, Nigeria
ILC1.1–025
Parasitic Co-infection in Patients with Hansen’s disease Attended at the Eduardo de Menezes Hospital, Minas Gerais, Brazil
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Objectives: Parasitosis coexist with Hansen’s disease in many endemic areas such as in Brazil. However, there have been very little data on the interactions between leprosy and helminths or protozoan infection. We hypothesize that these co-infections, mainly schistosomiasis, may be risk factors to immunological reactions which are serious complications that can lead to irreversible nerve damage. The goal of this study is determine the prevalence of enteroparasitosis from adult patients with multibacillary disease attended in reference clinic from the Eduardo de Menezes Hospital, located in Belo Horizonte, Minas Gerais, Brazil. Methods: From July to December 2015 we performed a pilot case study with 73 patients and a questionnaire about hygiene and sanitation habits was administered to participants.
Patients were instructed to collect stool on 3 separate days for ova and parasite testing and venipuncture was performed for Schistosoma mansoni serology. Feces were processed by the Kato–Katz and spontaneous sedimentation methods. We analyzed three blades from the feces mixtures, for each method. To increase the sensitivity of diagnosis for schistosomiasis infection, serology was also being performed. Results: The analysis of questionnaire responses showed that 26.3% people use untreated water, 20% do not have piped sewerage and only 15.8% know how to properly sanitize vegetables. Thirty eight stool tests and 74 serology were made and the preliminary results shows that all the Kato–Katz were negative for helminthes infection and five patients were reactive for S. mansoni IgG4 adult antigen. Using the spontaneous sedimentation method, we found one patient infected by hookworm. The main protozoan found was Blastocystis hominis with a prevalence of 18.4%, followed by Endolimax nana (7.9%) and Entamoeba coli (5.3%). To determine the association between parasitism and the reactions, we will evaluate more patients from regions with high prevalence of helminth infections, mainly schistosomiasis.

**Keywords:** Leprosy, Parasitosis, Immunological reactions
ILC1.1–026
Performance of the Multidisciplinary Team in the Treatment of Plantar Ulcer in a Patient with Hansen’s Disease
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Objective: The objective of this study was to describe the evolution and treatment of a plantar ulcer in a patient going through polychemotherapy for Hansen’s disease and the performance of the members of the multidisciplinary team, Referral Center in the city of Belo Horizonte, Brazil.

Methods: The ongoing data were obtained by written records on the chart and periodic photographic evaluation of the ulcer respecting ethical principles.

Results: Treatment was managed with topical therapy, confection of biomechanical accommodative innersoles and medications for infection control. The plantar ulcer was effectively treated. The entire treatment regimen was accompanied by a nursing team, physicians and a physical therapist.

Conclusion: The multidisciplinary team’s work in a reference center shows the importance of the performance of the health care professionals in physical impairments prevention.

Keywords: Patient Care Team, Leprosy, Foot Ulcer
ILC1.1–027
Case Report: Leprosy Macular Reaction
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Introduction: Leprosy Macular Reaction is an acute reaction with old cutaneous lesions gets erythematous, bigger, infiltrated and edematous. The neural damage gets more gravity to the case.

Objective: This present study aims to report a patient with macular reaction leprosy with emphasis on dermatological and clinical aspects. The patient was male, 38 years old, with a history leprosy treated with 12 doses multidrug therapy; last in October 2012. In 2013, it was referred to the reference service due to macular lesions scattered throughout the body.

Methods: This study was performed at the Eduardo de Menezes Hospital – Belo Horizonte/MG, Brazil. The report was based on chart review, photos, interviews with the patient and subsequent literature review.

Conclusion: Leprosy is endemic in our country and it should always be remembered. We emphasize the difference between leprosy reaction and relapse to avoid diagnostic

Keywords: Leprosy macular reaction, Leprosy reaction type I, Leprosy
ILC1.1–028
The Importance of Multidisciplinary Care in Monitoring Patients with Leprosy and Prevention of Disabilities
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Objective: This study aims to emphasize the importance of a multidisciplinary staff for the monitoring of leprosy patients, mainly in a reference center, providing them a proper assistance since the diagnosis, during and after the treatment. It is essential to the early detection of disabilities and deformities and it helps to improve the quality of life of leprosy patients. This is an analysis of notification records of 72 newly diagnosed leprosy cases that was performed in a Sanitary Dermatology Reference Center, in the city of Belo Horizonte, Brazil.

Methods: This is a descriptive study, exploratory from the records of notifications of new cases of leprosy. Data were consolidated and analyzed by description of variables. Data were analyzed relating to clinical presentation, bacterial index (BI), degree of disability (DI) to diagnosis and high of 72 cases.

Results: It was observed a predominance of male patients (40, versus 32 female patients; 56% and 44%, respectively) and the most common clinical presentation was borderline leprosy (66.7%), 54.2% of them, were male patients. A total of 44.4% of patients had positive slit skin smears, (68.8% were male patients). The proportion of cases with no disability increased from 63.9% at baseline to 70.8% at the end of therapy, which suggests a proper assistance.

Keywords: Leprosy, Clinic Epidemiology, Prevention, Control, Disability
Lucio’s Phenomenon with Extensive Ulcerations Progressing to Death: Case Report and Literature Review

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Objective: This study aims to report the case of Lucio's phenomenon, with emphasis on early diagnosis in order to prevent the fatal outcome. We reported a case of Lucio's phenomenon in a 60 years old men with a history of more than a year of emergence of shallow ulcers on legs that had erythematous base and progressed with necrosis, sought medical assistance several times, being conducted as erysipelas. Venous duplex ultrasound of the legs identified extensive obstruction of bilateral sepheno. It evolved with the spread of lesions quickly and systemic symptoms requiring hospitalization. Extensive clinical and laboratory workup confirmed the diagnosis of lepromatous leprosy and Lucio's phenomenon was made. Despite the therapeutic measures taken, the patient progressed to septic shock cutaneous focus and evolves by death on the 18th day of hospitalization.

Methods: This study was performed at the Eduardo de Menezes Hospital – Belo Horizonte/MG, Brazil. The study period covered the time between hospital admission and the death of this patient after 18 days of hospitalization. For the preparation of the case was conducted clinical history and clinical examination of the patient daily. Subsequently, an extensive literature review was made on the subject in books and scientific papers.

Conclusion: We conclude that being leprosy endemic disease in our country, clinical suspicion should always be considered in patients with diffuse infiltration of the skin, associated with distal madorasis, in addition to recurrent necrotic ulcers of the lower limbs. The case described the patient remained for about a year without a diagnosis, if this had been done early on, the lethal outcome could have been avoided.

Keywords: Lucio’s Phenomenon, Lepromatous Leprosy, Leprosy
ILC1.1–030
Case report: Necrotic Erythema Nodosum Leprosum
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Introduction: The patient was a man, 54 years old without previous pathologies, referred to the reference service due nodular lesions with ardur in the trunk and limbs associated with fever and weakness. Lesions evolved to painless ulcers.

Objective: This present study aims to report a case of a patient with severe necrotic erythema nodosum leprosum without previous treatment for leprosy with emphasis on dermatology, clinical, epidemiological and biopsychosocial aspects.

Methods: This study was performed at the Eduardo de Menezes Hospital – Belo Horizonte/MG, Brazil. The report was based on photos, interviews with the patient and subsequent literature review.

Conclusion: Leprosy is endemic in our country and it should always be remembered. The development of actions for the training of health professionals is necessary for early diagnosis and treatment of leprosy and orientation that leprosy reaction type 2 can occur after, during or before treatment with multidrug therapy and can lead to death if it isn’t treated. The biopsychosocial approach to the patient and the understanding of the disease by the patient are also important to achieve successful treatment.

Keywords: Leprosy, Leprosy reaction type 2, Necrotic Erythema Nodosum Leprosum;
ILC1.1-031
Impact of one month training in leprosy on Physiotherapy graduates
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Objective:
To determine the impact of training on clinical practice of the therapists and their contribution in management of leprosy related complications.

Methodology:
Methodology Out of the eight hundred physiotherapy and occupational therapy graduates oriented and trained during the period March 2005 to March 2014, we were able to contact 178 participants through their contact telephone numbers which were provided to us. All participants were interviewed through the close ended questionnaire, following questions were asked from the participants
Q1. Whether they are practicing currently as physiotherapist?
Q2. Are they involved directly in any ways with leprosy program?
Q3. If yes, then did they had any leprosy or leprosy suspected patient during their practice?
Q4. If they had any leprosy patient then how they managed it?
Q5. Are you involved in some or the other ways in rehabilitation of the person affected by leprosy?
Q6. Do they still feel that leprosy is a health problem in India?
Result:
- 146—were doing physiotherapy practice
- 4—therapists were directly involved in leprosy related program
- 51—therapists said that they have seen suspected case of leprosy during their clinical practice.
- 16— Therapists said that they referred the suspected case to government set up.
- 15— Therapists said that they referred suspected case to dermatologist.
- 8— Therapists were of the opinion that leprosy is still a public health problem in India.
- 138— Therapists were of the opinion that leprosy is not a public health problem in India.
- 48— Therapists said that they are involved in some or the other way in rehabilitation of person affected by leprosy.

Conclusion:
Out of the total 146 therapists who were interviewed, only 2.7% of the therapists are directly involved in leprosy related program. Further 34.93% of the therapists seen suspected leprosy cases during their practice. 32.87% of the participants were involved in some or the other way in providing rehabilitation services to the person affected by leprosy. And 94.52% of the therapists don’t feel that leprosy is a health problem in India.

Keywords: physiotherapy graduates, training, impact on clinical practice
ILC1.1–032
A field report: why do people affected by leprosy migrate to Delhi for treatment?
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Objective:
To determine the reasons why people affected by leprosy and on anti-leprosy treatment in their home town, migrate to multispeciality hospitals in Delhi.

Methodology:
The data was collected from 200 people affected by leprosy who were taking anti leprosy treatment from hospitals of Delhi during the period of March 2015 to January 2016. On the basis of an interview, the patients interviewed include 137 males and 63 females from Lal Bahadur Shastri Hospital, Guru Teg Bahadur Hospital, The Leprosy Mission Hospital, All India Institute of Medical Sciences and Safdarjung Hospital.

Result:
The most prominent reasons due to which patients want treatment from hospitals in Delhi include greater faith in multispeciality government hospitals of Delhi(42%), locally prevalent stigma on leprosy affected(35%), patients consultation for a second opinion(20%), patient’s perception that they will receive better management and diagnostic facilities (23%) etc in Delhi.

Conclusion:
From this study it can be seen that person affected by leprosy migrate to Delhi in search of better treatment for leprosy and related complications. The most significant reason for migrating to Delhi is tag associated with Delhi that being a capital city it has best hospitals and treatment facilities. Further sometimes patient’s perception that they are not being counseled properly regarding the treatment in their hometown also plays important role in their migration to Delhi.

Keywords: leprosy treatment, migration
ILC1.1–033
MOBILEP: A Special Initiative to Improve Digital Data collection in Leprosy through Mobile Phone
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Abstract for 19th ILC: Clinical Science (Health System)

MOBILEP: A Special Initiative to Improve Digital Data Collection in Leprosy through Mobile Phones.

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Objectives:
To conduct a pilot for digital leprosy data collection system in Bogra district, Bangladesh.

Methods:
This pilot study conducted through using six android phones and a special software (Kobo toolbox), based on Open Data Kit, which were installed in each phone. Before starting the data collection an orientation was arranged for data collectors on the uses of survey form and mobile data input into software. Problems were identified during field practice and solved locally through mobile setting. Data was collected through visiting each patient’s house and uploading input directly to the mobile phone to have GPS location of each subject, as well as having the data recorded in survey form for future reference. Kobo toolbox has Global Positioning System (GPS) that allowed to identify patients exact location in the community.
Data was uploaded from mobile phone into the central server through internet connection whenever attending the district office. Ready compilation of data and analysis was available at various points in time. The raw data is equally available for download and analysis online anywhere using the log in details. The set up allows us to work with truly live data.

Results:
Through this pilot study, data of 400 patients was recorded through baseline and exit survey to understand the changes of the program intervention. Each interview took only 15 minutes and staff was able to record simultaneously from different parts of the districts. Only 5 data collectors were involved in covering the whole district within short period. The data collectors were also involved in other project activities. It is also possible to identify the GPS location of each individual subject that allows for planning and implementation of any health program.

It is possible to download and analyze raw data from globally at any point. Data collection time was minimum and data transfer occurs instantly through internet connection.

Conclusion:
It is a new idea to collect digital data through mobile phone which was piloted in Bogra through this Survey. It saves time, user friendly, easy and quick for analysis and there is no chance of missing information of any data. Now Lepra is planning to introduce digital data collection system in all projects situated in 3 different countries (Bangladesh, India & Mozambique).

**Keywords:** Leprosy, Data, Kobo toolbox, Mobile phone, GPS
20 years of Leprosy in the United Kingdom – where do the diagnostic delays occur?
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Objectives
Leprosy is an uncommon disease in the United Kingdom. Previous studies have suggested that late diagnosis correlates with lasting disability. We aimed to examine the experience of leprosy patients in the UK by identifying stages in the diagnostic pathway where delay was most prevalent, and examining the relationship between late diagnosis and disability.

Methods
We conducted a retrospective analysis of 140 patients who were diagnosed with leprosy between 1995 and 2013 at the Hospital for Tropical Diseases, London. We performed logistic regression analyses to examine relationships between Ridley–Jopling classification, delayed diagnosis and disability on examination both at diagnosis and at 2 years. Analysis was conducted using Stata version 12.0.

Results
Our patients originated from 37 countries. The median age at diagnosis was 33 years (range 13–85) and 66% of the patients were male.
61 patients (45%) consulted a healthcare professional within 3 months of symptom onset, but 48 (36%) did not seek healthcare for more than 1 year after their symptoms began.
117 patients (85%) initially consulted a GP with their symptoms, and 95 (73%) were referred for review by a hospital specialist within 3 months of their first presentation to primary healthcare. However 13 patients (10%) were not referred for specialist review for more than a year.
98 patients (74%) were ultimately diagnosed with leprosy within a year of their first presentation to healthcare, many due to timely skin or nerve biopsy for investigation of unexplained symptoms. However some experienced diagnostic delay of more than 10 years between first consultation and diagnosis.

Patients with long delays to diagnosis (>1 year since first consultation) did not have significantly more severe sensory or motor disability on examination at either diagnosis or following completion of treatment (p=0.98). In addition, there was not a statistically significant relationship between the Ridley-Jopling classification and delayed diagnosis (p=0.92).

Conclusions
Delays in the diagnosis of leprosy in the UK are multifactorial, relating most commonly to either delays in presenting to healthcare, or late recognition of leprosy by hospital referral specialities. We suggest a targeted approach toward education of the most common referral specialities, highlighting the value of early skin or nerve biopsy for unexplained symptoms. In this study we did not find a significant relationship between delays in the diagnosis of leprosy, and severity of associated sensory or motor disability.

Keywords: disability, delayed diagnosis, referral
ILC1.1–035
Case Report of Two Cases of Fever, Rash, and Organ Involvement during the Treatment of Leprosy
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Dapsone Hypersensitivity syndrome (DHS) is a life-threatening condition in the treatment of leprosy with an incidence of 0.5% - 3.6% and an associated mortality of 9.9%. Timely and correct diagnosis and differential diagnosis is the key to further management. Here, we presented two leprosy cases who suffered fever, rash and moderate organ involvement during the treatment. All the symptoms of the two patients were firstly suspected to be a drug-induced hypersensitivity syndrome caused by MDT, especially dapsone. And also we could not exclude the diagnosis of leprosy reactions totally. To find more evidence for final diagnosis, we performed an analysis using HLA-B*13:01 test in the two patients using PCR-SSP and the results indicated both of them carried one HLA-B*13:01 risk allele. Finally, the diagnosis of DHS was based on the combination of symptoms, the two patients’ medical history, and the results of HLA-B*13:01 test. The two patients remain under supervised treatment for leprosy, with good outcome. This case report is a useful reminder that clinicians should be aware of the possible fatal adverse effects of dapsone. And the HLA-B*13:01 test is useful to distinguish DHS from leprosy reactions.

Keywords: leprosy, dapsone, dapsone hypersensitivity syndrome, HLA-B*13:01 test
ILC1.1–036
Screening for Diabetes in a Leprosy Hospital
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Objectives:
To assess cost and output of different methods of screening for diabetes amongst people admitted to a leprosy hospital for management of leprosy complications.

Methods
All leprosy-disabled individuals admitted to the specialist leprosy hospital over 8 months were considered for inclusion in the study, unless they gave a past history of diabetes. We assessed the usefulness of doing either random blood sugar (RBSL) on arrival, spot urine test by dipstix on arrival, or fasting blood sugar (FBSL) next morning. Anyone with glucose–positive urine dipstix, Random blood sugar >11m mMol/L, or fasting blood sugar >7.0mMol/L was further investigated by Oral Glucose tolerance test (OGTT): fasting and 2 hour “post prandial” blood sugar levels. Patients with a confirmed new diagnosis of diabetes were advised appropriately. The cost of testing was calculated.

Results:
Over a period of 8 months, 308 Subjects were tested. Of them 90% were admitted for complicated trophic ulcer and 6% for leprosy reaction. Others were for miscellaneous reasons. 19 subjects (6%) had at least one abnormal result. Urine sugar was positive in 5 cases of whom 2 had normal blood sugars, while 9 people with RBSL >11mMol/L had negative urine tests at that time.
Of 12 people who had RBSL>11 m Mol/l, only 5 had FBSL>7.0m Mol/l, and of 10 people who had FBSL>7.0m Mol/l only 5 had RBSL>11.0m Mol/l. Only 5 subjects had both RBSL and FBSL high and 3 of these were confirmed as diabetics on their oral glucose tolerance test. In 2 cases either a RBSL or a FBSL was abnormal and OGT1T was positive, so diabetes was confirmed. Hence 5 diagnoses were made as a direct result of this screening, amounting to a frequency of 1.6%. Of these 5 people, 2 subsequently admitted to a previous diagnosis of diabetes for which they had not taken treatment! Two of the other 3 were taking steroids for reaction; so these 2 individuals could be case of steroid induced hyperglycaemia. Cost of one blood test in our situation is 75 bdt, approximately £0.60

Conclusions:
Since diabetes is a common condition which may be asymptomatic in early stages yet complicate management of other disorders such as leprosy reaction or trophic ulcers, it is advisable for a leprosy hospital to screen all admissions by the most cost effective method available but in our experience urine testing is not useful. Direct questioning about a previous diagnosis of diabetes is essential.

**Keywords:** Diabetes, Leprosy, Screening, RBS, FBS
ILC1.1–037
Role of medical officer in a leprosy focused hospital: an experience
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Objective:
To explore varied role played by a medical officer in a leprosy focused hospital.

Methodology:
In order to explore the varied role of medical officer in a leprosy focused hospital, data was collected from the hospital management system and the recording charts and registers of The Leprosy Mission hospital Nand nagri Delhi–93 in terms of
• Number of tendon transfers assisted by medical officers between the year 2011–2015
• Number of ulcer debridement done by medical officer between the year 2011–2015
• Number of leprosy screening camps/ skin camps organized by medical officer between the year 2011–2015
• Number of orientation courses in leprosy conducted for the nurses and other paramedical workers
• Number of training conducted for the medical officers
• Number of leprosy cases seen for non-leprosy reasons

Results:
Between the year 2011 to 2015, 30 tendon transfer surgeries were assisted by the medical officer, 250 ulcer debridement were done by the medical officers, 15 skin camps were organized by the medical officers, 37 orientation courses were conducted for the nurses and other paramedical workers between the year 2011 to 2015, 7 training were conducted for the medical officers, and more than 3000 leprosy patients consulted medical officer for non-leprosy cases.

Conclusion:
The above study clearly indicates that medical officers were involved in most of the activities in the hospital and play a very significant role in a leprosy focused hospital. They are involved in training, community and research apart from their regular hospital duties.
Further this study clearly indicates that medical officers are the key members of the team of a leprosy focused hospital.

Keywords: medical officer, leprosy focused hospital
ILC1.1–038

Combined Lasso and Opponensplasty: a single stage leprosy reconstructive hand surgery that expedites recovery and reduces hospital stay by 6 weeks

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Objective:
Current practice for leprosy hand reconstructive surgery is performed in two stages, requiring two surgeries to perform separate Lasso and Opponensplasty procedures (L&O) and 14 weeks hospital stay. In this study, we evaluate surgical outcomes and patient satisfaction after a single hand surgery using Combined Lasso and Opponensplasty (CLO) procedures instead of the conventional L&O.

Method:
In this study, a retrospective analysis of 28 patients from 2011 to 2015 was performed at Anandaban Hospital, a tertiary leprosy referral centre in Nepal. The two conventional surgical procedures, L&O, were merged into a single procedure, CLO, for patients exhibiting both ulnar and median claw. Early active mobilization of fingers was started on post-operative day 1. Isolation exercise of transferred tendons, the flexor digitorum superficialis (FDS), was started on post-operative day 21 and continued for 4 weeks. A patient satisfaction assessment was performed at the time of discharge and at 3 month follow up using a customized satisfaction scale with a 0–10 scoring system (0 as the worst, and 10 as a normal hand) alongside analysis of hand function and cosmetic appearance.
Result:
Among 28 patients receiving CLO, the male: female ratio was 2:1 (19:9) with a mean age of 33 years (range of 10–65 years). A total of 37 hands were corrected, with 9 cases having operations on both hands. Two tendons (FDS middle and ring fingers) were transferred with one for each CLO. No CLO patients demonstrated post-operative tendon pull out, adhesion or stiffness of joints. Only 4 patients reported post-operative pain and swelling, all of which resolved by the time of discharge. Out of 37 hands, 27 hands reported excellent (73%), 9 good (24%) and only 1 poor (3%) outcome satisfaction at the time of discharge. Follow up was performed in 21 patients, 17 of them reported excellent (81%), 3 good (14%) and only 1 poor (5%) outcome satisfaction. The average patient satisfaction score was 7.23 at the time of discharge and 7.52 at the time of follow ups. The average duration of hospital stay for CLO was only 8 weeks.

Conclusion
We found that patient satisfaction was high in patients after CLO: 95–99% reported good–excellent satisfaction over 3 months post-operatively. No CLO procedures resulted in pulled out tendons or other major complications. As compared to standard L&O recovery expectations, CLO provided more rapid restoration of function while effectively reducing total hospital stay by 6 weeks.

Keywords: hand surgery, neuropathy, Opponensplasty, FDS transfer, Lasso
ILC1.1–039
Are leprosy focused hospital are the hospital for diagnosis of non-leprosy related problems for person affected by leprosy: Trends in last five years (2011–2015)
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Objective:
To determine the various problems not related to leprosy for which person affected by leprosy are being treated in leprosy focused hospital.

Methodology:
Data was collected retrospectively from the hospital management system. Data was collected for the period between 2011 to 2015. Non leprosy related problems among person affected by leprosy were categorized as diabetes, hypertension, cataract surgery, other skin conditions, cardiac problems and lung problems, osteoarthritis and others.

Results:
Between the period of 2011 to 2015 more than three thousand person affected by leprosy reported to The leprosy Mission Hospital for problems not related to leprosy. 652 patients reported for the cataract surgery, 557 were taking treatment of diabetes and 714 were taking treatment for hypertension. 542 patients for generalized low back pain and arthritic conditions, 630 patients reported for general medical conditions and skin problems.

Conclusion:
From the study it can be concluded that person affected by leprosy approach leprosy focused hospital for the treatment of problems not related to leprosy as well. Further leprosy focused hospital also serves as point where some of the lifestyle diseases diagnosed early and treated.

Keywords: problems not related to leprosy, person affected by leprosy
**LC1.1–040**
Detection of Thermal Thresholds in Skin Lesions – New Cases of Patients with Hansen's Disease

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Objective: to determine the perception thresholds to heat and cold in skin lesions of leprosy patients, using the sensory analyzer TSAII–Medoc and thermal stimulator small area 0.5 x 0.5 cm (0.25 cm²).

Methods: Tests were conducted using a thermal sensory analyzer TSA–2001 (Medoc Ltd, Israel). Warm and cold sensory thresholds were determined bilaterally, on the skin lesion compared to the contralateral area. The thermal sensation was assessed using the method of limits with a thermal analyzer (thermode) 0.25 cm². Cut-off was determined using the ROC curve from a control group. Analyses of the WPT and CPT of the skin lesion, contralateral area and control group were correlated.
Results: Our results suggest that the skin lesion in patients showed a greater thermal threshold when compared to the contralateral area of the same patient and to the control group. The cut-off established with the thermal stimulator in smaller areas using the method of limits was also shown to have a capacity to determine thermal thresholds. Values were established from 36.55 °C for WPT to 26.35 °C for CPT (with a sensitivity of >90% and a specificity of >80% for both), determined by the ROC curve.

In Hansen’s disease lesions, thin myelinated A-δ fibers and unmyelinated C fibers measured for thermal sensations, showed sensitivity deficits. Heat sensory deficits were more evident than the cold ones. Interestingly, no statistical significance was found between the perceptions of tactile sensitivity to the heat, although results show a tendency to increase.

Conclusions: Taken together, our results establish a cut-off with higher thermal thresholds through a smaller thermode by the method of limits. The establishment of a cut-off for suspicious lesions in Hansen’s disease is important for an accurate diagnosis and an early disease detection, favoring the control on transmission of M. leprae, as well as being the best aid in the treatment, early detection of peripheral neuropathies that affect unmyelinated sensory nerve fibers and monitoring nerve damage. Our analyses indicate that the evaluation of thermal sensation of heat and cold with a small thermode has great potential to detect sensory deficits of the fine fibers in early stages.

Keywords: Leprosy, Thermal quantitative sensory test, Thermal perception thresholds, Thermal stimulator, Method of limits
ILC1.1-041
Case Analysis of New and Recurrent Leprosy in Xuancheng During 2006 to 2012
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Objective To analyze the clinic and epidemiological characteristics of new and recurrent cases of leprosy in Xuancheng during recent years so as to provide scientific basis for taking effective prevention and control measures. Methods Individual records, which include the clinic and epidemiology data, of the new and recurrent leprosy cases in Xuancheng during recent years were collected for case analysis. Results There were four new cases and four recurrent cases of leprosy in Xuancheng from 2006 to 2012 and all eight cases were peasant. Four new cases were women in which one was local disease and three were married in Xuancheng from Yunnan and Guizhou. One of four new cases was Multibacillary leprosy(MB) and three were Paucibacillary leprosy(PB). Distribution of the delay was from 1 to 16 months. There was no nervous lesion and disability in new cases. There were three man cases with level 2 disability and one women case with no disability in recurrent cases which were local residents and lepromatous recurrence. After the first confirmed, the recurrence time of new cases which accepted DDS single treatment was from 8 to 36 years. Conclusion Leprosy in Xuancheng is on a low prevalence state. Inputted leprosy cases from Yunnan and Guizhou had brought new challenges to the prevention and control work. It help to detect cases early to strengthen the propaganda of grassroots medical staff of knowledge and training about leprosy prevention. To eradicate leprosy still need long-term positive prevention and treatment.

Keywords: leprosy, new case, recurrent case, case analyze
ILC1.1–042
Spectrum of leprosy: A study to evaluate the various classification criteria
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Objectives: According to WHO, leprosy is classified clinically into pauci-bacillary (PB) and multi-bacillary (MB) based on the number of skin lesions (NSL). Other clinical criteria used are size of the largest skin lesions (SLSL) and number of body areas affected (NBAAS). Ultrasonography (USG) of nerve has been used to identify the early changes. The objective of this study was to assess the sensitivity and specificity of different clinical criteria individually and in combination for classifying leprosy in different spectrum.

Methods: Thirty newly diagnosed, untreated cases of leprosy were recruited and were classified into PB and MB according to NSL, NBAA and SLSL. Sensitivity and specificity was calculated taking histopathological findings as the gold standard. Receiver Operator Characteristic (ROC) curves was plotted for each parameter to identify the best cutoff. USG of ulnar, median, lateral popliteal and posterior tibial nerve was done to identify the nerve changes.

Results: The sensitivity and specificity of NSL using the histopathology as the gold standard was found to be 93.8% and 85.7%, respectively. The ROC curve for NSL found the best cut off 6 or more than 6 for MB. The sensitivity and specificity for NBAA was 93.8% and 64.3%, respectively with a best cut off of 3 or more than 3. Similarly, for SLSL the sensitivity and specificity was 68.8% and 21.4% respectively, and cut off was 2 or less than 2 for MB. Combining all three criteria, the sensitivity rose to 100%, however specificity decreased to 14.3%. USG revealed significantly enlargement of peripheral nerves in MB groups.

Conclusion: It is better to use the clinical criteria individually than in combination as when combination of different criteria was used there are chances of misclassifying the PB patients into MB. The current system of classifying the leprosy i.e. NSL seems to be the best of all. USG at referral centers can be a useful tool for identifying earlier changes in nerves secondary to leprosy.

Keywords: clinical critria, paucibacillary, multibacillary, Number of skin lesions
ILC1.1–043
An investigation on the prosthetic status in patients with leprosy

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Objective: To evaluate the prosthetic status in patients with leprosy in China.
Method: 613 patients with leprosy were randomly selected in six leprosy villages in three provinces of China (Hunan Province, Jiangsu Province and Shanxi Province). Investigate their prosthetic status. Result: Among 613 patients with leprosy, the restoration rate was 23.8%, while the bad restoration rate was 85.4%. Conclusion: The restoration rate was low and the bad restoration rate was high among patients with leprosy. We should pay attention to the oral health status in patients with leprosy, and take measures to improve the restoration rate and restoration level.

Keywords: leprosy, prosthesis, bad prosthesis
ILC1.1–044
Therapeutic dilemma of refractory erythema nodosum leprosum: A case report
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Erythema nodosum leprosum (ENL), also known as type II leprosy reaction, is a serious immune-mediated complication of multibacillary leprosy. For ENL, corticosteroids and thalidomide are the mainstays of treatment. Other immunosuppressants, such as cyclosporine, azathioprine and methotrexate have also been used. Although most patients with ENL respond well to conventional treatments, a small number is refractory to these therapies and have severe morbidity or mortality. We report the case of a 24-year-old man with refractory ENL treated with high-dose corticosteroids for fifteen months. The patient developed steroid-dependence and serious adverse effects, and died of an intracranial infection.

Keywords: leprosy, erythema nodosum leprosum, steroid-dependence
ILC1.1–045
Analysis of Dyslipidemia in Lepers
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In this paper, a new way for prophylaxis and treatment of leprosy was found by analysis the results of blood lipid in the rehabilitative lepers. Using Excellence 310 Automatic Biochemical Analyzer made by Shanghai Kehua Bio-engineering Corporation(KHB), tests the total cholesterol (normal range 3.35~6.45mmol/L), triglycerides (normal range 0.48~1.88mmol/L), High density lipoprotein (normal range 0.9~3.65mmol/L) and Low density lipoprotein (normal range 0~4.11mmol/L). There are 58 cases of rehabilitative lepers who have received our test, of which 13 are in low cholesterol, 9 are in high triglycerides, 4 are in low high density lipoprotein and as none is in low high-density lipoprotein. And substandard patients in cholesterol and Low density lipoprotein testing account for 22.4% as well as hypocholesterolemia in the rehabilitation of lepers of LL type, BL type, BB type and TT type among substandard patients in the testing of cholesterol account for 61.53%, 23.07%, 7.69%, 7.69%, respectively. This is consistent with the body’s immune response to the leprosy bacteria, which also explains why the LL type has the weakest immunity but with the highest percentage of hypocholesterolemia, and BL type follows. In conclusion, It is an effective measure that eating balanced meals, correcting lipid metabolism, maintaining ideal levels of blood lipid and improving human immunity for susceptible hosts to prevent leprosy.

Keywords: Leprosy, Low cholesterol, Prophylaxis and treatment, Prophylaxis and treatment
ILC1.1–046
A case of leprosy aggregated in family
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A 45-year woman’s eyebrows and eyelash had fallen off; diffuse infiltration on the face; skin lesions on the limbs and body; skin lesions and nodules on the hip. Initial onset to diagnosis lasted 5 years. Several visits to doctors, but couldn’t be diagnosed. After clinical examination, tissue fluid leprosy bacillus and histopathology examination made a definite diagnosis of lepromatous leprosy. Treatment: MDT-MB. The patient was clustering occurrence in the family. This patient’s grandmother’s arms and hands had many fester before her death, which are clinical manifestations of leprosy. Oral dapsone was treated with this grandmother, and she died in 1974. There was long time history of close contact between this patient and her grandmother. The history of close contact also present in the patient and her two sisters (one was diagnosed with leprosy in 1989, another was diagnosed with leprosy in 1993), uncle (he was diagnosed with leprosy in 1980) and her uncle’s son (he was diagnosed with leprosy in 1981), these people all suffered from leprosy before the patient, they recovered after therapy, and all alive. The patient’s binocular vision almost went blind, left eye could feel light only. Patient’s vision began to decline at the age of twenty, at last went blind, was diagnosed the second disability. 11 new cases of leprosy patients were registered in the jurisdiction area where the family live in more than 60 years, 5 cases of leprosy belong to the patient’s family, and there were no cases of leprosy in other consanguinity in this area, it prove that this is a case of a family aggregation of leprosy cases. It confirmed that leprosy has the genetic susceptibility genes in the studies recent years, it is likely that leprosy patients within family had the same susceptibility genes of this case report, meanwhile they are in the same natural society and economic environment, long-term close contact with each other made them infected by leprosy.

Keywords: leprosy, family inner, disease onset
A 48-year-old man had presented with torso and limbs burgundy were infiltrated with plaques, papule damage 2 years., The lesion manifested as papules and plaques incipiently, infiltrating plaque formation gradually, the edge was higher than the leather face, the immune area was in center place. Left foot’s ulna nerve was bulky than the right, motor and sensory the function of movement and feel were normally. Skin tissue pathology: irregular hyperplasia of epidermis, dermis in nodules foam cells and lymphocyte infiltration. Acid fast stain demonstrated lots of acid-fast bacillus. The diagnosis of Borderline lepromatous leprosy was confirmed. The leprosy’s transmission mode is long-term close direct contact by droplet infection, and the survey results showed that this patient had no family history and history of close contact. Indirect contact can also infect leprosy, the patient was admitted to college of Xi’an city in 18 years old, and was assigned to a unit after the graduation, because of work, he had been on a business trip frequently to our country and our province leprosy epidemic areas. He had the chance of indirect infection leprosy, bacteria index pointed out that the patient was infected by leprosy bacillus with more than 10 years. With the decline of leprosy popularity in our city, leprosy became a rare disease, and even rare diseases, the epidemiology data of our city with more than 10 years showed that all new leprosy cases of urban area were immigration cases. A great personnel flow frequency in economically dynamic region, if one is on a business trip frequently to leprosy epidemic areas, there will be chance of indirect infection leprosy.
ILC1.1–048
Leprosy knowledge among the students of RCI
(Rehabilitation Council of India) courses
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Objective:
Rehabilitation Council of India(RCI) as the statutory body to regulate and monitor services given to persons with disability, to standardize syllabi and to maintain a Central Rehabilitation Register of all qualified professionals working in the field of rehabilitation, provides various Diplomas, Under Graduate, Post Graduate courses on the areas viz. Rehabilitation training, Speech & Hearing and Special Education etc. While the above qualified professionals form a significant component of specialized leprosy care workers, specific objective of this study is to find out the magnitude of knowledge on leprosy among those qualified of RCI recognized courses.

Methodology:
A total sample of 100 students who have completed RCI recognized courses from NIEPMD (National institute for Empowerment of Persons with Multiple Disabilities), out of which 60 were of diplomas, 20 were of UG, and 20 were of PG level courses have been randomly selected to collect data by using scientific questionnaire.

Results:
The study brought out various facts about levels of their scientific knowledge with reference to the causes, transmission, treatment, correction of deformities and cure etc. of leprosy disease.

Conclusion:
Based on the levels of knowledge, the study makes an attempt to suggest the areas of knowledge, to be improved for handling leprosy cases and required improvements in the syllabi of various courses in the RCI.

Keywords: Leprosy, RCI, Students, Knowledge, Courses
ILC1.1-049
The effective evaluation of the vacuum sealing drainage dressing in leprosy ulcers
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[Objective] To investigate the application of the vacuum sealing drainage dressing in the therapy of leprosy ulcers. [Methods] A total of 16 leprosy patients with 21 ulcers were treated by the vacuum sealing drainage dressing, we evaluated the short-term effectiveness of the vacuum sealing drainage dressing in those ulcers (7days). The area of ulcer deceased above 70% was considered as significantly effective, above 50% as effective. [Results] The total effectiveness rate was 80.95%, the significantly effective rate was 57.14%. [Conclusion] The vacuum sealing drainage dressing is effective in the therapy of leprosy ulcers, the debridement before VSD and adequate rest of limbs is related to the effectiveness of VSD in leprosy ulcers.

Keywords: vacuum sealing drainage, effective evaluation, leprosy ulcer
Thalidomide has anti-inflammatory, antiangiogenic and immunomodulatory properties and Brazil it is indicated for the treatment of six diseases, including a leprosy complication called erythema nodosum leprosum. However, its use by pregnant women causes severe teratogenic effects, including the phocomelia. Brazil regulates this medicine by the RDC nº. 11/2011, which has brought important advances for its prescribing and dispensing. The objective of this study was to identify and reflect on the main gaps observed to meet that standard. We developed a descriptive study detailing the achievement of an operating plan (OP) experience based on the method of Situational Strategic Planning. This plan highlights the following four steps: Explanatory Moment; Normative Moment; Strategic Moment; Tactical and Operational Moment. The method chosen for the explanation of the problem was the fishbone, adaptation of the Ishikawa diagram. The selected problem for developing OP was the "low compliance level of RDC nº. 11/2011 – thalidomide control", explained through three evidences: absence of national patient registration; absence of national list of public dispensing units; little knowledge of the Public Health Network over the thalidomide control. The model of fishbone diagram allowed to defining the specific objectives of the OP and the construction of eight operations and fifteen actions to promote compliance with current regulations. The OP allows the exercise of the stages of strategic planning for the development of intra actions between Ministry of Health and Brazilian Health Surveillance Agency and State and Municipal Health Secretariats. This involves coordination between different entities and actors and it has assumed a central role in Pharmaceutical Assistance to redirect the actions to better control and monitoring of the use of thalidomide. The development of the OP has contributed to raising awareness among managers, resume their responsibilities and better articulation of pharmaceutical care and health surveillance services. In addition, it promoted qualifying actions to minimize the risks of using thalidomide among leprosy patients and stimulate its rational use.

Keywords: erythema nodosum leprosum, thalidomide, drug regulation, drug control, pharmaceutical assistance
Early Diagnosis of leprosy based on Multiple Assays
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Introduction Early diagnosis of leprosy is a big challenge in endemic countries. At the present, no single assay can predict the persons who have infected M. Leprae may develop to be leprosy or what time they may develop to be leprosy. The study was to use the multiple assays that were consist of ELISA, PCR and T cell assays, as well as Acid-Fast staining, histopathology. Those assays have been applied to the contacts. The aim of the study is to demonstrate whether the assays may be useful for early detection of leprosy.

Methods
1 New assays performed in the study:
(1)Serologic tests: ELISA on PGL-1 (Providing by Prof. P. J. Brennan ) and LID-1 (Providing by Dr. M. S. Duthie).
(2)Nested-PCR and Real time PCR: Amplify RLEP fragment from skin biopsy, paraffin tissue and whole blood.
(3)T cell assay: IFN-γ by Whole blood and PBMC.
Routine examinations: AF staining and histopathology

2. Application areas: KaiYuan city, in Honghe Prefecture, Yunnan Province. During 1996–2006, the twenty-one cases were newly detected in the 647 villagers from the three villages, Kaiyuan city. The three times or more following up have been conducted from 2007.3 to 2012.02. The expansion of trials with the same methods were conducted in XiShuangBanNa in Yunnan Province and SanYa in HaiNan Province in 2015.
Results: 527 people were evaluated in the cohort study, the total examine rate of 5 years was 100% with the patients and contacts, 98.91% with villagers, and evaluated once 59.58%; twice 28.46%; thrice 9.3%; forth times 1.71%; respectively. There were 61 people who were the double positive to NDO–BSA and LiD–1.12 value (≥ 0.5) showed a significant increase in their IgM or IgG titres. It is worth mentioning 3 value of 12 was the same person, who proved to be new case eventually. Those 7 new cases diagnosed by us with multiple Assays, 3 developed leprosy during the thrice following-up, the others showed nerve enlargement, a single lesion in the screening, 3 with successful DNA detection had positive PCR results for paraffin tissue or biopsy; one with IFN-γ positive had a better results with MDT six months.

Conclusion:
The seropositive subjects of a series strong humoral response in follow-up were at the highest risk for developing the disease in its lepromatous forms. The high detection rates of pathogenic DNA by PCR of tissue fluid, paraffin tissue and biopsy can help to early diagnose the patient from nerve enlargement, a single lesion, the high seropositive index of contacts, subclinical infection in the screening.

Keywords: Early diagnosis, leprosy, multiple assays, high risk population, following up
ILC1.1–052
Training in NLEP in Indian context
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Objective: With the INTEGRATION of the Leprosy programme as a part of the General Health System, it is the responsibility of all health professionals to manage the challenges faced by patients, according to their level of training. Yet, we discover that there is a disparity between responsibility given and the competence shown in caring. Very little is documented about knowledge, attitude and practice (KAP) of Health professionals of General Health system under the training component of NLEP in the state of Karnataka, India. The objective of this study was to assess these parameters, thus be able to provide relevant and efficient training which in turn would improve the competence of Health providers from the General Health System.

Methodology: A cross-sectional survey was conducted. Data were collected from 30 doctors in charge of Government Health care units. A structured questionnaire covering socio-demographic information, as well as information on KAP was distributed and analysed. With the results obtained, a one point intervention was conducted and a post intervention survey conducted.

Result:
The finding of the KAP study confirmed that Efficient Training is essential to enable the Medical Officers to carry out their responsibility effectively. More details on the result of the study would be presented during presentation.

Conclusion: Efficient Training is crucial for effective implementation of NLEP. It promotes inclusion of all levels of health care providers, working as a team towards one goal. The goal being, early detection and adequate treatment of persons affected by leprosy, which would in turn stop transmission and prevent disability which is the stigmatizing factor.

**Keywords:** Knowledge, Attitude, Practice
ILC1.1–053
Misdiagnosis Analysis of Leprosy Cases from 2011 to 2015 in Ganzhou
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Objective Analyze and summarize the misdiagnosis situations of newly leprosy patients in Ganzhou, and provide the basis for the prevention and control of leprosy.

Methods Collect the clinical data of 63 leprosy patients misdiagnosed in recent 5 years, and analyze the misdiagnosis reasons. Results According to the statistical clinical data of 72 newly leprosy patients, it can be found that diagnosis rate of the first time is 12.5% and the misdiagnosis rate is 87.5%. The reasons of high misdiagnosis rate of leprosy, besides the complex clinical symptoms of leprosy itself, mainly relate to lack of the prevention and control knowledge of clinical doctors and not enough strength of propaganda and training of the prevention and control knowledge of leprosy. Conclusions Under low epidemic conditions of leprosy, the keys to reduce misdiagnosis and missed diagnosis are to enhance the propaganda of the prevention and control knowledge of leprosy, strengthen the training of the prevention and control knowledge of leprosy for clinical doctors and rise vigilance and diagnostic level of doctors for leprosy.

Keywords: leprosy, misdiagnosis, analysis
ILC1.1-054
What has happened 24 years after the development and adaptation of using Semmes-Weinstein Monofilaments in Brazil’s national Hansen’s disease (leprosy) control activities?
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Introduction:
In 1993 the American Journal of Hand Therapy asked the authors to write an article about the development and adoption of using Semmes-Weinstein Monofilaments in Brazil. The article used the PRECEDE Health Model and Adoption Theory to describe the needs and phases required to adopt a new technology. It described the complexities of adapting and developing a Brazilian model that would be assessable and acceptable for routine clinical use within Hansen’s disease (leprosy) control activities at all levels. Today Brazil continues to have more than 30,000 new cases per year, as they did in 1991. Early disease detection was considered the most important aspect of disability prevention but it was also recognized that 30–60% of cases had reactions and neuritis that needed to be detected early and treated adequately if disability prevention was to be successful. The authors feel other countries could benefit from this Brazilian experience.

Objectives:
1. To understand what affects the adoption of use of S-W monofilaments within routine leprosy control activities.
2. To understand the importance of beliefs, attitudes, political and professional support, knowledge and skills in changing behaviors for monitoring nerve function early and for monitoring clinical and surgical interventions for restoring nerve function.

Keywords:
Methods:
The presentation will describe the process of adopting of S-W monofilament testing within routine HD control activities in Brazil and how this experiences may be applicable to other countries.

Results:
Understanding how technology is adopted and what facilitates behavior change in practice, enables better planning of interventions needed for sustaining use of S-W Monofilament monitoring within decentralized routine HD control activities.

Conclusions:
Today, Brazil’s national, state and local Hansen’s disease control activities consider the use of S-W monofilaments as best practice for both peripheral health services as well as referral services. National guidelines and protocols include the use of multiple monofilaments for both clinical evaluation and disability prevention activities within decentralized HD control activities. One of the most critical factors was the availability and accessibility of a reliable portable instrument within the country.

Keywords:
ILC1.1–055
The clinical analysis of 712 newly detected leprosy cases

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Objective: To analyze the clinical features of new leprosy cases in Jiangxi in recent years and improve the level of clinical diagnosis and treatment of leprosy.

Methods: A retrospective analysis was made according to the data of new leprosy cases in Jiangxi during 2000–2012. Results: There are 712 new leprosy patients with a sex ratio 2.72 : 1, among whom peasants account for 87.36%, and the patients with family history account for 32.44%. The founding ways give priority to dermatology clinics, which account for 71.63%. The average duration is 31.12 ± 8.14 months. There are 318 leprosy cases that can be confirmed at the first diagnosis, and the average misdiagnosis times are 5.34 ± 3.19. Through the clinical manifestations, patients only with skin lesions account for 15.87%, patients only with nervous lesion account for 13.62%, and patients with both skin lesions and nervous lesion account for 64.47%. The clinical types contain TT 10.39%, BT 17.98%, SB 8.57%, BL 30.17%, LL 31.46%, and 1.4%. There are big differences in checking the fungus’s positive rate, and most of the patients have leprosy pathological manifestations. The patients were treated by combined chemotherapy, with a leprosy reaction in 162 cases and neuritis in 186 cases. 698 cases were clinically cured, 11 cases died not for the treatment, 3 cases died for the treatment, and the disability accounted for 25.98%. Conclusion: Leprosy is not popular in Jiangxi. The diagnosis of leprosy needs to give priority to dermatology clinics, combining with checking the fungus and pathological results. The attention should be paid to the side effects of drugs and the complications such as leprosy reaction and nerve inflammation during the treatment.

Keywords: Leprosy, Aewly detected, Clinical analysis
ILC1.1–056
The Misdiagnosis Analysis of 3 Cases of Type BL Leprosy
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Objective Improve the level of diagnosis and treatment and the examination skills
to decrease the misdiagnosis of leprosy. Methods Analyze 3 misdiagnosis cases of
type BL leprosy. Results A man aged 44 whose face has been red time and again
during six years and limbs and body with erythema for two years, another man
aged 72 whose skin of limbs numb with blister over and over again and fingers
of left hand have been curved for more than seven years, and a woman aged
27 who has skin lesions and numb on her lower limbs for more than one year.
They were misdiagnosed as acute febrile neutrophilic dermatosis, vasculitis,
peripheral neuritis, Ichthyosis, peripheral neuritis and so on by a general hospital
in a city(county) or a dermatological hospital. Conclusion The clinical manifestation
of leprosy is complicated, so it needs to strengthen the prevention and control
knowledge training of leprosy for dermatologists and neurologist at all levels, and
improve the level of diagnosis and treatment to decrease the misdiagnosis of
leprosy.

Keywords: leprosy, diagnosis, misdiagnosis
ILC1.1–057
Field testing of a common skin diseases approach to detect leprosy, other NTDs and HIV-related skin diseases in Mozambique: a health systems strengthening approach using a smartphone app.
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Background
Training general health workers for leprosy is often inefficient, because gained knowledge quickly erodes when seeing only a few cases. However, 21–87% of people in developing countries are affected by skin diseases, children disproportionately so. Up to 24% of PHC consultations in Africa concern skin problems, with 90% of HIV/AIDS patients having skin problems during the course of the disease. We wanted to test a health system strengthening approach for common skin diseases. A pilot study in Nigeria focussed on applying a diagnostic algorithm for common skin diseases, filtering out leprosy. One of the findings was that more visuals were needed. We developed a smartphone application, based on literature and feedback from dermatologists. Extra algorithms were added about skin-related NTDs and skin diseases predictive for HIV.

Objectives
To field-test a smartphone application concerning common skin diseases (including those related to HIV) and skin-related NTDs, on its usefulness and ease of understanding by general health workers in Mozambique.

Methods
The app was field-tested in Zambezia (Mozambique), both in urban and rural districts. This was done through observation of app users, semi-structured interviews, and focus group discussions.
Results
• Smartphones are widely used. Ownership is very common for health workers, mostly Android 4.1 or higher.
• After a short training of half a day, participants could easily navigate the application.
• Everybody was content with the clarity of photos in the application.
• Users mainly focus on photos, therefore the app needs extra emphasis on textual information, e.g. about location on the body, symmetry, itch etcetera.
• Health workers thought the app is a good summary of a variety of skin diseases, including signs and treatments. They found information easier to find and understand than in books.
• Medication supply is not always steady, hampering treatment.
• Workload makes it unpractical to use the application with each patient. Health workers use the application to find treatment information and in doubtful cases. In effect, the app was used as a training tool.
• With patients queuing, a search function would facilitate finding the right information.

Conclusions
The application was successful and received with great enthusiasm, offering an easy-to-use tool for the management of common skin diseases and HIV-related skin diseases, while filtering out skin-related NTDs, including leprosy. This health systems strengthening approach offers a sustainable leprosy control strategy.
ILC1.1–058
A report on a patient of lepra lepromatosa (LL) twice misdiagnosed lymphoma by two big hospital
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Objective: To improve the diagnosis of leprosy and reduce misdiagnosis.
Methods: retrospective analysis of a leprosy patient’s clinical and experiment examination that was twice misdiagnosed, review diagnosis and analyze the reason of misdiagnosis. Results: It is the reason of misdiagnosis of the dermatological department in the big hospital that there are so many outpatients that the diagnosis time is less, and The patients did not have tissue fluid smear and biopsy for acid fast stain. The reason of misdiagnosis of senior doctors in the civilian battalion hospital is that they didn’t make a comprehensive analysis of history data and treatment, no make a further inspection, and excessively echoed the superior hospital diagnosis. Conclusion: To reduce the misdiagnosis is raising our vigilance against to leprosy; find out reasons of sensory disturbance; Emphasize the importance of skin tissue fluid to check acid bacillus and the necessity of biopsy for acid fast stain.

Keywords: lepra lepromatosa (LL), misdiagnose, lymphoma, report
ILC1.1–059
Diagnosis methods of leprosy
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Objective To study the diagnosis methods of leprosy. Methods To introduce the idea of leprosy diagnosis included collecting the clinical data, seizing the main points, analyzing and diagnosing. No conditions for the diagnosis of human needed referral, there were checks and laboratory conditions could be diagnosis; differential diagnosis, make a diagnosis. Results Competence and familiarity with the idea of leprosy diagnosis can be timely and accurate diagnosis of leprosy. Conclusion No conditions for the diagnosis needed referral, there were checks and laboratory conditions can be diagnosis.

Keywords: Leprosy, Diagnosis
ILC1.1–060

Nodular Lepromatous Leprosy Mimicking Prurigo Nodularis

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INTRODUCTION
Leprosy is one of the great imitators in dermatology. Manifestation of leprosy as in the following report is peculiar and rare; not only were the lesions nodule shaped, they were also accompanied by prominent itch. The clinical manifestations, especially itch, lead to wrong diagnosis (i.e. prurigo nodularis) and subsequently failure of treatment. Our case highlights the need to conduct a thorough and careful examination of the skin and to weigh all information before arriving at a certain diagnosis.

CASE
Female, 38 years old, presented with multiple pruritic nodules on face, arms, back, and legs of eight months duration. She was diagnosed with prurigo nodularis and received clobetasol propionate 0,05% ointment. After poor response, treatment continued with combination of triamcinolone acetonide 10 mg/ml injection and desoximethasone 0,25% ointment. After eight weeks, due to lack of adequate response, a biopsy was performed.
Histopathological examination showed granulomatous reaction with foam cell macrophages, containing large number of acid-fast bacilli in the dermis to the subcutis, consistent with leprosy. Physical reexamination revealed diffuse erythematous nodules on both ear lobes and enlargement of bilateral auricular, ulnar, and posterior tibial nerves. Slit skin smear examination yielded bacterial index +4 (on the right arm) and morphology index 0.28%. Our final diagnosis is nodular type of lepromatous leprosy.

DISCUSSION
Pruritic nodules are unusual presentation in leprosy causing diagnostic confusion; nevertheless they have been reported in the literature. Slit skin smear examination is not routine, only done in suspected cases of leprosy. After histopathological examination, physical reevaluation revealed diffuse erythematous nodules on both earlobes, previously covered by the muslim headdress. The socio-cultural barrier hindered the inspection of the closed part of the patient’s body which she did not complain of. Diffuse erythematous nodule on the ear lobe is one of the typical picture of leprosy. In cases with atypical clinical features, special investigations, e.g. histopathology examination, need to be considered to support the diagnosis. This case underlines the importance of a thorough examination, not only on the location that the patient complains of.

Keywords: pruritic nodules, leprosy, prurigo nodularis, diagnosis
ILC1.1–061
Leprosy in Children: A 20 year retrospective case review in Nepal
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Objectives:
To study the profile of clinical presentations, complications and treatment of childhood leprosy registered at Anandaban Hospital, a tertiary leprosy referral center in Kathmandu, Nepal.

Methodology:
A retrospective chart study was performed on children < 15 years reporting to Anandaban Hospital from 1994 to 2015 for leprosy-related treatment. All information was entered into a computer database and analyzed.

Results:
Among 2701 total new leprosy cases registered from 1994–2015, 211 (7.8%) were < 15 years of age (range 3–15 years). 39% reported family history of known leprosy contact(s). The male to female ratio was 3:2, with the majority (60%) receiving child multibacillary (MB) multi–drug therapy (MDT) and 28% slit skin smear positive. Two patients later relapsed after successful completion of MDT. Twenty one percent of the children had WHO grade 1 and 11% had grade 2 disability at the time of registration. It was found that 30% had neuritis, 10% Type 1 reaction (T1R), and 3% had erythema nodosum leprosum (ENL); 34% received systemic steroid treatment for management of neuritis, T1R or ENL. Seven of 211 patients were treated for Dapsone Hypersensitivity, with one case of mortality within 10 days of initiating MDT.

Conclusion:
Child presentation and treatment demographics differ from adults in Nepal in areas of gender, treatment and MDT. Leprosy contacts including children should be screened for early signs of disease, as more than a third report known contacts. Despite various programs to eradicate leprosy, continued leprosy detection in children demonstrates active transmission.

Keywords: Leprosy, MDT, Disability, Dapsone Hypersensitivity, Relapse
ILC1.2-001
Late Disability Outcomes In MB Leprosy Cases Treated With Only 6m MBMDT
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Objectives
To compare disability outcomes over 10 years follow up, in MB leprosy patients who had received 12m or 6m MBMDT

Methods
A study of 6m triple therapy was conducted in Bangladesh for MB leprosy cases newly diagnosed in 2005-6. They were compared with a similar cohort of subjects who received standard 12m triple therapy. These 554 subjects were followed up annually for up to 10 years, to assess their bacteriological, neurological and clinical condition. Any who suffered acute reaction (reversal or ENL) or new nerve function impairment were normally offered a 12 week steroid course, but the attending clinician could adjust the treatment according to expert assessment at the time. The late outcomes of the two cohorts are compared in respect of proportions of subjects with worse WHO disability grade than at diagnosis, with decreased nerve function score compared with that at diagnosis, or with reactional episodes requiring steroids ("at any time" or "more than 2 or 5 years after starting MDT"). We also compare outcomes in the groups of subjects who initially had negative or positive smears.

Results (initial analysis)
Data on annual assessments for mean 8.3 years, of 554 subjects (57% after 6m and 43% after 12m MBMDT) amounted to 4609 pyar follow up.
At entry subjects’ WHO disability grades were as follows: grade 0,1,2 respectively in 6m regimen cohort 53%, 23%, 23%, and for grades 0,1,2 in 12m regimen cohort 53%, 22%, 24%. Findings will be presented on the late disability levels in terms of changes in WHO disability grade, changes in total nerve function impairment, changes in visual acuity. We also report on frequency, timing and duration of Leprosy reaction in the 2 cohorts

Conclusions The data presented will help in decisions about the advisability of introducing the shorter course of MDT in routine leprosy control, and in policy for monitoring MB patients after completing MDT.

Keywords: chemotherapy, disability, nerve function impairment, leprosy reaction
ILC1.2-002
U-MDT; are we ready for the change: a retrospective study on clinical non-responsiveness to MDT in multibacillary patients
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World Health Organization (WHO) has proposed treatment with U-MDT regimen, to be the key tenet of the global leprosy elimination strategy (2016–2020). WHO MDT has been used successfully for over four decades and has played a tremendous role in achieving the epidemiological target of “elimination of leprosy as a public health problem”. However, in the past few years, leprologists/dermatologists across India are observing a subset of leprosy patients particularly with multibacillary disease who are suspected to have “clinical resistance” or “non-responsiveness” to WHO MDT MBR. Aims: This retrospective study was carried out to gain an insight into clinico-epidemiological details such non-responsive MB cases treated with WHO MDT MBR for 12 months.

Methods: The leprosy clinic files over a period of six years (2009–2014) were analysed. The data was collected with respect to demographic profile of the patients, clinical lesions, final diagnosis, investigations consisting of slit skin smear (SSS) and histopathology. The criteria for non-responsiveness were: (a) Appearance of new lesions (not due to reaction) with deterioration of the disease after the completion of treatment (b) no decline in the morphological index (MI) after 12–24 months of MDT-MBR.

Results: Over a period of six years 434 cases of leprosy were enrolled; among them 63.13% (274) were diagnosed as MB and 36.86% (160) as pauci-bacillary (PB). Thirty five patients (8.05%) fulfilled both the criteria for unresponsiveness to MDT-MBR. The mean baseline BI and MI of these patients was 5.07 and 6.35 respectively. Recurrent erythema nodosum leprosum (ENL) and chronic ENL were seen in 10 (28.5%) and 6 (17.1%) patients respectively. All these patients were started on alternative treatment with clofazimine, minocycline and ofloxacin following which the MI became zero, the lesions improved and their ENL also responded favorably.

Conclusions: Our study highlights the problem of clinical nonresponsiveness to WHO MDT MBR in a subset of MB patients. These patients represent the high infection pool and pose a potential threat to elimination. In our opinion UMDT should not be implemented as it will lead to under treating of these MB cases especially with high BI which can lead to relapses and resistance.

Keywords: U-MDT, multibacillary leprosy, clinical resistance, non-responsiveness, WHO MDT MBR
Experiences with Thalidomide for Erythema Nodosum Leprosum – a retrospective study
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Background: Thalidomide is well known as a steroid sparing drug in type 2 reaction in leprosy. There is no guideline as when it should be offered to patients. Documentation of ENL presentation with its morbidity before and after with patient profile can be a baseline to develop a selection criteria as to when thalidomide should be started to reduce steroid related morbidity.

Methodology: Chart and electronic record review was done.

Result: 427 ENL patients attended the hospital from 2010 to 2014. 73(67 males 6 females) patients were treated with thalidomide. 77% (56) patients were in the age group of 16-45 yrs. 16%(12) were dependant and 39%(29) were taking steroids at presentation. 82%(60) became dependant while on treatment, 95% were chronic or recurrent ENLs and 73%(53) had moderate to severe ENLs over 49 median months. Steroid induced morbidities were (Cushingoid features 42%, diabetes 21%, infections GI 42%, genitourinary 26%, cataract 23%). There was 11% mortality.

Discussion: Further studies are recommended to diagnose steroid dependence early to prevent serious adverse effects.

Keywords: ENL, Thalidomide, steroids
ILC1.2-004

COMPARATIVE EVALUATION OF A NEW 1,3-DIAZINON-4 PYaTd1 AND DAPSONE ON PERIPHERAL BLOOD INDICATORS IN THE EXPERIMENT

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Objectives. The search for new drugs with antileprosy activity and less toxicity relative to dapsone is actually. New compound – a derivative of 1,3-diazinon-4 under the code PYaTd1, is synthesized in Pyatigorsk Medical Pharmaceutical Institute, the results of primary screening showed that it has an activity identical to dapsone. We researched its influence on blood parameters in rats at long-term administration.

Methods. The study was performed on 60 rats «Wistar» of both sexes, weight 190–205 g. The animals were divided into groups, taking into account gender, 1 and 2 groups were control and they got distilled water as placebo, 3 and 4 – dapsone, 5 and 6 – PYaTd1 25 mg / kg (minimum effective dose). The substances were administered into the stomach by gavage once per day for 30 days. Blood was carried out from the sublingual vein. Parameters of blood were determined using system of veterinary auto hematological analysis 2800 BC vet (Mindrey). All manipulations were carried out according to GLP requirements. The results were processed statistically using «BIOSTAT» program. The significance of differences was determined by Student's.
Results. Reduction in the content of erythrocytes and hemoglobin, and other changes of erythrocyte’s characteristics were not observed in rats treated with compound PYaTd1 for 30 days. At the same time, these parameters are significantly reduced, and the average volume of red blood cells and the coefficients of variation are increased in the rats treated with dapsone. In female rats, these changes expressed less than in males. Reduction of platelet count and trombocrit, increase in the average volume of platelets and their coefficient of variation were showed in animals of both sexes. In rats treated with PYaTd1, significant changes in platelet parameters have been identified. Decrease in the relative content of neutrophilic granulocytes and the appearance a big amount of immature forms in comparison with the control were observed in leukogram of animals under the effect of dapsone. The percentage of eosinophils were also reduced. In conditions of PYaTd1 such changes have been identified.

Conclusions. The results of experiment provide a basis to conclude that a compound PYaTd1 under identical conditions of administration, in contrast to dapsone, has no adverse effect on the peripheral blood. It determines its prospects for future research.

Keywords: TOXICITY, NEW 1, 3-DIAZINON-4, DAPSONE, INDICES OF BLOOD
ILC1.2–005
RE–EXAMINING THE EVIDENCE ON UNIFORM MDT (UMDT) FOR LEPROSY
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Introduction: WHO recently formulated its strategy for leprosy control in a draft
document titled, “Universal elimination of leprosy, towards zero disabilities
among new child cases plan period: 2016–2020.” This draft also states as one
of its strategy to “promote use of shorter, uniform treatment regimen, uniform–
multi–drug therapy (U–MDT)” for all categories of leprosy globally in its executive
summary. The objective of this paper is to re–examine the evidence for UMDT in
the light of the above recommendations.

Methods: Various studies have been conducted on the efficacy of UMDT in
the past and are also presently ongoing. The WHO initiated a non comparative
open label multicenter study with 8 centers in India and 2 in China. The evidence
available at this point of time from studies from China, Brazil and India are
examined and inferences drawn.

Results: An open comparative study between WHO MDT and U–MDT regimen
with follow–up of 24 months carried out in India in 127 patients based on clinical,
bacteriological, and histopathological parameters, concluded that U–MDT of
6 months duration was effective in PB leprosy but was too short a regimen to
adequately treat MB leprosy. Two other studies from Brazil too did not find U–MDT
superior to 12 months WHO MDT–MB. In a study from China on 165 MB patients
reported that at the end of 42 months of follow–up post–U–MDT, 26.5% of
patients were still smear positive and reactions were marginally higher. The study
revealed one relapse 13 months after stopping UMDT. A more recent report after
six years follow concludes that UMDT is effective in MB leprosy patients, however,
they conclude that further research should be conducted to confirm these results.
The WHO Technical advisory group reports in 2014 that the preliminary results of
multicentric study on U–MDT are encouraging.

Conclusion: Evidence is still coming in from the different trials on UMDT in the
world. The evidence available is equivocal and not convincing. There is still reason
for caution for its widespread implementation.

Keywords: U–MDT, leprosy control, evidence
ILC1.2-006
Treatment Completion and Adverse Effect Profile of Multi Drug Therapy for Leprosy in Sri Lanka

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Multi drug therapy (MDT), issued free of charge by the WHO is used worldwide as the first line therapy for leprosy. Even though the Anti Leprosy Campaign, Sri Lanka, has comprehensive data on patients with leprosy at diagnosis, data on follow up, including treatment completion rate, the frequency of adverse effects due to MDT and the rate of lepra reactions are not complete.

Objectives
To determine the treatment completion rate and the adverse effect profile of MDT.

Methods:
Retrospective study using clinical case records and an interviewer administered questionnaire. All patients who had been started on MDT from 1/1/2009 to 31/12/2011 were included.

Results:
A total of 407 records were analysed. The ethnic distribution of the sample was fairly representative of the ethnic distribution of the country.
The majority (57.6%) belonged to the paucibacillary (PB) category. Disability at, during and after completion of treatment was significantly more among men.
There were 91 defaulters and the treatment completion rate was 78.4%. There was no difference between males and females. The defaulter rate among the Sinhalese was 63.7% while in persons of other ethnicities the defaulter rate was 36.3%. This difference between the ethnic groups was statistically significant.
Only nine (9.9%) out of 91 defaulters could be contacted using conventional methods. Among those who responded, the commonest reason for default was adverse effects due to therapy. Fifty eight (18.5%) patients developed at least one adverse effect. The occurrence was significantly more in females. The adverse effects in order of frequency were; dapsone induced haemolysis (n=35), dapsone intolerance (n= 25) dapsone induced hepatitis (n=12), dapsone hypersensitivity syndrome (n=5), allergy to any component of MDT (n=9), flu like illness (n=1) leucopenia (n=1), Steven Johnson Syndrome (n=1). In 42 patients the treatment was changed due to adverse effects. In 39 (92.9%) patients the treatment was changed to MDT MB without dapsone while ofloxacin was added to the treatment in 3 patients.

Conclusions:
The defaulter rate (21.4%) and the rate of adverse effects among the sample were high. Approximately 10% (42/407) needed a change in treatment. It is important to consider this change in treatment in preparing estimates for MDT. Prospective studies looking at the adverse effect profile in more detail are necessary. The present methods of defaulter tracing should be reviewed and revised to ensure better treatment compliance.

**Keywords:** multi drug therapy, default, adverse effects
ILC1.2–007
A Molecular Assay for Determining Mycobacterium leprae Viability in Tissues and its Application to Clinical Samples
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Objectives: Despite numerous attempts, Mycobacterium leprae has never been cultivated on laboratory medium or in cell culture. Moreover, growth in the host, whether clinically (i.e. human) or experimentally (i.e. mouse foot pad or armadillo), occurs very slowly (2 wks). These distinctive characteristics make detection and monitoring M. leprae viability slow, cumbersome, and expensive tasks. Thus, in an effort to simplify and expedite these procedures, we developed a quantitative reverse transcription - PCR (qRT–PCR)-based molecular viability assay (MVA) for assessing M. leprae viability in tissues.

Methods: For assay development, M. leprae was inoculated into the foot pads of athymic nude mice, which allow prolific growth of the bacilli, and into foot pads of immunocompetent BALB/c mice where an adaptive immune response kills the organisms. Bacterial killing was also assessed in drug-treated athymic nude mice. For clinical studies biopsy specimens were obtained, after informed consent, from patients comprising the full leprosy spectrum reporting to clinics in Nepal and the Philippines. All M. leprae-infected tissue specimens were fixed, stored, and shipped in 70% ethanol.
The tissues were rehydrated in water, minced, and suspended in TRIzol reagent for RNA and DNA extraction using a vertical homogenizer system. The number of M. leprae in each specimen was determined on the DNA fraction via qPCR for the M. leprae-specific repetitive element, RLEP. The RNA equivalent of 3000 M. leprae was reverse transcribed to cDNA and viability was determined using qPCR assays specific for hsp18 (encodes the 18kD protein) and esxA (encodes the ESAT-6 protein). Mocks and negative controls were included.

Results: The MVA is a rapid and reproducible indicator of bacterial viability in experimental animal tissues, accurately differentiating viable M. leprae from bacilli killed by host immunity or antimicrobial therapy. Of the clinical samples tested thus far, 36/45 (80%) yielded sufficient M. leprae to forward on to the hsp18 and esxA expression analyses. Of these, 24/33 (72.7%) demonstrated viable M. leprae whereas 9/33 (27.3%) indicated dead bacteria. We are currently analyzing additional patient specimens and providing training in this new technology.

Conclusions: The inability to cultivate M. leprae axenically makes even the most fundamental attempts to study its genetics, metabolism, sensitivity to antimicrobials, and pathogenicity difficult. The MVA will expedite experimental evaluation of potential new anti-leprosy drugs, drug regimens, or other therapies. Additionally, it may provide a rapid M. leprae detection and viability assay to assist in clinical diagnosis, especially relapse, and monitoring treatment efficacy.

**Keywords:** viability, RT-PCR, chemotherapy, biopsy, mouse foot pad
Treatment of Trophic Ulcers in Leprosy with Intrallesional Autologous Platelet Rich Plasma
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Trophic Ulcers in Leprosy with Intrallesional Autologous Platelet Rich Plasma, Rai Mamta, Yadav Savita, Khanna Neena.

Introduction: Trophic ulcers are seen in about 10–20% of leprosy patients and result in serious disability. Managing such patients is a therapeutic challenge for the clinician. Platelet rich plasma (PRP), which contains high concentration of multiple fundamental growth factors helps in modulation of tissue repair and regeneration and wound healing.

Objective: To retrospectively evaluate the response of intrallesional autologous PRP injection in treatment of trophic ulcers in leprosy.

Methods: In 3 patients, 4 trophic ulcers which had failed to respond to conventional treatment were treated with intrallesional injections of autologous PRP prepared from patient’s own blood, using dual spin method. Within 5 minutes of preparation, 0.5ml of the PRP so prepared was injected at 4 equidistant points into the ulcer about 0.5 cm from the margin, using a 24 gauge needle. Three injections were given, at 4-weekly intervals. The response to PRP was assessed by calculating the reduction in area of the ulcer and quantifying the patient’s satisfaction with treatment on a visual anologue scale (VAS).
We calculated the area of the ulcer at baseline and at 4 weekly intervals, by tracing its outline on a transparent sheet and transferring it on to a graph paper. The patient’s satisfaction with the treatment was assessed at week 4, 8 and 12 on a VAS ranging from 0-10, with 0 being the worst and 10 being the best.

Results: All 3 patients were males and had the trophic ulcers for a period of ranging from 6 months to 2 years and had used a variety of treatment modalities including rest, antibiotics and dressings. The ulcers were present on medial malleolus in 1 patient, and over the plantar surface in others. The mean area of ulcer at baseline (week 0) was 2.11 cm², and at week 12, ulcers had healed completely. On VAS the mean of patient’s satisfaction with the treatment was week 4, 8, and 10 at week 4, 8 and 12, respectively.

Conclusion: Intrallesional autologous PRP therapy is a potential treatment modality for non-healing trophic ulcers in leprosy patients. However, further randomized controlled trials are necessary to establish its efficacy.

Keywords: leprosy, trophic ulcers, PRP
Molecular Investigation and Characterization of Phenotypically Rifampicin-Resistant Mycobacterium leprae Samples Lacking Known rpoB Resistance Mutations

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Objective: While multi-drug therapy (MDT) has proven effective in killing Mycobacterium leprae, drug resistance development is of global concern. Drug resistance can be detected either phenotypically using mouse footpad (MFP) growth assay or more quickly by molecular detection of known mutations within resistance genes for dapsone (folP), rifampicin (rpoB) and ofloxacin (gyrA). The Mycobacterial Research Laboratories of Anandaban Hospital have been monitoring leprosy drug resistance in Nepal using MFP assay since 1980 and by molecular methods since 2000. Since 2008, some patient isolates demonstrated phenotypic rifampicin-resistance without evidence of known rpoB mutations. In this study, we have employed whole genome sequencing (WGS) in order to further investigate and characterize these samples.

Methods: M. leprae was isolated from skin biopsies and inoculated for culture using the Shepard MFP model in 3 treatment groups: rifampicin (weekly gavage), dapsone (daily in feed) or untreated controls. Fresh biopsy homogenates were also screened for other mycobacteria using Lowenstein Jensen media.
M. leprae isolates evidencing phenotypic rifampicin–resistance with or without dapsone–resistance were then subjected to DNA isolation, PCR and sequencing of the drug resistance determining regions (DRDR) of rpoB and folP in two independent laboratories. In addition, WGS using the Illumina MiSeq platform was carried out for 6 strains.

Results: Twelve leprosy patient isolates evidenced some level of M. leprae growth in the presence of rifampicin. All were culture negative on Lowenstein Jensen media. The DRDR in rpoB was consistently found to be wild-type when tested by PCR–sequencing of the rpoB amplicon. WGS yielded ~30X coverage of one strain belonging to SNP type 1D. This strain revealed 18 non–synonymous SNPs of which only four (in genes fadD29, thiO, ML2035 and ML2075) were not present in previously sequenced M. leprae strains (n=16) from different parts of the world.

Conclusions: Comparative genomics of these strains can pinpoint the SNPs uniquely shared by these rifampicin–resistant strains with wild–type rpoB gene. As the rifampcin–resistance of these field samples was undetectable by existing molecular assays, these findings highlight limitations while re–affirming a role for strategic phenotypic screening (MFP). For the remaining samples in our study, we will carry out DNA enrichment to improve the genome coverage. Further identification of mutations unique to such strains by whole genome sequencing can help in identifying alternate molecular mechanisms of rifampicin–resistance in mycobacterial pathogens.

**Keywords:** Leprosy, Rifampicin, Whole Genome Sequencing, Single Nucleotide Polymorphism, Illumina MiSeq platform
ILC1.2-010
Leprosy Drug Resistance Monitoring in Nepal
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Objective: To surveillance monitor leprosy drug resistance in Nepalese leprosy patients.

Methods: Mycobacterium leprae isolates were obtained from skin biopsies from untreated primary and secondary multibacillary (MB) leprosy patients. Biological growth testing was performed using the standard Shepard mouse foot pad (MFP) model for dapsone and rifampicin. Molecular screening by PCR and DNA sequencing was performed in samples since 2000 to detect mutations associated with resistance to dapsone (folP), rifampcin (rpoB) and ofloxacin (gyrA).

Results:
Altogether 1040 primary, 72 secondary and 74 dapsone monotherapy relapse cases have been evaluated for leprosy drug resistance by MFP in Nepal since 1980. Among primary and secondary patients, 118 have demonstrated some level of dapsone resistance and 14 rifampicin resistance. Both high and low level dapsone resistance has been reported in Nepal since 1984. Within the last 7 years, 13.3% of MFP-tested cases demonstrated low levels of phenotypic resistance without known folP mutations. Within the same time frame, 2% were phenotypically and molecularly-identified as dapsone resistant. Rifampicin resistance was first detected in 2008. Since then, a total of 7% (14/196) of tested cases have demonstrated rifampicin resistance. While phenotypically resistant, many of these rifampicin resistant samples have lacked known rpoB mutations. Two primary and 4 secondary cases have demonstrated some level of both dapsone and rifampicin resistance in past six years. To date, all patients seem to respond to MDT; although more recently, some have been provided secondary line drugs.

Conclusions:
While global leprosy relapse rates are ~1% after multi-drug therapy (MDT), increasing detection of drug resistance within endemic populations should be of concern. In Nepal, both rifampicin and dapsone resistance are detectable within primary and secondary patient populations. Some phenotypically rifampicin resistant strains lacking known rpoB mutations are currently undergoing further molecular analyses (see separate presentation).

Keywords: Leprosy, Dapsone, Rifampicin, Drug Resistance, Mouse Foot Pad Assay
ILC1.2-011
Any chemical treatment progress
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Existing leprosy drug resistance of leprosy resistant bacteria and vitality to the side effects, as well as the standard of the world health organization recommends the curative effect of combined chemotherapy scheme, and recurrence rate after treatment. In 1998 the world health organization (who) expert committee meeting 7 leprosy leprosy treatment with combination chemotherapy shortened more bacteria was put forward to 1 year, and no single lesions less bacteria leprosy joint scheme of a quantity with three kinds of drugs treatment recommendations. Given the combined chemotherapy in the treatment of many bacteria leprosy period reduced to 1 year of curative effect remains to be seen, and no single lesions less bacteria leprosy is very little in our country, proposed our country is still to the world health organization (who) standard of MDT fixed cure period of treatment is advisable.

Keywords: progress, leprosy, Chemical treatment
ILC1.2-012
Topical Application of Platelet Rich Plasma in Treatment Chronic Leprosy Leg Ulcer
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Introduction: Platelet rich plasma (PRP) in dermatology plays a key role in the treatment of chronic ulcers and has already been applied in several clinical situations. In spite of recent advances and emergence of new drug therapy for leprosy, treatment of chronic leprosy ulcers may become ‘frustrating’. Hereby report a case topical application of PRP in chronic leg ulcer in leprosy.

Case: A 65 year-old man presented with leg ulcer since 2 years before admission that became wider since 1 month before. Firstly appeared as tender small ulcer that became a wide painless ulcer. This ulcer had never been healed. Diagnosed as morbus hansen lepromatous leprosy 2 years before maintained on uniform multi-drug therapy (MDT) for the previous 12 months. Dapsone was not given since dapsone syndrome appeared after first ingestion. Dermatological examination on anterior aspect of leg dextra revealed well-defined clean erythematosus-based ulcer, sharply defined borders, no erythema no tender and no discharge along the margin. Volume was counted with value 25,46 (12cm x 9cm x 0,3cm x 0,786). Nerve peroneus communis and tibialis posterior dextra and sinistra were tender. Complete blood count showed hemoglobin 12 g/dl. Liver function and renal function test were within normal limit. Diagnosed as chronic leg ulcer in leprosy, platelet rich plasma were applied after debridement and closed with gauze dressing. Improvement had been shown in seven days. Volume was counter with value 20,75 (11cm x 8cm x 0,3cm x 0,786).

Discussion: Topical application of PRP significantly accelerated the re-epithelialisation process, shown to be through the upregulation of cell cycle regulatory proteins in chronic ulcer. Management of chronic leg leprosy ulcers using platelet rich plasma has promising result that may become a new hope for leprosy patients since its benefit in low cost and morbidity.

Keywords: Platelet Rich Plasma, Leprosy, Chronic, Leg Ulcer, Treatment
ILC1.2-013
MOXIFLOXACIN BASED REGIMENS IN LEPROSY – CLINICAL OBSERVATIONS ON OCCURRENCE OF REACTIONS AND BACTERIAL DECLINE
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Introduction
We have earlier reported our observations on clinical trials in leprosy using Moxifloxacin based regimens for the first time in 2009 (Ganapati et al 2009). Further observations on clinical parameters were also reported in 2013 (Pai et al 2013). Moxifloxacin a fluoroquinolone has been shown to be powerful bactericidal agent against M leprae. We now report subsequent observations based on this regimen in a larger series of patients.

Methods
In an open comparative trial aimed to make observations on a selected sample of 234 patients with 117 patients smear positive (age group of 10 to 63 years) and another group of 117 patients smear positive (age group of 16 to 70 years) in an ongoing clinical trial receiving Moxifloxacin 400mg, Rifampicin 600mg and Minocycline 200mg (MRM) at monthly intervals for 12 months while the comparative group of (MRMC) received Clofazimine in addition to judge its anti-inflammatory property in preventing reactions. This group received 300mg under supervision along with MRM followed by unsupervised doses of 50mg daily clofazimine. Patients available for analysis of reaction for a follow up period of 4 years were selected. Though sample of bacillated patients in MRM and MRMC groups is being studied from relapse point of view, bacteriological status measured by BI of all patients at 12th, 24th, 36th and 48th months was assessed in both groups.
Results
It was observed that a high proportion of patients had reactions in 48 (41%) patients in smear positive MRM group, while reactions were seen in 44 (37.6%) patients in MRMC group. In 24 (19%) in 124 patients of PB group and 16 (45.7%) in 35 smear negative MB patients of MRM group while comparative group of smear negative MB patients receiving MRMC had 18 (51.4%) reactions though they were not severe and controllable with conventional treatment. Addition of Clofazimine did not appear to have particular influence on occurrence of reactions. Long term observations are in progress. Average BI of all patients in both groups with initial mean BI of > 3.0+ showed steady decline.

Conclusion
We observed good clinical improvement in most of cases of MB and PB though reactions were a predominant feature in smear positive MB patients, but not a major feature in PB group. BI decline in both smear positive groups was comparable. Further observations on rate of decline of BI, reactions and most importantly on relapses will be observed and reported.

Keywords: Moxifloxacin, Reactions, Bacterial decline, Relapse
ILC1.2-014
RELAPSES IN LEPROSY - FIELD AND CLINICAL OBSERVATIONS
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Introduction
Relapses in leprosy pose not only clinical challenges but also epidemiological challenges due to transmission of leprosy. Between 2010–11 and 2014–15, India reported 1611 confirmed relapse cases of which 424 cases were reported from Maharashtra (NLEP reports). Further, 236 cases from Maharashtra were reported in 2013–14 alone. Relapses could be either due to persistent dormant mycobacteria or due to insufficient treatment. Potential of such cases, either to act as incubatory carriers prior to clinical manifestation of relapse or even to act as convalescent carriers, needs to be explored. We present our experience in BLP in the post integration period (July 2004 to 2015) pertaining to study of occurrence of relapses as seen in our center. A recent follow up study by BLP in association with Foundation for Medical Research, Mumbai and Kushtgarog Nivaran Samiti, Panvel on occurrence of relapse cases in a cohort of 577 leprosy patients released from treatment (RFT) between April 2005 and March 2010 from the public health facilities in parts of Maharashtra State India revealed a relapse rate of 11% (Shetty et al, 2015).
Methods
Sporadic relapses reporting voluntarily beyond specified surveillance periods, pose a threat of continued transmission. In this study we undertook surveillance of relapses to trace and reassess all MB patients treated with MDT and Short Course Chemotherapy (SCC) for detecting possible relapses.

Results
The number of patients confirmed as relapse in relation to duration of follow-up was 16 patients in MDT >24, 17 in MDT =24, 21 in MDT=12, 11 in ROM=1, 9 in ROM=3, 6 in ROM=6, 8 in RO=28 days.

Conclusion
Therefore it is necessary to identify the relapses early before they transmit the infection to a large segment of population. Though relapses are few in relation to the number of leprosy cases completed treatment it has not been adequately documented at the community level, particularly in densely populated cities like Mumbai. Besides the static trend in detection of new smear positive cases indicating a constant pool of reservoir of infection in the community continued occurrence of relapses will only add to the quantum of reservoir of infection responsible for chain of transmission and disease burden in the community.

**Keywords**: Relapse, Short Course Chemotherapy, Surveillance, Transmission, Disease Burden
Results of eight years’ following up among multibacillary patients treated with six months of UMDT in China

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Objective: To analyze the results of treatment among MB patients 8 years after treated with six months’ multidrug therapy.

Methods: Newly detected and relapsed MB leprosy patients were treated with 6 months’ WHO multidrug therapy. Then the patients were followed up for 8 years. The effectiveness of treatment was analyzed by clinical status and bacteriological changes.

Results: A total of 114 patients were recruited. Forty two patients were withdrawn from the study based on various reasons. Only 72 patients were qualified for final analysis. The mean bacteriological index (Bi) of all patients decreased from 2.93 ± 1.39 before treatment to 0 at the end of eight year’s following up with annual Bi decrease of 0.42. The rate of smear negativity of all patients was 100% at the end of eight year’s following up. There were 38 leprosy reactions observed during the study with a rate of 53.5% and one patients relapsed with a relapsed rate of 0.05 per 100 patient year.

Conclusion: The recent and long term effect of UMDT for treatment of leprosy is similar to that of therapies with one or two years’ routine MDT.

Keywords: leprosy, multidrug therapy, bacteriological index, leprosy reaction
ILC1.2-016
Analysis of Combined Chemotherapy towards Leprosy in Hezhou, Guangxi
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Objective The purpose of the thesis is to get to know and sum up the combined chemotherapy of leprosy so as to map out the strategy of preventing leprosy and provide theoretical basis for therapy. Methods The method that authors adopt is to collect, sort out and count the data of leprosy sufferers from 1986 to 2015. Results After analysis, the authors got the result that 183 persons have accepted MDT therapy in Hezhou. There are 162 new cases and 21 recurrent cases. Among them, male leprosy sufferers account for 76.5% and youth adults of leprosy sufferer account for more than 88.52%. 91.26% leprosy sufferers are Hans and 95.08% sufferers are farmers. There are 59.02% MB sufferers and 40.98 % PB sufferers. 39.4% leprosy sufferers have the symptom of visibility of disability. 74.86 % leprosy sufferers choose extramural hospital treatment. The average age of sufferers is 45.55. It takes 2.77 years to cure the disease. 97.11 % of them can be cured with a recurrent rate of 1.79 %. 97.62 % of them return to their residence community after treatment. Conclusion The thesis draws the conclusion that the sufferers who choose MDT therapy could be cured in a short time with high curative rate, low recurrent rate and visibility of disability, less adverse drug reaction. Sufferers take medicine with less time and good cooperation. In conclusion, MDT is the best way to cure leprosy.

Keywords: leprosy, combined treatment, Hezhou City
ILC1.2–017
A Case of Misdiagnosed Multidiscipline Leprosy
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[Abstract] A 60 year-old man presented with swelling and pain on both lower limbs for 9 months, accompanied by swelling and pain on right palm for a week. ANCA, p-ANCA,MPO, were detected as positive and his RF-Ig was 164.5U/ml, therefore the patient was hospitalized in departments of rheumatology and immunology at several provincial hospitals throughout Yunnan province. The patient was diagnosed as ANCA associated vasculitis and rheumatoid arthritis. The patient had undergone continuous systemic treatment with prednisone and methotrexate for 4 months. After this treatment the patient’s urinary protein worse to 3+ and she was further diagnosed with Nephrotic syndrome at the department of nephrology. Department of dermatology was asked to consult the patient, who was found to have an ulcer on right lateral aspect of planter surface of the foot for 2 months. Upon further investigation medical history of the patient reviled that patient had numbness in the limbs for half a year. Examination at department of dermatology reviled that, both hands joints were anfractuous and misshapen like “ape hands”. Wasting of the thenar and hypothenar eminences was present, thickened nerves could be found on cutaneous aspect of limbs. The ulcerative lesion about 2cm*1.5cm on right lateral aspect of planter surface of the foot accompanied with purulent secretion on the surface. The biopsy of skin lesion showed epidermal hyperkeratosis with focal parakeratosis, acanthosis, dermal angiectasias, lymphocytes and histiocytes infiltration around the vascular margins. The final diagnosis of Tuberculoid Lepromin with acute kidney injury was made. Treatment included stopped the incrcetion and immunosuppressant and treated with MDT for 3 months. Upon follow-up proteinuria became negative and the ulcer healed completely.

Keywords: Leprosy, Misdiagnosis, Acute kidney injury
ILC1.2–018
Misdiagnosis of leprosy report of two cases
heng long

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Abstract: Leprosy is a chronic infectious disease caused by Mycobacterium leprae and Mycobacterium leprae entering the body after perineural invasion and superficial sensory disturbance of lesions on the skin and mucosa, serious can lead to muscle atrophy, bone resorption, chronic ulcer and so on, forming facial paralysis, rabbit eyes, hook finger (toe), vertical wrist (foot), loss of functional and cosmetic deformity. This paper reports two cases of misdiagnosed cases, the loss of skin lesions in the late, the early manifestation of the skin lesions and skin granuloma, persistent uplift of erythema, lupus erythematosus and other manifestations are very similar, easy to misdiagnosis. Tip: young physician in Jiezhen similar skin manifestations of patients must be asked in detail about the history of disease, infectious disease contact history, in particular, to perfect relevant examination, especially skin tissue smear looking for acid fast bacilli and skin biopsy of specific changes, otherwise, leading to misdiagnosis cause exacerbations even disability, or spread to other people.

Keywords: Leprosy, misdiagnosis, Report
ILC1.2–019
A three generations of lineal consanguinity 4 people with leprosy with DDS syndrome in children 1 case report
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[abstract] Objective to explore the leprosy disease status in the family, family within the agglomeration phenomenon, dapsone syndrome (DDS) clinical manifestation, laboratory examination and treatment measures. Methods within a family of 4 cases of leprosy patients epidemiological investigation, and make analysis of risk factors and monitoring measures. Results blood relationship is leprosy disease risk factors, family family gathering is DDS syndrome in patients with risk factors. DDS syndrome in children is rare, in a critical condition, need to strengthen the monitoring, timely detection and timely treatment. Conclusion: to strengthen the related leprosy family members focus tracking and regular physical examination are important for monitoring the leprosy measures, strengthen the grassroots leprosy prevention workers against leprosy knowledge training of adverse drug reactions, effectively improve the understanding of DDS syndrome, is the key to timely detection, timely handling DDS syndrome. For leprosy chemotherapy before blood, urine, liver, kidney, leprosy HLA – B left 1301 laboratory is the foundation of the DDS syndrome monitoring indicators.

Keywords: leprosy family gathering, DDS syndrome based indicators
ILC1.2-020
Experimental treatment for Jorge Lobo’s disease with MDT/MB/WHO
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Objective: this study aims at comparing different therapeutic schemes using MDT/MB/WHO alone or combined with other treatment options as an experimental therapy for Jorge Lobo’s disease (DJL), a neglected tropical disease that has never had a satisfactory treatment reported.

Material and methods: a total of 80 DJL patients were treated either with MDT/MB/WHO; MDT/MB/WHO and itraconazole (200mg daily); MDT/MB/WHO, itraconazol and surgery; MDT/MB/WHO and surgery. Patients received drugs daily for four years and were evaluated every six months, improvement criteria were: decreased or remission of pruritus, atrophy of the lesions, decreased number of fungi and/or viability. Cure was considered when there was a total remission of lesions in at least two years of follow-up after the end of treatment.

Results: Among the 80 evaluated patients, 53 (66.3%) presented improvement, independent on the therapeutic scheme used. Eight patients (10%) remained stable, with decreased pruritus but slight reduction of size of the lesions and number of fungi and/or viability. It is important to highlight that 19 (23.8%) of the individuals were considered cured after the different treatments. A higher percentage of patients who improved was found in the groups treated with MDT/MB/WHO, itraconazole and surgery (94.7%) and in the group treated with MDT/MB/WHO and surgery (92.3%) independent of the clinical form.

Conclusions: The number of patients who improved after four years of regular MDT/MB/WHO treatment alone or associated with surgery and/or itraconazole was higher than the number of patients who remained stable. The quality of life of the patients treated with MDT/MB/WHO improved dramatically. Because DJL is a chronic disease of long evolution, the challenge to help these patients is to make a treatment option available, once specific treatment options with antifungal drugs are scarce and inefficient.

Keywords:
LC1.2–021
Comparative Study between Multi Drug and Homoeopathic Medicine in Treatment of Multibacillary Leprosy
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Objectives: Introduction of multidrug therapy (MDT), the prevalence of leprosy has been brought down remarkably but after completion of MDT for one year in multibacillary (MB) leprosy, clinically most of the patients do not feel cured because of the existence of their lesion for a long time which is the root cause of stigma. Different clinical trials demonstrated that some homoeopathic medicine can reverse the loss of sensation of hand and feet healing of trophic ulcer in lepromatous leprosy affected persons who have been released from MDT. In this clinical trial an effort was taken to compare the efficacy of a homoeopathic medicine Mercurius solubilis with MDT for the cure of leprosy.

Methods: Sixty proven cases of lepromatous patients who had no previous history of treatment were taken in the study. All the patients were divided into two equal groups; one group was given orally WHO recommended MB regimen of MDT and the other group received a homoeopathic medicine, Mercurius solubilis in 200 potency once a week, for a period of one year. All the patients were subjected to clinical examination, slit skin smear, histologic study of skin lesion and lepromin test before and after the treatment.
Results: The patients, received MDT showed no significant changes in clinical signs and no change in lepromin reaction whereas hypo aesthetic, macular, papular lesion patches were found to be disappeared in patients who received Mercurius solubilis and 70% patients showed positive lepromin reaction after treatment. Complete regain of touch and pressure sensation with reappearance of normal texture of the lesions was also recorded. The patients who received MDT did not show any change in these parameters.

Histopathological study of skin biopsies of both groups before treatment showed presence of granuloma, and perivascular, perineural inflammations with degeneration of nerves. The patients received homeopathic treatment showed almost normal dermis containing normal looking nerve twigs and few sweat glands. Blood vessels appeared to be normal. No Granuloma was observed. Perivascular and perineural inflammation were also not recoded. On the other hand, histopathology of the patients treated with MDT failed to reveal such changes except absence of granuloma.

Conclusions: The clinical trial revealed that the homeopathic medicine – Mercurius solubilis in 200 potency was found advantageous in regaining loss of sensation of lesional area with regeneration of nerve fibres and upgradation of host immunity than MDT in lepromatous patients.

**Keywords:** Mercurius solubilis, Lepromatous leprosy, Lepromin, MDT
ILC1.2–022

Drug–resistance surveillance and genotyping of Mycobacterium leprae strains from Yemen
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Molecular drug susceptibility testing was performed on skin biopsies from 16 leprosy patients from Yemen for the first time. 8 of them are relapse cases. We identified secondary drug–resistance in one case which is resistant to rifampicin.

Genotyping, obtained by PCR and Sanger or whole-genome sequencing, shows a very high genomic diversity in Yemen probably because of the geographical situation of this country. All 4 SNP-types were found but also 6 different SNP-subtypes.
ILC1.2–023

Transmission of drug-resistant leprosy in Guinea–Conakry detected by molecular epidemiological approaches
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Molecular drug susceptibility testing was performed on skin biopsies from 24 leprosy patients from Guinea–Conakry for the first time. We identified primary drug-resistance in four cases and a dapsone-resistant cluster caused by the same strain. Primary transmission of drug-resistant Mycobacterium leprae, including a rifampicin-resistant strain, is reported.
ILC1.2-024

Genome downsizing and drug resistance in Mycobacterium leprae: are there places for drug efflux pumps?

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Contrary to Mycobacterium tuberculosis, Mycobacterium leprae, the causative agent of leprosy, is an obligate intracellular pathogen. During evolution, M. leprae underwent genome downsizing resulting in the loss of genes coding for metabolism and respiration, among others, given him limited capacity to survive extracellularly. The most striking features of M. leprae are that its genome encodes only 1614 proteins and harbours an extremely high number of pseudogenes. Similar to M. tuberculosis, drug resistance in M. leprae is mainly due to mutations in genes coding the primary targets of the antibiotics used in therapy, such as dapsone, rifampicin and ofloxacin. Phenotypic drug resistance resulting from the balance between the cell wall impermeability and the overexpression of efflux systems, also plays an important role, alongside with the alteration of drug targets in M. tuberculosis. Several drug transporters are involved in drug resistance in M. tuberculosis and were classified as primary transporters (ABC, ATP-binding cassette), which are energized by the hydrolysis of ATP, or secondary transporters (MFS, major facilitator superfamily; SMR, small multidrug resistance; RND, resistance nodulation cell division), which act based on proton motive force. In silico, the M. tuberculosis H37Rv genome has 267 putative transporters, of which, 129 correspond to ABC transporters, 30 MFS, 14 RND, and 1 SMR. Whole-genome comparative analysis of transporters reveals only 56 common drug efflux transporters between M. tuberculosis and M. leprae, of which 25 are ABC transporters, 2 putative MFS, 6 RND, and 1 SMR. This indicates a predominantly loss of secondary transporters in comparison with primary transporters. P55, one of the major efflux pumps found in M. tuberculosis associated with rifampicin resistance is one of the two MFS transporters in M. leprae. Likewise, the RND efflux pumps MmpL3, MmpL4, MmpL7, MmpL9 and MmpL10 associated with resistance to indoleamines, adamantylureas, and SQ109 plus antibiotics isoniazid and rifampicin, are also present in M. leprae. Fluoroquinolone efflux, associated with the expression of the efflux systems PstB and DrrAB in M. tuberculosis, are also found in M. leprae. Mutations in MmpL5 efflux pump regulator renders resistance to bedaquiline and cross-resistance to clofazimine. Interesting MmpL5 is absent from M. leprae genome which may explain why clofazimine is so efficient against M. leprae. The maintenance of these efflux systems in M. leprae even upon genome reduction indicates that these systems are undoubtedly required for its intracellular survival and lifestyle and their role in drug resistance requires future functional studies.
ILC1.2-025
Surveillance of drug resistance in M. leprae
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We may assume that resistance in M. leprae did not exist before the discovery of dapsone as the first antileprosy drug. Dapsone resistance was first observed as secondary resistance with a rate from 0.2% in the 1960’s to 80% in the 70’s, and then as primary resistance up to 30%. Sooner after, rifampin started to be used to treat dapsone-resistant leprosy cases and rifampin-resistant cases of leprosy emerged. This is the reason why WHO Study Group on Chemotherapy of Leprosy for Control Programs recommended the introduction of multi-drug therapy (MDT) in 1982 in response to the widespread emergence of drug resistance. At the end of 90’s, some cases were reported with multidrug resistance, i.e. acquired resistance to dapsone, rifampin and even ofloxacin. As with tuberculosis, the emergence of multi-drug resistant strains of M. leprae would pose a serious threat to leprosy control efforts. The development of molecular techniques for detection of resistance to antileprosy drugs gave tools for drug resistance surveillance much easier than the mouse footpad assay.

In 2008, WHO and ILEP launched a network of clinicians, programme managers and laboratories where leprosy cases can be tested for antibiotic resistance. They first focused their efforts and resources on relapse cases. From 2008 to 2010, among 1000 cases of relapse cases notified in 8 countries, one third of them were studied for detection of mutations in rpoB, folP and gyrA genes. Results were obtained for 217 of them with 29 (15%) cases of dapsone resistance, 16 (7%) of rifampin and 2 (1%) of ofloxacin. Most of the strains resistant to rifampin were also resistant to dapsone and the two strains resistant to ofloxacin were multidrug resistant, i.e. also resistant to dapsone and rifampin. From 2011 onwards, some new cases were also studied for resistance. This allowed for the description of unexpected primary resistance to ofloxacin (gyrA mutation) and monoresistance to rifampin in several countries. As more countries will participate in future surveillance studies, it will be possible to formulate an accurate view of drug-resistant leprosy and thereby assess the success of current control strategies. This will be a key factor in monitoring MDT effectiveness and preventing the spread of drug resistance.
ILC1.2–026
Immunology confirmation of Dapsone Hypersistivity Syndrome — preliminary report
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Objectives: Dapsone (4, 4’-diaminodiphenylsulfone, DDS) is a basic drug for the treatment of leprosy and it is also widely used in the treatment of malaria, dermatitis herpetiformis, urticaria, acne and other chronic inflammatory disease. Dapsone hypersensitivity syndrome (DHS), which belongs to delayed hypersensitivity reaction (IV type), is the most serious side effect of DDS. Nearly 0.5%-3.6% of patients who take DDS for 4 to 6 weeks will appear DHS, and case fatality rate is about 11%. The diagnostic criteria of DHS, which was not specific, was proposed by Richardus and Smith in 1989. Doctors cannot distinguish DHS with other drug hypersensitivity syndrome or inflammation according to present diagnostic criteria. The objective of this study was used patch test to immunologically confirm DHS and reduce the false positive rate of DHS.

Methods: A female patient who was diagnosed of leprosy in September 3, 2012, treated according to MDT recommended by WHO. However, she got a high fever(39.8 °C ) in September 21, 2012. What’s more, many papules occur on her face and trunk and DHS was suspected. HLA-B*13:01 was tested by real-time PCR. Dapsone powder was mixed up with petroleum by different proportion. Dapsone patch test had been done to immunologically confirm whether the syndrome was DHS.

Results: HLA-B*13:01 was positive in this patient. The results of patch test showed that patient responded to 2%, 3%, 4% concentration of dapsone while on papules occurred in the skin with petroleum only.

Conclusions: Dapsone patch test immunologically confirm DHS and reduce the false positive rate of DHS. However, this method was not widely used in clinic because of its less sensitivity.

Keywords: patch test, dapsone hypersensitivity syndrome
ILC1.2-027
Morbidity and Mortality Associated With Dapsone Hypersensitivity: A Retrospective Hospital Based Study
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Objectives: To study the clinico-epidemiological profile, morbidity and mortality associated with dapsone hypersensitivity in patients taking Multi-drug therapy (MDT) for leprosy.

Methods: A retrospective chart review was performed on leprosy patients who presented with signs and symptoms of dapsone hypersensitivity and received treatment anytime between January 2000 to December 2014 at Anandaban hospital, a tertiary leprosy referral hospital in Nepal.

Results: Among 61 patients with dapsone hypersensitivity, 15 (24.5%) patients had fatal outcomes. Dapsone hypersensitivity symptoms developed within 8 to 143 (median 30) days of MDT start, the most common findings were skin rash (85.2%), fever (77%), and hepatitis (60.7%). Eighty percent of the patients were managed on an inpatient basis. Dapsone was stopped in all patients, and 82% of the patients received systemic steroids. The duration of treatment ranged 7-210 (median 84) days in patients who survived, and 2-50 (median 8) days in patients who died (apart from one outlier that died after 270 days). The duration of total hospital stay was 3-210 (median 27) days in patients who survived. Among 15 patients, 8 died within 8 days, 6 died within 10-15 days and 1 died after 270 days of hospital stay. Hepatic encephalopathy (40%) was the most common cause of death followed by septicemia (26.6%) and chronic exfoliative dermatitis (20%).

Conclusion: The development and course of dapsone hypersensitivity is unpredictable, and there is no established consensus on effective treatment. This study shows a significant morbidity and mortality associated with dapsone hypersensitivity. Although MDT has been used worldwide for more than three decades, there is a need to properly educate and caution health personnel and patients regarding the complications of dapsone.

Keywords: Dapsone Hypersensitivity, Leprosy, Mortality, Systemic steroid, MDT
Neurolysis Outcomes in Leprosy Patients: Prospective Study of Sensory and Motor Changes Following “Double Crush” Decompressions

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Objectives:
Since the mid-1950s, for Hansen’s disease, retrospective case series have reported outcomes following decompression of single anatomic sites of compression (e.g., ulnar nerve at elbow). More recently, studies comparing efficacy of steroid versus single surgical site decompression have been reported. The purpose of the present prospective study is to apply concepts developed from the successful treatment of diabetics, who have neuropathy and multiple sites of chronic nerve compression, to patients with leprosum neuropathy (e.g., neurolysis of the ulnar nerve at the elbow and at the wrist).

Methods:
After working in the indigenous area of Hansen’s disease in Guayaquil, Ecuador, an IRB-approved protocol was applied prospectively to a cohort of 19 patients who were medically cured of Hansen’s but suffered from leprosum neuropathy. Each patient received surgery upon one leg and one arm, with the goal of decompressing nerves at multiple anatomic sites of known compression (e.g., median and ulnar nerves at wrist and elbow, peroneal nerve at knee and lower leg, tibial nerve at four medial ankle tunnels). Outcomes measured were changes in sensory function (i.e. one and two-point static-touch), patient-reported muscle strength change with voluntary muscle testing at, and changes in patient reported outcomes of quality of life (RAND-36), disability (Q-DASH), and pain (NPRS). Outcome measurements were obtained at 12 and 24 months post-operatively.
Results:
Eighteen of 19 patients returned for post-operative evaluation. There were no post-operative complications. At 2 years follow-up, 13/15 (87%) patients have sensory improvement as demonstrated by the Pressure-Specified Sensory Device™ (PSSD). Thirteen of 13 (100%) patients reported motor improvement and could demonstrate a voluntary muscle testing score of 4/5 or 5/5 on their most recent follow-up.

In total, 88 nerves were operated upon. At 2 years, 10/15 (67%) of median nerves, 6/15 (40%) of ulnar nerves, 8/12 (67%) of radial nerves, 5/10 (50%) of fibular nerves, 8/11 (73%) of tibial nerve medial plantar branches, and 6/11 (55%) of tibial nerve medial calcaneal branches showed sensory improvement as demonstrated by the PSSD.

Among those patients with complete pre-operative and post-operative surveys, we observed healthier RAND-36 scores across all dimensions, (p = 0.03). We also observed that upper-extremity disability as measured by Q-DASH improved significantly (p = 0.02).

Conclusions:
The "double crush" decompression of multiple peripheral nerves is feasible in the population with leprous neuropathy, and, in this cohort, in sensory and motor function in the majority of patients and nerves that had a neurolysis.

Keywords:Nerve Decompression, Neuropathy, Disability, Quality of Life
ILC1.3–002
Recent Trends in Leprosy Reactions – the Chittagong Experience
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Background: Leprosy reactions (LRs) are immunologically mediated conditions and a major cause of disability before, during and after multidrug therapy (MDT). Little data has been published on the epidemiology of LRs.

Objectives: To describe the pattern and prevalence of LRs in post elimination stage.

Methods: A descriptive retrospective cross-sectional study was carried out in Chittagong Medical College Hospital using the registered records of patients between the periods 2004 and 2013.

Results: Of the 670 leprosy patients 488 (73.38%) were males and 182 (26.73%) were females. The prevalence of reaction was 300 (44.78%) with a male: female ratio of 3.55:1. The age specific cumulative reactions cases at >40 years was high {115 (38.33%)} among all age groups. The prevalence of reaction was found to be 166 (55.33%) for the reversal reaction (RR), 49 (16.57%) for the erythema nodosum leprosum (ENL) and 85 (28.33%) for the neuritis. Borderline tuberculoid (BT) was the most common 106 (35.33%) group in RR while lepromatous leprosy (LL) was the most common 37 (12.33%) in ENL. More than half of the patients 169 (56.33%) had reactions at the time of presentations while 85 (28.33%) and 46 (15.33%) of patients developed reaction during and after MDT respectively. The RR group presented with ≥ 6 skin lesions in 96 (57.83%) and ≥ 2 nerves involvement in 107 (64.46%) patients. The ENL presented chiefly as papulonodular 45 (91.84%) lesions followed by pustule–necrotic 33 (67.35%) lesions, neuritis 33 (67.35%), fever 24 (48.98%), arthritis 7 (14.29%), lymphadenitis 5 (12.24%) and iritis 5 (10.20%). Bacterial index ≥ 3 had been demonstrated in 24 (60.71%) patients of ENL. The grade II deformities were manifested in 121 (40.33%) cases, mostly limb deformity 76 (25.33%) and ulcer 27 (9%).

Conclusion: The incidence of LR seemed to be three times more common in BT than in LL. Reactions with nerve function impairment and disability still occurs among MB patients during and after MDT. Early detection and management of LR is very important in preventing disability and deformity, and patients should be educated to undergo regular follow-up examinations.

Keywords: Leprosy Reaction, Reversal reaction, ENL, Neuritis, Chittagong
ILC1.3–003
Retrospective Analysis of Persons Affected by Leprosy with Type 2 Reactions at Secondary Care Leprosy Referral Centre, South India
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Introduction: Blue Peter Public Health and Research Centre (BPHRC), Hyderabad is a research arm of LEPRA Society in India. The centre is functioning since the year 2000 with leprosy control as a core component. It is a secondary care centre in terms of service provision. The type 2 reaction is also known as Erythema Nodosum Leprosum (ENL) which is one of the medical emergencies in leprosy. The objective of this study is to analyze the profile of 407 such cases managed at this centre.

Methodology
It is a retrospective analysis of the cases registered for management of ENL at this centre for a period of 15 years from 2000–2014.

Results
The center registered 3568 cases for all types of services related to leprosy i.e., from diagnosis to rehabilitation in the study period. Amongst them, 407 (11%) cases had ENL reaction with an age range from 12 – 78 years. Male constituted 295 (72%) and there were only 4 children from the study group. These study subjects hailed from 21 districts of undivided Andhra Pradesh 2 from neighbouring Karnataka and 1 from Madhya Pradesh states. There were 5 districts from where only one case was registered while the maximum cases (118) were from Rangareddy district where the center is located. Skin smears were done for all the cases except 10 and the results were reported as Bacteriological (BI) and Morphological Index (MI). BI of the study subjects ranged from 0 – 6.
It is observed that 115 cases belong to the low BI range (0.1 to 2.99) group; while 273 cases (67%) cases to high range (3 to 6). Skin smear was zero in the rest 9 cases. There were cases where Morphological Index was calculated in percentage which ranged from 0 to 6. About 40% cases were positive to MI. More than 80% of the cases developed ENL after being treated with MDT. These cases were managed in 3 different groups - Groups A with only steroids, B with steroids and Clofazimine and C with Thalidomide. But the group C which was given thalidomide was ensured that they were treated with other two regimens. Nearly 60% of cases were chronic/recurrent/non responders to steroids and started on thalidomide for better resolution. The detailed analysis of gender, age and year wise in relation to the bacterial positivity of three groups will be presented during the congress.

Conclusion
- The occurrence and severity of ENL depended upon bacterial load
- There should be efforts to reduce the bacterial load as early as possible after completion of scheduled course of MDT also so as to stop the risk of recurrent ENL.

**Keywords:** leprosy, ENL, Skin smear, Bacteriological Index, Morphological Index
ILC1.3–005
Metformin, an antidiabetic drug as a therapeutic agent in the management of chronic recurrent moderate to severe Erythema Nodosum Leprosum.
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Erythema Nodosum leprosum (ENL) or type 2 Lepra reaction is a known complication affecting lepromatous and borderline lepromatous leprosy patients. ENL has been regarded as an immune complex–mediated disease or type III hypersensitivity reaction. ENL was associated with high serum tumour necrosis factor–alpha (TNF alpha) levels. Capsule Thalidomide (TLD) and systemic oral prednisolone are the two current effective drugs for the management of ENL by inhibiting TNF. Because of major adverse effects by these drugs, it is hypothesized to use an antidiabetic drug with good safety profile for managing the inflammations in ENL. The benefits of using metformin over the currently available drugs are its safety profile, available in market for long decades, can be given safely in pregnant women, wide range of dose selection and no much follow up special investigations. In addition metformin can be used as monotherapy or in combination with low dose of steroids or in diabetic ENL patients. This hypothesis will encourage the researcher in field of leprosy to try with a safe drug.

**Keywords:** Reactions, TNF alpha, Metformin, antiinflammatory, safety
**ILC1.3–006**

**The Inverse Relationship of Pro- and Anti-inflammatory Lipid Mediators in Leprosy Patients with Type 1 Reaction**

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Objectives. Type 1 reaction (T1R) significantly contributes to the neuropathy of leprosy. However, there are no available tools to identify those patients that will develop T1R. Previous metabolomics studies revealed alterations in the levels of polyunsaturated fatty acids (PUFAs) in T1R-free leprosy patients and suggest the use of PUFAs as prognostic biomarkers of leprosy. Thus, current studies performed a metabolomics-based study to assess whether PUFA levels differed in sera from T1R versus T1R-free patients.

Methods. Retrospective serum sample from leprosy patients with T1R (N=7) and T1R-free (N=9) were subjected to serum metabolite extraction with methanol, and analyzed by liquid chromatography mass spectrometry (LC-MS) in negative and positive ion modes. LC-MS data files were analyzed using the XCMS software and the relative abundances of each metabolite were compared between T1R and T1R-free patients. The accurate masses of metabolites that differed significantly between the two groups (P <0.01, fold change ≥ 2.0) were interrogated against metabolic pathways and metabolite database. The structures of selected metabolites were confirmed by comparing their MS/MS fragmentation and retention time with commercial standards. An enzyme immunoassay (EIA) was used to confirm the abundance changes of targeted lipid mediators.
Results. Metabolomics analysis identified 2,135 and 6,726 metabolites by negative and positive ion mode, respectively, that possessed coefficient of variations <20% and allowed separation of T1R and T1R–free patients. In silico interrogation of metabolic pathways indicated a significant alteration in the levels of multiples PUFAs metabolites defined as lipid mediators. LC–MS and EIA data showed a significant increase in the abundance of the pro–inflammatory lipid mediator leukotriene B4 (LTB4) in T1R. In contrast, the levels of the pro–resolving lipid mediator resolvin D1 were significantly lower in T1R individuals. The level of prostaglandin E2, a lipid mediator with an immune suppressive role in leprosy, was also decreased. Additionally, we observed higher abundances of prostaglandin D2, lipoxin A4 and hydroxyeicosatetraenoic acids.

Conclusion. Our data showed a strong correlation between lipid mediator levels and the development of clinical signs of T1R. Specifically, LTB4 and resolvin D1 present an inverse shift in their abundances, suggesting that they contribute to the pathogenesis of T1R. Further studies are underway to evaluate whether changes in lipid mediator levels are predictive of T1R development and to elucidate the role of lipid mediators in pathogenesis.

Keywords: Type 1 Reaction, Lipid Mediators, Metabolomics, Prognostic
ILC1.3-007
Targeting mental stressors for the prevention of recurrence of lepra reactions.
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The occurrence of lepra reactions is the major problem in the management of leprosy patients. These immunological reactions are the consequences of the dynamic nature of the immune response that may occur for the first time before, during, or after the completion of multi-drug therapy. The most common precipitating factors well established in literatures include vaccinations, infections, starting multi-drug therapy (MDT) and mental stress components. Usually, the role of Psychological stress is not much evaluated in the management of Lepra reactions. Many Studies also show the prevalence of depressive and generalized anxiety states in leprosy patients who were also at the risk of developing lepra reactions during the course of their illness. But few of these studies excluded the reaction patients in ascertaining the mental status. One of the study also recommended cognitive behavioral therapy and psychotherapy as an approach to mental health care. But this approach is questionable in the case of lepra reactions as the patient will not be in a condition to perceive the therapy. Recently hypnotherapy was tried as a preliminary approach in reaction patients, which showed some positive response, but it is difficult to standardize the methods for lepra reaction types with varying severity. The current treatment for reactions are initiated only after the reactions are started in patients. There is no much information for reaction management in relevance to the psychological/mental/ anxiety aspect of disease in WHO or NLEP. It is very well established that mental stressors in reaction patients activate two major neural pathways, one being the hypothalamo–pituitary–adrenal axis and the other being the autonomic system particularly sympathetic nervous system producing neurogenic inflammation. In this respects, the drug Selective Serotonin Re-uptake inhibitors (SSRI’s) could be a good pharmacological interventions in preventing the recurrence of lepra reactions. SSRIs are a group of anti-depressants, often prescribed for depression and generalized anxiety disorder because they are safe and well tolerated. As the recent evidences also pile up with SSRIs for its additional anti-inflammatory benefits, it could be a good therapeutic strategy in treating both the mental stressor as well as the reaction inflammations. In lepra reactions SSRIs can be initiated once the patient is evaluated and diagnosed for possible depression thereby helping the patients in the treatment of mental stress, inflammations and to disrupt the vicious cycle that contributes recurrence.

Keywords: reactions, central component, SSRIs, Evaluation, safety
ILC1.3-008
Mycobacterium Leprae, Helminths, Micronutrient Deficiencies and Reactions: Elucidating Risk Factors For Hansen’s Disease Associated Morbidity
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Objectives: Risk factors for leprosy reactions are not well understood. Both helminth infections and micronutrient deficiencies co-exist in many areas with leprosy and can have immune effects on the host. Therefore, the goal of this study is to determine whether helminth infections and micronutrient deficiencies predispose to Type 1 and Type 2 reactions. To our knowledge, these specific risk factors have not been previously studied.

Methods: Between July and December 2015 a pilot case-control study was performed at a Hansen’s disease reference clinic in Belo Horizonte, Minas Gerais, Brazil. Adult patients with multibacillary disease were eligible for enrollment and were considered cases if they were being treated for an active reaction or controls if they had never had a reaction or had been reaction-free for 1 year or longer. Clinical and demographic data were collected and blood drawn and tested for Schistosoma mansoni serology, complete blood count, and micronutrient testing (Vitamin A, Vitamin D and iron deficiencies) and stool tested for ova and parasites.
Results: Seventy-three patients were enrolled including 39 (53%) with active reactions and 34 (47%) without reaction. Of cases, 41% had Type 1 reaction, 49% had Type 2 reaction, and 4% had both. Overall, 73% of participants were male and age ranged from 23 to 80 years old. Five patients had serologic evidence of Schistosoma mansoni infection and one patient had a helminth found on stool studies. On univariate analyses, age, gender, and helminth co-infection were not associated with the occurrence of reactions (either Type 1 or Type 2). Multivariate analyses adjusting for age, gender, bacillary index, clinical type of leprosy, socioeconomic status and year of multidrug therapy will be undertaken. Lastly, nutritional parameters such as BMI, anemia, and presence of vitamin D, vitamin A and iron deficiencies will also be analyzed for associations with reactions.

Conclusions: The literature has shown an association between soil-transmitted helminths and multibacillary leprosy with increased Th2 cytokines in co-infected patients. Since reactions are immune-mediated, it follows that co-morbidities that affect the immune system, like chronic helminth infections and micronutrient deficiencies, may predispose individuals to reactions. While our preliminary findings do not show an association with helminth infections, multivariate analyses and inclusion of nutritional parameters may reveal risk factors for reactions. Final results could have implications for the management of and prevention of reactions and pave the way for larger scale studies on the effects of co-infections and undernutrition on leprosy.

Keywords: leprosy, reactions, helminth, nutrition, Brazil
ILC1.3-009
Necrotic erythema nodosum lepromatous: an emergency in Leprosy - report of two cases
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Objectives
Necrotic erythema nodosum lepromatous (ENN) is an intense immune response. This case report reinforces the importance of early diagnosis and proper treatment to reduce the development of sequelae.

Methods
We report the cases of two women of 45 and 50 years old, both in MDT-MB for leprosy with severe ENN. The first one, in the ninth month of MDT-MB, presented diffuse necrotic erythema nodosum lepromatous mimicking Sweet syndrome. She was admitted and she complained of epigastric pain that radiating to the flanks. On laboratory tests there was an increase of inflammatory tests (leukocytes 25630/ mm³; ESR 83 mm; C reactive protein 330 mg/L; ferritin 2460 mg/ml). Endoscopy showed distal esophagitis and erosive pangastritis. Abdominal ultrasonography and tomography both demonstrated hepatosplenomegaly. Methylprednisolone was prescribed in pulse therapy and rapidly controlled the complaint of abdominal pain. The other patient, in the 23th month of MDT-MB (introduced because on the first biopsy the bacilloscopy of 5+) presented diffuse necrotic erythema nodosum lepromatous mimicking multiform erythema. Laboratory tests showed increased levels of bilirubin, canalicular enzymes and lactate dehydrogenase, decrease in hemoglobin. The ENN lesion was characterized on immunohistochemistry of biopsy by high expression of CD4+ T cells, IL17, TNF-alpha, IL10 and TGF-beta, presenting humorl and cellular immune response in ENN.
With the hypotheses of cholangitis metronidazole and ceftriaxone were prescribed. The association of new drugs with the MDT-MB led to a clinical picture of methaemoglobinemia. This picture made take out dapsone and infections cholangitis treatment. She had prescribed the prednisone dose from 0.5 up to 1mg/kg.day. Also it was introduced thalidomide 400mg/day for five days that it was down to 100mg with 3 days and maintence 100mg for one month when she haven’t new skin lesions.

Results
Both patients in few days showed the skin lesions healed leaving scars but still presented neuritis for months. Oral prednisone about 20mg per day for three month and after was slowly tapered within six months.

Conclusion
These cases are presented to reinforce the severity of systemic symptoms in necrotic erythema nodosum in Leprosy. The differential diagnoses are also important to be considered, since those lesions can mimic other clinical and dermatological conditions as cholangitis infections that the treatment provoked MTHb. The early diagnosis and appropriated treatment were primordial to prevent sequels and comorbidity.

**Keywords:** erythema nodosum necrotic, immune response, leprosy, hansen
ILC1.3-010
Cortico-steroid adverse events in a large prospective randomized controlled clinical trial: Comparing 20 versus 32 weeks in the treatment of leprosy reaction/neuropathy
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Objective: to determine occurrence of (serious) adverse events (SAE) in the prevention and treatment of nerve function impairment. Cortico-steroids (prednisolone) are the mainstay in the treatment of leprosy reactions including neuropathy. However, these drugs are also known for their adverse effects and patients have to be carefully followed for potential serious adverse events.

Method: In a prospective double blind randomized clinical trial (RCT) treatment efficacy of a standard treatment regimen (20 weeks) was compared with a longer and more intensive course (32 weeks) to assess whether this would be more efficacious than the generally accepted dose and course. In this multi-country, multicentre research project patients were assessed monthly for the duration of the prednisolone treatment and at regular intervals thereafter. When a SAE was noticed, or self-reported, the event had to be reported on a specific form to the main principle investigator (EP). In a parallel interventional RCT, patients with sub-clinical neuropathy received either a course of 5 months prednisolone or placebo to assess if prednisolone could averse the development of clinical neuropathy. Also in this trial same procedures regarding presence and reporting of SAE were followed.
Results: Preliminary analysis shows that the clinical trial 7/432 (1.6%) of patients developed major adverse events in the 20 weeks prednisolone arm and in the 32 weeks trial arm this was 19/442 (4.3%). In the subclinical trial (20 weeks) this was 6/184 (3.3%) in the intervention arm and 3/186 (1.6%) in the placebo arm. Diversity and extent of minor adverse events varied greatly between the centres in both trials and were also often recorded in the placebo arm of the subclinical trial.

Conclusions: The results of the primary outcome of both trials - recovery or prevention of nerve function impairment will be discussed related to possible side effects. Occurrence of (S)AE needs to be taken into account when considering extension of treatment duration. In our cohorts preliminary results do not show significant benefits of the longer prednisolone intervention. (Definitive data and conclusions to be presented at the conference).

**Keywords:** Prednisolone, Reaction, Neuritis
ILC1.3–011
The Erythema Nodosum Lepromatous Leprousum International Study Group – a progress report
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Background
The Erythema Nodosum Lepromatous (ENL) International Study (ENLIST) Group was formed in 2012 at a meeting in Cebu, Philippines. The rationale for holding a meeting was to try and address significant unmet needs in the understanding of the causes of ENL, paucity of evidence to guide treatment decisions and lack of effective alternatives to corticosteroids in countries where thalidomide is not available. One of the obstacles to effective ENL research is that no single centre has sufficient numbers to adequately power clinical trials. However the chronicity of ENL and the adverse effects of long term immunosuppression means that this group of patients represent a large proportion of leprosy referral centres workload.

Objectives. To describe the outputs and future projects of the ENLIST Group

Results. The ENLIST Group published its first collaborative piece of original research in 2015. A cross-sectional study of the clinical features of ENL. This publication is important in demonstrating the varied nature of ENL which must be taken into consideration when planning clinical trials but also documented in an objective way the severity of pain associated with the condition.
This led to the Group examining health-related quality of life in people with ENL. A further important achievement of the Group has been the ENLIST ENL Severity Scale; a clinical measure of disease severity. This is an important step in not only improving clinical trial methodology in ENL but potentially treatment decisions in the clinic. The validation of the scale is underway and will be discussed at this meeting.

Conducting randomised controlled trials in multisystem disorders is complex. The ENLIST Group is developing trial protocols for ENL and has funding to implement them. After five years of hard work individuals affected by ENL will be able to participate in well-designed and adequately powered treatment studies.

Conclusions
The ENLIST collaboration has enabled an international group of dedicated clinicians and laboratory scientists in leprosy to come together to form a team which can utilise all the different skills available. Standardising study methods across different geographical locations, cultures and healthcare systems and between physicians is challenging but not impossible. As is often the case with leprosy research, when attempting to answer one question several others arise. We wish to continue addressing these questions which encompass: the immunological mechanisms involved in ENL, treatments and adverse effects, equity of access to treatments, patient centred outcomes in ENL and health policy to better deal with ENL.

Keywords: ENLIST, ENL, Collaboration, International
ILC1.3-012

Measuring the severity of erythema nodosum leprosum – validation of the ENLIST ENL Severity Scale

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Background

Erythema nodosum leprosum (ENL) is a severe, painful multisystem complication of lepromatous leprosy. The inflammatory state of ENL causes significant morbidity. Patients are treated with immunomodulating drugs which are used for prolonged periods of many months or years. Treatment is often associated with tachyphylaxis and adverse effects particularly in settings where thalidomide is not available or affordable. The development of a quantitative measure to assess the severity of ENL has been highlighted as a priority research area. A tool which enables clinicians to accurately assess the severity of ENL would be useful in defining outcomes for clinical trials and guiding clinical decisions. The Erythema Nodosum Leprosum International STudy (ENLIST) Group developed the 16 item ENLIST ENL Severity Scale (EENS) during a three day workshop.
Objectives
To assess the validity, reliability and minimal clinically important difference (MCID) of the prototype EENS.

Methods
Each centre held a workshop prior to starting recruitment or had an oversight visit which ensured the study protocol was being adhered to. Participants with ENL were examined independently by a worker trained to use the scale and experienced leprologists who also completed the scale and categorised the ENL as mild or moderate or severe. Neither assessor (nor the patient) were aware of the result of the other assessor’s examination. Inter-observer agreement was tested. The time interval between the two assessments was kept as short as practicable. Patients with a past history of ENL and uncomplicated borderline lepromatous (BL) leprosy and lepromatous leprosy (LL) were recruited to act as controls. The MCID of the scale was determined by applying the scale to individuals after four weeks of treatment and using their responses as an “anchor”. Recruitment into the study will continue until at least 30th June 2016. A sample size of 300 will be achieved. It is often cited that a minimum of 10 study subjects are required per scale item or an absolute number of 300. Data were collected on standardised forms and entered into a secure anonymised Access database.

Results
To date we have recruited 221 individuals into the study. 167 (75.6%) were male. 107 (48.4%) had ENL, 49 (22.2%) uncomplicated BL leprosy, 55 (24.9%) uncomplicated LL and 32 (14.5%) a past history of ENL. The results of the validation exercise will be discussed.

Discussion
This is the first study to validate an ENL specific clinical severity scale.

Keywords: ENLIST, ENL, Severity, Scale, Measure
The Development of a Severity Scale for Erythema Nodosum Leprosum – the ENLIST ENL Severity Scale

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Background
ENL is a severe multisystem complication of lepromatous leprosy and causes significant morbidity. Patients are treated with high doses of corticosteroids and thalidomide which are used for prolonged periods and this leads to complications and deaths. Thalidomide is not available in many countries or is severely restricted. A quantitative measure to assess the severity of ENL has been highlighted as a priority area. A tool enabling clinicians to assess the severity of ENL would be useful in defining outcomes for clinical trials.

Objective
To develop a clinical severity scale for ENL which could be subjected to formal validation.
Method
Three published, unvalidated severity scales for ENL were applied to patients at six leprosy referral centres. Each patient was categorised as having mild, moderate or severe ENL by the physician.
A three day meeting of leprosy experts from eight leprosy endemic countries was held to critically appraise the scales with respect to face, content and construct validity. The ease of application of each scale was also assessed.
43 patients with a median age of 32 years were examined. Only one scale appeared to discriminate between patients with mild and moderate and moderate and severe ENL. However it was felt that some of its items were vague and there was marked weighting in favour of neurological features which was not felt to be ideal. A second scale was felt to have good face and content validity but again suffered from imprecise language. A third scale had poor content validity because it only included cutaneous features of ENL. Regression analysis of prospective data collected on the clinical features of ENL during the ENLIST 1 study was also used to identify important features of ENL to incorporate as items.

Results
A new scale was drafted which incorporated items and features from all three scales as well as completely new items. This was circulated to all participants and a consensus meeting was held where each of the 16 items in the draft scale were discussed in detail including the scores that should be applied. Detailed notes were taken during this discussion which enabled accompanying notes and definitions to be developed for the scale.

Discussion
We have developed the ENLIST ENL Severity Scale and it was piloted in one centre. The formal testing of the validity and reliability of the scale is now underway and the aim is to recruit approximately 300 individuals. We are also assessing the minimal clinically important difference of the scale.

Keywords: ENLIST, ENL, Severity, Scale, Development
ILC1.3–014
Erythema Nodosum Leprosum (ENL) and Pregnancy: A Report of Three Cases
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Objective: To study the course of ENL and outcome of pregnancy in leprosy patients suffering from ENL.

Method: A retrospective chart review was performed on three leprosy patients suffering from ENL reactions during pregnancy.

Results: All three cases were diagnosed with leprosy and had their first episode of ENL before pregnancy. Among the three cases, two were Lepromatous Leprosy (LL) and one was Borderline Lepromatous Leprosy (BL). All of them received WHO MB–MDT, with one was released from treatment (RFT) just before pregnancy. All ENL reactions during pregnancy and were managed with oral prednisolone. While the dose of prednisolone was reduced, ENL flared up in all the three cases and none of them were able to reduce the dose of prednisolone below 30 mg to control ENL. All of them developed oligohydramnios. Two of the pregnancies resulted in intra uterine fetal death (IUF) at 26 weeks and 28 weeks of gestation. The remaining one had live birth by caesarian section at 37 weeks of gestation with intra uterine growth retardation (IUGR) evidenced by a birth weight of 1.7 kg.

Conclusion: During pregnancy the severity of ENL increases due to hormonal changes which requires higher dose of oral steroid to suppress symptoms. Both, the ENL itself and the oral steroid have negative impact on pregnancy which leads to grave complications like IUF and IUGR. So, while treating leprosy patients with ENL or those with high risk of ENL development should be advised to take effective means of contraception and proper care during pregnancy.

Keywords: Pregnancy, ENL, Leprosy
ICL1.3–015
Nerve ultrasound as an additional diagnostic and prognostic tool to monitor leprosy reactions in a two year follow up study

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Background and Objective: Although the incidence of leprosy has decreased significantly, grade 2 disability due to nerve damage has remained relatively constant. New tools are being developed to better diagnose and monitor leprosy and lepra reactions; this study investigated if high-resolution sonography (HRUS) can be such a tool.

Methods: A prospective study with follow-up period of 2 years wherein clinical examination assessing sensory and motor function, and HRUS of the four main peripheral nerves in 57 patients was carried out, of whom 36 were in reactions and 21 without reactions. The two key parameters studied were cross-sectional area (CSA) and increased blood flow in the nerve using Color Doppler (CD). Normative data of CSA of these nerves was obtained from 55 healthy subjects (HS).

Results: At baseline and during follow-up all four nerves were significantly thicker (increased CSA) in patients with leprosy reactions in comparison to HS (p<0.0001) and to a lesser extent also in comparison to patients without reactions. During follow-up, nerve size did not change much in patients without reactions (CSA close to normative values); while it decreased significantly in patients with reactions. Increased endoneurial blood flow was present at baseline only in patients with reactions; this occurred in 20 of the 36 (55%) patients (49 nerves) and decreased to 1 patient (2.7%) at the end of the follow-up period.

Conclusion: This prospective study demonstrates the ability of HRUS to monitor changes in size and blood flow of nerves which are indicators of nerve activity in reactions and can be used to assess response to treatment.

Keywords: High resolution Ultrasonography, Monitor, Reactions, Cross sectional area
ILC1.3–016
The Impact of Erythema Nodosum Leprosum on Health Related Quality of Life in Rio de Janeiro, Brazil - an ENLIST Group study
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Erythema nodosum leprosum (ENL) is a severe, painful multisystem complication of lepromatous leprosy. The inflammatory state of ENL causes significant morbidity, economic hardship and occasionally death.

Objectives
To determine the impact of ENL on health related quality of life (HRQoL) using the Medical Outcomes Study: 36-Item Short Form Survey (SF-36)

Methods
Individuals with a diagnosis of leprosy attending the Leprosy Clinic of FIOCRUZ, Rio de Janeiro were invited to complete the Brazilian Portuguese version of the SF-36. Patients were classified into three groups: ENL, past history of ENL and never had ENL. The responses to the items of the surveys were coded, summed and transformed into a scale for each of the eight domains. A lower score reflects a worse HRQoL compared to a higher one.
The differences among the groups were analysed using analysis of variance. Differences between pairs of groups were tested post hoc using Scheffé’s method.
Results
60 individuals with a median age of 40 years (Range 16–83) were recruited. Thirteen (21.7%) were female. Two (3.3%) had borderline borderline leprosy, 17 (28.3%) borderline lepromatous leprosy and 41 (68.3%) lepromatous leprosy. Thirty–eight had ENL (63.3%), two (3.3%) had a past history of ENL and 20 (33.3%) had never had ENL.

Patients with ENL had the lowest mean scores in six domains. However there was no statistical difference between the mean scores of the four groups for six domains - Physical functioning, Role functioning/physical, Role functioning/emotional, Emotional well-being and General health. In energy/fatigue the mean scores for ENL patients were significantly lower, 49.1 ± 20.2, compared to 95 ± 0 of those with a past history of ENL. In the pain domain patients with ENL had significantly lower mean scores, 44.1 ± 24.1, than those with no history of ENL 68.8 ± 26.8.

Conclusions
This small study demonstrates a negative impact of ENL on HRQoL. We showed reduced scores in patients with ENL in six domains and this was significant in energy/fatigue and pain. These significant reductions are in keeping with the symptoms of ENL which include pain and lethargy.

This study is limited by size and lack of matched controls. The SF–36 is a general tool and may not reflect specific aspects of ENL and leprosy which may have an important bearing on HRQoL. Larger studies of the HRQoL of people affected by leprosy are needed, conducted with the best possible tools. New instruments may be needed.

**Keywords:** Quality of Life, ENL, ENLIST, Brazil
ILC1.3-017

A hospital based retrospective study of the morbidity and mortality associated with Erythema Nodosum Leprosum at the Oswaldo Cruz Foundation, Rio de Janeiro, Diana Neves¹, Anna Maria Sales², Stephen Walker³, José Augusto da Costa Nery⁴, Rogerio Valls de Souza⁵, Euzenir Nynes Sarno⁶, Diana Lockwood³

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Erythema nodosum leprosum (ENL) is a potentially life-threatening multisystem condition affecting individuals with borderline lepromatous (BL) leprosy and lepromatous leprosy (LL). In Brazil, thalidomide is a recommended treatment whereas elsewhere in the world the usual first line therapy is oral corticosteroids.

Objectives
To determine the morbidity and mortality associated with ENL at the Oswaldo Cruz Foundation, Rio de Janeiro.

Methods
All patients seen at the Ambulatório Souza Araújo or admitted to the Oswaldo Cruz Foundation with their first ENL episode diagnosed between January 1st 2005 and December 31st 2010 were identified from the electronic database of leprosy patients. Data were extracted from the patient’s files using a standard data collection template.
Results
676 patients with leprosy were seen in the six year period of the study. 112 (16.6%) patients had their first episode of ENL. 81 (72%) were male. The median age at onset of ENL was 34.8 years (Range 13.4–79.6). 93 (83%) had LL and the remainder BL leprosy. 28 (25%) presented with ENL at leprosy diagnosis. During the first episode of ENL 14 different combinations of drugs were used. 98 (87.5%) individuals received thalidomide although it was used as monotherapy in just 31 (31.6%). 64 individuals received oral corticosteroids. Thalidomide in conjunction with corticosteroids was used in 22 (19.6%) but another 34 received at least one other drug in addition to thalidomide and corticosteroids. All of the 81 men diagnosed with ENL received thalidomide whereas 14 of the 31 (45.2%) women did. Fourteen (12.5%) patients required hospitalisation because of complications of ENL. Six patients were confirmed to have died between the start of the study period and the end of June 2014 when the data were collected. Four occurred while patients were taking treatment for ENL and were attributed to: myocardial infarction in two cases, cancer and suicide. All four were taking thalidomide and corticosteroids. The other two deaths were attributed to tuberculosis and “cerebrovascular event”.

Conclusions
This retrospective study demonstrates that ENL is common complication of leprosy in Brazil and is associated with morbidity. Despite access to thalidomide, a large proportion of patients with ENL require corticosteroids which leads to adverse effects. The high rate of adverse effects associated with corticosteroids is similar to that seen in an Ethiopian cohort although the mortality rate appears lower. This may be due to thalidomide reducing exposure to corticosteroids however thrombotic events associated with ENL treatment requires further study.

Keywords: ENL, Morbidity, Mortality, Steroids, Thalidomide
ILC1.3-018
The Effect of Erythema Nodosum Leprosum on Health Related Quality of Life in People with Multibacillary Leprosy in Bangladesh – an ENLIST Group Study
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Erythema nodosum lepromatous (ENL) is a severe, painful multisystem complication of lepromatous leprosy. The inflammatory state of ENL causes significant morbidity, economic hardship and occasionally death.

Objectives:
To measure health related quality of life (HRQoL) of people with ENL compared with others at risk of ENL reaction but not suffering from it.

Methods:
Sequential patients presenting with ENL were enrolled from selected clinics in north–west Bangladesh. Matched controls were selected from other MB patients attending the clinics (2 per index case). Matching was based on age group, gender, disability grade, treatment status, socio-economic status (as crudely judged by subject’s housing type), and literacy.

With their consent, the eligible subjects were interviewed using the validated Bangla version of the Medical Outcomes Study: 36–Item Short Form Survey (SF–36). Biodata and history of leprosy, including treatment received, was recorded. Data was entered into a custom database which calculated the domain scores. Analysis was conducted using R Statistics.
Results:
Chi squared analysis showed no statistical differences in the matching criteria between the individuals with ENL (n=29) and the control group (n=46). Mean period since leprosy diagnosis was over 2.5 years (mean 46 months for controls and 32 months for index cases). Amongst people with ENL, about 40% had chronic or recurrent reaction. 82% had received prednisolone plus/minus high dose clofazimine and 76% were still on medication for reaction. The individuals with ENL had significantly lower HRQoL scores in all domains of the SF-36 compared with the individuals serving as a control.

Conclusions:
ENL is very important in regard to the patients’ welfare not only because of risk of future long term disability but because it causes severe acute impairment of quality of life. Serial measurements of Quality of life, before ENL and after resolution of the reaction would be desirable to better understand the effects.

Keywords: Health Related Quality of Life, SF36 short form, MB leprosy, Erythema Nodosum Leprosum, ENLIST
ILC1.3–019
Deep Vein Thrombosis Diagnosed in a Patient with Erythema Nodosum Leprsum in use of Thalidomide and Corticosteroids: a Case Report
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Objective: To report a case of patient affected by erythema nodosum leprosy with the outcome of deep vein thrombosis in the course of the use of prednisone and thalidomide.

Methods: This study was performed at Eduardo de Menezes Hospital in Belo Horizonte, Brazil. The report was based on chart review, interviews with the patient and subsequent literature review.

Results: NCL 43 years, male, Caucasian, with multibacillary leprosy treated in 2004 and leprosy reaction type 1 and 2. On the day of consultation in December 2015, he was taking prednisone 20mg / day, thalidomide 100mg / day, amitriptyline 50mg / day and omeprazole 20mg / day. He complained of swelling in the left leg with 30 days of evolution. It was supposed to be deep vein thrombosis (DVT) and he was admitted to hospital for anticoagulation with enoxaparin. The diagnosis was confirmed by Duplex doppler ultrasound showing an extensive vein thrombosis. The past medical and family history of the patient was non-contributory for a history of thrombophilia. After clinical improvement of ENL it was suspended thalidomide. He was discharged from hospital with total edema improvement and no sequelae signals.
Conclusion: Treatment of patients with ENL has always been a great challenge, both by the complexity of the disease, as the need for prolonged treatment with prednisone and thalidomide. In the literature there are already thromboembolic events reported with the combination of thalidomide and corticosteroids in the treatment of multiple myeloma, but this complication is rarely reported when these drugs are used in combination for the treatment of ENL.

More studies are needed to assess the risk of thromboembolism in these patients. If there is concomitant use of these medications should be attend the diagnosis of deep vein thrombosis, in order to avoid the lack of diagnosis and complications such as pulmonary embolism.

In our literature review, we found 8 patients with erythema nodosum leprosum treated with thalidomide associated with systemic corticosteroid therapy who had thrombotic events. There is not a lot of literature on this subject which indicates the importance and originality of this work.

**Keywords:** Leprosy, Leprosy reaction type 2, Erythema Nodosum Leprosum, Thrombosis, Corticosteroid and thalidomide
ILC1.3-021
Effectiveness of 32 versus 20 weeks of prednisolone in leprosy patients with recent nerve function impairment: results of the randomized controlled TENLEP trial
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Objectives: While prednisolone is commonly used to treat recent nerve function impairment (NFI) in leprosy patients, the optimal treatment duration has not yet been established. In the Treatment of Early Neuropathy in LEProsy (TENLEP) trial we evaluated whether a 32-week prednisolone course is more effective than a 20-week course in improving and restoring nerve function.

Methods: In this multi-center, triple-blind, randomized controlled trial, leprosy patients who had recently developed clinical NFI (results: We included 868 patients in the study, 429 in the control group and 439 in the intervention group. At 78 weeks, the proportion of patients with improved or restored nerve function did not differ significantly between the groups: 78.1% in the control group and 77.5% in the intervention group (p=0.821). Nor were there any differences in secondary outcomes.

Conclusion: In our study, a 20-week course of prednisolone was as effective as a 32-week course and 20 weeks is therefore the preferred treatment duration for improving and restoring recent clinical NFI in leprosy patients.

Keywords: Nerve function impairment, Prednisolone, Neuropathy, POD, Randomized clinical trial
ILC1.3–022
A review on primary neuritic leprosy
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Objective: To understand the research progress of primary neuritic leprosy and to provide a theoretical basis for the prevention and control work. Methods: By means of literature review. Results: In terms of the primary neuritic leprosy, there was a difficulty to prevent, diagnose and treat, because the specificity of clinical manifestation, complexity to diagnose and being short of a systematic study and cognition. Conclusion: Improving the leprosy awareness and knowledge on the primary neuritic leprosy of the dermatologist and grassroots medical staff in department of neurology may be important to diagnose early.

Keywords: Primary neuritic leprosy, review
Disability and Reactions Workshop: The Erythema Nodosum Leprosum International STudy Group –ENLIST
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Erythema nodosum leprosum (ENL) is a debilitating and often extremely painful inflammatory reaction occurring in people who are or have been infected with a large number of Mycobacterium leprae. The reason for this is not well understood. ENL may affect the skin, nerves, joints, eyes, kidneys, nose and testes. ENL is often chronic and it is not uncommon for these painful and damaging episodes to continue for more than five years.

The ENLIST Group is an international collaboration of leprosy centres formed with the aim of improving the understanding of the pathophysiology of ENL, developing evidence for the treatment of patients and ensuring that policy reflects best practice for ENL.

Since the formation of the Group in 2012 we have made great strides to delineate the clinical features of ENL and its impact on the lives of those affected. Members of the group have studied the morbidity and mortality associated with ENL, the economic burden it produces and impact on quality of life. We have developed a clinical severity measure, the ENLIST ENL Severity Scale, and are currently validating this in our centres in Bangladesh, Brazil, Ethiopia, India, Indonesia, Nepal and the Philippines with support from the Leprosy Research Initiative (LRI). A validated scale will be an essential tool in treatment trials in ENL.

The LRI is also supporting the ENLIST Group to develop and implement double-blind, randomised, placebo controlled trials of the efficacy of methotrexate in the management of ENL.

In this talk I will outline the work of the ENLIST Group, particularly that which is supported by the LRI and focus on the challenges of designing and conducting clinical trials in ENL and other leprosy reactional states.

Keywords: Leprosy Research Initiative, Reactions, ENLIST, ENL
ILC1.3–024
ENL Reactions Workshop: Erythema Nodosum Leprosum
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Erythema nodosum leprosum (ENL) is a severe immunological complication affecting individuals with lepromatous leprosy (LL). ENL affects approximately 50% of individuals with LL and 5–10% of borderline lepromatous (BL) leprosy patient. It is estimated that over 50,000 of the new leprosy patients diagnosed each year are at risk of ENL. ENL may occur before, during or after successful completion of multi-drug therapy (MDT). The inflammatory state of ENL causes significant morbidity and if untreated mortality. ENL is also associated with severe economic hardship.

ENL is characterised by the development of crops of erythematous, tender skin nodules and inflammation and severe pain in other body sites causing iritis, arthritis, lymphadenitis, orchitis and neuritis. Fever or a history of fever is also common.

Patients are treated with corticosteroids and thalidomide which are used for prolonged periods of many months or years. Many patients require high doses of corticosteroids to control their disease and this leads to complications and a significant number of deaths associated with long-term use of these drugs. Thalidomide is not available in many countries (such as Bangladesh, Ethiopia, Indonesia, the Philippines and Malaysia) or is severely restricted (Nepal) because of the risk of teratogenicity. Thalidomide is also associated with adverse effects such as somnolence, nausea, neurotoxicity, dizziness and thromboembolism which may limit its use.

The identification of other agents for controlling ENL is a priority. Since the introduction of MDT there have been five randomised controlled trials involving just 189 individuals, five of these involved some form of allocation concealment. The largest of these with 60 participants compared thalidomide with prednisolone. This workshop will aim to:

1. Demonstrate the impact ENL has on individuals
2. Highlight the challenges of managing ENL
3. Discuss the impact ENL has on health systems
4. Discuss important avenues of research including pathogenesis

Keywords: ENL, Erythema nodosum leprosum, ENL, Research, Management
ILC1.3-025
LENALIDOMIDE IN ENL REACTIONS IN LEPROSY - PRELIMINARY OBSERVATIONS
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Introduction
Lenalidomide is an analogue of thalidomide and has been shown to be more potent than thalidomide in stimulation of T-cell, interleukin-2, and interferon-γ production. Lenalidomide is in a class of medications called immune-modulatory agents. Both drugs have direct cytotoxic effects on myeloma cells and are capable of inducing apoptosis. They are also capable of reducing angiogenesis through inhibition of secretion of vascular endothelial growth factor (VEGF). Unlike thalidomide, lenalidomide has almost no sedative or constipative properties and induces only minimal neurotoxicity; however, there is concern about lenalidomide’s teratogenic potential. We report our preliminary observations for the first time on the role of Lenalidomide in three patients with ENL reactions.

Methods
As a pilot investigation three male patients with (age group ranging from 30 to 57 years) attending the Referral Centre of Bombay Leprosy Project with moderate to severe type II reactions and ENL were considered for treatment with Lenalidomide. All three patients were subjected to a detailed clinical examination, haemogram and chest radiograph. Informed consent and undertaking as per protocol was taken. Lenalidomide was administered as a daily dose of 25mg per day and maintained over a period of 4 to 6 weeks.

Results
In all the 3 patients, BI was < 3+ and clinical score at intake and during follow up using Reaction score was assessed to study severity of reactions. All 3 patients were of moderate severity. Out of the 3 patients, ENL improved in 2 patients while in 1 patient who was already suffering from severe ulcerative necrotic ENL reaction did not show improvement. No major adverse effects were observed.

Conclusion
The preliminary observations show that Lenalidomide as an immunosuppressive and anti-inflammatory drug does seem to have a role in controlling type II / ENL reactions in leprosy. We need to study the role of Lenalidomide in a larger series of patients and in a comparative well designed study and also its role in neuritis and nerve function impairment and its consequences.

Keywords: Lenalidomide, ENL Reactions, Thalidomide, Analogue
ILC1.3-026
The Impact of Erythema Nodosum Leprosum on Health Related Quality of Life in Surabaya, Indonesia: an ENLIST Group Study
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Erythema nodosum leprosum (ENL) is a severe, painful multisystem complication of lepromatous leprosy. The inflammatory state of ENL causes significant morbidity, economic hardship and occasionally death.

Objectives
To determine the impact of ENL on health related quality of life (HRQoL) using the Medical Outcomes Study: 36-Item Short Form Survey (SF-36)

Methods
Individuals with leprosy at the General Soetomo Hospital, Surabaya, Indonesia were invited to complete the Bahasa Indonesian version of the SF-36. Patients were classified into three groups: ENL, Type 1 reaction (T1R) and no reaction. The responses to the items were coded, summed and transformed into a scale for each of the eight domains. A lower score reflects a worse HRQoL compared to a higher one.

The differences among the groups were analysed using analysis of variance. Differences between pairs of groups were tested post hoc using Scheffé’s method.
Results
70 individuals with a median age of 32 years (Range 14–65) were recruited. Twenty (28.6%) were female. Twenty-five had ENL (26.6%), 9 (37.5%) T1R, and 36 (28.1%) no reaction. Patients with ENL had the lowest mean scores in all domains except, surprisingly, pain. The differences between patients with ENL and those in the other groups were significant for: PF, RFP, RLE, EF, EWB and GH. SF scores were significantly lower in ENL patients than those with T1R.

Conclusions
This small study demonstrates a negative impact of ENL on HRQoL. We showed reduced scores in patients with ENL in five domains and this was significant in social functioning. This reduction in social functioning is in keeping with the symptoms of ENL which include pain, lethargy and visible changes of the skin. This study utilised a validated tool but is limited by size, lack of matched controls. The SF–36 is a general tool and may not reflect specific aspects of ENL and leprosy which may have an important bearing on HRQoL. Larger studies of the HRQoL of people affected by leprosy are needed, conducted with the best possible tools. New instruments may be needed.

Keywords: Health related quality of life, ENL, ENLIST, HRQoL, Reactions
ILC1.3–027
THALIDOMIDE IN TYPE II REACTIONS – LARGER EXPERIENCE OVER A DECADE
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Introduction
Thalidomide belonging to the thiomide group of drugs is well known and useful in management of ENL and type 2 lepra reactions. Clinical observations on efficacy of Thalidomide as a primary drug and its role in maintenance therapy has been reported earlier in 2005 (Pai et al 2005) and in 2013. We now report our observations over a decade long experience on patients managed with thalidomide in type II reactions in leprosy.

Methods
During the period from 2005 to 2015 we recruited 305 patients from those referred by local medical colleges and practicing dermatologists to Referral Centre of Bombay Leprosy Project with type II reactions and ENL for treatment with thalidomide. All referred patients were subjected to detailed clinical examination, haemogram, chest radiograph. Informed consent and undertaking as per protocol was taken. Thalidomide was administered as daily dose of 300mg per day in divided doses and tapered and maintained over a period of 12 to 18 months.
On intake and during follow up clinical scoring using Reaction score was done to record severity of reactions. All patients were of moderate to severe reaction. Patients were divided in two groups for purpose of maintenance therapy i.e. 50 mg daily for six to twelve months and twice weekly for six to twelve months. Those patients who developed recurrent reaction and were treated in past with NSAIDS, Prednisolone and Clofazimine were considered to be treated with Thalidomide.

Results
ENL reactions in most of these cases subsided in one week. No major adverse effects were seen except edema of feet in few cases. 75 (26%) patients had recurrence of reactions either during course of Thalidomide or on completion of treatment needing additional steroids or thalidomide. Most of these patients had BI > 3+. ENL reaction improved well in most patients and therefore weaned away from steroids and steroid dependency could also be averted.

Conclusion
In our experience over a decade, it was thus observed that thalidomide as immunosuppressive and anti inflammatory drug is an excellent drug in controlling severe type II / ENL reactions in leprosy and specially in those with steroid adverse effects and steroid dependency. Its role in controlling type II reactions and in nerve damage and ENL pain improves greatly the quality of life of leprosy patients.

Keywords: Thalidomide, Recurrence, Maintenance
ILC1.3-028
SEVERE REVERSAL REACTION IN A KIDNEY TRANSPLANT RECIPIENT: A PARADOX MEDIATED BY REGULATORY T-CELLS (Tregs)??
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Case report: A 55 years-old man was admitted with chronic kidney failure of unknown etiology. He remained on hemodialysis from 02/2007 to 05/2009 when he was submitted to a live kidney transplantation (donated by a sister). He was then treated with prednisone (10mg/day), micophenolate (1080mg/day) and tacrolimus (5–7mg/mL). The first three years passed unnoticed when on 03/2012 he referred a migratory polyarthralgia, night fever and weight loss. Rheumatologic and infectious screening was negative. In June/2012 he returned with skin lesions in both hands and ulnar e tibial nerves enlargement. Histopathology disclosed the diagnosis of BB/BT leprosy. He was treated accordingly with the WHO regimen for 12 months with resolution of the lesions. One month after cessation of the multidrug therapy he presented painful erythematous-violaceous papules and edema of the fingers and hands. A biopsy showed chronic granulomatous dermatitis with fibrinous exudation, lack of bacilli and a negative immunohistochemistry (IHC) for BCG. Reversal reaction (RR) was diagnosed and prednisone was increased from 10 to 40 mg/day;
micophenolate and tacrolimus were maintained, but one month later micophenolate was removed due to persistent diarrhea. The RR manifestations subsided and the patient was prescribed everolimus to replace micophenolate. The patient is still being followed without relapses up to now.

Results: Circulating Tregs were measured by flow cytometry and in situ by IHC. We previously demonstrated that patients with RR have ~3% of circulating Tregs (CD4+CD25+CD127lowFoxp3+) cells while this patient had 0.24% during RR and 1.2% after resolution of RR. In situ we found 170 cells/mm² in RR patients, but this patient presented 55 cells/mm² during RR and 71 cells/mm² after the RR. Lack of Tregs ability to expand was also observed when circulating Tregs were stimulated with M. leprae antigen during the reaction episode (0.56% vs. mean of 6.7% in RR patients), but expanded moderately (3.4%) after reaction.

Discussion: The development of severe RR, i.e., exacerbation of the anti-M. leprae inflammatory response, in leprosy patients on severe immunosuppressive regimen seems paradoxical. At the time the patient developed RR he was receiving micophenolate for preventing graft rejection, a drug that inhibits the de novo purine synthesis, which is essential for Tregs proliferation and survival. Consistent with this the patient had deeply reduced Treg numbers, which additionally had dampened proliferative capacity. With MMF removal, the Tregs number increased as their proliferative response to M. leprae, concomitant with the improvement of the RR.

**Keywords:** Reversal reaction, T regulatory cells, T regulatory cells, Micophenolate, Immunosuppression, leprosy
ILC1.3–029
Analysis of clinical characteristics of thirty-three lepromatous reactions and evaluation of therapeutic effect of prednisone on leprosy cases after combined chemotherapy
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Objective To understand the occurrence of lepromatous reactions and evaluate the therapeutic effect of prednisone on leprosy cases. Methods The data of leprosy case in Huizhou city during 1995 to 2012 were collected and retrospectively analyzed. All the leprosy cases were treated with full dose and standard chemotherapy. The cases with lepromatous reactions were treated with two prednisone regimens based on the systemic symptoms, dermal lesion and the peripheral neurological involvements. Results Totally thirty-three times of lepromatous reactions occurred to 28 out of the 60 leprosy cases including 10 times of type I lepromatous reactions in 9 cases, 21 times of type II reactions in 17 cases and two cases/time of mixed type lepromatous reactions. About 18.18% of the lepromatous reactions were observed before confirmation of leprosy, 63.64% of the reactions were noticed 12 months after combined chemotherapy. The main manifestations were skin lesions and peripheral nervous involvements. After treatment with prednisone 19 cases/times of lepromatous reactions were cured, 7 were markedly effective, 6 were improved an one were deteriorated with a effective rate of 78.79%. All case were treated with full courses though full moon faces were observed in 10 cases, stomach upset, swelling at lower extremities and increased blood pressure were noticed in each of the cases after treatment with prednisone. Conclusion The incidence of lepromatous reactions was high twelve months after treatment of the leprosy cases and prednisone is efficacious for treatment of lepromatous reactions stressing that attention be paid to adverse events during treatment of leprosy cases.

Keywords: Lepromatous reaction, Combined chemotherapy, Prednisone, Effect evaluation
ILC1.3–030
lepromatous leprosy with Lucio’s phenomenon
report one case
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Lucio’s phenomenon (LP) is considered a necrotizing, panvasculitis and a variant of leprosy Type 2 reaction, clinically characterised by necrotic–haemorrhagic lesions on the extremities and trunk. Lucio’s phenomenon is observed mainly in diffuslepromatous leprosy (DLL), lepromatous leprosy with erythema nodosum leprosum (ENL). We report a rare case of lepromatous leprosy with LP, who presented clinical manifestations during the past five years (repeated tubercles and ulcers) not under diagnostics or therapy. Recently, the patient developed to a urinary system infection with hyperpyrexia and anaemia, and presented several new tubercles and extensive skin ulcers. Histopathology showed angiectasis, hyperaemia, thrombosis, hemorrhagic necrosis, fibrinoid degeneration, neutrophils and massiveneutrophils infiltrating in the wall of the vessel; perivascular and periaxialfoamy macrophages, lymphocytes and acid–fast bacillus.

Keywords:
ILC1.3–032
Treatment of Early Neuropathy in Leprosy (TENLEP): outcomes of a randomised, double blind, placebo controlled clinical trial to treat subclinical neuropathy with prednisolone.
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Background
The effect of prednisolone treatment on patients with subclinical neuropathy to prevent clinical nerve function impairment (NFI) as determined with MFT and/or VMT has not been studied in a randomised clinical trial before. Subclinical neuropathy is defined as abnormalities in nerve conduction and thermal sensation assessment.

Objectives
To determine whether prednisolone treatment (20 weeks) of early sub-clinical NFI can prevent clinical NFI.
Methods
In 4 research centres (India, Nepal and Bangladesh), leprosy patients with subclinical neuropathy, as determined by Nerve Conduction Studies (NCS) and/or Warm Detection Threshold (WDT), and without any clinical signs of NFI were randomly allocated to a placebo group or treatment group receiving 20 weeks prednisolone ((starting dose 45mg or 60mg depending on weight). The primary outcome was the proportion of patients developing clinical NFI, as determined by monofibre testing (MFT) and voluntary muscle testing (VMT). Reliability and normative studies were carried out before the start of the trial, both of subclinical assessments through nerve conduction and thermal sensation assessments, and of MFT and VMT.

Results
Preliminary analysis shows that there treatment of subclinical neuropathy with prednisolone, as compared to placebo, is not preventing clinical neuropathy at 20 weeks, nor later on at 52 or 78 weeks after steroid treatment was started. The rate of developing clinical neuropathy was 8.7%.
When looking at individual nerves, similar results were found: no difference between treatment and placebo arm. Preliminary analysis of subclinical parameters also showed no difference between treatment and placebo arm.

Conclusions
In our cohort of patients there was no evidence that treatment of subclinical neuropathy with prednisolone made any difference for developing clinical nerve function impairment or not. Further analysis will look into subgroups of this patient population to see if lessons can be learned to refine existing clinical decision rules. This will be presented during the conference.

Keywords:
ILC1.3-033
Lucio Phenomenon in Child with Cushing Syndrome Successfully Treated with Pentoxifylline: a Case Report
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Objective: to report a case of Lucio phenomenon in a child with Cushing syndrome due to continuous steroid therapy, which was successfully treated with alternative therapies.

Method: We describe a case of a 13 year old patient with Cushing syndrome and repeated episode of type 2 reaction. He was later diagnosed histopathologically with Lucio phenomenon, and successfully treated with combination of clofazimine and pentoxifylline.

Result: a 13-year-old patient came to the emergency room complaining of painful and ulcerated nodules in the face and all extremities. The patient was diagnosed with borderline lepromatous leprosy 2 years earlier and completed the multidrug treatment (MDT) regimen for 18 months. After 6 months consuming MDT, the patient had multiple episodes of type 2 reaction. He was then treated continuously with corticosteroid. After one year of corticosteroid therapy, the patient diagnosed with Cushing syndrome and stunted growth. The corticosteroid was tapered off but the patient continued to have acute episode of type 2 reaction. We then performed histopathology examination from the ulcerated nodule and found epidermal necrosis and vascular occlusion with no vasculitis, consistent with Lucio phenomenon. We tried the alternative regimen of clofazimine 50 mg/day and pentoxifylline 200 mg/day, whilst still continue the corticosteroid at minimal dose. The patient condition improved and we tapered off the corticosteroid while still continue giving clofazimine and pentoxifylline. After 2 months follow-up, we stop both medication and the patient has not had any complaint for almost a year. The patient is now still being treated for Cushing syndrome and stunted growth.

Conclusion: Corticosteroid was the drug of choice for leprosy reaction. But continuous use, especially in children, could cause severe side effect. Pentoxifylline could be considered to spare long term use of corticosteroid, though further studies are still needed to determine its efficacy, especially for Lucio phenomenon.

Keywords: Lucio, Phenomenon, Cushing, Syndrome, Pentoxifylline
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Objective: To determine the prophylactic and therapeutic effect of an extended course of clofazimine after 12 month WHO-MDT on the occurrence and severity of erythema nodosum leprosum (ENL) in multibacillary (MB) leprosy.

Methods: With the approval of an Institutional Ethical Committee, new MB leprosy patients with a site Bi of at least 4+ who consented to participate in the study were recruited. Patients were randomly allocated to two drug regimens: Regimen A consisted of One-year MDT + Clofazimine 100 mg daily for 12 months; Regimen B consisted of One-year MDT + placebo daily for 12 months. During and after treatment, the occurrence and severity of ENL were carefully monitored. Since clofazimine (regimen A) was given for an additional period of 1 year, a reduction in the severity of ENL by 50% was considered minimal to outweigh patient discomfort and additional cost related to treatment extension. The ENL severity scale being developed and tested was divided into three parts.
The first part contained 5 individual parameters: the number of ENL lesions, inflammation of ENL, fever, body malaise, edema. The second part is a combined assessment of nerve involvement and the third part is the combined assessment of other non-specific symptoms. The total score reflected the ENL severity status of the patient and could vary from a minimum of 0 to a maximum of 21. A clinical score of >4, ENL duration of >20 weeks per episode and a total prednisolone dose of >2gms served as markers for severity.

Results: There were a total of 110 candidates considered for enrolment; ten were excluded for various reasons. With these 100 participants, we had an 81% power to detect a 50% reduction in severe ENL in regimen A as compared to regimen B. Each regimen enrolled 50 patients. For Regimen A: 45 (90%) were males, 42 (84%) had an average BI of ≥ 4+ and 48 (96%) had Lepromatous Leprosy (LL). For Regimen B: 41 (82%) were males, 35 (70%) had an average BI of ≥ 4+ and 46 (92%) had LL. Statistical analysis using Cox Proportional Hazard Models, Kruskal–Wallis, Poisson and Generalised Regression Models showed no statistical difference between treatment groups as to time to first ENL episode, ENL incidence, severity and steroid use.

Conclusion: We conclude that an extended course of clofazimine after WHO–MDT has no prophylactic and therapeutic effect on the occurrence and severity of ENL respectively.

**Keywords:** prospective, randomized, double-blind, Clofazimine, ENL
ILC1.4-001
Clinico–Pathological Features of Erythema Nodosum Leprosum: A case–control Study at ALERT Hospital, Ethiopia.

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Background: Leprosy reactions are a significant cause of morbidity. Erythema nodosum leprosum (ENL) is an immunological complication affecting approximately 50% of patients with lepromatous leprosy (LL) and 10% of borderline lepromatous (BL) leprosy. ENL is associated with skin lesions, neuritis, arthritis, dactylitis, eye inflammation, osteitis, orchitis, lymphadenitis and nephritis. The treatment of ENL requires immunosuppression, which is often required for prolonged periods of time and may lead to serious adverse effects.

Objective: We described the clinico–pathological features of patients with ENL before and after prednisolone treatment

Materials and methods: A case–control study was performed at ALERT hospital, Ethiopia. Forty-six patients with ENL and 30 LL controls were enrolled in the study and followed for 28 weeks. Clinical features were systematically documented at each visit using a specifically designed form. Blood and skin biopsy samples were obtained from each patient. Laboratory and histopathological investigations were used to supplement the clinical data.
Results: Pain was the commonest symptoms reported (98%) by patients with ENL. About 80% of them had reported skin pain and more than 70% had a nerve and joint pains during enrolment. About 40% of the patients developed Chronic ENL. The morphology of cutaneous lesions showed that 95.7% individuals had nodular lesions. More than half (52.2%) of patients with ENL had old nerve function impairment (NFI) while 13% had new NFI at the time of enrolment. Facial and limb oedema were the most reported organs involved in ENL reactions. Before treatment, dermal neutrophilic infiltration was noted in 58.8% of patients with ENL compared to 14.3% in LL controls. Only 14.7% of patients showed evidence of vasculitis.

Conclusion: The most frequent site of pain due to ENL in our study was the skin which is explained by the fact that 95% of patients with ENL cases had skin lesions. More diverse cutaneous manifestations of ENL are documented in this study than usually used in case definition. Whenever present, polymorphonuclear cells infiltration with perivascular lymphocyte infiltration were diagnostic features of ENL lesions. Chronic ENL comprises 40% of patients with ENL signifying that these patients require corticosteroid treatment for extended periods. This implies that chronic ENL continue to be a burden for the health intuitions. Households affected by ENL face significant economic burden and at risk of being pushed further into poverty.

Keywords: Case-control, ENL, Ethiopia, Leprosy, Pathology
ILC1.4-002
PRESENCE OF M. LEPRAE IN THE SPUTUM OF A PATIENT WITH RESPIRATORY SYMPTOMS IN BELÉM, PARÁ STATE, BRAZIL.
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Introduction. The state of Pará has a high leprosy prevalence rate (4.07 / 10,000) in Brazil, with an incidence rate of 50.75 / 100,000 (data from 2012). Belém, the capital, had an incidence rate considered too high (23.47 / 100,000), with 331 new cases reported in 2012 (DATASUS, 2014). Some cases of patients with respiratory symptoms have been reported in leprosy and tuberculosis co-infection. Nevertheless, it is quite possible that these symptoms may be related to M. lepra and not entirely to M. tuberculosis.

Objective. Present a case report of a patient with lepromatous leprosy with respiratory symptoms.

Methods. A male patient, 30 years old, from Belém, Pará State, was examined on September 11, 2013 at Unified Medical Service of the Instituto Evandro Chagas in Belém, Pará State, with a main complaint of productive cough for three months with purulent sputum.

Results and Conclusions. On clinical examination, it was noted that the patient bilateral ear infiltration, multiple hypoesthetic hypo and hypochromic spots, and anesthetic spots in the lower and upper limbs. Lymph smears of the two earlobes, right elbow and left ankle were performed, with staining by the method of Ziehl–Neelsen. A bacterial index (BI) of 4.25 was obtained. Samples of sputum and nasal secretions (NS) through swab technique were collected for Polymerase Chain Reaction (PCR) for M. lepra. Both were positive and anti-PGL-1 was also positive. Leprosy should be considered in all patients who have skin or nerve lesions suggestive of leprosy, even in patients with unusual presenting symptoms.

Keywords: Leprosy, Clinical presentation
LC1.4–003 Evaluation of Patients With Relapsed Leprosy After Multidrug Treatment at a Leprosy Clinic in Rio de Janeiro, Brazil.
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Objective Despite the efficacy of multidrug treatment in leprosy patients, some will suffer from a re-occurrence of the disease after complete multidrug treatment (MDT). It remains a difficulty to diagnose relapse in leprosy patients, especially in the paucibacillary patients. The aim of this study is to evaluate the incidence and patient findings of relapsed leprosy patients after MDT at a leprosy clinic in Brazil. This evaluation is needed to allow better management and control of relapsed patients.

Methods Leprosy patients (diagnosed according to the Ridley and Jopling classification) were retrospectively included when diagnosed with a relapse. They had to be diagnosed and treated with MDT (according to the World Health Organization (WHO) standards), at the leprosy clinic Ambulatório Souza Araújo (ASA) in Rio de Janeiro, Brazil, from October 1998–December 2015. The demographic findings, the clinical form of leprosy, bacillary index, histopathological findings, multidrug treatment dose and the time between initial diagnose, treatment and relapse, were statistically analyzed. Based on the new relapse protocol of the Ministry of Health of Brazil further differentiation was made.
Results In the period from October 1998 until December 2015 there were 3145 of leprosy patients in ASA. Of which 132 (4.1%) patients were diagnosed as a relapse. In total 27 patients were included in our study. The average age at he first diagnose was 33 years. 37% were feminine patients. At the initial diagnose 20 patients (74%) were multibacillary and 7 patients (26%) were paucibacillary. At the diagnose of relapse 24 patients (88%) had the multibacillary form and 3 patients (12%) had the paucibacillary form. The mean bacillary index of the patients at initial diagnose was 2.79, and the mean bacillary index at relapse was 1.94. The mean difference between the bacillary index at the end of the first treatment and the initial diagnose of relapse was 0.16. The mean time between the initial diagnosis and the diagnosis of relapse was 11 years.

Conclusions Although the number of relapse cases after complete multidrug treatment is low, it remains important to diagnose and treat a relapse in an early stage in order to prevent further disabilities, transmission and spreading of the disease.

Keywords: leprosy, relapse, diagnose, treatment
ILC1.4-004
Histoid leprosy in post leprosy elimination era in India
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Objectives: Histoid leprosy is a unique form of leprosy with distinct clinical, bacteriological and histopathological features. In the post leprosy elimination, a surge in the proportion of Histoid leprosy has been observed from India. We reviewed the epidemiological and clinical characteristics of Histoid leprosy cases at our hospital.

Methods: A retrospective analysis of clinical records of Histoid leprosy patients registered in the leprosy clinic of our tertiary care centre in North India was undertaken (January 2008 to December 2013). The data was collected with respect to demographic profile of the patients, clinical lesions, routine investigations along with slit-skin-smear (SSS), histopathology, diagnosis, complications and course following treatment was analysed.
Results: The incidence of Histoid leprosy was 2.7% (29 out of 1078) among the registered leprosy patients in our clinic. The male to female ratio was 4.8:1. De novo Histoid leprosy was seen in 8 patients. Other forms of leprosy having Histoid lesions were polar lepromatous leprosy (10) and sub-polar lepromatous leprosy (7). Borderline lepromatous leprosy and borderline tuberculoid leprosy were seen in 2 patients each. Most common lesions were nodules (41.4%), followed by nodulo-plaque lesions (27.6%). Anatomical areas most commonly involved were face, thighs, buttocks and upper limbs. Type 1 and type 2 leprosy reactions were seen in 2 and 4 patients respectively. Deformity (grade II) was seen in one patient each of de novo Histoid and lepromatous leprosy. Twenty-one patients received WHO MDT-MBR. In 8 patients, MDT was continued to 24 months because of high bacteriological index even after completion of 12 months of treatment. Immunotherapy in the form of BCG vaccine and mycobacterium indicus pranii vaccine was given in 12 and 6 patients respectively. Two patients having persistently positive morphological index and continuing to develop new lesions at 12 months of MDT-MBR were treated with second line alternate anti-leprosy therapy (ALT). Reactions were noted in 7 patients which were managed with oral corticosteroids. Treatment was well tolerated except dapsone hypersensitivity syndrome and lichen scrofulosorurum secondary to BCG vaccination in one patient each. No relapse was seen in the follow-up period.

Conclusions: In the era of leprosy elimination, many Histoid variant of leprosy continue to emerge, however diagnosis is often delayed/missed. The bacteriological clearance may take longer time in this variant of leprosy with WHO-MDT-MBR. Consequently, such patients highly loaded with M. Leprae act as an infection pool in the society posing a challenge for eradication of leprosy.

Keywords: Histoid leprosy, Multibacillary disease, MDT
ILC1.4-005
Cutaneous sarcoidosis with granuloma formation around nerves mimicking mycobacterial infection
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Granulomatous dermatitis could be defined as having an inflammatory cutaneous infiltrate in which the presence of granulomas is the preponderant histologic feature, with infectious or non-infectious cause. As a broad group, sometimes they are relatively difficult to diagnose and distinguish both clinically as well as histologically. Herein we report of one difficult case, whose pathological examination showed the presence of superficial and deep dermal epithelioid cell granulomas. Within some of those tubercles, peripheral nerves with incomplete perineurium were found. The diagnosis of sarcoidosis was made after exclusion of leprosy using real-time quantitative PCR (qPCR) test for Mycobacterium leprae gene encoding antigen 85B and SODA. The patient was treated with glucosteroid with good outcome.

Keywords: sarcoidosis, leprosy, qPCR
Think Of Leprosy, Even In The Era Of Elimination

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With the elimination of leprosy from most parts of the World including India, diagnosis of leprosy is becoming more and more challenging.

Objectives
To determine the number of leprosy patients attending a specialty clinic in a tertiary care center in India in whom the diagnosis of leprosy was missed on presentation.

Material & Methods
We retrospectively reviewed case files of 1543 patients registered during 2009–2015 in the leprosy clinic of All India Institute of Medical Sciences, New Delhi, India to determine the number of patients in whom the diagnosis of leprosy had initially been missed and there had been delay in starting antileprosy treatment (ALT). We also identified the spectrum of diseases which were diagnosed in these patients.
Results
Of the 1543 files reviewed, we observed that 156 (1.01%) patients had been misdiagnosed at presentation to the doctor and institution of ALT had been delayed for periods varying from 1- 36 months. In 27 (17.3%) of these patients the diagnosis of leprosy was missed at the primary health center, in 46 (29.5%) by the general practitioner, in 34 (21.8%) by practitioners of alternate systems of medicine, in 39 (25%) by a dermatologist, in 9 (6.4%) by an internist and in 1 (0.6%) by a surgeon. In 92 (59.0%) patients, the delay in the diagnosis had led to development of disability (grade I: 60; grade II: 32). In 110 (70.5%) patients, the patient’s prescription did not have any diagnoses and the patient had been treated variously with topical steroids, vitamin supplements and antihistamines. Of the 36 patients in whom a diagnoses of dermatological conditions was made, 22 (14.1%) were diagnosed to have a fungal infection and in other 14 (9.0%) a spectrum of dermatological diseases were diagnosed including orofacial granulomatosis (2 patients), post kala azar dermal leishmaniasis (3), granuloma annulare (2), erythema annulare centrifugum (1) and sarcoidosis (2). One patient each with erythema nodosum leprosum (ENL) was misdiagnosed as erythema nodosum and Sweet’s syndrome. Nine (5.8%) patients with ENL presented to the internist due to the presence of conspicuous constitutional symptoms. Three of these were misdiagnosed as lymphoma, and 6 as different connective tissue disorders. The patient who presented to the surgeon was misdiagnosed as neurosarcoma.

Conclusions
Leprosy remains a great mimicker and clinicians really need to think of leprosy, even in era of elimination.

Keywords: Leprosy, misdiagnosis
ILC1.4-007
Two cases of leprosy in siblings caused by
Mycobacterium lepramatosus
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We describe two leprosy cases in Mexican siblings caused by a new species Mycobacterium lepramatosus. This is likely the first report of family clustering of this infection. The patients showed severe prolonged leprosy reactions after antimicrobial treatment, raising a challenge for clinical management. The current status of M. lepramatosus infection is reviewed.

Keywords: M. lepramatosus, Erythema Nodosum Leprosum, Family Clustering
ILC1.4–008
Erythoderma as a manifestation of borderline tuberculoid leprosy on reversal reaction: report of a case
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Case report
A 63-year-old man presented a two-month history of erythoderma. Skin was diffusely infiltrated but axillary and inguinal areas were spared. He also presented amyotrophy of interosseous muscles of the hands, ulnar claw, thickening of ulnar and fibular nerves, edema and paresthesia of hands and feet. Three simultaneous skin biopsies showed perivascular, periadnexal and perineural chronic granulomatous infiltration in the dermis and hypodermis. Fite stain showed whole acid–fast bacilli within the infiltrate. Other diseases that can culminate with erythoderma such as inflammatory dermatoses, drug reactions, cutaneous lymphomas, and infections were all ruled out. Diagnosis of borderline tuberculoid (BT) leprosy was made. Peripheral edema and the moderate quantity of multinucleated histiocytes were considered manifestations of reversal reaction (RR). Immunohistochemistry revealed overexpression of IL–17+ cells as compared with FoxP3+ cells (in situ: 213 vs 121 cells/mm²). Peripheral blood Tregs corresponded to 2.7% and could be induced/expanded after in vitro stimulation with M. leprae antigen (MLCwA) (11.7%) and phytohemagglutinin (14.9% vs. 4.8% in unstimulated cells). MDT–MB, prednisone, amitriptyline, and gabapentin led to resolution of erythoderma and neuritis.
Discussion

Leprosy is frequently complicated by reactional episodes. Edema is a common feature of RR. In our patient, diffuse skin infiltration, neural disability and peripheral edema raised the suspicion of leprosy on RR, which was confirmed by histology. The patient’s higher Th17 (IL-17+ cells) than Treg response (FoxP3+ cells) is in contrast with our previously published data showing higher number of Tregs than Th17 cells in RR. In fact, erythrodermic psoriasis leads to decreased expression of Tregs as compared with psoriasis vulgaris. We speculate that development of erythroderma in our patient promoted the enhancement of Th17 response. However, we did not find neutrophils infiltration in the same biopsy, a characteristic feature of Th17 response. Although we could expand in vitro the Treg subpopulation with MLCwA, this was apparently not taking place in vivo, resulting in exacerbated cutaneous inflammatory response.

Conclusion

The fact that M. leprae affects cooler areas of the body, sparing axillary and inguinal folds, together with the findings of hypoesthesia and neural dysfunction, offers clues to the diagnosis of leprosy-associated erythroderma. Both RR and inflammatory erythroderma have a Th1 profile, and reverse reaction causing erythroderma in patients with history of leprosy must be considered. We highlight the importance of a thorough physical, histopathology examination, and detailed laboratory tests in erythrodermic patients to determine the etiology and introduce appropriate treatment of the underlying disease.

Keywords: Borderline tuberculoid leprosy, Reversal reaction, Erythroderma, Immunology
ILC1.4-009
The Analysis of 8 cases of numb erythema
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Objective: To find leprosy patients early, by follow-up studying numb erythema. Methods: Follow-up studying regularly 8 cases of numb erythema, and giving bacteria and pathologic examination timely when the case had changes. Results: 5 cases were male, 3 cases were female, age 10 ~ 46, 3 cases were diagnosed to leprosy, 4 cases were healing by themselves, 1 case had no change. The average follow-up time was 3 years. Conclusion: Pure numb erythema, and had a contact history with leprosy, especially aging 15 ~ 30, should be focused on follow-up, the follow-up period should not be less than 3 years.

Keywords: Numb erythema, leprosy, follow-up studying
ILC1.4–010
Clinical Profile and Trends of Childhood Leprosy over a Ten Year Period at a Tertiary Referral Centre
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Introduction: Leprosy in children forms an important link in the transmission of the disease. In this paper leprosy in children is studied with two main objectives – to examine the trends of childhood leprosy and to construct the profile of disease over the ten year period.

Methods: All new untreated patients under the age of 15 years presenting to the outpatient department of SIHRLC, Karigiri formed the clinical group for this study. The study period is from 2000 to 2009. The ten year period is divided into pre elimination (2000–2005) and post elimination (2006–2009) based on the year elimination of leprosy was declared in India i.e 2005. A total of 282 children were seen with leprosy during this period. 201 were in the pre elimination period and 81 in the post elimination period.
Results: The occurrence of the disease in children reduced from an average of 33.5% in the pre elimination period to 20.3% in the post elimination period. The delay in presentation during the pre elimination period was more than one year in 27.3% as compared to 23% during the post elimination period. 24.4% of children had history of intra familial contact during the pre elimination period as compared to 32% during the post elimination period. Children with five or more than five skin lesions were 30.8% during the pre elimination period and 34.5% in post elimination period. Similarly during the pre elimination period there were 52.2% of children with two or more major nerve trunk lesions as compared to 50% during the post elimination period. However the proportion in the tuberculoid spectrum increased during the post elimination period from 82% to 90%. Smear positive status did not change between the two periods with around 8% children being smear positive. As far as nerve function impairment is concerned 20.4% had NFI during the pre elimination period which dropped to 14% during the post elimination period. Type I reactions occurred in 22.4% of children during the pre elimination period and 13% during the post elimination period the occurrence of Type II reactions was around 2% during both the periods.

Conclusion: From the results it can be observed that the occurrence of disease in the children reduced during the post elimination period. However the profile of the disease remained the same, save for decrease in Type I reactions and nerve function impairment during the post elimination period.

Keywords: Childhood Leprosy, Reactions, Bacteriological Index, Eradication, Prevelance
ILC1.4-011
Lepromatous leprosy and neurofibromatosis: two cases of association and one misdiagnosis
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Neurofibromatosis (NF) is a genetic disorder presenting tumors on nerve tissue. Café au lait spots together with cutaneous neurofibromas are common manifestations. We present two cases of delayed diagnosis of Lepromatous Leprosy (LL) in patients with NF and another case where a NF patient was misdiagnosed as having LL, all from Pará State, Brazilian Amazon. Case one, male, 57 years old, was diagnosed with NF when he was a child. Two years ago, he started to feel paresthesia and itching sensation on hands and feet, together with the appearance of new nodules he noticed were different of those he previously had. However, even after consultations with different doctors on general clinics, he was told those nodules were part of NF, until he came to the leprosy reference unit, where LL diagnosis was made with high acid fast bacilli (AFB) bacterial index (BI) and high anti-PGL-1 titration. Case 2, male, 47 years old, presented since his childhood café au lait macules and a few nodules, but never complained about that. For the last 3 years, he noticed new nodules and infiltration on both ears, and diagnosis of NF1 was done.
But, since the symptoms got worse and he started to detect new macules with sensory alteration, he decided to seek for help at the leprosy reference unit. Skin infiltration was evident on his ears and face, associated to disseminated nodules. Hypocromic macules with sensory impairment were detect and a skin biopsy was done. Typical interlacing bundles of spindle cells with wavy nuclei were seen, together with foamy macrophages, heavily filled with AFB in globi. Both patients were treated with MDT. Case 3, male, 42 years old, presenting disseminated nodules, was diagnosed as LL patient, and MDT was introduced. After 12 months, with no regression of the lesions, we were called to see him during our visit to his municipality. He had small disseminated nodular lesions on the skin, two café au lait macules and no other complaints. There was no skin infiltration, his ears were spared and there were no sensory impairments. Skin smear AFB was negative, and a skin biopsy was typical of NF. Although LL seems to be easy to detect, unexperienced health professional may not notice the disease in the presence of other skin conditions, as NF, and the patients keep the transmission chain and can develop physical impairment, or as presented here, LL may be misdiagnosed with NF, leading to unnecessary treatment.

Keywords: Lepromatous Leprosy, Neurofibromatosis, misdiagnosis
ILC1.4-012
Clinical Research of PHN Treated by Pricking and Cupping Combined with Nourishing Yin and Activating Blood Circulation

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Objective: To observe the clinical curative effect on postherpetic neuralgia (PHN) treated by pricking and cupping combined with nourishing yin and activating blood circulation.

Methods: 70 outpatients chosen from June, 2014 to April, 2015 in the hospital were divided into two groups randomly, 35 in the treatment group and 35 in the control group. The treatment group was treated by pricking and cupping combined with self-made traditional Chinese medicine orally, while the control group was treated by Mecobalamin tablets (Methycobal) orally combined with semiconductor laser irradiation on Ashi points and corresponding ganglion (once a day). The course of treatment is 2 weeks and then observe the clinical curative effect and compare adverse reactions between two groups. Results: The effective rate of the treatment group is 91.4%, while the control group is 77.1% (P<0.05). There are significant differences between two groups.

Conclusion: It is simple for PHN treated by pricking and cupping combined with nourishing yin and activating blood circulation with good curative effect. It is worth popularizing application in clinic.
LC1.4–013
Clinical Observation of Vitiligo Treated by 308nm Excimer Laser Combined with Vernonia Anthelmintica Willd Injection in Points
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Objective: To observe the curative effect and safety of Vitiligo treated by 308nm Excimer laser combined with Vernonia Anthelmintica Willd injection in points.
Methods: 150 Vitiligo patients in stable phase are divided into 3 groups averagely. The treatment group is treated by 308nm Excimer laser (once a week) combined with Vernonia Anthelmintica Willd injection in points (three times a week), while the first control group is treated by 308nm Excimer laser (once a week) and the second control group is treated by Vernonia Anthelmintica Willd injection in points (three times a week). The course of treatment is all 12 weeks.
Results: The effective rate of the treatment group is 88.00%, while the first control group is 66.00% and the second control group is 40.00%. There is statistical significance among three groups (P < 0.05). The curative effects on skin lesions of face, neck, body and limbs in the treatment group are better than in the control group (P < 0.05), and there is no statistical significance of curative effects on skin lesions of acra (P>0.05). There aren’t serious adverse reactions on patients.
Conclusion: The 308nm Excimer laser combined with Vernonia Anthelmintica Willd injection in points takes effect on Vitiligo quickly with high curative effect and without obvious adverse reactions.

Keywords: 308nm Excimer laser, Vitiligo, Vernonia Anthelmintica Willd, injection in points
Observation of the Clinical Effects on Herpes Zoster Treated by Penciclovir
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Objective: To discuss the clinical effects on herpes zoster treated by Penciclovir.
Methods: According to the parallel comparative method, 90 patients with herpes zoster in recent 2 years were divided into two groups averagely, the observation group and the reference group. The observation group was treated by penciclovir, while the reference group was treated by acyclovir. Then observe the clinical therapy effects, the disappearance time of herpes and the average period of treatment, and record the occurrence of adverse reactions. Results: The effective rate of the observation group is 95.6%, while the reference group is 75.6%. There is statistical significance between two groups ( P<0.05 ). The disappearance time of herpes and the average period of treatment in the observation group are shorter than in the reference group ( P<0.05 ), and the occurrence of adverse reactions in the observation group are obviously lower than in the reference group ( P<0.05 ). Conclusion: The patients treated by penciclovir can be recovered from herpes zoster as soon as possible, and they have good tolerance. So it is worth popularizing application.

Keywords: Penciclovir, herpes zoster, clinical effects
ILC1.4–015
The Curative Observation of 42 Cases of Pityriasis Rosea Treated by Narrow-band UltravileB
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Objective: To discuss the clinical effects of pityriasis rosea treated by NB-UVB
Methods: 42 patients chosen are divided into two groups randomly. The treatment group is cured by NB-UVB combined with compound glycyrrhizin tablets. The control group is cured orally compound glycyrrhizin tablets. The results are observed after two weeks’ treatment.
Results: The effective rate of the treatment group is 95.45%, while the control group is 65.0%. There are differences between the two groups with statistical significance(P<0.05).
Conclusion: The NB-UVB takes effect on pityriasis rosea quickly with high curative effect and safety.

Keywords: pityriasis rosea, narrow-band ultravileB
ILC1.4–016
A Case of Acute Generalized Exanthematous Pustulosis
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A case of acute generalized exanthematous pustulosis. A woman aged 28 sees a doctor with erythema, pustules the whole body and fever for 3 days, whose body, flexor side of limbs, underside of breast with plica and axter with red patches, which are blended partly and faded under press. There are non-follicles and sterility pustules like a pinpoint distributed intensively on the erythema, which are not blended. It can be found slight abscess on the angle layer through pathological examinations and hyperplasia of epidermis irregularly. The inflammatory cells are infiltrated on the superficial layer of dermis and around blood vessels, lymphocytes mainly, and it can be found some eosinophil. So it can be diagnosed as acute generalized exanthematous pustulosis.

Keywords: exanthematous pustulosis, acute generalized
ILC1.4-017
Tacrolimus ointment combined with NB-UVB treatment of facial seborrheic dermatitis clinical curative effect
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Objective: To investigate the effects of tacrolimus ointment combined with narrow band ultraviolet therapeutic effect in the treatment of facial seborrheic dermatitis. Methods: 150 cases of acne patients, were randomly divided into narrow wave UVB group, tacrolimus group and combination group, narrow wave ultraviolet group 48 patients with narrow wave ultraviolet therapy in the treatment of, every week 2 – 3 times, the symptom is reduced apparently. The treatment gap for irradiation every week 1 ~ 2 times; tacrolimus ointment group 50 patients treated with tacrolimus ointment, 2 times a day; combination group (52 cases) patients were treated with tacrolimus ointment combined with narrow wave ultraviolet treatment, use Alexandrine; after 4 weeks of treatment in three groups and compared among the three groups of clinical efficacy and adverse reactions, and followed up for 2 months, and make a summary. Results: after 4 weeks of treatment, the effective rate was 64.5%, the recurrence rate was 31.2%, the effective rate was 74%, the recurrence rate was 24%, the effective rate was 94.2%, the recurrence rate was 9.6%, and there was no adverse reaction. The difference of curative effect and the recurrence rate of the three groups were significant (P < 0.05). Conclusion: tacrolimus ointment combined with narrow wave ultraviolet in the treatment of facial seborrheic dermatitis is a effectively, safe method, to eliminate or reduce the patient’s physical and mental suffering and promote the recovery of the has important significance, it is worth of clinical application.

Keywords: exanthematous pustulosis, acute generalized
Clinical Observation of Chloasma Treated by Liuwei Dihuang Pills and Xiaoyao Pills Combined with Alpha Hydroxy Acids
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Objective: To observe the curative effect on chloasma treated by Liuwei Dihuang pills and Xiaoyao pills combined with alpha hydroxy acids.

Methods: The patients take 8 pieces of Liuwei Dihuang pills once and 8 pieces of Xiaoyao pills once orally, both three times a day, and it has to last three months. While the patients are treated by alpha hydroxy acids of high concentration (20%-35%) by the order of forehead, nose, cheeks, and chin, smear every 15 days, and then observe the curative effect after 6 courses. Results: The effective rate of chloasma treated by Liuwei Dihuang pills and Xiaoyao pills combined with alpha hydroxy acids is 78.57%. Conclusion: It’s convenient to take Liuwei Dihuang pills and Xiaoyao pills combined with alpha hydroxy acids for curing chloasma with obvious effect and without time limit. It is worth popularizing application.

Keywords: Liuwei Dihuang pills, Xiaoyao pills, alpha hydroxy acids, chloasma
ILC1.4–019
Clinical Observation of Pityriasis Rosea Treated by Compound Glycyrrhizin Combined with Narrow-band UltravileB
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Objective: To observe the curative effect on pityriasis rosea treated by compound glycyrrhizin combined with NB-UVB.

Methods: The treatment group is treated by NB-UVB phototherapy unit (wld man CW100L German). The predose is 0.4 ~ 0.6J/cm², and whether to add 20 ~ 30% on the basis of the previous exposure and irradiate every other day depend on the skin’s reactions to radiation. Meanwhile, the treatment group is intravenously injected by 40 ~ 60ml compound glycyrrhizin injection(20ml) added with 5% glucose injection(250ml). The control group is intravenously injected by 40 ~ 60ml compound glycyrrhizin injection(20ml) added with 5% glucose injection(250ml). The course of treatment is 7 days on both groups and the curative effect can be observed after 2 courses.

Results: The effective rate of the treatment group is 94.4 %, while the effective rate of the control group is 72.2%. There is significant difference between two groups.

Conclusion: The compound glycyrrhizin combined with NB-UVB takes effect on pityriasis rosea quickly with high curative effect and without obvious adverse reactions. It is worthy of clinical application.

Keywords: compound glycyrrhizin, Narrow-band UltravileB (NB-UVB), pityriasis rosea
Objective To observe effect of traditional chinese medicine syndrome differentiation and treatment combined with excimer light 308 nm for psoriasis vulgaris. Methods 120 patients with psoriasis vulgaris from January 2013 to November 2014 at outpatient clinic of dermatological department in our hospital were selected and randomly divided into treatment group and control group. The treatment group was treated with excimer light 308 nm combining with chinese herbal medicine, while the control group was treated with excimer light 308 nm. After 2 months of treatment, the therapeutic effect was evaluated for both groups. Results The total effective rate of the treatment group was 86.7% and in the control group was 72.2%. There was a significant difference between the two groups side effect rate (P<0.05). The side effect of the treatment group were 31 cases and in the control group were 35 cases. But the side effects in two groups were mild and tolerated without treatment process. Conclusion Traditional chinese medicine syndrome differentiation and treatment combining with excimer light 308 nm is an effectively treatment for psoriasis vulgaris.

Keywords: Psoriasis vulgaris, Excimer light, 308nm, Chinese herbal medicine therapy
ILC1.4–021
The clinical observation of pricking and cupping therapy combining with Chinese herbs for Qi stagnation and blood stasis type of postherpetic neuralgia
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Objective: To observe the effects of pricking and cupping therapy combining with Chinese herbs for postherpetic neuralgia (PHN) ascribed as Qi stagnation and blood stasis type. Methods: Eighty patients with Qi stagnation and blood stasis type of PHN were enrolled and randomly divided into treatment group and control group. The treatment group was treated with pricking and cupping therapy combining with oral herb decoction, while the control group was treated with oral mecobalamin and cimetidine, plus intramuscular injection of vitamin B12. After 30 days of treatment, efficacy was evaluated for both groups. Results: The effective rate of treatment group and control group was 92.5% and 77.5%, respectively, showing significant difference between the two groups (P<0.05). Conclusion: Pricking and cupping therapy combing with Chinese herb is an effectively treatment for Qi stagnation and blood stasis type of PHN.

Keywords: Pricking and cupping, Chinese herbs, Postherpetic neuralgia
ILC1.4-022
A pocrine hidrocystoma with intradermal nevus: a case report
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A case of apocrine hidrocystoma with intradermal nevus is reported. A 55-year-old man presented with a black-brown papule on the right inner canthus for over 10 years, bigger for one year, without subjective symptom. The lesion was excised and histopathologic examination showed apocrine hidrocystoma within intradermal nevus.

Keywords: apocrine hidrocystoma, intradermal nevus
ILC1.4–023
Effectiveness of oral low-dose dapsone therapy for generalized acquired cutis laxa associated with IgA–lambda monoclonal gammopathy and urticarial neutrophilic dermatosis
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Acquired cutis laxa (ACL) is rare and the skin involvement varies from generalized to localized, and is related to various conditions and drugs. There is no definitive treatment. We report here a new case of ACL associated with IgA–lambda monoclonal gammopathy and recurrent neutrophilic urticarial dermatosis. The patient responded well but has to be dependent on oral low-dose dapsone (0.5mg/Kg/day) therapy.

**Keywords:** Psoriasis vulgaris, Excimer light, 308nm, Chinese herbal medicine therapy
**ILC1.4-024**
**Retrospective analysis of clinical characteristics of 59 cases of nonmelanoma skin cancers of the scalp**
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Objective To study clinical characteristics of 59 cases of nonmelanoma skin cancers (NMSC) of the scalp. Methods A retrospective analysis of the clinical and pathological data was performed on the hospitalized patients in our hospital during 1999-2014 suffered NMSC of scalp in the rural areas of Jiangxi province. Results The total 59 cases of NMSC were collected, including 43 males and 16 females (68.0 ± 11.8 years old, male to female ratio was 2.7:1); diagnosis of squamous cell carcinoma 49 cases (83.1%), basal cell carcinoma 10 cases (16.9%); farmers 48 cases (81.4%); elderly patients (≥ 60 years) 48 cases (81.4%); with scar and alopecia due to previous history of tinea capitis 20 cases (33.9%), 7 cases of scar caused by other reasons (11.9%); local or distant metastases 8 cases (13.6%). The shortest duration from onset to diagnosis was 2 months, the longest one was 10 years (59.7 ± 85.0 months). In BCC, 10 cases were nodular ulcer type. Conclusions Patients with NMSC of scalp in rural areas of Jiangxi province was mostly older men, more common with squamous cell carcinoma; a history of scar and alopecia may be a predisposing factors; these patients were not diagnosed timely and with high metastasis rate.

**Keywords:** squamous cell carcinoma, basal cell carcinoma, skin, Jiangxi Province, rural area
ILC1.4–025
A Case of Metastatic Adenocarcinoma of the Uterine Cervix Mimicking Eczema
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We report a case of adenocarcinoma of the uterine cervix in a 46-year-old woman who presented with a generalized swelling erythematous plaque on her vulva and thighs for 8 months. The patient had been treated with radiotherapy and chemotherapy many times owing to diagnoses of adenocarcinoma of the uterine cervix two years ago. Cutaneous metastasis from adenocarcinoma of the uterine cervix was diagnosed on the basis of histopathological examination (i.e., atypical cells in the dermis and vasa lymphaticas), and immunophenotyping (i.e., cytoplasmic epithelial membrane antigen and carcinoembryonic antigen positive). For patients with cervical carcinoma, persistent skin lesions on the vulva similar to eczema should be suspected of metastasis.

Keywords: Adenocarcinoma, Cervix, Neoplasm metastasis, Eczema, vulva
ILC1.4-026
In vitro experimental study of CXCR7-shRNA's targeted inhibition on melanoma M14 cell line
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Objective To study the effects of chemokine receptor 7(CXCR7) gene on the migration of melanoma M14 cell line. Methods After transfection with small interfering RNA(siRNA) targeting CXCR7, the expressions of CXCR7 mRNA and protein in M14 cell line were detected by Real-time PCR and Western blotting respectively. The effects of altered expression of CXCR7 on cell invasion ability was measured by Transwell and Cell scratch test. Results At 24-hour post-transfection, the relative expression level of CXCR7 mRNA in the CXCR7-siRNA transfection group was significantly decreased than those in the negative control group and blank control group (P<0.05). The cell invasion ability of M14 cells were also significantly decreased (P<0.05). Conclusion siRNA targeting CXCR7 gene can significantly inhibit the invasiveness of M14 cells in vitro, suggesting the value of CXCR7 as a potential target for cutaneous melanoma therapy.

Keywords: Malignant melanoma, RNA, small interfering, Chemokine receptor 7, invasion
ILC1.4–027
Clinical Observation of Traditional Chinese Medicine Mask Combination with Cold Spray on Facial Corticosteroid Dependent Dermatitis
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Objective To investigate the efficacy and safety of traditional Chinese medicine mask and cold spray in the treatment of facial corticosteroid dependent dermatitis.

Methods Total 130 facial corticosteroid dependent dermatitis patients were randomly divided into two groups. Both of the two groups were applied Epirastine 10mg once daily. At the same time, the treatment group were guided traditional Chinese medicine mask coordination with cold spray. The control group were applied Vitamin E cream. The efficacy was evaluated after 8 weeks of treatment.

Results The total effective rate of the treatment group was 69.23%, significantly higher than the control group (P<0.05). Patients were followed up for 2 months, they were well-tolerated and had no obvious adverse reaction and recurrence in the treatment group. Conclusion Traditional Chinese medicine mask combination with cold spray is an effective and safe method in treatment of facial corticosteroid dependent dermatitis.

Keywords:Corticosteroid dependent dermatitis, Cold spray, Traditional Chinese medicine mask
ILC1.4–028
The Curative Effect of Eupolyphaga Particles Combined with Acyclovir in the treatment of Herpes Zoster
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Objective: To observe the clinical curative effect of combining eupolyphaga particles and acyclovir in herpes zoster. Methods: One hundred and ten patients with herpes zoster were randomly divided into two groups: 56 cases in observation group and 54 cases in control group. Results: The total effective rates were 91.07% and 68.52% for observation group and control group respectively, and the difference was statistically significant (P < 0.05). The duration of analgesia, shingles and scab form of observation group was significantly shorter than that of control group, and the rate of secondary neuralgia of observation group was significantly less than that of control group (P < 0.05). Conclusion: The eupolyphaga particles joint acyclovir to treat herpes zoster have significant effect, which can obviously promote the rash fades and wound healing, alleviate neuralgia, shorten symptom time, reduce adverse reaction. So it is a safe and effective method for treating herpes zoster and worth popularizing.

Keywords: Herpes zoster, Eupolyphaga particles, Acyclovir
ILC1.4-029
Discussion of Curative Effects on Allergic Dermatitis Treated by Combined Therapy of Chinese and Western Medicine
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Objective
To discuss the curative effects on allergic dermatitis treated by combined therapy of Chinese and Western medicine.

Methods
Using a randomized method and clinical controlled experiment, 60 allergic dermatitis patients chosen from May, 2013 to May, 2014 in the hospital were divided into two groups, 30 in the experiment group and 30 in the control group. The experiment group was treated by combined therapy of Chinese and Western medicine, while the control group was treated by conventional Western medicine. The data from the experiment was analyzed by spss 17.0, and the differences were statistically significant(p < 0.05).

Results
15 cured, 10 effected, 4 improved, 0 not effected in the experiment group, and the total effective rate is 86.7%, while 6 cured, 10 effected, 10 improved, 4 not effected in the control group, and the total effective rate is 53.3%. The data above was statistically analyzed by $\chi^2$ test, and the differences were statistically significant(p < 0.05).

Conclusion
The curative effects on allergic dermatitis treated by combined therapy of Chinese and Western medicine are better than conventional Western medicine. It is worthwhile for spreading in clinical practice.

Keywords: combined therapy of Chinese and Western medicine, allergic dermatitis, clinical and experimental study
ILC1.4–030
Observation of Clinical Curative Effects on Postherpetic Neuralgia Treated by Mouse Nerve Growth Factor
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Objective: To observe the clinical curative effects on postherpetic neuralgia treated by different infections of mouse nerve growth factor.

Methods: The treatment group was treated by mouse nerve growth factor dissolved by sterile water for injection combined with 2% lidocaine hydrochloride injection (1:2) on affected parts, once in three days, and the course was 5 times. While the control group was treated by mouse nerve growth factor dissolved by sterile water for injection on muscles, once a day, and the course was 14 days.

Results: The average pain relief time of the treatment group was 2.87 ± 1.0, while the control group was 5.14 ± 1.2, and the differences were extremely significant by t-test (t=7.95, p<0.01). The average pain disappearance time of the treatment was 10 ± 1.6, while the control group was 12.5 ± 2.42, and the differences were extremely significant by t-test (t=4.72, p<0.01). Comparing the clinical curative effects, there were extremely significant differences between two groups by chi-square test (χ²=10.84, P<0.05), and the curative effects of the treatment group were better than the control group.

Conclusion: The curative effects of postherpetic neuralgia treated by mouse nerve growth factor infection on locals are better than on muscles.

Keywords: mouse nerve growth factor, postherpetic neuralgia
ILC1.4–031
Discussion of effects on Psoriasis treated by traditional Chinese medicine of cooling and activating blood circulation formula
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Objective
To discuss the clinical curative effects on Psoriasis treated by traditional Chinese medicine of cooling and activating blood circulation formula.

Methods
50 Psoriasis patients chosen from January, 2013 to June, 2014 in hospital were divided into two groups randomly, 25 in experiment group and 25 in control group. The control group was treated by compound qingdai pills, while the experiment group was treated by cooling and activating blood circulation formula. Then evaluate the curative effects after three months’ treatment.

Results
Compared with control group, the curative effects on Psoriasis patients in experiment group were better, and the levels of E-selectin and ET-1 were \((45.21 \pm 10.12) \mu g/L\) and \((83.21 \pm 10.32) ng/L\) after the treatment. The clinical effective rate of experiment group was 80.0%, and the differences were statistically significant between two groups \((P<0.05)\).

Conclusion
The effects on Psoriasis treated by traditional Chinese medicine of cooling and activating blood circulation formula are good, and it is worth popularizing and applying in clinic.

**Keywords:** traditional Chinese medicine, cooling and activating blood circulation formula, Psoriasis, observation of effects
ILC1.4-032
Observation of Clinical Curative Effects on Psoriasis Vulgaris Treated by Xiyanping Injections Combined with Tripterygium Glycosides
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Objective: To observe the clinical curative effects on Psoriasis Vulgaris treated by Xiyanping injections combined with Tripterygium Glycosides.

Methods: 80 patients were divided into treatment group and control group randomly. The control group was treated by 20mg Tripterygium Glycosides orally, three times a day, while the treatment group was treated by 20mg Tripterygium Glycosides orally(three times a day) combined with 250mg Xiyanping injections added by 5% glucose injection or 250ml saline with intravenous drip, once a day.

The course of treatments are both one month.
Results: Analyzing the total clinical effective rate, the effective rate of the treatment group is 90.0%, while the control group is 67.5%(P<0.05). There is statistical significance between two groups.

Conclusion: The curative effects on Psoriasis Vulgaris treated by Xiyanping injections combined with Tripterygium Glycosides are good with few side effects. It is worthwhile for spreading in clinical practice.

Keywords: Psoriasis; Xiyanping injections, Tripterygium Glycosides
ILC1.4–033
The clinical study of early antiviral drugs combined with herb fumigation and phototherapy in the preservation of postherpetic neuralgia
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Objective: To observe the efficacy of antiviral drugs combined with herb fumigation and phototherapy in the preservation of postherpetic neuralgia. Methods: Total 60 herpes zoster patients were randomly divided into two groups. The treatment group were applied antiviral drugs combined with herb fumigation and phototherapy. The control group were applied antiviral drugs without other therapy. The efficacy was evaluated at the fourth, seventh, and tenth day, respectively, after the treatment. Results: At the fourth day, seizure frequency, duration, interval time and pain intensity had no significant differences between two groups (P>0.05). At the seventh and tenth day, there were statistical differences for seizure frequency, duration, interval time and pain intensity between two groups (p < 0.01). The incidence of postherpetic neuralgia of the treatment group were significantly lower than that of the control group after the treatment (p < 0.01). Conclusion: Antiviral drugs combined with herb fumigation and phototherapy is an effective and safe method in preservation of postherpetic neuralgia.

Keywords: herb fumigation, phototherapy, postherpetic neuralgia, clinical study
ILC1.4-034
Biologics and leprosy - a systematic review
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Biological medicines are defined as pharmaceutical products which are made in, extracted from or partially synthesized from biological sources. This broad group includes among other things: vaccines, blood products and recombinant therapeutic proteins (RTPs). The first RTP to be produced was human insulin but other molecules including monoclonal antibodies have since been manufactured and are increasingly used to manage chronic inflammatory conditions, autoimmune disease, malignancies and infections such as Ebola virus. RTPs that antagonise cytokines or deplete immune cells induce targeted but profound immunodeficiency. There is an increased risk of tuberculosis. Targeted biologic therapeutic agents and their “biosimilar” counterparts are expensive but effective. Adalimumab, infliximab and etanercept had sales totalling over 30 billion US dollars in 2014. Biologics are being increasingly prescribed in leprosy endemic countries such as Brazil and India. There are reports of individuals taking biologics presenting with leprosy and biologics have been used to treat erythema nodosum leprosum (ENL).

Objectives
To conduct a systematic review of original clinical studies and reports of biologics and leprosy.
Methods
An initial search was performed in PubMed. Combinations of keywords used were: Hansen* OR lepra* OR lepro*ANDadalimumab, certolizumab, etanercept, golimumab, infliximab, rituximab, secukinumab, ustekinumab and anti-TNF. The reference lists of included studies were checked. Other databases will be searched. National biologic database managers and pharmaceutical companies will be contacted.

Results
The original search yielded 157 publications, 17 were assessed for eligibility and 11 included. Ten cases of leprosy presenting during biologic therapy with one of adalimumab, etanercept and infliximab from Brazil, Greece, Spain and USA. The time to onset of the symptoms of leprosy after commencing the drugs was between two weeks and four years. The biologics were prescribed for ankylosing spondylitis, rheumatoid arthritis, seronegative arthritis, psoriasis and psoriatic arthritis. There were three cases of tuberculoid leprosy, one borderline tuberculoid, three borderline lepromatous and three cases of lepromatous leprosy. Four of these individuals had Type 1 reaction, two of which occurred after stopping infliximab. There were two cases of chronic ENL treated with infliximab and etanercept respectively.

Conclusions
The use of anti-TNF biologic drugs for chronic inflammatory conditions may be a risk factor for developing leprosy. To date five cases have been reported from Brazil. It is important that patients are examined for signs of leprosy prior to starting these agents and that leprosy is considered in those who develop cutaneous or neurological symptoms during treatment.

Keywords:
ILC1.4-035
Experimental treatment for Jorge Lobo’s disease with MDT/MB/WHO
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Objective: This study aims at comparing different therapeutic schemes using MDT/MB/WHO alone or combined with other treatment options as an experimental therapy for Jorge Lobo’s disease (DJL), a neglected tropical disease that has never had a satisfactory treatment reported. Material and methods: a total of 80 DJL patients were treated either with MDT/MB/WHO; MDT/MB/WHO and itraconazole (200mg daily); MDT/MB/WHO, itraconazole and surgery; MDT/MB/WHO and surgery. Patients received drugs daily for four years and were evaluated every six months, improvement criteria were: decreased or remission of pruritus, atrophy of the lesions, decreased number of fungi and/or viability. Cure was considered when there was a total remission of lesions in at least two years of follow-up after the end of treatment.

Results: Among the 80 evaluated patients, 53 (66.3%) presented improvement, independent on the therapeutic scheme used. Eight patients (10%) remained stable, with decreased pruritus but slight reduction of size of the lesions and number of fungi and/or viability. It is important to highlight that 19 (23.8%) of the individuals were considered cured after the different treatments. A higher percentage of patients who improved was found in the groups treated with MDT/MB/WHO, itraconazole and surgery (94.7%) and in the group treated with MDT/MB/WHO and surgery (92.3%) independent of the clinical form.

Conclusions: The number of patients who improved after four years of regular MDT/MB/WHO treatment alone or associated with surgery and/or itraconazole was higher than the number of patients who remained stable. The quality of life of the patients treated with MDT/MB/WHO improved dramatically. Because DJL is a chronic disease of long evolution, the challenge to help these patients is to make a treatment option available, once specific treatment options with antifungal drugs are scarce and inefficient.

Keywords:
ILC1.4-036
Human Leukocyte Antigenis associated with hypersensitivity reaction induced by dapsone in Brazilian leprosy patients

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Introduction: Dapsone is used in the treatment of leprosy disease. The dapsone hypersensitivity syndrome (DHS) develops in about 0.5 to 3.6% of persons treated with the drug. Recent advances in pharmacogenetic studies show strong genetic associations between human leukocyte antigen (HLA) alleles and susceptibility to drug hypersensitivity. The aim of this study was to verify the association of the HLA class I and II alleles with DHS in Brazilian leprosy patients (including TT, BT, BB, BL, and LL), once there is no data available in this population.

Methods: We performed a case-controlled study involving 237 participants who had received dapsone as part of multidrug therapy for leprosy (26 participants with DHS and 211 controls). DNA was extracted from peripheral blood and the HLA-A*, B*, C*, DRB1* and HLA-DQB1* alleles were determined by PCR–SSO (polymerase chain reaction – sequence-specific oligonucleotides) using Luminex® (One–Lambd, CA, USA).

Results: The results showed positive association of DHS and HLA-B*51 (17.31% vs. 8.06%, p = 0.038, OR = 2.38, 95%CI = 1.07–5.31), HLA-C*15 (13.04% vs. 4.3%, p = 0.024, OR = 3.33, 95%CI = 1.23–9.01), HLA-DRB1*09 (6.25% vs. 1.74%, p = 0.038, OR = 3.76, 95%CI = 1.19–11.92) and HLA-DRB1*13 (25.00% vs. 14.43%, p = 0.029, OR = 1.97, 95%CI = 1.08–3.60). Haplotype analysis showed that A*01–B*51–C*15–DRB1*04–DQA1*03–DQB1*03 (4.17% vs 0.00%, p = 0.0351) were associated with susceptibility to DHS. Conclusion: This study suggest that HLA alleles are involved with DHS in Brazilian population and emphasizes the importance of screening different populations in order to know the background of each population and preventing hypersensitivity to dapsone and other drugs.

Keywords:
ILC1.4-037
Lucio Leprosy with Lucio Phenomenon and Secondary Cryoglobulinemia in One of the Twin Brothers Leprosy Patients: a Case Report
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Objective: to report a case of Lucio phenomenon and secondary cryoglobulinemia in a patient whose twin with leprosy, which was treated by steroid and cliostazol.
Method: We report a case of 19 year old Lucio leprosy patient with Lucio phenomenon, whose twin brother also diagnosed as leprosy, were previously thought to be cryoglobulinemia. Clinical features were found as facial edema, purpura, and purplish-black patches on his extremities. Further examination was required to confirm the diagnosis.

Result: a 19 year old patient was consulted by the internal medicine colleagues to dermatology suspected with cryoglobulinemia. The patient’s chief complaint was pain and ulcerated patches on his extremities. On physical examination we found edema of the face and fingers, purpura on his arms and legs, with some purplish-black ulcerated patches. Madarosis visible on his eyebrows and eyelashes. There were positive acid-fast bacilli and histopathological examination confirmed Lucio phenomenon. We did the examination to his twin brother, and we diagnosed his twin with borderline lepromatous leprosy corresponding clinical manifestation and slit skin smear examination.

Conclusion: Cryoglobulinemia can occur associated with infection, including leprosy. The comprehensive approach between multidisciplinary team is needed. Different clinical type and manifestation can also happen in close contacts of leprosy patients. As dermatologists, we should aware of the occurrence of leprosy in close contact so that we can do the prevention of transmission.

Keywords: Lucio leprosy, Lucio phenomenon, Cryoglobulinemia, Indonesia, Hansen’s disease
ILC1.4–038
A Clinical observation about Mizolastine combine with ranitidine to treat chronic idiopathic urticaria
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Objective: A clinical survey of Mizolastine combine with ranitidine to treat chronic idiopathic urticaria.

Methods: we use the clinical retrospective analyse to review the clinical materials of the treatment of 93 chronic idiopathic urticaria patients in our hospital from January 2014 to January 2015. We divided the patients into two groups, the intervention group and control group. In intervention group, we give the 47 patients oral 10mg Mizolastine(once a day) and give 150mg ranitidine(twice a day) at the same time. In control group, we only give the 46 patients oral 10mg Mizolastine(once a day). After a month, we compared with effects between the two groups.

Results: In intervention group ,the total effective rate is 93.61%(44/47), and in control group, the total effective rate is 73.9%(34/46). The difference of two groups had statistical significance (P <0.01)

Conclusion: The method of Mizolastine combine with ranitidine to treat chronic idiopathic urticaria operate quickly and safely, has fewer side effect. It is worth popularizing and using.

Keywords: Mizolastine, ranitidine, chronic idiopathic urticaria
ILC1.4-039
The expression and significance of brain-derived neurotrophic factor in plasma of patients with psoriasis vulgaris
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Objective: To investigate the expression of brain-derived neurotrophic factor (BDNF) and vascular endothelial growth factor (VEGF) in plasma of patients with psoriasis vulgaris, and to analyze the correlation of two cytokine levels to PASI.

Methods: The patients were separated into active group (n = 23) and inactive group (n = 19). The expression of BDNF and VEGF were measured by ELISA in plasmas from the patients and 16 healthy volunteers. The relationship between the expression of BDNF and VEGF and PASI was analyzed.

Results: In the case of the expression of BDNF and VEGF, the patients had a higher level than the healthy controls (P < 0.01), so did the active group than the inactive group (P < 0.01). The expression levels of BDNF were positively correlated to PASI (P < 0.01). While there was no correlation between the VEGF expression level and PASI (P > 0.05).

Conclusions: These findings indicate that BDNF and VEGF might be involved in the pathogenesis of psoriasis vulgaris. BDNF is likely to be a novel angiogenic protein of psoriasis after VEGF. Also, BDNF could serve as a helpful index to evaluate the therapeutic efficacy for psoriasis vulgaris.

Keywords: Psoriasis, Brain-derived neurotropic factor, Vascular endothelial growth factor
**Patients' experience after Tarsorraphy procedure of the eye**

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**Objectives:**
To determine the various reasons due to which patients do not appreciate tarsorraphy as a procedure for the protection of the Cornea.

**Methodology:**
Data was collected through one-on-one conversation with patients who came for their follow-ups after the tarsorraphy procedure and their responses were categorized.

**Results:** Following were the bullet points recorded after interviewing those patients:
1. Up to 90% patients complained of the eye becoming comparatively smaller, hence changing the appearance of the face.
2. Up to 50% faced discomfort caused by shortening of the eye.
3. Broken suture caused irritation which forced them to report to the hospital within the next two days (10%).
4. Up to 10% faced decreased field vision and discomfort in side vision.
5. Beyond these medical consequences, almost 5% of these patients faced non-acceptance and did not appreciate the expected new appearance from spouses, friends, and family members, for the said procedure.

**Conclusion:**
Based on the study, it can be concluded that although tarsorraphy is a quick and easy procedure to protect the eye/ cornea most patients who advised and underwent the procedure elicited a negative response, mainly because of the physical consequences (cosmetic).

**Keywords:** tarsorraphy, patient experience
ILC1.5–002
The Visual Acuity Change of Clinically Cured Leprosy Patients in National Sanatorium Oku-komyoen in Japan over a period of 20 years.
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Objective
National sanatorium Oku-komyoen was established as National Leprosarium about 100 years ago. It is a small island located on the west side of Japan. Now 120 patients stay there. They are all clinically cured but average age is 84 years old and suffered from several disorders.
The objective study was to determine the visual acuity change among clinically cured leprosy patients presenting in one Japanese sanatorium.

Methods
From 1995 to 2015 a period of 20 years, patients in National sanatorium Oku-komyoen were received routine eye examination including visual acuity at least once a year. A total of 104 patients were studied over a period of twenty years.

Results
Totally aging tends to reduce visual acuity due to progress of cataract and exposure keratitis. Contribution of visual acuity was cataract surgery and YAG laser capsulotomy. Cataract surgery outcome was almost good. It was no severe postoperative complications. And YAG laser capsulotomy for after cataract was effective. Lagophthalmos surgery was temporarily effective. 3 eyes were new blindness due to glaucoma, endophthalmitis and exposure keratitis.
Statistical analysis is being examined.

Conclusions
Regular follow-up for cured leprosy patients deemed to be higher risk is appropriate.

Keywords: leprosy, eye, visual acuity, lagophthalmos, cataract
ILC1.5–003
Is corneal astigmatism an additional risk factor for vision handicap in leprosy patients?
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Introduction
In Hansen’s disease, the eyes are frequently affected with complications like corneal ulceration, corneal opacity/scarring, lagophthalmos, exposure keratopathy, entropion, trichiasis, ectropion, uveitis, complicated cataract, loss of sensation of the cornea, scleritis, secondary glaucoma and chronic dacryocystitis. Of these complications, the visually handicapping ones are the corneal scars/opacities and cataracts. In olden days, where cataract surgery was done without implantation of intraocular lenses, the Hansen’s patients were not really benefited as their deformed noses couldn’t hold the aphakic glasses. With the recent advances and better techniques of cataract surgery, even these patients could be given the promise of visual rehabilitation. But by coincidence these patients were found to have a higher degree of corneal astigmatism. This prompted us to conduct a study to compare the pre-existing corneal astigmatism in these patients as against their normal age matched ones, so that the cataract surgeries in these patients could be customized.

Aim
1. To compare pre-existing (before any surgical intervention) corneal astigmatism in leprosy patients as compared to their age-matched normal population.
2. To study the various causes for the corneal astigmatism in Hansen’s patients.
Methods
A retrospective study was done, taking the charts of all the 138 eyes from 103 Hansen’s patients and the 138 eyes of the age-matched from 138 non leprosy patients, who had undergone cataract surgeries from the year 2009 – 2013. The pre-existing astigmatism of these patients as according to the preoperative keratometry readings were noted and the astigmatism graded as grade 1 as mild or no astigmatism (≤ 2.0D), grade 2 as moderate astigmatism (2.1–<4D), grade 3 as severe astigmatism (≥ 4D).

Results
The statistical significance was determined using chi-square test using the software med calc version 16.2, was found that the distribution of astigmatism significantly differs between leprosy and non-leprosy patients (χ²=21.68, p=0.0001). Severe and very severe astigmatism was higher in the leprosy group.

Conclusion
Our study shows that the pre-existing corneal astigmatism is significantly more in the Hansen’s patients and helped us to give a realistic visual prognosis to these patients who have very bad pre-existing corneal astigmatism. Also we realized that cataract surgery in these patients need to be customized with modifications like perop radial keratotomies, changing the site of external wound, proper suturing, toric IOL implantations etc.

Keywords: corneal astigmatism, leprosy patients, non leprosy patients, hansen's disease
ILC2.1-002
Brief Introduction to China’s Modern Leprosy Control Course (1840-1949)
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Methods: We collected the historical literatures and file data and analysed the organising features and activity state and technological change and control effects in modern China and thus classified modern China’s leprosy control into stages.

Results: There were about one million leprosy patients in modern China during the period of 1840-1949. The process of modern China’s leprosy control can be divided into four stages. (1) Period of maintaining traditional control system (1840-1874): Western medicine began to spread into China and medical missionary partly participated in the leprosy treatment after the opium war of 1840, but the traditional established leprosy asylums still maintained and played the leading role in modern China and the chaulmoogra compound prescription still widely used on the basis of dialectical diagnosis and treatment. (2) Period of Christian leprosaria (1874-1926): The Leprosy Mission founded by a dedicated Irishman Mr. W.C. Bailey in 1874 and its foundation promoted the establishment of leprosaria of western styles in China, which was characterized by redemption of body and soul among leprosy patients and soon became the main force of leprosy control. (3) Period presided by Chinese Mission to Lepers (1926-1937): In Jan 1926, Chinese Mission to Lepers was founded in Shanghai, China, which advocated establishing modern leprosy clinic and leprosaria and adopting Chaulmoogra oil injection widely and resulted rapid development of leprosy control in China. (4) Declining and maintenance period in anti-Japanese War and civil war: In 1937, Japan began its full-scale invasion to China and the leprosy relief work was severely disrupted and leprosy control services mostly stopped and the remained clinic and leprosaria reduced their activities. After 1945, the relief work recovered in certain degree, but also influenced by the subsequent civil war.

Conclusions: The modern leprosy relief work in the period of 1840-1949 was severely influenced by political situations, the introduction of medical missions, traditional relief customs and technological changes, which led to limited results, needing the subsequent People’s Republic of China to complete the historical task of leprosy relief.

Keywords: Modern China, Leprosy, Control, stage, Medical mission
The patient as historical agent in leprosy research - a vision from mid-twentieth century Uzuakoli, Nigeria

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Treatment of leprosy, and of human disease in general, has come to recognise the voice, needs and demands of patients and advocacy groups to a greater degree than ever before. This has not always been the case in the modern history of leprosy, its treatment, and control. The experiences of many individuals - leprosy patients - whose contribution to experimental treatment regimens gave rise to current techniques for the control of leprosy are lost to the historical record. Focused around a retelling of the history of experimental research carried out at the Leprosy Research Centre, Uzuakoli, Nigeria from 1948 to 1967, this paper explores ways in which we can place the person and the body of the leprosy patient at the heart of our account of how leprosy came to be curable. It presents the ways in which a variety of social forces and interactions - specific to times and places largely defined by shared colonial and imperial histories - made it possible to ‘isolate’ and examine the dynamics of leprosy. It examines the intersecting lives of patients, host communities, clinicians, laboratory scientists, and administrators, as coalitions of interest formed around the metabolism of groups of chemical compounds with an arresting effect on infection with M. leprae. In doing so, it seeks to reinterpret - and perhaps to reopen - a dialogue among all parties to scientific and clinical research and its legacy.

**Keywords:** History, 20th century, Nigeria, patient experience
ILC2.1-004
The Leper Home in Jerusalem 1867-2009
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Objective: To describe the history of the Leper Home in Jerusalem.

Methods: Reports collected from the Moravian Church Archives and the Hansen Hospital were used to describe the development of the Leper Home.

Results and conclusions: The first Leper Home in Jerusalem, built in 1867, was the first initiative to care for people suffering from leprosy in the Holy Land, who until then had resided in mud huts and begged at the city gates. In 1887 it was replaced by a larger walled edifice which served its original purpose until 2009. The Moravian Church assumed responsibility for the management and sent staff from Europe to run the “Jesus Hilfe” asylum and care for the patients, who were mostly Muslim of diverse social groups, and a few Christians and Jews. The medical standards applied were modern, but obviously focused on care rather than cure, through hygiene, fresh air, rich nourishment, occupation, and Christian love.

There were fundamental principles according to which the Leper Home was managed: patients had to come voluntarily, sexes had to be separated, and no patient was to be compelled to attend religious worship. It was conceived as a closed and isolated institution, but in fact relatives could visit and patients could go home. As of 1925, following the introduction of bacteriological testing, those who were “cured” were discharged. It was the only asylum of its kind in the Middle East and was considered a progressive institution in which clinical trials were carried out.

During the 20th century the Leper Home withstood turbulent events: both World Wars; and conflicts between Arabs and Jews - which affected the supply of basic provisions and staff. In 1950, the Moravian Church sold the compound to the newly established Israel Ministry of Health that named it Hansen Government Hospital. The change of name and management did not affect its mission. It was always the only place where people suffering from leprosy were welcome and unconditionally treated, regardless of religion, gender or ethnic group, and which also provided a high standard of medical care. In 2000, a decision was made to close the hospitalization service, with the Israel Hansen Disease Center remaining on site, until its final closure in 2009. This architectural treasure was then transformed into a Center for Design, Media and Technology which is open to the public, and in which a historic exhibition preserves its story.

Keywords: asylum
ILC2.1–005
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Objectives
In colonial Uganda, biomedical treatment for leprosy was primarily available at large, in-patient leprosy settlements, run by missions with the cooperation of philanthropic organizations and the British colonial government. This paper focuses on the men, women, and children who lived in these settlements, and the ways in which they shaped life in the settlements through negotiation, flouting rules, and taking advantage of economic opportunities that the missionaries offered.

Methods
Drawing on interviews with former leprosy patients and staff, as well as on hospital, government, mission, and philanthropic archives from Uganda and Europe, this paper explores patient perspectives on life in Uganda’s colonial leprosy settlements. For most patients, entering a settlement was a choice that they or their relatives made. This paper begins, therefore, by examining the reasons why life in the leprosy settlements could be an attractive choice, factoring in local perceptions of leprosy, both positive and negative, and community attitudes towards the missionaries who ran the settlements. It then explores patient experiences of and attitudes towards medicine and towards mission evangelism within the settlements.
For every European missionary working at a leprosy settlement, there were hundreds of Ugandan leprosy patients, and in order for the settlements to run smoothly, missionaries relied upon the cooperation of patients. This need gave patients the power to successfully negotiate with missionaries, for example over the terms under which patient councils would allow children to be separated from their infectious parents. And while the missions had strict standards by which they expected people to live, archival and oral sources are full of examples of the ‘bad behavior’ that individuals exhibited when avoiding these strictures – such as beer parties heard but hidden from missionaries by tall elephant grass. Far from isolation, patients maintained connections with relatives and communities outside the settlement, and many found advantages in settlement life. Others did not, and the paper concludes by discussing those patients who left the settlements without discharge, and why.

Results and Conclusions
People entered leprosy settlements seeking education, economic gain, medical treatment, and about half of the patients who entered stayed until the settlement doctor deemed they had been successfully treated. While recognizing that life in a leprosy settlement could be difficult, and not all residents entered voluntarily, this paper concludes that leprosy patients were not only victims or sufferers, but also individuals who proactively shaped the settlements to suit their own interests and needs.

**Keywords:** patients, settlements, Uganda, mission, colonialism
The "discovery" of leprosy bacillus as a process: the history between science and society.

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The development of Science is a historical process, produced by actors linked to their time. The “Discovery” of the Mycobacterium leprae was an interesting historical process in the last decades of the nineteenth century, which involved some of the leading names in medical Science of the period, such as Robert Koch, Albert Neisser, Rudolf Virchow and Armauer Hansen. Understood as a scientific paradigm, this “discovery” is reexamined here based on primary sources, to provide new cultural and social tools for analysis and reflection for the historiography of Science. It is here an example of how the understanding of a “scientific fact” as a historical process with these approaches can contribute to a “another” understanding of Science, its actors and its results. More than discussing who was the “discoverer” of the leprosy bacillus, the intention here is to emphasize the role of history as an important interlocutor between Science and Society. Yesterday, today and tomorrow.

Keywords: Discovery of Mycobacterium leprae, Popular Science, History of Science
ILC2.1–007  
Applying the “index of care” to a person who experienced leprosy in late Medieval England  
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Objective: While the devastating image of the experience of leprosy in the past is changing with new historical and bioarchaeological studies and the development of new perspectives, a key question surrounding the disease is whether people were cared for within their communities. What provision was made for these people and can we access that information from the bioarchaeological record?  
This paper considers evidence for impairment and care in a skeleton from a Medieval context.

Methods: The skeleton of an adult man who was buried in the 12th–14th century AD part of the cemetery of the leprosy hospital of St James and St Mary Magdalene, Chichester, Sussex, England was studied and the bone changes of leprosy recorded. The four steps of the Index of Care model (Tilley and Cameron 2014) were followed. Results: Based on the bone changes and what is known about the disease and how it affects people today (signs and symptoms), the experiences of this person are suggested, and whether impairment may have been a resulting outcome. What cannot be said about the “leprosy experience” of this man, based on his skeleton, is also discussed, i.e. missing data. Finally, the potential care he might have needed is outlined, alongside consideration of the context of the site, and the historical data associated with the hospital, albeit limited.

Conclusions: Everyone is an individual and “one size does not fit all”. All people today and in the past with leprosy will have had different personal experiences, signs and symptoms, levels of impairment, attitudes from their communities, types of care given (if any), and recovery rates.

Keywords: care, personalized, Chichester, skeleton, leprosarium
Regaining a Place in History: The Identification of Individuals in Photographs Taken at Kalaupapa, Molokai, More than 100 Years Ago
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Objectives: Throughout the world, countless numbers of individuals were separated from their families and isolated in remote places such as Kalaupapa, island of Molokai, Hawaii. While numerous photos were taken in these facilities by physicians, visitors and the residents themselves, more often than not the people in these photographs were not identified. The current project sought to identify individuals in the remarkable portraits taken by Father Joseph Juliotte at Kalaupapa in the early 1900s.

Methods: The Congregation of the Sacred Hearts U.S. Province Archives contains more than 300 photographs of individuals of all ages, families, husbands, wives, and children that were taken by Father Juliotte at Kalaupapa. A Photo Bank compiled by Ka ‘Ohana O Kalaupapa (The Family of Kalaupapa) contains more than 1,000 photographs of individuals sent to Kalaupapa, including many medical entrance photographs. While Father Juliotte’s photographs reflect great dignity, the medical entrance photographs were often humiliating. The individuals in Father Juliotte’s photos were, for the most part, not identified. The individuals in the medical entrance photos were always identified. The photographs from these two collections were compared in order to identify as many individuals as possible in Father Juliotte’s portraits.
Results: The process of identification was far more complicated than anticipated. Not only were many individuals older, their appearance had often been changed by the progress of the disease or as the result of treatment. In some cases, their condition was worse but in some cases their condition was better, due to the excellent medical care at Kalaupapa in the early 1900s. In some instances, identifications were easy; in other instances, they were tentative; and in some cases they were not possible – at least not at the present time. Individuals in 95 photos were identified. Once an identification was made, additional information was added from other archival sources including admission registers, correspondence, and other documents. A dignified image is now available for family members.

Conclusions: It is possible to identify individuals and bring them back into their history, even after 100 years. In addition, the photographs taken by Father Juliotte show how the residents of Kalaupapa chose to define themselves—through their elaborate dresses, suits and hats; by the place where they chose to be photographed; and by who they chose to be photographed with. These photographs present a very dignified image of the residents of Kalaupapa as well as their strong desire to be remembered.

Keywords: Historic Photographs, Individuals, Inclusion, Dignity, Names
ILC2.1–009
Assessing physiological stress in young people with leprosy buried at a Medieval English leprosarium using stable isotope analyses from high-resolution incremental dentine
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Objective: Our research aims to view patterns of physiological stress in children, adolescents, and young adult people with bone changes of leprosy buried at a medieval leprosarium (10th–14th centuries AD), and explore indicators of nutritional stress and potential links to leprosy immunity (Barker 2012; Filipie twenty one and Roberts in prep). This may be seen through stable isotope analyses of dietary carbon and nitrogen using collagen from high-resolution incremental dentine sections of teeth (Hobson et al. 1993; Hatch 2012; Reitsema 2013; Montgomery et al. 2013; Beaumont et al. 2015). Incremental dentine has the potential to show the diet and physiology of these people at the time of their death if the tooth is still forming (Beaumont et al. 2015). By analysing developing teeth, it is possible to explore patterns of early childhood stress and lifetime changes in diet. By comparing the data with what was known about their diet and physiology, it is possible to consider whether early life stress led to leprosy susceptibility later in life.

Materials and Methods: This study employs a novel isotopic approach to examine individual life histories of people displaying skeletal signs of lepromatous leprosy in Medieval Winchester. Whole-life dietary profiles (carbon and nitrogen stable isotopes) spanning birth to death from 10 targeted young individuals

Keywords: bioarchaeology, nutrition, immunity, life-history profiles, leprosarium
ILC2.1-010
New Evidence for an Old Debate: What do Bone Changes of Hands and Feet Reveal about the Palaeoepidemiology of Leprosy?
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Objectives: This research aims to discuss the palaeoepidemiology of hand and foot bone changes in leprosy by correlating paleopathological and clinical evidence. The retrospective diagnosis of leprosy has been centered, mainly due to historical reasons, in the rhinomaxillary region. As a consequence, few systematic paleopathological studies exist regarding the prevalence of the skeletal manifestations of leprosy in hands and feet.

Methods: The samples under study consisted of: a) 191 skeletons of both sexes, 148 adults and 43 non adults, unearthed from the necropolis of the medieval leprosarium of St. Jørgen’s, located at Odense, Denmark; b) 300 medical files, 150 of each sex, from the last leprosarium in Portugal, the Hospital-Colônia Rovisco Pais (HCRP), representing patients aged between 4–93 years old and screened between 1947–1985.

Results: Hand and foot osseous lesions, or “phalangeal absorption”, were respectively present on 10.4% (31/299) and 3.4% (10/296) of the HCRP leprosarium patients. Conversely, in the Odense medieval skeletons the prevalence of correlative lesions, namely concentric diaphyseal destructive remodeling and/or acro-osteolysis, was higher on foot (26.1% [35/134]) than on hand (6.9% [11/159]) bones.

Conclusions: These differences, and their possible underlying causes, raise interesting issues regarding the epidemiological contexts and sociocultural practices during the historical periods under study.

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Keywords: Paleopathology, Denmark, Portugal, Medieval, Leprosaria history
Unusual prevalence of palatal perforations in the skeletons from the medieval leprosarium of St. Jørgen, Odense, Denmark

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Objectives: There is limited evidence regarding leprosy in childhood and adolescence in the past. It is aimed to bring new palaeopathological evidence regarding the prevalence of palatal perforation in leprosy and to discuss the importance of this particular skeletal manifestation to the reconstruction of the epidemiology of leprosy during medieval times.

Methods: This investigation comprised the macroscopic analysis of 191 skeletons unearthed from the necropolis of St. Jørgen’s medieval leprosarium, located in the city of Odense, Denmark. The hard palate of 148 adults, from both sexes, and 43 non-adults was inspected for the presence of destructive lesions which were registered according to standard palaeopathological methods.

Results: The overall frequency of palatal perforation was 12.6% (24/191) and no significant differences between sexes were found (p>0.05). These lesions were recorded in 11.5% (n=17) of the adult skeletons and a higher prevalence was found in non-adults (16.3%; n=7). This difference between age groups has no statistical significance (p>0.05), however, it is important to emphasize that bone changes in leprosy are very infrequent in non-adults and palatal perforations are even more rare.

Conclusions: From the palaeoepidemiological perspective the unusual prevalence of palatal perforations found in this study, both for adult and non-adult skeletons, suggests a different epidemiological scenario than previously thought, at least in Denmark, during medieval times.

Funding: This research was financed by national (POPH – Programa Operacional Potencial Humano) and European (European Social Fund) funds through the FCT – Fundação para a Ciência e Tecnologia: project references UID/ANT/00283/2013 and IF/00186/2014.

Keywords: Palaeopathology, Epidemiology, Children, Palate, History
ILC2.1-012
Eending the Millennium lonely, from Isolated to the integration, promoting Transnational world heritage of Leprosy sites and spirit.
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Leprosy have existed in human history for thousands years. However, in modern two hundred years, we are rewriting the history of human civilization. Early period had serious prejudice and social discrimination, occurred a global wave of high-voltage isolation policies, it was a disaster in human civilization. Nearly used a hundred years of medical research and gradually eliminating the disease. The most important of all, was the efforts from the people and their families affected by leprosy, it struggled to reduce social discrimination, stigma, forwarded to defend human rights, through her / their voices, the outside world began to reflect and support the reform, to rewrite a new chapter for human civilization.

In 2010, My research for ILA history database found more than 80 countries, 505 leprosy sanatorium, isolated islands, reclamation village was recorded, but the trajectory of human civilization just the tip of the iceberg. We can see in Buddhism, Christianity many classics had more records and stories. Leprosy show effects on human civilization and diverse look. As mentioned in the Declaration of Quebec, spirit of places, sites, by UNESCO, Leprosy as important as in the world of human assets. Leprosy can be cured now, many important historical places was torn down, gradually disappear. Taiwan, Malaysian, and even Japan, South Korea, in recent years also been heard continuing demolition, evictions, removal of the important places. This place has made history leprosy into the possibility verge of extinction.

In 2009, we initiated the first time an international symposium in Taiwan, it’s donated by people of Lo-sheng Sanatorium, promoted leprosy Transnational World Heritage. Representatives from Taiwan, Japan, Korea, Norway, Guam, Hawaii of IDEA. Thus mad the Taiwan Ministry of Culture appointed Lo-sheng Sanatorium to be potential World Heritage site of Taiwan. And then, we kept promoted the issue to Korea, 2010, USA (2012), and Brussels (2013), 18th International Leprosy Congress. Last Year I was very happy to know the Japan government will pointing Long Island, Nakashima to pointed as a World Heritage Site. In another way, the Malaysian government also announced they will pay attention to Sanatorium World Heritage Site. At the same time, The Philippines, will also follow the work together. Nippon Foundation also help the issues. Leprosy transnational World Heritage designation will from isolation to integrate and become a goble trend in the world future. It will create a more beautiful world to commemorate the history of this millennium.

Keywords: Leprosy, Transnational World Heritage, Lo-sheng Sanatorium, Lai Tse Chun, Sawa, Taiwan
ILC2.1-013
Having a Conversation Between The Humanities and The Sciences
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Historians have had much to learn from the current scientific research into the origins of the disease and its presence in various parts of the world that challenges some well-rehearsed myths. Mapping M leprae using genomics tells us how different strains spread with population flows along the slave and trade routes. Knowing what we now know about the origins of M leprae, does that change how we write the history of leprosy? Scientific research seems to be closer to understanding more about transmission and determining if there is a reservoir of the disease that is other than human. Historical research has studied the extensive investigations of the Leprosy Commission to India that concluded leprosy was a disease de novo. The commissioners stated that “Leprosy in the great majority of cases originates de novo, that is, from a sequence or concurrence of causes and conditions, dealt with in the report, and which are related to each other in ways at present imperfectly known.” My dictionary tells me that de novo is a Latin phrase, literally translating to “from the new,” but implying “anew,” “from scratch,” or “from the beginning.” De novo synthesis also refers to DNA replication.

So I ask, why did the commissioners use that phrase “de novo”? And what does the work of the Leprosy Commission mean, if anything, to today’s scientist? Is there something that the scientist can gain from knowing about the Leprosy Commission to India, in 1891? But I am at a disadvantage in answering this question because I am not a geneticist, much less a scientist, and can only guess at the significance of a scientific publication on the genome. This then leads me to ask a more fundamental question: what is my object of study? How does it differ from the object of study of the geneticist? Is my task different, from the point of view that I look at the same things, but from a different perspective? Or is my task more subversive: is it to interrogate the assumptions that underpin any study, including that of the scientist? How do our goals differ? In this session, I hope that we can ask ourselves how historical work on leprosy talks to and differs from scientific work on leprosy: is there potential for a conversation that is of benefit to all investigators?

Keywords: history, science, genome, M. leprae, transmission
ILC2.1–014
Solidarity, linkage global to promoting Transnational/Cross boundaries World Heritage Sites and spirit registration of Leprosy/Hansen disease.

Lai Tse–ching
Coordinator of IDEA Taiwan/Losheng Sanatorium, Taiwan China

The numbers of cases of leprosy may have been dramatically reduced over the last decade, the number who have completed MDT is now more than 16 million and many continue to experience continued morbidity and socio-economic challenges. Lesheng Sanatorium founded in 1930 before WWII, was the only national established Sanatorium and was the biggest one once have thousands residents here in Taiwan. It once had 220 buildings about 30 ha with thousands people here at most. in beggins social people had serious stigma for the residents here, till 1980 gradually opening up, but public feel afraid come in, full of discrimination and stigma, and the patients outside here is not been socially acceptable. Since 2004, at first, the Taiwan government want to build the MRT depot here, which decision attracted students, teachers, and social public concern. Many people from Universities with artists, performers started use music and art actions to invite the public coming here, for many years, finally to reduce the stigma, finding dignity from the historical sites and the residents here. In 2009, the Government decided to designate here as a cultural asset, and as a potential World Heritage in Taiwan. Efforts for many years, Last month, our Minister of health declared that the government will allocate 1.5 billion repair Lesheng hospital, let it close to the world heritage criteria authenticity and integrity. I believe that social efforts and concerning influenced government's decisions and the feeling of the public. In the past centuries, there are many individuals concerned about the treatment of leprosy, prognosis care, and social welfare system. In spite of medical advances can cure leprosy, at the same time, people also gradually forget history happened before, because residents pass away, and the story, and the pain everything is gradually disappearing now. From 2008, the UNESCO had started appeal transnational World Heritages appointed together to rescue important human monuments, like Silk Road happened in China and along countries. Maintaining Losheng Sanatorium give us good ideas. I believed Leprosy historical sites worth been noted by the world. In my research in the past 10 years, I found leprosy once across over 80 countries, once have more over 550 important historical sites, clinics, colonial villages, islands all over the world and many oral histories in different communities recorded on IILA historical website, like the spirit of sites worth appointed. Losheng Sanatorium promoted transnational world heritage appointed work not only benefit itself, it solitary more countries cooperated together to help the world to cherish the Heritages.
ILC2.2–001
Nagashima Aisei-en and the Legacy of Human Rights: A Partnership to Teach the Lessons of Hansen’s Disease in Japan
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This paper focuses on social activism and Hansen’s Disease in Japan. In particular, we look at the current movement launched by Nagashima Aisei-en to gain World Heritage Site status and the focus on preserving the legacy of Hansen’s Disease in Japan. As part of this movement, Nagashima is working to make its history and legacy more accessible to international audiences. This paper reports on a service learning project conducted in English in the summer of 2015. The Institute of International Education at Otemae University in Hyogo, Japan, partnered with Nagashima Aisei-en in Okayama prefecture, Japan’s first national leprosarium, as part of the activist movement to gain UNESCO World Heritage Site status for Nagashima. Students participated in an intensive study camp at Otemae, wherein they learned the history of Hansen’s Disease and human rights in Japan before spending a week working in the institution. This project combined studies of translation, human rights, and history with an English-based learning project in Japan. This presentation introduces the Nagashima Project, its goals and outcomes, and student responses to the experience before concluding with a discussion of the ways local communities can work to preserve the legacy of Hansen’s Disease and fight future discrimination.

Keywords: Nagashima Aisei-en, Japan, Human Rights, Student Activism, Legacy
ILC2.2–002

Writing Life: Illness, Isolation, and the Importance of Hōjō Tamio’s Fiction
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In 1934, a young man named Hōjō Tamio (1914–1937) was admitted to Zensei Hospital in Tokyo for treatment of Hansen’s Disease. Soon after his quarantine, with the support of Kawabata Yasunari, he began to publish short stories about Hansen’s Disease and life in the hospital. His work received broad popular attention and he received several literary prizes. Today, he is still known as the most famous example of a Japanese literary genre of “leprosy literature,” or sufferers writing about their experience of Hansen’s Disease.

In recent years, Hōjō’s work has received new attention as Japan begins to reconcile with the history of Hansen’s Disease. This presentation looks at the importance of Hōjō not only as literature but as part of the global history of Hansen’s Disease. The unique Japanese genre of sufferers writing about their illness experience allows more nuanced examination of the human side of HD policy. In particular, Hōjō’s writing reveals the way residents reclaim the power to assign their own meaning to their experiences and their illness. This paper takes up some of Hōjō’s most famous short stories to look at their continued relevance. I demonstrate the ways in which Hōjō reveals not only the humanity of the sufferers but also how patients created new ways of living in a space of social exclusion where normal social roles, such as spousal relations or parenthood within a nuclear or extended family, were denied to patients.

Keywords: leprosy literature, Hojo Tamio, Japan, human rights, illness experience
ILC2.2-003
Commitment to influence change
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I was previously diagnosed with the Hansen disease, known as a curse to many people. Infected at 20, I had to receive treatment in Sorokdo, an island off the southern coast of the Korean Peninsula, for 5 years and managed to medically free from this disease. However, I could not regain a "normal" person, as a human being because in the eyes of other people, it remained an incurable disease.

Perhaps due to its characteristic nature, all over the world, people suffering from Hansen disease continue to be victims of harsh discrimination. Until the 20th Century, once you were infected with the disease, you would lose all basic rights a human should rightly enjoy. The freedom of residence, the right to education, the right to work, and even the right to move were not ensured, and patients had no choice but to live a life of seclusion in a designated camp under the control of the state authority.

I could not visit my hometown, no matter how much I longed to go there. Neither could I meet my parents or siblings. As a patient with Hansen's disease, I was excluded from the complication of life and was deprived of dreams or hopes. For me, there was no meaning to life except that I was alive and breathing. All pathways to the outside world were devastatingly, firmly blocked. The patients were aliens to society and thoroughly alone.

But I could not give up on my life. I realized that I must correct the misunderstanding people had about this disease. I could not allow other patients, like myself, to suffer in a world of misunderstanding. So, in the 1960’s, I escaped from Sorokdo to the mountains where other patients were living together in huts away from the eyes of the people.

And with them, I began to build a life by begging on the streets and clearing fields for cultivation. I also began my struggle against the world. I demanded the Korean government to set up policies to support the patients, built a resettlement village for them in the livestock-raising business.

Finally, the government acknowledged that the state policy on the patients, which was to isolate them by force was illegal, and at the same time, the Korean National Assembly passed ' the Legislative Bill for Close Examination for the truth of Hansen's disease Incidents and Victims '.

Keywords: Korea, Human rights, Discrimination, Sorokdo, Hansen's disease
ILC2.2-004
Begotten of Corruption? Tracing the history of stigma for people with leprosy in South Asia
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People with leprosy are strongly stigmatized in South Asia today. The disease is regarded as a manifestation of extreme levels of spiritual pollution and wrong deeds going back through one or more incarnations of the self. Stigma results from a process of "othering", where difference is recognized, constituted, signified as negative and this eventually leads to surveillance, exclusion, confinement, and other forms of social control. To write the history of stigma for people with leprosy in South Asia, we must trace the disease back to its zero-point, the historical time when the disease was not yet differentiated, or signified. We know that leprosy is seen for the first time in South Asia during the Mature Harappan period (2500–2000 B.C.). Using archaeological skeletal data, mortuary archaeology, and an exegesis of texts from the second and first millennium BCE, this paper traces the history of stigma for people with leprosy in South Asia, demonstrating stigma emerged relatively much later than the disease itself, and ultimately destabilizing what is currently thought to be “true” about leprosy and its sufferers.

Keywords: archaeology, history, skeleton, stigma, discrimination
ILC2.2-005
Life experiences of people with leprosy disability with diabetes
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Objectives
To assess the self-management of Diabetes, livelihood, rights & fulfillment of basic needs of leprosy disabled people with diabetes in 4 district of NW Bangladesh. 25 words

Methods In the course of a project screening for diabetes amongst all known living leprosy-disabled people resident in 4 districts, a sample was taken among all diabetes affected leprosy disabled people, for more detailed case histories . They were asked about:
1. Compliances on Diabetic treatment, diet and care
3. Social relationships: acceptance & support by Family, community and respect from them.
4. Mental support on areas of Health & fitness, mental peace and enjoyment of life.
Results
13 leprosy disabled people (10 male & 3 female) with diabetes were enrolled for this series of case histories. All had high Eye hand foot scores indicating severe disability. All report difficulty with fulfillment of basic needs, social relationship and mental peace. Most of them experience a miserable life because of their leprosy disability and diabetes. Most of them told that they find difficulties to access required diabetic medicine, regular check-up and dietary support from their family. According the RBS done while taking histories, their diabetic control seem poor. 6 of them have chronic plantar ulcer as complication, two of them have below knee amputation and 1 has blindness. Among them 7 subjects who are less than 70 and all of them told that have impaired sexual abilities with adverse consequences on their marriage. Due to uncontrolled diabetes they physically become very weak and find difficulties to perform the activities of daily living (ADL). Family members do not understand how to support them and community do not treat them like other people. Out of 13 subjects 7 of them do not attend in social function and place of worship because of embarrassment. With their leprosy disability and uncontrolled diabetes they are dissatisfied with their level of health and fitness. They suffer from frustration, insomnia, inability to pay proper attention to ADL or work or enjoyment of life. Many feel quite hopeless, socially isolated.

Conclusions
Leprosy disabled with higher EHF scores and with uncontrolled diabetes endure a miserable life. They cannot fulfil their basic needs, cannot live with rights in the family and community, do not get respect from society and they become burden of their own family. The feel they deserve a better life. Greater understanding of their need among family and community might greatly improve their life

Keywords: Basic needs, isolation, ADL, social relationship, plantar ulcer
ILC2.2–006
Evidence on elimination of discrimination against persons affected by leprosy and their family members with reference to UN principles and guidelines in 6 rural districts of Maharashtra (India)
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Objectives:
Understanding the inequity and prejudices is crucial for planning strategies to eliminate discrimination against Persons Affected by Leprosy (PALs) and their families. The study is aimed to measure the extent of discrimination suffered by PALs through evidence search.

Methods:
A pre-designed interview schedule based on UN Principles and Guidelines for the Elimination of Discrimination against Persons Affected by Leprosy and Their Family Members was used for collecting evidence based information. 598 PALs selected using stratified sampling method from 12 endemic blocks of 6 districts of Maharashtra were interviewed on one-to-one basis. Of which, 40% were female and 71% had MB leprosy, 44% (261) have Grade 2 disability (G2D). All respondents were above 15 years of age. Data collected were entered and analyzed using MS Excel version 2010.
Results:
125 (21%) respondents have experienced discrimination with respect to one or more violation of rights as mentioned in UN Principles and Guidelines (2010). 11% of respondents reported discrimination with regard to marital / family life, however 1% revealed rejection for marital alliance and 4% reported denial of conjugal relationship with spouse. 5% of respondents were separated from family, 3% from spouse and 2% from children. 2% of the respondents were given advice to undergo sterilisation by the family and healthcare providers. Only 3% reported discrimination against rights pertaining to full citizenship, obtaining identity documents and participation in local politics. 6 (1%) respondents lost job or admission to educational institutions. 8% respondents experienced use of abusive or disrespectful language against them and 5% were subjected for disrespectful treatment at family or social programmes. Most of respondents were restrictive in sharing information on discrimination especially on conjugal matters. More details on the attributing determinat will be presented.

Conclusions:
The study strongly confirms the existence of discrimination against PALs that restrain their dignity.
It also reinstates the fact that the proactive actions based on international human rights instrument to ensure equal rights to PALs are absent. This can be attributed to lack of issue based decisive plan by the state to eliminate discrimination against the people affected. Nevertheless, it was observed that the intensity of stigma and discrimination on account of leprosy have declined over the period as compared to the studies published earlier. It is recommended that state along with other stakeholders play a proactive role in bringing social reforms, in order to eliminate the discrimination against PALs and their family members.

**Keywords:** Human Rights, Discrimination, Stigma, Principles, Evidence
ILC2.2-007
The evaluation of Integrating Prasart leprosy colony into general community, Surin Province, Thailand
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Introduction
Leprosy colonies in Thailand, had been gradually established since the year 1937 under the administration of the Department of Disease Control. The colony members were people affected by leprosy, who were mostly old, faced difficulties in accessing to general health care services and public utilities. Prasart colony was the first colony integrated into the general community in 2012. This study was conducted to evaluate the effectiveness of integrating ex-Prasart colony into general community. The study results and lesson learnt obtained from this evaluation expected to be used as information to address remaining challenges and formulate the plan to integrate the other leprosy colonies in Thailand.

Objective
To evaluate the effectiveness of integrating ex- Prasart leprosy colony in Surin Province into general community. The evaluation contents consisted of the colony context, the difficulty of living, the social participation, stigmatization, and discrimination against people affected by leprosy and the attitudes of people around this ex-colony.

Method
This exploratory research used quantitative and qualitative methods to evaluate the effectiveness of integrating ex-Prasart leprosy colony into general community. Quantitative data was collected by using the participation scale, Discrimination scale and the EMIC stigma scale while qualitative data was collected from the in-depth interview. Descriptive statistic was used to analyze quantitative data while content analysis was used to analyze qualitative data.
Results
The members of the ex-Prasart leprosy colony consisted of 24 people affected. Out of these were 15 women, and 9 men. All of them were over 60 years old, cured from leprosy, had grad 2 leprosy disability and loss of sensation in hands and feet. The number of 18 cases (75%) were supervised self care techniques by the staff of a district hospital on monthly basis.
The number of people affected by leprosy who had participation restriction was 3 (12.5%). The number of those perceived community stigma was 3 (12.5%). The in-depth interview revealed that 2 cases (8.3%) experienced discrimination from people when they visited a hospital.
Out of 31 community leaders living around the Ex-Prasart leprosy colony, 26 people (83.9%) perceived that leprosy is an embarrassing disease and need to be concealed, 24 people (80%) revealed negative attitudes towards leprosy.

Conclusion
After the wall between people affected by leprosy and surrounding community had been demolished. Leprosy related stigma still exist. The de-stigmatizing intervention is needed to address this stigmatization for the better quality of life of people affected by leprosy.

Keywords: integrated, leprosy, colony
ILC2.2-008
Experiencing stigma and discrimination and the inspiration of gaining back human dignity: Life story of people affected by leprosy, Khonkaen province, Thailand
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Objective
To share my own life experiences in stigma and discrimination, and inspiration of gaining back dignity of people with disabilities. This is to inform health providers and general public what people affected by leprosy have encountered along the course of life and how to cope with the difficulties.

Method
I wrote my own story under the two themes namely ‘experiencing stigma and discrimination’ and ‘the inspiration of gaining back human dignity’

Results:
Experiencing stigma and discrimination. In 1952, I was 13 years old. I had rashes on my face and diagnosed as having leprosy. I was shocked and saddened and forced to leave school. My friends did not play with me and called me a leper.
I avoided this situation by entering a monkshood along with attending Chaulmoogra oil therapy. In 1957, the abbot and the other monks knew my disease; they repelled me. I was then employed to work in a cattle farm, feeding cows and buffaloes with which I was arranged to live. My employer separated my food and utensils. I was so desperate enough to make a suicide attempt that did not succeed. After that, I met a missionary who convinced me to get Dapsone treatment. At that time I was still desperate and often shunned by people. The inspiration of gaining back human dignity. In 1958, I was referred to the Phra Pra Daeng hospital. In this year, His Majesty the King visited the hospital. I saw him reach out his hand to pat a nose of people affected and asked whether he was hurt. This event reflected His Majesty’s kindness towards us. This inspired me to fight for the dignity of myself and other people with disability. In 1980, I started to use my painting skill to earn a living by producing and selling handicrafts. I was able to well take care of my family. I was so proud. In 2013, I formed the Self-help Group and voluntarily instructed people with disability to paint and produce handicrafts. As a result, most of them were proud as they became the bread winners of their families.

Conclusion: Inspiring and promoting people with disability to stand by our own feet is important for us to live independently and with dignity.

**Keywords:** Stigma, Discrimination, Inspiration, Experiencing
ILC2.2-009
From Dignity to Advocacy
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The Methodology of development for people who affected by leprosy conducted in Indonesia, is motivated on the basis of the increase in the fulfillment of human rights of people affected by leprosy in Indonesia. Indonesia as the third country in the world for new case detection rate after Brazil and India is still has the problem of highly stigma and discrimination against leprosy. People still think that leprosy was caused by witchcraft, a curse, and or because of sin. Big impact suffered by people who have or are currently affected by leprosy due to the stigma and discrimination is isolation, a waiver, in derision and a variety of other problems that often they get. If persons with disabilities are more common to have schools for they can still get the right to a proper education, then a different reality is given to people who have and or are currently affected by leprosy. If they were caught they had leprosy so they are difficult to be able to go to school everywhere. In fact, many of those who had to drop out of school, the impact that occurs is in the low quality of human resources of most people who affected by leprosy. Eventually, employment opportunities for them are very limited which makes poverty the stigma new for people affected by leprosy, that leprosy is a disease of the lower classes in society; other consequences are they difficult to voicing what the basic rights of their own to be met by government.

The program is implemented at this time is an activity that is based on community empowerment in which the activities to mainstream people affected by leprosy in character development, develop young people who willing to have high motivation in voicing leprosy, advocating public policies that the government willing to make a leprosy treatment program becomes their program priorities, as well as a bridge for people affected by leprosy to government organizations, non-governmental organizations and other community groups who also willing to participate care for leprosy. The final goal of this program is to make them feel valued, acceptable in society and have the power to which is important in their families, as well as for other community members resulting in the friendly society and inclusion for people affected by leprosy, and also to make their own can voicing what is their basic needs to policy makers.

Keywords: 123, 123, 456, 456, 789
ILC2.2-010
TAKE PART, TAKE THE LEAD - Rights-based Approach to Social Inclusion and Participation
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When it comes to social inclusion and participation, people affected by leprosy usually find themselves at the receiving end. Leprosy - a disease which is riddled with many age-old misconceptions has pushed them into isolation and despair. Due to the horrendous stigma attached to leprosy, many of them are confined to the “ignominy of leprosy colonies”, abhorred by the general public. Having been left with no alternatives, most of them resort to begging for livelihood. Their human rights are violated at every turn, and they do not have the knowledge or bargaining power to demand their rights. Besides, there are many laws in India that are discriminatory towards people affected by leprosy. These laws are an abuse of human rights and a denial of equal rights, which are guaranteed by the Constitution of India, under Article 14 (Right to Equality) and Article 1 of Universal Declaration of Human Rights.

The Leprosy Mission initiated a project - Challenging Anti-Leprosy Legislation (CALL) - with a rights-based approach to advocacy, funded by DFID, to address the issue of discrimination and social exclusion faced by people affected by leprosy. CALL trained people affected by leprosy in two States of India - Chhattisgarh and Uttar Pradesh - where prevalence of leprosy is very high on their rights and entitlements, and built their capacity to advocate when their rights are violated, through collective bargaining, under the banner of community-based organisations (CBOs).

The Project has facilitated formation of 24 community-based organisations (CBOs) in the above states. There is encouraging evidence to show that CBO members, after adopting a rights-based approach, are claiming and defending their rights and have shifted their focus from living on charity to a dignified life. They bargain collectively for their rights and entitlements, accessing services in the government healthcare institutions as part of their right to health, government social welfare schemes, document cases of discrimination faced by them and take up these issues with the media. They also engage with Panchayati Raj Institutions (local self-government), and access their rightful needs through memoranda to government authorities. They challenge discrimination and inequality, and advocate for social inclusion and equal distribution of resources.

As a result of asserting their rights on a collective bargaining platform, a paradigm shift has occurred in the lives of people affected by leprosy. A right-based approach has propelled them to social inclusion and participation in a big way!

Keywords: Leprosy, people affected by leprosy, right-based approach, social inclusion, participation, discrimination, collective bargaining
Objectives
Ex-leprosy patients who were sterilized in the Korean national leprosy hospital have filed public interest litigation against Korean government in 2011. This research is to historically examine why and how leprosy patients were sterilized in the national leprosy hospital until 1980’s, but has currently filed litigation against Korean government. Also, it has scrutinized the origin of the discriminative and eugenic policy over leprosy patients in the history of Japanese leprosy policy, and relationship between public interest litigation filed by ex-leprosy patients in Korea and one in Japan. Therefore, it will try to uncover that legacy from Japanese colonial regime had remained in South Korea very recently.

Methods
We have collected and analyzed historical data on sterilization in leprosy control not only in South Korea but also Japan. Also, we have conducted several interviews with attorneys for the plaintiffs in the litigation. With medical and historical-sociology perspective, these data were structurally analyzed.
Results
In 1915, Mitsuda Kensuke, a leading Japanese leprologist and director of Tama Zenshöen Sanatorium, began to conduct vasectomy over male patients, and this leprosy control policy was diffused not only in Japan, but also in Korea. The first vasectomy over leprosy patients was in Aeyangwon leprosarium in 1935, and in the national Sorokdo leprosarium in 1936. Since then patients wanted to get married, they had to have vasectomy operation. Also patients who complained would have been sterilized as punishment. Even after liberation of Korea from Japan, Korean government kept this sterilization policy until 1980’s. In 2011, ex-leprosy patients filed public interest litigation against Korean government. This litigation has strongly influenced by a series of litigation filed by ex-leprosy patients in Japan, Taiwan, and South Korea against Japanese government. Through litigation in Japan, Korean ex-patients found they were empowered to argue that their human rights were violated by their government and to demand the apology of government. Finally, they found litigation could be an effective means to achieve their demands from the government.

Conclusions
Even though Korean government abandoned the forcible segregation policy over leprosy patients, it did not aware that vasectomy was serious human rights violation against patients. Without regrets Korean medical experts and officials continued this terrible operation only for effectively managing patients in the national hospital. For Korean government, this is a very good chance to repent of its fault, and to compensate for ex-patients’ damages and suffering.

Keywords: Leprosy, people affected by leprosy, right-based approach, social inclusion, participation, discrimination, collective bargaining
ILC2.2–011
Sterilization in Leprosy Control & Public Interest Litigation in Korea
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Objectives
Ex-leprosy patients who were sterilized in the Korean national leprosy hospital have filed public interest litigation against Korean government in 2011. This research is to historically examine why and how leprosy patients were sterilized in the national leprosy hospital until 1980’s, but has currently filed litigation against Korean government. Also, it has scrutinized the origin of the discriminative and eugenic policy over leprosy patients in the history of Japanese leprosy policy, and relationship between public interest litigation filed by ex-leprosy patients in Korea and one in Japan. Therefore, it will try to uncover that legacy from Japanese colonial regime had remained in South Korea very recently.

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Even though Korean government abandoned the forcible segregation policy over leprosy patients, it did not aware that vasectomy was serious human rights violation against patients. Without regrets Korean medical experts and officials continued this terrible operation only for effectively managing patients in the national hospital. For Korean government, this is a very good chance to repent of its fault, and to compensate for ex-patients’ damages and suffering.

Keywords: sterilization, public interest litigation, Sorokdo leprosarium, human rights, empowerment
Objective: To describe the operational framework used for the cultural adaptation of the Explanatory Model Interview Catalogue stigma scale (EMIC-SS) for the Brazilian culture.

Methods: Following authorization by the author, Mitchel Weiss, we proceeded to the translation and testing according to Seaton et al., 2002. The process involved the 1st to 5th stages for the adaptation of the 15 items and the Likert scale response options of the EMIC-SS.

Results: Best equivalency between source and target was pursued during the entire process of translation into Portuguese by informed and uninformed translators, synthesis, back translation and expert committee review. The synthesis meeting, with the two translators, two translation coordinators, the research team, and judge, solved the discrepancies between the translator’s reports by consensus. The expert committee included a methodologist, 3 health professionals, 1 language professional, and the translators (forward and back translators, one of them a native English-speaker), the translation coordinators, and a leprosy patient.
The versions were consolidated and a pre-final version of the scale was developed for testing. Decisions were made to achieve semantic, idiomatic, experiential and conceptual equivalence between the source and target versions. Most discrepancies were observed in the response options, which is a four-option graded scale. In several items, we observed the need to modify certain aspects, such as the words “marriage” and “problem” that were substituted to be adequate for the target population, i.e. leprosy affected Brazilian patients, and to be understandable by a 12-year-old. A total of 17 adult leprosy patients attending the Souza Araújo Clinic, were invited to participate of the testing phase, 2 declined and 1 was excluded due to reduced understanding capacity. Fourteen patients (71% male, 45.8 ± 14.8 years old, 34% had incomplete primary schooling) were interviewed. During the first testing, 5 items caused difficulties for understanding, which were modified for the second testing. The instructions to participants were also better detailed. The third testing is in process after which further testing of the adapted version will be developed to evaluate the psychometric qualities of the Brazilian version.

Conclusions: Cross-cultural studies are essential to evaluate the perceived stigma in people affected by leprosy. The cultural adaptation process needs to be rigorous and meticulous in order to maintain the measurement properties needed to assess the cultural epidemiology of stigma, while retaining both the item-level and the score-level characteristics of reliability, construct validity, and responsiveness of the EMIC-SS.

**Keywords:** Explanatory Model Interview Catalogue stigma scale, stigma, cross-cultural adaptation, leprosy, Brazilian portuguese translation
ILC2.2-013
Gender differentials in patients reporting late for leprosy treatment in an urban centre in North India
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Objective:
The purpose of the study is to determine the reasons due to which person affected by leprosy report late to hospital to avail leprosy treatment.

Methodology:
Data was collected from the all the new patients registered during the period of Jan 2014 to June 2015 and who reported late (means after the scheduled appointment date) to avail the anti-leprosy treatment. In total 157 patients were interviewed among which 111 patients were male and 46 patients were female. Data was collected through the interview and the results were grouped accordingly.

Results:
Out of the total 111 male patients interviewed, 98 male patients do not wanted to bring the spouse for healthy contact examination. 67 of the male patients brought only male child for healthy contact examination and not the female child for healthy contact examination. Out of the 111 male patients 53 of the male patients do not gave any importance to the patch of the spouse. Out 46 females interviewed 27 told that they have problem in seeking permission from spouse to come to hospital for examination of patch. 9 of the 12 dropout female patients said that they have problem in seeking permission from spouse to come to hospital as household work suffers. Out of the 46 female patients 39 said that it is the male member of the family who decides that whether the female child has to take treatment or not.

Conclusion:
From the above study it can be concluded that gender bias is there in availing the anti-leprosy treatment and also in context of continuity of the anti-leprosy treatment. This gender bias can only be handled properly with proper counseling.

Keywords: gender, leprosy treatment
ILC2.2-014
Addressing Discriminatory Legislation in India – Initiatives and Experiences
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Stigma against leprosy and discrimination of people affected by the disease continue to negatively impact disease control activities and quality of life of the affected.

To facilitate a non discriminatory legislative environment in India for people affected by leprosy, we adopted a rights based approach to the problem of leprosy. Our major interventions included working closely with the Law Commission of India, engaging with the National Human Rights Commission and directly implementing projects like "Challenging Anti Leprosy Legislations (CAL)" to empower communities and people affected by leprosy to demand a change in the status quo of opportunities, services and cultural practices.

The result is a set of significant recommendations by the Law Commission of India to the Law Ministry to create a more conducive environment to reduce discrimination and enhance the dignity and rights of people affected by leprosy. The most significant of these recommendations is the EDPAL Bill 2015 (Eliminating Discrimination against People Affected by Leprosy) which neutralises the current discriminatory provisions in the law and encourages social inclusion of people affected and their families. This Bill has been forwarded to the Prime Minister's office.

Keywords: Stigma, Discriminatory Laws, Rights based approach, Societal mindset, Convergence
ILC2.2-015
Enhanced Participation in Society Through Involvement in National Human Rights Organization Representing Persons With Disabilities
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Objectives
The partnering of organizations of persons affected by leprosy with other human rights organizations can provide another platform for advocacy for our rights and increasing our participation. In Nigeria this was accomplished through IDEA Nigeria’s involvement with Joint National Association of Persons with Disabilities (JONAPWD).

Methods
In 2004 Shehu Abdullahi Sarkin Fada, Representative for IDEA Nigeria, was the first individual affected by leprosy to attend the annual general meeting of JONAPWD. Initially JONAPWD members rejected Mr. Sarkin Fada’s participation because he was a person affected by leprosy. As a result of his advocacy efforts however, JONAPWD agreed that persons affected by leprosy could join.

Results
At the first meeting of JONAPWD he attended, Mr. Sarkin Fada ran for National Chief Whip. Although JONAPWD members initially opposed this, they eventually altered their position, and he was elected. Persons affected by leprosy have been actively involved in JONAPWD leadership positions including:
actively involved in JONAPWD leadership positions including:
• Re-elected to National Chief Whip in 2007.
• Elected to National Publicity Secretary in 2014.
• Elected to state chapter offices including State Chairman, Vice Chairman, and Secretary.
• Elected as zonal coordinators of JONAPWD’s six geopolitical zones.
• Appointed to JONAPWD committees: Affirmation of the Right of Persons with Disabilities; Steering Committee for Persons Living With Leprosy; and Electoral Committee for national elections.

Involvement with JONAPWD has expanded opportunities for persons affected by leprosy for participation in local, state and national government; expanded training; and government employment including:
• Assigned desk officer in the Federal Ministry of Women Affairs and Social Development.
• Appointed Special Assistants on Persons Living with Disability to the Governors in their State, or Chairman of the local government.
• Appointed ex-officio members of the ruling parties in their States for individuals involved in politics.
• Individuals can participate in vocational training for persons living with disabilities offered through the Federal Ministry of Women Affairs and Social Development.
• One State established an ongoing training program for women and children who have experienced leprosy or who have a family member who has had the disease.
• State governments committed to employing persons with disabilities have hired persons affected by leprosy.

Conclusion
Membership in JONAPWD has helped individuals affected by leprosy in Nigeria gain greater government recognition and involvement at the local, state and national levels. People who felt marginalized and segregated from society due to leprosy now have greater opportunity for participation in their communities through employment and training, local and national government representation and advocacy.

**Keywords:** human rights, disability, participation
ILC2.2-016
Timeline of Human Rights and Leprosy from the perspective of public health policies in Brazil
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Introduction - in the twentieth century the Brazilian government took control of endemic leprosy by compulsory isolation in asylum-colonies. In 1958, it was internationally recommended to abolish the isolation and offer chemotherapy in the central health agencies 2. Purpose: Represent through a timeline the public health policies introduced in the twentieth century in Brazil that ensured social and fundamental rights to people affected by leprosy. Method - bibliographic review, data source Virtual Health Library. Search Terms: Leprosy, Human Rights and Public health Policy rights. Results: the Normative Federal Decree 962/1962 abolished compulsory isolation. In the 60s and 70s, the patients could choose to leave the institution and seek treatment in a clinic. Some have chosen to stay because they have lost the social and family life. The ordinance 165/1976 provides that the term “lepra” and its derivatives are definitely outcasts of official documents, recommends the treatment in clinics, physical and social rehabilitation of patients and restructuring of hospitals colony according to local peculiarities. The name “lepra”, which is pejorative, was replaced by “hansen í ase” with Law No. 9,010 / 1995 3. Ordinance 585/2004, aimed to conduct a Situational Diagnosis of the old colony hospitals with the participation of technical representatives of the social movement. Recognizing the history of systematic violations of civil, social and political rights of people affected by leprosy, the Brazilian government enacted Law 11,520 / 2007, granting special monthly pension, perpetual and nontransferable to people affected by leprosy and who were subjected to isolation and compulsory admission in colony hospital until December 31, 1986. In 2008 was published a booklet entitled Leprosy and Human rights, an important document that gave power to users. Until September 2015 the Secretariat of the Leprosy Commission on Human Rights granted 8,788 of 12,186 pension applications. As a result of compulsory isolation many children were separated from their parents and this group is claiming state compensation for that.

Conclusion: The public health policies should ensure the individual rights, and for that, it is fundamental that the user participation is guaranteed, as well maintained the political decision to ensure the individual and collective human rights.

Keywords: Leprosy, Human Rights, Public health Policy rights
ILC2.2–017
The Empowerment of People Affected by Leprosy through Making Biogas to Increase Productivity and Eliminate the Discrimination of People Affected by Leprosy in Sumberglagah, Indonesia by LCC Indonesia
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Leprosy is a chronic disease that caused by Mycobacterium leprae. Leprosy can affect the skin, peripheral nervous system and upper of the eye. Based on Weekly Epidemiological Record that published by WHO in September, the number of new cases leprosy in Indonesia in 2013 was decreased 18,994 to 16,856 from the previous year. Leprosy in Indonesia is one of health problems where stigma and discrimination in society become an important role. Stigma and discrimination in society can restrict people affected by leprosy to obtain their health care, education and employment. In Sumberglagah, Mojokerto, East Java, Indonesia, leprosy is one of chronic diseases that can affect many problems such as stigma and discrimination from community in social aspects, then disability in medical aspect. Disability could reduce the productivity of people affected by leprosy, beside that, discrimination and stigma from community could affect their human rights. United Nations Universal Declaration of Human Rights in 1948 said that “Everyone, without any discrimination, has the right to equal pay for equal work”. Their human rights can’t fulfilled because people affected by leprosy were difficult to get a job. It could affect their revenue too. This problem could impact their family’s economy. The difficulty of getting a job made people affected by leprosy became a breeder of cows and goats. Sumber Glaagah has a lot of cow dung which can be used to generate the energy by making biogas. The waste of biogas could be a fertilizer for agriculture. Leprosy Care Community Indonesia had a project to make biogas together with people affected by leprosy in Sumber Glaagah, Indonesia. The purpose of the biogas production was to increase their productivity and their economy by selling the fertilizer which is the waste of biogas. The characteristic of this study was an observational study and supported by other sources of literature. The productivity of some people affected by leprosy could be increased by making biogas, so they could get energy supply or generate the energy and the waste from biogas is a sludge which can be used as fertilizer. That fertilizer could be sold in Mojokerto, Indonesia. The earning of fertilizers can increase the economy and human rights of people affected by leprosy. Therefore everyone without any discrimination, has the right to equal pay for equal work. Stigma and discrimination against people affected by leprosy will be reduced.

Keywords: Leprosy, Stigma, Discrimination, Biogas, Productivity
ILC2.2-018
The Impact of a Rights-Based Counselling Intervention To Reduce Stigma in People Affected by Leprosy in Indonesia
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Abstract
Objective: Counselling is one of promising intervention strategy to reduce stigma. The use of the rights-based approach that was developed by SARI effectively made people affected by leprosy positively experienced life change. This paper aimed to describe the impact of a counselling intervention by encouraging human rights against stigma and discrimination in people affected by leprosy in Cirebon District, Indonesia.

Methods: This study is part of the Stigma Assessment and Reduction of Impact (SARI) project, which is a participatory and inclusive project. The counselling intervention used a rights-based approach and combined three types of counselling (individual, family and group counselling). The most prominent feature was the training and deployment of peer and other lay counsellors who were responsible for giving the actual counselling to the SARI clients. A mix of quantitative (P-scale, WHO-QoL, BREF and SARI Stigma Scale) and qualitative methods (including interviews, focus group discussions and notes) were used to monitor the intervention and to assess the impact. A baseline was set in 2011, the intervention was implemented for two years after which an end survey was conducted. The study participants were the 145 people affected by leprosy who received counselling as part of the SARI project.
Results: The qualitative baseline showed that many people who were diagnosed by leprosy felt worries and fears and excluded themselves from their family and community due to false perceptions about their disease. The qualitative end survey indicated that counselling provided benefits including more knowledge, more confidence and friendships with people from their sub-district who have been through similar experiences. Actions to change life for the better were initiated by the clients, such as re-connecting to people in their neighbourhood, helping in household activities, applying for a job and continuing their education rather than sitting at home and keeping silent. Challenges included the wish to conceal their condition and aspects related to the design of the study.

Conclusion: Many clients experienced a significant life change due to counselling but this was not the case for all clients. More research is needed to improve the selection and training of counsellors, to further improve the counselling module and to create a more sustainable implementation of the counselling. The success stories tell us that this counselling intervention has great potential in decreasing stigma, promoting the rights of people with leprosy and in facilitating their participation in family and community life.

**Keywords:** counselling, stigma reduction, leprosy, human rights, disability
ILC2.2-019

ANTI LEPROSY LEGISLATIONS IN INDIA:
BUREAUCRATIC CHALLENGES WITHIN THE
INDIAN LEGAL FRAMEWORK
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Background: The Hansen’s disease, its disfiguring and disabling complications made leprosy both as a disease and as a condition, a highly feared thing. This deep-rooted fear over time gave birth to the attitudes of revulsion and practice of segregating those affected by the disease away from the fabric of community life on the reasoning of controlling the spread of the disease. Within this backdrop, is an important component, the law, which is one of the signifying practices that constitute culture and vice versa in our lives. Similarly, leprosy is also equally impacted by law and the law has been impacted by the cultural practices in its formation, interpretation and implementation. However, since the advent of MDT, the needed change in legal practices is still to occur. Millions living with the tag of leprosy in India still await for a better, protective and proactive legal regime, as it affects their lives and opportunities for growth and holistic inclusion. This paper highlights the co-relation of stigma and discrimination faced by people affected by leprosy with the legal framework.

Objectives:
1) To access the co-relation of stigma and discrimination faced by people affected by leprosy with the legal framework
2) To carry out review of legislations discriminatory towards people affected by leprosy prevalent in India
3) To understand & recommend best course of action with governmental agencies to being about a change in the Indian legal framework.
Methodology:
1) Review of Literature
2) TLMTI’s CALL Project
3) Advocacy Interventions at the Central Government level
4) Building capacity of Community Based organizations
5) Engagement with different stakeholders (government & development)

Results:
Strategic advocacy interventions led to a comprehensive report by the Law Commission of India to the Central Government of India on the issue of leprosy. The paper highlights the details of recommendations included in the draft proposed bill & the advocacy efforts, its results in the process of reconsideration of the Rights of Persons with Disabilities Bill, 2014, which was undertaken by the Standing Committee of the MoSJE, Gol.

Conclusion:
The immediate results of the reports of the Law Commission and the Standing Committee need to be followed with a sustained effort by all stakeholders, as these are only recommendatory in nature. Any further action on either of them is solely dependent on the will of the government.

Keywords: Anti Leprosy legislations, Discrimination, Laws, Advocacy, Stigma
EMPOWERMENT OF YOUTH FROM LEPROSY
COLONIES AS CHANGE AGENTS
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Background
Young adults belonging to communities of people affected by leprosy are greatly
disadvantaged though they themselves do not have the disease. Age-old
negative attitudes continue to lead to situations of discrimination and ill-treatment
of people affected by leprosy and their family members even today depriving them
of education, employment, development and recreation. Years of segregation,
stigma and discrimination have left deep rooted scars on the life, personality and
inter-personal skills affecting their everyday life. This has resulted in lack of self
confidence and low aspiration levels, thereby creating obstacles to their holistic
development and improved quality of life.

Objectives
(i) To identify the needs to empower the youth from leprosy – cured families in
leprosy colonies with necessary skills and personality.
(ii) To assess the psycho-social changes that have been brought about through
the intervention initiated among the youth.

Methods
A baseline study was conducted to assess the situation in Tahipur leprosy
colonies regarding the degree of discrimination, barriers faced by cured individuals
and social stigma attached with the disease and the willingness towards inclusion
of leprosy cured. Further, group discussions with the youth were conducted
to decide on appropriate learning needs and marketable skills needed for
empowerment in their respective environments.
Finally, a social awareness campaign called HEAL India was initiated in the year 2014. One of the interventions was a Capacity building initiative specially for the youth, in the age group of 15-25 years, by The Leprosy Mission Trust India, through a series of training programmes over a span of two years on soft skills, social skills & entrepreneur skills.

Results
The intervention has built 12 young adults from this colony as change agents representing people affected by leprosy in various platforms and spreading awareness on leprosy. This also enabled them to recognize and access different career opportunities of high aspiration levels.

Conclusion:
The intervention was found to be successful to unlock the potential of these young people, increase their capacity as well as gain confidence to face societal challenges. This also enabled them to engage with different sectors such as policy makers, employers and vocational institutions to address the employment/career needs through application of advocacy techniques.

**Keywords:** empowerment, leprosy, youth
ILC2.2-021
Analysis of Individual Survey on the Cured Leprosy Survivor in Hezhou City of Guangxi Province
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Objective Study the living situation and the needs of the cured leprosy survivor and help the government sector to draw up a care and salvation policy with objective and scientific evidences. Methods A field survey to each one of 164 persons is carried out and a questionnaire is re-checked carefully. The leave-outs and the mistakes will be made up and corrected without any delay whenever they are found. Results Among the 164 survivors, there are 121 men (15.9%) with average age of 64.5 and 151 peasants (92.1%); 45 persons (27.4%) are from broken families, 19 persons (11.0%) widowed, 25 persons (25%) incapable, 26 persons (15.9%) unable and 14 persons (8.5%) without guardians. Annual incomes for most of them are under 2000 RMB. 30.5% of them receive the minimum living allowance from local government and 18.9% of them are supported by their families. Meanwhile, 90 persons (54.9%) are handicapped, 101 persons (61.6%) need medical protective shoes and 26 persons (15.9%) demand being treated. Most of them (95.1%) are willing to be treated at the residences instead of the leprosy yard. Conclusion Most of the cured leprosy survivor are the old, the orphans and widows, the incapable, the finance-lacked and the poor. For these reason, more attention should be paid to them and great effort of salvation should also be taken by all levels of government.

Keywords: leprosy, the cured, individual survey
ILC2.2-022
Analysis of alimony subsidy level of people infected by leprosy live in leprosy villages in Guangdong province, China
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Objective To investigate the alimony subsidy level people infected by leprosy live in leprosy villages, provide reference data to government to increase alimony subsidy for people infected by leprosy live in hospitals and villages and cover the basic needs in their daily life. Methods: Use self-made questionnaire to collect information include number of people infected by leprosy, the alimony subsidy level paid by local governments, the alimony subsidy level paid by the Guangdong Provincial Government, the local urban minimum living security. Results A total of 2034 people infected by leprosy live in 63 leprosy villages in Guangdong province; the average alimony subsidy level for each patient was 515.5RMB every month. In order to guarantee the alimony subsidy level reach the local urban minimum living security, another 606,912RMB was needed each year; and 2,183,258.4RMB was needed each year to make the alimony subsidy level reach the average alimony subsidy level of whole province. Conclusion The alimony subsidy level of people infected by leprosy live in leprosy villages was low. Government should take multiple measures to guarantee the basic needs in their daily life.

Keywords: People infected by leprosy, Leprosy village, Alimony subsidy, Cross-sectional study
ILC2.2-023
An analysis of 230 cases of people affected by leprosy control services for the satisfaction of conditions
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Objective: In order to understand the province affected by leprosy satisfaction for the satisfaction of leprosy services, to improve the prevention and treatment of leprosy services. Methods: According to the literature, specially designed questionnaire to investigate 230 leprosy affected persons and medical personnel, who from Haining and Shaoxing, analyzed data collected by questionnaires. Results: There were 178 cases (77.30%) had the attitude of satisfaction in the current leprosy control services, generally 48 cases (20.87%), not satisfied 4 cases (1.74%). In the 12 leprosy control services, patients for anti-leprosy treatment regularity, the quality consulting services to patients, the attitude of health workers, in terms of service and satisfaction could be high. Eliminated leprosy discrimination in the community, detected leprosy close contacts and the rehabilitation and disability sequelae processing services were the most needed leprosy disease control services. Conclusion: The lepers recognized leprosy control services in Zhejiang, but intervention in discrimination, detected leprosy close contacts, disability prevention services, there were still much room for improvement.

Keywords: Leprosy, Prevention services, Satisfaction
ILC2.3–001
Children and Adolescents attitude towards having Leprosy in an High Endemic District of Eastern India
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Objective: To determine attitude towards the leprosy among children and adolescent’s diagnosed with leprosy.

Methods: The sample consisted of 65 subject aged 8 to 18 years registered with a diagnosis of leprosy register at a tertiary referral hospital in eastern India. Attitude towards leprosy was measured using The Child Attitude Towards Illness Scale (CATIS).

Results: A total of 65 subjects were interviewed, comprising of 45 males and 20 females. The overall mean CATIS score of the participants was 3.27, with a range of 1.89 to 4.77, suggesting that the children and adolescents had positive attitudes towards having leprosy. Six (9.2%) participant had mean scores of above 4, thirty-nine (60%) participant had mean score above 3, and twenty (30.8%) participants had mean scores of 3 and below; eight (12.3%) had scores of 2.5 and below.

Conclusion: The results indicate that the children and adolescents had a positive attitude towards having leprosy. However, one-third of children and adolescents experienced internalised stigma. Further research may help guide policy on leprosy treatment allowing targeted approaches to benefit the psychosocial wellbeing of leprosy patients.

Keywords: Childhood, Leprosy, CATIS, Attitude, Self Stigma
LC2.3–002

Stigma in leprosy: concepts, causes and determinants
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Background: Stigma related to chronic disease – such as leprosy – is a serious obstacle to case finding and to the effectiveness of treatment, which are the major concern of disease control programs. To conduct any intervention to address leprosy related stigma, it is essential to understand the social history, current cultural meaning and the ‘world – view’ of the people involved.

Purpose: This literature review was conducted to understand the concept, causes, and determinants of stigma in leprosy.

Method: Electronic searches were undertaken using PubMed (Medline), CINAHL and PsycInfo databases. The internet was searched through Google Scholar for papers not found in these databases. The main inclusion criteria were papers related to stigma or leprosy written in Thai or English.

Results: After searching the databases, 84 papers were identified, 3 were removed because of duplication and parallel publication, and 20 were removed on abstract screening. After reading 61 full papers, 7 were excluded. Finally, 54 were included in this review. It was found that the concept of stigma involves not only characteristics considered undesirable, but also the social context of the individual or group. Reported causes and determinants of stigma related to leprosy are the external manifestations of the disease, cultural and religious beliefs, fear of transmission, association with people considered inferior and public health-related interventions.

Conclusion: Stigma is a complex phenomenon that has multiple causes, often linked to the cultural context in which it occurs. Despite this, many similarities were found in leprosy-related stigma across countries and cultures, which would facilitate the development of interventions.

Keywords: stigma, leprosy, concepts, causes, determinants
ILC2.3-003
Long Term Social Welfare Activities Undertaken by Leprosy Patients Welfare Society (LPWS) with an Aim to Provide Respectable Socio-Economic Rehabilitation to Destitute and Disabled Leprosy Patients

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Introduction: Leprosy Patients Welfare Society (LPWS), a Non-Governmental Organization (NGO), Agra was founded in 1976 and since then, it is working in the field of Mass Awareness and Health Education to help in rehabilitation of the destitute leprosy patients.

The place of work is Kusht Seva Sadan (KSS) in near vicinity of Taj Mahal, Agra. It is one of the oldest leprosarium founded in 1861 and was then known as ‘Leper Asylum’.

Main Objectives of LPWS (working for the last forty years):
- To fulfill the needs of the destitute leprosy patients by providing them free boarding, lodging and other facilities.
- To help the leprosy patients having deformities by correcting their affected organs using reconstructive surgery for their rehabilitation in the society.
- To provide vocational rehabilitation training to the leprosy patients, so that their respectable social and economic rehabilitation could be possible.
- To provide free and relevant counseling to the family members of leprosy patients and community leaders, so that leprosy patients could be accepted by the family members and the society.
- To organize meetings for creating Mass Awareness and giving Health Education regarding leprosy to the persons from different walks of life including young school children to eradicate stigma against leprosy.
Methods: The main important features to fulfill the objectives of our society (LPWS) are:
- To impart basic, relevant scientific informations, which have helped to remove superstitions, fear and stigma against leprosy.
- The ongoing studies have resulted in educating the people having early signs of leprosy and advantages of early treatment to prevent deformities and disabilities.
- The intensified Mass Awareness Programme has resulted in developing confidence among the people affected by Pauci or Multi-Bacillary Leprosy that they are fully curable by using Multi Drug Therapy (MDT).

Results & Conclusions: During the last nearly four decades (40 years), LPWS has significantly contributed to provide respectable social and economic rehabilitation of more than sixty thousands (60,000) destitute leprosy patients, which has resulted in keeping them away from the ugly problem of begging. The detailed aspects of introduction, objectives, methods, results and conclusions of our study will be presented and discussed during 19th International Leprosy Congress, Beijing, 18–21 September, 2016.

Keywords: Rehabilitation, Destitute, Deformities, Disabilities, MDT
ILC2.3–004
Effectiveness of the Orientation Training for Laboratory Technicians in leprosy Skin Smear and Nasal Smear Techniques in central leprosy teaching and research institute, India
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A total number of 155 Laboratory Technicians working in Government of Tamil Nadu, India having the experience of 3 – 25 years in various public health Laboratories of the state were deputed to undergo 2 days orientation training programme on skin smear and nasal smear techniques at Central Leprosy Teaching and Research Institute, Chengalpattu, India in the year 2013–2014. The effectiveness of these training were analyzed and showed that there were strong evidence (p<0.05) of the teaching intervention improves the knowledge of the trainees. On average the level of knowledge improved by approximately.

Keywords: Effectiveness, Lab-technicians, Orientation, Skin Smear & Nasal Smear, Performance good
ILC2.3-006
Self esteem of the adolescents from leprosy affected families
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Objectives: While the broad objective is to assess the level of self esteem of adolescent family members of leprosy cured persons, the specific objectives are to:

a. To assess the level of influence of leprosy on the self esteem of the adolescents.
b. To identify the other influencing factors of self esteem.
c. Establish correlation between the socio-economic, diseases related demographic factors among the adolescents.

Methods: Samples of five hundred adolescents from leprosy cured family have been chosen from thirty four leprosy colonies of Delhi NCT (National Capital Territory). The data was collected directly from the respondents by standardized cultural free scale of self esteem and also about their general details of the respondent and their family members. All the respondents were of either second or third generation of the people those who treated for leprosy and its complications and living in the leprosy colony. An approved scale of self esteem by Heatherton et al (1991) has been chosen to assess the level of self esteem.

Result: This study helped to understand, the various socio-economic factors that contribute to determine the level of self esteem, such as socioeconomic influence of adolescents self esteem, correlation between intellectual, physical appearance and self esteem. Involvement of social development activities made more dominance in their self esteem. Same time it shows the level of self esteem among second and third generation is not similar. Health related practices shows as smoking and alcohol consumption of the parents also influenced the self esteem of the adolescents to a great extent.

Conclusion
The level of self esteem among the adolescents is influenced by leprosy as well as other socio-economic factors, which also needs to be addressed by community as a part of disease control program. This study will helps to develop new need based approach for adolescents’ psycho social development.

Keywords: self esteem, adolescents, leprosy, psychosocial
ILC2.3–007
Innovative strategies to cope with stress patients admitted with recurrent Lepra reactions.
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Objective:
To find effective strategies for coping with the stress of patient admitted in the hospital for treatment of recurrent reaction.

Methodology:
Data is collected through interview, group discussion from the health care staff employed in The Leprosy Mission Hospital, NANDNAGRI Delhi–93, for their opinions regarding the new, effective and innovative strategies which they employ with the patients of recurrent reactions.

All sixteen patients admitted in the IP ward for an average period of two months for treatment of recurrent reaction during 2014–15 have been categorized into 3 groups viz, with moderate depression, severe depression and very severe depression, using Hamilton rating scale. The patients were also interviewed for their perception about effectiveness of different methods.

Result:
Strategies suggested by the staff members and the patients of recurrent reactions include:
1. Involving the patients in group discussion on leprosy and its complication.
2. Involving patients in cultural program held in the hospital during various occasions like world disability day etc.
3. Involving patients in chart making and drawing.
4. Involving the patients in data entry if having computer knowledge.
5. Making patients to watch various movies on leprosy produced by TLM media center.
6. Giving patients the responsibility to act as role models and counselors for the fellow patients.
7. Educating the admitted patients on general health issues like sanitation, clean water and hygiene etc.
8. Giving the patient responsibility on the front desk to interact with new patients who are coming to hospital.
9. Given them the responsibility to teach fellow inpatients read and write if educated.
10. Involving the patients small hospital work like POP rolls making, bandage for dressing.

Apart from regular activities other activities like regular counseling, spiritual talk and encouraging the family members for regular visit to hospital etc. were found to be useful for patient with severe and very severe depression.

Conclusion:
From the study it can be concluded that patient with recurrent reaction and with moderate, severe and very severe depression can be made to cope up the stressing situation with involving them in some activities of the hospital and specially designed programs for them.

Keywords: INNOVATIVE STRATEGIES, STRESS, RECURRENT REACTIONS
ILC2.3–008
Perception and attitude of the admitted chronic ulcer patients towards self-care and leprosy as a disease
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Objective
To find out the perception and attitude of the admitted chronic ulcer patients towards leprosy as disease and self-care as admitted patients also have lots of myths regarding leprosy and are not motivated to do self-care.

Methods:
Data is collected from The leprosy mission hospital shahdara, which is a tertiary care hospital for management of complications related to leprosy in Delhi. Annually around 300 patients admitted annually for the management of plantar ulcers. Total of 40 case studies have been carried out, who were admitted recurrently in the hospital for the treatment of ulcer during the period of Jan 2015 to December 2015. The data was collected through the personal interviews. The main focus of the interviews was to explore the hidden beliefs which were present among the patients.

Results:
The study has brought out the facts about negative and positive perceptions and attitudes of admitted patients, which shows that majority of the admitted patients do not believe in self-care (75%), thinks that in patients admission is necessary for healing of ulcer (95%), 80% of the patients believes that leprosy ulcer will never heal, majority of the admitted chronic ulcer patients have negative thinking regarding the ulcer management.

Conclusion:
Study shows that most of the patients who have chronic deformities seek frequent admission to the hospital and their perception and attitude has effect on other patients as well. Further most of the chronic ulcer patients are not convinced of self-care techniques and thinks that patient admission is necessary for ulcer healing in ulcer management.
This study concludes that perception and attitude of chronic ulcer patients is negative therefore during readmission of the ulcer patients counseling of the patients and family members is deemed necessary.

Keywords: perception, attitude, chronic ulcers, self care
ILC2.3-009
Practical difficulties faced during follow up of defaulters patients registered for MDT in urban clinical set up.
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Objectives:
To determine various problems faced by the health care workers in follow up of leprosy patients who defaulted from MDT in urban clinical set up.

Methodology:
Data was collected through interview with 32 health care workers of five categories viz, physiotherapist (6), counselor (2), leprosy assistants(8), paramedical workers (10) and non-medical supervisor(6) working in TLM community hospital and National Leprosy eradication program Delhi.

Results:
Results show that majority of the leprosy patients who are registering for the treatment give wrong address (93.7%) in order to hide the identity. There are other associated factors as well due to which follow up of the defaulted patients becomes difficult which include wrong identity (93.7%), wrong phone number (90.62%), reluctant to receive calls while in public (37.5%), migration of patients (31.5%), being housewife in joint family (25%), being student living in hostel (18.75%).

Conclusions:
Based on the above findings it can be concluded that many leprosy patients registering for the treatment hide their true identity because of some reason and it becomes difficult in their follow up. It is therefore very important that during the time of registration the identity of the patient should be verified and the registration may be done through documents such as voter cards or adahar cards etc.

Keywords: practical difficulties, follow up
ILC2.3–010
Assessment of Stigma As Perceived By the Persons Affected By Leprosy (PAL) from rural areas of Maharashtra State (India) – A Comparative Study of PALs With and Without Visible Disability.
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Objectives:
Leprosy is known for its lifelong social and psychological consequences on the life of people affected due to stigma and discrimination. A cross sectional study is aimed to examine and identify the cause for the self perception of stigma by PALs in terms of social interactions and participation with family and society.

Methods:
The study was conducted during 2015 in 6 endemic districts of Maharashtra under Leprosy Elimination Action Programme supported by Anesvad Foundation. Data was collected through interview of 545 PALs selected through stratified sampling method and using a pre–determined interview schedule. 48% PALs have Grade 2 disabilities (G2D) of which 38% were female. The stigma related to leprosy inhibiting the sharing of information about diagnosis and self stigmatization restricting participation by PALs were assessed. The data was analysed through comparison between PALs with grade 0 disability (G0D) and G2D.

Results:
Overall, 10% of PALs did not inform the diagnosis of leprosy to their family members and 27% PALs even to their spouse. Of the PALs who concealed diagnosis from their spouses, 21% PALs with G2D and 31% PALs with G0D. Similarly of the total respondents, 42% of PALs did not inform the diagnosis to their relatives, friends and neighbours, which is significantly higher as compared to that of the family members. 35% of PALs with G2D and 48% of PALs with G0D did not share information with their relatives outside family.
72% of PALs with G2D participated in family functions as against 88% PALs with G’0’D. However, a significant number (79%) of PALs with G’0’D participated in social functions. Almost 50% of PALs with G2D felt that community consider them inferior to normal citizen, while only 33% of PALs with G’0’D expressed the same. As regards self esteem, 73% PALs with G2D have expressed ‘guilt’ on account of fear of negative public response as against 43% among PALs with G’0’D.

Conclusions:
The study confirms the fact that most of the PALs act out of fear based on the self perceived social stigma. The PALs with G’0’D are more inclined to hide their disease unlike PALs with G2D. It is revealed that the self perception and fear about the traditional rejection and prevalent knowledge of social ostracism further impacts self stigmatization. Hence there is a need for individual counselling supported by social interaction forums resulting in collective assertion to minimize and overcome self stigmatization of PALs.

**Keywords:** Leprosy, Participation, Perception, Stigmatization, Counselling
ILC2.3–011
Disability Profile and Gender Issues in Female Leprosy Patients at Diagnosis in a Referral Hospital in Northern India
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Objectives: To determine the disability profile and women related issues of delay in treatment among newly registered female leprosy patients attending a referral hospital for leprosy in Northern India.

Methodology: The study was carried out at The Leprosy Mission Hospital, Naini, Allahabad, Uttar Pradesh, India. All new female leprosy patients registered for treatment during the period between 2012 and 2014 were included in the study. All those registered for treatment at this hospital routinely undergo body charting, slit–skin smear and nerve function assessment. The disability profile of each patient was established based on nerve function assessment done at the time of diagnosis and start of anti–leprosy treatment. The details on demographic, clinical and disability were extracted from electronic records of each patient. The qualitative research methods were used to explore the women related issues in delay in treatment. Focus group discussion (FGD) and in–depth interview were conducted in Hindi language and the transcript of the FGD and interview were translated to English for analysis and reporting.

Results: There were a total of 4120 new patients registered (never treated before) during the study period and among them 1368 (33.2%) were female. Proportion of female child case (< 14 years) was 8.2%. The proportion of Grade II disability among women at the time of diagnosis was 19.9%. Overall 36.3% of patients had grade I or II disability at the time of diagnosis. The claw hand was most commonly observed deformity followed by foot–drop and leghphthalinos. The most common issues mentioned by patients in seeking treatment are dependence on male person to reach hospital, family responsibilities and economic constraints.

Conclusions: The proportion of disability among female patients observed in this hospital (19.9%) is higher than the national average during the corresponding period (4.05%) for both male and female. Female patients face wide range of issues in seeking treatment for leprosy and its complications and they include dependence on male to access health facility, economic constraints and family responsibilities which prevents them from seeking treatment. Despite free treatment available female patients face difficulty in accessing treatment. To make the leprosy program successful it is necessary to address issues related to women in seeking treatment for leprosy and its complications.

Keywords:Leprosy, Women, Grade 2 disabilities, India, Participation
Developing An Effective Social Multi-Drug Therapy To Counteract Leprosy Stigma: Urgent Need of The Hour
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Objectives: Despite best knowledge, expertise, therapies, and surgical and physiotherapeutic skills to virtually cure and eradicate the disease, continuing high levels of stigma pose insurmountable obstacles either in early case detections or eradication. Therefore, research was carried out to develop strong multifaceted approaches that will permeate psychological, social, and mental layers of the human mind and result in necessary health-seeking behaviors.

Methods: A systematic review of recent literature on leprosy stigma was first done before embarking on a prospective multicentric study during 2005–12 in 3 states of India, called the community-based action research for eliminating leprosy stigma. In partnership and consultation with community leaders, a stigma-reduction organizing committee was formed in each main village as a first step. Through which, a number of research activities were systematically planned, several involving persons affected by leprosy. An Indian Council of Medical Research multicentric study in 3 states of India was done during 2007–10 on challenges and solutions to early voluntary reporting of leprosy. Studies included epidemiological, retrospective and prospective observational cohort studies, school surveys and randomized double blind field trials. Further, several qualitative research were done which included key informant interviews, focus group discussions of men, women, affected persons, communities and health professionals. Case studies were also compiled. Insights from the Indian Government NLEP midterm evaluation are also used.
Results: Detailed analyses of delay in reporting were done in terms of several demographic, social and medical factors, and barriers/constraints for early detection and reporting identified. Possible solutions to the problems were formulated from focus group discussions and in-depth interviews. Overall results indicate that what then is needed is a “social multi-pronged therapy” similar to the medical multidrug therapy, with 3 major arms: one arm for curing the medical problems of leprosy, a second arm focusing on empowering the people, especially affected persons, through appropriate education, awareness, especially for early detection and treatment, encouraging positive attitudes and perceptions, and a third arm for advocacy, deleting discriminatory laws, enabling opportunities for persons with leprosy disabilities to be profitably employed, and providing necessary rehabilitation facilities. A conceptual framework and details are provided to facilitate this approach.

Conclusions: National leprosy programs have been top-down bureaucratic undertakings, spending enormous amounts of money but with little participation by the community. Only a Multipronged attack, otherwise termed as a Social MDT, seems a viable proposition if done through community-based participatory approaches to reach our goals.

Keywords: Leprosy Stigma, Social, MDT, India
ILC2.3-013
The Impact of Erythema Nodosum Leprosum on Health Related Quality of Life in Cebu, Philippines - an ENLIST Group Study
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Erythema nodosum leprosum (ENL) is a severe, painful multisystem complication of lepromatous leprosy. The inflammatory state of ENL causes significant morbidity, economic hardship and occasionally death.
Objective: To determine the impact of ENL on health related quality of life (HRQoL) using the Medical Outcomes Study: 36-Item Short Form Survey (SF-36)

Methods: Individuals with leprosy at the Leonard Wood Memorial Center for Leprosy Research, Cebu, Philippines were invited to complete the English version of the SF-36. Patients were classified into four groups: ENL, Type 1 reaction (T1R), neuritis only or no leprosy reaction. The responses to the items were coded, summed and transformed into a scale for each of the eight domains. A lower score reflects a worse HRQoL compared to a higher one.
The differences among the groups were analysed using analysis of variance. Differences between pairs of groups were tested post hoc using Scheffé’s method.
Results: Sixty-four individuals with a median age of 28 years (Range 15–73) were recruited. Seventeen (26.6%) were female. Four (6.3%) had borderline tuberculoid leprosy, 28 (43.8%) borderline lepromatous leprosy and 32 (50%) lepromatous leprosy. Seventeen had ENL (26.6%), 24 (37.5%) T1R, five (7.8%) neuritis only and 18 (28.1%) no reaction.

Patients with ENL had the lowest mean scores in five domains. However there was no statistical difference between the mean scores of the four groups for seven domains – Physical functioning, Role functioning/physical, Role functioning/emotional, Energy/fatigue, Emotional well-being, Pain and General health. In the Social functioning domain though patients with ENL had significantly lower mean scores than those with T1R and no leprosy reaction. The mean scores for ENL patients were 64.1 ± 32.3 compared to 80.5 ± 21.2 and 79.3 ± 19.7 respectively.

Conclusions: This small study demonstrates a negative impact of ENL on HRQoL. We showed reduced scores in patients with ENL in five domains and this was significant in social functioning. This reduction in social functioning is in keeping with the symptoms of ENL which include pain, lethargy and visible changes of the skin.

This study is limited by size, lacked matched controls and used an instrument which was not validated. The SF–36 is a general tool and may not reflect specific aspects of ENL and leprosy which may have an important bearing on HRQoL. Larger studies of the HRQoL of people affected by leprosy are needed, conducted with the best possible tools. A new validation tool may be needed.

**Keywords:** Erythema nodosum leprosum, health related quality of life, survey
ILC2.3-014
Behaviour Change Communication in Leprosy - Understanding the Needs of Indigenous Population
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Objectives
Behaviour Change Communication modifies behaviour. To explore the creation of a BCC strategy for the National Leprosy Eradication Programme (NLEP), rooted in scientific and tested communication methodologies keeping in view the cultural context of operation along with suitable tools instead of a standard approach which is adopted.

Methods
The author mentions two examples witnessed by him in the field. Taking the examples of visits to Malbhoom inhabited by the Thakkar Adivasis and Bastar where the Raj Gonds live, the author writes about the myths and the traditional belief system of the tribal population regarding measles and leprosy. For the Gonds leprosy is a curse and treatment is not taken for a curse. So was it for the Thakkar Adivasis when their children suffered measles and fever. They too believed that it was a curse and the goddess was angry and did not want any medical intervention or vaccination for their children. However since they believed in the bhagat (a person who practiced witchcraft) a person who accompanied the author indulged in this and there was an hour of drama, mantras and mesmeric scenes including women acting as though they are possessed. The tribal belief systems have a deep connect with the environment. In the case of the woman affected by leprosy, she said it was a curse which was due to her grandmother’s dislike for frogs and harming frogs in Gond society was sinful. A witch doctor had to be brought to explain to her that treatment for leprosy was crucial in an additional way to placate evil forces.

Results: After witnessing the drama of the Bhagat, the villagers at Malbhoom were convinced and the medication and vaccination was given. The blend of methods used in both the cases without ignoring or brushing aside their traditional beliefs helped in behavior change communication.

Conclusion: Various methods like song, drama, dance and stories are far more effective. Also positive messaging works. So, the leprosy programmes strategy for BCC should keep in mind the cultural context and traditional wisdom besides being rooted in scientific and tested communication methods instead of being a standard one.
ILC2.3-015
Reduction of Grade 2 disabilities among untreated child leprosy cases to zero – challenges and steps needed based on a critical analyses of late registrations seen at a Leprosy Referral Centre in We
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Introduction and objective- Disabilities among children are particularly tragic and preventable. The children who report with Gr 2 disabilities have obviously delayed due to multiple medical and social reasons, but new GR 2 disabilities while on MDT or after completion needs explanation, The recent operational guidelines of the WHO emphasizes the need for reducing grade 2 disabilities among children to zero. However, mere slogans and routine health awareness campaigns will not achieve the target as seen from the experiences at a leprosy referral center in West Bengal, India during 2013–15. The objective of this study to analyse the children who reported late to find possible reasons and find solutions to report early.

Methods – Of 1940 new active cases of leprosy reporting at the hospital, 320(16.5%) were children aged 15 or younger. Of these, 21 children(6.6%) reported with grade 2 deformity (G2D). Descriptive statistical analyses, a case-control study and an indepth qualitative study was conducted.

Results – A significant number were contacts of untreated or treated leprosy index cases. Further, casual attitudes of parents, private practitioners and teachers in ignoring the early signs and symptoms or misdiagnosing them have led to delays till visible disabilities occurred. Poverty and illiteracy were not really the major constraints and it seems the gravity of delay resulting in irreversible disabilities has not yet seriously considered, compounding the prevailing high stigma.
Conclusion - Urgent field research is badly needed on possible inadequacies of the current MDT, the general lack of supplies of child MDT blister packs, and a study of a variety of factors such as anthropometry, co-morbidity, or even silent neuritis. Identification of high risk groups for development of grade 2 disabilities and suitable therapeutic or prophylactic measures will help in reduction of this problem and enhance the community’s faith in MDT. Better communication, and use of modern technology in persuading the families to report early needs to be tested urgently. It is amazing that the gradual development of disabilities have been missed by the teachers and care-givers. It is time that we revive school surveys and not simply pay lip service. At the same time, the stigma reduction programmes and more awareness building exercises should continue using community-based participatory approaches. Constant supply of child blister packs must be ensured and continuing education of doctors and other health professionals a priority.

Keywords: disability, child, leprosy
ICLC2.3-016
Parental attitudes and their influence on the management of leprosy affected children
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Introduction: Children presenting late, with stigmatizing deformity, indicates inadequate early case detection activities as well as reluctance or inability on the part of their parents to come forward to access the health system. A child with leprosy disability may have anxiety, fear, shame or other negative feelings which reflect how the child has been treated by others especially the family. The chronicity of the problems and long duration of treatment leads to stress among parent caregiver. Parental attitude is an important area to search for improved services to families of leprosy affected children. Also, parental attitudes play a major role in the treatment and diagnosis of the sick child. The objective of the present study is to assess the attitudes of parents of leprosy affected children in rural areas of eastern India towards leprosy.

Methodology: Parents of leprosy affected children aged 8 to 18 parents were interviewed with a semi-structured questionnaire which included socio-economic details, knowledge and attitude towards disease, implications of disability in the child’s future and coping mechanism by the family. Parental attitude was measured by 17 items of Likert scale in local language.

Results: A total of 100 subjects were interviewed, comprising of parents of 60 male and 40 female Children affected by leprosy. Of them 67% were MB, 13 had grade II disability. Of the 100 children, 15 children had discontinued their education, 33% fathers were farmers and 43% were daily labourers. The annual family income was from 18000–25000 for 18 subjects and 26000 to 50000 for 77, and the rest had income above 50000. 71% parents expressed fear, and 29% felt hopeless and sad about their child. Fifty-eight (97%) parents had positive attitude towards their child’s disease and their mean score 0.5 to 1.5, whereas 3% parents had negative attitude towards their child’s disease.

Conclusion: Improving parental attitude towards leprosy and accessing appropriate health care will go a long way in early reporting, contact tracing and improving compliance. There is a need for parental counseling along with leprosy control activities even in areas where, statistically, it has been eliminated.

Keywords: leprosy, child, parent, stigma
ILC2.3-017
A participatory, translational, social science pilot study to inform earlier detection and reduced transmission
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Objectives. The objective of this pilot study was to explore the use of a participatory, social science methodology to identify factors leading to delayed diagnosis of leprosy.

Methods. The study employed a number of rounds of qualitative data gathering, culminating in research translation. In-depth interviews were conducted in Chhattisgarh, India, with 39 people affected by leprosy and family members. They were conducted by “research partners” who were local people affected by leprosy, trained in interview techniques. Interviews focused on perceived reasons for delayed diagnosis. These reasons were then considered by other groups of participants in reflection and discussion groups, who were asked to suggest potential solutions or responses. Perceived reasons and potential solutions were then presented to key NGO and government stakeholders in translation workshops, to identify priorities for future action.

Results. Findings of each stage of the research are outlined, namely: o tallies of perceived reasons identified at interviews, o a thematic summary of key issues arising from reflection and discussion groups, and o a prioritisation (ranking) based on the feedback from NGO and government participants in the translation workshops.

Conclusion. Priorities for action, based on the perceptions of participants are noted. It is clear that factors that lead to delayed diagnosis (and by extension factors that will facilitate earlier detection and reduced transmission) are highly complex. The extent of factors identified suggests that studies which fail to take into account this complexity of factors are unlikely to be meaningfully translated into practice in endemic contexts. Elements and outcomes of the participatory, social science approach are also noted.

Keywords: delayed diagnosis, translation, participatory methods
ILC2.3-018
From an uneducated boy to a chief prosthesis technician – A Case Study of Participation and Empowerment
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Objectives:
Leprosy is a disease not only affecting people’s physical functions, but also causes mental, social and economic problems. To address the issue of leprosy, curing of disease and prevention of disability is not enough, but to change the social attitude and to help the people to rebuild their self-confidence and social connection and finally reintegrate into society.
This research is trying to explore the possible approach to help the people affected by leprosy to regain their self-value, self-cognition, self-confidence and reintegrate into society by a case study on a person affected by leprosy in Guangdong China.

Method:
The research applies qualitative research method, using participatory observation/in-depth case study analysis and in-depth interview to collect relevant information about the personal history of a person affected by leprosy, the change he has made and the impact he brought to the others in the past 15 years.
Result:
Mr. Yahua Yuan was diagnosed with leprosy when he was ten. Being afraid of being forced to leave the village, his parents hid him in an old house. He spent about one year in a dark room like a caged bird. Unfortunately, disability occurred on his hand and feet, and his father finally sent him to Suixi leprosy hospital. He spent more than 5 years in leprosy hospital, even after he was cured and spent most of his young age in an isolated situation lost his opportunity to go to school. It was not until 1998 when HANDA (An organization of the people affected by leprosy) went to his hospital, he dared not to go out and was afraid to communicate with outside people.
With the encouragement and opportunity provided by HANDA, he went to work in a shoe factory to learn shoe making skill. Then he participated in HANDA foot care team and finally was trained become a prosthesis technician. He is the chief-technician now in charge of HANDA prosthesis workshop and even was recognized by the government as outstanding warmhearted person for his great service to other people affected by leprosy in 2014. He is now a fully respected technician and has a happy family.

Conclusion:
Empower people with opportunities is an effective approach to rebuild a person’s self-confidence and reintegrate into society. It is also an important approach to reduce social stigma and change the social attitude to the people affected by leprosy.

**Keywords:** Empowerment, Participation, Social integration, Case Study
ILC2.3-019
From isolation to social integration—the impact of empowerment in leprosy rehabilitation service
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Objective
Though people affected by leprosy have been cured, the leprosy villages where they live have isolated people from the general community. The disease is curable, however the discrimination, injustices, and prejudice towards the people affected by the disease still exists, as a result, people affected by leprosy have lost their self-confidence. They shut them off from any social activities.
This article focuses on the analysis of the process of leprosy rehabilitation and empowerment activities that provided by HANDA Rehabilitation & Welfare Association, a people’s organization (hereinafter referred as HANDA), to see how the role of empowerment and participation of people affected by leprosy could lead to social integration.

Research methods
The research applies qualitative research method, using tracing and participatory approaches to analysis the thirteen years work of HANDA in leprosy rehabilitation field, and taking one leprosy village as a case for the research. Through generalization, summarization, comparative analyses and typical case studies on the original material collected by interview, observation and data studies.
Result:
Xinsha Leprosy Village is located on a small island which was setup in 1960s to isolated leprosy patients. It showed isolated characteristics of the life-world before HANDA intervention which led to a larger social problem: the villager’s life-world being full of incompetent and meaningless, and there is serious discrimination from outside community. Since 2000, HANDA started to carry out rehabilitation and empower activity in the village, including physical rehabilitation, community-based integrated activities, rights and resource-based social services. The life-world of the people in Xinsha now is rebuild and the community is integrated into society. This positive transfer reveals the significant role of empowerment and participation of people affected by leprosy to realize social integration.
Firstly, physical empowering help the people to identify their self-values and to rebuild their self-confidence. Secondly, participate in the community development help the people to increase their capability and management skills. Lastly, participating in social activities proves to be effective way to promote the communication and interaction between people affected by leprosy and outside.

Conclusion:
The research comes to the conclusion that by empowering people affected by leprosy to join in the leprosy rehabilitation services helps to rebuild the connection between leprosy village and outside. Breaking the isolation from people affected by leprosy themselves, leprosy villages and the society which would eventually contribute to the real social integration.

Keywords: Social Integration, Empowerment, Participation, Discrimination, Isolation
ILC2.3-020
Social Enterprise—A Way of Social Integration
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Objective:
Isolation, discrimination and poverty are the main barriers for the people affected by leprosy to integrate into society. The poor situation in turn lowers their self-confidence and self-image which is counterproductive to social integration. To address these problems, HANDA Rehabilitation and Welfare Association (HANDA), a people’s organization tried to develop a social enterprise in Maowangdong village in Yunnan province, enabling people affected by leprosy to establish a viable business model which will both enable social change and enable financial viability.

This research is to explore if a “livelihood development” social enterprise could help the people affected by leprosy to gain their self-confidence and ability required to integrate into society as well as to improve their economic situation.

Method:
Qualitative research oriented methodology will be applied in a way of conducting case study, observation, group interviews to analyze and verify the effective role of promoting the social integration of people affected by leprosy by running social enterprise.
Result:
Maowangdong village is a remote leprosy village in a mountainous area with full of flowers. After exploration and discussion with the villagers, honey was selected as starting product for the social enterprise. Through the engagement of people affected by leprosy and the provision of technical skills training/study tours and business capacity building trainings to improve their skills in bee keeping and management knowledge of social enterprise. People have high enthusiasm in learning, participating and managing in all aspects of social enterprise activities. Evidences showed that even though the economic situation has not been significant improved after one year of the project, people have increased self-confidence to communicate and market their products with general communities and reintegrate into society. A strengthening of female participation in the social enterprise activities has been also observed. Female villagers are blossoming in their role, demonstrating self-confidence, and proud to demonstrate their new skills.

Conclusion:
Poverty is one of the main obstacles that hinder people affected by leprosy to integrate into society. The social enterprise will enable the leprosy communities to generate income and also increase confidence, and contribute to achieving increased social and economic independency. The development of social enterprise will not only enable sustained financial viability of the isolated community, but greatly promote the social integration through social engagement and improving of self-confidence and esteem.

Keywords: **Social Enterprise, Social Integration, Economic Rehabilitation, Capacity Building, Livelihood**
ILC2.3–021
Level of Perceived stigma and its psycho-social implications among leprosy affected individuals living in rural communities of Western Maharashtra
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INTRODUCTION & OBJECTIVES:
One of the most important dermatologic diseases from the sociologic viewpoint has been leprosy. Those with leprosy were isolated, excluded from society, and stigmatized. Leprosy has been seen as the epitome of stigmatization. The psychosocial impact a person has to bear in a society after the diagnosis weighs heavier than the physical afflictions it causes, which does not get cured with the mere medical treatment. There are various factors which construct the perception of stigma in both leprosy affected persons and unaffected persons. The main purpose of this study was to determine the level of perceived stigma and the risk factors contributing to it among leprosy affected people, being treated in Kothara Community Hospital, Kothara, India.

METHODOLOGY:
Cross-sectional descriptive study was conducted among 191 leprosy affected people above the age of 18 years who consented to participate in the study and have been living with leprosy for >1 year. Two sets of questionnaire form with additional Explanatory Model Interview Catalogue (EMIC) for each individual were used.

RESULTS:
Among the 191 leprosy affected people, the median score of perceived stigma was 14. Women had the highest perceived stigma score of 15 and above compared to men. Ethnic groups such as Dalits, few minorities and tribals had higher perceived stigma score of 16 and above compared to the rest. People who lived farther away from the hospital, had low level of information about leprosy and overall low level of education had a higher perceived stigma score. Interestingly more number of men felt the need to keep their diagnosis a secret, where able to successfully hide it from their spouses, family and friends and hence may have felt a lower level of disruption in their lives.

CONCLUSIONS:
Stigma in leprosy was found highly associated with the lack of information about leprosy and their perception in treatment and disease severity. Female gender was found to be a significantly associated with increased stigma and marginalization. Stigma reduction strategies should focus on health education, targeting to alleviate their perception about the disease with their active participation and improving the overall standing of women in society.

Keywords: stigma, psycho-social impact, leprosy
ILC2.3–022
Cultural validation of a new leprosy–related stigma measurement: SARI Stigma Scale
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Background: The Stigma Assessment Reduction Impact (SARI) project adapted the Berger scale to assess leprosy–related stigma. This widely used Berger scale was designed to measure the perception of stigma among people who living with HIV. This paper presents the process of the cross-cultural validation of an shorthened Berger scale instrument that was potentially suitable in Cirebon District, Indonesia.

Methods: The Berger Scale measures different aspects like experienced, internalized and perceived stigma. Study shortened scale into 22 items by omitted too HIV related items and explores the conceptual, item, semantic, operational and measurement equivalence. The process included a qualitative exploratory study, translation and back-translation of the scale, training of interviewers and a pilot, followed by the main data collection. To achieve adequate power a sample of 154 people affected by leprosy with 60 repeated measures was needed. They were selected through convenience sampling.
Results: The Berger Scale showed good or acceptable conceptual, item and semantic equivalences but insufficient operational equivalence since the respondents found it difficult to respond to statements. Major adjustments in the format were necessary and we decided to change the name to SARI Stigma Scale (SSS). The measurement equivalence of the adapted scale showed good internal consistency with a Cronbach’s alpha for the whole scale of 0.88 and between 0.79 - 0.82 for sub-scales; no floor or ceiling effects in total score; good reliability with a Kappa score 0.75. Inter class correlation (ICC) test of the SSS shows the individual agreement is 0.75 (SD 0.64 – 0.83) and the average agreement is 0.86 (SD 0.78 – 0.90), and good interpretability.

Conclusion: The SARI Stigma Scale is a comprehensive, reliable and valid scale to assess different aspects of stigma among persons affected by leprosy in Cirebon District. Further research is needed to investigate whether this instrument is valid in other settings and cultures.

Keywords: Leprosy, cultural validation, stigma, Cirebon Indonesia, measurement
ILC2.3-023
The Impact of Erythema Nodosum Leprosum and Nerve Function Impairment on Health Related Quality of Life in Purulia, West Bengal, India – an ENLIST Group study,
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Erythema nodosum leprosum (ENL) is a severe, painful multisystem complication of lepromatous leprosy. The inflammatory state of ENL causes significant morbidity, economic hardship and occasionally death.

Objectives
To determine the impact of ENL on health related quality of life (HRQoL) using the Medical Outcomes Study: 36-Item Short Form Survey (SF-36)

Methods
Individuals with a diagnosis of leprosy attending the The Leprosy Mission Hospital, Purulia, India were invited to complete the Bengali version of the SF-36. Patients with leprosy were classified into four groups: ENL, Type 1 reaction (T1R), nerve function impairment (NFI) or no leprosy reaction/NFI. The responses to the items of the surveys were coded, summed and transformed into a scale for each of the eight domains. A lower score reflects a worse HRQoL compared to a higher one. The differences among the groups were analysed using analysis of variance. Differences between pairs of groups were tested post hoc using Scheffé’s method.
Results
290 individuals with a median age of 32 years (Range 14–82) were recruited. One hundred and six (36.6%) were female. Three (1.0%) had tuberculoid leprosy, 191 (65.9%) had borderline tuberculoid, one (0.3%) borderline borderline, 51 (17.6%) borderline lepromatous and 41 (14.1%) lepromatous leprosy. Three individuals (1.0%) had pure neural leprosy. Forty-four had ENL (15.2%), 39 (13.4%) T1R, 94 (32.4%) NFI and 113 (39.0%) no reaction/NFI. Individuals with ENL or NFI had the lowest mean scores in all domains. Compared with individuals with no reaction/NFI those with ENL and NFI had significantly lower scores in three and five domains respectively. The only domain in which no statistical difference was demonstrated was physical functioning.

Conclusions
This study demonstrates a significant negative impact of ENL and leprosy associated NFI on HRQoL. We showed significantly reduced scores in patients with ENL or NFI in all but one of the eight domains compared to individuals who had no evidence of reaction/NFI.
This study is limited by the size of the ENL and T1R groups and lack of matched controls. The SF–36 is a general tool and may not reflect specific aspects of ENL and leprosy which may have an important bearing on HRQoL. Larger studies of the HRQoL of people affected by leprosy are needed, conducted with the best possible tools. New instruments may need to be developed.

Keywords: ENL, Quality of life, leprosy
ILC2.3-024
Impact of Micro Credit System on quality of life of Leprosy Affected Members of Self Help Groups in Maharashtra, India,
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Author: Shirish David Shegaonkar Sr. Programme Manager, CHANGED Project, Miraj, TLMTI
Title: Impact of Micro Credit System on quality of life of Leprosy Affected Members of Self Help Groups in Maharashtra, India.

Objectives:
1. To study the impact of Micro Credit System on the Quality of life of Leprosy affected people who are the members of Self Help Groups implemented
2. To find out the problems of discrimination and stigma and social acceptance of Leprosy affected people.
3. To assess the Quality of Life of the respondents.
4. To know the level of participation of the leprosy affected in society.
5. To know the relation between Quality of Life and Participation of Leprosy affected people.
6. To know the different factors affecting Quality of Life and Participation.
Methodology
The study was conducted over a total sample of 143 members, selected from 64 Self Help Groups, implemented under the CBR Programme of The Leprosy Mission Trust India in the Sangli District of Maharashtra state in India. For the purpose of collecting relevant information from the people under the study, interview schedule was formulated and the researchers carried out the process of data collection. The Interview Schedule includes various aspects viz Personal Data, Family Data, Economic Data, details of Living Conditions and Clinical Status, Self Help Group Activities, Impact of Micro Credit System, Participation and Quality of Life etc.

Results
The study shows that Micro Credit system has helped the respondents to strengthen their financial conditions and they can become more stable financially & increase their social status.
The study shows that the Micro Credit System of Self Help Group had very good impact on the mobility of the respondents and Self Help Groups has brought changes in the lives of persons affected by leprosy to improve their quality of life.

Conclusion
The Micro-credit is an effective instrument of socio-economic changes for the leprosy affected people those who have gone under The Leprosy Mission CBR programme.

Keywords: Micro Finance, Leprosy, Quality of Life, CBR, Self Help Group
ILC2.3-025
Assessment of physical and Socio - Economic Needs of People Affected by Leprosy in Kanchanaburi province, Thailand
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This qualitative research was conducted to investigate the problems and needs of people affected by leprosy in terms of physical and socio-economic aspects. The studied subjects were 1) 25 people affected by leprosy who had activity limitation, social participation and perceived stigma 2) key informants including the relatives of people affected by leprosy and health workers of the sub-district health promotion hospital. Data collection and analysis were performed by in-depth interview and content analysis respectively. Personal information of the studied subjects were presented in the form of percentage and absolute number.

Overall results revealed that there were 3 different groups of people affected by leprosy namely 1) the first group of 11 people whose needs have to be satisfied by urgent care 2) the second group of 8 people whose needs could be satisfied by normal care system 3) the third group of 6 people who did not have any needs. The groups with urgent needs had severe problems in terms of eye, hand and foot impairments. Some cases were suffering from smelly chronic ulcers with cancer prone. Most of them were depressed because they could not economically contribute to their families.

The common problems among people affected by leprosy involved physical and mental health, and socio-economic aspects. The most crucial needs were physical rehabilitation followed by mental and occupational rehabilitation. However, in the perception of people affected by leprosy, their most important needs is income generation.

Even though Thailand already formulated a policy to support people with disability but people with leprosy-related disability are less likely to access rehabilitation service. Any sectors involving in providing care to people affected by leprosy, therefore, should transfer the policy into practice by conducting assessing surveys of disability, socio-economic and needs of people affected in order to provide more effective rehabilitation service accordingly. Counseling should be also provided to those who are under depression. Disseminating leprosy knowledge to community and health workers in endemic area is also required in order to reduce leprosy-related stigma.

Keywords: Need assessment, People Affected by Leprosy, Stigma, Discrimination
ILC2.3-026
IMPACT OF TRANSFORMING AN EXCLUSIVE LEPROSY HOSPITAL INTO A LEPROSY FOCUSED COMMUNITY (GENERAL) HOSPITAL
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Objective:
To understand the Perception, Attitude and Satisfaction of leprosy as well as non leprosy patients towards receiving medical services from an erstwhile leprosy hospital now transformed into a Community (General) Hospital.

Methodology:
The data was collected from about 500 patients (stake holders) on the basis of their experience using in-depth interview method. The sample comprised of persons affected by leprosy and non leprosy patients attending the OPD and those admitted for in-patient services at the hospital.

Results:
The paper explains the overall response of the patients of OPD and in-patients with regard to their perception, attitude and satisfaction towards transformation of the hospital into a general hospital and the medical services provided to them. The transformation of the leprosy hospital into a community hospital provides the evidence for success of achieving the integration of leprosy and general health services under one roof.

Conclusion:
This transformation has been found to be very beneficial for the general patients internals of developing a better perception about leprosy disease and positive attitude towards receiving treatment along with leprosy patients and great satisfaction for the leprosy patients for receiving both leprosy and non leprosy related services under the same roof, by one visit. It is a great satisfaction for the programmers and the service providing staff also to see both leprosy and non leprosy patients helping each other and enjoying the perfect harmonious atmosphere at this transformed Community Hospital.

Keywords: perception, attitude, leprosy focussed, general patients
ILC2.3–027
REBUILDING THE LIVES OF PEOPLE AFFECTED WITH LEPROSY IN A COLLABORATIVE APPROACH
– AN EXPERIENCE
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Introduction & Objective
Brighter Future Development Trust (BFDT) is a non-denominational social organization committed to support the affected persons to relieve the distress and poverty caused by leprosy. Founded in 2004, the trust is operational in two states of India namely Andhra Pradesh & Odisha. It works in close collaboration with The Leprosy Mission England & Wales, The Leprosy Mission Trust India (TLMl) and other agencies. The objective of this paper is to present the facilities provided to the persons affected with leprosy in 4 districts of Andhra Pradesh by various means.

Methods
It is retrospective analysis of the projects activities for a period of 10 years from 2005–2015.

Results
The trust is committed to fulfill the two out of three daily essential needs i.e., Food and shelter and health issues of affected persons in leprosy colonies during study period. In order to achieve the same it is providing nutritional food packets on a monthly basis to 60 aged and differently abled persons, houses were built for 97 families where 497 persons living. Simultaneously 9 community bore wells and 60 public water connections were provided in 7 colonies through an advocacy project. In another project the district collector of Srikakulam provided the govt. building to run the medical unit.
Developed linkages with respective public and private departments to provide customized footwear with micro cellular rubber (MCR) insole and other assistive devices as required to the needy. A total of 322 cases have undergone cataract surgeries and the vision is restored in 99% of them. A livelihood project was created 60 self help groups (SHGs) where 1091 persons are taking active part. The main activities of these groups are protection of their rights, developing a habit of small scale savings to meet the incidental expenses of tomorrow and improving their physical condition by observing daily self-care practices. A loan repayment project provided small amount of capital fund ranged from 5000 - 15000 INR depending up on the trade to 1764 persons with female preponderance of 65% to uplift their economical status. A total amount of 176, 15,500INR dispensed in this project and 108, 64, 680 INR repaid (62%) rest of funds are revolving in the community. The detailed activities and number of beneficiaries yearwise will be presented during the conference.

Conclusion
A well-structured and implemented projects paved way to restore the lives of persons affected with leprosy.

Keywords: leprosy, colonies, SHGs, loan repayment, PAL
ILC2.3–028
Development and Validation of a Questionnaire to measure attitudes of health care providers towards leprosy
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Objective: Health care provider’s (HCP) beliefs and attitudes play an important role in leprosy care. While positive attitudes enhance care seeking and care delivery, negative or stigmatizing attitudes may seriously affect quality of service delivery, thereby impairing health of persons with leprosy. Leprosy care in India has been integrated into the general health care system, wherein leprosy patients may not always be managed by leprosy specialists; we sought to develop and validate a culturally appropriate questionnaire to measure attitudes of HCPs towards persons affected by leprosy.
Methods: The Affective, Behavioural and Cognitive (ABC) model of attitudes guided the development of items which unfolded in 4-stages. Stage-1 Qualitative semi-structured interviews and focus group discussions were conducted with doctors, paramedical staff (health inspectors, village health nurses) and leprosy affected persons from 2-high prevalence districts in Tamil Nadu, India, to explore these 3-components of attitude. Till data saturation was reached, a total of 10-doctors, 20-paramedical staffs and 5-leprosy patients were interviewed with their consent. Information generated through the qualitative process informed the development of items for the draft questionnaire. Stage-2 Simultaneously, review of existing attitude assessment questionnaires in related areas was done which resulted in validating items generated through the qualitative process. Stage-3 Face and content validity was obtained by getting doctors and paramedical staff working in leprosy to review the items and determine its relevance and applicability. Thurston’s scaling method was followed for selection of the final set of items from a pool of 38. Eleven experts rated each item on a scale of 1-11 in terms of whether it was favourable or unfavourable towards the construct being measured namely; attitude towards leprosy. Stage-4 Reliability assessment is on progress.

Results: Face and content validity of the instrument was good with both doctors and paramedical staff endorsing the relevance and applicability of items. The scaling exercise resulted in a total of 27 items, the remainder of which was discarded owing to poor agreement among the experts regarding its relevance. The questionnaire was then translated into Tamil and back translated in English. Reliability assessments including tests of internal consistency and test-re-test reliability are underway and results will be made available soon.

Conclusions: A validated tool will enable an assessment of the attitudes of health care providers towards persons affected by leprosy. Such a measure will provide insights for appropriate sensitization and training programmes.

**Keywords:** leprosy, health care provider, attitude, Questionnaire
A Study To Identify Social Determinants Contributing To The Delayed Treatment Seeking Among New Leprosy Cases In 6 Districts Of Maharashtra State (India).
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Objectives:
The prospects of leprosy elimination depend on early case detection and timely treatment with MDT. Delayed detection of new leprosy cases thwarts the process of elimination of leprosy. Lack of awareness together with fear of stigma are known factors for delayed reporting of new leprosy cases. This study aims to identify social determinants and the extent of them influencing health seeking behaviour of PALs in the context of ‘timely’ detection.

Methods:
598 PALs were selected through stratified sampling method from 12 rural and tribal blocks of 6 endemic districts of Maharashtra (India). The data was collected through personal interview by trained field investigators using pre determined interview schedule.
60% were male and 47% belong to 36 to 60 years age group. 54% had completed primary to high school level education, 71% were of MB leprosy and 44% had visible disability (G2D).
The data was analysed in the context of time lag to reach diagnosis. The study was conducted during 2015 under Leprosy Elimination Action Programme supported by Anesvad foundation.
Results:
56% of PALs had less than 3 years of disease history before detection. 74% of PALs noticed the first sign of leprosy by themselves. 42% reported for diagnosis within one month’s time lag from noticing first sign of leprosy and among them 42% were female PALs. 44% PALs from joint family reported within 1 month’s time lag against 24% in nuclear families. 35% of them were head of families.
PALs who noticed the first sign by others (40%) reported much earlier for diagnosis (within two weeks time lag) than those who noticed first sign by themselves (31%).
92% of PB cases and 75% of MB cases were detected in less than 6 months time lag. On the contrary, 39% of PALs having disability (G1D & G2D) prior to diagnosis reported after 6 months time lag. Similarly, more than 6 months’ time lag was noticed among 26% of illiterate PALs compared to 12% of PALs with better education level (High school/above).
While 7% of PALs had dropped out from MDT, 20% also took treatment with non-allopathic medicines.

Conclusions:
The study identified several social determinants such as gender of PALs, age groups, illiteracy levels, and family responsibilities influencing the delayed treatment seeking by new leprosy cases. Greater awareness creation and ensuring conducive social atmosphere will reduce the delay in seeking treatment which will contribute to leprosy elimination and reduction of disability.

Keywords: Behaviour, Delayed detection, Determinants, Awareness, Leprosy
ILC2.3–030
Perceptions of informal healthcare providers towards the National Leprosy Eradication Programme in India
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Perceptions of informal healthcare providers towards the National Leprosy Eradication Programme in India Annamma S John, Krushna Sahoo

Objective
The objective of this study is to explore briefly the perception of informal healthcare providers towards the National Leprosy Eradication Programme, in India and determine the reasons behind their willingness to participate in NLEP.

Methodology
This is a qualitative study using face-to-face, open-ended, semi-structured interviews among informal healthcare providers in West Bengal, India. 20 in-depth interviews (IDIs) were conducted in Bengali, the local language, among informal healthcare providers in selected districts of West Bengal. The respondents were all trained in systems other than allopathic medicine. The digitally recorded interviews were transcribed verbatim and the transcripts were translated into English and analyzed using content analysis. The Max-QDA software was used for coding of the data and summary preparation.

Results
Two key broad categories emerged from the study: The first – understanding of leprosy and methods of management it and secondly – scanty knowledge on NLEP but enthusiasm to be involved.

Understanding of leprosy
According to most of the informal health care providers, leprosy is not infectious and there is no fear of transmission by contact with leprosy patients. A few participants came across leprosy patients with early symptoms, but they were not confident about recognizing all the possible presentations. They had seen physically disabled cases. They understood that if leprosy is detected earlier, it is curable. Scanty knowledge on NLEP.

All the participants suggested that there is a need for awareness generation on leprosy among the informal health care providers as they are the interface or first port-of-call for many communities as they are providing primary health care to the socioeconomically underprivileged people in remote areas in the absence formal healthcare. With training on leprosy treatment, they will be able to strengthen the NLEP by early detection of symptoms and appropriate referral to the nearest NLEP facilities. They were very willing to get involved in NLEP. The benefit they expected for their involvement was mostly social recognition and increased faith in them from patients and the larger community.

**Keywords:** leprosy, nonformal practitioners, NLEP
ILC2.3-031
Assessment of Leprosy awareness, knowledge and attitudes in the community across 3 endemic states in India
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Objective
To assess the level of knowledge regarding leprosy and the attitude towards leprosy and affected people in the community

Methodology
This assessment is part of a larger study on community based methods to facilitate and improve early case detection. The project is supported by the Leprosy Research Initiative. This survey is being conducted in selected areas of Chattisgarh, Uttar Pradesh and West Bengal. The survey will be undertaken to generate baseline data regarding the present level of awareness, knowledge and attitudes towards leprosy in the community.
A semi structured questionnaire which has been translated into the local language and field tested will be administered by trained interviewers in the 5 different project sites. The questionnaire covers demographic details as well as detailed questions on knowledge of leprosy, attitudes, sources of knowledge and perceptions regarding solutions.
A sample of 450 respondents will be interviewed which will comprise of people affected by leprosy, school children, youth, skilled and unskilled workers, teachers, village elders and local government representatives.

Results
Since the survey is in progress, it is not possible to provide results at this stage, but the report will be ready for presentation at Beijing in September 2016.

Conclusion
As above

Keywords: knowledge, awareness, attitudes, community, survey
ILC2.3–032
Cultural validation of a new leprosy related stigma measurement: SARI Stigma Scale
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Objectives: This study was part of Stigma Assessment Reduction Impact (SARI) project that aimed to develop a new leprosy related stigma measurement based on widely used Berger scale. Berger scale was designed to measure stigma among people who are living with HIV. This paper presents the process of the cross-cultural validation of a shortened version of the Berger scale in Cirebon District, West Java, Indonesia.

Methods: The Berger Scale measures different aspects of stigma, disclosure concerns, and experienced, internalized and perceived stigma. The scale was shortened to 22 items by omitting HIV specific items. This study explored the conceptual, item, semantic, operational and measurement equivalence of the instrument translated in Bahasa Indonesia compared to the original English version. The process included a qualitative exploratory study, translation and back-translation of the scale, training of interviewers and a pilot, followed by the main data collection. To achieve adequate power a sample of 154 people affected by leprosy with 60 repeated measures was needed. They were selected through convenience sampling.
Results: The Berger Scale showed good or acceptable conceptual, item and semantic equivalence, but insufficient operational equivalence since the respondents found it difficult to respond to statements with an agreement item response scale. Major adjustments in the format were necessary and hence we decided to change the name to SARI Stigma Scale (SSS). The measurement equivalence of the adapted scale showed good internal consistency with a Cronbach’s alpha for the whole scale of 0.88 and 0.79–0.82 for the sub-scales; no floor or ceiling effects were present in total score; reliability was good with a weighted Kappa score of 0.75, and good interpretability. The mean total score was significantly difference between person with disability (grade 1 and 2) and persons without disability, mean difference 5.8 and p= 0.0000, however, mean total scores of persons with grade 1 and grade 2 disability was not significant (p= 0.6584). We found moderate positive correlations for construct validity between the sub-scales as hypothesised (r=0.4 – 0.5), except for experienced stigma and disclosure concerns that have weak correlation (r=0.15).

Conclusion: The SARI Stigma Scale is a new, comprehensive, reliable and valid scale to assess different aspects of stigma among persons affected by leprosy in a context such as Cirebon District. Further research is needed to investigate whether this instrument is valid in other settings and cultures and with other stigmatised conditions in Indonesia.

Keywords: Leprosy, cultural validation, stigma measurement, Berger scale, Cirebon Indonesia
ILC2.3-033
"Concrete Actions to End Stigma and Discrimination"
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"Concrete Actions to End Stigma and Discrimination" Dr.P.K.Gopal and Ms.K.Gayathri

OBJECTIVES: While there is a lot of discussion about the need to end the discrimination associated with leprosy, it is important to recognize the concrete actions that have taken place and resulted in major social change. The objective of this study is to explore concrete actions that have resulted in the elimination of discrimination.

METHODS: A historical study of concrete actions that have resulted in the elimination of discrimination has been conducted in India and throughout the world.

RESULTS:
1. The establishment of platforms for presenting the voices, opinions and positive images of individuals affected by leprosy is crucial for ending discrimination. Many individuals in different countries who have experienced leprosy have fought against discrimination. With establishment of international organization IDEA (Integration, Dignity, and Economic Advancement) in 1994, many of these individuals came together to form a network of support and a platform to promote the voices and participation of leprosy affected people.
2. The display of "Quest for Dignity" exhibit at United Nations in 1997 launched a major campaign to eliminate discrimination.
3. Numerous workshops and conferences have been held to bring individuals together in mutual support, which is critical in promoting self-esteem and ending discrimination.
4. There are 778 leprosy colonies in India. There are 16 national laws and many state laws that discriminate against leprosy affected people. There are also traditional practices that result in discrimination. In 2008, a petition demanding the rights of people affected by leprosy and abolition of discriminatory laws was presented to Indian Parliament.
5. Individuals affected by leprosy must be regarded as international partners in the efforts to end discrimination. In 2010, joint efforts resulted in adoption of a resolution by United Nations Human Rights Council that called for the elimination of discrimination against persons affected by leprosy and their family members.
6. Local efforts must combine with international efforts to end discrimination. In 2015, the Law Commission of India prepared a Bill to be presented to Parliament that called for the abolition of all discriminatory laws related to leprosy.

CONCLUSION: The most effective approach to combat stigma and discrimination is to invest in the people affected by the disease as equal partners in this process. In addition, it is seen that advocacy efforts go hand in hand with socio-economic empowerment and the promotion of education of children whose parents had leprosy.

Keywords: Stigma, Discriminations, Leprosy, Affected persons, Socio Economic Rehabilitation
ILC2.3–034
Health Related Quality of Life (HRQoL) in patients with leprosy reactions, at ALERT, in Ethiopia – an ENLIST Group study
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Background:
In recent years there has been a broadening of focus in measurement of health, beyond traditional health indicators such as mortality and morbidity, to include measures of the impact of disease and impairment on daily activities and behaviours, perceived health measures and disability /functional status measures. With increasing comparative clinical studies being conducted in the management of leprosy reactions, health related quality of life questionnaire should be used to allow patients’ assessment of treatments to be taken into account.

Objective:
To determine the impact of leprosy reactions on health related quality of life (HRQoL) using the Medical Outcomes Study: 36-Item Short Form Survey (SF–36)

Methods:
The validated Amharic translation of SF–36 (main Ethiopian language), was administered to 150 patients in the leprosy outpatient clinic at ALERT hospital. The responses to the 36 items of the surveys were coded, summed and transformed into a scale for each of the eight domains. The lower the score, the poorer the quality of life.
The differences among the groups were analysed using analysis of variance.
Results: The patients were divided into 3 groups: 50 had leprosy but no reactions, 50 had Type 1 Reaction and 50 had Erythema Nodosum Leprosum. The median age of the whole group was 32 years with a male to female ratio of 2:1. The distribution of various characteristics was fairly equal within each sub-group. Patients with ENL had a lower quality of life than patients with T1R in all domains except Physical Role, Emotional Role and General Health. The differences in mean scores were not statistically significant. Patients with ENL had lower quality of life than patients with no history of reaction in all domains except General Health. The differences in mean were statistically significant for Physical Functioning and bodily pain.

Conclusion:
This small study demonstrates that the SF-36 is a useful tool in measuring HRQOL in leprosy patients. It also demonstrates the negative impact of ENL on HRQoL.

Keywords: Health related quality of life, Leprosy, Reactions, ENL, SF36
**ILC2.3–035**

**Impact Of The Earthquake On Overall Well Being Of People Affected By Leprosy**

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Title of the Paper: Impact Of The Earthquake On Overall Well Being Of People Affected By Leprosy

Background: The devastating earthquake on April 25, 2015 and aftershocks killed over 8,673 individuals and have injured over 21,952. In total, more than 8.1 million people have been affected across 39 of Nepal’s 75 districts, with the majority destruction taking place in the Central Development Region. People affected by leprosy, living with disabilities, women and children have become more vulnerable as a result of the disaster. (Source: MOHP/OCHA).

Objective: The primary objective of the study was to make an assessment of the overall well being of people affected by leprosy, now further affected by the recent earthquake. The secondary objective was to recommend TLMN and other stakeholders to develop appropriate intervention plans to respond to their needs.

Methodology: Social survey questionnaires were developed, records were collected, permissions were taken from respective government health offices. Field surveyors were dispatched to 12 districts heavily devastated by the earthquake. Descriptive analysis and interpretation was done on the basis of data collected.
Results: 687 people affected by leprosy were surveyed. 35% of those surveyed were females. Among those surveyed <1% are under 18, 18% belong to 18-40 age group, 40% belong to 41-60 age group, 28% belong to >61 age group. 62% of people are living under temporary shelter; only 30% continue to live in their old safe houses. 77% households reported they have toilets; however 76% of those households use temporary toilets. Most of the households use pipeline (73%) as their source of water whereas 14% use stream, ponds, rivers as their water source. 22% of the people affected by leprosy are in most vulnerable condition as a result of the earthquake. Interesting to note, that 45% of the people are do not know what self care is. Optimistically 86% of the people affected by leprosy are psychologically coping well. Nearly 60% of those are living with some kind of disabilities, of 19% are using some kind of assistive devices, 17% reported the need for some kind of assistive device.

Conclusion: The damage done by the earthquake has affected overall wellbeing of the people affected by leprosy. It is advised to advocate, lobby to develop holistic programmes and activities to meet the diverse needs of the people affected by leprosy in the central development region of Nepal.

Keywords: Vulnerable, Psychological coping, Self care, Overall Wellbeing, Disability
ILC2.3–036
The implications of climate change on leprosy and leprosy affected people
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Objective
Initially climate change was seen as an ‘environmental issue’, but increasingly it is being realized that it will impact onto all areas of life including health as a ‘risk multiplier’. Therefore the implications of climate change on leprosy related interventions needs to be considered in order to highlight areas in which organizations working on leprosy should alter their programmes.

Method
Literature on climate change and leprosy was analyzed. The research looked at the potential impact of climate change on the spread of leprosy directly and indirectly. In addition the implications of climate change on people affected by leprosy, and project interventions that support them were also examined.

Results
While due to the uncertain nature of climate change impacts, compounded by the lack of data on the impact of environmental variables on leprosy transmission, means that it is difficult to be too specific on potential changes in leprosy prevalence. However, what we do know does indicate that climate change will influence the prevalence of leprosy.
While the direct influence of climate change may be uncertain the indirect impact of climate change on leprosy prevalence may be more reliably predicted. Reduced nutrition due to reduced harvests, increased poverty due to weakened livelihoods, the impact of disasters on living conditions and the displacement of large numbers of people are all factors which affect the likelihood of people developing leprosy and influence the spread of the disease.

In addition the success of many of the interventions to improve the wellbeing of people affected by leprosy such as improving living conditions, livelihood development, the operation of health services and self-care training will be affected by the impacts of climate change.

Conclusion
Climate change will directly or indirectly affect leprosy transmission, and people affected by leprosy. Therefore interventions to address leprosy must take future climate predictions into account, and more research should be done to identify the likely impacts so that they may be mitigated.

In addition being among the poorest and most vulnerable within their communities and nations, people affected by leprosy will be disproportionately impacted by climate change, so they must be prioritised in work to increase their climate change resilience.

Those concerned about leprosy should add their voices in advocacy efforts to ensure climate change mitigation measures are implemented. While if designed well interventions to improve the wellbeing of communities affected by leprosy may assist them to adapt to climate change.

**Keywords:** climate change, global warming, disaster, environment, resilience
Title: PROFILE OF STIGMA AFTER CONTROL AND ELIMINATION OF LEPROSY IN INDIA
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Author: Shirish David Shegaonkar Sr. Programme Manager, CHANGED Project, Miraj TLMTI. Co-Author: Mrs. Tina Mendis Head Sustainable Livelihood & Emowerment Programme TLMTI. Title: PROFILE OF STIGMA AFTER CONTROL AND ELIMINATION OF LEPROSY IN INDIA. To assess the level of stigma towards leprosy at a rural district in a previously endemic state in India.

Objective:
1. To study the participation level of the people affected by leprosy and assess the level of stigma against leprosy in a leprosy controlled and eliminated area
2. To identify the psycho-social, demographic, economic and disease related correlates of stigma
3. To understand the situation and suggest methods to reduce stigma

Methodology: For collecting relevant information regarding correlating factors used an interview schedule which covered various areas viz. deformity status, age, gender, socio-economic background of the people affected by leprosy etc. A standardized Participation scale was used for the collection of data to assess the participation level and stigma level from 3 blocks of Sangli district which is rural and previously endemic, of Maharashtra state, India.

A total sample of 473 respondents have been studied, out of which 80% are from the age group 40–59 years, representing different levels of education viz. illiterates (54.87%), primary education (34.75%) and Secondary education (12.75%), out of whom 63% respondents are household workers, 37.89% respondents engaged in agriculture work.

Results:
Major findings of the study shows that 56.4% (207/367 respondents) of people affected by Leprosy have restrictions in the community and majority (59%) of Females (121/205 Female respondents) are facing restriction in the society.

Conclusion/Discussion:
The stigma of leprosy is a real phenomenon in many people’s lives that affects their physical, psychological, social and economical well-being. There are many causes for this damaging image of leprosy. There is no one easy answer to dispel this image; it is something that has to be done in partnership with communities.

Keywords: Stigma, Leprosy, Community, Self Stigma, Inclusion
Impact of Socio-economic Rehabilitation program of The Leprosy Mission Trust India on People Affected by Leprosy from Northern India

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Objectives:
To determine the impact of Socio-economic Rehabilitation on income generation and asset creation of people affected by leprosy from Northern India.

Methods:
The study was conducted at The Leprosy Mission (TLM) Hospital, Naini a unit of The Leprosy Mission Trust India (TLMTI). This hospital is a 150 bedded specialized Leprosy Referral centre with over 2500 new Leprosy registrations in a year. Socio-economic Rehabilitation (SER) through microcredit system has been a core strategy of TLMTI to uplift the economic condition of people affected by leprosy along with medical rehabilitation. The SER program was started in 2005 and covers the predefined catchment area of 80 kilometers radius from hospital. When a patient is found suitable for SER through screening, the Rehabilitation committee meets along with beneficiary to determine the income generation scheme appropriate for the person. The committee consists of SER program facilitator, Medical Officer, Rehab professional, admin officer and counselor. This study was conducted to assess the impact of SER. The main outcome variables are individual and family income, assets (house, animal possession etc) and savings. The data was collected using a structured questionnaire through interviews during October to December 2015. The data was entered in excel and analysed using SPSS. Case studies were used to highlight the impact.
Results:
There were 52 beneficiaries since 2005 and 31 patients were available for interview. The mean individual monthly income of beneficiaries before and after intervention was Indian Rupees 796 and 3136, respectively. The individual income was positively correlated with total family income. The mean possession of number of animals like cow or goat etc., increased from less than one to two after intervention. The assets like savings improved from nil to Indian Rupees 7166 after SER.

Conclusions:
The leprosy affected individual suffers both from disability and resulting economic deprivation. The finding shows that the socio-economic rehabilitation improves the economic condition of the affected individual and family. There were many people who would benefit from this program but due to limited fund the catchment area of this program only few were selected. Similar and more innovative SER programs are in need to improve the economic and social aspect of individual affected by leprosy apart from medical rehabilitation.

Keywords: Leprosy, India, Medical Rehabilitation, Socio-economic Rehabilitation, Disability
ILC2.3-039
Leprosy Post-Exposure Prophylaxis and Perception of Leprosy
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The Leprosy Post-Exposure Prophylaxis (LPEP) project, introducing Single-Dose Rifampicin (SDR) prophylaxis for contacts of leprosy patients, is carried out in six countries. In Nepal, Indonesia, India and Sri Lanka, a Perception Study is performed as part of the LPEP project. Existing perceptions and lack of knowledge may result in exclusion of people affected by leprosy and self-stigmatisation. The distribution of SDR in the community may change what people know about leprosy and how they perceive leprosy. A positive impact would be an added advantage of this intervention.

OBJECTIVES: To investigate the impact of SDR as post-exposure prophylaxis on the way people see leprosy, what they know about leprosy and their attitudes and reported behaviour towards persons affected by leprosy.
METHODS: The Perception Study follows a before–after survey design using the same sample of respondents. Quantitative and qualitative methods are used. In each country a random selection of, 100 leprosy patients, 100 contacts and 100 community members are interviewed using a Knowledge Attitude and Practice (KAP) questionnaire, the Explanatory Model Interview Catalogue (EMIC) perceived attitudes and behaviour scale and the Social Distance Scale (SDS). Semi-structured interviews are conducted with six purposively selected leprosy patients, contacts, health workers and community members (gender balanced) and two focus group discussions are held. Their perception of leprosy and persons affected by leprosy will be documented before education about SDR is given (baseline) and will be compared to their perception one year after the start of SDR distribution.

RESULTS: Preliminary analysis was done on baseline data from Nepal and Indonesia. The results show a lack of awareness regarding the cause of leprosy. Around 60% of the leprosy patients said that they did not know the cause of leprosy. In Indonesia only 12% of the leprosy patients knew that it is caused by a germ; in Nepal this was 5%. Several other causes were mentioned by the interviewees, such as impure blood, an unclear environment and witchcraft. Both the EMIC and SDS scale showed widespread negative attitudes and behaviour towards people affected by leprosy. The mean EMIC score (range 0 - 30) was: 15.7 (95% CI: 14.1 - 17.2) and the mean SDS score (range 0 - 21): median 3.0 (IQR 1.0 - 9.0).

CONCLUSION: We found a serious lack of knowledge regarding leprosy and evidence of widespread negative attitudes and behaviour towards persons affected by leprosy. There is much scope for a positive impact of LPEP, which includes education regarding leprosy.

Keywords: leprosy post exposure prophylaxis, perception, attitudes, behaviour, exclusion
ILC2.3-040
Models for building sustainable livelihood for the leprosy affected and marginalized people
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Abstract title:
Models for building sustainable livelihood for the leprosy affected and marginalized people

Introduction: The Leprosy Mission Trust India (TLMTI) has been serving people affected by leprosy for more than 140 years working with them towards healing, inclusion, and dignity. One of the prime focus areas of TLMTI is to provide sustainable livelihood options to the people affected by leprosy and their households. One of these initiatives is the “Securing Opportunities towards Advancing Revenue” Craft project phase II (SOAR).
The SOAR project aims to sustainably enhance the quality of life of people affected by leprosy and their families (caretakers) in Cuddalore, Thiruvannamalai and Villupuram districts of Tamil Nadu. The project seeks to promote and incubate a Producer Company (community-owned enterprise) that will enable the affected to become more self-reliant and evolve as required. As a project that empowers the community, the participation and ownership of the community is central to the model. This paper describes this intervention and the changes in the lives of those participated.
Methodology: In May–July 2015, a livelihood profiling of 340 people affected by leprosy across 13 blocks of Cuddapah was completed. Information was gathered through baseline surveys and focus group discussions, to gain an understanding of the socio-economic profile and livelihood options of the affected community. From consultations with the community, livestock based livelihoods emerged as the most preferred options. In particular, dairy was the most favored. Accordingly, TLMTI studied the backward and forward linkages, right from credit services for cattle purchase to livestock services for better cattle management, value addition and marketing. In addition, the strategy was designed to include social security, savings and credit for financial inclusion, and other livestock holdings (poultry and goatery).

Result: The initial phase of the project has generated buy-in from the community to build their own enterprise. Seven promoters have been chosen from the leprosy-affected community to establish the producer company, which is under registration. Phase one of providing end-to-end dairy services is underway.

Conclusion: Based on the design and initial results, the authors believe the model has the significance and the potential to improve the livelihoods of the people affected by leprosy.

**Keywords:** Sustainable, Livelihood, leprosy, affected, inclusion
ILC2.3-041
Three Box Solution to the socio-psychological problems of leprosy patients
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THREE BOX SOLUTION TO THE SOCIO-PSYCHOLOGICAL PROBLEMS OF LEPROSY PATIENTS

Introduction: Although leprosy has been ‘eliminated’ from India in 2005 it continues to be a public health problem with new cases being detected from high endemic districts and sporadically from the rest of the country. Leprosy is more a social problem than a medical one due to stigmatizing deformities/disabilities, religious and cultural beliefs, fear of transmission and isolation. The social issues surrounding leprosy still remains a challenge to health care providers. This paper analyses and evaluates the impact of an innovative tool to understand and successfully address the socio-psychological issues that surround leprosy.

Methodology: Measures and strategies have to be continually reinvented in order to be successful. Based on this premise the Vijay Govindrajan (VG’s Model) discusses strategy in innovation in a three box model as below: Box-1 Box-2 Box-3.

Results & Discussion: Stigma continues to be high particularly as new cases are diagnosed late, many with visible deformity. What is required is a patient-centered approach, which starts in Box 1 with interventions targeting the intrapersonal level, to empower affected persons to assist in the development and implementation of stigma-reduction programmes and supporting those who are stigmatized to limit their vulnerability and strengthen their resilience. Psychological resilience is built by strengthening the interpersonal relationship between the patient and healthcare worker. Similarly, family relationships of these patients need to be preserved and strengthened. The proposed model also suggests that merging the community-development process with a compatible community-assessment, planning, implementation, and evaluation framework will result in effective rehabilitation strategy. Education, media campaigns, and group counselling is also helpful.

Conclusion: There is no one answer to dispel the stigma attached with leprosy patients. One day we will be able to cure stigma of leprosy patients and make the road to rehabilitation an easier one. The three box model of understanding and addressing the issue may be one such effort.

Keywords: stigma, disability, three box solution, community participation, patient centred approach
ILC2.3–042
Knowledge, attitude and practice related to leprosy in Zinder, Republic of Niger
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Objectives:
1. To investigate knowledge attitude and practice related to leprosy in Zinder region, Republic of Niger.
2. To evaluate the national support system of the disease and the care system in the Health Centre Karakara–Zinder.

Methods:
Qualitative study using document review, observation, interviews and case studies. The tools developed are the interview guide, observation and analysis grids.

Results
Leprosy is no longer a public health problem in Niger, yet more than 400 new cases were detected in 2014, of which 25% had grade 2 disability. Most cases come from peripheral areas more than 15km from an integrated health centre.
Many people struggle to accept that leprosy is caused by a bacillus. Rather, leprosy is understood as a punishment from the Holy Quran (A Kan Layya) following a committed sin. Interviewed traditional healers say they have treated dozens of cases of leprosy using traditional medicine and incantations of the Qur’anic verses. Treatment is limited to the first signs of the disease (skin) and when there are complications due to nerve damage these are referred to health centres. People affected by leprosy in Karakara district in Zinder face stigma and the challenges of poverty. Negative beliefs about the disease appear to worse in urban areas. The State’s political and financial commitment to tackling leprosy is limited and there is high dependence on the two ILEP organisations (FRF and TLM). Capacity in peripheral health centres is low. People affected by leprosy in Zinder are not yet involved in the management of leprosy.

Conclusions
1. The stigma coupled with the low capacity of the peripheral health centres to deal with leprosy contributes to late detection of leprosy.
2. Much more effort is needed towards improving community awareness of the disease and its management, building the capacity of the health services to manage leprosy and its complications.
3. Changing attitudes about leprosy remain a long-term challenge and is only possible with the full participation of people affected by leprosy and their families.

Keywords: Niger, stigma, KAP, community, leprosy
ILC2.3–044
Estimation, Evaluation and Elimination of the 4Ds in Leprosy
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Objectives:
While the prime objective of the study is to diagnose the medico-psycho-social pathology of the leprosy afflicted after occurrence of symptoms, the specific objectives are as follows:
1. To estimate and evaluate the burden of the 4 Ds (Delay, Defaulting, Deformity and De-habilitation), and carry out a network analysis on estimating conditional probabilities and their relationship to specific demographic, social and economic factors.
2. To involve the communities in developing acceptable strategies to reduce or eradicate the links among the various Ds (Delay, Defaulting, Deformity and De-habilitation) and suggest community based approaches to eliminate them.

Methods: All the qualitative and quantitative types of social science research and Community based action research methods have been used in the study. A total of 450 leprosy affected persons and families in rural and urban areas of 2 states of Uttar Pradesh and West Bengal in India were studied.

Results: Univariate analysis shows the significance of correlation of the 4 D variables – delay, defaulting, deformity and de-habilitation with the possible influencing factors viz. type of leprosy, age, gender, religion, marital status, educational status and occupation. Bivariate analysis of interaction among the 4 Ds revealed a strong internal correlation among themselves. Multivariable analyses confirmed these associations.
The Qualitative research using FGD, Case reports and In-depth interviews with key informants substantiated and offered specific community based solutions to eliminate the 4 Ds, thus leading to eradication of leprosy and improved quality of life.

Conclusions: Detailed analyses show that Leprosy is an unique bio–psycho–social – economic entity, that is dynamic and challenging for clinicians, paramedical workers, sociologists, program administrators and policy makers. While deformity is biological, delay seems to be the primary and crucial factor in preventing deformity through early reporting and prompt treatment is a psycho–social variable. Defaulting is shown to be associated with delay, but defaulting could be due more to ignorance, misconceptions and lack of faith in MDT, that contributes to inadequate treatment, relapses and continued transmission of the disease. The final D, de-habilitation is entirely sociological, but a criminal neglect of an affected person, and has no place in today’s family structure, and should be the first D to be eradicated. Further research mainly qualitative, will be required to question the community’s perception of leprosy, and their full participative involvement in removing all the Ds in leprosy.

**Keywords:** Delay, Defaulting, Deformity, De-habilitation, Leprosy
ILC2.3-045
The Leprosy Mission Nepal’s Disaster Response: Capacity Building at Community Level
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Objective: Following the 2015 earthquakes, the Government of Nepal (GoN) recognized the need for disaster preparedness at community level. Funded by CBM, supported by GoN and Handicap International, The Leprosy Mission Nepal (TLMN) conducted Injury and Trauma Management trainings for community level cadres in 7 earthquake affected districts of Nepal. Despite not being a disaster organization, our medical expertise especially in orthopedics and also our experience in training health personnel allowed us to achieve our goal of building capacity of 420 community level health workers in injury and trauma management. Regarded as a pilot project, the outcomes and lessons learnt from this will inform future trainings that the GoN hopes to roll out to all 75 districts of Nepal. This also signifies TLMN’s foray into disability inclusive Disaster Risk Reduction (DRR); a new field for us but one that we seem to be able to contribute to more than other medical/non medical institutions.

The main objective of this research is to prepare a list of recommendations that will inform and improve future community level injury and trauma management trainings in Nepal and other countries.
Method: Feedback forms were created and administered to all participants at the end of training. Trainers and coordinators were debriefed and session reports were prepared with recommendations to better the next training. Focus group discussions of TLMN trainers and coordinators were also conducted.

Result: The assessment showed that on average 80% were very happy with the trainings. 82% of trainees gave ‘excellent’ feedback for the training and trainer. 74% were very happy with the training content and materials. 83% found the training extremely beneficial and 86% were confident they could apply what they have leaned in their communities/working area. TLMN also incorporated a session on leprosy which was well received by all trainees. Trainees wished such training was conducted before the earthquakes since they would have been able to help more people in time of need. A common feedback was that the training was too short for the vast content covered.

Conclusion: TLMN successfully conducted the injury and trauma management training as a new DRR initiative in Nepal with valuable recommendations to consider for the future. We have been able to highlight the need for a similar countrywide training project covering more health personnel to prepare for future disasters. Incorporation of leprosy teaching has been an outstanding opportunity for TLMN to reach more community level cadres.

**Keywords:** Community Participation, Capacity Building, Training, Disaster Risk Reduction, Injury Management
ILC2.3–046

Relevance of various methods used in early detection of leprosy

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Introduction: Age-old stigma perpetuated by misconceptions and lack of factual knowledge about leprosy continues discrimination against people affected by leprosy and hinders early diagnosis. The Leprosy Mission India’s (TLMTI) programmes aim at educating various community stakeholders on leprosy. New cases identified are referred to the Primary Health Centers (PHCs) and TLMTI Hospital at Champa for diagnosis and treatment.

This paper studies the feasibility and efficacy of various methods used in educating community stakeholders on leprosy for early detection of leprosy.

Methodology: TLMTI’s Self-Help-Groups for Holistic Community Development (SHCD) Project created leprosy related awareness among communities, civil society and duty bearers in Nawagarh and Malkhrod Blocks of Champa-Janjir District of Chhattisgarh. Over a 3 year period 2013-2015, the Project educated the following stakeholders about leprosy and the need for timely detection and treatment of the disease:

- Local community - 18199 members (18-60 years)
- Schools- 72 schools (5781 students)
- Members of Community Based Organisations (CBOs)- 107 CBOs (1322 members)
- Health care providers- comprising of 390 grassroots village health workers and 30 Auxiliary Nurse Midwives

The following methodologies to create awareness were used:

- Inter village rallies organized by school children and CBOs
- School awareness program
- Street Plays
- Teaching learning sessions
- Wall painting
- Outreach clinics
- Block Information Centre
Records were kept about the population and frequency of each method
Result: The table below illustrates the number of new leprosy cases identified through the various methods used:

<table>
<thead>
<tr>
<th>Method</th>
<th>2013</th>
<th>2014</th>
<th>2015</th>
<th>Total No. identified</th>
<th>Total No. with deformities from cases identified</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inter village rallies</td>
<td>0</td>
<td>8</td>
<td>6</td>
<td>14</td>
<td>2</td>
</tr>
<tr>
<td>School awareness</td>
<td>2</td>
<td>5</td>
<td>12</td>
<td>19</td>
<td>0</td>
</tr>
<tr>
<td>Street plays (started in 2014)</td>
<td>14</td>
<td>15</td>
<td>18</td>
<td>47</td>
<td>2</td>
</tr>
<tr>
<td>Teaching learning sessions</td>
<td>2</td>
<td>4</td>
<td>2</td>
<td>8</td>
<td>1</td>
</tr>
<tr>
<td>Outreach clinics</td>
<td>24</td>
<td>15</td>
<td>18</td>
<td>57</td>
<td>3</td>
</tr>
<tr>
<td>Wall painting</td>
<td>3</td>
<td>6</td>
<td>4</td>
<td>13</td>
<td>0</td>
</tr>
<tr>
<td>Block Information centre</td>
<td>0</td>
<td>0</td>
<td>5</td>
<td>5</td>
<td>1</td>
</tr>
<tr>
<td>Total</td>
<td>45</td>
<td>53</td>
<td>65</td>
<td>163</td>
<td>9</td>
</tr>
</tbody>
</table>

Conclusion: Based on the results, the authors believe that:
1. All 7 methods used in creating leprosy awareness are relevant in early identification of leprosy
2. Awareness during outreach clinics (especially skin camps) detect a significant number of new leprosy cases
3. Community awareness programmes (street plays, rallies), especially done by community members themselves help in identification of suspect leprosy cases.

**Keywords:** Awareness, IEC Methods, Leprosy, Community
**ILC2.3-047**  
The Attitudes of Village member towards leprosy and relatives in Pho si suwan District, Sisaket Province, 2015.  
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Pho si suwan District, Sisaket province is one of endemic area where detected leprosy continuously. Previous 10 year (2004 - 2013), there are 23 cumulative patients, new case detected previous 3 year (2012 - 2014) there are 3, 4 and 7 cases respectively, in 2014 there are on register 4 cases. So the author was interesting in attitude of Village member towards leprosy and relatives. The objectives are finding attitude of village member towards leprosy patient and relatives on ordinary activity and living together in order to plan for work by giving knowledge and attitude adjustment to general village member and empowerment to leprosy patient.

Method, the survey study was launch between Raj pracha samasai day campaigns on January 16th 2014. Using semi-structure open-end questionnaire. The sample size groups were purposive selected in general village member who had more than 15 years and live in same sub-district where on register cases in 2014. There are 184 families represent by one of family member. And analyses in descriptive statistic.

Results, the sample size were divided by gender and age group equally. A majority of participants 56.6% finished secondary school, 84.8% got married. For leprosy knowledge, 83.5% does not know who got leprosy. For attitude towards leprosy patient, there are 87.5% who had relative got leprosy not hate. For behavior, there are 67% can live with leprosy patient, 50.9% can use same swimming pond with leprosy patient, 69.2% can have meal with leprosy patient’s member, 64.3% can have meal with leprosy patient’s friend, 64.3% let their son learn same class with child leprosy case, 60.9% let their son play with child leprosy case, 69.6% can use same toilet with leprosy patient, in case of family’s member got leprosy there are 88% can take care, if know who got leprosy, 80.4% not run away or keep away. For expose to family’s member in case of itself got leprosy 96.2% will tell their family. Summary and recommendation, although the majority of general village’s member in Pho si suwan district not mind leprosy patient but there are someone still hate. So the campaigns activities to giving knowledge to general population in village is necessary and giving knowledge for screening skill to relative or family’s member is importance in order to early diagnose. For case finding activities in endemic area the finding data base in community such as knowledge about leprosy or stigma it is necessary for public health worker or relate field to use data base for achieve.

**Keywords:** stigma, leprosy
ILC2.3-048
Quel avenir pour les handicapés de la lèpre après atteinte du seuil de son élimination : Cas du Cameroun.
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CONTEXTE
Depuis 2002, avec l’aide de ses partenaires dont FAIRMED, le Cameroun a atteint et se maintient au dessous du seuil d’élimination requis. Toutefois on compte beaucoup d’handicapés de la lèpre (512) qui vivent soit en léproserie (80%), soit en communauté dans des conditions particulièrement précaires. Une enquête réalisée en 2006 a montré les conditions de vie des anciens malades de la lèpre et leur famille. D’une manière générale, l’handicapé de la lèpre était comme précipité dans la tombe et mourait d’une mort lente et programmée. La vie en léproserie est apparente avilissante, rythmée par les dons, source de stigmas des personnes handicapées et leur famille et sans désir d’autodétermination. La léproserie reste un triste vestige de la lèpre.
La présente étude a conduit à une vaste intervention de resocialisation des personnes handicapées au Cameroun par FAIRMED.

OBJECTIF GLOBAL
Améliorer les conditions de vie des handicapés de la lèpre en particulier et les handicapés en général.

METHODOLOGIE
L’intervention a été lancée dans la période allant de 2006 à 2013.
La méthodologie de cette intervention a été structurée autour de trois axes :
• L’enquête de base
• L’élaboration d’un cadre d’intervention
• Intervention proprement dite
RESULTATS
123 handicapés de la lèpre avec leurs familles qui vivaient en léproserie ont été réinsérés volontairement dans leurs villages d’origines et y mènent une vie autonome.
267 handicapés lourds qui ne peuvent rentrer chez eux en raison de leur âge ou du degré de leur handicap sont pris en charge dans les différentes léproseries. 20 handicapés vivants en léproseries sont décédés pendant cette période. Les infrastructures de 10 léproseries sur 18 ont été réorientées en structures sociales jusqu’en 2013.

CONCLUSION
La resocialisation des handicapés de la lèpre au Cameroun était une initiative heureuse permettant aux handicapés de la lèpre d’achever dignement leur vie. Elle est un succès qui ferme progressivement l’histoire de la lèpre.

La lutte contre la lèpre ne devrait pas se limiter à son élimination théorique, mais il faut encore apporter des réponses à la précarité de la vie de ses victimes.

Keywords: Lepre, Handicape, Elimination, Leproserie, FAIRMED
ILC2.3-049
Investigation into leprosy rehabilitation villages in Guangyuan
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Objective: Leprosy rehabilitation village plays an important role in rehabilitation
management for leprosy patients. There are 9 leprosy rehabilitation villages
in Guangyuan, Sichuan province. We aimed to investigate the situation about administration
management, information on villagers and staff, and appropriation language.

Methods: This study enrolled 93 villagers and 27 staff in 9 leprosy rehabilitation villages, which located on 7 districts and counties, as Lizhou, Zhaohua, Chaotian, Wangcang, Qingchuan, Jiange, and Cangxi.

Results: By the end of 2015, 93 villagers had still lived in leprosy rehabilitation villages, aged from 57 to 89. 90 leprosy patients were cured, but 85 patients got disabled. There were 27 staff assigned to 8 villages, who were governed by civil administration department. Living expenses of villagers were afforded by government, ranged from 300 to 800CN¥ per month.

Conclusions: Leprosy is a public health problem at National level. Leprosy rehabilitation village should undertake more responsibilities on rehabilitation, and get more public support.

Keywords: Leprosy, rehabilitation village, Investigation
ILC2.3-050
Socio economic profile and empowerment status of leprosy colony dwellers
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Objectives:
While the broad objective is to assess the socioeconomic profile of the leprosy colony dwellers, the specific objectives are to assess the following:
- How many people living in the colony studied access the schemes and facilities provided by Government and Non Governmental Organizations
- What proportion of those eligible are availing these
- Need for new social developmental program
- Factors obstructing the empowerment process.

Methods:
A sample of 500 families has been studied from the thirty leprosy colonies of Delhi N. C. T. The data of the study was collected directly from the respondents by a standardized interview schedule, direct talk and observation. Respondents were person affected disability, Leprosy and their family members.

Results:
This study helped to understand the factors which influenced the socioeconomic development of the inhabitants of the leprosy colonies in Delhi. It could help to assess the influence of factors such as illiteracy and physical deformity on community development.
The basic needs expected are support for higher education, quality education, facility for self employment, proper maintenance of sanitation system, skill development trainings for the adolescents, etc. Illiteracy and lack of capacity of parents to monitor their children in their academic area, lack of financial stability for sending children for skill development training and low level of income and high number of dependents affecting the economic condition, etc. or the factors not in favor of empowerment of the colony dwellers. Majority of respondents do not have hygienic sanitation facilities. Drinking water supply is not sufficient in the summer season. Regarding health seeking behavior the majority of them are depending on Government facilities and TLM Community Hospital. Community wise study shows the need to improve the basic facilities of the community such as sanitation, drainage system, etc. , Ratio of illiteracy and disability rate in adult group is very high. Ratio of leprosy affected male ratio is higher than female.

Conclusion:
This study helped to understand present resources available and facilities which are lacking in the process of empowerment of the community. This study made as an indicator for the further social development program among people affected by Leprosy and disability.

**Keywords:** socio-economic, leprosy, empowerment
184 cases of leprosy mental state analysis  
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Psychology is the human brain of the objective material world of subjective responses, many factors led to leprosy patients unique psychological personality traits. Leper (including cured) material, social and spiritual needs of lower than normal population (P < 0.01), described cured lepers and overall adverse psychological reactions is higher than the normal population. And cure of leprosy patients and the physical and social needs were in no significant difference (P > 0.05). Clinical cure leprosy or mental needs significant improvement (P < 0.01), but lower than the normal population (P < 0.01), described leprosy "Burn" too, though already cured but still in a particular social context "leprosy" in the individual body fixed, the objective world remains a psychological barrier. Necessity is the source of human mental activity, as well as human mental activity. Needs and the mental condition of material life and social interaction are closely related, both because of adverse psychological factors also affect the treatment of leprosy patients after rehabilitation prognosis. Authors believe that efforts to improve the health of patients with mental health is not only an important issue for sustainable development leprosy unfinished business, but also the elimination of leprosy hazards, promote integration and increase the level of social civilization compulsory. So that the community interest and understanding crowd lepers, and establish self-reliance, self-reliance, self-confidence, self-love of conviction. On current disease cured lepers and mental health education is very important.

**Keywords:** leprosy, psychological states
ILC2.3-052
The walls of this hospital did not take my life: Elderly people living in a hospital for people affected by Hansen’s Disease in Ecuador
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In 1930 a hospital in Quito Gonzalo Gonzales was built for people affected by the Hansen’s Disease. Since then, stories of pain, suffering, love and life have been accumulated but most of the time invisible for the outsiders. This paper will present some of those stories narrated by people who are spending the last years of their lives in the same hospital. Their fear for dying in a place that will somehow be transformed into a rehabilitation centre for people with drug and alcohol addiction allowed them to share their experiences. 25 people were interviewed during 2014. Their ages fluctuate between 65 and 85 years. The aim of this presentation is to raise some issues about the condition of elderly people who have been affected (physically, socially and morally) by the disease. While attention is given to the reduction of number of cases, it is also important to look at the situation of those who are at the end of their lives and still living in a hospital.

Keywords: Ecuador, Elderly, life stories, Hansen
IC2.3-053
Investigation and analysis of the present functioning situation of leprosy villages in Jiangsu Province
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Objective To grasp the present functioning situation of leprosy villages in Jiangsu Province and provide the government with decision-making basis for strengthening and enhancing the living condition and life quality of the people affected by leprosy (PALs) in the villages. Method The national leprosy village functioning situation questionnaire and the data from the province concerning leprosy control were collected and analysed. Result There were currently 37 leprosy villages in our province, which lived 1023 PALs with an average age of 67 and relatively high frequency of common and frequently-occurring senile diseases. 86.02% of them were with Grade 2 disabilities, 87.59% were lost their ability to work, 48.48% were unable to take care of themselves. 13 leprosy villages joined and completed the national leprosy village reconstruction plan and 17 (45.95%) of them with the permanent medical staff, and 12 with a dining room for PALs respectively. There were total 257 staff served in the villages and 135 (52.53%) of them were medical staff. The ordinary expense of 21 villages needed supplement with revenue of management units. Conclusion Authors suggested the provincial government should carry out the relative documents about leprosy village functioning plan, make full use of the villages which have reconstructed, make reasonable settlement for the current PALs living in the villages and take full consideration of the later transformation of the combined villages when policy was made.

Keywords: Leprosy Village, Functioning
ILC2.3-054

Leprosy and Migration in the United States: Treatment Challenges for First-Generation Migrants and for Healthcare Professionals

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International migration of people to the United States from countries where there is a high prevalence of leprosy is not a new phenomenon, but few researchers have examined the different ways in which international migration shapes the experience of diagnosis, treatment, and follow-up care in the contemporary era. In this panel, we will identify some of the cultural, linguistic, and logistical difficulties faced by first generation migrants to the U.S. who seek diagnosis and treatment for leprosy as well as the challenges described by physicians and other healthcare professionals who work with leprosy in the United States. We will address some of the complications with treatment that are related to the transnational status of many migrants to the U.S. We will discuss how anti-immigration stigma and ethnocentrism in the U.S. intersects with leprosy stigma, sometimes affecting people’s willingness to seek treatment. We will also discuss how nationality and ethnicity might affect individual experiences with leprosy in the U.S. for people affected by the disease. Panelists include two anthropologists who have conducted ethnographic research at ambulatory clinics for leprosy treatment in different parts of the United States (including Georgia, Louisiana, and California) and the director (also a physician and researcher) of the Chicago Regional Hansen’s Disease Center.

Keywords:
Role of print media in covering leprosy related news
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• Objective: Media plays an important role in opinion building as well as educating the society. Print media is an easy medium to spread awareness to any particular geographical area. Some forms of the print media have a huge and trusted following. Newspapers, that unite news, articles in a frequent and regular manner and present them in an attractive manner that creates interest of the reader along with providing accurate and authentic information about the latest events around the world and other aspects of life related to health, entertainment and other social grounds. Whereas a newspaper contains information from every social aspect of life, the magazines concentrate their complete focus over a particular topic and provide a complete research analysis about that topic. For example, there are certain magazines available in the market that focuses particularly on a single topic like fashion, technology, cars or interior.

• Methods: Data’s has been analyzed from news published in local newspapers in local Bengali and English language published from India mainly from West Bengal, where there is relatively high P/R rate. Some magazines, books/stories have also been analyzed as stories, news of national as well as international programmes & success, societies’ approach to lepers, achievement of individual handicapped leprosy affected person as well as of leprosy organization.

• Results: Details will be presented at conference.
Conclusions: Media can play more constructive role, but we see that negative news (contrary to science) is published by giving more importance. Social issues may be highlighted in acceptable and sensitive manner.

Keywords: Print media, electronic, social
ILC2.3-056
Direction of Health Education of County-Level Prevention and Control Institution of Leprosy
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Leprosy is a kind of chronic infectious diseases caused by leprosy bacillus, and it has been an epidemic disease for more than 2 thousand years. Leprosy was regarded as an incurable disease for a long time, and it is an issue of public health and social problem concerned by global now. Leprosy mainly has lesions in the skin and peripheral nerve. Leprosy is not only a kind of chronic infectious diseases, but also a social disease. It is influenced by biological, social, psychological, and economic factors and so on. With the effect of leprosy on the society, the health education of leprosy has become a great part of the prevention and control of leprosy. According to the county-level health education of leprosy, the passage below is to expound the direction of health education of county-level leprosy in future.

Keywords: leprosy, health education, cognition, social medical problems
ILC2.3-057
Investigation and analysis on the core knowledge about leprosy control of urban and rural residents in Jiangsu Province
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Objective: To understand core knowledge about leprosy control of urban and rural residents in Jiangsu Province, and furtherly improve the work of health education for leprosy control. Method: Calculating sample size according to the principle of maximum sample size. Sampling method with multi-stage sampling method, and then carry out the core of leprosy knowledge survey in sample population. Result: The general awareness rate of core knowledge leprosy control of urban and rural residents in Jiangsu Province is 52.98%, which are 51.95% in South Jiangsu, 58.43% in middle Jiangsu, and 49.28% in North Jiangsu respectively (χ²=52.21, p<0.01). The awareness rate of male and female are 54.63% and 49.99% respectively (χ²=24.44, p<0.01). For the awareness rates on different rank of literacy of residents, the illiteracy is 33.73%, the primary school education level is 44.10%, the junior middle school culture level is 55.87%, the high school and above culture level is 59.63%, the college culture is 59.21% (χ²=149.76, p<0.01) respectively, and the results show statistically significant differences among them. The awareness rate of correct answer the question on which leprosy can be cured is the lowest of 32.26%. Conclusion: The core knowledge awareness rate about leprosy control of urban and rural residents is far lower the 80% of target on the National eliminate leprosy program from 2011 to 2020. To strengthen health education on leprosy control in different regions and different groups is necessary.

Keywords: Resident, Leprosy, The core knowledge, Awareness rate
Stigma against leprosy and other NTDs - the case for joint approaches and action
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Stigma causessocial exclusion and added morbidity for persons and families affected by leprosy and many other neglected tropic diseases (NTDs). Stigma is a known barrier to effective NTD control. However, reports of effective measures to reduce stigma are rare. If the manifestations and consequences of stigma are sufficiently similar, joint approaches and interventions could be used to combat NTD-related stigma.

Objective
To demonstrate the extent of social stigma and the similarities and differences in the causes, manifestations and consequences of stigma, and the interventions used in leprosy and other NTDs.

Methods
We combined findings from several field studies and a systematic review in Pubmed, ScienceDirect, PsycINFO, and Web of Knowledge. The review comprised 17 NTDs, including podoconiosis but not leprosy, because this had recently been done. We extracted evidence regarding causes, types and manifestations of stigma, consequences of stigma and interventions used to mitigate stigma or its impact.
Results
We found evidence of widespread stigma related to leprosy, LF, podoconiosis, Buruli ulcer, onchocerciasis and leishmaniasis. The evidence was less firm for Chagas disease, schistosomiasis, trachoma and STH (hookworm–related cutaneous larva migrans), while in the case of HAT, only minimal stigmatization was found. The similarities predominated in stigma related to the various NTDs; only minimal differences in causes of stigma and measures against stigma were found. The similarities concerned especially the types and manifestations of stigma (discrimination, both experienced by affected persons and enacted in communities, and stigma anticipated and internalised by those affected), and the consequences of stigma (negative impact on many aspects of social participation, physical health and mental health). Widespread similarities were also reported in measures taken to reduce stigma, although the effectiveness of these were rarely studied.

Conclusion
Stigma is a cross-cutting issue in NTDs. There is evidence of stigma affecting the people suffering from no less than 11 NTDs, including leprosy. The similarities in the manifestations and consequences of stigma, and interventions used to mitigate stigma suggest that joint approaches and interventions should be possible. Lessons from leprosy and other stigmatized health conditions can be used to plan such joint approaches. Further research is needed to study the efficacy of joint interventions, to study the impact of stigma on mental in more detail and to investigate stigma related to NTDs for which no evidence is available yet.

**Keywords:** stigma, NTDs, joint interventions, human rights, inclusion
ILC2.3–060
The SARI Project: how to measure leprosy-related stigma in the community
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Stigma is a key cause of social exclusion of persons affected by leprosy and their family members. However, stigma levels are rarely quantified and very little is known about the effectiveness of interventions to reduce stigma against leprosy. The SARI Project, conducted in Cirebon District, West Java, Indonesia, aimed to validate stigma measurement tools for use in leprosy and use them to assess the effectiveness of interventions to reduce leprosy-related stigma and discrimination.

Objective
To validate two instruments to measure leprosy-related stigma among community members.

Methods
The SARI Project used a validation study design to test two scales to measure attitudes and perceived or expected behavior among community members, the 15-item EMIC community stigma scale (EMIC–CSS) and the 7-item Social Distance Scale (SDS).
Both instruments were put through a rigorous process of cultural validation before use, based on the Herdman–Stevelink framework of cultural equivalence. After translation and back-translation of the instruments, this method evaluates the equivalence of the translated instrument against the original in 5 domains: the concept of stigma, the relevance and acceptability of the items, the understanding and meaning of the questions and the questionnaire format. The measurement properties that were evaluated included internal consistency, factor analysis, floor and ceiling effects, inter-interviewer reliability and smallest detectable change (SDC).

Results
A sample of 259 community members was selected through convenience sampling and 67 repeated measures were obtained to assess inter-interviewer reliability. The issues addressed in the EMIC–CSS and SDS were perceived to be very relevant, acceptable and important in the target culture. The questions in both instruments were understood well. A positive correlation was found between the EMIC–CSS and the SDS total scores \( (r = 0.45) \). Internal consistency was good, with alphas of 0.83 and 0.87 for the EMIC–CSS and SDS. The inter-interviewer reliability was also good with reliability coefficients (ICC) of 0.84 (95%CI 0.75–0.90) and 0.75 (95%CI 0.62–0.84), respectively. The smallest changes detectable by the EMIC were 0.81 on a scale of 0–30 and 0.60 for the SDS on a scale range of 0–21, which means they are very sensitive to changes and differences.

Conclusion
The EMIC–CSS and the SDS are valid short instruments to assess attitudes and reported behaviour in a Bahasa-speaking population. A cultural validation protocol should be used to confirm their validity in different cultural settings and target groups. The instruments can be easily adapted for use with other NTD oror disabilities.

Keywords: stigma, measurement, impact, human rights, inclusion
ILC2.3-061
A Counselor’s Notes along the Journey with the leprosy affected.
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OBJECTIVES:
To present the perspectives and insights drawn from a counselor’s experience with the leprosy affected persons and their families during the past 22 years. The objective is to highlight specific concerns and approaches which have been found to be essential and useful in addressing the counseling needs of the persons affected by Leprosy. The main focus is to enable a contextual understanding of the priorities in counseling from the perspective of the person affected and identifying suitable methods to address those issues.

Background:
The author felt the need for sharing these simple lessons because sometimes leprosy counseling gets detached from patient’s perspectives and becomes leprosy education based on the needs of the control program. According to Thornicroft et al (2007) there has been reluctance in involving academic and individual experiences which could enrich the analysis but also the practical work on leprosy.

According to Beatriz Miranda (2008) individual and medical models have characterised the study of leprosy with results that give information about statistics and numbers more than the life of individuals. Also, the professional approach that has made emphasis on top down relationships, sharply dividing actors between professionals and patients has reduced the possibilities to make the individuals actors of their own change.

METHODS:
This paper is based on counseling sessions, qualitative interviews, formal and informal assessments with patients and case studies. It summarizes the points of view emerged from the qualitative sessions the counselor has had with the affected persons over the years as individuals, families and as groups.

RESULTS:
The results are presented as themes addressing breaking the diagnosis of Leprosy and conveying the disease information, Compliance, Disclosure, Contact screening (both at hospital and the field), Family, Communication, Post RFT issues, Sensitivity to life events and Co-morbid stressors and issues with regard to the use of assessment tools in Leprosy.
A few examples given below require specific ways of dealing with issues on disease information and family screening.

For example, while conveying the disease information we need to understand how they decode our explanation and education about the disease; when we explain that the disease is caused by germs, we find that in many local languages (colloquial language) germ is translated as insects in Tamil or worm in Telugu. So patients think that some insects or worms are moving around in their nerves and blood thus leading to fear. Subsequently this fear is reflected at the time of RFT when a few patients, who are unable to believe that they are cured, come back with delusional paresthesia or delusional parasitosis. Many of the RFT patients keep visiting the hospital with vague complaints of these symptoms.

The paper high lights the dos and don’ts in leprosy counseling which we often overlook, such as not allowing a relative or neighbor in the room when the doctor breaks the diagnosis, which are often overlooked. Revealing the news in the presence of others has led to emotional trauma and major family problems for the patients.

Example of one specific protocol for getting contacts screened which has been found to be useful.

Before asking the patient to bring his family members/contacts for screening, always listen to their concerns in bringing them. Many patients say they don’t want the family to know about the disease. They express fear of rejection by family with disease disclosure. Those patients who express such fears need to be assured of confidentiality and they should be assured that we will not tell them the name of the disease. The family will be told that it’s a bacterial infection. Such assurance of not revealing the NAME of the disease gives confidence to patients and motivates them to bring the family for screening. Patient feels happy that his/her privacy is respected and his feelings are addressed.

CONCLUSION:

In order to facilitate leprosy affected persons accept and cope with the challenges of Psychological problems and consequences of stigma, certain specific approaches have been found to be useful. These strategies may also benefit in addressing issues which are of relevance for Leprosy control programmes and policy makers. Further the paper draws important lips on getting across to the patient, keeping in mind the context, educational and cultural background of the person affected. Finally the article provides a framework which is evidence-based and can help in developing a standardized protocol of best-practice information by collecting insights from other counselors in the field.
ILC2.3-062
A study of the effect of floods on the lives of the leprosy affected in Cuddalore District, Tamil Nadu, India
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Objective: To identify the needs of people affected by leprosy and use of MCR Footwear in Cuddalore district after the floods in December 2015.

Introduction: The floods in Cuddalore, in Tamil Nadu, South India, during November and December 2015 have resulted in great destruction to the environment, housing, business and livelihood and life stock etc. In these situations though the whole community suffers, people affected by leprosy are more severely affected as they are the last to be able to avail the relief provided. This study attempts to assess their situation and prioritize their felt needs after the floods.

Methodology: This is a Community based cross sectional study. The persons affected with leprosy living in the community were located by the community development organizers of the Securing Opportunity Advance Revenue project. The Rehabilitation team from the The Leprosy Mission hospital Vadathorasalur surveyed the flood affected areas of Cuddalore district between during 11th to 18th December 2015 and identified 65 persons affected with leprosy who were included in our study. The needs were identified by using questionnaire and interviewing the person affected by leprosy and their family members. The use of MCR footwear by Visual inspection and interview with them for the compliance were also recorded along with basic disability status, required rehabilitation measures and felt needs.
Results: 65 leprosy affected person were studied. 27 (42%) of them belong to the age group 60–69 years. 52 (80%) of them belong to Male and 13 (20%) female. Disability status: 56 (86%) hand impairments, 57 (88%) foot impairments and 12 (18%) eyes were affected. 33 (50%) of them had ulcers of both hands and feet and 28 (43%) present in foot. 64 (98.5%) of those surveyed had Grade II disability. 45 (69%) houses were affected by floods. 56 (86%) needs ADL adaptations, 7 (11%) needs splints, 56 (86%) needs MCR, 8 (12%) needs housing, 4 (6%) needs tools adaptations, 53 (82%) need community POID activities, 13 (20%) needs Reconstructive surgeries, 33 (50%) Ulcer management, 7 (10%) Orthopaedic and mobility devices, 7 (10%) counselling, 6 (9%) cataract surgery, 9 (14%) Vocational training for their children, 29 (44%) needs government benefits like disability maintenance grant. Micro cellular Rubber (MCR) footwear were provided to 52 (80%) of the person with leprosy by the Community Development organizers during their regular visits. The visual inspection reveals that only 8 (12%) is using the MCR foot wear and 29 (45%) using own footwear and 28 (43%) walk bare foot. The foot ulcers are present in Bare foot walk 5 (8%), own footwear 15 (23%) and MCR footwear 8 (12%) respectively.

Conclusion: The needs identified by the person affected by leprosy are listed in sequence. Majority of their needs belongs to ADL adaptation, Durable MCR footwear, Community POID activities, Ulcer management & Government Benefits. The family members and the person affected by leprosy will be empowered and assisted to access their needs from the Government. The foot ulcers are more present in the Own footwear users than MCR Footwear and Bare foot walk. Hence it is very important to do regular foot care activities and adherence to MCR footwear to protect the foot from secondary complications.
Socio economic status of Young youths after Vocational training programme in TLM Vadathorasalur, TAMILNADU
M MATHANRAJ DAVID1, K JILAVARASI1, M PAUL ISAAC2

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Objective: To study the Socioeconomic status of young youths after Vocational training in TLM Vadathorasalur, Tamilnadu.

Introduction: Providing young people with opportunities for skills acquisition is widely perceived to be a fair and effective use of public resources. Vocational training programs have therefore emerged as an important source of livelihood support for the youths.

Methodology: This was a retrospective study and the data taken from The Leprosy Mission Vocational Training centre Vadathorasalur during the period of 2000 to 2013 years. We have randomly selected the 118 student’s record from the placement department for 6 trades. The Kuppuswamy’s Socio economic status scale were used to analyses the data of all the 118 students after training and placement for 1st year, 2nd year, 3rd year and present status. The young youths were divided into Male and female and were further categorized as Person with leprosy, Dependents of Person with leprosy, General & Differently abled. The data were recorded and interpreted.
Results: A total of 118 youths 75(63.5%) were Male and 43(36.4%) were female. The Categories of youths under Dependents of Person with leprosy were 86 (72.8%), Person with leprosy 18 (15.2%), General 6 (5%) and Differently abled 8 (6.7%). The various trades youths under Motor Mechanic Vehicle were 18 (15.2%), Automobile 15 (12.7%), Computer 16 (13.5%), Tailoring 19 (16.1%), Electrician 36 (30.5%) & Refrigeration 14 (11.8%). The socio-economic status scale in 1st year were in Middle/Upper middle class 37 (31.3%) and Lower/Upper Lower class 81 (68.6%). In 2nd year Middle/Upper middle class were 81 (68.6%) and Lower/Upper Lower class 27 (31.3%). In 3rd year Upper middle class were 4 (3.3%), Middle/Upper middle class were 81 (68.6%) and Lower/Upper Lower class 33 (27.9%). The present Socioeconomic status of the youths were in Upper middle class 41 (34.7%), Middle/Upper middle class were 55 (46.6%) and Lower/Upper Lower class 22 (18.6%) respectively. The socioeconomic status in Upper middle class for the trades Motor Mechanic Vehicle were 17 (14.4%), Electrician 13 (11%) and Refrigeration 8 (6.7%) respectively. The socioeconomic status in Upper middle class for the categories of youth, Dependents of Person with leprosy were 35 (29.6%) and Person with leprosy 6(5%). The male were 37 (31.3%) and Female 4 (3.3%) in socioeconomic status in Upper middle class.

Conclusion: The finding of the data clearly shows that the socioeconomic status of the young youths after the vocational training programme has improved considerably over the years. The percentage of youths is more in the Middle/Upper middle class for the socioeconomic status than the Upper middle and Lower/Upper lower class. The trades like Motor mechanic vehicle, Electrician and Refrigeration has more socioeconomic status in Upper middle class and the Male percentage in upper middle class was more in comparison with Female. Hence we conclude that the vocational training with proper monitoring and placement services will enhance the socioeconomic status of the youths.
QUALITATIVE ANALYSIS OF THE FACTORS ASSOCIATED WITH DEHABILITATION OF LEPROSY-AFFECTED
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Objective: Rehabilitation of persons affected by leprosy is unique for the disease and totally undesirable. This becomes all the more regrettable with availability of MDT, integrated services, and good referral care. The main objectives are to determine the specific factors through qualitative data analysis, contributing towards Dehability of the leprosy afflicted and identify community based solutions to prevent the phenomenon.

Methods: All the qualitative methods of social science research viz. observation, in-depth interview and FGDs have been used in the study for conducting case studies. A total of 13 case studies of dehbabilitated patients have been conducted from 2 states of Uttar Pradesh and West Bengal in India and brief summary of the case study findings have been presented in the paper.

The cases studied represent the problems of due to various reasons viz. delayed due to ignorance, economic and financial problems, defaulted from treatment due to side effects of MDT, embarrassing look of dressings of ulcers, miss interpretation of leprosy as mental illness and lack of immediate improvement after taking MDT etc.
Results of qualitative analysis: Summary of the qualitative analysis gives rise to the following inferences:

- Qualitative findings provide witness for delay i.e. starting of proper treatment after development of deformity is a common phenomenon among the deformed
- The specific phenomenon found to be prevented through special approaches include: Delay of treatment after reporting to treatment centre and Getting dehabilitated while treatment is going on
- Delay in reporting for treatment after noticing the symptoms has been found to be due to the reasons viz. ignorance, economic problem and carelessness of the family members (husband)
- Defaulting of MDT is due to various reasons viz. psycho-social, economic and nature of treatment facilities etc in the PHC etc
- Discussion with the patient’s family members and the neighborhoods brought out their perceptions on how to prevent the phenomenon of defaulting, which the primary reason for Dehabilitation.
- The study also highlights various specific factors of the above phenomenon, with special reference to female patients and the factors promoting colonization of the dehabilitated,

Conclusion:
The community’s activities that have been proved to be successful and replicable in similar situations are of three broad categories viz. Patient Involved Community Actions (PICA), Non-patient Involved Community Actions (NICA) and Actions of Social Institutions (ASI).

Keywords: Leprosy, Dehabilitation, Qualitative research
ILC2.3-065
Leprosy perception among Self Help Group members in Rautahat District, Nepal
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Objectives: Self Help Groups (SHGs) are key organizations where leprosy affected people (LAP) and people with disability can discuss their problems and help each other through the system of microfinance. As SHGs can provide opportunity to reduce stigma, a study was performed to examine the perceptions about leprosy among SHG members.

Methods: At the end of a 5 year Community-Based Rehabilitation Programme (2009–2014), 20% (114 of 570 members) of 65 SHG across 8 Village Development Committees (VDCs) of the Rautahat district were surveyed, maintaining similar proportions of gender and various disabilities. Assessments were made by interviews with close-ended questionnaires involving multiple choice options, and two Focus Group Discussions were held. Data were collected and analyzed in Microsoft excel.

Results: 68% (78/114) of the SHG members were LAPs. 83.33% (95/114) of the SHG members were illiterate or had received less than 1 year of formal education. 86% (98/114) of SHG members performed some kind of income generating work. Almost all of the SHG members believed that leprosy is not caused by sin or curse but by bacteria.
The majority (80%) of SHG members believe that leprosy is transmitted by droplet infection and not by sharing the same plate. Less than 10% of the people think leprosy is only susceptible to poor, low caste, female or old people and believe that people of any background can get the disease. While almost all of the SHG members think that early MDT can prevent disability, only 32.46% (37/114) understand that MDT can cure leprosy but can’t cure disability. While almost all of the SHG members believe that LAPs can participate in the community, more than half (56.14%) agreed that LAPs would be unable to mobilize SHG members if they were made the heads of the SHGs. Similarly, while almost all of the SHG members think they have good relationships with their communities, one-fourth (25.56%) still report that community people hesitate to buying from their shops.

Conclusion: SHG members seem to have good insight about the cause and transmission of leprosy. Most of them understand that early diagnosis and treatment can prevent disabilities. In spite of that, quite a number of SHG members feel that LAPs can’t work as leaders of the SHGs and community people hesitate to buy things from the shops of LAPs and disabled people. Stigma reduction remains an important challenge in Nepal for LAPs in their communities.

**Keywords:** Leprosy, Stigma, Community based rehabilitation, Nepal, Disability
ILC2.3–066
A socio–economic survey among leprosy and other disabled populations prior to launch of community–based rehabilitation within a rural central Nepal population
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Objective: A buffer zone within a national forest park is a human settlement either inside or along the borders of the national park. The main objective of this study was to identify and characterize the socioeconomic status of leprosy–affected as well as other disabled people living in the buffer zone of Chitwan National Park in Nepal prior to initiation of community–based rehabilitation (CBR) programmes. The buffer zone consisted about 40,000 people in 4 villages that are army–regulated for entry, dwelling or exit.

Methodology: Four data collectors visited and surveyed homes with disabled occupants in the 4 villages. The data collection process utilized a custom economic survey, Participation Scale and World Health Organization Disability grade assignment.

Results: In total, 330 disabled people were surveyed with one or more disabled occupants living in single homes. Among them, 45 people were leprosy–affected (13.6%) and 285 persons were affected with other general disabilities (86.4%). Out of 45 leprosy affected people, 3 (6.6%) had disability grade (DG) I and 7 (15.5%) had DG II. Most of the general disabilities (80%) were either due to other disease or congenital reasons rather than accidents. While only 34% of the non–leprosy disabled had received a government disability identification card, none of the leprosy–affected had received one.
The majority (65%) of respondents had severe or extreme participation restriction within their community as measured by the Participation scale. 84.8% of the disabled people reported dependence on agriculture for their livelihood; and 53% of respondents had insufficient lands to sustainably feed their household throughout the year. A higher proportion of leprosy-affected people owned no land at all compared to those with non-leprosy disability (18% vs. 8%, OR 2.4630 CI 1.0267–5.9087). Most disabled people, whether leprosy affected or not, were not engaged in direct income generating activities like business, daily-wage or service work (89% and 97%, respectively). Average income did not differ between disabled groups. 66% of respondent’s family incomes were below WHO poverty lines (less than USD 1 daily income) and 77% had salaries below Nepal’s minimum wage requirement (less than USD 74/month).

Conclusion: The disabled population surveyed is impoverished with severe to extreme participation restriction within the community. This baseline data indicates the need and likely benefit from the establishment of effective CBR programmes to support increased community participation, optimized agricultural methods and income generation.

**Keywords:** Leprosy, Disability, socio-economic, community based rehabilitation, Nepal
ILC2.3-067
Psychological well-being and experiences of disabled leprosy-affected persons following the devastating 2015 earthquake in Nepal
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Objective: The 2015 devastating earthquake caused significant effects on the livelihood and psychological well-being of people of Nepal. This study was carried out to assess the psychological impact of the earthquake on leprosy-affected people (LAP) in two earthquake affected districts of Nepal.

Method: World Health Organization (WHO)-5 Well-Being Index (WHO5) was used to assess psychological status. Psychological, social and physical (PSP) status were measured using a customized questionnaire. Both questionnaires were used to interview 35 LAPs, by phone or personal interviews, at 10 months time after the earthquake. To measure their well-being at the time of the earthquake, the LAPs were asked to remember their status at that time. The counselor had also personally interviewed all LAPs within 2 months after the disaster either at the hospital or their homes. 35 LAPs, comparable to in terms of WHO disability grade (DG) and gender, from areas unaffected by earthquake, were also enrolled as comparison controls. Also, 35 non-leprosy-affected or non-disabled controls were surveyed to compare with the hesitation of LAPs to integrate within community shelters after the earthquake.

Results: Most of the LAPs surveyed had WHO DG 2 (28/35, 80%); none had DG0. More than half (60%) of the LAPs reported uninhabitable homes and were presently living in temporary shelters. 37% (13/35) LAPs found it difficult to adjust in the community shelter during the immediate few weeks after the disaster; but only 6% (2/35) of the healthy people found it difficult (37% vs. 6%, p

Conclusion: Immediately following the earthquake, LAPs with DG of 1 or 2 experienced more difficulty integrating within community shelters than controls. There has since been huge improvement in the psychological status of the LAPs in 10 months after the earthquake; however, their psychological well-being has not yet returned to comparable control levels. This means LAPs still require time to come back to their normal lives.

Keywords: Leprosy, earthquake, psychological, WHO-5 well-being questionnaire, Nepal
ILC2.3-068
Leveraging the Influential Power of Religious Institutions to Reduce Leprosy-related Stigma in Local Communities
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Objective:
Deep-rooted misconceptions surrounding leprosy are prevalent in local communities, stigmatizing those affected by the disease and bringing about discrimination. In an age where leprosy continues to be perceived as an act of divine punishment, this project sought to reshape communities’ views and norms by leveraging the influential power and wide reach of religious institutions.

Method:
Master Trainers were selected from Church Pastors representing Churches from each district, and trained by the Sri Lankan Government’s Anti-Leprosy Campaign. The Master Trainers were each tasked with training 10 - 20 Pastors in their respective districts.

In order to maintain consistency and training quality, the Master Trainers were encouraged to partner with local Public Health Inspectors when conducting the training programs and were provided with training manuals. The training manuals contained chapters on clinical leprosy, facts of Leprosy (including symptoms and detection), stigma, and the biblical basis for engaging with those affected with Leprosy together with suggested sermon notes for a ‘Leprosy Awareness Sunday’.

The trained District Pastors were mobilized to hold ‘Leprosy Awareness Sunday’s in their local Churches, educating congregations about leprosy, encouraging the care of those affected by it and dispelling wide-spread myths.
Results:
This campaign led to the education and training of 724 church leaders around the country, including those from very remote communities. They in turn carried the message to their local congregations, significantly expanding the reach of the campaign.

Moreover, many churches have since indicated their desire to work on leprosy-related activities in their communities, including working with local Public HealthInspectors to conduct leprosy awareness programs and skin camps in schools, prisons, and other high-risk community groups.

By collaborating with the Government’s Anti-Leprosy Campaign, the trained participants have been recognized in their local communities, which has resulted in a large volunteer force around the country that can be mobilized by the Government in its future Anti-Leprosy Campaigns.

Conclusion:
This Church-based approach has proven to be useful in raising awareness on Leprosy in grassroots communities across the country that once had strong misconceptions and beliefs. Leveraging the influential power religious institutions has shown to be successful in addressing stigma and encouraging societal care for those affected by this disease. This model conducted via a Church-based approach can be replicated in other religious structures for a holistic coverage of society.

Keywords: Awareness, Church, Marginalized, Training of Trainer, Government
ILC2.3–069
Use of a cooperative model of community base rehabilitation to bring social status improvement for leprosy affected and general disabled in Nepal: a 5 year Prospective Study
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Objective: Community-based rehabilitation (CBR) programs aim to address socio-economic obstacles alongside patients to generate more effective participation within their communities. The objective of this prospective study was to measure the improvement of social status of leprosy-affected (LAP) and People with Disability (PWD) achieved through a cooperative CBR project entitled Community Empowerment, Development and Rehabilitation (CEDAR).

Methods: CEDAR was implemented for five years (July 2009–June 2014) in two districts of the central development region in Nepal and included 14 cooperatives to be led by LAP and PWD themselves. 884 participants were evaluated by standard questionnaires like the Participation Scale (P Scale), World Health Organization (WHO) Quality of Life (WHOQOL-BREF) and WHO Disability Assessment Schedule (WHO-DAS) alongside study-specific socioeconomic and customized health-related questionnaires. A microfinance system was started in all of the co-operative groups. All of the co-operative members received training related to entrepreneurship and leadership, prevention of disability, health and sanitation, capacity building and co-operative management at the beginning and/or during the study period.

Results: Of 884 co-operative members, the ratio of LAP to PWD was 2:3 while the male to female ratio was 1:1. 13% (114/884) had toilets at enrollment compared to 61% (542/884) at the end of 5 years (p<0.01).

Conclusion: This study demonstrates that community based interventions like CEDAR can bring significant socio-economic growth health improvement in LAP and PWD. The study shows that proper entrepreneurship, health and leadership training can strengthen LAP and PWD to be integrated into their communities.

Keywords: Leprosy, Nepal, community based rehabilitation, quality of life, microfinance
ILC2.4-001
COMPARATIVE IMPACT OF INSTITUTIONAL AND COMMUNITY BASED INTERVENTIONS AGAINST DEFAULTING FROM MDT
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Objective:
To assess the comparative impact of three different institutional and community based interventional methods viz. Hospital based counseling, Family based counseling and Community Action, implemented to prevent defaulting from MDT of leprosy patients.

Methods:
The innovative action research project was carried out in 4 TLM leprosy control centres, from one district selected from each states viz. Andhra Pradesh(AP), Chhattisgarh(CG), Maharashtra(MH) & Uttar Pradesh(UP).
Impact of each intervention was assessed based on the defaulting rates before and after implementation of each intervention, calculated over the patients’ samples available for Hospital Based Counseling (919 and 1456), Family Based Counseling (129) and Community Action for Prevention of Defaulting from MDT (83 patients representing 43 villages). Analyses were done by type of leprosy, Gender and Age-group.

Findings:
• Hospital based counseling has shown significant decrease in the rate of defaulting in the 3 study centres. The maximum percent of decrease is found in UP (65 to 32) and a minimum in CG (30 to 29).
• Out of the 129 cases in the 4 centres visited by the counselors at the residence, 83 patients remained defaulters and the others showed positive improvement, by continuing their treatment till RFT or as active case after 1 visit of counseling by the counselor.
• While a total of 543 patients received involved with the services of community action, out of the total 83 patients studied for evaluation, more than 50 (41 restarted and 2 already completed the treatment) showed positive results within 2 months of period after community’s intervention was stated.

Conclusions:
• Prevention of defaulting and successful completion of MDT needs all 3 types of interventions viz. Hospital based counseling of patients, Family based counseling of defaulters and Community Action.
• While counseling at the Treatment Centre will be the primary method and Family Based Counseling is the secondary technique for better impact, the Community Action is the ultimate/best strategy to prevent defaulting and ensure adherence to MDT.

Keywords: Leprosy, Prevention of Defaulting, MDT, Leprosy, Impact
ILC2.4-002
Enabling Enhanced Participation
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It is nowadays our common understanding that health services especially for disease control cannot be effectively provided, unless those who need and use the services directly participate in the course of provision of the services. In case of leprosy services, WHO developed the guidelines for strengthening participation of persons affected by leprosy in leprosy services (hereinafter called SPP), which state important and feasible roles, with which the persons will take part in provision of sustainable quality leprosy services.

SPP is in fact observed in many parts of the world at various levels in scale and scope, however, the information on SPP cases is yet to be widely shared among those concerned including national leprosy programs and therefore it is likely that the persons’ competency and knowledge obtained through their experience with leprosy are not well acknowledged and appreciated.

In order to enable and enhance SPP, Temporary Expert Group (TEG) was formed under ILEP Technical Commission and studied SPP practices in Nepal, India, Indonesia, China and Ethiopia. TEG had discussion in person twice with the participating persons, in addition conducted a survey of good practices by self-assessment and by interview. As a result, TEG identified various facts and factors influencing SPP both positively and negatively. These include scale and scope of SPP, motivations of participating persons, external support and guidance including opportunity for empowerment, capacity building and poverty alleviation, concerns of health personnel, process to starting up SPP, impacts on the persons and the services etc.

At this workshop, these findings are presented and further discussed hoping that the shared information will give health personnel, especially of national leprosy programs, concrete tools and guidance to start up SPP at field level in their countries.

Keywords: leprosy services, participation, good practices, Temporary Expert Group, SPP
ILC2.4–003
My eventful journey to enhance Integration, Dignity and Economic Advancement
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Diagnosed with Hansen’s disease (HD) at 16, I received treatment at Sorok-do national hospital in Korea for 3 years and managed to fully recover from illness. However, I could not gain status as the general public even though I actively participated in HD relief work to help HD patients and their family in other countries. One of my toughest challenges in my life was hiding the fact that I was not known as an ex-patient to people. This was because I was afraid that I would be discriminated against and stigmatized if it were disclosed. Revealing the history of my disease to others was only the beginning.

In 2009 some of my closest colleagues suggested that I could write the story of my own life disclosing that I was once was infected with HD and then hold a book-launching ceremony. This enhanced me with a good opportunity and it went over immensely well with my colleagues. The people around me gained a better understanding about HD and its patients and now eagerly join my programs. I regretted not doing this earlier. By taking this opportunity, I began to have a voice through various social groups such as IDEA International, the Seoul District Elders’ Association, Connecting the Business Marketplace to Christ (CBMC)-East Seoul branch, and others.

My life journey for struggles and efforts over the past 60 years have created a world where the HD patients and those affected by HD can lead a more humane life with a voice the community and general public. My social participation as an ex-patient is now giving hope and injecting a spirit of challenge to HD patients helping to eliminate both the stigma and discrimination against HD.

The deep-rooted stigma cannot be dissolved by itself even over time. This indicates to the need for those affected by HD to inspire social integration like the HD patients participate in throughout Korea. The greatest progress, which is to restore human dignity for those affected by HD and to eliminate both stigma and discrimination, is being made through active social participation by patients and ex-patients themselves in Korea. Presently those affected by HD can live life with full dignity as a human being and are proud members of Korean society by being givers rather than takers or receivers. Social participation plays an essential role in tackling HD related challenges.

Keywords: IDEA, Korea, Integration, Dignity, Advancement
ILC2.4–004
Changes in Social participation and disability level among leprosy affected persons before and after completion of multidrug therapy
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Objectives:
1) To detect and evaluate changes in social participation among leprosy affected persons after completion of MDT.
2) To study the relationship, if any, between age, sex, caste and physical disability which contribute to this changes in participation level.

Methodology:
This is a longitudinal study with stratified random sampling of all persons new leprosy patients who were willing to continue MDT from Bethesda Leprosy Hospital, Champa from January 2014 to December 2014. The patients selected were enrolled in this study and followed till they completed their MDT treatment. Changes in Physical disability were assessed by WHO disability grading and Eye Hand Foot scoring, while the social participation level was be assessed through the Participation scale.
The Pre–scoring was done during their first visit to Champa hospital for MDT and Post scoring was be done after their completion of MDT. The collected data was entered in to excel sheet continuously for analysis.

Results:
108 persons affected with leprosy, who were willing to take MDT regularly from Bethesda Leprosy Hospital, have been entered in this study. Among this 91(84.3%) were multibacillary patients and 17 (15.7%) were paucibacillary. Their ages ranged from 16 years to 80 years. The bacterial index was between 0 to 2 for 75(69.4%) of the patients, and between 2–4 for 20 (18.5%) patients, while the remaining 13 (12.1%) had a bacterial index between 4 and 6. Their initial disabilities scoring according to World Health Organization was Grade ‘0’ for 53 (49.1%) persons and Grade ‘1’, 25(23.1%) for persons and Grade ‘2’, 30(27.8%) persons. Till now 85 (78.7%) persons were released from treatment, remaining 23 (20.3%) need to be followed up till March 2016, after this the result of pre and post participatory scores will be analyzed.

Conclusion:
The results demonstrate the changes in social participation and disability level of leprosy affected person before and after taking Multidrug therapy.

Keywords: social participation, disability
ILC2.4-005
Fair labour practices of people affected by leprosy and disability, working with wage and self-employed
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Objectives: Livelihood opportunities are one of the key factors in eliminating poverty. In rural and urban areas, people with disabilities are not included in income generating activities and may be excluded from the decision making processes at all levels of the community. In the present scenario they are less likely to be employed, compared to their non-disabled peers because of barriers in finding and retaining jobs. These barriers include unequal access to training and education, physical barriers and other forms of discrimination.

Methods: The Research included disabled and leprosy affected people from Vocational Education Programs, Community Development Programs and as well as non-disabled artisans who are peers from wage and self-employed. To understand the fair labour condition of these people with disability, initially the existing tools measuring fair labour conditions is reviewed to develop / adapt an appropriate check list based on Indian context. Then the fair labour conditions of the people disadvantaged by leprosy/ disabilities and non-disabled co-workers in the same workplace were assessed. In each VTC 25 students from the batches of 2009 to 2013 were selected through random purposive sampling across categories such as gender, education, trades, geographical backgrounds, etc. The methodology included interviews, group discussions, workshops and case study.
Results: Analysis shows that People with disabilities face significant challenges, ranging from negative attitudes among employers and co-workers to inaccessible work places, lack of training opportunities and little public support. Negative attitudes exacerbate discrimination. The stereotypical view of disabled person as being helpless discourages employers from recruiting people with such challenges. This leads to people with leprosy and disabilities, being the poorest and most marginalized members of the communities.

Conclusions: The target population (person affected by leprosy and disability) represents a significant portion of Indian population who are facing great challenges accessing basic rights such as education, health services and importantly, gainful employment. Inclusive vocational education institutes play a key precondition for decent employment. Government Policy for undertaking intensive accessibility audits in private and government sectors “From inclusive education to inclusive employment for people with disability” to identify infrastructure changes with technical advice on how to implement these will create work place structures that promote access and enable to fulfil their full potential. With the right support and accommodation those with more substantial disabilities, can become as productive as their non-disabled co-workers in the workplace.

Keywords: disability leprosy, inclusive education and employment, dignity discrimination, inaccessible work places, Fair labour practices
ILC2.4–006
Participation Restriction of People Affected by Leprosy in South Sudan
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Abstract: Participation Scale Study in People Affected by Leprosy in South Sudan

PURPOSE:
This study examined Participation Restriction using Participation Scale (P-scale) among people affected by leprosy in Luri Rokwe (South Sudan) previously a leprosy colony. In addition, the purpose of the study is to determine factors associated with the participation restriction in that community.

METHOD:
People affected by leprosy were systemically recruited to the study from the community (Luri Rokwe village in the outskirts of Juba the main town in South Sudan) for a period of ten days. The selection criteria include speaking Arabic, consent and age above 18 and below 75 years old. Data on socioeconomic status and leprosy were collected. The interviews were conducted in fully private settings and consents were obtained before each interview.
RESULTS:
The Study interviewed 92 respondents and all respondents have completed treatment of leprosy. The study found 77% of the people affected by leprosy have participation restriction. 21% of the respondents with participation restriction have very severe participation restriction. The respondents with grade 2 disability (48% of the total number of respondents) have severe restriction compared to the Grade 0 (56% of the total number of respondents) and Grade 1 disability (14% of the total number of respondents). Other characteristics of people affected by leprosy with participation restriction are no formal education, low income and unemployment, and low self-esteem. Logistic regression analysis of the variable common in all the respondents shows the association of visible deformity, age above 50 years old and female gender with participation restriction.

CONCLUSION:
Stigma, visible deformity and poverty are combined factors that affect the livelihood, self-esteem and dignity of people affected by leprosy. Old age combined with disabilities due to leprosy cannot be addressed by rehabilitation alone but an appropriate approach is needed to address the issues of destitution and old age people affected by leprosy to reduce their participation restriction and isolation.

Wilson Lado Santo
Operation Manager
TLM–South Sudan
Feb 4, 2016

Keywords: P–Scale, Stigma, Restriction, Dignity, Empowerment
ILC2.4-007
Exclusion to Inclusion— Community Led Actions Reduce Leprosy Stigma and Prevent Isolation, Bogra District, Bangladesh
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Objective: People affected by leprosy in Bogra district, Bangladesh, will develop a sense of mutual co-operation and community, where people recognise the importance of working together to facilitate change. The target community will understand their legal/human rights and are empowered to access their entitlements through collective action.

Method: A SHG is a group of 8 - 15 people affected by leprosy, who gather regularly to create a conducive environment for its members in their community. The group member engage in financial management skills building, interactive meetings and capacity building of the group members. Lepra implemented the Exclusion to Inclusion project from 2011 to 2014 with two intervention strategies: 1) Inclusion of persons affected by leprosy into SHGs for sharing of information and social interaction; 2) Enabling SHG members to overcome social barriers and provide them with tools to improve their livelihoods. Data were collected through community survey at beginning and after 2nd year of intervention using a structured questionnaire.

Results: A total of 105 SHGs were formed with 961 members (543 male and 418 female), of which 468 members were affected by leprosy. The 68 male and 37 female SHG leaders were instrumental in continuing group gatherings and interaction on various issues. During the lifetime of the project, 1530 group meetings were conducted. Almost half of the total targeted beneficiaries had improved their socio-economic condition and were able to live to the same standard of their surrounding community. Family income among SHG members increased by 35%, health expenditure reduced by 23%, and school attendance by the beneficiaries’ children increased by 57%. Among group members, 45 people disabled by leprosy enrolled in government disability grants from the Social Welfare department and 40 obtained employment in the private sector.

Conclusion: The SHG approach was effective in changing the lives of people affected by leprosy and their families. Economic uplift and financial management have opened the door to many opportunities and thus contribute to productive lives among beneficiaries. The living conditions of beneficiaries related to housing, sanitation, social cohesion and interaction have also improved. The lesson learned is that SHGs act as life changing tools that motivate communities affected by leprosy to set up their own initiatives for their own benefit.

Keywords: Exclusion to Inclusion
ILC2.4–008
Engaging people affected by leprosy as research partners in qualitative research
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Objectives: The objective of this pilot study was to explore the use of a participatory methodology to identify factors leading to delayed diagnosis of leprosy. The objective of this presentation is to outline the participatory methodology as well as the “process outcomes” of this translational research project, recently completed in Chhattisgarh, India.

Methods: Three people affected by leprosy were trained as research partners to conduct semi-structured interviews. Their progress was monitored and they were interviewed at completion of the project.

Results: The trained research partners obtained consent, and audio recorded 39 interviews with people affected by leprosy and community members. They then provided a verbal summary of each interview to the research team, and also participated in a translation/feedback session with government staff. Benefits and limitations of this pilot study method (including the process of engagement with participants and local communities, data quality, timeframe, and cost) are outlined with examples. Partners’ perspectives on their involvement in research are also discussed.

Conclusion: Engaging people affected by leprosy as research partners in qualitative research is feasible and appears to result in high quality, reliable information. It should be the preferred option where research projects seek to be genuinely participatory, and may be a small step towards more inclusive research.

Keywords: Qualitative research, Translational research, Delayed diagnosis, People affected by leprosy, Inclusive research
ILC2.4-009
Self-help group: a socio-economic rehabilitation approach to regain human dignity and reduce leprosy-related stigma in the Northeastern community, Thailand
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Objective: This study was conducted to regain human dignity of people affected by leprosy and reduce stigma towards leprosy among community members and health workers in the Northeastern community of Thailand.

Methodology: The intervention was done cooperatively between people affected by leprosy and health officers. Under the technical and financial support from the government sector and the Nippon Foundation, a self-help group (SHG) was formed in 2011 with 11 members consisting of 5 people with leprosy-related disability and 6 people with other disability. The main objective of the group was to reduce stigma towards leprosy through changing attitudes from negative to positive. The SHG members conducted income earning activities, disseminated leprosy knowledge, participated in community’s activities, and supported each other and other people with disability who had encountered participation restrictions. Evaluation was conducted by researchers who are health officers at district, provincial and national levels. Data collection was done by interviewing the SHG members, community members, and health workers using qualitative and quantitative stigma assessing tools, including the EMIC stigma scale. Apart from that, the SHG members also helped assessing the effectiveness of the interventions by gathering information from their own experiences, observing and talking with each other.
Results:
Assessed by the researchers
The socio-economic rehabilitation resulted in a measurable reduction of perceived stigma related to leprosy among community members and health workers. Significant reductions were found in the mean EMIC score after interventions. Even after the intervention, the percentage of people with perceived stigma was still high; 81% of community members, 72% of health workers. There was a notable improvement of self-esteem and social participation of the self-help group members. Accessed by the SHG members
We felt that we had regained our human dignity as we had more income to support our own families, had a group we belonged to, and had a chance to join social activities as other people have. People had a positive attitude towards us and paid attention to what we had done.

Conclusion: involving people affected by leprosy in socio-economic rehabilitation helps people affected to regain human dignity and reduce stigma. This should be done by also involving people with other disability in order to enhance the capability of the group, narrow the gap between people affected by leprosy and others, and include people affected by leprosy in the mainstream developing process.

Keywords: Rehabilitation, Human dignity, Participation, Stigma, Self-help group
ILC2.4-010
Acceptability of a Rapid Diagnostic Test (RDT) for Leprosy Among Patients, House Contacts and Community Contacts in Cebu, Philippines
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OBJECTIVE: To determine the acceptability of an immunologic, lateral flow-based rapid diagnostic test (RDT) among leprosy patients, house contacts (HC) and community contacts (CC) in a well-defined population in Cebu, Philippines.

METHODOLOGY: With the approval of an Institutional Ethics Committee, study volunteers were interviewed on their level of acceptance of an immunologic, lateral flow-based RDT consisting a combination of PGL-I and LID-1 (ML2331,ML0405) as a serodiagnostic, treatment monitoring and seroprognostic tool among leprosy patients, house contacts and community contacts. The survey was conducted in February-May 2015 at the Leonard Wood Memorial Center for Leprosy Research. Leprosy cases were newly diagnosed multibacillary (MB) and paucibacillary (PB) patients; while healthy household and community contacts were those residing in the same dwelling or community with the index case for at least 6 months. The study was conducted by asking the respondents their perception of benefits and importance of RDT, their willingness to participate in future studies and their preferred frequency of testing using the tool.

RESULTS: There were a total of 707 respondents, including 168 patients, 297 house contacts and 242 community contacts. Among the patients, 156 (93%) were MB and 12 (7%) were PB.
Cohort responses were as follows:

1) Acceptance: 94% of patients, 93% of HC and 82% of CC were in favor of using RDT as a diagnostic, prognostic and treatment monitoring tool for leprosy.

2) Desired Frequency of Monitoring: Slightly over half of the patients preferred an extensive RDT monitoring schedule from time of detection through end of treatment. However, most patients preferred that RDT testing be confined among their family members (HC) rather than including other members of the community (CC).

3) Willingness to Participate in Future Studies: Around 92% of the patients (91% of M5, 100% of PB), 71% of HC and 72% of CC would definitely be interested in participating future RDT-related studies. Majority of the contacts preferred an RDT monitoring schedule on a “per need” basis rather than submitting themselves at scheduled intervals.

4) Perceived Importance and Benefits of RDT: RDT is positively perceived by all study groups. Most respondents considered the tool as “very important” while only a minority perceived it to be slightly to “moderately important.”

CONCLUSION: The routine and regular use of RDT is widely acceptable among patients and their contacts. The highest level of acceptance was seen among patients followed by house and community contacts respectively.

Keywords: Rapid Diagnostic Test, Acceptability, Leprosy
ILC2.4–011
Abstract: Participation Restriction of People Affected by Leprosy in South Sudan (Revised and Edited version)
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Abstract: Participation Restriction of People Affected by Leprosy in South Sudan (Revised and Edited version)

PURPOSE:
This study sought to assess the level of Participation Restriction among people affected by leprosy in Luri Rokwe (South Sudan) previously a leprosy colony. In addition, the study helped to determine factors associated with the participation restriction.

METHOD:
People affected by leprosy were systematically recruited to the study from the community (Luri Rokwe village in the outskirts of Juba the main town in South Sudan) for a period of ten days. Each person was interviewed using an Arabic translation of the participation scale (P-scale). Inclusion criteria included speaking Arabic, consent and age above 18 and below 75 years old. Data on socioeconomic status and leprosy were collected. The interviews were conducted in fully private settings and consents were obtained before each interview.

RESULTS:
In total, 92 people affected by leprosy were interviewed using the P-scale. Of these, 77% were found to have participation restriction and 21% have very severe participation restriction. The respondents with grade 2 disability (48% of the total number of respondents) have more participation restriction compared to the Grade 0 (56% of the total number of respondents) and Grade 1 disability (14% of the total number of respondents).
Other factors linked to participation restriction are no formal education, low income and unemployment.
Logistic regression analysis of the variable common in all the respondents shows the association of visible deformity, age above 50 years old and female gender with participation restriction.

CONCLUSION:
Stigma, visible deformity and poverty are combined factors that affect the livelihood, self-esteem and dignity of people affected by leprosy.

Wilson Lado Santo
Operation Manager
TLM-South Sudan
Feb 4, 2016

Keywords: Participation, Stigma, Restriction, Dignity, Empowerment
ILC2.4-013
A HOLISTIC REHABILITATION PROGRAM FOR LEPROSY AFFLICTED PEOPLE: A SEVEN-DECADE EXPERIENCE FROM A CENTER IN CENTRAL INDIA
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Objectives:
To develop a socioeconomic rehabilitation program for people afflicted by Leprosy

Methods:
A facility–based programme for stigma neutralization and socioeconomic rehabilitation of people afflicted with leprosy has been gradually developed over a period of 67 years at Maharogi Sawa Samiti (Leprosy Service Society) ,Warora, a non–profit organization at Anandwani in Chandrapur district of Maharashtra State in India, located in high prevalence area of leprosy (prevalence rate–3.96/100000 population). The program uses a systematic approach of self–awareness, stigma neutralization, psychosocial ressurection, re-socialization and economic empowerment evolved by leprosy specialists and trained leprosy afflicted paramedical workers. During the program medical treatment, physical rehabilitation, assistive device support, psychological counseling, dignity building program, skill building training, re-socialization through family ressurection/ reunion and train-the-trainer programs are offered.

Results:
Over last 67 years a total of 0.96 million patients have been treated for leprosy, 0.348 million people have been trained in 139 different skills such as fabrication, cloth production, nursery, dairy technology, carpentry, agriculture, electrical and construction skills. At present, the team of 1800 rehabilitated leprosy afflicted people generates a revenue of about 4 million rupees annually. In addition, a revenue village was developed by the leprosy afflicted patients that practices sustainable rural development and through various empowerment programs gives support to people afflicted with various disabilities, orphans, farmers and depressed. Currently about 700 people go through this program annually.

Conclusions:
It is feasible to develop a programme to rehabilitate people afflicted with leprosy using a systematic approach. The experience gained over the years provides valuable inputs regarding rehabilitation of leprosy patients as well as those suffering with disabilities due to other causes. Opportunities and challenges in the rehabilitation process will be discussed.

Keywords: socioeconomic Rehabilitation, re-socialization , economic empowerment , dignity building program, Maharogi Sewa Samiti
ILC2.4-014
Community Participation in Leprosy Care Through
Integrated Health Care: A Dream Come True
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Objectives:
To eliminate the stigma traditionally attached to leprosy.
To provide comprehensive care to leprosy affected persons.
To integrate leprosy care with feasible general health care.
To generate resource from the non-leprosy affected clients to provide free
treatment and care to the leprosy and tuberculosis affected and to make the
facility self-supporting.

Methods:
The process began in the year 1999–2000. Apprised the Board of management
of the diversification plan and obtained approval. Identified the areas of feasible
diversification and integration. Approached and listed the initial technical and
financial support from GLRA, CBM. Conscientized and trained the existing staff,
recruited new ones where necessary. Updated and modified the infrastructure
and acquired necessary equipment. Publicized in the local community through
posters, handbills, friends and satisfied clients. Net-worked with community
organizations. Constantly monitored, reviewed all aspects and modified as
required emphasizing on quality care at low cost, with human touch at all levels,
beginning from the entrance gate.
Results:
The efforts gradually began to pay off; more people began to avail the services. By 2010 the facility was widely accepted as an integrated facility providing quality care for leprosy, tuberculosis, skin, eye, dentistry, orthopedics and Diabetes and capable of supporting its services. By 2012 GREMALTES became self-supporting and external support ceased. The team gained more self-confidence and ready to take up more challenges. In 2013 took up the management of one more Holistic Health Facility in another part of the city.

Conclusion:
The vision has been greatly achieved. The stigma attached to leprosy has been considerably diminished. GREMALTES has become a busy, integrated health care facility. Of over 120,000 clients patronizing annually, only over 4% are leprosy and tuberculosis affected; thanks to the drastic reduction in the leprosy prevalence in the community; other 96% constitute of dermatology (38%), Eye, including cataract surgeries with IOL (10%) and others (48%). It truly is a dream come true: an organization well accepted by the community, confident to run on its own steam. Thanks to GLRA, Emmaus Swiss, CBM, Government and others for providing the foundation to build on.

Keywords: GLRA – German Leprosy and TB Relief Association, CBM – Christofel Blinden Mission, Emmaus Swiss – Emmaus Swiss Leprosy Work, IOL – Intra Ocular Lens
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Objectives
Chetana, meaning initiatives to make things happen, was conceptualised involving persons affected by leprosy living in the communities served by LEPRa referral centres. The issues related to the daily life of people living in the community were discussed and problems identified needed to be addressed. The activities include selection of volunteers within the community called Lokdoots and building their capacity. Lokdoots work with people affected by leprosy and support them in accessing services and improving their quality of life. The project facilitates the formation of an empowered society of people affected by leprosy and a few committed volunteers who can take the initiatives forward.

Methods
At the start of the project a rapid assessment was done using a simple questionnaire for a house-to-house survey by the lokdoots. The analysis included project reports, records and interaction with the affected persons and inmates of five leprosy colonies. The colonies have 396 houses with 425 families. The population of the colonies is 1412, among which 360 are leprosy affected, 275 with deformities and 178 people have ulcers. A retrospective, record-based quantitative analysis of process data was done.
Results
Chetana project built awareness and conducted health camps to screen general health problems in the colonies with the collaboration of Govt staff and provided medicines. In the DPMR and footwear camps, the lokdoots explained to the colony inmates about the importance of self-care and usage of footwear. Chetana provided grip aids like wheel chairs, crutches, walkers and hand sticks to disabled people and increased their mobility. The colony inmates benefitted with Antodaya Anna Yojana (AYY) Cards, Ration Cards, Pensions, Train passes, Bus passes, Medical Certificates and Gas connections. Livelihood training like motor car driving, computer training, tailoring, candle making are also being provided. Chetana staff conducts Group discussion with the colony inmates. In the discussion the inmates express their needs and problems faced by them in the colonies.

Conclusion
The results showed that the colony people have become older with various health issues and most of them suffered from geriatric problems along with leprosy. This study also suggests that the entitlements of their well being should be in sync to cope with the ageing. This study is an attempt to look into the lives of the leprosy-affected people living in the leprosy colonies and recommending extending this model to other colonies in India.

Keywords: leprosy colonies, entitlements, ageing, rapid assessment, lokdoot
ILC2.4-016
Transformation from service receiver to advocate
—the role of the participation of people affected by leprosy in leprosy service
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Objective:
Leprosy is a curable and very low contagious disease. However, discrimination against people affected by leprosy remains serious.
It has been discussed widely that the participation of people affected by leprosy in leprosy service is an important and key force for sustainable leprosy services.
This study is trying to explore how the participation of people affected by leprosy could play an important role in reducing social stigma and discrimination to promote the social reintegration.

Method
1. Interview method
Semi-structured interview for people affected by leprosy, doctors from dermatology institute/hospital and volunteers.
2. Documentary method
Review a great quantity of governance and management data of organization of people affected by leprosy, and collected information of roles and influence of people affected by leprosy in carrying out advocacy work in the organization.
3. Participatory observation/in-depth case study analysis
Collected relevant information by means of observing concrete activities of people affected by leprosy in educating leprosy knowledge and promoting social acceptance.
Result:
According to the research, discrimination against people affected by leprosy has brought huge influence on the body, livelihood, economy, and social life, and has acted as a serious impediment to the socialization of this marginalized group. From the active participation of people affected by leprosy in rehabilitation work, it can be seen that the degree of participation of people affected by leprosy has a profound influence on elimination of discrimination and promotion of public acceptance.

Firstly, roles of people affected by leprosy transformed from service receiver to advocate. Therefore, by the joint efforts of people affected by leprosy, they set up an organization with mission and vision of eliminating leprosy discrimination. Secondly, people affected by leprosy play governance function and role to ensure this organization carries out series of services centered on elimination of social discrimination. Moreover, the organization plays as a platform for people affected by leprosy to interact and contact with outside communities.

Conclusion:
The conclusion of the research is that the solution of discrimination and unfair social problem of a group relies more on the participation of people suffer from discrimination. Their self-agency is not found in other groups and can produce immense effect. by means of setting up and participating in running and managing the organization has brought prominent effect to improve the public understanding of the disease and promote the public acceptance to people affected by leprosy.

Keywords: Participation, Social Integration, People’s Organization, Discrimination
ILC2.4-017

“Footwear Mela” – A new initiative by LEPRA Society

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Introduction: Mela (Sanskrit: मेला) is a Sanskrit word meaning ‘gathering’ or ‘to meet’ or a ‘fair’. It is used in the Indian subcontinent for all sizes of gatherings and can be religious, commercial, cultural or sport-related. In recent times “Mela” also popularly refers to shows and exhibitions. It can be theme-based, promoting a particular culture, art or skill. One of the main characteristics of Leprosy is anaesthesia of the feet. As the disease affects the nerves of the feet, the soles become insensitive which can cause ulcers if left uncared for, if not given regular attention and if one doesn’t wear the right kind of foot wear.

Methodology: LEPRA Society has organised 52 “Footwear Mela” in Bihar at Block PHC level in year 2015. Before the Mela 3 day IEC programme were carried out in the villages through Public Address System (PAS). The gathering of 50 to 70 beneficiaries in the Mela. The beneficiaries are free to selected their Modal, Colour, design, etc and tell the choices to Shoes technician and team. Maximum No. we delivered on spot and some we take the measured with choiseses and we delivered within 10 days.

Result: Through this camp we have delivered 2108 pair of protective footwear (For Gr I disability 945 and Gil disability 1163)

- Ms Kurani Mahaitain, age-45, Female, “Ham sapno me nahi soche the ki itna sundar chappal zindagi me naslo hoga takin mai sage sanbandhio ke yaha ja pawunga.” (I had not thought in the dream that I can afford this type of beautiful sleeper so that I will be able to go my relatives home.)
- Ms Astani Mahaitain, Age 50 Female “ye chapaawma je jadu ba hamrha panele jaasab ghaw ab naekhe howt.” (This is a magical sleeper. I am not getting any wounds like before)
- Ms Nasima Bibi age-30 Female, “Chappal ke bina ham paanch kadam bhi nahi chal pate hai agar chappaal pahan liye to panch kilometer bhi chalne me ko dikkat nahi hota.” (I cannot walk five steps without sleeper but if I wear sleeper than I can walk 5 kilometer without any difficulties.)

Conclusion: This is the best way to reach many people and deliver the services at nearer to their door step. “Smile” of people after getting the footwear is our work impact.

Keywords: MCR, Footwear, Mela, Protective, IEC
"Integrated Protective Footwear unit at District level: Footwear for all"
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Introduction:

To deliver the proper protective footwear is always a challenge for disabled cases due to leprosy and Lymphatic Filariasis by Government and Civil Society working in leprosy and Lymphatic Filariasis. Few ILEP agencies are preparing but this is not sufficient amount as per need. District Health Societies always procure the MCR footwear but these are bulk supply and not fit with desirability Gr II cases in leprosy. No provision for protective footwear for disabled cases due to Lymphatic Filariasis. Protective footwear early used in leprosy programme was made by tyre sole and tubes, latter on developed and modified by Tyre sole and leather. This looks very ugly and socially not accepted by patients. Because it was essential to wear so patients are wearing. There was no choice for them.

Methods:
LEPRA has made study of around more than 2000 feet from tribal, urban and village population and brought new footwear modal for disabled foot (WHO Gr I & II disability).
On learning from MCR footwear LEPRAs Society has started manufacturing the protective footwear for disabled cases due to leprosy. Now LEPRAs has started 4 footwear units in four districts lead by Physiotherapist and Shoes technician in the districts in their working state producing quality protective footwear with new color, designed and well accepted by community and person with foot disability. Each centre has producing 750 - 1000 protective footwear. We have trained more than 20 affected people in footwear (MCR) manufacturing. For bulk supply, we give them to these trained material and we check 5% (randomly) the product material.

Result:
This 4 integrated protective Footwear unit has Protective MCR Footwear prepared and distributed in Bihar and Jharkhand. More than 10000 protective footwear’s has been distributed for disabled person due to leprosy and Lymphatic Filariasis each year.

Year Own Patients (LF & Leprosy) Govt. (Leprosy) ILEP agencies (Leprosy and LF) Other State Total
2010-11 3675 6313 588 763 11339
2011-12 3181 2761 923 499 7364
2012-13 3290 1603 0 214914
2013-14 6241 7863 233 Nil 14337
2014-15 6756 6708 193 964 13657
2015-16 (Till Jan) 8981 4000 Nil 93 Nil 13074

Conclusion: We have seen very good successes with these units. Thus we urge the policy maker and other stake holder to establish a unit in the districts so that patients can easy ass the good services.

Keywords: Integration, Units, MCR, Footwear, disabled
ILC2.4-019

The knowledge, Attitude and Practice of Health Workers towards Leprosy at Kokosa Woreda Health Centers and Clinic, West Arsi zone, Oromia Regional State, Ethiopia

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Abstract

Background: Leprosy is a chronic mycobacterial disease caused by Mycobacterium leprae. In 2014, 3758 new cases were reported from Ethiopia where 482 were children and, 384 were with grade 2 disabilities (G2D) alarming the presence of new transmissions. The annual incidence of leprosy has remained the same in Ethiopia for over a decade with more than 76% of the reported new cases coming from Oromia and Amhara Regional States. However, the knowledge, attitude and practice (KAP) of health workers in these regions toward leprosy have not been addressed.

Objectives: To assess the KAP of health professionals at Kokosa Woreda health centers and clinic, West Arsi zone, to determine the level of Health workers KAP towards leprosy.

Methods: A cross-sectional study was employed at six health centers and one clinic. Data were collected from 86 health workers through a self-administered structured questionnaire.
Socio-demographic data, health workers attitude towards leprosy and their knowledge and skill in the management of leprosy was assessed. Bloom’s cut off point was used to describe the knowledge and practical skills whereas Likert’s scale was used to describe attitude of the respondents.

Results: Data were obtained from 86 health workers. The female to male ratio of the respondents was nearly 1:1 with the mean age of 25± SD 2.10 with range 21–33 and median age 24.0 years. The proportions of health officers (HOs), clinical nurses and health extension workers (HEWs) were 14%, 58.1% and 27.9% respectively. The result showed that 62 (72.1 %) had poor knowledge and only 23 (26.7 %), 1 (1.2) had medium and high knowledge respectively. Regarding the attitude, 22 (25.58%) of the respondents had negative attitude towards leprosy while 37 (43.02) had intermediate attitude and 27 (31.39%) had positive attitude to the disease. Of the 86 health workers; 62 of them were considered for practical assessment of diagnosing leprosy where only 4 (6.45 %) of them diagnosed leprosy correctly.

Conclusion: The majority of health workers had poor knowledge of leprosy and only very few health workers were able to diagnose leprosy correctly. Therefore, training should be in place to improve the knowledge and promote their practical involvement in leprosy work at the health facilities.

**Keywords:** Leprosy, KAP, HEALTH workers
ILC2.4-020
Development Evaluation: The Art of Nudge Leprosy Elimination Project in 12th Health Area, Lower South Thailand
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Objective:
Leprosy is neglected disease and its natural of disease is complex, dynamic, and adaptive. This study was aimed to depict results of development evaluation (DE) to provide screening, active case finding, diagnosis, and treatment leprosy in 12th health area, lower South Thailand.

Methods:
This action research applied DE’s concepts for nudging leprosy elimination project that was initiated since 2015. Setting was seven provinces, which has diversity of social and political contexts. Before project was developed, principle investigator, external evaluator, and key persons were trained in ‘five DE skills’. They also learn to practice art of nudge ‘five practices’ for development evaluator. This intermittent (6 months) course contained eight sections (2 days/section). In this study, we applied the five DE skills and the five arts of nudge for doing active case finding, providing treatments and rehabilitations. Data were analyzed using descriptive statistics and contents analysis.

Results:
Applying DE was resulted in rising number of new leprosy detection. In first year, active cases finding was covered 91.63% of target population and 55 new leprosy cases, which 2 children and 3 disabilities, were detected. Detection rate was 1.26/100,000 population.
Sixty of leprosy case was multi-bacillary (MB) which low MB rate then previous reported. In 2015, three provinces of Deep South are top five leprosy case-detected ranks in Thailand. Applied DE concepts, number of changes were revealed. First, DE could enhance relationship building and networking between policy makers and practitioners in 12th health area. Policy makers, other stakeholders, and evaluators shared commitment that aims to eliminate leprosy in the next 10 years (2025). They could act as a ‘practicing servant leadership’ by listening and integrating number of reflections into practice. Second, principle investigator, evaluators could facilitate and pay attention to structure that allow stakeholder could act and function as a personnel skills to organize leprosy elimination project. Third, DE increases ability to recognize pattern and senses program energy among key stakeholder. These could unfasten channels of communication, both formal and informal, with respect and sympathy. Fourth, DE participants could identify, observe, and prioritize information related to leprosy elimination. Common space for listening, communicating, sharing, and supporting together was intact. Last participating DE, we have tolerance of ambiguities and untied knots, conflicts, or others hindered iteratively.

Conclusion:
We found that the DE could provide quicker and more effective feedback results for improving leprosy elimination project, in lower south Thailand, to reach its goals.

**Keywords:** Development Evaluation, Art of Nudge, Leprosy Elimination, Leprosy in Lower South Thailand, Art of Nudge Development Evaluation
ILC2.4-021
Can Leprosy Self-Care Groups Contribute to Efforts to Secure Leprosy Control?
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Background
RECLAIM was an empowerment project implemented by Nepal Leprosy Trust in four districts of Nepal; it ran from 2011 to 2016 when 50 self-care groups were formed with a membership of 920 people. The RECLAIM methodology reflected that of an earlier project that was implemented under the title of STEP. Whereas the primary aim of STEP was stigma reduction the main aim of RECLAIM was poverty reduction. It was assumed that since the methodology for both projects was essentially the same a default outcome of RECLAIM would be enhanced social participation of RECLAIM beneficiaries.

Objectives
Based on experience in the STEP project, it was anticipated that the 50 self-care groups that were established would gain high regard from implementing civic minded projects in their communities. This presentation focuses on an outcome that was not anticipated, i.e. the self-initiated engagement of self-care groups (represented primarily by their leprosy affected facilitators) with local health posts and the effects that relationship had on the participation of leprosy affected people in leprosy control activities.

Method
Feedback from routine RECLAIM coordination meetings had been given throughout the duration of the project. Information concerning leprosy related activities had been recorded at those meetings. That information was presented to an external investigator who had been contracted to undertake an external evaluation of the project. The investigator sought verification of claims concerning leprosy related activities through a series of focus group discussions and interviews with self-care groups, their facilitators and with government health officials.
Results
• 47 of 50 groups were actively involved in leprosy related activities beyond self-care (case finding, footwear distribution, counselling, defaulter tracing, stigma reduction activities and advocacy)
• Through informal encounters (active and passive), self-care groups had referred 288 suspected cases of leprosy to local health posts of which 122 were confirmed as leprosy
• Self-care facilitators were frequently asked by Government Health Post staff to conduct follow-up visits to people on MDT
• Self-care facilitators had referred 6 people for reconstructive surgery and 15 people with reaction or complicated ulcers to Laligadha Leprosy Services Centre (a recognized tertiary referral centre)

Conclusion
Self-care groups can be a valuable resource for the enhancement of leprosy control activities. Greater effort should be invested to ascertain how to maximize the potential of such groups.

Keywords: participation, self-care, facilitator, inclusion, community
Ten Top Tips for Including People Affected by Leprosy and Disability in Mainstream Development Programmes - Learning from Bangladesh

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The objective of this paper is to share learning from the EU-funded Food Security for the Ultra Poor project in Bangladesh to provide ten top tips for enabling cost effective, disability and leprosy-inclusive development. Food Security for the Ultra Poor Project (FSUP) was a 10 million Euro project funded by the European Union targeting the socio-economic development of 40,000 female-headed households in Gabanbha District of Bangladesh. The project involved 10 NGOs: six mainstream NGOs, two disability-focused NGOs and two NGOs with significant leprosy and disability expertise. Data was gathered through: project monitoring databases, reports and surveys; interviews and focus group discussions of clients; a study on the impact, outcome and process of inclusion of people with disabilities (including those disabled by leprosy) in the income generation activities of FSUP; and discussion with the participating organisations during an internal evaluation of the project. Learning was then used to identify ten top tips for effective disability/leprosy-inclusive development. More than one billion of the world’s population is disabled, with over three million disabled by leprosy. For the premise of the Sustainable Development Goals – ‘Leaving No-one Behind’ – to be achieved there is a desperate need for mainstream NGOs and Government programmes to actively include disabled and leprosy-affected people.

The following Top Tips aim to support this:

1) Before any call for proposals, develop links with organisations with specialisms in disability/leprosy so they can be partners; 2) Inclusion starts at the programme planning and proposal writing phase; 3) Make sure your needs assessment and selection do not exclude disabled/leprosy-affected people; 4) Ensure all data is disaggregated by disability and gender in your M&E framework so you have evidence of inclusion; 5) Ensure programme staff and the senior management teams of all implementing partners are trained in disability inclusion right at the beginning; 6) Accessibility must be taken into account in all aspects of the programme; 7) Training for income generation should be inclusive, accessibility must be considered and the IGA should not lead to a further deterioration in their condition; 8) Ensure the disabled/leprosy-affected person remains at the centre of the intervention and maintains ownership; 9) Build access to physical rehabilitation services into your programme and budget for this; 10) Social inclusion and the removal of barriers within a programme and community are equally important as medical rehabilitation.

Keywords: participation, self-care, facilitator, inclusion, community
ILC2.4-023
CBR groups improve leprosy case finding in Kongo Central province, DRC
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Introduction:
Leprosy was officially eliminated in the Democratic Republic of Congo (DRC) in 2007, but more than 3200 new cases were detected in 2014. The Grade 2 disability rate among new cases in Kongo Central is more than 10% due to late detection (14% at national level). Leprosy cases are being identified late, when visible impairments are already present.

In DRC, we face two major challenges to reaching people affected by leprosy before they develop impairments. 1. There is little interest from donors to invest in leprosy. 2. As a consequence, staff morale is low, case finding is entirely passive, with little or no contact tracing. This operational study aims at encouraging and facilitating the local communities participation to leprosy detection and management.

Methods:
30 Members of 3 CBR groups were trained in how to suspect leprosy. Between 27 and 31st December, 2015 (5 days), mass-screening for skin diseases was conducted in 105 villages in Kongo Central. The screening was conducted using CBR groups seconded by leprosy staff from the health zone.

Results:
Over the 5 days, 28,838 people were examined, 664 were diagnosed with fungal infection, 44 suspected leprosy, among which 17 were confirmed leprosy new cases (39% of true positive among 44 suspected). Despite the low sensitivity, the result is the double of all passive detection in the Kongo Central province for the quarter. Out of the 17 new cases, there were 9 PB, 8 MB, 4 children and 12 women.

Conclusion:
Our experience in DRC shows that involving the community to detect leprosy is effective in finding more cases than the usual leprosy detection activities which are mostly passive. The number of cases detected in just 5 days was double the number detected in previous 3 months.

Keywords: CBR groups, leprosy, case finding, Community screening
ILC2.4-024

“Increased social acceptance and dignity of leprosy disabled after Adult literacy”

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Objectives
To assess improvement in social acceptance and dignity of people disabled by leprosy disabled people after Adult literacy in 4 district of NW Bangladesh.

Methods
There are about 4000 disabled people living in 4 districts of NW of Bangladesh who have completed anti-leprosy treatment under The Leprosy Mission International-Bangladesh and are followed up annually. We have formed 700 Self-Help Groups (SHG) as part of CBR project among most of people disabled by leprosy. To facilitate participation in SHGs, 30 Adult literacy classes were established and participants completed a 10 month course. Of the 300 participants in the literacy classes, 10 were selected for an interview to enquire more about their social acceptance and dignity. The subjects were asked on following areas of their life:
1. Experience of leprosy disability and destitution.
2. Social relationship, acceptance & support by Family and community.
3. Economic development and mental satisfaction

Results
Almost all 10 interviewee spoke of their life history being affected by leprosy and disability family and society. Because of leprosy they lost their limbs, dignity and of their life. After being involved in a Self-Help Group their life experience were improved. They participated in Adult literacy classes for 10 months. After completion of the literacy course they were able to read the Bengali newspaper, poster, signboard, and leaflet as well as write minutes of group meeting and maintain all other registers. In addition, they were able to monitor their personal income and expenditure, write letters, and use a mobile phone. Now some of them became leaders of Self Help Group and support other SHG groups. Community people now respect them and in some case they are taking role of community.

Conclusions
People in a self-help group may be able to better participate in the group if they are able to read and write. They may be more socio-economically developed and more respected.

Keywords: Self-help group, basic needs, Adult literacy, social acceptance, participation
ILC2.4-025

The Role of IDEA Nepal in Eradication of the Disease as well as its Consequences; disability and discrimination
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Background:
IDEA Nepal was formed by people affected by leprosy in 1998, now it has more than 1000 life-members. It has been working hard to uplift people affected by leprosy to live dignified life in the communities. As the organisation is run by people affected by leprosy, the problems of people affected by leprosy are better understood by the members.

Objective:
To be advocates of people affected by leprosy so that they are capable of living dignified lives in their communities.

Method:
IDEA Nepal meets its objectives through various activities. Myths prevailing against people affected by leprosy are removed through passing of accurate information in different level of programs and activities. IDEA Nepal was involved in recent disaster response in Nepal. It was involved in rapid assessment of the people affected by leprosy affected by the quake with door to door visits in some of the worst affected areas. It also worked in partnership and collaboration with various CBOs, TLMN etc in delivering the relief and recovery items. It also advocated and lobbied in various forums on behalf of those affected by leprosy. Over 100 people received the humanitarian support.
Results:
As a result of advocating on behalf of people affected by leprosy to the ones in the leadership (Parliament, Politicians, Lecturers and teachers, students), the discriminatory law biased against people affected by leprosy has been reviewed, and removed. Recent endeavors of IDEA Nepal in the earthquake assessment, coordination with partners, advocacy & lobbying on behalf of people affected by leprosy, direct humanitarian support as members of a community and people affected by leprosy to the needy played a tremendous role in the uplifting the dignity of people affected by leprosy in the communities.

Conclusion:
Despite the decreasing trend of leprosy in Nepal and worldwide, several people affected by leprosy face discrimination in various dimensions of life. There are several people despite the advancement in Medical science still think “Leprosy” as a curse of the sins committed in the past life. Ostracism, discrimination, ill treatment against leprosy continues in various spheres of lives in Nepal and elsewhere. Therefore it is mandatory for IDEA Nepal to continue to advocate, lobby, raise awareness, educate on behalf people affected by leprosy so that they are treated as important members of the communities.

Keywords: Background, Objective, Method, Results, Conclusion

Conclusion

Conclusion

Conclusion

Conclusion
ILC2.4-026
stratégie de dépistage de la lèpre en zone endémique fortement islamisée et en zone de rébellion indépendantiste où la maladie avait été déclarée éradiquée depuis 10 ans ?
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Background: Depuis que la lèpre est éliminée en 1995 et intégrée dans la SSG, le nombre de cas de lèpre est stationnaire autour de 250/an. Les groupes vulnérables (65 %) sont plus touchés et l’accès aux soins est loin de devenir une réalité. Les enquêtes de perception montrent que 95 % du personnel de santé n’ont pas une formation en lèpre et 52 % interrogés du public ignorent la lèpre.

Objectives: une opération de recherche active de lèpre a été initiée grâce à la stratégie RBC et l’organisation des PAL’s.

Methods: Six (6) comités RBC et 11 SHG dans 6 quartiers/74 de la cité religieuse et 56 relais RBC à Bournikiling (zone de conflit) sont créés et formés sur la RBC en approche sociale de cas suspects. Après cette formation, les relais pairs et volontaires ont effectué des VAD utilisant des fiches de référence et des dépliants, pour sensibiliser et orienter les suspects. Au sein des GDP, une approche innovatrice basée sur l’organisation de repas communautaires dans les foyers et membres du réseau des GDP a facilité l’examen des contacts MB. Toutes les personnes présentant des dermatoses ont été listées et référencées dans 2 districts sanitaires pilotes.
Results:
Dans la ville religieuse
• le nombre de cas est passé entre 2012 et 2015 de 17 à 54 soit 69 % d’augmentation.
• En 2015, sur 26 suspects dans 39 familles de contacts MB et voisinage, 17 nouveaux cas de lépre ont été confirmés en l’espace de 3 mois dont 14 MB et 3 PB enfants. Un perdu de vue retrouvé et 2 NCL avec trichiasis.
Dans la première localité en zone de conflit où l’ICP a été formée sur la lépre:
• Sur 528 ménages visités, 2367 personnes ont été consultées, 252 cas suspects référés dont 13 cas de lépre MB confirmés et 1 PB. 2 femmes avec degré 2 et 6 homme avec degré 1.
Dans la seconde où l’ICP n’a pas été formé :
• Sur 397 ménages visités, 2283 consultés, 37 référés et aucun cas confirmé de lépre.

Conclusion: l’étude a montré l’importance de la participation (Empowerment) des PALS dans l’orientation et le dépistage chez les contacts MB et que la mobilisation communautaire est efficace si le personnel de santé est qualifié pour l’offre de soins.

Keywords: participation, empowerment
ILC2.4-027
A more supportive Livelihood development model for people affected by leprosy and disability
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Objectives
To provide a model for livelihood creation that will enable successful businesses to be developed by people affected by leprosy who would usually be excluded from credit as they would not be seen as reliable and would risk failure due to a need for greater support as a result of stigma or disability.

Methods
1000 people with disability including over 100 people affected by leprosy were provided support to develop livelihoods in Myanmar. For all subjects a thorough process was conducted which started with a general assessment, followed by marketing and management training, then business plan development, vocational training (if required), credit disbursement, regular follow-up over a three year period and modification of the business plan if necessary. The Leprosy Mission Myanmar collected information on the progress of the businesses as well as data on the vulnerability of beneficiaries using the ‘Umbrella’ model.

Results
Participation and willingness to start a business despite stigma and lack of initial capacity was much higher than would usually be expected and resulted in reduced vulnerability as well as greater inclusion within their communities. Results will be presented highlighting how the approach increased the confidence of people affected by leprosy or disability to do business and how the sustainability of businesses was improved.

Keywords: Livelihoods, Myanmar, business, credit, training
ILC2.4-028
Rural based Information Centre for Accessibility of Rights and Entitlements for persons affected by leprosy and other disabilities.
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Background:
People affected by leprosy and other disabilities have the rights to claim the benefits through various schemes and plans. It was found that people located in remote places are not able to access due to lack of information and difficulty in accessibility. This calls for a system which is accessible and user friendly to realize the rights.

Objective:
To establish a communication system for enhancing flow of information on schemes and benefits. To find its effectiveness on the basis of accessed benefits entitled to the right holders

Methodology:
The process of developing the system through information is as follows:
Identified a location where people have less accessibility for the disability service centre. Established a Information Centre in that remote locality. Identified and trained a person with disability for functioning of information centre on rights and entitlements. Equipped the information centre with resources and documents required for application. Informed the people around the locality about the facilities available through Information Centre. The Information Centre provided information and guided the process of getting the entitlements from the specific departments. The community volunteers also took responsibility in reaching the applications to concerned departments and followed up.
Findings:
209 persons with disabilities visited the centre in which to 187 persons forms were issued. 152 persons applied for the entitlements. Out of these 89 of them got benefit. Applications of 98 are in process. Regarding the persons benefited, the types of disabilities are 29 of them affected by leprosy, 118 are of locomotor disability, 23 were having Mental Retardation, 12 had visual disability, 25 with Hearing Impairment and 2 with Cerebral Palsy.
Regarding the type of benefits, 39 of them got their Disability Identity card, 14 with travel pass, 10 got protective foot wear, 16 got referral service for health care, 5 with aids and appliances, 3 with maintenance allowance and 2 got loans for livelihood.

Conclusion: This system was found to be effective and sustainable since they are built on the local community members. Similar model is replicated in 2 other locations which are proving to be effective. This acts as bridge between the Government and people with disabilities living in remote rural locality.

Keywords: Information Centre, disability, rights, entitlements
ILC2.4-029
Reuniting People With Their Families and Communities To Increase Participation in Society
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Objectives
There is increasing emphasis on strengthening participation of individuals affected by leprosy in society. The United Nations Guidelines for the Elimination of Discrimination Against Persons Affected by Leprosy and Their Families, adopted in 2010, states: “States should, where possible, support the reunification of families separated in the past as a result of policies and practices relating to persons diagnosed with leprosy.” Concrete efforts to enable individuals to return home lays the foundation for their increased participation in society.

Methods
In Ghana a concerted effort has been made to educate the public through the media and grassroots efforts. This has laid the foundation for individuals who have been living in leprosy communities, some for as long as 56 years, to return to their homes and families. To prepare for their return, members of IDEA Ghana visit these individuals’ hometowns to meet with families and the village chief. Individuals are then accompanied by a member of IDEA Ghana to their home, or if their home is nearby, a family member or village chief will come to bring them back.
Results
More than 300 people who have lived in leprosy communities in Ghana for most of their lives have returned to their homes and families. In many instances, those who have returned home learn that they are the oldest surviving member of their village, and immediately become respected for their knowledge of its history. Others have been asked to serve as advisors to the chiefs of their village. The response to these individuals returning home is always one of joy and welcome. Stephen Ampomsah commented: “About two months ago when some of my friends were going home it made me cry because I did not know when it would be my turn. Today my turn has come and I am really happy and I know little by little we are all going back and we will leave the leprosy camps empty.” There are currently 52 people of varying ages who are waiting to return home.

Conclusion
The experience of IDEA Ghana shows that with support and public education individuals who have been living in leprosy communities for most of their lives are increasingly returning to their hometowns. As people see their friends successfully being reunited, they also decide to return home. Returning to one’s family and community is a major step in increasing participation in society and ensuring human rights.

Keywords: participation, human rights, social aspects, family
ILC2.4-030
Improving inclusion and participation of people affected by leprosy and other disabilities by providing a barrier free environment
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Objective:
1. To conduct access audit at the Kothara Community Hospital, TLMTI and examine how participation improves after installing disabled friendly infrastructure

Methodology:
The Leprosy Mission Trust India, Inclusive Holistic Development of individuals with Disabilities (IHDID) Project at Kothara Hospital is working for people with all types of disability including leprosy. An access audit was carried to study the situation before instituting any changes. The audit covered Inpatient wards, outpatient clinics, community hall, chapel, rehabilitation centre etc. Based on the findings and recommendations the environment was modified and restructured to be accessible to people with all different types of disabilities. Another audit was carried out after making the changes.

Results:
Now more people affected by leprosy and disability can attend the health care services on their own without waiting for assistance. They reach the respective service centres independently and so feel empowered. This intervention has enabled improved participation and social inclusion.

Conclusions:
Creating an access for all promotes access to health care, social inclusion and a sense of liberation. It is recommended that other health care providing institutions. This intervention will help wider communities, organizations from private and Government sectors to improve participation and inclusion.

Keywords: Leprosy, Disability, Barrier Free Environment, Accessibility, inclusion
Introduction to regional leprosy prevention center logistics management

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Objective: Leprosy prevention measures after system reform, the importance of regional leprosy prevention center logistics management work, lay a good foundation for the comprehensive management for the unit. Methods: Through summary analysis of Hubei Xiaogan leprosy prevention and control center in the system construction, medical treatment, network culture, fire safety etc. The specific application of the logistics, a comprehensive analysis. Results: to establish a centralized and unified way of professional logistics operation system in the center of the regional leprosy prevention plays an important role in low-income and assist. Conclusion: to establish a scientific, standardized and effective logistics, is the fundamental guarantee of performing functions, improve the efficiency of management.

Keywords: epidemiology, leprosy, Logistics management
ILC2.4-032
Investigation of Leprosy Core Knowledge and Awareness in Weiyuan County
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Objective: To investigate core knowledge awareness about leprosy control of the Weiyuan County general population and medical staff, for the future development of leprosy health education to provide reference. Method: Using Stratified random sampling method, five types of people (urban residents, rural residents, high school students, middle school students, medical personnel) were investigated by trained investigators using a unified questionnaire. Results: The leprosy core knowledge awareness rate of the general population is 18%. The leprosy core knowledge awareness rate of the medical staff is 64%. Conclusion: It is low that core knowledge awareness rate of leprosy control of the Weiyuan County general population. It is urgent to increase the knowledge of leprosy prevention propaganda, according to the different levels of the crowd to design different forms of propaganda, publicity materials, effective, reasonable, sustainable health propaganda and education.

Keywords: Leprosy, Knowledge, Awareness, Investigation
ILC2.4-033
Increasing awareness to exclude social exclusion in Angola
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Objective:
WHO’s target from 2010–2015, was to reduce late diagnosis of leprosy by reducing the Deformity rate by 35%. In Angola new case detection reduced and the Deformity Rate likewise reduced from 7.67 in 2010 to 3.6 per million population in 2015 (53% reduction). This cannot be explained by the increase of population (4.1 Million in 5 years).
The objective is to demonstrate that innovative approaches to detect leprosy, reduce the main causes of late diagnosis identified as: preconceived ideas on leprosy, lack of information about the disease, fear and belief of incurability. To address this problem the Leprosy Association ARPAL, organized awareness campaigns, in 15 Provinces of Angola from 2012–2015.

Method:
Organize a campaign in an endemic Province and visit 2 Municipalities. Address children, teachers and the community through Health promotion activities in markets, schools and churches; Distribute information leaflets on leprosy and dramatize discriminatory attitudes, by a theatre play of a young girl with leprosy excluded from her family and community. Update nurses on leprosy and train community agents to suspect and report leprosy. Teams of 6 –8 people visited the municipalities, mobilized the community leaders and ensured that treatment is available and free of charge at the Health Center. Data collected was analysed, before the team moved to another Province.
Results:
From 2012 to 2015, 15 Provinces were visited, 32 Municipalities, and 47’101 participants mobilized resulting in a 22% increase in detection of new cases. Comparing the year of the campaign with the previous year the following changes were noted: a relative increase (9%) of new cases with Deformity G2 when reduction of deformity in new cases was expected. This is the results of reduced fear in the community, better information and lower stigma.
New cases in Children and female also increased by 5% and 17% respectively, underlining the importance of increasing awareness in schoolchildren to influence families and households in the community. We believe, that the increase in treatment completion, is also a reflection of improved compliance.

Conclusion:
Awareness campaigns on leprosy, provide accurate information on the disease, its treatment and reduce preconceived ideas and stigma, resulting in a 22% increase in new case detection. New cases with G2 Deformity also increased, as a direct result of reduced fear and discrimination, allowing old untreated cases of leprosy to come for treatment.
Increasing awareness in the community reduces discrimination, and results in increased case detection.

Keywords:
ILC2.4–034
Participation Of Local Cooperatives/Self help group Members In Disaster Response To Reduce Stigma And Enhance Community Participation
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Objective: The main and primary objective of this study is to determine the level of participation of SHGs/Cooperatives in their communities before and after the earthquake. Secondary objective of this study is to determine the impact of TLMN’s relief and recovery efforts through SHG/cooperatives on the community members of Namdu and Sunkhari VDC.

Method: Survey questionnaires were administered to 100 individuals SHG/cooperative to assess the change in level participation of non group members before and after the earthquake. Secondly, Focus groups discussion was conducted to study the perception of 100 self help group/cooperative members comprising of people affected by leprosy, people with disabilities and the marginalized. Thirdly, interview of 50 community leaders who were not self help group/coop members was conducted to collect their views on impact and participation.

Result: The study revealed that participation of SHG/cooperative members in the relief and recovery effort after the earthquake had significant impact in the communities. There was significant level of increased participation of the SHG/cooperative members during and after the earthquake response. There were also significant changes in the level of participation of the non SHG/cooperative members in the activities led by SHG/cooperative members. The membership in the coops increased exponentially by in Dolakha( Namdu and Sunkhari). The level of participation of other community members who were not earlier engaged with the SHG/cooperative members had significantly increased.

Conclusion: This study shows that inclusion of people affected by leprosy, people living with disabilities and the marginalized in any disaster situation could enhance in changing negative attitudes, reducing the level of stigma and ultimately promoting wider level of participation in the community.

Keywords: leprosy, self help group, community based rehabilitation, Nepal, earthquake
ILC2.4-035
Leave no one behind – key aspects of inclusion research
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Objective
To discuss key aspects of inclusion research, using a number of examples from the leprosy and disability field.
What is inclusion research?

Inclusion may be defined in various ways. “The action or state of including or of being included within a group or structure” (Oxford Dictionaries); or, a state when “all people freely, openly and without pity accommodate any person with a disability without restrictions or limitations of any kind” (Wikipedia page on Disability Inclusion). Concepts related to inclusion are social participation, belonging, exclusion and discrimination. An inclusive society is the ultimate goal of the UN Convention for the Rights of Persons with Disabilities (CRPD) and of the Sustainable Development Goals (SDGs). Inclusion or the lack of it is part of the daily experience of a large proportion of the population worldwide. This includes persons with disabilities, but is by no means restricted to them. Inclusion is now a major pillar of the new WHO Global Leprosy Strategy 2016-2020.

Inclusion research investigates whether certain (groups of) people are included, the factors that hinder or facilitate inclusion, and approaches or interventions to promote inclusion. Research on instruments that measure aspects of inclusion or development of tools to promote inclusion are also part of the spectrum. Nowadays, inclusion research is typically ‘participatory’, i.e. involving members of the target group in the actual research, or even ‘emancipatory’, i.e. led by representatives of the target group.
Key aspects of inclusion
- Barriers to and facilitators for inclusion
  o To be illustrated with examples of research on barriers in the environment and on social participation
- Interventions and approaches to promote inclusion
  o To be illustrated using an example from the SARI Project in Indonesia
- Instruments to assess aspects of inclusion
  o To be illustrated with examples from the NTD Morbidity and Disability Toolkit project

Conclusion
Inclusion research is essential to realise the rights of persons with disabilities, including those affected by leprosy, as laid down in the UN CRPD. It is also needed to monitor progress towards the SDGs, to see whether the ‘Leave no one behind’ principle is applied in practice. In the field of leprosy, instruments, approaches and interventions exist to promote inclusion of persons affected by leprosy in society. These should be used much more widely so that affected persons will be accepted and respected and will enjoy equal opportunities in all aspects of life.
"If you talk the talk, you've got to walk the walk": reflections from the SARI project on inclusive research

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Objectives
Involving people affected by leprosy in research can be done at different stages. There are, for example, the proposal writing and initial planning stage, collecting and analyzing data stage, perhaps a designing and executing intervention stage and in the end a dissemination stage. The aim of this paper is to gain insights in inclusive leprosy research by reflecting on the findings of an inclusive research project namely the Stigma and Assessment and Reduction of Impact (SARI) project.

Methods
The SARI project was executed from 2010 - 2015 in Cirebon District, Indonesia. It is a mixed methods intervention study (cluster-randomized controlled trail) that was guided by an Interactive Learning and Action (ILA) approach. For this paper we will draw on a variety of research methods including notes of meetings, observations, interviews and focus group discussions. The main study population are people affected by leprosy and SARI team members.
Results
In the SARI project people affected by leprosy were involved in some stages and less or not in others. People affected by leprosy were, for instance, not involved in the writing of the proposal, initial planning stage or in the data analyses stage. Reasons for this vary, but include mind-sets and habits. Good alternatives were found. The ILA approach, for instance, created space to make adjustments in the study design based on the views and experiences of the target group along the way. Several people with disabilities who experience similar challenges in life were hired when the desired number of applicants affected by leprosy was not reached. People affected by leprosy were involved in the data collection, their views influenced the design of the interventions and they particularly played a key role in the execution of the interventions and in the dissemination of the results. People affected by leprosy, for instance, made comics and films with messages for the community, several were trained as peer counsellors and some shared their experience to a wide and high level audience at local and national level. The latter had an positive and profound influence on the study.

Conclusions
If leprosy researchers, health professionals and policy makers strive for inclusion of people affected by leprosy in society as a whole the idiomatic expression in the title gets to the center of what needs to be done. The SARI project shows on the one hand that this is not always easy, but on the other hand illustrated the benefits of inclusion profoundly. More effort needs to be put in gaining insights in how to achieve inclusive research.
ILC2.4-037
Addressing Stigma Related to Leprosy: Lessons from an Intervention Study in Thailand
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Aims: This study was conducted to develop de-stigmatising interventions aiming to reduce stigma related to leprosy, to improve the quality of life of the people affected, and to draw out lessons on how to set up such interventions elsewhere.

Methodology: In this intervention study; de-stigmatizing interventions were designed and launched in three different ways, through a formal health care group, a local volunteer group and a self-help group in three districts of Chaiyaphum province, Thailand. The first intervention was conducted through the formal health care system. The second intervention was conducted by a local volunteers group and the third was operated by a group of people with leprosy-related disability and by people with other disabilities. Before launching the three interventions, a community survey was done. The formal health care group addressed leprosy-related stigma by training the health volunteers. The local volunteer group address stigma by visiting people with leprosy-related disability to instruct and supervise their self-care practice and also to support them in case of mental suffering. They disseminated the message that leprosy is curable and not hereditary. The SHG addressed stigma by practicing self-care and improving their personal hygiene, establishing income generation activities among group members, and participating in community events.

Results: After launching the interventions; full participation of people affected by leprosy was found in the interventions implemented by the self-help group, while little and no participation was found in those of the local volunteers and the formal health care group. Self-esteem and social participation of the self-help group beneficiaries changed more than that of the local volunteer group, while there was no change in those taking part in the formal health care group. Community showed their attention and admired the self-help group activities.

Conclusion: This intervention study, analysing three different approaches to de-stigmatization, showed that the most effective de-stigmatising interventions were those that actively involved local stakeholders, especially the beneficiaries themselves. Their involvement helps to facilitate improvement of their self-esteem and social participation and of the contact between people affected and other stakeholders. This resulted in a reduction of community’s negative attitudes. Quantitative follow-up research will study the extent to which this could eventually interrupt the vicious cycle of stigmatization.
MANAGING THE SARI PROJECT – INCLUSIVE RESEARCH IN FIGHTING STIGMA AMONG PEOPLE AFFECTED BY LEPROSY
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Background
Research in issues of stigma and disability has been over-represented by a disabilism perspective where persons without disability do the study, while persons with disabilities are often put in the position of the object of the study. This reflect the belief that they could not perform such complex academic activities. The SARI Project (2010–2014) aimed at empowering persons with disabilities and, especially, persons affected by leprosy in Cirebon District, West Java.

Research Design
This intervention research project was designed as a randomized clinical trial, involving over 600 participants affected by leprosy. Three interventions: economic empowerment, contact, and rights-based counseling were designed as inclusive activities in specific areas with the aim to eliminate stigma and discrimination. Among the PIs and management of the project, one was a medical doctor, one biologist, one disability public policy expert, and a psychologist. They represent interests in qualitative and quantitative approaches. Two of the senior researchers were persons with disabilities. Among the PhD students who managed the intervention, one was a blind person. Among the research assistants, 30% were either persons affected by leprosy or persons with different categories of disabilities.

Lessons learned
Bringing different perspectives into a large intervention study like SARI Project, and trying to bridge these, was quite challenging. Since data were collected both qualitatively and quantitatively, there were issues regarding time spent and use of resources for both methods. Repeated evaluations on the course of data collection enabled the team to balance both approaches. Although everybody agreed that the project should empower the researchers and the participants, building trust with persons with disabilities and creating an enabling environment for them has been an interesting process in itself. In fact, we had critical discussions about the capacity of the students as well as the research assistants, who had disabilities. A close working relationship, staying together as one team and one community while doing the study provide a lot of time and opportunities for building understanding and trust.

Keywords: inclusive research, intervention, disability, leprosy
ILC3.1-001
Live Mycobacterium leprae preferentially prime regulatory T cell responses associated with the development of lepromatous leprosy
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OBJECTIVES The persistence of Mycobacterium leprae (M. leprae) infection is largely dependent on the types of host immune responses being induced. In this study, we investigated the immune status of macrophages stimulated with live or dead M. leprae.
METHODS Peripheral blood monocytes were obtained from healthy volunteers and were differentiated into macrophages in vitro, and then incubated with viable M. leprae or restimulated with killed M. leprae, in plain culture medium for 6 days. Cytokine expression during the restimulation period was measured by luminex assay. Autologous CD45RO+ naive T cells were also incubated with live or killed M. leprae-treated macrophages. The T cells were then negatively selected and incubated separately in anti-CD3/CD28-stimulated media for an additional 72 hours, after which the supernatant was collected for ELISA and cells for flow cytometry.

RESULTS We found that macrophages treated with live M. leprae showed committed M2-like function, with decreased interleukin 1 beta (IL-1beta), IL-6, tumor necrosis factor alpha (TNF-alpha) and MHC class II molecule expression, while the expression of IL-10 was elevated. When incubating with naive T cells, macrophages treated with live M. leprae preferentially primed regulatory T cell (Treg)-like responses with elevated FoxP3 and IL-10 expression, while the expression of interferon gamma (IFN-gamma) and CD8+ T cell cytotoxicity was reduced. Our cytotoxicity experiment also found that live M. leprae-treated macrophages were more resistant to CD8+ T cell-mediated cytotoxicity than sonicated M. leprae-treated monocytes. In vivo study showed that the function of macrophages at the lesion site had clear differences between L-lep and T-lep patients, which was consistent with the in vitro findings.

CONCLUSIONS Our data demonstrate that M. leprae-infected macrophages prime Treg-like but not Th1-like or cytotoxic T cell responses and M. leprae-infected macrophages are more effective at evading CD8+ T cell-mediated cytotoxicity. Live M. leprae-infected macrophages polarized toward the regulatory M2-type, preferentially primed regulatory T cell responses, and downregulated the cytotoxicity in T cells.

Keywords: Mycobacterium leprae, Macrophages, Regulatory T Cells
ILC3.1–002
Immunological Observation of the Role of T Helper 17 Cells in Lucio’s Phenomenon
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Introduction and Objectives
Lucio’s phenomenon is a type of reaction seen in diffuse form of lepromatous leprosy (LL) also called “pure and primitive diffuse lepromatosis”. The condition has been mainly described in Mexicans with very rare reports from India. The immunological aspects of the reaction are not clearly defined. It has been reported that Th1 and Th17 cells play a protective role in leprosy, while FOXP3+ cells are associated with the pathogenesis in leprosy patients. The present study aims to analyse the immunological findings, in particular the T-cell pathology, in a rare case of Lucio’s phenomenon from India and compare the findings with those in three LL patients.

Methods
5 ml of blood was collected from four patients (one Lucio’s and 3 LL patients) and peripheral blood mononuclear cells (PBMCs) were isolated. The cells were cultured and stimulated with M. leprae (ML) antigens. After 48 hours, the cells were harvested and stained with anti-human CD4 (FITC), IFN-γ (PE-cy7), IL-17(Percp-cy5.5) and FOXP3 (APC). Finally stained cells were acquired. Analysis was done using FACS DIVA software.
Results
The patient, a 34 year old male, presented with purpuric and necrotic lesions over extremities and face. Histopathological findings confirmed the diagnosis as Lucio’s phenomenon. The three LL patients were all males in their thirties. Th1, Th17 and FOXP3+ cells were explored in 48h ML stimulated PBMCs by multicolour flow cytometry. It was observed that the numbers of Th1 (Lucio’s; 10.3%, LL; 10.1%) and FOXP3+ (Lucio’s; 11.4%, LL; 10.6%) cells were similar in our patient as compared to the 3 LL patients. But the unstimulated Th17 cells were 6 times higher in number (Lucio’s; 1.2%, LL; 0.2%) and ML stimulated Th17 cells were 6.5 times higher in number (Lucio’s; 1.3%, LL; 0.2%) in Lucio’s patient as compared to the LL patients.

Conclusions
Lucio’s patient showed an increased number of Th17 cells as compared to the LL patients. It is evident that T cell biology involves a balance of Th1, Th17 and Treg cells and is a double edged sword which may lead to protection against the M. leprae and/or result in tissue damage caused by Th17. In conclusion, Th17 cells may play a key role in the immunopathology of Lucio’s phenomenon, however the findings need to be corroborated with a large scale study.

Keywords: Lucio’s phenomenon, T helper cells
ILC3.1-003
Inflammatory Mediators of Leprosy Reactional Episodes and Dental Infections: A Systematic Review
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Objectives: To determine the main inflammatory mediators in the immunopathological process of dental infections and leprosy reactions. Methods: We conducted a systematic review of primary literature published between 1996 and 2013. A three-stage literature search was performed (Stage I, “leprosy reactions” and “inflammatory mediators”; Stage II, “dental infections” and “inflammatory mediators”; and Stage III, “leprosy reactions,” “dental infections,” and “inflammatory mediators”). Results: Of the 911 eligible publications, 10 were selected in Stage I, 68 in Stage II, and 1 in Stage III. Of the 27 studied inflammatory mediators, the main proinflammatory mediators were IL-6,

Keywords: Leprosy Reaction, Dental Infections, Inflammatory Mediators, Periodontics, Leprosy
ILC3.1-004
A Case-control Study Investigating T-cell Regulation in Erythema Nodosum Leprosum
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Abstract
Background: Erythema Nodosum Leprosum (ENL) is an immune-mediated inflammatory complication which causes high morbidity in affected leprosy patients.
Objective: This study investigated if impaired immune regulation is associated with ENL reactions.

Methods: A case-control study design was used to recruit 46 untreated patients with ENL and 31 non-reactional lepromatous leprosy (LL) controls at ALERT Hospital, Ethiopia. Clinical and histopathological data were also obtained for each patient. All patients were followed for 28 weeks. Blood samples were obtained before, during and after treatment. Peripheral blood mononuclear cells (PBMCs) were isolated and used for immunophenotyping of regulatory T-cells by flow cytometry. Five markers (CD3, CD4 or CD8, CD25, FoxP3, and CD127) were used to define CD4+ and CD8+ regulatory T-cells. Gene expression for FOXP3 in blood and tissue samples was used to supplement the flow cytometry data.
Results: Patients with ENL had significantly lower proportion of CD4+ regulatory T-cells (1.67%) than LL patient controls (3.79%) before treatment (P<0.0001). After treatment, CD4+regulatory T-cells in the two groups were not significantly different. CD8+ regulatory T-cells in both groups before and after treatment were not significantly different. Patients with ENL had higher CD4+ T-cells frequencies and CD4+/CD8+ T-cell ratio than lepromatous leprosy patient before treatment. CD25 expression on CD4+ and CD8+ T-cells were not significantly different between the two groups suggesting that CD25 expression is not associated with ENL while FoxP3 expression on CD4+ T-cells was found to be associated with the reactions. The mRNA expression in blood and tissue samples for FOXP3 was significantly lower in patients with ENL reaction than in LL patient controls before treatment. After prednisolone treatment, mRNA expression for FOXP3 in the blood samples from patients with ENL did not show significant change while it is significantly increased in skin biopsy samples. It is possible that there is local immune regulation at the site of reactional lesions in these patients. We found that oral corticosteroid treatment of patients with ENL is associated with suppression of CD4+ T-cells but not CD8+ T-cells.

Conclusions: Our findings suggest that ENL is associated with reduced regulatory T-cells and increased CD4+/CD8+ T-cells ratio and this immune imbalance could lead to the initiation of ENL reactions in either permitting productions of antibodies critical to immune–complex formation or as a cell-mediated immune response in patients with leprosy.

Keywords: ENL, immune regulation, Case-control, regulatory T-cells, leprosy
ILC3.1–005
New Insight into the Pathogenesis of Erythema Nodosum Leprosum: Is there a Role of Activated Memory T-cells?

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Background: Memory T-cells, particularly, effector memory T-cells are implicated in the pathogenesis of inflammatory diseases and may contribute to tissue injury and disease progression. Although Erythema Nodosum Leprosum (ENL) is an inflammatory complication, of leprosy, the role of memory T-cell subsets has never been studied in this patient group.

Objective: This study investigated the kinetics of activated and memory T-cell subsets in patients with ENL before and after corticosteroid treatment to show the importance T-cell activation in ENL.

Methods: A case–control study design was used and a total of 35 patients with ENL reactions and 25 non-reactional LL patient controls were recruited at ALERT Hospital, Ethiopia. Venous blood samples were obtained before, during and after treatment from each patient. Peripheral blood mononuclear cells (PBMCs) were isolated and used for immunophenotyping of activated and memory T-cell subsets by flow cytometry.
Results: The proportion of CD3+, CD4+ and CD8+ T-cells expressing activated T-cells were significantly higher in the PBMCs of patients with ENL than LL controls before treatment. The median percentages of central and activated memory T-cells were significantly increased in patients with ENL reaction compared to LL patient controls before treatment. Interestingly, patients with ENL had a lower percentage of naïve T-cells (28.0%) compared to LL patient controls (60.0%), however, after corticosteroid treatment, patients with ENL cases had a higher median percentage of naïve T-cells (43.0%) than LL patient controls (33.0%). The median percentage of activated T-cells (effector memory T-cells and terminally differentiated T-cells) were significantly increased in patients with ENL reactions (59.2%) before treatment compared to after treatment (33.9%) (P < 0.001).

Conclusions: This is the first work to show T-cell activation and the different subsets of memory T-cells in patients with ENL. Consequently, this study illuminates the role of T-cell activation in the pathogenesis of ENL reaction and challenges the long-standing dogma of immune-complexes as the sole etiology of ENL reactions.

Keywords: ENL, Leprosy, Memory T-cells, Immune activation, Pathogenesis
ILC3.1-006
Patterns of Cytokine Expression in the Blood and Skin biopsy Samples from Patients with Erythema Nodosum Leprosum: The influence of Prednisolone Treatment
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Background: Erythema nodosum leprosum (ENL) is a systemic inflammatory complication occurring mainly in patients with lepromatous leprosy (LL) and borderline lepromatous (BL) leprosy. Prednisolone is used for the treatment of patients with ENL in Ethiopia, although it is not efficacious in preventing recurrences.

Objective: This study described the kinetics of pro-inflammatory and regulatory cytokine production and gene expression in patients with ENL reactions before and after prednisolone treatment to understand the effect of prednisolone on cytokine production in these patients.
Methods: A case-control study was used to recruit 46 patients with ENL and 31 non-reactional LL patient controls at ALERT Hospital, Ethiopia. Blood and skin biopsy samples were obtained from each patient before and after prednisolone treatment. PBMCs from patients with ENL cases and LL controls were cultured with M.leprae whole-cell sonicates (MLWCS), Phytohaemagglutinin (PHA) or no stimulation for 6 days. The supernatants were collected and used for the enzyme-linked immuno-absorbent assay (ELISA). For cytokine gene expression, mRNA was isolated from whole blood and skin biopsies and then reverse transcribed into cDNA. The mRNA copy numbers were quantified on a Light Cycler using real-time PCR assays specific to TNF-α, IFN-γ, IL-β, TGF-β, IL-17A, IL-6, IL-8, IL-10. Human acidic ribosomal protein (HuPO) was used as a housekeeping gene.

Results: The in vitro production of the cytokines: TNF-α, IFN-γ, IL-1β and IL-17A were significantly increased in untreated patients with ENL before treatment. However, IL-10 production was significantly lower in untreated patients with ENL and significantly increased after treatment. The in vitro production of IL-6 and IL-8 in patients with ENL did not show statistically significant differences before and after prednisolone treatment. The mRNA expression in blood and skin biopsy samples of TNF-α, IFN-γ, IL-1β, IL-6 and IL-17A significantly reduced in patients with ENL after treatment, while mRNA expression for IL-10 was significantly increased both in blood and skin biopsy samples after treatment.

Conclusions: This is the first study examining the effect of prednisolone on the kinetics of inflammatory cytokines in patients with ENL reactions before and after treatment. Our findings suggest that prednisolone modulates the pro-inflammatory cytokines studied here either directly or through suppressing the immune cells producing these inflammatory cytokines, which needs further confirmation by identifying the immune cells producing these cytokines.

Keywords: Cytokines, ENL, Gene expression, Prednisolone, Treatment
ILC3.1-007
Does Mycobacterium Leprae signal through Toll-like Receptor-4?
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Introduction:
Toll-like receptor (TLR)-1 and TLR2 have been shown to be cell receptors for M. leprae. However, it is unclear whether M. leprae can signal through other TLRs.

Objectives:
We investigated whether TLR4 can act as a receptor for M. leprae and whether the binding to TLR4 leads to signal transduction and downstream activation of innate immune response genes. We also examined whether M. leprae contains additional as yet uncharacterized ligands for TLR4 in addition to those already described and whether treatment of macrophages with M. leprae could modify the expression of TLR4 depending on previous Bacillus Calmette–Guerin (BCG)–vaccination.

Methods:
A human embryonic kidney 293 cell line co-transfected with TLR4 was used to demonstrate that M. leprae activates TLR4. Peripheral blood mononuclear cells (PBMC) derived from healthy volunteers were isolated, differentiated into macrophages and stimulated with killed M. leprae to measure the cytokine production in the supernatants after pre-treatment with neutralising antibody for TLR4. Gene expression studies were performed to determine the signalling pathways activated by M. leprae. Multicolor flow cytometry of macrophages derived from non–BCG vaccinated and BCG–vaccinated healthy volunteers was used to measure the TLR4 expression.
Results:
Using a human embryonic kidney 293 cell line co-transfected with TLR4, we demonstrated that M. leprae activates TLR4. Cytokine production following macrophage stimulation with M. leprae production is diminished in the presence of neutralising antibody for TLR4. Gene expression studies showed that activated genes of both myeloid differentiation factor (MyD88)-dependent and independent signalling pathways are modulated by M. leprae. TLR4 protein expression was up-regulated after incubation with M. leprae on macrophages derived from BCG vaccination naïve healthy volunteers, whereas in macrophages derived from BCG-vaccinated healthy volunteers TLR4 expression was down-regulated compared to unstimulated control.

Conclusions:
We have shown that M. leprae contains a ligand that activates TLR4 leading to signal transduction. In addition, we demonstrated that TLR4 is also activated in ex-vivo derived human macrophages, the preferred niche of live M. leprae. The modulation of TLR4 protein expression after stimulating human macrophages with killed M. leprae, which it was regulated in opposite direction in BCG-vaccinated and non-BCG vaccinated healthy volunteers could be related to vaccination induced epigenetic changes including changes to the histone code and differential expression of certain microRNA. A similar phenomenon to this has been ascribed to lipopolysaccharide-induced tolerance or trained immunity in human macrophages.

Keywords: Toll-like receptor-4, Mycobacterium leprae, macrophages, Bacillus Calmette-Guerin
ILC3.1-008
Inflammatory Mediators in Periodontal Diseases and Leprosy Reactions
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Objectives: To determine the inflammatory mediators involved in the immune response to chronic periodontal disease (DPC) and leprosy reactions. Methods: The presence of DPC and leprosy reaction episodes was compared in 57 leprosy patients by analyzing levels of inflammatory mediators. The RT-qPCR technique was used to analyze mRNA expression of inflammatory mediators in gingiva and skin biopsies, while serum levels of inflammatory mediators were quantified using ELISA. Data analysis was conducted by comparing and correlating the mean levels of mediators between groups at a significance level of 0.05. Results: Among the leprosy patients, 23 (40.4%) presented with the first leprosy reaction episode and 34 (59.6%) did not present with a leprosy reaction; however, DPC was present in 22 patients (45.0%). Reactive patients had higher average serum levels of IL-6 (p = 0.036) compared to non-reactive patients. Average serum levels of IL-4 and IL-6 in reactive patients with DPC were significantly lower than those in reactive patients without DPC (p < 0.01 and p < 0.05, respectively). IFN-γ serum levels in reactive patients with DPC were higher than those in non-reactive patients without DPC (p = 0.044). In skin biopsies of reactive patients with DPC, IL-4 serum levels were shown to be negatively correlated with TNF-α expression, while IL-6 serum levels were shown to be positively correlated with IFN-γ expression. Conclusions: The above results indicate that IL-6, IFN-γ, and IL-4 are involved in the immune response to DPC and leprosy reactions. Presence of DPC was associated with decreased serum levels of IL-6 and IL-4 in patients with leprosy reaction. In addition, elevated serum levels of IFN-γ indicated concomitant DPC in patients with leprosy reactions.

Keywords: Leprosy Reaction, Dental Infections, Inflammatory Mediators, Periodontics, Periodontal Medicine
ILC3.1–009
Association of Localized Expression of Cathelicidin and Vitamin D Receptor in Type 1 Reaction of Leprosy Patients
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Objective:
Leprosy is a chronic granulomatous disease caused by Mycobacterium leprae. Liu et al., 2006 demonstrated that TLR2/1 activation in human macrophages up-regulates the expression of the vitamin D receptor and the vitamin D1–hydroxylase genes, leading to the induction of the antimicrobial peptide cathelicidin and the killing of intracellular Mycobacterium tuberculosis (M. tuberculosis). The antimicrobial peptide such as cathelicidin LL–37 and VDR possess antituberculous activity and its association with leprosy is still poorly understood. In this study we explored the association of lesional skin mRNA expression levels of cathelicidin LL–37 and vitamin D receptor (VDR) with Type 1 Reactional patients and Non–reactional leprosy patients.

Methodology:
We recruited 21 Type 1 Reaction (T1R) leprosy and 15 non–reaction (NR) leprosy patients for our study from outpatient department of The Leprosy Mission Community Hospital, Shahdara, Delhi, India. 5mmX5mm lesional skin incision biopsies were collected from all 36 subjects and mRNA encoding VDR and LL–37 were quantified using Realtime PCR (Rotor Gene Q ; Qiagen Inc. USA) and data was analyzed using Relative Gene Expression analysis with a Normalizing Gene using the Two Standard Curve method (normalized with GAPDH as the reference gene).
Result:
We studied lesional skin mRNA expression levels of cathelicidin LL-37 and vitamin D receptor (VDR) in above mentioned leprosy patients. The mean expression level of Cathelicidin mRNA in lesional skin biopsy sample was significantly lower in T1R patients than NR leprosy patients (21.91 Vs 134.2, p<0.05). On the other hand, the mean expression level of VDR mRNA in lesional skin biopsy sample was significantly lower in NR leprosy patients than T1R leprosy patients (1.735 Vs 12.57, p=0.0004).

Conclusion:
Ours results indicate that the lesional skin mRNA expression levels of cathelicidin are elevated in non reaction leprosy patients while VDR are elevated in T1R leprosy patients. Further functional analysis may aid in identifying role of vitamin D as potential therapeutica agent for early treatment of T1R in leprosy.

**Keywords:** Vitamin D, Cathelicidin LL-37, Type 1 Reaction, Leprosy, Real Time PCR
ILC3.1-010
T cell Epitope Mimicry between Host Keratin and proteins of M. leprae
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T cell Epitope Mimicry between Host Keratin and proteins of M. leprae
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Objective:
Mycobacterial agents are known to stimulate autoimmune response in the host. M. leprae is causing agent of leprosy. Leprosy is granulomatous disease of peripheral nerves. Skin lesions are primary external symptom of leprosy along with it keratosis is not an uncommon feature. High level of anti-keratin antibodies (AkAbs) in leprosy patients were reported earlier by our group and AkAbs might be responsible for the autoimmune phenomena in leprosy patients. Earlier we have reported that 6 B cell epitopes of cytokeratin 10 and HSP 65 of M. leprae are mimicking epitopes (Singh et al, 2012). The aim of this study was to predict T cell epitopes of keratin (KT) and to find out the mimicking T cell epitopes with the protein of M. leprae.
Methodology:
We predicted T cell epitopes of KT of host by online server HLAPred. Further, similarity between T cell epitopes and proteins of M. leprae were done by BLAST analysis.

Result:
We found that T cell epitopes of KT211–300 with Conserved integral membrane protein of M. leprae TN and Br 4923 strains, KT392–461 with Putative cell invasion protein of M. leprae TN and Br 4923 strains, KT389–469 with Putative membrane protein of M. leprae TN and Br 4923 strains and KT435–478 with ATP-dependent DNA helicase UvrD1 of M. leprae TN and Br 4923 strains are mimicking with each other.

Conclusion:
Hence, we observed 4 T cell epitopes of keratin are mimicking epitopes and these might be responsible for autoimmune skin damage in leprosy patients.

**Keywords:** Leprosy, Mimicry, T cell epitope, Keratin, Bioinformatics
ILC3.1-011
WhatsLep? Monitoring multiple immune response markers in blood and urine
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WHATSLEP?
MONITORING MULTIPLE IMMUNE RESPONSE MARKERS IN BLOOD AND URINE DURING ONSET AND TREATMENT OF LEPROSY (REACTIONS)
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Introduction: Early detection of M. leprae infection (before clinical manifestations occur) is vital to reduction of transmission. In addition, prompt diagnosis and treatment of leprosy reactions, will aid recovery from inflammatory nerve damage and reduce risks for permanent disability considerably. However, the lack of diagnostic tests for detection of asymptomatic M. leprae infection or prediction of progression to leprosy (reactions), impedes diagnosis at early stages.

Objectives: Identification of risk factors (immunological-, genetic-, or metabolic biomarkers) for disease development and/or onset of leprosy reactions is imperative for efficient diagnosis. In view of the complicated nature of M. leprae infections, it is essential to invest in longitudinal studies allowing intra-individual comparison of biomarkers in various leprosy endemic areas. Our research aims at development of field-friendly tests simultaneously detecting biomarkers specific for cellular- and humoral immunity that are well-suited for diagnosis of different clinical outcomes of leprosy.
Methods: In several cohort studies we have conducted follow-up studies analyzing immune-, genetic and metabolic profiles for leprosy patients, household contacts and healthy controls from areas with high or low leprosy prevalence. Results: Our studies identified immune-, and genetic profiles as promising host biomarkers for leprosy and reversal reactions (RR) in a longitudinal fashion. Field-friendly multiplex formats for diagnostic tests based on these biomarkers have been being developed. Furthermore, our exploratory findings indicate for the first time for mycobacterial infections, that urinary metabolic profiles are promising host biomarkers for detecting intra-individual changes during reactions.

Conclusion: Biomarkers as reliable correlates of disease complications and response to therapy represent essential tools for (early) diagnosis of disease states in leprosy. Field-friendly tests based on such biomarkers, when used for intra-individual monitoring, can aid health care workers to early diagnose reactional episodes allowing timely treatment thus helping reduce nerve damage.

**Keywords:** diagnosis, cytokines, biomarkers, field-friendly, UCP-LFA
APPLICATION OF A FIELD-FRIENDLY LF ASSAY FOR IMMUNODIAGNOSIS OF LEPROSY IN A BCG INTERVENTION FIELD TRIAL IN BANGLADESH: PROTOCOLS AND RECOMMENDATIONS

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Background: Leprosy is a debilitating disease caused by Mycobacterium leprae (M.leprae).
Despite global access to MDT, new case detection has been virtually stable and grade 2 disability at diagnosis is even increased. It is generally assumed that subclinically M.leprae infected individuals form the reservoir for new cases and are the major source of transmission.

Objective: Early diagnosis of leprosy is key to reduction of transmission and can help reduce severe tissue damage. Since leprosy is a multifactorial disease it requires a diagnostic test measuring multiple biomarkers. However, such tests are not yet available.

In this study a field-friendly lateral flow assay (LFA) based on up-converting phosphor (UCP) technology is applied for leprosy diagnosis in a BCG vaccination field trial in Bangladesh.
Methods: Levels of IP-10, IL-10, CCL4 and anti-PGL-I antibodies were assessed in whole blood assays using M.leprae unique proteins in a Bangladeshi cohort of 242 individuals (leprosy patients, their (BCG-vaccinated) household contacts (HHC) and endemic controls (ECs)). These samples were measured both by ELISA and UCP-LFA, as well as by other currently available serology-based diagnostic tests for leprosy.

Results: UCP-LFAs for all four analytes correlated well with the corresponding ELISAs. Sera levels of anti-PGL-I IgM and IP-10 measured by UCP-LFA significantly differed between MB patients and HHC/EC in sera, whereas CCL4 significantly differed between leprosy perse and EC. Moreover, upon stimulation with M.leprae antigen these differences became more evident and IL-10 could be used as a biomarker for disease as well.

Conclusions: The UCP-LFA is applicable to screening of large cohorts to discriminate patients from contacts and ECs. Moreover, UCP-LFA allow multifactorial analysis of cellular and humoral immunity in a field-friendly manner providing an improved algorithm for (early) diagnosis of leprosy.

Keywords: leprosy, UCP-LFA, Immunodiagnosis, BCG vaccination, M. leprae unique proteins
ILC3.1–013
Post-exposure Vaccination of *M. leprae* - Infected Armadillos does not Exacerbate Peripheral and Cutaneous Nerve Involvement

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Objectives: Nine-banded armadillos develop peripheral neuropathy after experimental *M. leprae* infection. A defined subunit vaccine, containing recombinant fusion protein (LEP-F1) formulated with the GLA-SE adjuvant (LEP-F1/GlA-SE) is being developed. In this study, we used armadillos to assess if the safety of this vaccine in the early subclinical stages of *M. leprae* infection, in particular with regard to immune-mediated nerve damage.

Methods: Quantitative and morphological changes of sensory nerve fibers and Remak Schwann cells in the distal leg of armadillos were assessed using stereological, intraepidermal nerve fiber density (IENFD) and Remak Schwann cell density measures. Armadillos were infected by intravenous *M. leprae* inoculation and then 1, 2 and 3 months later were immunized with LEP-F1/GlA-SE. As controls, both uninfected and *M. leprae*-infected but unvaccinated animals were evaluated. Skin (3mm punches) and posterior tibial nerve biopsies were taken at the distal leg 16 months and 28 months after *M. leprae* inoculation. Unmyelinated nerves in peripheral nerve sections were assessed by EM stereology. 50 μm skin sections were immunohistochemically stained against axonal (PGP 9.5) and Schwann cell (p75) markers and quantified by established protocols. IENFD was expressed as fibers/mm², Schwann cell density as number of cells/mm³ and data expressed as mean ± SEM.
Results: M.leprae was identified in Remak Schwann cells and in axoplasm of peripheral nerves without any intraneural inflammatory cells. The infected axons were dilated without axonal loss. The axonal diameter was lower in the vaccinated group (in nm, infected: 697.5 + 8.2, vaccinated: 678.5 + 10.3, p* = 0.002). The infected group had a lower mean IENFD (22.5+4.7) than uninfected animals (24.8+4.3), and trended higher among vaccinated animals (32.1+3, p = 0.23). Schwann cells density was more in the infected group (uninfected: 3172+403, infected: 5089+675, p* = 0.02) and trended to decrease in the vaccinated group (4624+417, p = 0.7).

Conclusion: Inoculation of M.leprae in armadillos produces dilated axons with intraneural M.leprae. The Remak Schwann cells harbor M.leprae and undergo proliferation for a long period of time before producing any significant damage on the sensory fibers and thus these data provide the first documented pathological evidence that the pattern of peripheral neuropathy in armadillos depicts an early preclinical model. Immunization with LEP-F1/GLA-SE appears to clear axonal edema, restore axonal size of small sensory axons and maintain distal epidermal nerve fibers. LEP-F1/GLA-SE immunization appears to be safe on small sensory fibers with no evidence of early nerve fiber injury.

Keywords: Vaccine, Armadillos, Epidermal nerve, peripheral nerve, Schwann cell
ILC3.1-019
Phenotypic Characterization of Immunoregulation Mechanisms of Tregs Cells in the Polar Forms of Leprosy: Emphasis on Cell Apoptosis Pathway
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Objective: In this study we evaluated the phenotypic profile and immunoregulatory mechanisms used by regulatory T Cells (Tregs), with emphasis on the cell apoptosis pathway, from patients with polar clinical forms of leprosy and their household contacts. Methods: To further characterize this population of cells from peripheral blood mononuclear cells, the co-expression of CD95, PD-1 and its ligands and also perforin molecules on the CD4+ CD25high FOXP3+ T regulatory cells were examined. The patients were classified according to the Ridley and Jopling classification.

Results: Our preliminary data showed a total of 9 patients with leprosy and 3 household contacts. From all infected patients, 4 presented the clinical form tuberculoid (TT) leprosy and 5 presented the clinical form lepromatous (LL) leprosy or multi-bacillary leprosy. Patients with LL clinical form showed a higher frequency of circulating Treg cells when compared to other groups. On the other hand, patients with TT clinical form showed higher expression of apoptotic markers CD95L and PD-1L by these cells. The greatest expression of CD95 by Treg was observed in their household contacts, but no statistical difference was observed between TT and LL patients. Similar profile was observed with the PD-1 and perforin molecules. Additionally, the expression of granzyme A and B by Treg cells was higher in TT patients.

Conclusion: Our data suggest that Tregs cells from patients with clinical form TT, induces self-apoptosis that may be involved in the effective defense of the host. On the other hand, the induction of apoptosis by Treg cells on effector cells from patients with the polar clinical form LL, contributes to the viability of the bacillus and persistence of the disease.

Keywords: Leprosy, Regulatory T Cells, Apoptosis
ILC3.1–020
Characteristics of the Immune Regulation of Skin in Leprosy Patients
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Objective: Characterizing the dermal immune regulation of patients and evaluation the pattern of expression of cytokines IFN–γ, IL–10, IL–17 and FOX–P3.

Methods: Skin biopsies were performed in 24 patients with clinical diagnosis of leprosy. The biopsy occurred in two different places one in area with visible lesion ("lesion"), and another in no lesion contralateral area ("no lesion"). Posteriorly immunohistochemistry was performed to determine expression levels of cytokines in both biopsies.

Results: At diagnosis clinical, of the patients were classified (50%) borderline–borderline – BB; borderline–leprous – BL, lepromatous – LL and tuberculoid – TT (12.5%); borderline–tuberculoid – BT (8.33%); and indeterminate (4.17%). In the histopathology the predominant diagnosis was undetermined dermatitis (45.83%), followed by TT (25.00%), BL and LL (12.50%) and indeterminate (4.17%). The cytokine expression was evaluated in dermal inflammatory infiltrate. The expressions of Fox–P3 biomarkers and IL–17 showed marked intensity in 37.5% for Fox–P3 and 95.83% for IL–17 of "lesion"; compared 12.5% and 79.19% in "no lesion", respectively. The cytokines IL–10 and IFN–γ show reactivity with basal level at 70.83% and 54.17% of "lesion" and 62.5% and 58.33% of "no lesion", respectively. Unlike previous biomarkers, IL–12 on inflammatory infiltrate showed staining with intensity 60.87% baseline samples "lesion" and negativity on 50% of the samples "no lesion".

Conclusion: These results demonstrate the role of Fox–P3 and IL–17 as potential biomarkers of inflammation in dermal lesions of leprosy patients.

Keywords: Leprosy, Cytokines, Dermal lesions
ILC3.1–021
Salivary antibody response in leprosy patients and their household contacts
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Background: Leprosy household contacts represent a group at high risk population for developing the disease. It is established that predominant route of leprosy transmission is from the discharge of patient’s respiratory system to the contact. Therefore, detection of biomarkers in saliva is of importance for early diagnosis of leprosy. Previous studies indicated that ELISA for detection of antibodies against M. leprae specific Natural disaccharide in sera of leprosy patients is highly sensitive for M. leprae infection. The aim of this study was to detect salivary antibody response in saliva from leprosy patients and their contacts.

Objective: Detection of antibody response in saliva of leprosy patients and their healthy household contacts and their correlation with disease status.
Methodology: Saliva samples were collected from patients endemic villages of Champa and Purulia. Total of 24 leprosy patients and 98 household contacts were recruited for the study. Enzyme–Linked Immunosorbent Assay (ELISA) for ND–O–BSA was performed to detect the antibody response in saliva of patients and their contacts.

Result: The positivity rates for ND–O–BSA IgA were 45.83% in patients and 28.57% in contacts, for ND–O–BSA IgG were 29.16% in patients and 9.18% in contacts while, positivity rates for ND–O–BSA IgM were 16.66% in patients and 2.04% in contacts.

Conclusion: We observed sero–positivity in saliva of leprosy patients as well as in healthy contacts by ND–O–BSA IgA, IgG and IgM. Follow up study of sero–positive household contacts may give us some lead whether antibody response to ND–O–BSA could be used to identify subclinical infection in leprosy.

Keywords: ELISA, ND–O–BSA, LEPROSY, Natural Disaccharide, IgA
IC: Vitamin D Mediated Immune Modulation in Leprosy

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Objectives: Recent studies have revealed the immunoregulatory properties of Vitamin D. T cells along with its subsets play a vital role in immune response against M. leprae. The delicate balance between the function of essential (Th1) and suppressive (Tregs) T cells further dictates the outcome of leprosy. Hence the study aimed to identify influence of Vitamin D on T regulatory cells (Tregs), Th1 and Th2 cytokines in leprosy.

Methods: The study groups included 28 subjects (i) Newly diagnosed leprosy patients; Border line Tuberculoid (BT=7), BT with Reversal Reactions (BT=RR=2), Borderline Lepromatous (BL=5), Lepromatous leprosy (LL=5), (ii) Healthy controls (HC=9). The PBMC from all the study subjects were challenged in vitro with WCS (Whole Cell Sonicate of M. leprae 10ug/ml); supplemented with 100nM Vitamin D3. TNF-α, IL-10 and TGF-β were measured in the culture supernatants by ELISA. VDR (Vitamin D Receptor) mRNA expression by RT-PCR and the circulating & in vitro Tregs percentage by Flow Cytometer. Statistics were analysed using Graphpad prism 5.0.
Results: The percentage of circulating Tregs was significantly high ($p<0.05$) in LL patients. Upon Vitamin D supplementation; (i) Tregs percentage were significantly lower ($p=0.04$) in LL patients and higher in BT patients ($p=0.04$) when compared to healthy controls respectively. (ii) VDR mRNA expression was significantly high ($p=0.04$) in BT patients. (iii) The expression of TNF-α decreased significantly in all the groups while TGF-β expression significantly decreased ($p<0.05$) in L-Lepr patient and increased in BT-RR patients when compared to healthy controls. Also IL-10 levels were significantly high in BT-RR patients.

Conclusion: These results suggest that Vitamin D supplementation improved immunological response by decreasing Tregs expression in LL patients & increasing in BT-RR group in order to minimise tissue damage due to reactions. Increased fold expression of VDR in BT patients may result in better antimicrobial response. This study elevates the potential of vitamin D as a supplement with anti-leprosy treatment, to maintain immune homeostasis in patients.

**Keywords:** leprosy, vitamin D, Cytokines, T-Regulatory Cells, Vitamin D Receptor
ILC3.1-023
Mycobacterial R32-Kda Ag Specific T Cell Responses Correlate with Successful Treatment and Heightened Antimicrobial Response in Human Leprosy Patients
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Objectives: Immunological characterization of mycobacterial peptides may help not only in the preparation of a vaccine for leprosy but also in developing in vitro assays. The main goal of this study was to evaluate the use of r32-kDa Ag stimulated T cell assay as a surrogate marker for treatment outcome and monitor the Vitamin D Receptor (VDR) mediated antimicrobial responses during MDT in leprosy.

Methods: Newly diagnosed tuberculoid & lepromatous leprosy patients; household contacts of leprosy patients; and healthy endemic controls. Leprosy patients were followed-up during their course of multi-drug-therapy at 6th and 12th month. PBMC from all the study subjects were challenged in vitro with r32-kDa Ag and IFN-γ, IL-10, IL-17 and IL-23 were measured in the culture supernatants by ELISA. The expression of VDR, TLR2, LL37 & DEFB was assessed by RT-PCR.
Results: In the tuberculoid group, the IFN-γ levels were significantly high at baseline (p=0.02, p=0.04) compared to HHC and HC respectively, whereas levels of IL-17 and IL-23 (p=0.004, p=0.02) were significantly low compared to HHCs. During their follow-up, IFN-γ and IL-10 levels declined (p<0.05) while IL-17 and IL-23 levels increased significantly (p<0.05). The VDR expression decreased at 6th month and elevated at 12th month while the antimicrobial peptides LL37 & DEFB significantly increased at 12th month of MDT. In lepromatous group, IL-10 and DEFB levels declined at baseline (p<0.05), while IL-17, IL-23, VDR and antimicrobial peptides LL37 and DEFB expression increased (p<0.05) during follow-up.

Conclusions: The results suggest that response to r32-kDa Ag reflects an improved immunological and antimicrobial response in leprosy patients during therapy, thereby indicating the potential use of r32-kDa Ag as a correlate of immunity in the treatment of leprosy patients.

**Keywords:** Leprosy, r32-kDa, cytokines, Treatment correlate, Anti-microbial responses
ILC3.1–024
A Systematic Review of the Immunology of Erythema Nodosum Leprosum
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Introduction
Erythema nodosum leprosum (ENL) is a painful inflammatory complication occurring in 50% of lepromatous leprosy (LL) patients and 5–10% of borderline lepromatous (BL) patients. Individuals present with crops of painful, erythematous skin nodules with systemic symptoms of fever and malaise. Other organ involvement causes iritis, arthritis, lymphadenitis, orchitis and neuritis. ENL is a significant cause of economic hardship, morbidity and mortality in leprosy patients. Our understanding of the causes of ENL is limited. ENL has been considered to be a neutrophilic immune complex-mediated inflammatory complication of leprosy.

Objectives
We sought to perform a systematic review of the published literature and critically evaluate the evidence for the role of neutrophils, immune-complexes, T-cells, cytokines and other immunological factors which could contribute to the development of ENL.

Methods
Searches of the literature were repeatedly performed in PubMed. Keywords used were: Hansen* OR Type 2 OR Type II OR leprosy OR lepra*, AND reaction OR Erythema Nodosum Leprosum OR ENL. Studies in PubMed, independent of published date, using samples from patients with ENL were included.
Samples including sera, peripheral blood mononuclear cells, skin biopsies or any other tissue were eligible for inclusion. Structured forms were designed for each of the main sections of the systematic review i.e. neutrophils, immune complexes and complement, T-cellular immunity, cytokines and other molecules or factors involved in the pathophysiology of ENL. Data were collected on the setting, study design and characteristics of the subjects, study measures, and main results/ conclusions.

Results
The search revealed more than 40,000 titles. The role of the neutrophil in the pathophysiology of ENL is unclear. There is no conclusive evidence that immune complexes cause ENL. Regarding the role of T-cell biology, the CD4+/ CD8+ ratio seems to be important in triggering ENL, while larger studies should be performed investigating the exact role of other T cell subsets such as Th17 and T regulatory cells in the pathogenesis of ENL. Laboratory studies of TNF-α and the use of anti-TNF-α antibodies to treat ENL support the role of this cytokine in the inflammatory phase of the condition but not necessarily the initiation. Microarray data are providing new insights into the pathogenesis of ENL.

Conclusions
Many studies have been performed but study design limits comparability due to a lack of case definitions, treatment status and timing of sampling as well as different laboratory techniques. A standardised approach to some of these design aspects would be useful.

**Keywords:** systematic review, erythema nodosum leprosum, immunology, pathogenesis, ENL
ILC3.1–025

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Objectives: to evaluate the immune response profile of the patients with ENL during and after the reaction.

Methods: eleven ENL patients, at the moment of reaction (M0) and one month later (M1), and 11 healthy adults (control group–CG) participated of this study. Peripheral blood mononuclear cells cultures were stimulated with PHA (10 μg/ml), LPS (10 μg/ml) and M. leprae sonicated antigen (10 μg/ml) or without any stimulus. After 24 hours, reactive oxygen (H2O2 e O2−) and nitrogen (NO) intermediates were measured, as well as TNF–α and IL–12p70. IFN–γ, IL–4, IL–10 and IL–17 were quantified after 48 hours of culture. The serum levels of IgM anti-PGL-I were also quantified in both moments. Skin biopsies from ENL lesions were also collected to evaluate the mRNA expression for the same cytokines; as control group we evaluated skin lesions from LL (n=8) and BL (n=3) patients, non–treated and without reaction.
Results: patients produced lower TNF-α levels in response to the M. leprae antigen (M0= 793,46 ± 523,15 pg/ml and M1= 1074,75 ± 441,78) than CG (1252,96 ± 207,32). However mRNA expression to TNF-α at the M0 and M1 was higher than observed in control biopsies. There was not IFN-γ production in cultures stimulated or not by M. leprae antigen at both moments, however there was some production in the CG (9,22 ± 19,92 pg/ml); there was no difference in IFN-γ expression among M0, M1 and control biopsies. The IL-10 production in cultures stimulated by M. leprae antigen was lower in M0 (359,39 ± 237,21 pg/ml) and M1 (284,95 ± 199,60) than in CG (1146,68 ± 615,68), while IL-10 expression in M0 and M1 was higher than in control. A small production of IL-4 was observed after M. leprae antigen stimulation in M0 (2,24 ± 2,41 pg/ml) while no production was detected for CG. Low levels of IL-12p70 and IL-17 were observed in M0 e M1. There was no difference in the mRNA expression for IL-12. The H2O2 and O2- production was low in patients, but higher than CG. There was not difference in NO production. The levels of anti-PGL-I were similar (O.D.= 1,099 in M0 and 0,956 in M1).

Conclusion: these results suggest a mixed cytokine profile in ENL, although patients have a very heterogeneous response. Of note, immunological profile was similar during and after reaction supporting, possibly, the recurrent character of ENL.

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Keywords: erythema nodosum leprosum, cytokokines, immune response
Transcriptome Profiles of Peripheral Blood Mononuclear Cells in Leprosy Prior to and at the Time of RR and ENL

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Objectives: Thirty percent of people with leprosy develop a pathologic immune reaction, a cause of significant additional morbidity. Additional insights into host risk factors and inciting events for immune reactions are needed. In this study, we applied next-generation sequencing technology to understand immune changes within a cohort of well-characterized patients with RR or ENL.

Methods: We enrolled patients with leprosy diagnosed in the state of Rio Grande do Norte, Brazil and collected clinical information and a blood sample. At the time of diagnosis of RR or ENL, a repeat blood sample was obtained. RNA was extracted from peripheral blood mononuclear cells (PBMC) using a Trizol-based protocol. RNA integrity was confirmed with Agilent analysis, and then sequenced using Illumina technology. Raw sequencing data were processed using the Tuxedo package. Genes with log2 fold change greater than 1.2 and false detection rate of less than or equal to 0.05 were selected for further analysis. A systematic pathways analysis was conducted using Ingenuity Pathways Analysis (Qiagen).
Results: Paired transcriptome data were generated for six people with leprosy and a leprosy immune reaction (n=3 RR, n=3 ENL). There were 92 (n=73 down, n=19 up) differentially expressed genes during RR, compared to pre-RR levels. Top canonical pathways for RR were granulocyte adhesion and diapedesis, IL-17A signaling in gastric cells, and LPS/IL-1 mediated inhibition of RXR function (all p < 2.48x10^-5). Top disease associations were immunological, connective tissue, inflammatory, skeletal/muscle, and dermatological (all p<0.01). There were 207 (n=11 down, n=196 up) differentially expressed genes during ENL, compared to pre-ENL levels. Top pathways for ENL were coagulation system, granulocyte adhesion and diapedesis, and atherosclerosis signaling (all p < 6.51x10^-6). Top disease associations were infectious, respiratory, immunological, connective tissue, and inflammatory (all p<0.001).

Conclusions: Pronounced among the gene expression changes in RR is the downregulation of multiple chemokine receptors, a finding which warrants further investigation and correlation with expression in pre/peri skin biopsies. A notable exception and validation of our methodology given prior research, was CXCL10, which increased 2.8-fold (p=0.009). A limitation of the study is the small sample size. A strength is that the pre-reaction and reaction samples are paired from the same individuals, which permits us to explore the changes in an individual at the time of reaction, with the ultimate goal of identifying the inciting event or events for RR and ENL development during leprosy.

Keywords: Reversal reaction, Erythema nodosum leprosum, Transcriptome, Pathways, Networks
Heme Oxygenase 1 as a marker of infection in leprosy household contacts

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Objectives: Contacts of leprosy patients are at increased risk of developing leprosy and need to be targeted for early diagnosis. Seropositivity to the phenolic glycolipid I (PGL-1) antigen of Mycobacterium leprae has been used to identify contacts who have an increased risk of developing leprosy. In the present study, we investigated the immune regulatory molecules that could be associated with disease development in contacts from patients with leprosy.

Methods: Leprosy contacts were examined as part of the surveillance programme of the Oswaldo Cruz Institute Leprosy Outpatient Clinic in Rio de Janeiro. The presence of IgM antibodies to PGL-1 in sera or IgG to LID-1 were evaluated in 165 contacts. The expression of arginase 1, HO-1, FoxP3 and VDR in blood collected in Pax gene tubes were determined by real-time PCR and protein expressions were evaluated in sera by ELISA.

Results: 39.8% of contacts were positive for PGL-1 and 40.9% were positive for LID-1. The contacts that become sick during the follow up (n=3) had higher PGL-1 serology when compared with the contacts that did not become sick (n = 162, p=0.03), but no differences were observed in LID-1 titers.
Analysis of Pax gene blood samples revealed that the expression of HMOX (p=0.0026), VDR (p=0.016) and FOXP3 (p=0.047) were increased in contacts that become sick during the follow up. HO-1 expression was also higher in the sera of contacts that become sick. The overall analysis of the blood samples from contacts included in the study demonstrated that HMOX expression was higher in PGL-1 (+) contacts when compared with PGL-1 (-). Analysis of PGL-1 (+) group demonstrated that HMOX expression was higher in PCR(+) when compared with PCR (-) contacts. Since contacts from multibacillary cases that are PGL-1 (+) have more predispositions to become sick, we evaluated the HO-1 expression in order to verify the existence of a correlation between seropositivity and HO-1 expression. Sera from contacts from multibacillary patients have increased concentrations of HO-1 when compared with sera from paucibacillary patients (p = 0.01). In addition, PGL-1 (+) serum has increased HO-1 levels when compared with sera from PGL-1 (-) contacts.

Conclusions: Together, our data suggest that HO-1 may be a potential marker for the early diagnosis of leprosy in the contacts, which may contribute to reduce the incidence of leprosy in this group.

**Keywords:** contacts, heme oxygenase 1, PGL-1, FoxP3, IL-10
ILC3.1-028
The Profile of Proliferation Index of Lymphocyte and Th1 / Th 2 as Lymphocyte Response in Reversal Reaction State Leprosy After Exposure to Dharmendra Antigen
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Background:
Reversal Reaction (RR) state is one of serious clinical implication from Multibacillary leprosy because it can lead disability. RR occurs because lysis of M. leprae break down into fragments. Stimulation of antigen in cellular immunity induced proliferation of Th1 lymphocytes characterized by an increased IFN-γ and humoral immunity induced proliferation of Th2 lymphocytes characterized by an increased IL-10.

Objective:
To compare the proliferation index of lymphocyte, the expression of IFN-γ and IL-10 and prove the significant difference in RR patients and in borderline patients without RR (Non RR), after exposure to Dharmendra 1/10 antigen.

Method:
An analytic explorative study using Lymphocyte Transformation Test to evaluate lymphocyte proliferation and ELISA to evaluate level of IFN-γ and IL-10 after exposure to Dharmendra 1/10 antigen was performed in 23 RR patients and 11 Non RR patients in Tadjuddin Chalid Hospital, Makassar, on May 2012 until May 2013.
The statistical analysis was performed using Fisher Exact test, Mann–Whitney U test and Spearman correlation.

Result:
The finding confirm a very significant difference (p=0.001) in the lymphocyte proliferation in 95.7% RR patients (22/23) compare to 27.3% Non RR patients (2/11) and negative correlation (R=-0.682) between exposure to Dharmendra 1/10 antigen and RR (p=0.000). The level of IFN-γ after exposure to Dharmendra 1/10 antigen in RR patients (25.86 ± 9.87) was higher than the Non-RR patients (23.41 ± 11.34) (p=0.522). The level of IL-10 after exposure to the Dharmendra 1/10 antigen in the RR group (29.59 ± 1:29) was higher than the non-RR (29.55 ± 1:20) (p=0.93).

Conclusion:
This study supports the hypothesis that lymphocyte proliferation, cellular immunity, and humoral immunity play a role in RR State of leprosy but research is required with larger scale to obtain cutoff values lymphocyte stimulation index as well as IL-10 and IFN-γ to be able to predict the occurrence of RR.

**Keywords:** Reversal Reaction, Dharmendra 1/10 Antigen, Lymphocyte proliferation, IFN-γ, IL-10
Evaluation of sensitivity and specificity and its clinical application value of ND-O-BSA-IgM-ELISA in detection of leprosy shunpeng Song¹, Yali Jin¹
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Objective: To detect the serum antibody levels of normal people, leprosy patients, pregnancy, connective tissue disease, psoriasis, syphilis, tuberculosis, and to determine the normal critical value of Dalian. Then to evaluate the sensitivity and specificity of the test and further discuss the cross reaction of the disease with some other diseases that are easy to be confused and not reported previously except tuberculosis. whether there are cross reactions between leprosy with all the diseases mentioned above. Methods: Anti-ND-O-BSA antibody levels of the sera were measured by enzyme-linked immunosorbent assay. Enzyme linked immunosorbent assay with serum from 60 leprosy patients, 100 normal male and 100 normal female persons, 60 leprosy patients, and the pregnancy, the connective tissue disease, the psoriasis, the syphilis, the pulmonary tuberculosis patients 30 copies each. Results: When the serum concentration is 1:100, the critical value is 0.14, the sensitivity was 95%, specificity is 96.5% (P>0.05); the OD value of normal person is 0.08 ± 0.06, the OD value of the pregnancy, the connective tissue disease, the psoriasis, the syphilis, the pulmonary tuberculosis patients are all 0.08 ± 0.06. Conclusion: This test further confirmed the high sensitivity and specificity of the ND-ELISA test. It can not only distinguish the normal person, but has no cross-reactivity with the tuberculosis, the pregnancy, the connective tissue disease, the psoriasis, and the syphilis. So the test can be used in early prediction of leprosy patients and help to differentiate leprosy with other diseases.

Keywords: Lepriasis, ND-O-BSA-IgM, ELISA
Detection of PGL-1 antibody in the lepers
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Objective: To research the application of the antibodies against leprosy bacillus in surveying the prevalence of leprosy and in selecting the multidrug therapy targets. Methods: ELISA was used to detect the level of anti-PGL-1 IgM in the serum of 70 cases of leprosy, 62 cases of close contact and 30 cases of healthy control. Results: The level of anti-PGL-1 IgM and the positive rate of antibodies between in the leprosy patients and in the close contacts were not shown a significant difference (P>0.05), however, both of them were higher than those in the healthy controls significantly (P<0.05). Conclusion: Anti-PGL-1 IgM can be applied in selecting the multidrug therapy targets with leprosy.

Keywords: Leprosy, close contacts, anti-PGL-1 IgM
ILC3.1-031
Evaluation of two synthetic antigens in the diagnosis of leprosy
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Objective: To evaluate the serological activity of antigens ND and NT against IgM and IgG in the sera of the following subjects, and to explore the relationship between the seral OD values and the bacterial index. Methods: ELISA was applied to detect the antibodies IgG and IgM against ND and NT, which assayed with serum from 50MB patients, 30PB patients, 80 normal controls, the pregnancy, the connective tissue disease, the psoriasis and the pulmonary tuberculosis patients 30 copies each. The relationship between the serological activity and bacterial index was displayed by plotting method.

Results: ① The two antigens show high serological activity, of which NT is slightly greater than ND, and in which MB is greater than PB. IgM and IgG in PB detected are basically equivalent, but in MB the IgM is higher than IgG. ② For normal controls, the antibodies detected with NT -ELISA were greater than with ND -ELISA, and IgG is more than IgM. ③ The antibodies (IgM, IgG) against ND detected is the same with normal people in the pregnancy, the connective tissue disease, the psoriasis, the syphilis, and the pulmonary tuberculosis patients. But in NT -ELISA, their levels of antibodies are all higher than the normal ones except the connective tissue disease group. ④ The OD value of leprosy serum is positively correlated with the bacterial index.

Conclusion: ND - ELISA has no cross-reactivity with the diseases mentioned. Its sensitivity and specificity were the best. To a certain extent, this ELISA can replace the method of bacteriological index to early diagnose leprosy. The sensitivity of NT - ELISA is great, but its specificity is lower than ND - ELISA. It can be used as preliminary screening essay.

Keywords: Lepriasis, ND-O-BSA, NT-P-BSA, ELISA
The Expression of Chemokine Receptor CXCR4 of Leprosy and Human Immunodeficiency Virus–1 Co-infected Subjects

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Objective: To investigate the changes of leprosy and HIV co-infection of immune cells, to understand the impact of leprosy on disease progression after HIV infection produced. Methods: The expression of chemokine receptor CXCR4 on CD4+ T cells and CD8+ T cells in the peripheral blood was determined by using flow cytometry in 3 patients leprosy and HIV co-infection, 10 patients leprosy infection alone, 9 patients HIV infection alone, and 9 normal control. Results: The CD4+ T cell count and CD4/CD8 ratio there was a significant difference between leprosy and HIV co-infection, leprosy infection alone, HIV infection alone, and normal control. Expression of chemokine receptor CXCR4 on CD4+ T cells and CD8+ T cells in between each group there was no significant difference (P>0.05). Conclusion: HIV infection is the main reason that is expression of chemokine receptor CXCR4 is reduced on CD4+ T cells and CD8+ T cells. More severe immune pathological response does not appear in the co-infection of HIV and leprosy.

Keywords: leprosy, HIV co-infection, lymphocytes, CXCR4
ILC3.1–033
Field Evaluation of Assays to Detect Cellular and Humoral Immune Responses for Early Diagnosis of Leprosy
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Introduction:
Early diagnosis of leprosy is vital to reduce disease transmission and prevent severe disease-associated deformities. Because the outcome of Mycobacterium leprae infection is determined by cellular and humoral immunity, we aim to develop diagnostic tests to detect the cytokines and antibodies against M. leprae and evaluate these tests for use in resource-poor settings.

Methods:
The combined diagnostic value of IFN-γ and antibodies was tested using M. leprae-stimulated blood and serum samples from leprosy patients and healthy individuals. We used the NDO-LID® test to detect specific IgM and IgG antibodies within 20 min of addition of the sample. We compared this test with the ELISA-based and whole blood assay (WBA) for IFN-γ for the ability to detect M. leprae infection.

Results:
The positive rate of the NDO-LID® test among the multibacillary (MB) patients was 94.7%, which is slightly higher than that of NDO-LID ELISA; the positive rate of LID-1 ELISA (92.1%) was higher than that of NDO-BSA ELISA (89.5%). The positive rate of NDO-LID® test among the paucibacillary (PB) patients was 65.2%, while WBA for the PB group incubated with ML89 and ML2028 antigens showed that IFN-γ response was induced in 47.8% of the sample; ML2044 and LID-1 antigens induced IFN-γ response in 60.9% and 56.5% of the sample, respectively. Our results suggest that the NDO-LID® test could be used for initial screening in endemic areas, and showed that weakly positive response can be further tested by WBA for auxiliary diagnosis of PB patients. Moreover, the performance of the NDO-LID® test as well as the time required for WBA without the need for CO2 incubator indicates excellent robustness. Conclusion:
The high levels of antibodies and IFN-γ expression render these tests useful to discriminate between leprosy patients and healthy individuals.

Keywords: ELISA, NDO-LID® rapid test, Whole blood assay, diagnosis, leprosy
ILC3.1-034
Does leprosy have the infection immunity as tuberculosis?
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Objective To study and infer the existence of infection immunity phenomenon of leprosy whether or not. Method On the basis of literature review, a comparison is done between some phenomena of leprosy reported by references and the confirmed infection immunity phenomena of tuberculosis to infer the existence of infection immunity in leprosy. Result The infection immunity refers to a state of immune that the body’s immunity against pathogens depends on pathogens existing. It has been proved that the infection immunity exists in tuberculosis. Based on past clinical experience, the infection immunity probably exists in leprosy. Conclusion The infection immunity probably exists in leprosy also. To prove the infection immunity of leprosy, some test methods were recommended. To study the infection immunity of leprosy would provide a new idea for leprosy research, especially for taking the best economical way for leprosy control in the future.

Keywords: Leprosy, Infection immunity
ILC3.1-035
Preliminary study of Ppar-gamma and ADRP with leprosy host lipid metabolism and the immune
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Leprosy (Leprosy) is caused by M.leprae and is a skin and peripheral nerve chronic infectious diseases. This study through using live bacteria stimulating PBMC of 12 MB cases, 5 normal, THP 1 cells, to evaluate the lipid metabolism factor PPAR gamma and ADRP expression. And cytokines IL 2, IL - 10, IL - 6, IL4, TNFα, IFN - γamma, TH17 secretion. In THP - 1 cell line, leprosy bacteria living bacterium, dead bacteria PPAR and expression level of ADRP is higher than without stimulation, there are significant differences (p = 0.0375), immunofluorescence test after living bacteria stimulates the THP 1 (48 h) visible ppar-gamma, ADRP fluorescent antibody labeling. In cell culture supernatant, normal PBMC IL2 secretion of dead bacteria and excitement of lactobacillus P = 0.032, there are significant differences, IL6 dead bacteria and live bacteria stimulation to compare P = 0.001, there are significant differences, IL - 2 normal people live bacteria stimulation and comparing P = 0.040 there are significant differences of normal IL - 6 and contrast to stimulate the living bacterium P = 0.002 there are significant differences, IL - 6 THP - 1 dead bacteria and live bacteria stimulation is P = 0.0478 there are significant differences of other normal people and patients with MB, T normal, THP other cytokines anyway - 1 bacteria were not significant difference, patients with MB, T normal, THP 1 living bacteria and contrast stimulation and no significant difference.
Application of Realtime PCR detection of live bacteria die bacteria and contrast stimulation of THP 1, ADRP expression level significantly higher than the death of lactobacillus bacteria and contrast (p = 0.05, 0.49), ppar-gamma expression level live bacteria is higher than the death bacteria and contrast (p = 0.048, 0.048). Living bacterium MB PBMC in patients in terms of its RNA ADRP gene expression and dead bacteria stimulation and control have no significant difference (P = 0.465, 0.221), and the living bacterium stimulates the MB PBMC in patients with the PPAR RNA gene expression and dead bacteria stimulation and control without significant difference (P = 0.069, 0.069), the living bacterium stimulates normal PBMC RNA the ADRP gene expression and dead bacteria stimulation and control had significant difference (P = 0.011, 0.019), and the living bacterium stimulates normal PBMC its ppar-gamma RNA gene expression and dead bacteria stimulation and control had significant difference (P = 0.018, 0.009), MB type patients (n = 9) and healthy controls (n = 5), mass spectrometry analysis showed that serum LL arachidonic acid of patients was obviously higher than that of normal people (p = 0.0231).

Conclusion
Ppar-gamma and ADRP gene in leprosy bacillus infection plays an important role in the process, and the host he adjust the fat metabolism of patients, promote the host generated fat cells, for the leprosy bacteria growth, at the same time, immune regulation and PPAR ADRP rise, IL - 6, increased significantly, IL - 2 significantly reduced.

**Keywords:** leprosy, lipid metabolism, ppar-gamma, ADRP, cytokines, Realtime - PCR
ILC3.1-036
A Preliminary Study on Specificity of Whole M. leprae and Its Some Antigens
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Objective: To study on the detection of antibody levels (AbLs) against whole M. leprae (WML), lipoarabinomannan-B (LAM-B), ND-O-BSA (ND), antigens of recombinant a1 and a2 of ML in sera from patients with psoriasis (Ps).
Methods: By using WML-ELISA, LAM-B-ELISA, ND-ELISA, a1- and a2-ELISA to detect the antibodies in sera from 63 cases of patients with psoriasis(Ps) and 30 cases of normal controls(NC).

Results: First, we detected the AbLs against WML and LAM-B in sera of Ps and NC. The results indicated that there were antibodies against WML and LAM-B in both of Ps and NC, but the averages of AbLs ( ) and the sero-positive rates in Ps were significant higher than those in NC. The were statistically significant differences between Ps and NC. Second, during detecting the AbLs and PRs in the different types of Ps and NC , under conditions increased ND, a1 and a2 antigens, in the ND-ELISA, the AbLs was negligible in Ps and NC and there was no seropositive cases in Ps, except one case in NC. In contrast with ND-ELISA, other ELISAs all showed the similar results: The averages of AbLs are higher in different types of Ps than those in NC, particularly, the differences of the above parameters among the different types of Ps were to be indicated.

Conclusions: 1. In sera from patients with psoriasis, the antibodies against Mycobacterium leprae(ML)-specific antigen ND not to be detected, i.e. its specificity for serodiagnosis of leprosy is much higher than other antigens tested, ND should to be chose first for detecting the specific antibody of ML.; 2. In sera from psoriasis patients and normal human, the different levels of antibodies against WML, LAM-B, ND, recombinant a1 and a2 of ML were all to be detected. Although differences of AbLs in different types of patients with psoriasis were also presence, the averages of AbLs in patients were all higher than those in NC, which is particularly highlighted in the both of WML and LAM-B; Due to presence of cross reactions, these antigens should not to be used for detecting the specific antibody of ML.

Keywords: Elisa, Antigen, leprosy
ILC3.1–037
Detection of antibodies to M. leprae NDO, LID–1 and MMP–II to recognize leprosy patients and the leprosy high–risk population of household contacts in Yunnan province

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Objective: Serological tests can be important tools to assist in the diagnosis of leprosy and contribute to an earlier diagnosis. The aim of this study was to evaluate the antibody responses against natural disaccharide octyl (NDO), Leprosy IDRI Diagnostic (LID)–1 and major membrane protein (MMP)–II, and the role in predicting the occurrence of the disease in 1700 household contacts (HHCs) of leprosy.

Methods: Detecting the antibody responses against natural disaccharide octyl (NDO), Leprosy IDRI Diagnostic (LID)–1 and major membrane protein (MMP)–II in 601 leprosy patients and 1700 household contacts (HHCs) of leprosy in Yunnan province of China, positive results were compared and analyzed. Results: Using NDO antigen–based diagnosis (IgM antibodies), we could detect 95% of multibacillary (MB) leprosy and 42% of paucibacillary (PB) leprosy patients, using MMP–II (IgG antibody), 93% of MB and 40.5% of PB patients were positive, whereas LID–1(IgG antibody) was used to the detection, 96% of MB and 41.5% of PB patients presented positive. Among the HHCS of leprosy, 13%, 14% and 10.5% presented positive levels of NDO, LID–1and MMP–II Abs, respectively.

Conclusion: The 3 kinds of antigens have high sensitivity to multibacillary (MB) leprosy, but all the HHCS developed leprosy during the follow–up period of 3 years will be estimated, and the capacity of the three antigens to predict the occurrence of the disease HHCS of leprosy will be also compared.

Keywords: Leprosy, Serological, diagnosis, antibodies
Studies on immuno–epidemiology of leprosy by using PGL–1–ELISA of blood from earlobes: A comprehensive report
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Objective: To understand the sero–epidemiological status of leprosy and its effect factors as well as whether leprosy has subclinical infection and correlations of leprosy with the subclinical infection or not and so on.

Method: Detecting blood from earlobes (i.e. making dried earlobe blood blotting by using filter paper strip) of leprosy patients by using PGL–1–ELISA.

Results: Part 1: Blood samples were collected 116 leprosy patients who were classified according to Ridley’s scale and 130 normal controls (NC) from a none–endemic area of leprosy. Blood samples were also collected from 291 household contacts and 1023 random population. The results were as follows: 1. Detecting the levels of anti–leprosy antibodies(LAA) in dried blood stored under different conditions indicated that: the LAA can to be kept for 3 years at 4 °C; 2. The quantitative analysis of the results of PGL–1–ELISA shew that: (1) the positive rate (PR) was 90.5% in leprosy patients; in NC, the PR was 0%; (2) Youden’s Index=90.5, r1=1, r2=0.95; (3) The relationship between PRs of PGL–1–ELISA and incidence rates of leprosy(random samples) in 7 districts tested were all identical and correlated well with the prevalence rates determined by epidemiological surveillance; (4) The household contact(HC)(291 cases) and random sample (RS) (1023 cases), their PRs of PGL–1–ELISA were 33.3% and 15.6%, respectively; Meanwhile the PR increased gradually from TT to LL, and the rate of subclinical infection in HC of MB was much higher than with PB. Part
II: The subjects consisted of 298 HC in contact with 137 leprosy patients. The purpose of the study was to detect the high risk population by using combination of PGL-1-ELISA with lepromin test. The results were: The PR for HC gradually increased with the type of contact patient and for each age group show that early youth and young people were higher, babies and children were between these ages. In family, children infected by their parents was the highest; and the infection of transmitting between husband and wife was 28.57%. All of PGL-1-ELISA positives were tested with lepromin. Their rates of positive reaction are 87.3%. among them, (+) and (+) were 12.7% as a risk population for following up for 3 years. The results: 1. The rate of subclinical infection with M.leprae (RSI) are higher in HC than those in around population; 2. Many factors, such as type of leprosy, degree of contact affected the development of RSI; 3. Among 97 follow up contacts (i.e. individuals of lepromin test were – and +), one person developed clinical leprosy in the second year; 4. Acid fast bacilli (AFB) were to be seen in the skin or peripheral blood of some subjects.

Conclusions: These results indicated PGL-1-ELISA with dried blood from earlobes of leprosy patients could be used as a tool in the immuno-epidemiological study of leprosy and the investigation of subclinical leprosy. About the results above mentioned studies, their practical importance for prevention of leprosy more practical importance needs to develop further.

**Keywords:** epidemiology, PGL-1-ELISA, leprosy
ILC3.1-039
Active search of leprosy cases among school children with positive serology using a rapid test in an endemic area of Brazil
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Objective: The leprosy elimination strategy is based in active detection of cases and early diagnosis, therefore, evaluation of school children should be a good strategy to control the disease, thus, in the present study students from Rondonópolis, MT were evaluated clinically and serologically.

Material and Methods: Active surveillance of leprosy cases among students in the State and Municipal elementary schools of Rondonópolis, MT. The study enrolled school children from five leprosy most prevalent areas (Municipal School Alcides Pereira Santos, State School Francisca Barros de Carvalho; State School Odorico Leocadio Rosa, State School Professor Maria Eliza Ferreira Ignatius and State School Maria Lima Cadê). During the evaluation dermato-neurological examination was conducted, peripheral blood sample collected for serology using the commercial rapid test ND-O-LID-1 and collection of demographic and epidemiological data. Students with positive serology were invited for further evaluation along with their household contacts in the Leprosy Reference Center.

Results: a total of 1279 school children were evaluated clinically and serologically, among those, 54 children presented positive serology. During reevaluation of the positive, 52 children and 232 of their contacts came to the service, and we identified 26 children with of leprosy in the family. As a result, 37 contacts presented positive serology to ND-O-Lid which corresponded to 30 families of the school children reevaluated. After clinical evaluation only one contact was diagnosed with paucibacillar leprosy. None of the school children presented with the disease.

Conclusion: positive serology of the school children suggests there may be another source of infection in the peri-domiciliary environment, such as undiagnosed M. leprae-infected, therefore, the surveillance of leprosy cases should be expanded to individuals that consist of neighborhood and social contacts. The result suggests that contacts with positive serology should be evaluated prospectively for the disease.

Palavras-chaves: School children, leprosy, NDO-LID-1
Agência de Fomento: CNPq

Keywords:
ILC3.1–040
THE PROFILE OF ANTI PGL–1 ANTIBODY AMONG CHILDREN TB PATIENTS
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Objectives: Double infection of tuberculosis and leprosy often occurred in leprosy endemic area. The aim of this study is to evaluate the risk of double mycobacterial infections among children that already suffered of lung tuberculosis.

Methods: Twenty three children (age 2–11 years old) suffering pulmonary tuberculosis treated in Surabaya Hajj Hospital were involved. These patients came from East Java areas, that are categorized as leprosy endemic and non–endemic areas. Sera from these patients were examined for IgM anti Phenolic Glycolipid–1 antibody (ELISA), the specific antibody to Mycobacterium leprae. Using the cut off value 605 u/ml for IgM anti PGL–1, the results were categorized as sero positive and sero negative. The relation of serological results with the patient’s domicil were analyzed.

Results: Two out of 23 children with pulmonary tuberculosis showed 2 (8.7%) positive results of IgM anti PGL–1 antibody. This sero–positive results was significantly higher (p = 0.023) in patients who live in leprosy endemic areas compared to those who live in non endemic areas.

Conclusion: Although these children are already suffered with pulmonary tuberculosis, double infection with other Mycobacteria is also possible, especially in leprosy endemic areas. Both diseases are still endemic due to density of the population and close community.

Keywords: double mycobacterial infection, tuberculosis, leprosy, anti PGL–1 antibodies
ILC3.2-001
INCREASING ANTIMYCOBACTERIAL ACTIVITY OF SYNTHETIC DRUGS UNDER THE INFLUENCE OF SUBSTANCES OF PLANT ORIGIN IN THE EXPERIMENT
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Objectives.
The antileprotic activity some substances of plant origin have been studied in the in vitro experiments and the ability to enhance the action of rifampicin antimycobacterial the combined use.

Methods.
AR Plant—sensitivity of Mycobacterium lufu (recommended for antileprotic drug trial) was defined by the method of serial cultivation on Shkolnikova’s medium within subsequent reseeding to E. Lowenstein medium.

Results.
In the experiment in vitro shows a pronounced antimycobacterial activity of plant origin substance obtained by using the original step extraction plants of the Astrakhan region. It was found that the minimum inhibitory concentration of plant origin substance, its components can significantly change the structure of Mycobacterium lufu. The substances of plant origin have shown the ability to enhance the action of rifampicin antimycobacterial the combined use.

Conclusion.
Provides relevant further study the most active antimicrobial component plants to study their chemical composition and properties for the development and creation of products, which, after appropriate tests can be used in medicine.

Keywords: antileprotic activity, substances of plant origin, rifampicin
**ILC3.2-002**  
**Characterization of Mycobacterium leprae Diguanylate Cyclases**  
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**Objectives**

Although Mycobacterium leprae is an obligate intracellular pathogen, this bacteria must possess mechanisms to adapt to different host defenses or cell types. This study evaluated M. leprae’s potential to synthesize cyclic diguanylate monophosphate (c-di-GMP), a second messenger utilized by bacteria to regulate gene expression and protein function.

**Methods**

Bioinformatics analyses were performed to identify M. leprae proteins that are involved in diguanylate cyclase (DGC) and phosphodiesterase (PDE) activities for c-di-GMP turnover. The M. leprae genes ml1419c, ml0397c, and ml1750c were cloned and expressed in Pseudomonas aeruginosa PA01 and Escherichia coli BL21(DE3) pLysS, where phenotypes for c-di-GMP production are well described. Phenotypic studies assessing colony morphology, macromolecule production and biofilm formation were performed, and the direct measurement of c-di-GMP levels was accomplished by LC-MS. RNA was extracted from M. leprae infected mouse footpads, and gene expression was measured by ddPCR. DGC proteins produced by M. leprae in armadillo tissue were also monitored with protein-specific polyclonal antibodies.
Results
Bioinformatics revealed that M. leprae harbors a putative DGC–PDE protein (ML1750c) and two putative DGC proteins (ML1419c and ML0397c). Interestingly, homologues of ML1419c and ML0397c are not encoded by Mycobacterium tuberculosis. Phenotypic studies revealed that recombinant expression of mll1419c altered colony morphology, motility and biofilm formation of P. aeruginosa, and the recombinant expression of mll0397c increased curl and cellulose production of E. coli. These phenotypes were consistent with increased c-di-GMP production, and LC-MS analyses confirmed increased c-di-GMP production via mll1419c and mll0397c expression. Interestingly, phenotypic studies suggested that ML1750c possesses PDF activity. In vivo gene expression studies revealed that mll1419c, mll0397c and mll1750c are expressed by M. leprae during infection, and ML1419c and ML1750c proteins were identified in whole cell sonicate of armadillo derived M. leprae.

Conclusions
This study demonstrated that M. leprae has significant potential to produce c-di-GMP. ML1419c and ML0397c were confirmed to function as DGCs. In addition, the genes encoding these proteins were expressed during infection. Continued studies to elucidate the physiological function and the environmental signals that trigger DGC activity of ML1419c, ML0397c and ML1750c are being performed. These efforts are directed at defining the role of c-di-GMP in M. leprae and in the pathogenesis of leprosy.

Keywords: c-di-GMP, diguanylate cyclase, second messenger
ILC3.2-003
THE SEARCH FOR NEW COMPOUNDS WITH ANTI-
MYCOBACTERIAL ACTIVITY AMONG DERIVATIVES
OF 1,3-DIAZINON-4 AND THEIR ACYCLIC
PREDECESSORS
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Objectives. The search for effective compounds with high anti-mycobacterial activity is actually for improving chemotherapy of leprosy. In this regard, we have been conducted primary screening of 1,3-diazinon-4 under the ciphers PYaTd1, PYaTs2, PYaTs6, PYaTd10, in order to assess their antimycobacterial activity. Compounds were synthesized in Pyatigorsk Medical Pharmaceutical Institute.

Methods. M.lufulu was used for the primary screening. The ability of derivatives of diazinon to inhibit the growth of the test culture was studied by serial dilutions on medium Shkolnikova. We used a two-week M.lufulu, synchronized with cold (+40°C) during 72 hours. Dilutions of tested compounds were prepared on medium Shkolnikova. 0,2 ml of mycobacterial suspension complying with the standard 5 to McFarland turbidity, including control (without compounds) was introduced to each test-tube. Cultures were incubated during 10 days at t = 310°C. After that 0,05 ml of sediment was sowed on the medium Levenstein-Jansen. From the remaining sediment we did smears, and then stained by Ziehl-Nielsen and by Murohashi. The crops on medium Levenstein-Jansen incubated during 10 days at t = 310°C.

Results. Analysis of smears stained by Ziehl-Nielsen was showed that after incubation with the compounds PYaTd1 and PYaTs2 in the concentration range 128–16 micrograms/ml M.lufulu lost acid resistance, acid resistance forms appeared at lower concentrations, but it does not exceed 50%. During incubation with the compounds PYaTd10 and PYaTs6 number of acid resistance mycobacteria ranged from 25 to 80% respectively.
In smears stained by Murahashi, a reduction in the content of the living forms of mycobacteria under the influence of substances was showed. Number of nonviable form under the influence of PYaTd1 was not more than 50–60%, while in the controls did not exceed 8–10%. PYaTs2, PYaTd10 and PYaTs6 were less active. Under the influence of PYaTd1 the growth of test-culture on medium Loevenstein-Jensen was in a concentration range 128–8 micrograms/ml, PYaTd10 – in a concentration range 128–64 micrograms/ml, PYaTs2 – 128 micrograms/ml. At lower concentrations and under the influence of PYaTs6 growth of atypical colonies from single to multiple respectively concentrations of the active ingredient were observed.

Conclusions. The new derivatives of 1,3-diazinon-4 PYaTd1, PYaTs2, PYaTs6, PYaTd10 showed bacteriostatic and bactericidal properties against M.lufu. PYaTd1 and PYaTs2 were more active.

**Keywords:** SCREENING, DERIVATIVES OF 1, 3 DIAZINON-4, DAPSONE, Anti - MYCOBACTERIAL ACTIVITY
ILC3.2-005
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Objective: Currently, Light Emitting Diode Fluorescent Microscope (LED-FM) is available in most health centers of leprosy burden countries like Ethiopia. Using this opportunity, staining techniques other than acid fast bacilli (AFB) could improve leprosy diagnosis particularly in rural settings where there is high scarcity of Dermatologists. Moreover, it will contribute a part in the national leprosy control activities. Auramine O (AO) staining is one of the staining techniques evaluated in this study for its potential in leprosy diagnosis. Therefore, this study aimed to evaluate the diagnostic potential of AO staining for the diagnosis of leprosy using LED-FM.

Methodology: Skin biopsies collected from One hundred and fifty three clinically confirmed leprosy patients and fixed in 10% formaldehyde and 70% ethanol divided in to two parts. Hematoxylin-Eosin (HE), Fite-Faraco (FF) and AO staining performed on tissue sections prepared from formalin fixed paraffin embedded tissues, whereas alcohol fixed tissues used for DNA extraction to do Polymerase Chain Reaction (PCR).
Clinical diagnosis has been used as reference standard in this study to compare the diagnostic potential of the four diagnostic methods.

Results: The diagnostic potential of four laboratory tests has been evaluated on 74 samples with completed results so far. PCR, HE, AO and FF has shown 87.8% (65), 79.7% (59), 67.6% (50) and 60.8% (45) positive results, respectively. A of total 38 samples were histopathologically classified as Tuberculoid (TT), Borderline Tuberculoid (BT), Intermediate (INT) and Negative (Neg). Among these groups, which are expected to have low bacillary concentration FF, AO and PCR yielded 28.9% (11), 42.1% (16) and 76.3% (29) positive results, respectively.

Conclusion: This preliminary results show that AO staining will add significant improvement over the routine ZN staining in sensitivity as well as simplicity of result reporting in leprosy diagnosis using LED-FM specially at low level health centers where the availability of dermatologist is scares. This result also clearly shows that PCR maximizes the detection rate of the disease at its early stage and helps in confirmation of inconclusive cases and it should be available at least at referral level.

**Keywords:** Auramine O, Fite-Faraco, Hematoxylin-Eosin, PCR, LED- Florosence Microscope
ILC3.2-006
Characterization of pre-rRNA as a viability indicator for Mycobacterium leprae
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Objectives: In vitro cultivation of Mycobacterium leprae remains to be a challenge. For this reason, during diagnosis or treatment, it is difficult to evaluate the viability of M. leprae which differs from other cultivable mycobacteria such as M. tuberculosis. In some cases, the 16S rRNA has been recognized as a viability indicator. It is known that the expression level of bacterial 16S rRNA fairly correlates with the viability, while it has tendency to show delayed response to actual viability. In contrast, the pre-rRNA, which is a precursor of mature 16S rRNA, has been shown to more readily respond to viability alteration, compared to 16S rRNA. However, it is still unknown whether the same is true for M. leprae. In this study, we focused on the pre-rRNA and characterized its fate in M. leprae.

Methods: For in vitro analysis, M. leprae Thai-53 strain propagated in footpads of nude mouse (BALB/c nu/nu) was incubated with rifampicin for various periods. Biopsy samples including M. leprae bacilli were stored in RNA-stabilizing reagent immediately after examining the patients. Total RNA was extracted from rifampicin-treated and patient-derived M. leprae and converted to cDNA by reverse transcriptase. By using cDNA as template, each expression level of pre-rRNA and 16S rRNA was relatively quantified by real-time PCR with specific primers for both targets.

Results: To confirm whether the differences was observed between pre-rRNA and 16S rRNA in M. leprae, we quantified and compared both expression levels in the presence of rifampicin. Consequently, when M. leprae was treated with rifampicin for 24 hours, the expression level of pre-rRNA was found to be around half of that of 16S rRNA, suggesting that the synthesis of pre-rRNA drastically diminished in response to the killing effect of rifampicin. Moreover, we investigated the fate of M. leprae pre-rRNA and 16S rRNA in leprosy patients under MDT (multidrug therapy), by using biopsy sample. Comparison of the relative quantity of both molecules indicated that pre-rRNA decreased more rapidly than 16S rRNA in accordance with the duration of MDT and almost disappeared after completion of MDT, in spite of the observation that 16S rRNA still persisted.

Conclusions: Our results demonstrated that pre-rRNA has potential to be a viability indicator of M. leprae, and could be used for the assessment of MDT.

Keywords: RNA, viability
Nitazoxanide is active against Mycobacterium leprae in vitro

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OBJECTIVES: Nitazoxanide (NTZ) has bactericidal activity against Mycobacterium tuberculosis and we were therefore interested to determine if NTZ had any effect against M. leprae.

METHODS: We examined the effect of NTZ against Mycobacterium leprae in axenic culture, using two methods to determine either metabolic activity or bacterial cell wall integrity. Radiorespirometry was used to determine M. leprae metabolic activity over 14 days in the presence of either rifampin (RIF) or NTZ, evaluating the oxidation of 14C-palmitic acid to 14CO2. We also adapted live-dead staining to monitor the effect over time. Bacterial cells were stained with a combination of SYTO9 and propidium iodide dyes and transferred to sterile tubes containing 3 mL LB broth with 0.05% Tween. Bacteria were treated with 2 μg / mL RIF or 100 μg / mL NTZ and incubated at 33°C with 5% CO2. One mL samples were removed, bacteria harvested by centrifugation and resuspended in 1 mL sterile distilled water. Bacteria were stained with the LIVE/DEAD® BacLight Bacterial Viability Kit (Invitrogen) with 5 μM SYTO 9 and 30 μM propidium iodide. After incubating at room temperature in the dark for 10 min and washing twice with dH20, bacteria were counted by microscopy on glass slides. Sample frames were counted using Ex/Eem of 480/500 nm for SYTO 9 and 490/535 nm for propidium iodide. Images were converted to binary versions, segmented using iterative watersheding, and particle images were analyzed for cell counts of live and dead populations. The percentage of viable cells was determined for each time point and for the untreated bacterial control sample.

RESULTS: We observed a dose- and time-dependent inhibition of metabolic activity over 14 days using radiorespirometry. Live-dead staining in axenic culture confirmed that bacterial killing occurred in response to NTZ exposure over 25 days.

CONCLUSIONS: These data suggest that NTZ is a novel, infective inhibitor of M. leprae that could be considered for the treatment of leprosy.

Keywords: drug
ILC3.2-008
Role of Mouse Foot Pad Inoculation Study to Diagnose Leprosy Relapse and to Determine Drug Resistance to WHO MDT.
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Objectives: To diagnose relapse by demonstrating viable M.leprae and to check drug resistance in clinical “Relapse” / “Suspected relapse” cases by MFP inoculation study

Methods: Old treated leprosy patients who attended SIHR&LC, Karigiri Hospital with new lesions during 2005 to 2015 (i.e., 10 years) are selected for this retrospective study. These patients were examined and made clinical diagnosis of relapse in 44 patients according to WHO criteria and suspected relapse in 16 patients. The suspicion of relapse in this group was due to non-availability of initial and RFT skin smear reports and non-availability of documented treatment details. After clinical examination, slit skin smear and skin biopsy was performed from new lesions. The fresh tissue is used for MFP study and for histopath tissue was fixed in formalin. Thymectomized CBA mice were used after irradiation. Ree’s technique is followed for the study. 2 sets of animals were used simultaneously, 1 set is to see viability of M.leprae and the other set to study drug resistance for all 3 drugs used in WHO MB MDT. 12 months after inoculation, the animals were sacrificed and harvested.
Results: Out of 44 cases in relapse group 27 patients showed growth in MFP indicating the presence of viable M. leprae and confirming relapse. 17 patients in this group did not show multiplication of M. leprae. Out of 16 patients with ‘Suspected relapse’ diagnosis group only 6 patients showed viable M. leprae growth while 10 patients did not show multiplication. DDS resistance in all concentration is noticed in 3 patients in relapse group and in 4 patients in suspect relapse group. DDS resistance in low concentration is noticed in 2 patients in relapse group. There is no rifampicin resistance in any patient in the study. The MFP results are correlated with clinical, bacteriological and histopathological reports.

Conclusion: In the absence of other reliable methods to demonstrate viable M.leprae, and to check drug resistance, MFP inoculation study will continue to be a useful tool in the diagnosis of relapse in selected cases.

Keywords: Mouse Foot Pad Inoculation, Relapse, Drug Resistance, Viability, Mycobacterium leprae
ILC3.2−009
Evaluation of Bactericidal Activity of New Drugs and Drug Combinations in Mice Infected With Rifampicin Resistant Mycobacterium leprae
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Introduction: The objective of the research is to study the efficacy of new drugs and drug combinations in mice infected with rifampicin resistant M. leprae. Individual drugs tested were rifapentine and moxifloxacin as possible candidate drugs to replace Rifampicin. Drug combinations were grouped to replace all three drugs in the Standard WHO MDT. The drug combinations are moxifloxacin, clarithromycin, minocycline (CMM), clarithromycin, ofloxacin and minocycline (COM). Both drug and drug combinations were used as daily regimen and intermittent regimen. MB MDT was also used as a drug combination and served as a positive control.

Methods: Thymectomized and irradiated mice were infected with M. leprae resistant strain inoculums and allowed to develop swollen foot pads. Mice with swollen foot pads were then allotted to daily and intermittent groups and given the selected drugs or drug combinations as per the selected dosage and schedule. Mice were sacrificed at chosen intervals and the bacterial counts were measured from each pad noting the solid ratios also.
The bacterial harvest suspension from the sacrificed mice was then serially diluted and sub inoculated into both TR mice as well as normal mice. These mice were maintained with normal diet for 12 months. At the end of 12 months mice were sacrificed and the foot pads harvested and bacterial counts estimated from each foot pad. The proportion % of viable bacilli was counted based on Spearman and Karber method.

Results: It was noted that Moxifloxacin and Rifapentine had bactericidal activity comparable to standard WHO MDT. Moxifloxacin had better bactericidal activity than Rifapentine. As far as drug combinations were concerned results showed that WHO MDT is the best drug combination, having the highest bactericidal activity. CMM as a combination also had bactericidal activity comparable to WHO MDT. The bactericidal activity of COM was less than that of WHO MDT and CMM. It is paradoxical that WHO MDT demonstrated good bactericidal activity in rifampicin resistant strains proved by molecular methods.

Conclusion: In the field setting where relapses are diagnosed on the basis of history and clinical criteria alone with no skin smear examination or molecular biology support it is prudent to re-start the patient on MB MDT. This is because disease history is not reliable and a number of patients may not have completed MDT. If no clinical improvement is seen then a drug combination of CMM can be started preferably as a daily dose.

**Keywords:** Mouse Foot Pad Inoculation, Rifampicin, Drug Resistance, Mycobacterium leprae, Cross Bred Albino Mice
ILC3.2-010
Evaluation of new Antibacterial Drug Combinations in Murine Model of leprosy to identify short duration alternative to Standard WHO regimen of Multibacillary – Multidrug Therapy
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Introduction: The objective of the research is to test the efficacy of new drugs and drug combinations in mice infected with M. leprae as alternative to present WHO MDT. Individual drugs tested were rifampicin, rifapentine and moxifloxacin. Drug combinations were grouped with the objective of replacing all three drugs in the Standard WHO MDT. The rifampicin drug combinations are rifampicin, clarithromycin, minocycline (RCM), rifampicin, ofloxacin and minocycline (ROM). Rifapentine drug combinations are rifapentine, clarithromycin, minocycline (RptCM), rifapentine, ofloxacin, minocycline (RptOM). Both drug and drug combinations were used as daily regimen and intermittent regimen. MB MDT was also used as a drug combination and served as a positive control.

Methods: Thymectomized and irradiated mice were infected with resistant strain inoculums and allowed to develop swollen foot pads. Mice with swollen foot pads were then allotted to daily and intermittent groups and given the selected drugs and drug combinations as per the selected dosage.
Mice were sacrificed at chosen intervals and the bacterial counts were measured from each pad noting the solid ratios also. The bacterial harvest suspension from the sacrificed mice was then serially diluted and sub inoculated into both TR mice as well as normal mice. These mice were maintained with normal diet for 12 months. At the end of 12 months mice were sacrificed and the foot pads harvested and bacterial counts estimated from each foot pad. The proportion % of viable bacilli was counted based on Speanmann and Carber methods.

Results: It was noted that rifampicin, rifapentine and moxifloxacin showed excellent bactericidal activity when used as daily or intermittent doses in both normal and TR mice. As far as drug combinations are concerned drug combinations of either CLAR/MINO or MINO/OFLO with Rifampicin or Rifapentine in daily or intermittent regimen showed bactericidal activity comparable to that of WHO MDT. These drug combinations can be tried as alternatives to the present WHO MDT regimen against sensitive strains.

Conclusion: From the study it seems that WHO MDT is still the best treatment option for sensitive strains of M. leprae. However, if the present duration of MDT has to be shortened then daily dose regimen with RMP/MINO/OFLO or RPT/CLAR/MINO can be tried. ROM has been used both for single lesion as well as PB treatment in earlier clinical trials with success.

Keywords: Rifapentine, Moxifloxacin, Alternative Drugs, Multidrug Therapy, Mycobacterium leprae
ILC3.2-011
A unique mutation on folP1 in Mycobacterium lepromatosis detected from leprosy patients in Mexico
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Objectives: Mycobacterium lepromatosis has been recently identified as a causative agent for atypical leprosy independent from Mycobacterium leprae. There are no methods to cultivate either bacterium in artificial culture, and growth of M. lepromatosis in the mouse footpad has not been reported. In this study, we focused on drug resistance-associated genes of M. lepromatosis in patient samples from Mexico.

Methods: Biopsy samples from leprosy patients in Mexico, including M. lepromatosis infection suspected cases, were collected with informed consent. Genomic DNA was extracted from samples using Qiagen DNeasyTM Blood & Tissue kit (Qiagen K. K., Tokyo, Japan) according to the manufacturer’s instructions. For the detection of M. lepromatosis, 16S rRNA and rpoT genes were amplified by the standard PCR method and sequenced. Sequencing of the 16S rRNA gene was used as a species identification. The number of a six base pair tandem repeat (CATCGA) and the presence of two repeats of 21 bases in rpoT were used to identify M. lepromatosis. The drug resistance-related genes folP1, rpoB, and gyrA were amplified and mutations in the drug resistance determining regions (DRDRs) of each gene were assessed.
Results: The 16S rRNA gene sequence of clinical samples identified two samples containing M. lepromatosis, seven with M. leprae, and one mixed infection with M. leprae and M. lepromatosis. Nine samples could not be amplified. Sequencing of the regions containing 6bp repeats and 21bp tandem repeats in rpoT verified the presence of M. lepromatosis. Although nucleotide mutations were found in drug resistance determining regions (DRDRs) of folP1, rpoB, and gyrA in Mycobacterium lepromatosis, they did not confer resistance to dapsone and rifampin, or quinolone. However, we found a new mutation at the 54th codon between two major sites of folP1 DRDR in all M. lepromatosis sequences.
Conclusions: There was no mutation on major sites of DRDRs in M. lepromatosis. Therefore, the multidrug therapy regimen proved effective against M. lepromatosis infection. However, We found a new mutation at the 54th codon between two major sites of folP1 DRDR in M. lepromatosis isolates. Further analysis of the new mutation would be needed.

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Keywords: Mycobacterium lepromatosis, folP1, leprosy, drug resistance, Mexico
ILC3.2-012

Human Organotypic Skin Explant Culture to Cultivate of Mycobacterium leprae

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Mycobacterium leprae was first bacterial pathogen to be identified and associated as cause of a human infectious disease, but since 1873, numerous attempts to cultivate it in vitro were performed, but without success. So far, the only way to keep it viable is through in vivo inoculation, especially in mice, but it requires a long time, mainly for studies about drug resistance and new antimicrobial tests. Furthermore, models in-vitro/ex-vivo like hOSEC consolidate as an alternative test to utilization of animals.

Objective: We propose a new culture model for M. leprae, an ex vivo model using Human Skin Organotypic Culture (hOSEC).

Methods: 2 x103 bacilli/0.1mL were inoculated into 6mm human skin fragments kept in culture medium. Maintenance, growth and morphology of bacilli into tissue were assessed by specific techniques of histopathology (H&E and Fite–Faraco staining) and immunohistochemistry, in different periods of culture.

Results: Partial results show that is possible to keep the bacilli into skin explants in culture. Histologically by H&E after 30 days, a new epidermis and into the dermis the histiocytic granulomas were found around vases. After 60 days, these granulomas became more constituted presenting also giant cells. By Fite Faraco, after 30 and 60 days, we have observed many isolated and viable bacilli, and also globi. In average, one bacillus were found in ten fields analyzed each time. Immunohistochemically, CD68, IFN–, IL–12, iNOS and MLSA–LAM (M. leprae specific) markers were expressed around granulomas and following the neural path until 60th days culturing.

Conclusion: Although still preliminary results, the ex – vivo model of skin seems to offer great prospects for the study of leprosy from the interaction skin and M. leprae, both for the evaluation of drug efficacy and resistance, as important advances in immunology of the disease.

Keywords: hOSEC, ex vivo, M. leprae, culture
ILC3.2-013
Up-regulation of mir-5703 expression under sonicates of M. leprae challenge in multibacillary leprosy patients: a preliminary study
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Increasing evidence suggests that microRNAs (miRNAs) play a critical role in the pathogenesis of mycobacteria diseases. The aim of the study was to explore biologic behaviors and disease relevance of miRNAs in the development of leprosy. To examine alterations in leprosy-related miRNAs, paired expression profiling of miRNA from peripheral blood mononuclear cells in the same person with and without sonicates of M. leprae treatment was performed by miRNA microarray analysis in the multibacillary patients and the healthy controls (HC). Expression profile analysis revealed that 3 miRNAs were upregulated while 2 miRNAs were downregulated in multibacillary patients. We performed qRT–PCR to verify the differentially expressed miRNAs, and found miR-5703 was significantly up-regulated in multibacillary patients. The background expression of miR-5703 exhibited no differences between multibacillary patients and the healthy controls. The predicted target genes of miR-5703 were enriched in the following gene ontology categories: cell apoptosis, innate and adaptive immune regulation. In conclusion, our study suggests that miR-5703 exhibited characteristic expression under the challenge of sonicates of M. leprae, indicating its potential role in pathogenesis of leprosy.

Keywords: leprosy, microRNA, Chips, miR-5703
ILC3.2-014
GEOGRAPHICAL DISTRIBUTION OF Mycobacterium leprae spp. IN INDONESIA BASED ON THE TTC REPEATS
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Introduction
Due to the incultivable of M.leprae, studies of of this bacilli mostly based on bio-molecular methods. One of the methods is to count the TTC in the nucleotides sequence from the DNA of the bacilli. Since longtime ago, the Wallacea line has been used for differentiating the ecological environment between Asia and Australia.

Objectives: To analyze relation between the number of TTC repeats and the geographical distribution of the samples collection sites from several parts of Indonesia, based on the Wallacea line.

Methods: Five hundreds and fifty six M.leprae positive PCR samples collected from several parts of Indonesia were re-analyzed using TTC primers and sequencing to obtain the TTC areas. The number of TTC repeats were count and categorized in two different groups : the long TTC repeats ( 15 times or more ) and short (< 14 times). The origin and results of these two groups were analyzed based on the Wallacea line area.

Results: The majority of samples collected from East Wallacea areas are the short TTC repeats group, while those from the West Wallacea areas showed longer TTC repeats group.

Conclusion: The geographical distribution of M.leprae in Indonesia has a correlation with ecologic and environmental distribution, following the Wallacea line.

Keywords: TTC repeats, M.leprae, geographical distribution, Wallacea line
ILC3.3–001
Molecular biology and genetics in leprosy
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Leprosy is one of the most common causes of nontraumatic peripheral neuropathy globally. Prevalence of leprosy has decreased dramatically, the high number of new cases indicates active transmission. The proportion of patients with disabilities is affected by the type of leprosy and delay in diagnosis. The availability of mycobacterial genomes in the past few years has provided a huge pool of information and careful analysis continues to provide insights into the biology and virulence determinants of the mycobacterial species. M. leprae genome is exceptionally large number of pseudogenes. Many studies have pointed out the genetic predisposition of the host to the development of diseases such as leprosy and tuberculosis. It is suggested that human genetic factors may influence the acquisition of leprosy and the clinical course of disease [Alter et al, 2008]. Single nucleotide polymorphism–association based studies showed a low lymphotoxin–α (LTA)–producing allele as a major genetic risk factor for early onset of leprosy [Alcas et al, 2007]. Other reported SNPs which are to be associated with disease and/or the development of reactions in several genes, such as vitamin D receptor (VDR), TNF–α, IL–10, IFN–γ, HLA genes and TLR1 (Santos et al, 2002; Mira et al, 2003, 2004). A frequently occurring SNP in TLR1 (the 602S allele), which impairs receptor trafficking and function, has been described and seems to play a protective role in the context of clinical leprosy [Johnson et al 2007]. Previous studies has demonstrated that TLR2 mediates the innate immune recognition of M. leprae [Bochud et al 2003]. TLR2 polymorphisms are associated with susceptibility to leprosy and/or leprosy reactions. The results of genome–wide analyses (linkage and association) and candidate gene studies suggest an independent genetic control over both susceptibility to leprosy and development of clinical subtype. Moreover, the emergence of a shared genetic background between leprosy and several inflammatory/autoimmune diseases suggests that leprosy is a suitable model for studying the genetic architecture and subsequent pathogenesis of both infectious and inflammatory/autoimmune diseases.

Keywords: Vitamin D receptor, Pathogenesis, HLA, TLR1, lymphotoxin–α
ILC3.3-002
Fine-mapping and functional annotation analysis revealed complex pleiotropic effect and tissue-specific regulatory mechanism of TNFSF15 in primary biliary cirrhosis, Crohn’s disease and leprosy
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Multiple associations have been reported within the 9q32 locus, suggesting a pleiotropic effect of risk variants in diseases such as Crohn’s disease (CD), primary biliary cirrhosis (PBC) and leprosy. However, it is still unclear which gene it affects and whether it’s driven by the same or different causal variants. We performed a systematic fine-mapping analysis of the locus in three large disease datasets of leprosy (9,619 cases and 12,896 controls of Chinese), CD (1,576 cases and 3,013 controls of Koreans) and PBC (1,594 cases and 1,529 controls of Japanese). Our study revealed two independent genetic associations at rs6478108/rs6478109 (r2=1) and rs4979462 for CD and leprosy, but only one association at rs4979462 in PBC. These associations show an opposite genetic effect between leprosy and CD/PBC. Strong eQTL effect of rs6478109 on TNFSF15 expression in whole blood and isolated monocytes suggests that high expression of TNFSF15 could be a risk factor for CD and PBC, but protective for leprosy. Cell/tissue-specific regulatory function was also observed at the locus, suggesting a diverse functional role for TNFSF15 in gastrointestinal cells, epithelial/connective tissues and immune regulation, thereby providing protective effect against infectious diseases such as leprosy, but increasing the risk for immune and inflammatory diseases.

Keywords: leprosy, tnfsf15, crohn's disease, primary biliary cirrhosis
ILC3.3-003
Genetic research of leprosy
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Genome-wide association studies (GWAS) have led to the discovery of several susceptibility loci for leprosy with robust evidence. To date, we performed more than three GWASs of leprosy in the Chinese population using a total of 8,313 leprosy cases and 16,017 controls, revealing over 18 susceptibility genes. These genes have provided biological insight into the role of host genetic factors in mycobacterial infection and potential application for the prediction diagnostics of early disease onset or asymptomatic patients. Further, dapsone alone or in combination with other drugs has been used for the treatment of leprosy, but caused severe drug hypersensitivity syndrome. Through GWAS and Next-generation sequence technology, we identified HLA-B*1301 as the risk predictor for DHS, with a sensitivity of 85.5% and a specificity of 85.7%. The perspective study for estimating the effectiveness of the predictor is now ongoing.

Keywords: leprosy, GWAS, dapsone, hypersensitivity syndrome
ILC3.3-004
A Genome-wide Meta-analysis of leprosy Identifies Four Novel leprosy Susceptibility Loci in Chinese Zhenzhen Wang\textsuperscript{1,2}, Hong Liu\textsuperscript{1,2}, Yonghu Sun\textsuperscript{1,2}, Furen Zhang

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Leprosy is a chronic infectious disease caused by the intracellular pathogen Mycobacterium leprae (M. leprae), which usually progress to peripheral neuropathy and permanent progressive deformity. Previous genome-wide association studies (GWASs) have identified 18 loci significantly associated with leprosy. However, these loci explain only a fraction of the disease risk and it is clear that more genes and loci remain to be discovered. In this study, we conduct a three-stage GWAS comprising 8,156 cases and 15,750 controls of Chinese ancestry. We identify four novel loci on 3p25.2 (SYN2-PPARG), 7p14.3 (BBS9), 8p23.1 (CTSB), 8q24.11 (MED30). Together, these findings significantly expand our understanding of the genetic susceptibility to leprosy.

**Keywords:** Leprosy, GWAS
ILC3.3-005
Detection of Mycobacterium leprae drug resistance mutations from leprosy patients from India by using molecular methods
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Background: Currently, leprosy treatment and control is based on World Health Organization (WHO)-recommended multidrug therapy (MDT) and is in use for treatment of leprosy for the last 29 years. Using MDT the prevalence of leprosy has come down drastically all over the world. It has been noted from earlier experience that any therapeutic control measure for prevention of disease with antibiotics ultimately leads to emergence of drug resistance. Therefore, a surveillance mechanism should function as a ‘watch dog’ for identification of drug resistance. Recent publications have, however, indicated instances of drug resistance in several endemic areas.

Objective: Molecular detection of drug resistance in M. leprae in clinically relapse leprosy patients.

Methods: In the present study, slit– skin smears samples were collected from 227 relapse leprosy cases from different hospitals of across India. DNA extracted from these samples were analyzed for the genes associated with drug resistance in M. leprae. Wild-type strain (Thai-53) and drug-resistant (Z-4) strain mouse footpad-derived were tested as reference strains. These samples were analyzed for the genes associated with drug resistance in M. leprae.

Results: Out of these 227 cases 13.4% were found to be associated with rifampicin resistance as revealed by mutations in rpoB region. We also observed 7.3% and 9.1% of the DNA samples showing mutations that can cause resistance to Dapsone and Ofloxacin respectively. We detected polymorphisms in rpoB gene at codons 410 (Glu–Val), 411 (Ala–Val), 424 (Val–Gly), 427 (Ile–Phe), 433 (Thr–Ile), 438 (Gin–Val), 439 (Phe–Leu), 441 (Asp–Tyr) 442 (Gln–His), foIP gene at 53 (Thr–Arg), 55 (Pro–Leu) and gyrA gene at 91 (Ala–Val, Ala–Thr), 92 (Ser–Ala).

Conclusion: Results from this study revealed resistance to rifampicin in relapsed cases of leprosy. Rise in number of the cases with resistance to rifampicin is likely that resistant strains are actively circulating in some endemic regions of India suggesting an urgent need for development of drug-resistant monitoring policy and a careful post-treatment follow-up of cured patients in order to detect relapse earlier and rapidly identify resistant strains. This further indicates an urgent need for identification and inclusion of new drugs in the regimen for treating such cases.

Keywords: Leprosy, Drug resistance, India
Multidrug Resistance among Mycobacterium leprae strains from Indian Relapsed Leprosy Patients
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Background: Global efforts to control leprosy by intensive chemotherapy have led to a significant decrease in the number of registered patients. Current recommended control measures for treating leprosy with MDT are designed to prevent the spread of drug–resistant M. leprae. However, drug resistance has been reported since 1984 for dapsone, 1976 for rifampicin and 1996 for ofloxacin.

Objective: We report here the identification of a multidrug–resistant strain of M. leprae from relapsed leprosy patients from an endemic region in India. The drug resistant profiles of the isolated strains were confirmed by the identification of mutations in genes previously shown to be associated with resistance to each drug (Rifampicin, Dapsone and Ofloxacin).

Material and methods: Two hundred and twenty seven slit–skin smears samples were collected from relapse leprosy cases from different hospitals of The Leprosy Mission across India between 2009 and 2015. DNAs were extracted from these samples and analyzed for PCR targeting genes associated with drugs (Rifampicin, Dapsone and Ofloxacin) in M. leprae. Thai–53 (Wild–type) and Zensko 4 (MDR) strains were used as reference strains.

Result: Eleven strains showed representative mutations in more than two genes and one strain showed mutation in all three genes responsible for rifampicin, dapsone and ofloxacin. Among these eleven strains 8 strains were showed mutation in rifampicin and dapsone and 3 showed in dapsone and ofloxacin.

Conclusion: The study showed occurrence of MDR strains of M.leprae in MDT treated leprosy patients from endemic regions of India.

Keywords: Multi drug resistance, leprosy , India
ILC3.3-007
In-Silico Approach for Screening of Interaction of rpoB gene to Secondary-Line Anti-Leprosy Drugs for Rifampicin Resistant M. leprae
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Background: Patients with high bacillary load after completion of multidrug therapy are known to relapse and small proportion of them have been shown to harbor drug resistance strains of M. leprae. As there is lot of time gap in identification of these relapse cases, there treatment failure cases are posing risk in dissemination of resistant strains in the community. It has been recently noted that several M. leprae isolates obtained from relapsed cases were harboring M. leprae resistant especially to its bactericidal drug, Rifampicin. The present investigation was carried out to find out the reasons for interactions by in-silico binding between the clinical mutant of RpoB and RIF resistance in M. leprae.

Aim: In this work, in silico molecular docking was performed in order to find the binding interaction and other properties of fluoroquinolones and minocycline which are used as secondary line drugs against M. leprae rpoB mutated gene, resistant to RIF.

Methods: In the present study homology model of wild type of RpoB of M. leprae was generated using I-Tasser, which is considered as template and Wild type, and for Mutant (Z-4) substitutions were done at the respective positions with the help of Molegro Virtual Docking 2011.5.0 (MVD) to dock with secondary line of drugs to determine the best possible treatment for the Rifampicin resistant M. leprae.
Results: The docking of RIF with Wild type and Mutant protein showed higher values with Wild type compared to Mutant protein. Our results suggest that substitutions have pronounced effect on the conformation of the Mutant proteins and eventually upon the RIF binding interactions leading to the cause of resistance. From the results obtained, MolDock score of wild and mutant rpoB-inhibitors complex for Moxifloxacin (−81.576 and −98.043) Minocycline (−67.583 and −81.2871) Sparfloxacin (−71.778 and −81.5758) and Ofloxacin (−78.735 and −80.8705) were observed. The interaction energies of wild and mutant rpoB-inhibitors complex, for Moxifloxacin, Minocycline, Sparfloxacin and Ofloxacin (−13.511 and −14.3883), (−28.927 and −31.12), (−19.878 and −24.4193) and (−17.203 and −20.4404) respectively. These results revealed that Minocycline and Moxifloxacin are the best inhibitors for mutant (resistant) rpoB protein compared with the other drugs used in this study.

Conclusion: We suggest here that bioinformatics approach using in silico virtual screening of some anti-mycobacterial agents (Ofloxacin, Sparfloxacin, Moxifloxacin, and Minocycline) against rpoB protein of M.leprae using docking server will be useful for screening alternate drugs for RIF resistant patients.

Keywords: In-silico, Drug Resistance, RpoB Gene, M.leprae
Tuberculosis risk-associated SNPs do not show association with leprosy in Chinese population

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Objective: Leprosy and tuberculosis are chronic granulomatous infectious diseases. Besides pathogens and environmental factors, host genetic factors are substantial contribution to the susceptibility of both diseases. More importantly, leprosy and tuberculosis also share part of pathogenic mechanisms and clinical features. Therefore, we investigated the genetic association between leprosy and tuberculosis in Chinese Han population.

Methods: A genetic association study including 46 tuberculosis susceptibility SNPs is performed in 1,150 leprosy cases and 1,150 controls from Chinese Han population using the Sequenom MassArray system.

Results: There is no significant association was discovered between 46 SNPs and leprosy, in other words, there is no shared susceptibility loci between leprosy and tuberculosis in Chinese Han population according to our study.

Conclusions: Although leprosy and tuberculosis have a number of similar aspects, the shared susceptibility loci of them were not found in Chinese Han population, so it demonstrated that the genetic basis of pathogenesis of both diseases may vary greatly.

Keywords: Leprosy, Tuberculosis, Genetic association, Chinese Han population
ILC3.3-009
Molecular Typing of Mycobacterium leprae Among Multi-Case Families and Multi-Case Villages in Cebu, Philippines
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Objective: To understand family level and community level leprosy transmission patterns within a geographically isolated and stable population using modern molecular methods.

Methodology: Cebu is an island in central Philippines which detects more than 200 new leprosy cases every year. Over the last 16 years (2000-2015), about 5,000 new leprosy cases were detected in the island. Within this period, a subset of this population volunteered for M. leprae strain typing upon diagnosis. After epidemiologic and clinical evaluation, biopsy and slit skin scrapings (SSS) were taken from the most active lesions of patients or contacts showing signs of leprosy. The specimens were processed for M.leprae strain typing on the basis of genetic variability at multiple loci arising from a variable number of tandem repeats (VNTR). Family and community level transmission patterns were traced through strain-type matching of blood-linked and community-linked cases detected within the study period.
Results:
Among 5,000 new leprosy cases detected over the past 16 years, over 10% were strain-typed for M. leprae. Within this cohort, 5 multi-case families/households involving 12 individuals were traced. Among them, 3 were siblings; 5 were siblings from two distinct families; 2 were a mother and son; and 2 were an uncle and a nephew residing in the same compound. Preliminary findings suggest identical M. leprae VNTR profiles between blood-linked cases; however, except for a number of cases residing in a well-contained leprosy enclave, non-identical VNTR profiles between community-linked cases were observed. Details of spatial and temporal distribution of strains between these patients will be presented during the congress.

Conclusion:
1. SSS from a single site provides DNA of sufficient quantity and quality for strain typing at >13 loci by PCR and sequencing methods. The VNTR allelic diversity detected within this population is adequate for strain discrimination.
2. This molecular approach can be used to determine epidemiological linkages and/or the source of infection among MB leprosy patients.
3. Our findings support the use of VNTR loci for short range (family level) transmission studies. This tool is vital to early case detection and basic leprosy control programs in a well-defined community. However, its use for a broad range (community level) transmission still needs to be explored.

**Keywords:** molecular, strain-typing, multi-case families, multi-case villages
ILC3.3-010

Medieval leprosy genomes: Retracing the evolutionary history of Mycobacterium leprae using ancient DNA

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Leprosy, one of the oldest recorded and most feared diseases in human history, is caused by the bacterial pathogen Mycobacterium leprae and was prevalent in Europe until the 16th century. Today the disease is still endemic in many countries with over 200,000 new cases reported annually. Ancient DNA studies allow us to trace back the evolutionary history of this bacillus via a comparison of ancient strains with contemporary ones and to compare the geographic distribution of various lineages at different time points in history.

In our previous studies we detected an exceptional DNA preservation of M. leprae DNA in medieval skeletons, that enabled us to successfully reconstruct a late medieval leprosy genome by de novo assembly, thus offering the prospect to retrace M. leprae’s pre-historic origins. A phylogenetic comparison of ancient and modern strains, revealed a pre-medieval origin of most contemporary human and armacillo leprosy lineages. Furthermore, the seven medieval M. leprae genomes sequenced previously suggested a prevalence of two distinct lineages in medieval northwestern Europe, of which one, lineage 2, was present at least from the 10th to the 12th century, while the strains of the late medieval era belong to lineage 3.

Our data provide new insights into the evolutionary history of leprosy in Europe from genome wide data of different time points and geographic origin including a 1500-year-old M. leprae genome from one of the earliest known cases of leprosy in the UK, a skeleton from the Great Chesterford cemetery with a calibrated date of 415 - 545 AD. A phylogenetic analysis including these novel medieval genomes points to a more complex picture of the geographic lineages distributed in medieval Europe than previously assumed: we found up to 4 distinct lineages suggesting a high diversity of M. leprae strains in medieval Europe. With the Great Chesterford genome, the so far oldest M. leprae genome, we were able to trace one of the lineages, lineage 3, back to the 6th century. These results question previous models for the geographic distribution of M. leprae lineages in the past indicating a higher complexity and point out the necessity of studying ancient M. leprae strains to understand the history of leprosy worldwide.

Keywords: evolutionary history of M. leprae, ancient DNA, phylogenetics, Next generation sequencing, genome wide analysis
ILC3.3-011
Understanding transmission of leprosy in an endemic region of India using molecular typing of Mycobacterium leprae.

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Introduction & Objective:
No significant reduction in new case detection rate in leprosy strongly suggest that the transmission of infection is continuing despite worldwide implementation of multidrug therapy (MDT). The success of MDT has drastically brought down the prevalence rate to less than 1/10,000 but the annual new case detection rate has not come down at many places of the world. Therefore, it is very clear that even today at this stage of elimination, the transmission of leprosy is very poorly understood. Molecular strain typing methods have been used recently to gain insight and understand transmission of M. leprae in an endemic region (Purulia district of West Bengal, India) the study was undertaken to probe the extent and variability in genetic diversity of M. leprae in this region and their transmission pattern by using SNP and VNTR.

Materials and Methods: slit skin scrapings (SSS) of 100 leprosy patients from the villages of Purulia District were obtained for DNA extraction. Molecular typing was carried out using SNP typing PCR and Multiplex PCR for VNTR followed by sequencing of amplicons to determine mutations and fragment length analysis respectively to determine numbers of tandem repeats respectively.

Results and Conclusion: All the PCR positive SSS samples were found to be SNP type 1 except one which was type 2. Subtype 1D was more prevalent (82%) than the other subtypes found viz. subtype 1A (2%) and subtype 1C (15%). We also found subtype 2G (1%) in one of the samples. Using data for SNP subtypes and VNTR pattern for the M. leprae strains from different blocks of Purulia a phylogenetic tree was constructed to understand transmission. Molecular typing based on SNP and VNTR can be useful in tracking transmission in particular geographical area.

Keywords: Transmission, Multiplex PCR, SNP typing, VNTR typing, M. leprae
ILC3.3-012
“A study on viable Mycobacterium leprae by 16S rRNA and transcriptome analysis of soil of an endemic region in India”
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BACKGROUND: This study was conducted to analyse and compare gene expression profile of M. leprae obtained from human and environmental sources. RNA was extracted from biopsies of leprosy cases and environmental soil samples and total RNA by subtractive hybridization of rRNA was reverse transcribed and amplified with random primers. The whole genome was tiled at 10bp to obtain probes having 60 mer oligonucleotides in sense orientation. 179963 probes were designed in both sense and antisense orientation. Blast was performed against the mRNA sequence databases to check the specificity of the probes. Finally, 359926 probes were designed and 56579 specific probes were replicated to fill the remaining spots.

RESULTS:
RNA expressions of several functional genes of M. leprae genome obtained from soil samples were compared to the RNA expression of samples from human patients. The up regulation of several functional genes was observed for cell wall synthesis (12 genes), lipid (15 genes), metabolism (24 genes), regulatory protein (6 genes), translational (22) and 14 genes associated with virulence (14 genes). For the first time this study provides an insight into the function of M. leprae genes outside human body.

CONCLUSION: Transcriptomic analysis indicated that several fold changes in gene expression of M. leprae transcript in environmental samples as compared to M. leprae isolates from human biopsy samples of leprosy patients. Up regulation of M. leprae genes in environmental samples indicate their role in survival in natural environment.

Keywords: Transcriptome, environmental samples, Viable M. leprae, gene regulation, Human samples
Fine mapping and functional analyses confirm a SNP within gene LACC1 to be a susceptibility locus for leprosy pathogenesis in Chinese population

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Objectives
To understand the contribution of LACC1 in the pathogenesis of leprosy and to identify the causal variants, we performed a fine mapping analysis for the LACC1 locus.

Methods
A deep genotype imputation analysis was used to discover the possible causal variants. Functional analyses of SNPs were performed in silico. The luciferase reporter gene assay was used to evaluate the effects of SNPs on the transcription of LACC1. The involvement of gene LACC1 in granuloma formation was studied in Mycobacterium marinum infected zebrafish.

Results
Three most significant SNPs (p-value: 10^-26) in the LACC1 locus were obtained. Functional analyses showed that one of them caused a missense mutation and the other two located in the intron region of LACC1. The SNP located in the exon region was predicted to do not affect the structure of the encoded protein but was found to increase the transcription efficiency by the luciferase reporter gene assay. Knockdown of LACC1 homolog in zebrafish confirmed the involvement of granuloma formation in M. marinum infected zebrafish skin tissue.

Conclusions
A SNP located in the exon region of gene LACC1 was confirmed as a susceptibility locus for leprosy pathogenesis in Chinese population.

Keywords: fine mapping, LACC1, causal variant
ILC3.3-014
VIABILITY OF MYCOBACTERIUM LEPRAE IN RFT (RELEASE FROM TREATMENT) PATIENTS; TIME TO REDESIGN THE REGIMEN SCENARIO
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Background: In endemic regions of several countries the prevalence of leprosy has not come down to the level of elimination and over and above new cases are being detected in large numbers from most of these areas. No serious investigative effort has been yet made to assess the load of viable bacilli that will be left out after fixed dose therapy (FDT) which might be playing a role in the transmission of the disease. The present study was aimed in measuring the viability of M.leprae strains from untreated, partially and fully MDT treated index cases to find out their role in transmission of disease.

Method: Thirty slit skin smears were collected from different categories of leprosy patients in RNA Later. Samples were categorized according to their bacillary load. BI negative PB new cases, BI positive new MB cases, BI negative RFT cases and BI positive RFT cases. RNAs were extracted from all these samples by Trizol method. Total RNA was used for Real time RT-PCR (two step reaction). A standard sample with known copy number was run along with unknown samples for RT-PCR. Standard Curve was generated by using 1/10 serial dilution of known M. leprae DNA. The copy numbers of unknown samples were calculated by extrapolation from the standard curve.

Result: In our analysis we observed that BI positive new cases showed highest Ct values, followed by Type 1 reaction cases and RFT cases. RFT cases also showed good signals for 16S rRNA gene indicating that RFT cases still harbouring viable bacilli in their system.

Discussion: Presently the MDT regimen has been shortened from 2 years to 1 year for MB cases with BI ranging from 1+ to 6+. It has been shown that majority of relapse occur from MB patients with BI >3+. By the time the patient that has relapsed and recognized, he/she might have infected several household contacts and neighbours. Viable M. leprae from RFT patients might have acted as the source for transmission of disease in the community and affected the Leprosy eradication programme.

Conclusion: The present study thus indicates that the present duration of MDT regimen needs to be changed and calls for careful alteration of the MDT regimen for highly bacilliated leprosy patients.

Keywords: MDT, RFT, Real time, viability, M. leprae
**ILC3.3-015**

**Role of Toll-like Receptor Polymorphism in Determining Host Susceptibility for Leprosy: Epidemiological Study in Purulia District of West Bengal, India**

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Objectives: Despite successful implementation of MDT, there remain geographical pockets of continued endemicity. District of Purulia in West Bengal reported an annual new case detection rate (ANCDR) of 47.20 per 100,000 population in 2015 and has been reporting more than 1000 new cases per year for several years. Genetic susceptibility of people in that region is hypothesized to play a role and polymorphism in Toll-like receptors (TLRs) 1, 2 and 4, which participate in activating innate immunity against mycobacterial antigen, needs to be explored. Aim of study was to identify polymorphism of TLR1, TLR2 and TLR4 genes in new cases of leprosy and compare it with both genetically-linked and non-linked non-leprosy contacts who have not developed leprosy despite exposure to leprosy patients for at least 5 years. basis for genetic risk stratification and therapeutic targeting.
Methods: We report top-line preliminary findings from this ongoing study, which is a case-control design. Leprosy patients were selected from Joypur block of Purulia (ANCNR 81.08 per 100,000 population in 2015), screened by WHO field definition and validated by histology (H&E and Fite stain) and presence of acid fast bacilli in the slit skin smear. DNA samples were isolated from blood of leprosy patients, genetically-linked and non-genetically linked controls. PCR was performed for TLRs 1, 2 and 4. PCR products were subjected to restriction digestion depending on the expected polymorphisms, viz TLR 1: Arg80Thr and Ile260Ser; TLR 2: Arg753Gln; TLR4: Asp299Gly and Thr399Ile. Digested products were resolved in 3% agarose gel and visualised in gel documentation system.

Results: Among 21 leprosy patients (mean age 32.38 ± 15.99; male:female ratio 11:10) 3 belonged to TT pole, 12 BT, 6 BL. Mean duration of disease was 9.89 ± 8.9 months, 5 (25%) had history of exposure to leprosy patients, 1 (5%) had been exposed to family member suffering from leprosy. 20 genetically-linked controls (mean age 28.05 ± 15.26 yrs; male:female ratio 7:13) and 16 non-genetically linked controls (mean age 34.5 ± 9.6 yrs; male:female ratio 5:11) were exposed to leprosy patients for a mean duration of 16.7 ± 36.7 and 7.6 ± 7.7 months respectively (median 6 months & 4 months respectively). Polymorphism was noted only with TLR4 gene (Asp299Gly) and was observed in 6 (28.6%) patients, 7 (35%) genetically linked controls and 4 (25%) non-genetically linked controls.

Conclusion: Results so far indicate a possible association of Asp299Gly polymorphism in TLR4 gene of patients with leprosy. Regulation/down-regulation of innate immune responsiveness could beneficially modify leprosy risk in endemic pockets of West Bengal and might provide a novel

Keywords: toll-like receptors, polymorphism, West Bengal, molecular epidemiology, endemicity
ILC3.3-016
PCR amplification of genomic Mycobacterium leprae DNA by using different gene targets
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Background: Although several attempts have been made to establish a diagnostic test for leprosy, however all of these tests have failed to identify specifically an early case of leprosy. The present study was attempted to develop a diagnostic test using a M. leprae specific PCR in clinical samples. None of these assays could diagnose more than 60% of PB cases of leprosy. The study was aimed to detect M. leprae genomic DNA by using two different gene targets.

Material and method: Standardization for sensitivity of PCR for two genes was performed with Standard genomic DNA of M. leprae strain NHDP-63. The standard DNA was serially diluted in 1:10 ratio up to 10 dilutions and prepared in decreasing concentrations. The concentration of stock DNA was measured by spectrophotometer (Biospec-1601). The DNA concentration of first dilution was 7.5 x 10⁻¹ μg/μl (750 ng/μl) to tenth dilution 7.5 x 10⁻¹⁰ μg/μl (0.75 fg/μl). PCR amplification using four gene targets of M. leprae namely repetitive element (rlep), Superoxide dismutase A (sod A) were performed with serially diluted standard genomic DNA. PCR amplicons were analysed on 2% and 3% of agarose gel.

Results: Both the genes were found to vary in terms of sensitivity for PCR. PCR amplifications for Rlep gene target were positive up to 6th dilution i.e. 7.5 x 10⁻⁶ μg/μl, similarly sod A gene target were positive up to 5th dilution i.e. 7.5 x 10⁻⁵ μg/μl. The sensitivity of two gene targets i.e. These genes have been tested with clinical samples of leprosy patients and positivity of results were found 43.75 % in case of Rlep whereas the positivity for sod A gene was 75%.

Conclusion: Amongst the gene targets in this study PCR positivity of sod A gene was more than RLEP in the clinical samples. Gene targets like Rlep and sod A can be further considered to develop a diagnostic tool for detection of sub clinical leprosy.

Keywords: Leprosy, PCR, Molecular, Diagnosis, RLEP
ILC3.3-017
Novel Genetic Markers Associated with Leprosy Susceptibility in a Group of Incident Household Contacts from Brazil
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Objectives. Our aim was to perform a genome-wide association study in a case-control design comparing a group of incident household contacts with contacts that did not progress towards leprosy.

Methods. First, we performed a GWAs evaluating incident household contacts, i.e., cases (N=67) and contacts that did not develop the disease i.e. controls (N=319) considering at least two years follow up after the confirmed diagnosis of the leprosy index case. SNP genotyping was performed using the Illumina HumanCore-12 platform (~290,000 polymorphisms). A logistic regression test determined the association of polymorphisms with leprosy per se as outcome. Next, we prioritized SNPs with association values (OR) higher than 2 or lower than 0.5 with significance levels < 0.001. An enrichment analysis was performed based on the genes in which the top associated polymorphisms were mapped to. We returned to genotyping data and evaluated the SNPs located in genes from the enriched processes and performed individual association tests by means of mixed models in logistic regression to assess leprosy. Furthermore, a genetic risk score was obtained by combining individual weighted values of each associated SNP. Finally, we tested differential expression of gene candidates using RT-qPCR from functional experiments in THP-1 cell line and primary macrophages infected with live and dead M. leprae. Genetic association and functional analyses were performed using R environment v.3.1.1 and GraphPad Prism respectively.
Results. Based on the top markers from the preliminary logistic regression, enrichment analysis of associated SNPs pointed towards 31 genes that represented biological processes of neuron generation, regulation of neuromuscular junction, neurological system process and cell recognition (P-valueEnrichment < 0.001). The second logistic regression using mixed models indicated that 17 polymorphisms distributed in this specific set of genes were significantly associated either with susceptibility (N= 11 SNPs) or protection (N=6 SNPs) towards disease development even after correction for multiple comparisons (P-valueFDR<0.05). Combinatorial analysis indicated that the group of incident household contacts had a higher genetic risk score (P<0.001). Functional analysis evaluating the set of associated genes revealed differences in gene expression in human primary macrophages or THP-1 monocytic cell line after infection with live, but not dead M. leprae (MOI 1:10, MOI 1:100).

Conclusions. We determined novel SNPs in a specific group of incident household contacts that can be used as prognostic markers towards disease progression. Further validation is required for either genetic replication in larger cohorts and also functional evaluation of the associated genes.

**Keywords:** GWAs, SNPs, Gene-enrichment, Contacts, Susceptibility
ILC3.3–018
Emergence of Rifampicin drug resistant M.leprae in Kolkata region of West Bengal.
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Introduction:
The current strategy for leprosy control depends mainly on early case detection and providing the recommended multidrug therapy (MDT) dosage. It has been noted previously that any therapeutic measures taken by chemotherapeutic agent single or combined (antibiotics) leads to the emergence of drug resistance. Studies suggested that mutations in the genes and or the regions of the drug activity may leads to the observed development of drug resistance. Rifampicin drug resistance was observed in leprosy patients treated by rifampicin monotherapy. Multidrug resistant M. leprae strains, reported from South East Asia, indicate a serious threat for control of leprosy. Understanding the molecular mechanisms of drug resistance to each of these drugs in MDT is essential in providing effective treatment and preventing the transmission and spread of resistant strains in the community.

AIM:
We aimed to investigate the point mutations within the rpoB gene region of the Mycobacterium leprae genome, which are responsible for resistance to rifampicin, in order to find out the emergence of drug resistance in leprosy in the Kolkata region of West Bengal.
Result:
A mutation at the base pair position 2275405 where G is replaced by C in the M. leprae genome, which corresponds to the coding region of rpoB gene (279 bp – 2275228 to 2275506), was observed in two patients. This missense mutation in CAC codon brings about a glutamic acid to histidine change in the amino acid sequence of RNA polymerase beta subunit at the position 442 (Glu442His), a region specific for rifampicin interaction, which might be responsible for unresponsiveness to rifampicin by manifesting a stable bacteriological index in these 2 patients even after completion of 24 months of multi-bacillary multi-drug therapy (MB-MDT). However, the M. leprae strain having the new mutation at codon 442 Gin–His was found to be sensitive to all the three drugs and strains having additional mutations at 424 Val–Gly and 438 Gin–Val were conferring resistance with Multi drug therapy in mouse foot pad assay.

Conclusion:
This study reports the existence of rifampicin drug resistance and at the same time there is possibility of presence of a huge number undetected cases of such type of drug resistance which may contribute to an alarming situations of multirdrug resistance M.leprae. In a country like India with a high prevalence of Leprosy disease a rapid and efficient technique is needed to monitor the drug resistance strain. Molecular techniques might provide a better tool for the same.

Keywords: Drug Resistance, RRDR, Multi Drug Therapy
ROLE OF AUTOIMMUNITY IN NERVE DAMAGE:
MOLECULAR MIMICRY OF M.LEPRAE TO MULTIPLE
NERVE PROTEIN REGIONS
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Introduction: The predilection of M.leprae to human peripheral nerve has been studied and specific interactions with Myelin P0, Laminin-2, and α-dystroglycan documented. However, the molecular mechanism of nerve damage has not yet been clearly elucidated. The high bacillary load in the nerve in lepromatous leprosy is not proportional to the degree of nerve damage and on the other hand nerve damage in BT leprosy is extensive even with far fewer bacilli. Given this, molecular mimicry and auto immunity could play a significant role in the pathogenesis of nerve damage. The present study is a Bioinformatics approach of comparison of M.leprae protein sequences with 35 host nerve proteins. It focuses on a set of structurally and functionally important nerve proteins and their sequence similarities to M.leprae.

Materials & Methods: The human nerve protein sequence data was assembled for the analysis of sequence similarity against various nerve pathogens including M.leprae (1769) using UNIPROT protein sequence database.
The 35 nerve proteins chosen for this study: Agrin, Calbindin, N-chimaerin, Secretogranin-2, Neuronalmodulin, Kinesin, Tau protein, 1,3-cyclic-nucleotide 3’-phosphodiesterase, Myelin-associated glycoprotein, Myelin protein P0, Myelin P2 protein, Oligodendrocyte–myelin glycoprotein, Brain-derived, neurotrophic factor, Ciliary neurotrophic factor, Neurotrophin-3, Beta-nerve growth factor, Nestin, Neurofilament heavy polypeptide, Neurogranin, Voltage-dependent T-type calcium channel subunit alpha-1G, Hippocalcin, Neurocalcin-delta, Recoverin, Bombesin receptor subtype-3, Kininogen-1/Bradykinin, Calcitonin, Cholecystokinin, Galanin peptides, Pro-neuropeptide Y, Neurotensin/neuromedin N, Protein S100-B, Synapsin-1, Probable tubulin polyglutamylase, Myelin basic protein and Protein phosphatase 1 regulatory subunit 1B. The computer program available at the Basic Local Alignment Search Tool (BLAST), pBLAST, PSI BLAST, BLOSUM62 and CLUSTAL X2 site were used to identify sequence and structural similarities.

Results: Among the 35 host nerve proteins evaluated, 34 showed sequence and structural similarities. Extensive multiple region similarities were obtained for 30 proteins of which the significant are Calbindin, Myelin P2 protein, 2,3-cyclic-nucleotide 3’-phosphodiesterase, Oligodendrocyte–myelin glycoprotein, Recoverin, Pro-neuropeptide Y, Neurotensin, Neurocalcin, Hippocalcin and Myelin basic protein. Certain proteins revealed multiple numbers of identities.

Conclusions: These similarities could have significant role in autoimmune mediated and long term nerve damage. Designing molecules against key epitopes could prevent the trigger of autoimmunity and prevent/stop nerve damage.

Keywords: Bioinformatics, M leprae, Nerve Proteins, Autoimmunity, Molecular mimicry
ILC3.3-020
Application of Polymerase Chain Reaction (PCR) in The Genome of Mycobacterium leprae Detection and Diagnosis of Leprosy
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Introduction: Leprosy is an infectious disease caused by Mycobacterium leprae, which primarily affects the peripheral and secondary nerves, skin and other organs. The intervention model for leprosy control is based on early diagnosis, timely treatment of all cases, prevention and disability treatment and surveillance of household contacts. Molecular Biology come help control of this disease, once expands our look ahead to genetics of M. leprae and thereby, aid on the early diagnosis, as well as help us in solving cases that have not been solved by conventional methods.

Objective: In this way, this study aims to examine the applicability of the polymerase chain reaction (PCR) in aid of diagnosis of leprosy. Methodology: This study was performed analyzing patients treated at Eduardo de Menezes Hospital, Belo Horizonte, Brazil. Blood samples were collected from 41 patients previously diagnosed with leprosy by the Dermatology Department of this hospital. Then, the DNA was extracted from these samples for the PCR reaction, using primers already described by other authors. The examination of smear was performed for all patients analyzed, which was held at the Laboratory of the same hospital. Results: Among the 41 patients confirmed to the leprosy by clinic examinations and smear, 38 presented positive result for PCR, totaling a 93% positivity rate for the technique.

Discussion: The three cases of patients negative for PCR but confirmed to leprosy by clinical examinations and smear indicates that while it is a technique that present the advantage of being minimally invasive and highly sensitive, PCR for detection of bacilli in blood may not be effective in cases where the bacillus can not be found circulating in the peripheral blood of the patient. However, the high rate of positivity of the PCR reaction demonstrates that standardization of this technique in specialized laboratories establishes an important tool to aid the diagnosis of leprosy, especially in cases of dubious or even in the early diagnosis, where there are no spots or typical lesions of the disease.

Keywords: Mycobacterium leprae, Leprosy, Molecular Biology, Polymerase Chain Reaction
ILC3.3-021
Expression of microRNAs in Skin Lesions of Leprosy

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Objectives: The microRNA expression profile (miRNAs) has been described in several neoplastic and non-neoplastic diseases, but a few studies were carried out on miRNAs in leprosy, therefore, this study aimed at identifying miRNAs differentially expressed in skin lesions of leprosy patients by microarray.

Material and methods: Leprosy patients, classified according Ridley & Joplin’s criteria, reactional forms (R1 and R2) and healthy controls (HC) were included in this study. Punch biopsies were collected from leprosy lesions (10TT, 10BT, 10BB, 10BL, 14L1, 14R1 and 09R2) and 09 HC. The miRNAs expression profile was obtained by Agilent microarray platform using miRBase for 1368 Homo sapiens (HSA) miRNA candidates. TaqMan real-time quantitative reverse transcription polymerase chain reaction was used to validate the data of the differentially expressed miRNAs.

Results: 64 differentially expressed miRNAs were identified by comparing disease versus CC, 50 up-regulated and 14 down-regulated (FC ≥ 2.0 and p = 0.05). Another eight (five in R1 and three in R2) differentially expressed miRNAs were identified by comparing reactions versus HC. Nine miRNAs were validated by RT-PCR, seven up-regulated (hsa-miR-142-3p, hsa-miR-142-5p, hsa-miR-146b-5p, hsa-miR-342-3p, hsa-miR-361-3p, hsa-miR-3653 and hsa-miR-484) and two down-regulated (hsa-miR-1290, hsa-miR-139-5p). According to the literature, many differentially expressed miRNAs identified in leprosy lesions are also present in many pathways and diseases.

Conclusions: This study identified many miRNAs that may play a role in the molecular pathogenesis of leprosy and should be studied to identify new markers and/or molecular therapeutic targets for leprosy.

Keywords: leprosy, microarray, miRNA, signaling pathways
ILC3.3-022
Association of CCL 2 Variants (-2518A>G and -362G>C) with Leprosy in a Population of Northern Indian States - An Exploration
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Complex interactions amongst M. leprae, host immune responses and environmental factors contribute to the susceptibility or resistance to infections. CCL Chemokine Ligand 2 is an important chemokine reported to play significant role during mycobacterial infections and regulate the immune responses.

Objectives - To analyze the association of CCL 2 gene polymorphisms (-2518A>G, rs1024611 and -362G>C, rs 2857656) with leprosy susceptibility in a population of northern Indian states.

Methods - A case control study was conducted to analyze the association of two snps(-2518A>G, rs1024611 and -362G>C, rs 2857656) of CCL2 gene in 370 leprosy cases attending the Out Patient Department of National JALMA Institute for Leprosy and Other Mycobacterial Diseases, Agra and 290 healthy controls residing in northern Indian states of India. SNPs were analysed either by PCR-RFLP (rs1024611) or melting curve analysis after hybridisation probe method through FRET mechanism in realtime PCR(rs 2857656). Level of CCL2, IL 12, TNF α, IFN γ and TGF β was measured in sera samples and in culture supernatants after stimulation with whole cell sonicates of M leprae using respective Duoset from R & D System, USA. Observations were analysed using STATA/SE11.0 software (StataCorp LP Lake way drive, college station, TX, USA). Haplotype and Linkage Disequilibrium analysis was done using SNPSTAT software.
Results— AA genotype (rs1024611) and GC genotype (rs 2857656) are most frequent genotypes in leprosy cases and healthy controls. The CC genotype is significantly associated with Leprosy cases compared to healthy controls with OR 2.4, p=0.003. Conversely, GC heterozygous genotype is significantly associated with healthy controls with OR 0.70 (p=0.027). Although there was no significant difference in frequencies of various genotypes among the different clinical types of leprosy cases, subgroup analysis indicated the association of GG (rs1024611, OR 5,p=0.005) and CC(rs1024611, OR 4,p=0.02) with leprosy patients with Type2 reactions. Linkage disequilibrium analysis indicated a strong LD between CCL 2 -2518A/T and -362G/C sites (D’ = 0.83, P-value = 0.00). There was a significant correlation observed in level of serum CCL 2 and genotypes with lowest amount in GG genotyped leprosy cases (Spearman r=-0.788, p<0.00001). Serum level of TGF β was observed to be correlated significantly with serum CCL 2 level in leprosy patients.

Conclusions— CC genotype at -362 CCL 2 was observed to be associated with leprosy and GC genotype at -362 CCL 2 with healthy controls. Strong LD between CCL 2 -2518A/T and -362G/C sites suggested the important role of this gene.

**Keywords:** Leprosy, CC Chemokine Ligand 2, Single Nucleotide Polymorphism, Type 2 reactions, Cytokines
ILC3.3–023
Rifampicin Resistant Leprosy in Southern India; Analysis of Efflux Pump Gene Expressions and Molecular Modelling of Rifampicin - RpoB interactions in Mycobacterium leprae.
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Introduction: Mis-sense mutations within the rpoB gene of Mycobacterium leprae were identified to be a possible reason for rifampicin resistance in leprosy. In the current study, we investigated mutations within rpoB gene of M. leprae in relapsed leprosy cases from 4 tertiary care leprosy centres in south India. Additionally we investigated the differences in mRNA expression levels of 8 efflux pump genes in rifampicin resistant and sensitive strains. In-silico modelling of rifampicin interaction with native and mutant RpoB protein models was performed to determine variations in hydrogen bonding and energy changes.

Methods: DNA and RNA were extracted from skin biopsies of 35 relapse/MDT non–respondent leprosy cases and PCR was performed to amplify 276bp rifampicin resistance determining region of rpoB gene of M. leprae. Sanger sequencing of PCR products was performed by a commercial facility (Scigenom Pvt. Ltd, India) and mutations were identified using NCBI-BLAST. Homology models of mutant and native RpoB proteins were developed using iTasser Suite (Zhang Lab – University of Michigan) and docking experiments were conducted using Molecular Docking Server (AutoDock 4). mRNA expression levels of efflux pump genes (ML0556, ML1349, ML1388, ML1562, EMRB Efflux Pump and ML2350–2352) were analysed in rifampicin resistant and sensitive strains.
Results: Mutations were detected in 5 out of the 35 relapse leprosy cases which included codon positions "Asp441Tyr" in two cases, "Leu436Ser", "Leu436Pro" and "His476Arg" in one case each. Molecular docking analysis revealed that native RpoB interacts with Rifampicin with two hydrogen bonds with estimated change in free energy of binding of -7.71 kcal/mol. This energy decreased in mutants with Asp441Tyr = -5.68 kcal/mol, Leu436Ser = -6.70 kcal/mol, Leu436Pro = -4.78 kcal/mol and His476Arg = -3.34 kcal/mol. Asp441Tyr mutation indicated complete loss in hydrogen bonding with rifampicin and rest of the mutations indicated only single hydrogen bond. The estimated inhibition constant "Ki" has also increased in all mutants when compared to native RpoB. mRNA expression levels of ML1349-dmrB family and ML1388-drug efflux membrane protein coding genes increased by 14.55 and 7.93 fold respectively in rifampicin resistant strains (normalized with 16SrRNA).

Conclusion: We identified rifampicin resistance in relapsed leprosy cases from south India. Structural variations induced by point mutations in RpoB protein can be a possible reason for loss in interaction with rifampicin. Efflux pump gene expression is associated with rifampicin resistance in leprosy.

**Keywords:** Rifampicin, Efflux Pump Genes, Gene Expression, Homology Modelling, Interaction Energy
ILC3.3-024
Genotyping (SNPs) of Mycobacterium leprae of leprosy patients from Sanatorium Fontilles, Spain. Anna Torres Sorra, Pedro Torres Munoz, Jose Ramon Gomez Echevarria, Lucrecia Acosta Soto

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Since 1902, Fontilles has been dedicated to the diagnosis, treatment and care of leprosy patients. Although at present Spain is not an endemic country for the disease because it's considered eliminated, new autochthonous and imported cases of leprosy continue to be diagnosed every year. From an initial clone of Mycobacterium leprae which disseminated worldwide, at present 4 different strains can be retracted from the analysis of three very rare single-nucleotide polymorphisms (SNPs: SNPA, SNPB and SNPV); Type 1 (Common in Asian), Type 2 (Southeast African), Type 3 or (Latin America/South and Europe) and Type 4 (Northwest Africa).

Objectives
Evaluate the genotypes (SNPs) of M. leprae from the patients diagnosed at the Sanatorium Fontilles, Spain.

Methods
From June 2011 up to January 2016 330 samples of DNA from 114 different individuals, that were stored at the laboratory of Fontilles, have been analysed (DNAs from swabs from scrapings of ear lobe and edges of skin lesions and biopsies). The amplifications was carried out using a nested PCR (nPCR) which amplifies a repeated fragment (RLEP) of M. leprae genomic DNA. To determine the type of SNP of the samples, the locus of the 3 SNPs A, B and C at positions 14.676, 1.642.875 and 2.935.685 respectively were amplified by conventional PCR and the amplicons obtained were sequenced.
Results
M. leprae DNA was detected in 127 samples of 47 patients (43 samples of 26 suspected patients during first-diagnosis and 84 samples of 21 confirmed patients who were in post-treatment follow-up).
Finally, ten biopsies and one nasal swab were genotyped from 8 patients and 3 patients were detected (2 Spaniards and 1 unknown) with genotype Type 4, most frequently found in Northeast Africa, 4 patients (3 Spaniards and 1 Venezuelan) with Type 3, the most common in Latin and South America and Europa, and 1 Venezuelan patients with Type 3 or 4.

Conclusions
Genotypes 3 and 4 are present in the strains of M. leprae detected in Spanish leprosy patients. Probably, the genotype 3 is the traditionally endemic one in the Iberian Peninsula from the end of the 2nd or early 1st century B.C. and taken to Venezuela with the Spanish colonization of the Americas in the 15th century A.C. To our knowledge this is the first time in Spain the characterization of the genotypes of the SNPS of M. leprae has been determined.

Keywords: SNPs, Genotyping, Fontilles, Spain
Real Time-PCR and High Resolution Melting Analysis for Drug Susceptibility Testing of Mycobacterium leprae Directly from Clinical Specimens of Leprosy Patients

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Objectives: Evaluate Real-Time PCR High Resolution Melting analysis (RT-PCR/HRM) as screening tool for rapid identification of dapsone (DDS), rifampin (RMP) and ofloxacin (OFX) susceptibility in Mycobacterium leprae isolates and clinical samples. Methods: 19 reference strains containing the most common drug resistance determining region (DRDR) mutations leading to DDS, RMP and OFX resistance, and susceptible wild-type strains were utilized for optimization of the RT-PCR/HRM. Specificity of this assay was determined using DNA from other mycobacterial and bacterial infections. Results: Sensitivity limit of detection 103 bacilli/ml in RT-PCR/HRM. DNA from 211 skin biopsies of leprosy patients positive for M. leprae DNA using RLEP qPCR were included. All characterized drug-resistant strains were identified as distinct variants from the wild type profile. DNA sequencing of DRDR confirmed the genotypes. Of 211 clinical samples, samples that amplified in RT-PCR/HRM for genes rpoB, folP1 and gyrA were: 197 (93.4%), 201 (95.3%) and 193 (91.5%), respectively. Comparatively, amplification in the PCR conditions for the PCR-direct DNA sequencing were: 189 (89.6%) rpoB, 195 (92.4%) folP1, and 176 (83.4%) gyrA. Four samples presented a HRM variant profile for the folP1 DRDR, and one sample for both folP1 and rpoB DRDR. No variant profile was observed for the gyrA DRDR.
All variant profiles had confirmed resistant mutant genotype. The observed mutations in 2olP1 DRDR were: P(CCC)55L(CTC); P(CCC)55R(CGC); T(ACC)53I(ATC); T(ACC)53A(GCC). The latter strain also presented the S(TCG)456L(TTG) mutation in the rpoB DRDR. RT-PCR/HRM was more sensitive than direct DNA sequencing for the detection of mixed infections with susceptible and resistant strains of M. leprae, detecting the minority mutant allele in a concentration as low as 10% of the sample; while for the PCR-direct DNA sequencing, the lowest detectable percentage of the mutant allele in a mixed sample with the wild type was 40%. Conclusions: Taken together findings demonstrate the utility of the RT-PCR/HRM as reliable screening tool for drug susceptibility. RT-PCR/HRM is a closed-tube method which avoids post-PCR manipulation and can analyze up to 42 samples in a 96 well-based format within less than 4 hours. This enhances the applicability in endemic regions and reduces cost and time for susceptibility screening, thereby providing valuable information not only to improve patient treatment outcome but to the global context of leprosy drug resistance monitoring. We recommend that variant HRM profiles be further evaluated by DNA sequencing.

**Keywords:** Drug Susceptibility Testing, Real-Time PCR, High Resolution Melting Analysis
ILC3.3-026
Association of CCL 2 Variants (rs1024611 and rs 2857656) with Leprosy in a Population of Northern Indian States— An Exploration
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Complex interactions amongst M leprae, host immune responses and environmental factors contribute to the susceptibility or resistance to infections. CC Chemokine Ligand 2 is an important chemokine reported to play significant role during mycobacterial infections and regulate the immune responses.

Objectives— To analyze the association of CCL 2 gene polymorphisms (-2518A>G, rs1024611 and -362G>C, rs 2857656) with leprosy susceptibility in a population of northern Indian states.

Methods— A case control study was conducted to analyze the association of two snps(-2518A>G, rs1024611 and -362G>C, rs 2857656) of CCL2 gene in 370 leprosy cases attending the Out Patient Department of National JALMA Institute for Leprosy and Other Mycobacterial Diseases, Agra and 290 healthy controls residing in northern Indian states of India. SNPs were analysed either by PCR-RFLP (rs1024611) or melting curve analysis after hybridisation probe method through FRET mechanism in realtime PCR(rs 2857656). Level of CCL2, IL 12, TNF α, IFN γ and TGF β was measured in sera samples and in culture supernatants after stimulation with whole cell sonicates of M leprae using respective Duosets from R & D System, USA. Observations were analysed using STATA/SE11.0 software (StataCorp LP Lake way drive, college station, TX, USA). Haplotype and Linkage Disequilibrium analysis was done using SNPSSTAT software.
Results- AA genotype (rs1024611) and GC genotype (rs 2857656) are most frequent genotypes in leprosy cases and healthy controls. The CC genotype is significantly associated with Leprosy cases with OR 2.4, p=0.003. Conversely, GC heterozygous genotype is significantly associated with healthy controls with OR 0.70 (p=0.027). Although there was no significant difference in frequencies of various genotypes when compared among the different clinical types of leprosy cases, subgroup analysis indicated the association of GG (rs1024611, OR 5.5, p=0.005) and CC (rs 2857656, OR 4, p=0.02) with reactionary leprosy patients (Type2). Linkage disequilibrium analysis indicated a strong LD between CCL2 -2518A/G and -362G/C sites (D' = 0.83, P-value = 0.00). There was a significant correlation observed in level of serum CCL2 and genotypes with lowest level in GG genotyped leprosy cases (Spearman r=-0.788, p<0.00001). Serum level of TGF β was observed to be correlated significantly with serum CCL2 level in leprosy patients.

Conclusions- CC genotype at -362 CCL2 was observed to be associated with leprosy and GC genotype at -362 CCL2 with healthy controls. Strong LD between CCL2 -2518A/G and -362G/C sites suggested the important role of this gene.

Keywords: CC Chemokine Ligand 2, Single Nucleotide Polymorphism, Leprosy, Cytokines, Genotypes
ILC3.3–027
The Transcriptome of Mycobacterium leprae During Growth in Mouse Foot Pad
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OBJECTIVES: Mycobacterium leprae has undergone reductive evolution resulting in a genome with less than 50% protein coding capacity of its close relative, M. tuberculosis. To determine the functional genome of M. leprae, global gene expression was studied during log phase growth in the immunocompromised (nu/nu) mouse foot pad at 5 months post infection (MFPS) using RNA-Seq. These data were compared to that of M. leprae during short-term metabolic maintenance of bacteria in mycobacterial medium for 96 hours to potentially identify nutritional deficiencies of this medium.

METHODS: Total RNA was isolated from M. leprae after treating with NaOH to remove mouse nucleic acids and Ribo-Zero Bacterial kit (Epicentre) was used to deplete rRNA. SOLiD® Total RNA-Seq Kit (Life Technologies) was used to prepare sequencing samples and sequencing was performed with the SOLiD® 5500 System. Trimmed reads were mapped to the M. leprae TN genome (MayoBiotics). Read counts were normalized across all samples and then used for differential expression analysis using DEseq. Significant differentially expressed genes were determined by adjusted P value.

RESULTS: Averaged DEseq abundance levels of annotated reads demonstrated that all 2770 genes were transcribed under both MFP and axenic conditions, including: all protein coding genes, all annotated pseudogenes and all 50 stable RNAs. To compare transcriptional profiles of M. leprae in log phase of growth to that held under axenic conditions we focused on protein coding genes only. 31.23% of gene transcript levels were significantly altered at 96hr in axenic medium when compared to that of MFP. These altered gene transcripts represented 10 Functional Categories. The largest number of differentially expressed genes with known function was observed in intermediate metabolism and respiration category including ABC transporters, membrane-bound component of phosphate transporters and sugar transporters in contrast genes involved with peptidoglycan biosynthesis were upregulated in axenic cultures. Most of the PE/PPE genes, important for mycobacterial virulence, were upregulated in MFP vs axenic. Altered gene expressions were also detected within the lipid and folate metabolic pathways but not in the glycolytic pathway.

CONCLUSIONS: These data suggest that M. leprae utilizes its entire repertoire of protein coding genes for survival and growth in the MFP model giving it the capability to utilize host-derived metabolites. Altered gene expression in axenic medium may give us potential clues to deficiencies in current medium.

Keywords: Transcriptome, RNASeq, PE/PPE, leprae
ILC3.3–028

Host–transcriptional profiling of susceptibility and resistance to experimental M. leprae infection in the armadillo model

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Objectives:

Early detection of leprosy progression can help in timely implementation of control measures. However, there are no tests for that. The nine–banded armadillo is the only animal that recapitulates all aspects of human leprosy including the hallmark nerve involvement and full histopathological spectrum of response to M. leprae. While the majority of the armadillos develop disseminated disease within 2 years of experimental infection, approximately 20% of the animals can resist high–dose experimental inoculation. This differential leprosy susceptibility of armadillos presents a valuable analogy to investigate a key question in leprosy research; “How some people resist infection with M. leprae while others progress to disease?” Our present work aims at identifying biomarkers of leprosy progression by comparing the transcriptional profiles of leprosy susceptible armadillos against the resistant ones using RNA–Sequencing.

Methods:

Six armadillos were inoculated with a billion live M. leprae bacilli and their PBMCs were collected and cryo–preserved at the 4th and 18th month post–infection. All animals were monitored for the M. leprae specific antibody titers using ELISA and nerve conduction velocity. In our preliminary RNA–Seq experiments, the cryo–preserved PBMCs from 4th month time point were stimulated with various M. leprae antigens and RNA was extracted, followed by library preparation for RNA–Sequencing.
Initially one set of libraries representing a resistant and a susceptible animal was sequenced using paired-end Illumina reads. After sequencing was completed, an analysis pipeline assessed differential gene expression for the samples.

Results and conclusions:
Four animals progressed to disease within 2 years of infection, while the remaining two exhibited leprosy resistance phenotype even till the end of 3 years and showed no seropositivity against M. leprae antigens. Comparison of the transcriptional profiles between the resistant and susceptible animals revealed 270 genes differentially expressed at a cut-off of 4 fold (161 genes up-regulated and 109 down-regulated in resistant animals). These involve host innate immunity and regulation related genes, especially those associated with cell migration (CEMIP) and receptor–function (CSF3R, FCRLA, IGF2R, IGFLR1, MRC1, TLRs, TRAV3, CCL17, TRB15, LDLR, GPR84, IL22RA1, IFNLR1, CCRL2, IRAK2, TNFRSF1B, TNFRSF8, GRB10, TNFRSF21).

Hence, our preliminary results indicate that several receptors and regulatory genes show altered expression. We are testing additional samples from armadillos by RNA-sequencing, which will help in identifying candidate genes and pathways in susceptible and resistant hosts. This can reveal characteristic host transcriptional signatures associated with leprosy progression vs protection.

**Keywords:** transcriptomics, RNA-Seq, biomarkers, early detection
ILC3.3-029

Acetylation and hydroxylation phenotypes in populations of five geographical regions of Brazil based on the genome: possible influence of pharmacogenetics in the therapeutic management of leprosy

Lopes, MQP1, Teixeira RLF1, Cabello, PH2, De Miranda, AB3; Nery, JAC4; Sarno, EN4, Salles, AM5, Duppreè, NC6; Pellegrini, E5; Cavalcanti, M6; Narahashi, K7; Woods, WJ8; Moreira, MV9; Leme, PCSA10; Silva, LFM10; Nobre, MLN11; Stahlke, EVR12; Oliveira, MLW13; Gallo, MEN14; Suffys, PN15; Santos, AR1

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Leprosy is a chronic infectious disease with high disabling potential. The treatment is based on polychemotherapy involving dapsone, rifampicin and clofazimine, which has been effective but with frequent occurrence of drug-induced adverse reactions (ADRs). Dapsone intolerance is the main responsible (~70%) by ADRs in leprosy treatment; it is mainly metabolized by acetylation and hydroxylation reactions, which are catalyzed by the N-acetyltransferase 2 (NAT2) and cytochrome P450 (CYPs) enzymes, coded by high ethnic-related polymorphic genes. Brazilian populations marked by a high interethnic admixture and phenotypes of low, intermediate and rapid (acetylation/hydroxylation) associated with ADRs varies depending on the genetic diversity in different regions. Being leprosy in Brazil an endemic disease, treated with a standard regimen for the whole population, evaluation of these profiles became relevant aiming ADRs prevention. Here we describe the genetic variability of NAT2, CYP2E1, CYP3A4 and CYP3A5 genes in cohorts of leprosy patients from five Brazilian geographical regions and a case control evaluation of the identified gene variants and occurrence of dapsone-induced ADRs. Nine hundred sixty-four individuals were enrolled to the descriptive study for NAT2. For the association study, the sample size varied according to the region. Twenty-three SNPs in NAT2 were identified in the whole study, seven of which, 191 G>A; 282 C>T; 341T>C; 481 C>T; 590 G>A; 803 A>G and 857 G>A were reported as the most frequent around the world. There was a predominance of the NAT2 alleles associated with slow acetylation, however, varying according to the studied region. Similarly, after genotyping of CYP450 gene family, a high allele and genotype frequency variation was also observed over Brazil. The results showed that leprosy patients with slow acetylation and rapid hydroxylation profile (CYP2E1), evaluated separately showed an association with the occurrence of ADRs, but with lower Odds ratios (2.4 and 1.9) than that observed in combined analysis (4.08 CYP2E1). The hydroxylation profile characterized by the presence of CYP3A5*3, CYP3A5*6 and CYP3A4*1B, analyzed separately, did not show association with the occurrence of ADRs. However, the combined analysis with NAT2 slow acetylation profile showed a strong association with this outcome represented by the ORs (6.4 for CYP3A5*3; 4.83 for CYP3A5*6 and 2.84 for CYP3A4*1B) suggesting that the combination of slow acetylation with fast hydroxylation phenotypes represent the ideal algorithm for a predictive test to be used as a support for leprosy treatment with DDS-containing regimen.

**Keywords:** leprosy, ADRs, Pharmacogenomics, NAT2, CYPs
ILC3.3-030
Genotyping of Mycobacterium leprae in Guangdong province
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Objective To understand the genotypes of Mycobacterium leprae collected from Guangdong province, China and to analyze the routes of leprosy transmission both inside and outside of Guangdong. The impact of emigrant leprosy patients to the endemic nature of the disease in Guangdong was also studied. Methods Typing on strains with variable number of tandem repeats (VNTR) and single nucleotide polymorphism (SNP) were performed on the local cases and emigrant cases based on skin biopsy. Results Most isolates from local patients belong to SNP type 1 and SNP type 3 isolates were found just in a small part of local isolates. However, all the emigrants were carrying SNP type 3. Within the SNP type 1 strain from Guangdong, alleles at the 18-8, 12-5, ML, TA 10 and GGT 5 differed from SNP 3 strains collected from other areas in China. However, all the SNP type 1 and SNP type 3 local isolates identified from Guangdong were having close VNTR profiles and the main differences appeared in the alleles at ML, TA 10 and GGT 5. Conclusion The transmission of strain with SNP type 1 seemed to be associated to the “Silk Road on the Sea”, calling for monitoring and confirming the transmission of patients with SNP type 3 in Guangdong were from the secondary transmission, by the emigrant patients. Further study on the historic spread and phylogenetic relationships between SNP type 1 and novel SNP type 3 in Guangdong is needed.

Keywords: Mycobacterium leprae, Genotyping, Transmission
ILC3.3-031
Association between genetic variants in TNFSF15 gene and leprosy among the Chinese Yi population
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Objective A significant association between single nucleotide polymorphisms (SNPs) in TNFSF15 gene and leprosy has been reported in a previous genome wide association study (GWAS) of leprosy in Chinese Han population. However, it remains unknown whether this association exists among the Chinese Yi population. The aim of this study was to investigate whether SNPs in TNFSF15 gene are associated with leprosy among the Chinese Yi population in China.

Methods We genotyped rs10982385, rs4574921, rs6478108 and rs10114470 in the TNFSF15 gene in a Chinese Yi cohort composed of 100 patients with leprosy and 100 ethnic matched controls. The differences between the patients and healthy controls were analyzed using χ² analysis.

Results Significant differences of rs10982385, rs4574921 and rs6478108 in TNFSF15 were observed between the patients and the healthy control groups in the cohort. The allelic p-values and odd ratios are as follows: rs10982385, 1.0 x 10^-8 and 2.55; rs4574921, 1.7 x 10^-7 and 1.88; rs6478108, 1.16 x 10^-5 and 1.95. No significant differences were found in the distributions of rs10114470 between the patients and healthy controls.

Conclusions We demonstrated that genetic variants in the TNFSF15 gene are closely associated with leprosy among the Chinese Yi population, which implicates the pathogenic role of TNFSF15 gene in a different ethnicity.

Keywords: TNFSF15 gene, Chinese Yi population
ILC3.3-032

Novel Genetic Markers Associated with Leprosy Susceptibility in a Group of Incident Household Contacts from Brazil

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Objectives. Our aim was to perform a genome-wide association study in a case-control design comparing a group of incident household contacts with contacts that did not progress towards leprosy.

Methods. First, we performed a GWAs evaluating incident household contacts, i.e., cases (N=67) and contacts that did not develop the disease, i.e., controls (N=319) considering at least two years follow up after the confirmed diagnosis of the leprosy index case. SNP genotyping was performed using the Illumina HumanCore-12 platform (~290,000 polymorphisms). A logistic regression test determined the association of polymorphisms with leprosy per se as outcome. Next, we prioritized SNPs with association values (OR) higher than 2 or lower than 0.5 with significance levels < 0.001. An enrichment analysis was performed based on the genes in which the top associated polymorphisms were mapped to. We returned to genotyping data and evaluated the SNPs located in genes from the enriched processes and performed individual association tests by means of mixed models in logistic regression to assess leprosy. Furthermore, a genetic risk score was obtained by combining individual weighted values of each associated SNP. Finally, we tested differential expression of gene candidates using RT-qPCR from functional experiments in THP-1 cell line and primary macrophages infected with live and dead M. leprae. Genetic association and functional analyses were performed using R environment v.3.1.1 and GraphPad Prism respectively.
Results. Based on the top markers from the preliminary logistic regression, enrichment analysis of associated SNPs pointed towards 31 genes that represented biological processes of neuron generation, regulation of neuromuscular junction, neurological system process and cell recognition (P-valueenrichment< 0.001). The second logistic regression using mixed models indicated that 17 polymorphisms distributed in this specific set of genes were significantly associated either with susceptibility (N= 11 SNPs) or protection (N=6 SNPs) towards disease development even after correction for multiple comparisons (P-valueFDR<0.05). Combinatorial analysis indicated that the group of incident household contacts had a higher genetic risk score (P<0.001). Functional analysis evaluating the set of associated genes revealed differences in gene expression in human primary macrophages or THP-1 monocytic cell line after infection with live, but not deadM. leprae (MOI 1:10, MOI 1:100).

Conclusions. We determined novel SNPs in a specific group of incident household contacts that can be used as prognostic markers towards disease progression. Further validation is required for either genetic replication in larger cohorts and also functional evaluation of the associated genes.

Keywords:
From the genetic association studies to host-directed therapies in leprosy

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In past 10 years, use of large scale techniques such as genomic scans, Genome-Wide Association Studies (GWAS), population-based case-control testing candidate genes, large scale gene expression analysis and literature-based meta-analysised enabled fast advances in pinpointing genes and single nucleotide polymorphisms (SNPs) associated with leprosy susceptibility. Major genes and enriched pathways have been depicted either leprosy per se or endophenotypes such as reactional episodes. In parallel, cellular and molecular biology tools have been able to validate these main pathways/targets in in vitro experiments or in vivo analysis. One example is the definition of PARK2 single nucleotide polymorphisms (SNPs) as associated with leprosy. Parkin is ubiquitin ligase enzyme associated with Parkinson’s disease. But, parkin knockout mice were characterized as more susceptible to M. tuberculosis infection due to deficiencies in correctly address phagocytosed mycobacteria to autophagy and consequently control the bacterial replication. A search for novel candidate genes and pathways are described with no a priori hypothesis, an in-depth knowledge of mycobacterial immunopathogenesis can be achieved. Several other genes have been consistently replicated like TNF/LTA/HLA, NOD2, TLR1, IFNG and IL-10 as associated with leprosy. Some other promising routes have been pinpointed using microarrays analysis such as type-I IFN. Recently, host-directed therapies have been demonstrating that individuals with specific genotypes in these genes respond differently to drugs, vaccine adjuvants or immunobiologics. Thus, genetic background could be used to drive detailed responses that, under the use of these agents, might hamper cellular signaling triggered by the mycobacteria switching towards a restrictive environment blocking infection disease progression or reaction outcome.

Keywords:
ILC3.3-034
Whole genome sequencing of leprosy bacilli: from efficient DNA extraction methods to analysis of 100+ genomes
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Objectives
Leprosy is a chronic mycobacterial infection caused by Mycobacterium leprae and the newly described species M. lepromatosis. While ‘wet lab’ research on leprosy remains challenging due to the in vitro uncultivability and the slow growth of leprosy bacilli, genomics has the potential to reveal new insights into their biology, genetics and evolution. High throughput sequencing methods are cost-effective with pure DNA, but expensive and less efficient with DNA extracts from leprosy skin biopsies, especially those with low bacillary index (BI). Efficient DNA extraction methods for the leprosy bacillus, tailored for various types of samples, are therefore prordial for routine whole genome sequencing applications.

Methods
For human skin biopsies and animal tissues, DNA was extracted using a customized in-house protocol combining host tissue digestion, host DNA depletion, strong bacterial cell lysis and silica based purification (Qiagen). For formalin fixed paraffin embedded (FFPE) samples, DNA was extracted using the Adaptive Focused Acoustics (AFA) technology (Covaris). Libraries prepared from the extracted DNA can be directly used for shotgun sequencing or additionally enriched using array capture in case of low BI or poor quality samples.

Results and conclusions
With improved DNA extraction and enrichment methods we are now able to multiplex and sequence from 10 to 30 genomes on an Illumina HiSeq lane, which decreases the sequencing costs considerably. Furthermore, we are able to sequence genomes of leprosy bacilli from challenging samples such as FFPE samples. So far, we have analyzed whole genome sequences of more than 150 M. leprae strains from 39 different countries as well as 9 M. lepromatosis strains from 3 different countries. This analysis offers an unprecedented overview of the genetic diversity and phylogeography of leprosy bacilli.

Keywords: M. leprae, M. lepromatosis, DNA extraction, whole genome sequencing, phylogeny
**ILC4.1-001**

**Prevalence and Severity of Late Disability due to Leprosy in Bangladesh with Key Characteristics of Disabled People**

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**Objectives**
To assess the cumulative prevalence and severity of late leprosy-related disability in 4 districts of NW Bangladesh

**Methods**
In the course of a project screening for diabetes, all known living leprosy-disabled people resident in 4 districts were surveyed over a 6m period in 2015. They were assessed for disability level (WHO grading and Eyehandfoot score), & body mass index, and screened for hyperglycaemia by a single random blood sugar level. The data have been analysed to identify risk factors for high levels of late disability, and to establish if the pattern of disability in terms of disease duration or subjects’ age can be used to predict future levels of disability burden in this population.

**Results**
Data was collected on 3573 individuals (95% eligible people). The majority had completed MDT. Of those reviewed 62.7% had grade 2 disability, representing a cumulative prevalence rate of 28.4/100,000 population. This compares with prevalence of current cases having disability grade 2 at diagnosis of 0.79/100,000 and registered prevalence rate of leprosy of 0.78/10,000.
47 new diagnoses of diabetes were made and 97 other diabetics were identified. Body mass index and High blood sugar levels are not apparently associated with greater levels of disability. Mean BMI was low which may be due to manual labour or malnutrition amongst these leprosy-affected people. For subjects over 50 years old, mean EHF score was 3.38, 18% subjects had EHF>6, and 71% had WHO disability grade 2, for those diagnosed over 20 years ago. In contrast same age subjects diagnosed 0–5 years ago had mean EHF2.71, 4% had EHF>6, 51% had WHO grade 2.

Besides a correlation between age and severity of disability, there is a correlation with time since diagnosis. We suggest this may reflect the fact that those cohorts diagnosed long ago received less “disability-prevention care” at early stages of disease, as well as increasing disability over time in individuals, rather than older people being more susceptible to disability. If this is true we should expect a declining average level of disability in future cohorts of leprosy affected people, even though in individuals disability might slowly increase as they age.

Conclusions
Actual Disability burden in the community is at least 36 times as high as the prevalence of disabled registered leprosy cases. Older people with existing impairment, who were diagnosed long ago should be monitored for progression of disability and offered extra support.

Keywords: leprosy-disabled, disability grade, eyehandfoot score, age, diabetes
An epidemiology of leprosy among children of high prevalent districts of West Bengal.
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OBJECTIVES:
1. To estimate prevalence of childhood leprosy in high risk districts of West Bengal.
2. To assess knowledge & attitude of the parents of children
3. To examine all family members and neighbors (most likely source of childhood leprosy) to identify signs of leprosy

Methodology: A descriptive observational study with cross-sectional design was conducted in five high prevalent districts of West Bengal with the objectives to estimate prevalence of childhood leprosy and assess knowledge, attitude & treatment seeking behavior of the parents & search for sources of leprosy among family members & neighbors.
Total duration: one year

Result:
We have examined 4,41,954 children, of these 2,72,808 in primary schools of selected villages and 1,69,146 during household visit in the five selected districts, e.g. Kolkata, Burdwan, Paschim MIDnapur, Bankura & Purulia of the State of West Bengal.
We detected 248 cases with sign of hypo-pigmented anesthetic patch (suspect), giving overall prevalence of leprosy suspect 5.6 per 10,000. We interviewed 69655 people by community based household survey. 93.7% respondents heard about leprosy. 33.8% said that it is caused by bacteria; about one-fourth had opinion that leprosy is a disease, caused by divine curse, or sin, or hereditary
influence and about 19% did not have any idea of its causes. One-fourth of the respondents did not know its modes of transmission. Correct knowledge regarding mode of transmission of leprosy varied from 42% in Burdwan to 58% in Bankura districts. While 20% had no idea about signs of leprosy, about 78.8% knew one or other signs of leprosy like hypo pigmented, anesthetic or erythematos patch, nodules etc. 23.3% respondents said that all cases of leprosy are infectious to others. 85.2% had idea that leprosy has treatment, but only 45.3% heard about MDT. Total 23 adults in neighborhood of leprosy patients (9.3%) were identified as having of leprosy (probable source of infection of leprosy in children).

Conclusion: Infection among children indicates active transmission of disease in the community. Knowledge gap about leprosy among Community members is still of great concern.

Acknowledgement: We acknowledge the support and cooperation of Indian Council of Medical Research, Govt. of India, New Delhi. We also extend our thanks to the State Leprosy Officer, Govt. of West Bengal.

**Keywords:** Prevalance, Leprosy, Transmission, KAP
ILC4.1-003
Diet-Related Risk Factors for Leprosy: A Case-Control Study
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Objectives: Food shortage was associated with leprosy in two recent studies investigating the relation between socioeconomic factors and leprosy. Inadequate intake of nutrients due to food shortage may affect the immune system and influence the progression of infection to clinical leprosy. We aimed to identify possible differences in dietary intake between recently diagnosed leprosy patients and control subjects without leprosy.

Methods: In a leprosy endemic area of Bangladesh, newly diagnosed leprosy patients and control subjects were interviewed about their socioeconomic situation, health and diet. Dietary intakes were recorded with a 24-hour recall, from which a Dietary Diversity Score (DDS) was calculated. Body Mass Index (BMI) was calculated and Household Food Insecurity Access Scale (HFIAS) was filled out for every participant. Using logistic regression, a univariate, block wise multivariate, and an integrated analysis were carried out.

Results: Fifty-two leprosy cases and 100 control subjects were included. Food shortage was more common, dietary diversity was lower and household food insecurity was higher in the patient group. Patients consumed significantly less items from the DDS food groups ‘Meat and fish’ and ‘Other fruits and vegetables.’ Lower food expenditure per capita, lower BMI, lower DDS and absence of household food stocks are the main factors associated with an increased risk of having leprosy.

Conclusions: Low income families have only little money to spend on food and consequently have a low intake of highly nutritious non-rice foods such as meat, fish, milk, eggs, fruits and vegetables. Development of clinical leprosy could be associated with deficiencies of the nutrients that these foods normally provide.

Keywords: Nutrition, Food shortage, Dietary diversity, Food expenditure, Deficiencies
ILC4.1–004
Leprosy in Western Australia 1986–2016; historical context, epidemiology and challenges
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Leprosy was first detected in the indigenous population in the Kimberley in the late 1800s, with a peak in case detection rates between 1930 and 1950. Since the 1980s, Australia has achieved the WHO goal to eliminate leprosy by attaining a prevalence rate of less than one case per 10,000 population. While 78% of cases in Australia are acquired overseas, infection continues to occur in the Indigenous population, with highest rates in Western Australia. In recent years there have been two notable cases of lepromatous leprosy in the East Kimberley, with a case of multibacillary (borderline) disease in a 17 year old household contact of one of the cases, indicating ongoing transmission. These cases have led to renewed interest in the public health approach to this disease in the Kimberley region. A consequence of the low incidence has been loss of expertise in health care workers (HCW) and waning of community knowledge of disease manifestations. To ensure early diagnosis and thereby limit disease transmission and prevent and minimize disability, there is a need for ongoing education, provision of protection to at risk groups through neonatal BCG vaccination, adequate treatment, contact tracing and comprehensive follow up to detect relapse. Social, geographic and cultural aspects of the Kimberley region and its Indigenous population pose unique challenges for Leprosy control and prevention of disability.

Keywords: Leprosy, Australia
ILC4.1-005
Changing Profile of Leprosy from an Endemic Area in Allahabad district, Uttar Pradesh, India
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Background & objective:
The state of Uttar Pradesh contributes to 18% of total cases in India. The state achieved elimination of leprosy.

Methods:
To understand the epidemiological trends, records of all leprosy patients registered for treatment at leprosy or government hospital within the district during the period 2005-06 to 2014-15 (Ten years) was included in the study. The data from patient records was entered into MS Access database and analysed using SPSS. The epidemiological indicators like annual new case detection rate (ANCDR), proportion of child cases & multibacillary (MB) cases and proportion of grade 2 disability for each year were calculated to study the time trends. The observed trend were compared with the expected trend when the disease in decline to describe the current disease situation in study area.

Results:
The ANCDR shows decreasing trend during the study period. The trends in proportion of child cases.

Conclusions:
The decreasing trend of ANCDR is encouraging but it is very much influenced by the type of case detection activities. The increasing trend of proportion of MB cases with inconsistent trend in grade 2 disability at the time of diagnosis indicates the delay in diagnosis. The inconsistent trend of proportion of child cases among new cases indicates the active transmission of disease in the community. Overall the trend in epidemiological indicators shows that the disease is not in declining phase in the study area.

Keywords: Leprosy, Epidemiology, Grade 2 disabilities, Multibacillary, India
ILC4.1-006
Health Seeking Behavior of New Adult Leprosy patients from an Endemic Area in Allahabad district, Uttar Pradesh, India
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Background & objective: The delay in case detection leads to poor prognosis and increases transmission of infection in the community. Hence, it is important to determine factors responsible for delay in seeking care to create better awareness in the community. This study aims to study the health seeking behaviors and associated delay and the factors affecting the delay in diagnosis/treatment of new leprosy patients from Allahabad district.

Methods: A cross-sectional study design was used by administering a structured questionnaire to all new adult leprosy patients randomly selected blocks of Allahabad district. All patients registering for treatment at the Government or The Leprosy Mission Community Hospital Naini within these blocks during the period between Jan 2015 and Dec 2015 were included in the study. The questionnaire includes demographic and clinical details along with knowledge of leprosy and perceived level of stigma due to leprosy. The questionnaire was administered by the principal investigator either at the hospital or at place convenient to patient.

Delay was defined as the time taken from first becoming aware of the symptoms of disease through to the start of an effective treatment. The delay longer than 12 months or more as outcome bivariate and multivariate analyses were done to see the association between the determinants and the delay.
The informed consent was obtained before administering a questionnaire. This study was approved by the ethics committee of Christian Medical College, Vellore, India. The data was entered using Epidata and analysed using SPSS.

Results: 125 patients were included in the study. Delay from time of first symptoms through to start of anti-leprosy treatment was mean 23 months. The patient and health system related delay was mean 10 months and 13 months, respectively. Among the health system related delay 43% of delay was caused by visit to traditional healer, followed by general practitioner 24%. Logistic regression analysis identified visit to traditional healer and multiple visits as predictive of delay.

Conclusions: Identification of reasons for delay is essential to devise strategies to promote early diagnosis/treatment of leprosy. Patient and health system related factors equally contributed to the delay before start of anti-leprosy treatment. The intensive and innovative Information, Education and Communication activities are essential to identify the cases early in order to reduce the active transmission of disease and prevent permanent disabilities due to leprosy.

**Keywords:** Prevention and control, Leprosy, Epidemiology, India, Delay in presentation
Trends in the historical sequence of detection rates overall and in children less than 15 years of age Brazil from 1995 to 2014

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Objective: To analyze leprosy trends in Brazil according to the historical sequence of the leprosy detection rates overall and in children less than 15 years of age.


Results: The reduction in leprosy overall and children under 15 year detection rate was the same 38% from 23.27 to 14.97 per 100,000 inhabitants in Brazil for overall and from 6.20 per 100,000 to 4.78 in children over the last 20 years was verified. From 2004 on there has been a declining trend in general detection coefficients and in children under 15 years of age. When they are face to analyses each decade separately is clear that the decline in the both indicators is consolidates in last decade (2005–2014)

Conclusion: One can conclude that a solid decline in the leprosy detection rate has been taking place in Brazil over the past ten years, both overall and in children under 15.

This trend is probably the result of initiatives that included the introduction of multidrug therapy (MDT) in 1991, of the strategy of increasing access to integrated diagnosis and treatment to primary healthcare services, and of efforts to change the image of leprosy within society.

Keywords: tendency, detection rate in children less than 15 years of age, detection rates overall, epidemiology, Brazil
ILC4.1–008
Fifty years of leprosy in Brazil: Joinpoint trend analysis from 1965 to 2014
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The decrease in the leprosy detection rate in Brazil over the past 11 years is both remarkable and evident. This study aimed to investigate trends in the leprosy detection rate in Brazil during the last 50 years (1965–2014).

Methods: We performed a time series study using data from the Notifiable Diseases Information System (SINAN), reports, and/or historical documents. The Joinpoint program was used to calculate the annual percentage change (APC) in the leprosy detection rate per 100 thousand inhabitants from 1965–2014 period time series. A segmented linear regression model was used to identify the trend change points and to estimate the APC. Confidence intervals limits (95% CI) were calculated for each line segment, with an estimated slope.

Results: From 1965 to 2014, 1,289,731 cases of leprosy were reported in Brazil. Three statistically significant (p < 0.05) trend change points were observed. There were no significant changes in the detection rate from 1965 to 1969. There was a significant increase trend in the leprosy detection rate from 1970 to 1983 (APC: 7.7%, 95% CI: 6.7% to 8.8%), owing to the suspension of compulsory hospitalizations for contagious forms of leprosy and the expansion of outpatient treatment facilities, and from 1989 to 2003 (APC: 2.7%, 95% CI: 1.8% to 3.5%), with the implementation of multidrug therapy in the basic healthcare network and municipal decentralization. Conversely, from 2003 to 2014 (APC: –6.0%, 95% CI: –7.0% to –4.9%), there was a significant decrease in the leprosy detection rate in spite of the intensification of decentralization efforts, expansion of policies and strategies supporting integration with other health issues, prioritization of contact investigation, and case detection campaigns.

Conclusion: Differences in trends were found to be associated with periods of distinct policies and strategies for coping with the endemic disease. The continuous decrease in the detection rate observed in the last decade is expected to persist and is higher than the increase observed during the period of multidrug therapy implementation and decentralization of diagnostic and treatment actions in primary care at the municipal level.

Keywords: trend analysis, detection rate, epidemiology, Brazil
ILC4.1–010
ADVANCING LEPROSY ERADICATION
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The disease Leprosy is simple to diagnose, sure to cure; still, lots of cases are remaining hidden in the community. Unfortunately the main reason for such hidden cases is that leprosy doesn’t manifest with acute sign and symptoms like Malaria, Chikungunia, Dengue, etc.

Thousands of cases are detected in India, where 60% Global burden exist. If we go through the case detection and treatment history in India and worldwide, it can be seen that prevalence rate is always low or stagnant, for the period that active case detection is not carried out. In case of infectious disease with acute signs and symptoms, patients voluntary seek medical assistance and the number is known without any effort. Many examples can be shown that the Prevalence Rate of leprosy in particular areas are different for the same period depending on the method of case detection (Active/Passive). During 2001–02, reported PR in Himachal Pradesh and Meghalaya was 0.39 and 0.29/10,000 population respectively. A study by CLTRI for WHO to pilot test the tool for the validation of elimination of leprosy was astonished to find that actual PR was many times (3.48 and 9.29 respectively) higher than reported PR, which makes us to think that leprosy have different prevalence rates depending on the method of case detection (active or passive). The huge number of cases that is detected during a special activity in a locality can be called as epidemic of leprosy as it is happening in a short period of intensive activity to detect case. Several examples can be shown to prove this phenomenon which points out that active case detection is essential in the case of leprosy, to bring the cases in record for treatment and control. Detection of cases with G2D should be an eye opener in this context. Therefore unless we actively detect cases as in Modified leprosy elimination campaign (MLEC) conducted in India during 1998–2003, we cannot eradicate leprosy from the Globe.

The presentation by the author, who has begun his career in leprosy and the Director of a premier Leprosy Research Institute, emphasizes the importance, necessity and the role of active case detection, for the eradication of leprosy from the globe, with evidence and examples achieved from the experiences and the activities under taken by this premier Leprosy Research Institute in different parts of Indian continent.

**Keywords:** ACTIVE CASE DETECTION, MLEC, PR, INDIA
ILC4.1-011
Spatial Distribution of Leprosy in Bangladesh: Tool to Assess the Trends and Programmatic Implications
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Objectives: Like many other parts of the world, the size, scope and context of leprosy services are changing in Bangladesh. Simple changes in numbers and figures possibly do not represent what actually happened in leprosy elimination in Bangladesh. The objective of this disease mapping was to get a spatial distribution of leprosy in Bangladesh by different parameters.

Methods: A comprehensive digital database was prepared using records and reports collected from National Leprosy Elimination Programme (NLEP) and its partners from all reporting units for the years 2008–2014. Leprosy disease mapping was prepared using ArcView GIS 3.3 software (Environment System Research Inc) to determine geographical distribution (district level) of leprosy in the country. Data was digitized and converted to a comprehensive GIS database format and superimposed in a preexisted district wise map developed by Local Government Engineering Department (LGED) of the Government of Bangladesh.
Results: The prevalence in some northern and southern districts remained consistent during 2008-2014 and the status of endemicity (prevalence per 10,000 population) did not change. The new case mapping (incidence per 100,000 population) followed the same pattern as prevalence. The northern districts including Nilphamari and Gaibandha reported maximum number of cases. Interestingly, Dhaka City Corporation (DCC) though surrounded by zero reporting areas constantly reported nearly one quarter of all country cases. Other epidemiological parameters also did not show any changes over the period including grade 2 disability among the detected cases which remained as high as 10% or more in these areas.

Gaps were identified in the data generating, recording and reporting system, as well a huge lag of time from generation to country level compilation for utilization. Dissociation between paper based systems at different levels of data generation and weak central level coordination was marked.

Conclusions: Geographical distribution of leprosy in Bangladesh showed that the disease is not uniformly distributed in Bangladesh. The trend did not indicate any declination of transmission either. However, there are gaps in the management information systems (MIS) for leprosy at all levels that may adversely forecast the leprosy epidemiology. Introduction of electronic data collection and reporting system, capacity building at the central level on data management and routine utilization of such data are recommended. Occasional undertaking of spatial data mapping will be helpful for planning NLEP activities, which could even be extended to individual level tracking of every persons affected with leprosy in the country.

Keywords: Leprosy, GIS, "Geographical Distribution", Bangladesh
ILC4.1–012
Leprosy in Russia
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Objectives. The incidence of leprosy in Russia has a stable and character. For the last 10 years only one new case has been detected. Lepromatous type of leprosy was diagnosed woman aged 47, resident of Astrakhan, whose parents also suffered from leprosy. In Russia 275 persons are registered, 55% of them are residents of the South of Russia, the Caspian sea coast.

Methods. Epidemiological analysis, sanitary-statistical, historical.

Results. 80% of registered leprosy patients, are persons of elderly and senile age, mainly with multibacillary leprosy. They all have different concomitant somatic disease and require case follow up, medical and social rehabilitation. 30% of registered patients hospitalized in a leprosy institution. The early detection of patients, their 100% hospitalization, effective treatment, follow-up of patients and contact persons, and other preventive measures favored success in the fight against leprosy in Russia. With increasing tourism and migration processes from leprosy endemic countries in Central and South-East Asia there are cases of imported leprosy. So, in 2013, we identified active leprosy in a 32 year old worker from Tajikistan. Migrants need special attention and a compulsory survey.

Conclusions: Under the conditions of sporadic disease, it is important not to reduce the activity of carrying out leprosy activities, introduce of modern immunogenetic methods for early diagnosis and control of leprosy; prevention of disability; effective rehabilitation aimed at improving patients’ the quality of life.

Keywords: leprosy, import leprosy, epidemiology, control, rehabilitation
ILC4.1–013
Serological monitoring of levels of immunoglobulin M to a specific semi-synthetic ANTIGEN M. LEPRÆA in residents of endemic and non-endemic leprosy RUSSIAN REGIONS
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Introduction
An important objective of the fight against leprosy is early identification of infected persons and cases of subclinical infection. The level of immunoglobulin class specific IgM is a laboratory marker that reflects the interaction of the human body and M.lepræa during the infection process (O.V. Degtyarev et al, 2015; J.G. Barreto et al, 2015).

Methods
Detection of IgM anti-PGL–1 was performed using an ELISA as previously described by A. Waller (1976). Disaccharide bovine serum albumin (Dis–BSA) was used as a semi-syntetic analogue of anti-PGL–1. Anti-human IgM conjugate diluted 1: 2000 in anti-body diluent solution. The plate was read a multiscan ELISA reader. Sera with an absorbance at 592 nm. Results are expressed in arbitrary units of optical density (OD). The level of IgM to Dis–BSA was detected in the sera from 837 healthy blood donors from endemic leprosy region (Astrakhan region, Russia) and 364 healthy blood donors from the Samara region (non–endemic leprosy region of Russia).

Results
Of the 837 sera from residents of the Astrakhan region revealed 29 (3.47%) seropositive samples that revealed high levels of IgM anti-PGL–1. Optical density of positive results varied in the range from 0.3 to 1.0 OD average value (M ± m) was 0.53 ± 0.024. Indicators OD negative results (807 samples – 96.53%) ranged from 0.00 to 0.30 OD, the average value of (M ± m) 0.12 ± 0.003. Of the 364 sera endemic leprosy region (Samara region) revealed 100% negative results. The average value of the level of IgM anti–PGL–1 (M ± m) in seronegative samples was 0.06 ± 0.004 (0.00 to 0.29 OD).

Conclusion
Detection of IgM anti–PGL–1 in serum of healthy individuals indicates a contact person with M.lepræa. The result is the formation of specific infection antibodies. In the future, if there is a defect of the immune system may develop active leprosy manifestation. Therefore, seropositivity does not always coincide with the incidence and spread of leprosy in endemic region. High levels of IgM anti–PGL–1 inhabitants of endemic region, increases the risk of developing clinical manifestations of leprosy.

Keywords: M.lepræa, ELISA, Dis–BSA, PGL–1, IgM
Stratification of new Leprosy cases notified in Mile 4 hospital, Ebonyi state, Nigeria in 2014 by residential addresses: implication for mapping leprosy cases in countries with leprosy endemicity.

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Introduction:
Ebonyi state with estimated population of 2.8 million is among the 15 states in Nigeria with pockets of significant leprosy endemicity. Total number of new leprosy cases notified in Ebonyi state increased from 145 in 2013 to 167 in 2014. 14.4% (24) of the cases in 2014 had grade 2 disability (Grade 2 disabilities rate of 8.6/1,000,000 population). There are 39 MDT clinics in the state. The Mile 4 hospital (St. Patrick Hospital) Abakaliki situated in Ebonyi LGA accounts for 61% (101) of the new leprosy cases notified in the state in 2014.
The aim of the study is to assess the distribution of new leprosy cases notified in Mile 4 hospital in 2014 by their residential addresses to enhance efforts in implementing targeted interventions.

Methodology:
The National R&R tools were used in capturing detail and traceable addresses of all new leprosy cases notified and other information. The Leprosy cases notified in the state were collated quarterly. New Leprosy cases notified in Mile 4 hospital in 2014 were further stratified by their residential addresses.
Results
A detailed mapping of the new leprosy cases in mile 4 hospital by residence shows that 82% (83) of the new leprosy cases notified in this hospital are NOT from the LGA and community in which the hospital was situated. 86 (85%) of the total new leprosy cases (101 cases) reported by this hospital are people that resides within the state. Three LGAs in the state account for 71% of these new Leprosy cases. The LGAs are: Ohaukwu LGA which account for 26% (22 cases); Izz LGA accounts for 24% (21 cases) and Ebonyi LGA accounts for 21%(18 cases). The remaining new leprosy cases notified in mile 4 hospital are from Benue, Enugu, Imo and Anambra states, with Benue state accounting for the highest number (11 new leprosy cases). The cases from Benue state are almost all from one LGA (Ado LGA). The Benue state STBLCP is not aware of this information.

Conclusion and Recommendations
Stratification of new leprosy cases in 2014 in mile 4 hospital by residential addresses revealed that most of the patients are only from communities in 3 out the 13 LGAs in the state. Majority of the new leprosy patients (73%) notified in this hospital that are from outside the state came from only one LGA in Benue state.

Mapping of new leprosy cases should be done routinely in leprosy endemic countries to identify probable areas for intervention in view of dwindling resources. System of feedback among various states should be instituted in-country to ensure that no endemic communities are left-behind in the leprosy control efforts.

Keywords: Leprosy, mapping, MDT, left-behind
**ILC4.1-015**

**Forecasting New Case Detection Rates of Leprosy: A Survey of Experts**

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**Objectives**

Much progress has been made in the global fight against leprosy, as evidenced by dramatic declines in prevalence rates in recent years. However, leprosy has proven elusive. New case detection rates have remained fairly stable, particularly in countries with remaining pockets of high endemicity such as India, Brazil, and Indonesia. The 2012 London Declaration formulated the following targets for leprosy control: (1) global interruption of transmission or elimination by 2020, and (2) reduction of grade-2 disabilities in newly detected cases to below 1 per million population at a global level by 2020. Aggregating the opinions of leprosy experts can supplement existing data to help determine the feasibility of reaching these goals. To obtain the opinions of experts, a cross-sectional survey will be sent asking experts to project new case detection rates in quantitative forecasts for Indian districts, select countries, and total worldwide. Opinions on whether the specific goals for 2020 are likely to be met will also be elicited.

**Methods**

A survey created in Qualtrics will be emailed to professionals with expertise in leprosy, neglected-tropical diseases, and forecasting. In order to survey a broad cross-section of such experts, PubMed was searched for articles published on relevant topics and 4,189 emails of corresponding authors were extracted.
The 11-item survey consists of general demographic questions and slider bars, multiple-choice questions, and forecasting exercises designed to elicit opinions on the short-term future of new case detection rates. For the country/world level forecasting exercise, we used publicly available data from the 2014 WHO Global leprosy update report, which reported annual new case counts for leprosy from 2008–2014 in India, Brazil, Indonesia, and the total worldwide. For the Indian district forecasting exercise, we used publicly available district level data from the Indian Ministry of Health, which reported annual new case counts for leprosy from 2008–2015. In both forecasts, participants are asked to provide their central estimate and 95% credible intervals for the new case count in the following year.

Results
The UCSF Institutional Review Board has granted the study’s approval and the survey is currently in pilot testing with plans to email the survey to experts in February.

Conclusions
The results will provide a probabilistic estimate of the likelihood of the leprosy goals being accomplished by 2020 according to experts. With the Indian district level data, the experts’ forecasts can be compared to mathematical models and validated against the forthcoming 2016 district level data.

**Keywords:** leprosy, forecasting, prediction, expert survey
ILC4.1-016
Risk factors for treatment default among multibacillary leprosy patients
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Objectives: Quantitative methods used to identify risk factors for Multiple Drug Therapy (MDT) default among leprosy patients are not well documented in the literature. This study identified whether patients’ age, sex, place of residence, hospital where they had received treatment, number of MDT doses recommended by the doctor, and initial mean bacterial index are determinants of treatment default.

Methods: Patient records of 1034 new multibacillary leprosy cases from three large hospitals in Metro Manila were reviewed. Pertinent variables such as patient age, sex, place of residence, hospital where they had treatment, number of MDT doses recommended by the doctor, initial mean bacterial index, and duration of treatment as well as treatment outcome were obtained from patient records. Cox Proportional Hazards Regression Analysis was used to identify risk factors for treatment default. Focus-group discussions were also conducted with health workers to determine the reasons why patients default from treatment.

Results: Out of 1034 patients, only 590 (57.1%) completed treatment. Sixty-one patients (5.9%) either transferred to another treatment facility, died while under treatment, or were still under treatment by the end of December 2014. However, because many patients did not have initial mean bacterial index, only the data from 926 patients were included in the regression modelling.
Without adjusting for the effect of potential confounders, only the number of MDT doses recommended was found to be significantly associated with treatment default. After controlling for several confounders, hospital where patients underwent treatment (Hazard Ratio comparing Hospital A and B (HR): 1.58, 95% CI: 1.07 – 2.32, HR comparing A and C, HR: 1.17, 95% CI: 0.91–1.50), the mean bacterial index at start of treatment (HR: 1.43, 95% CI: 1.14–1.78) and the number of MDT doses received (HR: 0.15, 95% CI: 0.09–0.23) were found to be significantly associated with treatment default.

According to the health professionals, financial reasons, erroneous perceptions that they have already been cured, and the stigma attached to the disease are three major reasons why patients default from treatment.

Conclusion: Patients treated at Hospital B are 1.6 times more likely to default compared to their counterparts from Hospital A. Patients with a high mean initial bacterial index (4.0–6.0) are 1.43 times more likely to default from treatment. Patients who were given less than 12 doses of MDT were 6.8 times more likely to default from treatment. Financial reasons, misconceptions and stigma of the disease were also reasons for defaulting treatment.

Keywords: Risk factors, Default, Multibacillary Leprosy, Multiple Drug Therapy, Treatment Compliance
ILC4.1-017
Risk factors for treatment default among multibacillary leprosy patients treated with the Multiple Drug Therapy
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Patient records of 1034 new multibacillary leprosy cases from three large hospitals in Metro Manila were reviewed. Pertinent variables such as patient age, sex, place of residence, hospital where they had treatment, number of MDT doses recommended by the doctor, initial mean bacterial index, and duration of treatment as well as treatment outcome were obtained from patient records. Cox Proportional Hazards Regression Analysis was used to identify risk factors for treatment default. Focus-group discussions were also conducted with health workers to determine the reasons why patients default from treatment.

Out of 1034 patients, only 590 (57.1%) completed treatment while 383 (37.0%) defaulted. Sixty-one patients (5.9%) either transferred to another treatment facility, died while under treatment, or were still under treatment by the end of December 2014. However, because many patients did not have initial mean bacterial index, only the data from 926 patients were included in the regression modelling.
Without adjusting for the effect of potential confounders, only the number of MDT doses recommended was found to be significantly associated with treatment default. After controlling for several confounders, hospital where patients underwent treatment (Hazard Ratio comparing Hospital A and B (HR): 1.58, 95% CI: 1.07 – 2.32, HR comparing A and C; HR: 1.17, 95% CI: 0.91–1.50), the mean bacterial index at start of treatment (HR: 1.43, 95% CI: 1.14–1.78) and the number of MDT doses received (HR: 0.15, 95% CI: 0.09–0.23) were found to be significantly associated with treatment default. According to the health workers, financial reasons, erroneous perceptions that they have already been cured, and the stigma attached to the disease are three major reasons why patients default from treatment.

Patients treated at Hospital B are 1.6 times more likely to default compared to their counterparts from Hospital A. Patients with a high mean initial bacterial index (4.0–6.0) are 1.43 times more likely to default from treatment. Patients who were given less than 12 doses of MDT were 6.8 times more likely to default from treatment. Financial reasons, misconceptions and stigma of the disease were also reasons for defaulting treatment.

**Keywords:** Multiple Drug Therapy, Treatment Default, Treatment Compliance, Risk Factors, Multibacillary Leprosy
ILC4.1–018

Android based software for field data collection in Leprosy; effectiveness and advantages of the tool as an integral part of epidemiological survey
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Objectives–
1. Application of the android based software in Leprosy to capture data of people newly diagnosed with Leprosy and of people already affected with Leprosy in the district of East Godavan in Andhra Pradesh.
2. Effectiveness as a tool to help the public health system in early case detection as well as in management and follow up.
3. Use of a web based digital storage tool for data which eliminates the need for cumbersome paper based recording and can be accessed from multiple points in real time.
4. One stop user friendly software which can analyze the collected data and derive the required results.

Method–
The data is input in the android based software using tablets in the field by the Divisional Coordinators (DC) contracted by FAIRMED India. Each DC is designated for a decided number of blocks in the district. The DC’s prepare a line list of the people drawn from various sources including the General Healthcare System (GHS) and the FAIRMED India healthcare setup. The DC’s visit each of the people listed and record all the required data after obtaining audio visual consent. A unique feature of the software is its capability to geo–tag in real time the location of the people whose data are captured.
The software can function on an online (3G connectivity)/ offline mode and it has a comprehensive array of indicators which collect data of the people including:

a. Clinical data
b. Epidemiological data
c. Socioeconomic data
d. Linkages with the local GHS (Primary Health Centers/ Community Health Centers) as well with the peripheral health workers of the area

Results-
The software helps collect and store the data of the people in the district. The data is analyzed by the software itself to derive various results and some of the salient indicators are:

a. Spot mapping (with geo tagging) of the people in the district
b. Clinical aspects of Leprosy
c. Age, sex and socioeconomic distribution

Conclusion-
The software is a user friendly tool which can be used at the field level to capture information of the people. This software launched by FAIRMED India is a pioneer of sorts for such methods of data capturing for diseases in India. Various similar platforms were only recently launched or are in the pipeline to be used by the General Healthcare System. The software eliminates the cumbersome paper based methods and is a one stop application for data collection, storage and analysis.

**Keywords:** Android, Tablet, Leprosy, Epidemiology, Socioeconomic
ILC4.1-019
Android based software for field data collection for Leprosy in India
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Android Based Software for Field Data Collection in Leprosy
Android based software for field data collection for Leprosy in India

Objectives-
1. To develop an android based application to capture epidemiological and social data in Leprosy.
2. To facilitate the public health system in early case detection as well as in management and follow up of the people.
3. To develop a web based data storage system.

Method-
The Divisional Coordinators (DC) gather field based epidemiological, social and demographic data using android based software. Each DC is designated for a predetermined set of blocks in the district. The DC’s prepare a line list of the people drawn from various sources including the General Healthcare System (GHS) and the FAIRMED India healthcare setup. The DC’s visit each of the people listed and record all the required data after obtaining audio visual consent. A unique feature of the software is its capability to geo-tag on a real time basis the location of the people whose data are captured.
The software can function on an online mode as well as offline mode and it has a comprehensive array of indicators which collect diverse data of the people including:

a. Clinical data
b. Disability data
c. Epidemiological data
d. Socioeconomic data
e. Linkages with the local GHS (Primary Health Centers/ Community Health Centers) as well with the peripheral health workers of the area

Results:
The software helps collect, store and analyze the data of the people in the district. Some of the results of the data analyzed by the software are:

a. Sex wise distribution of the people- Male 64.16% and female 35.84%
b. Ulcer wise distribution of the people- complicated ulcers- 321, septic ulcers-17, simple ulcers- 428 and others- 995
c. Type of Leprosy- MB- 74%, PB- 13.3% and NR- 12.7%
d. Number diagnosed with Leprosy among contacts- 308 diagnosed with Leprosy out of 5691 contacts screened.
e. People referred by ASHA (peripheral health workers of the GHS)- 7 diagnosed with Leprosy out of 49 suspects referred.

Conclusion:
The software is a user friendly tool which can be used at the field level to capture information of the people. This software launched by FAIRMED India is a pioneer for capturing leprosy and disability data in India. The software eliminates the cumbersome paper based methods and is a one stop application for data collection, storage and analysis.

Keywords: Android, Epidemiology, Leprosy, Socioeconomic
Sex Differences in the Epidemiological Profile and Treatment Outcomes of Leprosy Patients in a Rural Hospital in South-Eastern Nigeria

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Objective: To investigate sex differences in the epidemiological profile and treatment outcomes among leprosy patients managed in a large rural hospital in south-eastern Nigeria.

Methods: This was a retrospective cohort study carried-out in a large rural hospital in an endemic State in South-eastern Nigeria involving patients treated from 2011 to 2015. Chi-square/Fisher’s exact tests were used to assess significant differences in values between males and females. Statistical analysis of differences in treatment outcomes, between males and females, as well as other epidemiological factors of interest was done.

Results: During the study period, 316 patients with leprosy were treated; 172 (54.4%) were male, and 144 (45.6%) female. 2.1% of female patients and 3.6% of male patients were classified as paucibacillary while 97.9% of female patients and 96.5% of males were multibacillary leprosy cases (p = 0.35). There were no significant age differences between male and female patients (mean; 39.0 versus 40.2 years, respectively) (p = 0.54). Overall, 95.8% of female patients completed treatment versus 93.0% of male patients (p = 0.28). Male patients were more likely than female patients to have physical disability at diagnosis (55.2% versus 38.9%; p = 0.004) and at the end of treatment (42.8% versus 28.5%; p = 0.01), respectively.

Conclusions: There were no sex differences in the epidemiological profiles and treatment outcomes of patients managed at the hospital during the 5-year period studied. However, male patients were more likely to have physical disability at diagnosis and at the end of treatment.

Keywords: sex, Epidemiological, Treatment outcome, Leprosy, Nigeria
ILC4.1-022
Characterization of leprosy contacts in a Brazilian endemic municipality during 2013 to 2014. Eliane Ignotti¹, Lúbia Maieles Gomes Machado¹, Natasha Rayane de Oliveira Lima¹, Laila Ribeiro Soares²

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The examination of household contacts of leprosy is a priority action of surveillance. It considers the 75% contact test coverage as the minimum necessary for the occurrence impact to change the current situation of the disease in the country. The aim of this study was to evaluate the proportion of examined contacts of new cases of leprosy according to gender and age during 2013 and 2014. It is cross-sectional epidemiological study of leprosy contacts exam coverage in the city of Caceres - MT from 2013 to 2014. The selected variables included: number of contacts recorded and examined, gender and age group of contacts, gender, age, operational classification (MB/PB). We carried out X² test at a significance level of 5%. A total of 104 new cases were identified, with 352 household contacts. There was no statistically significant difference in the proportion of contacts examined between registered according to gender and age group. According to characteristics of the index case, there were a higher proportion of contacts examined among multibacillary patients (MB), females and children. The study shows a percentage of contacts investigated in Caceres below 75%, considered good by the World Health Organization and the Ministry of Health. This fact is missed opportunities for timely diagnosis and transmission chain breaks. The proportion of contacts examined between contacts recorded was not associated with gender and age group, but it is dependent with gender, age and operational classification of the index case.

Keywords: leprosy, household contacts, gender
ILC4.1-023
An 1-Year Study of Leprosy Cases Diagnosed at Eduardo de Menezes Hospital, Minas Gerais State, Brazil
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Introduction: Leprosy is an infectious disease with high disabling potential. Since there are still misconceptions about leprosy, the disease still remains a stigma. Brazil is the second country with the highest prevalence of leprosy in the world, whereas Minas Gerais is the state of higher incidence. This panorama leads us to think how great is the problem for population’s health in our country and our state.

Objective: In view of this, the aim of this study was to review confirmed and notified cases of leprosy at Hospital Eduardo de Menezes (HEM) database, in the period from January to December 2014, providing updated information of leprosy on Minas Gerais state, as long as the hospital represents a reference center to the state.

Methods: We analyzed clinical / epidemiological and sociodemographic characteristics of 98 patients through electronic medical records at the hospital’s database. The data were presented as frequency tables with the absolute number of cases and their respective percentage and graphics. For association between gender, age and other variables we used the chi-square test. All tests were performed considering 5% significance. Results: During the analyzed period, patients were predominantly men, aged 46 to 60 years, from Belo Horizonte and its metropolitan region with new leprosy diagnostic. For epidemiological and clinical aspects, it was observed mainly the operational classification multibacillary, the borderline clinical form, patients with zero degree of disability and negative bacilloscopic index. When we crossed the degree of disability with sex, it was possible to obtain a meaningful analysis, verifying that the chance of a woman diagnosed and notified with leprosy do not have disabilities is 3,81 times higher than a man.

Conclusion: It is extremely necessary to achieve further reduction in the number of cases of leprosy. Epidemiologic data is a disease control pillar. It makes possible effective disease control measures creation and it can guide public investment in health education programs, to early diagnose and treatment of leprosy.

Keywords: Leprosy, Mycobacterium leprae, Epidemiology, Bacilloscopic index, Health education
Trends of leprosy at leprosy referral hospital in high endemic district Purulia, West Bengal, India.
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Introduction:
India declared elimination in 2005 implying fall in the load of infection. In a country as vast and diverse like ours, the leprosy situation may not be as projected. Unequal distribution of leprosy prevalence has falsely led us to believe that leprosy is no longer a epidemiological threat. There pockets that have high endemicity and unless studies are undertaken to analyse trends, one can not be sure of the status of the disease. Only then can control and surveillance programs be directed to specific needs of these so called hotspots of leprosy. Purulia district in West Bengal, India is one such district where PR is 3.52 per 10,000 population as on march 2015. The objective of this study was, to observe the trends of new case detection in patients reporting to the hospital and discuss factors associated with the trends.

Methodology: A descriptive retrospective study was conducted in The Leprosy Mission Home and Hospital, Purulia, West Bengal. New cases of leprosy, childhood leprosy (0-14 years), sex and disability grades (grade 1, grade 2 and grade unknown) were the variables collected from the hospital registry from the period of January-2009 to December 2015. Relevant data was entered into Microsoft excel and analysed using SPSS.

Results: A total of 5182 new cases were registered in the time line of 7 years with a reduction in incidence of 4.2 %. There has been no reduction in proportion of child cases over the study years. The male:female (M:F) ratio decreased from 1.7 to 1.4 from 2009-2014 but increased to 1.7 in 2015. Male: female (M:F) child ratio increased from 1.1 to 1.3. Overall the numbers of people reporting with grade 2 disability decreased from 17% to 13% of the total registrations. Grade 2 disability in children and young adults increased from 11% to 17%.

Conclusion: The trends of leprosy patients profile clearly shows that, child cases are increasing and reporting late. This calls for urgent need of effective programme to improve early new case detection at the community level. Allocation of resources, strengthening the existing facilities and timely stringent monitoring of IEC activities is the need of the hour.

Keywords: leprosy, child, disability, endemic
ILC4.1-026
A Profile with resistance pattern among relapsed patients at The Leprosy Mission Hospital, Purulia.
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Introduction: The single most important tool to measure efficacy of MDT in leprosy is the relapse rate. In the year 2013–14, 919 relapses were reported from India, second only to Brazil who reported 1603 cases. World Health Organization (WHO) estimates risk of relapse to be low, hence post-MDT surveillance has been discontinued. Relapsed patients add to the prevalence of leprosy population and undiagnosed cases are a continual source of transmission due to their high positivity. The aim of this study is to study the clinical profile of patients diagnosed with relapsed leprosy using WHO guidelines and correlate their bacteriological and histopathological findings. Drug resistance profile also will be discussed in this cohort of patients.

Methods: All patients who had successfully completed treatment with WHO MDT in the past, reporting with clinical signs of progression of disease were suspects. WHO guidelines for diagnosing relapse was strictly followed. Data Collection was done from patient medical records and computerized hospital information system on patients diagnosed with relapse from 2009 to 2015.

Results: 160 patients were suspects, 94 confirmed relapse. 74 (78.7%) were males. 71 (76%) patients were above 40 years of age. The time of relapse after RFT in years was 30 in 5 (5.3%). The presenting complaints were new patches in 49 (52%), infiltration, edema and neuritis in 20 (21.2%), painless nodules in 16 (17%) and ENLs in 6 (6.3%). 83 (88%) had Bi > 3 and 94 (100%) had Bi 4 at any one site. 89 (94%) had solid bacilli reported in the histopathology, 77 (82%) had a Granuloma fraction of > 30% and 63 (67%) had Bi > 4. Biopsy classification was LL in 65 (69%) and BL in 28 (29.7) cases respectively. Details of resistance profile will be discussed in the final paper.

Discussion: Although studies show that relapse rates are very low after WHO MDT, relapses do occur. There is a possibility that more relapses in leprosy may develop if the WHO accepts uniform MDT and the treatment duration is reduced. Clinicians must use their judgement and tailor treatment regimens for individual patients, especially those with high Bi. It is imperative that at least bacteriological examination be offered at all peripheral health facilities treating leprosy. Post MDT surveillance must be carried out in those at risk for developing relapse.

Keywords: leprosy, relapse, resistance
ILC4.1-027
Trends of New Leprosy patients accessing Tertiary Leprosy Referral Hospitals in India
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Background: The Leprosy Mission Trust India (TLMTI) is an ILEP partner and the largest Non-Governmental Organization in the field of Leprosy in India with a presence in 9 states of the country. Its 14 Hospitals are recognized by the Government of India as Tertiary Leprosy Referral Hospitals for specialized leprosy care.

Objective: To study the trends of new Leprosy patients accessing TLMTI Tertiary Referral Hospitals and to analyze these in the context of the National trends.

Methods: This is a retrospective study. Uniform statistical data is collected annually from TLMTI hospitals in Chhattisgarh, Maharashtra, Uttar Pradesh, West Bengal, Delhi, Tamil Nadu, Bihar, Andhra Pradesh and Uttarakhand. The data is collected through the Hospital Information System and sent to the Learning & Development domain of TLMTI where it is consolidated into Annual Statistical Reports. The trends of new leprosy cases in the years 2010-2015 were extracted from these reports and presented in this study.

Results: The 6 year (2010-2015) trends analysis is based on new, never treated before Leprosy cases. The parameters which are being studied are: actual numbers of new leprosy cases, geographical distribution, age, gender, classification (MB/ PB), smear status at time of diagnosis and disability status at time of diagnosis.

Conclusions: Trends analysis of new Leprosy patients accessing TLMTI’s Tertiary Leprosy Hospitals provides a snapshot of the leprosy situation in the country. Studying these trends in the context of the National trends will give us new insights into the situation and emerging areas of concern.

Keywords: New Leprosy cases, Trends, Tertiary Leprosy Hospitals, India
Trends of New Leprosy patients accessing Tertiary Leprosy Referral Hospitals in India
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Keywords: New Leprosy cases, Trends, Tertiary Leprosy Hospitals, India
LEPROSY PATIENTS ATTENDED AT A UNIVERSITY HOSPITAL IN NORTHEAST BRAZIL: CLINICAL AND EPIDEMIOLOGICAL, 2007–2011
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BACKGROUND:
Leprosy is an infectious chronic condition associated with potentially serious physical, social and psychological impacts. Reference services have great relevance in the process of organizing the network of health care to these patients.

OBJECTIVES:
To characterize the clinical and epidemiological profile of leprosy patients treated from 2007 to 2011 in the University Hospital of Ceará, Northeastern Brazil.

METHODS:
This is a retrospective and descriptive study. The study population consisted of residents in the state of Ceará treated in a dermatology clinic between 2007–2011. Clinical and epidemiological data analyzed were obtained from medical records and the database of national Information System for Notifiable Diseases.

RESULTS:
475 cases were analyzed, mostly women (51.8%), with age between 45–59 years (35.0%) – average of 45.2 years at diagnosis – with 6.3% of children under 15, with low education (73.7%), white colour (68.8%), residency in the city of Fortaleza (82.3%), and no defined work occupation (59.6%). At diagnosis, most were multibacillary (MB) (65.5%), had borderline clinical form (48.0%), and 22.7% had physical disability (8.0% with grade 2), predominantly in MB cases ( p <0.000). We observe worsening of disability in 5.1% of cases post-MDT. The proportion of cases with functional episodes was 42.7%, mainly during MDT (51.2%).

CONCLUSIONS:
This is the first study conducted in this hospital context, revealing late diagnosis, high burden of disease, hidden endemic, and high social vulnerability in the state of Ceará. This study reinforces the need to strengthen health care network for timely diagnosis and treatment, in order to longitudinal assistance. It recognizes the concentration of cases in this health services in Ceará State, and reinforces the priority role of primary health care in the leprosy control.

Keywords: Leprosy, Health of the person with disabilities, Epidemiology, Health services, Clinical Medicine
ILC4.1–029
Oral health status, access to dental health services and self-perceived oral health in patients with leprosy in a hyper-endemic area of the Brazilian Amazon
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Background: Leprosy is a hyper-endemic chronic condition in the state of Rondônia with many significant impacts, including physical, psychological, social, and behavioral. Oral health is a critical dimension for this population, considering the related risks. However, it has been systematically neglected, amplifying stigma and preconception.

Objectives: To analyze the dental clinical profile, the self-perception of oral health and the access to dental services for leprosy cases diagnosed from 2001 to 2012, residents in the municipality of Cacoal, Rondônia (Legal Amazon).

Methods: A descriptive cross-sectional study, with an operational nature, based on the use of standardized examination and structured instruments – clinical and self-perceived oral health – including assessment of access to dental health services.

Results: We included 303 people with leprosy, 41.6% rated their oral health as good, and 42.6% report being satisfied with their oral health. Was self reported a loss of 45.5% of the upper teeth and clinical assessment was found 54.5% of active carious surfaces at the time of evaluation.

Conclusions: The poor standards of oral health and its relationship with leprosy reinforce the neglected character of this disease in populations with high social vulnerability. This condition amplifies the risk for progression of nerve damage from leprosy reactions and the disease transmission. We emphasize the need to achieve comprehensive health care for this neglected population.

Keywords: Leprosy, Oral Health, Self Concept, Health Profile, Health Services Accessibility
ILC4.1-030

Leprosy in Israel: a non-endemic, immigrant-rich country

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Objectives:
Leprosy is infrequent in Israel. Since Israeli physicians rarely encounter it, diagnosis is often late. We performed a retrospective review of patient records from the Israeli National Hansen Center. The aim of our study was to characterize patient population and better understand their features, so we can improve early diagnosis.

Methods: The Israeli National Hansen Center was established in 1933. It is a national center with a physician, nurses and physical therapist. Since its establishment 500 patients have been diagnosed. Files of patients referred to the Center between 2000 and 2015 were reviewed. All those definitively diagnosed with Leprosy were included in the study. Patient demographic and clinical characteristics were analyzed.

Results: During the years 2000–2015, 75 patients were diagnosed with Leprosy, an average of 5 patients per year. Thirty-five (47%) were female, 40 (53%) married. The mean age at diagnosis was 38 years, 56% of patients were aged 21-40 years. All but one were born in countries outside Israel, 53 (70%) in Ethiopia, others originating from 11 different countries. The mean stay in Israel before diagnosis was 5 years, ranging from 0 to 60 years.
All were presumed to have contracted the disease in their countries of origin. As for clinical presentation at diagnosis, 56 (74%) had skin lesions at diagnosis, 74% were defined as multibacillary, having more than 5 lesions. Skin smears were performed in 72 of the patients; 32 (44%) were negative for acid-fast bacilli. Of those with a positive skin smear, 27/40 (67%) had a bacteriological index of 4+ or higher. According to the WHO classification, the vast majority (82%) had a disability grade of 1 (36%) or 2 (46%) at diagnosis. We had access to 55 patient records prior to diagnosis. Of these, 35 (62%) were examined in specific clinics, such as orthopedic and dermatology clinics, during the 5 years prior to diagnosis. This suggests missed opportunities to diagnose leprosy earlier.

Conclusions:
Our results show that the patient population at the Israeli National Hansen Center consists of immigrants born outside of Israel, who seem to be diagnosed several years after their initial presentation. They have a relatively high disability grade. The diagnosis is often overlooked by different specialists. It is important to raise awareness of suspicious skin lesions, orthopedic and neurological complaints in patients from endemic countries, among relevant medical specialties in Israel.

Keywords: immigrants, late diagnosis, disability
ILC4.1-031
Household contact surveillance in a hyper-endemic municipality of the Brazilian Amazon region: the user’s perspective
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This study aimed to characterize the contact perspective about the approach to household contacts of leprosy cases diagnosed in the period 2001–2012 in the city of Cacoal, Rondônia State (Amazon Region). This is a cross-sectional and operational study with descriptive approaches. The study population was 2,726 household contacts; the information was obtained from the National Information System for Notifiable Diseases (SINAN). The sample consisted of 459 household contacts; interviewed using a structured instrument resulting in a score (Integral-Hans-score – Federal University of Ceará) for assessing the quality of the contacts surveillance actions. Of the respondents 59.1% were female, mean age 31.4 years, standard deviation of 20.5, and 58% of grayish-brown (“pardos”). 41.6% said had not been submitted to dermatological examination, and 54.9%, to neurological examination. 69.9% received the BCG vaccine, and 73.4% received counseling about BCG vaccine, 56% were not instructed to return for further evaluation, and 54.9% were instructed to mobilize other contacts for the examination. The nurse was the main health professional to carry out the examination of household contacts: 64.4%. Of those contacts who carried out the dermatologic and/or neurological examinations, 54.7% said that the main motivating factor was the involvement of family members with leprosy control. The main difficulties referred to by another contact group were related to the lack of guidance – 58.3%. The quality of the contacts approach was classified as fair or poor 67.7% by the Integral-Hans-score. Strengthening contacts surveillance activities is an essential approach for the elimination of leprosy as a public health problem. However, it is necessary not only to achieve the main goals to be able to decrease the burden of disease: it is also necessary to conduct the examination of contacts based on a qualified, ethical and comprehensive manner.

Keywords: Leprosy, Surveillance, Contacts, Perception, Brazil
ILC4.1–032
A FAMILY-BASED STRATEGY TO ENHANCE CONTACT-TRACING PROGRAMMES IN BRAZIL: THE EXPERIENCE FROM BAHIA STATE, NORTHEAST REGION
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Introduction: The leprosy control in the Brazilian Unified Health System is characterized by insufficient operational indicators. The evaluation of household contacts of leprosy cases is a critical issue. This situation supports the high and late detection of new cases, resulting in nerve damage, disability and stigma. Evidence based strategies reinforces the need to qualify and enhance the surveillance actions.

Objective: To assess the impact on the diagnosis of new cases of leprosy enhancing the concept of leprosy contacts: integrating residents and social co-inhabitants in Vitoria da Conquista and Tremedal, Bahia State, 2001–2014. Methods: An operational research with a descriptive approach, including household contacts (who resides or resided with the reference case 5 years before the diagnosis), residents cohabitants (who resided with the case until the time of data collection in the study, but had no contact with the case during or before the diagnosis), and social co-inhabitants (who do not live or lived with the case in the same house, but regularly attending the residence for at least one year) of leprosy cases diagnosed and notified in the Notifiable Diseases Information System (SINAN), with residence in these cities. We conducted a survey by the application of a structured instrument to compose epidemiological and demographic retrospective scenarios.
Study subjects underwent dermatological and neurological examinations by the study team, with a confirmatory diagnosis by reference physicians. For descriptive analysis, we calculated the proportion of new cases among household contacts, residents and social co-inhabitants. This project is a part of the multi-center study "IntegraHans North-Northeast", conducted by the Federal University of Ceará.

Results: 808 people were included, 471 of these (58.3%) household contacts, 84 (10.4%) residents co-inhabitants, and 253 (31.3%) social co-inhabitants of the included reference cases of leprosy. Of the total of 68 (8.4%) leprosy suspected cases at the dermatological examination, 17 (25%) were confirmed as new cases, 10 (58.8%) among household contacts, and 7 (41.2%) social co-inhabitants. Of the new cases, 16 (98.1%) had a multibacillary operational classification, 7 (41.2%) are under 15 years-old. Conclusion: The expansion of the concept of contacts (including residents and social co-inhabitants) was effective in the discovery new cases in a low endemicity context in the Vitoria da Conquista and Tremedal municipalities. These results indicate that leprosy surveillance activities in the city need to be qualified in the first assessment of contacts, incorporating the systematic evaluation with follow-up of contacts for at least five years, specially by the primary health care services.

**Keywords:** Leprosy, Surveillance, Epidemiology, Contact, Prevention & control
ILC4.1-033
Multibacillary leprosy and male sex: a behavioral question?
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Introduction
The rates of leprosy, especially of multibacillary (MB) type, are greater in men than in women. This has been attributed to greater exposure of men to infection and to diagnostic challenges in women. In Brazil, this has been explained by differences in gender behavior, with decreased attention of men to personal health, leading to later diagnosis and progression to MB leprosy.

Objectives
To investigate if among leprosy patients without disability (indicating early diagnosis), sex differences are smaller than in general, which would indicate that health-seeking behavior differences account for the sex ratio. To determine if men have higher M. leprae bacterial burden than women with similar leprosy stage.

Methods
For the epidemiological study, population was all leprosy new cases reported in Brazil (2001 to 2013) to a national database (SINAN). Cases with missing information regarding sex, age, or leprosy type were excluded. New Case Detection Rates (NCDR) and the ratio between male NCDR and female NCDR (sex ratio) were calculated. For the bacilloscopic index study, population was all patients treated at Oswaldo Cruz leprosy unit (1990 to 2014) with bacilloscopy results. Ratios were compared using chi-squared test and ANOVA with a p-value less than 0.01 considered statistically significant.
Results

541,090 new cases of leprosy diagnosed in Brazil were analyzed (99.7% of total). MB leprosy was twice as frequent in men (OR=2.35, IC95%=2.33–2.38), which remained the same in those without disability (OR=2.22; IC95% 2.19–2.25). Sex ratio (SR) for MB leprosy showed a peak for age group 20–39 years both in general (2.04) as in patients without disabilities (1.87). Differences in SR between all MB patients and those without disabilities were not significant (p = 0.6308). Bacilloscopy Index (BI) from 2,092 leprosy cases was analyzed. Average BI in leprosy per se was below 1.1 for females in all age groups, but reached a peak of 2.2 for men at 20–39 years of age in general and 2.0 in men without disabilities. Average BI was 1.9 and 2.3 times higher in men than in women, respectively in all patients and in those without disability.

Conclusions

Predominance of MB leprosy was the same in men with possible earlier diagnosis, which does not support the behavior hypothesis for these differences. Peaks of sex ratio and for BI in age group 20–39 years suggest a physiological factor in sex-related difference in leprosy risk and progression, such as sex hormones impacting immunity to other intracellular pathogens.

**Keywords:** Leprosy, Multibacillary, Gender
ILC4.1–034
Clinical Variables Associated with Worsening of Disability Grade in Leprosy Cases during Treatment in South-Eastern Nigeria
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Objectives: To analyse factors associated with worsening of physical disabilities during treatment of leprosy in a large rural hospital in Nigeria between 2011 to 2015.

Methods: This was a retrospective cohort study which investigated factors associated with worsening of the physical disability grade of leprosy cases during treatment. The outcome variable was the change in physical disability grade (worsening or no worsening, based on WHO grading between assessment at diagnosis and that at release from treatment. Logistic regression with a confidence interval of 95% was used to analyse the variables associated with the worsening of disability grade.
Results: There were 316 leprosy cases treated during the study period; 307 (97.2%) were multibacillary and 2.8% were paucibacillary cases, 93.6% (296) of the study patients completed treatment. Of those who completed treatment, 155 (52.4%) had grade 0 disability, 80 (27.0%) had grade 1 and 61 (20.6%) had grade 2 disability at diagnosis. Overall, 30.4% (90 cases) of all cases had worsening of disability at the end of treatment. This is considerably higher than the 5% target set by the National programme for this indicator. The cases with worsening disability comprised 6.5%, 58% and 54.1% of patients with grade 0, grade 1 and grade 2 disability at diagnosis, respectively. The cases with the greatest odds for worsening physical disability grade were male patients (OR 2.0, 95% C.I. 1.2 - 3.4), patients who received corticosteroids (OR 4.0, 95% C.I. 1.7 - 9.7), and patients with involvement of more than three nerve trunks (OR 5.1, 95% C.I. 2.5 - 10.2).

Conclusions: Factors associated with higher odds of worsening physical disability during treatment in this hospital suggest inadequate or inappropriate use of established measures to prevent disabilities. The National programme should conduct a systematic evaluation of adherence to current protocols for POD, consider refraction service providers as well as providing better supportive supervision to improve patient outcomes.

**Keywords:** Clinical, Disability, Nigeria, Worsening
ILC4.1-035
The trend forecast of the prevalence of leprosy in Gansu province
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Aim Predicting the prevail trend of leprosy. Method Using historical data of leprosy morbidity in Gansu Province, the grey model GM (1,1) is established to predict the prevalence.

Results Based on the data between 2005 and 2014, we get the GM(1,1) with C=0.2921 and P = 1, belongs to class I. The forecasting data of leprosy prevalence are 0.46/million, 0.42/million and 0.39/million for 2015, 2016 and 2017. Based on the forecasting data from 2015 to 2017, we get the new GM(1,1) with C= 0.0901 and p=1 in class I, and the forecasting results are 0.39/million, 0.34/million, 0.31/million, 0.29/million and 0.26/million for 2018 to 2021.

Conclusion Grey model is an effective method for predicting the leprosy morbidity of Gansu Province.

Keywords: Grey Model, Prevalence of Leprosy, Trend Analysis
ILC4.1–036
Epidemiological Analyses of Leprosy in Children in Anhui from 1949 to 2013
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Objective: To analyze the Epidemiological characteristics of Leprosy in children in Anhui, know its epidemic status and trend, and provide new clue and foundation for prevention leprosy. Methods: Collected the date of leprosy in children from 1949 to 2013 in Anhui by using Leprosy Management Information System in China, then descriptive and comparative analysis was performed.

Results: A total of 8104 leprosy cases were detected during 1949–2013 in Anhui, of which 221(2.7%) were child cases, 158males and 63 females. Cases scattered every age. The median and quantile range of the delay of diagnosis was 13.0 months, 25.5 months, the delay of diagnosis which ≤ 24 months were 152 (68.8%); 94(42.5%) were with grade 2 disability, the rate of deform will increased with the delay of diagnosis. 70(31.7%) cases were with positive skin smears, the major subgroups were TT and LL, the major were found by the dermatology clinic.

Conclusion: The proportion of leprosy in children is one of the sensitive indicators of leprosy endemicity. Improving the work of active modes in Anhui may be important to find leprosy in children early, control the source effectively, shorten the delay period, and reduce the rate of deform.

Keywords: leprosy, children, the delay of diagnosis, the deform
ILC4.1-037
Epidemiological Analysis of Leprosy in Low Epidemic Situation in Hanchuan
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Objectives: Learning about the influence factors of leprosy when Hanchuan is in low epidemic situation of Leprosy after achieving the aim of basically eliminated leprosy, and provide the effective basis for regional work of prevention and treatment on it.

Methods: Doing an epidemiological investigation on the 33 new registered leprosy cases of Hanchuan city in 2000–2015 and taking SPSS software to process all the data.

Results: The new cases mainly are peasants and peasant-workers those ages from 15 to 59 and takes 72 percent of all, the early discovery rate is 63.6%. The Class II disability rate is 18.2% and the female-to-male ratio is 1:0.92 as in female cases there is one more case than male. Majority of the detection cases, 75.8% cases are from passive found of hospital outpatients and self-reporting, and about a quarter (24.2%) of the new registered leprosy cases are recurrent cases.

Conclusions: The incidence in rural area is higher, the cases of both gender is close in number, the initiative found cases are less than expected, and the mode of integration management of leprosy prevention and treatment, these are epidemic characteristics in low epidemic situation of Leprosy in county area.

Keywords: lemolology, leprosy, epidemiology, analysis
ILC4.1-038
PROFILE OF NASAL SWAB PCR AND SEROPOSITIVITY LEVEL OF ANTIBODY RESPONSE TO M. leprae PGL-1 AMONG SCHOOL CHILDREN IN THE NORTH AND SOUTH COASTAL REGION OF EAST JAVA PROVINCE IN INDONESIA
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INTRODUCTION. Indonesia has some pockets of leprosy endemic areas with higher distribution mainly in eastern Indonesia. East Java has become one of the provinces that also have higher prevalence especially in the coastal region. As it is described previously that environment has also had potential reservoir for leprosy transmission especially non-human factor, epidemiological studies of leprosy in children can give an illustration of the important aspects of the environment, in the patterns influence of leprosy transmission in endemic area because children have lower mobility than adults. Presence of M. leprae DNA in nasal swabs and seropositivity level among elementary school children can describe Mycobacterium leprae exposure in that area.

THE AIM. Analyzing PCR from nasal swab and seropositivity level among elementary school children between northern coast and southern coast of east java province.
MATERIALS AND METHODS. Five hundred and thirty children (301 students from elementary school in Pacitan and 229 students from Lamongan) were involved. Both areas are representation of northern coastal and southern coastal region in East Java Province. After clinical examination, nasal swab and blood samples were obtained. ELISA (Enzyme-Linked Immunosorbent Assay) test was performed to measure the titer of IgM anti Phenolic Glicolipid-1 (PGL-1) antibody and DNA M.leprae detection then performed using nested PCR to detect RLEP3 repetitive sequences target of M.leprae DNA.

RESULT AND CONCLUSION. From 301 students in Pacitan, 25 students (8.3%) are sero-positives and 9 students (2.9%) are PCR positives. from 229 students in Lamongan, 110 (48.3%) students are sero-positives and 49 students (21.4%) are PCR positives. Both are analyzed by Chi-Square, and from the PCR and ELISA X2 val > X2 tab, it concluded that there are statistically significant difference between the two regions. From sero-epidemiological study above shows that in the northern coast of East Java (Lamongan), incidence of subclinical leprosy is still high, it means that in this area still has a high risk of new cases of leprosy in the future. Even in the same coastal region and leprosy incidence rate, still there is a different condition in leprosy distribution.

**Keywords:** PCR, PGL-1, M.leprae, children, Indonesia
ILC 4.1-039
Epidemiological Analyses of Leprosy in new cases
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Objective: To explore the epidemic characteristic and results from controlling the leprosy during 1992, the year of the basic elimination of leprosy to 2011. Methods: The case were from the case report and LEPMIS in Fengyang, Anhui. Results: 21 cases were diagnosed during 1993–2011. The average discovery rate was 0.15 per 100 thousand, and sex ratio was 2.0:1, the average was 48.19, the year of delay diagnosed was 43.33 months, MP:PB was 3.2:1, 90.5% was the locality census register. Conclusion: Every year had new case after 1992, the year of the basic elimination of leprosy, and the epidemic was not stationary, but the epidemic situation was low.

Keywords: leprosy; epidemiological analysis
ILC4.1–040
Epidemiological analysis on new cases of leprosy in Bozhou city between 1993 and 2012
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Objective To analyze the epidemiological characteristics for new detecting cases of leprosy between 1993 and 2012 in Bozhou City, understand the leprosy epidemic situation of Bozhou City after basic elimination of leprosy, and provide the leprosy prevention measures and scientific basis for the future.

Methods The epidemiological characteristics of 27 leprosy cases between 1993 and 2012 in Bozhou City were analyzed, and descriptive analysis was performed by using discovery rate, incidence, prevalence, and etc.

Results 27 new leprosy cases were discovered between 1993 and 2012. The average annual discovery rate was 0.13/10 million and the sex ratio was 3.50:1. The average age of 27 leprosy cases was 37.29, and the average delay of diagnosis was 40.52 months. The ratio of many bacteria (MB) and less bacteria (PB) was 12.50:1.

Conclusions The leprosy epidemic was no significant decline after basic elimination of leprosy, and it has been in a low epidemic status. Because of the longer delay of diagnosis, comprehensive prevention and control measures, early detection and early treatment of leprosy patients, should be taken in the future, in order to completely eliminate leprosy as early as possible.

Keywords: leprosy, monitor, epidemiological analysis
ILC4.1–041
Analysis of new cases of leprosy in Hubei Province in 2006–2015
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[Abstract] Objective To analyze the findings and clinical features of new cases of leprosy in Hubei Province in 2006–2015. Methods: data from the National Leprosy Prevention and control management information system, the 2006–2015 Hubei Province leprosy new medical records of patients were analyzed. Results: 233 cases of newly diagnosed cases of leprosy in Hubei Province in 2006–2015, Among them, 2006–2010 was found in 169 cases, Average annual found in 33.8 cases, Department of dermatology outpatient found 81 cases, accounting for 47.93%, Large scale investigation Found 17 cases, accounting for 10.06%, Through the clues found in 16 cases, accounting for 9.48%, Contacts were examined in 16 cases, accounting for 9.48%, Epidemic investigation of 3 cases, accounting for 1.78%, Reported disease in 33 cases, accounting for 19.53%; 2011–2015 was found in 64 cases, Average annual found in 12.8 cases, Department of dermatology outpatient found 42 cases, accounting for 65.63%, Large scale investigation Found 0 cases, Through the clues found in 6 cases, accounting for 9.38%, Contacts were examined in 2 cases, accounting for 3.13%, Epidemic investigation of 2 cases, accounting for 3.13%, Reported disease in 10 cases, accounting for 15.63%; Conclusion: 2006–2015 years in Hubei Province leprosy incidence rate showed a clear downward trend, but take the initiative to find low rate, low epidemic counties still scattered in patients, that our province leprosy epidemic situation is still grim, parts of leprosy problems should not be underestimated; proposed to strengthen the active found regularly in the key cities and counties to carry out leprosy elimination campaigns, continue to implement and expand access to check the quality and scope, promote early case detection and treatment, reduce the secondary disability rate.

Keywords: leprosy, new cases, analysis
Epidemiology Analysis of the Leprosy Endemic Status from 1935 to 2015 in Henan Province

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Objective: To analyze the leprosy endemic status in the period of 80 years in Henan province, China, from 1935 to 2015, and to assess the effect of prevention and treatment, so as to provide the basis for draw up prevention and control measures and strategy of elimination leprosy hazard.

Methods: All the leprosy casas from 1935 to 2015, Henan Province, were recorded into the leprosy information system for investigating. Data analysis was exerted by using Foxpro software.

Results: In this research, the earliest recorded leprosy case in Henan was detected in July, 1935. After 1957, three leprosariums had been constructed successively in Henan province. By comprehensive measures such as searching, hosting, treatment, Propaganda and investigation etc., the whole province has achieved the basic standards of elimination leprosy in 1995 (The leprosy prevalence rate has dropped below 0.001% in whole province ). 1174 cases were detected in the Henan province by 2015. 45 cases were present infection and monitoring period patients in ten year. The disability rate is 32.01%. Conclusion: From the three leprosariums of Henan had established in 1957, the detection rate was significantly declined through the comprehensive measures and multi-drug therapy against leprosy, so as to keep leprosy situation in a low endemic level. But a few of new cases have remained to be detected every year in the past 5 years. So the skill of grassroots dermatologist’s detecting new cases was still needed to improve so as to reduce the incidence of rate of disability.

Keywords: Henan Province, Leprosy, Epidemiology analysis, Prevalence rate, Disability rate
ILC4.1-043
Epidemiological analysis on leprosy in Sichuan, China, 2000-2014
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Objective To investigate the epidemiological characteristics of endemic situation of leprosy in Sichuan from 2000 to 2014, and to provide the a scientific basis for the development of control strategies. Methods: collect the epidemiological data from leprosy surveillance database (2000-2014), make the descriptive and comparative analysis of data. Result: 2803 new leprosy cases were detected during 2000–2014 with an average case detection rate of 0.227 per 100,000 populations. Among whom the proportion of children under 14 years, Multi-bacillary and Grade 2 disabilities were 2.4%, 83.9%, 19.6% respectively. A total number of 106 relapse cases were detected, among whom 42 cases were relapse after multi-drug therapy (MDT). By the end of 2014, the number of registered cases was 552, with a prevalence of 0.684 /100,000. 245 cases were under MDT. There are significant differences in gender, proportion of MB, proportion of Grade 2 disabilities between relatively low and high endemic areas.

Result The leprosy endemic situation declined gradually in Sichuan province in the last 15 years with an uneven distribution, especially after 2010. The relatively high endemic areas were Liangshan, Ganzi prefecture, Guangyuan and Panzhihua. Leprosy remains a public health issue in Sichuan province, the effective control strategy is needed according to the epidemiological features, and early case detection, case management and rehabilitation are needed to be enhanced in the coming years.

Keywords: leprosy, epidemiological, characteristics and trends, Sichuan
ILC4.1–044
The epidemiological of analysis on leprosy in Xi’an city from 1986 to 2015
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Objective To grasp the epidemiological trends and prevention efficiency of leprosy in Xi’an city in 30 years, and provide evidence for leprosy control work under low state of pop. Methods The leprosy control and prevention information were collected from districts and counties since 1986. Data were analyzed according to year period.

Results It has 123 new cases of leprosy from 1986 to 2015. After promoting of MDT, the incidence and prevalence were from 0.6/105 in 1986 down to 0.09/105 and 0.05/105 respectively in 2015. From 1986, discovery pattern by the combination of active and passive achieved significant effect, there were 63.4% leprosy cases having clear infection source, the percent of female patient increased, the average age of new patient was 43.4, diagnosis of time delayed 48.81 months, the percent of the secondary disability was 18.69%. Conclusion The leprosy popular was suppressed effectively in Xi’an, popular trend and the characteristics of the cases had the new change nearly 30 years,

Keywords: Leprosy, Epidemiology, Analysis
ACCESS TO DIAGNOSIS OF CHILDREN UNDER 15 YEARS OLD WITH LEPROSY

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Introduction: Difficulties to accede diagnose of children with leprosy could cause the evolution to serious forms of the disease and neural damage.

Goal: Describe the access to diagnoses and clinical epidemiological aspects of children aged under fifteen with leprosy, diagnosed at URE Dr. Marcello Candia in Marituba - Pará, Brazil.

Material and Methods: Transversal Study, descriptive and quantitative in children aged under fifteen diagnosed with leprosy at UREMCI, from April 2014 to June 2015.

Results: From 41 children evaluated, 23 (56.1%), were from the metropolitan area of Belém and the referral was the detection mode of 33 (80.5%). Home visits (less than 1 per month) or absent, by the Community Health Agents (ACS), was reported by 24 (58.5%) of them. Among the interviewed, 19 (46.3%) had consulted at least three or more physicians before and 26 (63.4%) received other diagnoses. The time of onset of symptoms till the diagnosis was more than 1 year to 30 (73.2%) of children. The predominant clinical form was the Borderline with 20 (48.8%) cases, 26 (63.4%) were multibacillary and 7 (17.1%) had a disability.

Conclusion: The centralized model of care to patients with leprosy, the low performance of ACS (Health Care Agent) in addition with the difficulty of diagnosis in children, are factors that may contribute to the delay in starting treatment, increasing the prevalence of multibacillary forms and the presence of Disability.

Keywords: Leprosy, Children, Diagnosis
ILC4.1–046

Search for Mycobacterium leprae in Amazonic armadillos in a hyper endemic location

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Armadillos belong to the superorder of Xemathra, mammals with low metabolic rates and low body temperatures and native from South America. Those animals in laboratory environments as animal model for leprosy infection. Those are the preliminary results of an exploratory study searching for M leprae infection in wild armadillos in an area belonging to the Amazon ecosystem. The Amazon region has high leprosy detection rates and a local population that still has its nutrition based on fishing, hunting and collecting fruits from the forest, i.e., the population has everyday contact with the wild environment. The armadillos were capture in the region of a lake with low population density, but with new leprosy cases detected every year since the beginning of leprosy control program in the area in the late seventies of the last century. Local inhabitants were submitted to dermatological examination: 178 exams and six leprosy cases detected (3.4%). Twelve specimens of Dasypus novemcinctus were capture. The bacterial DNA present in skin biopsies and organ was extracted using a commercial kit (QIAGEN DNeasyTissue) according to the manufacturer’s instructions (QIAGEN). To estimate the concentration in ng / uL and purity of the isolated DNA is used a spectrophotometer (NanoDrop 1000, ThermoScientific). The Real Time PCR technique was used to investigate the presence of M. leprae in animal tissues. For that will be used primers specific to repetitive regions (RELP) present in the genome M. leprae com chemical SYBR Green. The ML3 primers (5’ ATTCTGCGCTGATCGCT 3’, 5’ TGGCCTAGAGGTTGCCGTAT 3’) were designed within the overlapping region of RELP1, RELP2, RELP3 and RELP4 (using primer Express program, Applied Biosystems). There was no evidence of infection by M. leprae in any of the armadillos.

Keywords: leprosy, armadillo, Brazil, Amazon
ILC4.1–047
Investigate of the health status of cured leprosy patients in Zhejiang province
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Objective To know the basic health status and influencing factors of cured leprosy patients, and provide the basis for taking better rehabilitation and medical security measures.

Methods We investigated all the cured leprosy patients, and used household survey method by questionnaire and interview.

Results The chronic disease prevalence rate of cured leprosy patients was 59.9%, and the main chronic diseases were hypertension, gastropathy, bronchitis, osteoarthrosis and diabetes mellitus. Gender, age, inhabitation and disability were the main influencing factors of health.

Conclusion The health of cured leprosy patients is not optimistic. The work of psychological intervention, rehabilitation and social concern should be strengthened for cured leprosy patients.

Keywords: leprosy, cured patients, health status
**ILC4.1-047**

**Investigate of the health status of cured leprosy patients in Zhejiang province**

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**Conclusion**
The health of cured leprosy patients is not optimistic. The work of psychological intervention

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**Keywords:** leprosy, cured patients, health status
Investigation on living situation of cured patients with leprosy in Zhejiang province
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Objective To know the current living condition and health status of cured leprosy patients in Zhejiang. Methods We investigated all the cured patients with leprosy, and used household survey method by questionnaire and interview.

Results Among 4026 cured patients with leprosy, the ratio of male to female was 2.68:1, with more males than female, the average age was (69.90 ± 10.65) years, the cured patients with leprosy were main paucibacillary patients (62.62%), 1944 cured patients with leprosy were disability(48.28%). Patients without life self-care(6.66%), patients lost labor ability(21.66%), average household income was main 5000 to 10000 yuan, medical insurances were main new rural cooperative medical system, the chronic disease prevalence rate was 59.89%.

Conclusion The living situation of cured patients with leprosy in Zhejiang province is a worried problem, the government and all society should pay close attention to this vulnerable groups. Especially for cured patients with leprosy disability, we should improve their life quality by rehabilitation project, life assistance, elimination of discrimination and so on.

Keywords: Leprosy, Cured patients, Living situation
ILC4.1-050
The analysis of the disability situation among new leprosy cases in Dazhou, Sichuan
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【objective】to investigate the application of the suspicious symptoms monitoring system in the case detection of leprosy. 【methods】the suspicious symptoms monitoring system programs were carried out in the 11 counties with low and medium endemic situation, programs included training of village doctors, encouraged them to report the clues of the patients with suspicious symptoms to the CDC at the county level, the stuff of CDC detected leprosy case through these clues.

【results】the total number of newly detected cases was 11, 6 cases with Grade 2 disability with the rate of 54.55%, which were detected in 5 counties among these 11 counties. 167 clues were reported from 8 counties, 11 cases were confirmed. Compared to the last 5 years, the suspicious symptoms clues were less than 31 per year, the cases less than 2 per year. 【conclusion】the suspicious symptoms monitoring system is effective in case detection of leprosy.

Keywords:suspicious symptoms monitoring system, case detection
ILC4.1-051
Survey on the awareness status of key message on leprosy control among national public in epidemic area in 2012
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Objective: To explore the awareness status of key message on leprosy control among general public in epidemic areas, and to provide the direction and focus of health education in the future. Methods: 5 counties with leprosarium which located in Jiangsu, Hunan, Zhejiang, Shanxi and Hebei Province were selected as the survey sites, according to the prevalence rate and the accumulated registered leprosy cases. The outpatients in a skin clinic in each survey site were randomly investigated through a questionnaire by the medical staffs, to probe into the awareness status of 7 items of questions on key messages.

Results: The study surveyed 1218 masses in skin clinic, with a total awareness rate of 35.69% (3043/8526). The groups of women, people aged 12–39 years old, masses in Shanxi and Hebei Provinces and farmers had lower awareness rate, with a statistical difference. The awareness rates of infectiousness, population resistance, early symptoms, control agencies, policies on free examination and treatment of leprosy, disability prevention measure and curability are 49.10%, 35.88%, 26.93%, 41.95%, 14.45%, 38.83% and 42.69% respectively.

Conclusion: Targeted leprosy health education should be launched out according to local awareness rate to reach the national planning goals on time.

Keywords: Leprosy, Epidemic area, Public, Key message on leprosy control, Awareness rate
ILC4.1-052
Investigation on Quality of Life in Cured Patients with Leprosy
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Objective: To explore the quality of life in cured patients of leprosy. Methods: 249 cured patients of leprosy who lived in Leprosy Village and age- and gender-matched cured patients who lived in community were under investigation by self-designed questionnaire.

Results: There were 208 males and 41 females. The average age of village group was 71.10 ± 9.59, while the community group was 71.28 ± 9.75. Among the two groups, most of them are farmers. In the meanwhile, the population of patients with hypertension is the biggest. As compared with community group, marital status, living skills, medical conditions and deformities case were significantly associated with village group (p < 0.05). In emotional terms, the two groups can accept the fact that had leprosy, but the community group had more mood swings.

Conclusions: Village group were better in economic and medical conditions, the prevalence of common diseases and emotional control, but social skills were not as good as community group.

Keywords: Leprosy, Investigation, Living situation
ILC4.1–053
Study on the mental disorder among leprosy affected persons and the its influencing factors
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Objective To investigate the mental disorders and its influencing factors among leprosy affected persons. Methods Self-reporting inventory was performed in the survey to evaluate the mental health status of 392 cases in three districts of Zhejiang Province, China, and logistic regression method was used to determine the influencing factors of mental disorders.

Results The prevalence of mental disorders was 24.49% (96/392) and the factors of summarization, depression and phobic anxiety were higher than that of norms, with a marked statistical difference (P<0.01). The influencing factors of mental disorders among leprosy affected persons include age, health status, economical status, relation with neighbors, perceived social stigma, disability severity, magnitude of care from relatives and friends.

Conclusion Mental disorders were presented in leprosy affected persons and psychological rehabilitation is needed in leprosy control activities.

Keywords: Leprosy, Mental disorder, Influencing factor, Self-reporting inventory
ILC4.1–054
THE PROFILE OF ANTI PGL-1 ANTIBODY AMONG CHILDREN TB PATIENTS
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Objectives: Double infection of tuberculosis and tuberculosis often occurred in leprosy endemic area. The aim of this study is to evaluate the risk of double mycobacterial infections among children that already suffered of lung tuberculosis.

Methods:
Twenty three children (age 2–11 years old) suffering pulmonary tuberculosis treated in Surabaya Hajj Hospital were involved. These patients came from East Java areas, that are categorized as leprosy endemic and non–endemic areas. Sera from these patients were examined for IgM anti Phenolic Glycolipid–1 antibody (ELISA), the specific antibody to Mycobacterium leprae. Using the cut off value 605 u/ml for IgM anti PGL-1, the results were categorized as sero positive and sero negative. The relation of serological results with the patient’s domicily were analyzed.

Results:
Two out of 23 children with pulmonary tuberculosis showed 2 (8.7%) positive results of IgM anti PGL – 1 antibody. This sero–positive results was significantly higher (p = 0.023 ) in patients who live in leprosy endemic areas compared to those who live in non endemic areas.

Conclusion:
Although these children are already suffered with pulmonary tuberculosis, double infection with other Mycobacteria is also possible, especially in leprosy endemic areas. Both diseases are still endemic due to density of the population and close community.

Keywords: anti PGL-1 antibodies, leprosy, tuberculosis, double mycobacterial infection
ILC4.1-055
Unexpectedly High Leprosy Seroprevalence Detected Using a Random Surveillance Strategy in Midwestern Brazil: A Comparison of ELISA and a Rapid Diagnostic Test
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Leprosy diagnosis is mainly based on clinical evaluation, although this approach is difficult, especially for untrained physicians. We conducted a temporary campaign to detect previously unknown leprosy cases in midwestern Brazil and to compare the performance of different serological tests.

Methods: A mobile clinic was established in the main bus terminal in Brasília, Brazil. Leprosy patients, household contacts and non-contacts were submitted to a clinical exam, and blood was collected to determine anti-PGL-I and anti-LID-1 antibody titers by ELISA and by the NDO-LID® rapid test. New cases of leprosy and the impact of performing this broad random surveillance strategy were evaluated. Accuracy values and concordance between the test results were evaluated among all groups.

Results: Four hundred thirty-four individuals were evaluated, and 44 (10.14%) were diagnosed with leprosy. Borderline forms were the most frequent presentation. Each test presented higher positivity in those individuals with multibacillary disease. All tests demonstrated a specificity of approximately 90% but a sensitivity for clinical disease of less than 20%. A substantial agreement between NDO-LID® and ELISA with concomitant positive results was found within leprosy patients (Kappa index=0.79 CI95% 0.36 - 1.22).

Conclusions: The unexpectedly high leprosy prevalence in this population indicates high rates of subclinical Mycobacterium leprae infection. All tests showed high specificity but low sensitivity and therefore cannot be considered stand-alone diagnostics. Rather, considering their positivity among MB patients and non-patients, these tests can be considered effective tools for screening and identifying individuals at high risk, who might benefit from regular monitoring.

**Keywords:** leprosy, Diagnosis, Immunology, Phenolic glycolipid I, Surveillance
ILC4.1-056
Profile of New detected Patients with Grade 2 disabilities from non endemic areas in Maharashtra state in India
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Introduction 16415 patients were newly diagnosed out of which 713 were with grade 2 disabilities & in the year 2015 till september 8266 patients were diagnosed out of which 215 were with grade 2 disabilities.

During 2014–15 In the Kolhapur District 228 patients were newly diagnosed out of which 18 were with grade 2 disabilities & till April to September 2015, 59 patients were newly diagnosed out of which 6 were with grade 2 disabilities. During 2014–15 In the Pune District 584 patients were newly diagnosed out of which 56 were with grade 2 disabilities & till April to September 2015, 214 patients were newly diagnosed out of which 13 were with grade 2 disabilities.

Methodology:
Newly detected Patients with grade 2 disabilities were interviewed for occupation, educational status, exposure to IEC before diagnosis, medical intervention before receiving MDT, duration of appearance of first symptoms & treatment, reaction status at the time of diagnosis. These patients were from districts which have prevalence less than 1 per 10,000 populations. Data of the Year 2014–15 & 2015–16 was referred for the newly registered patients with grade 2 disabilities in the two non endemic areas of Maharashtra. The information were collected according to patients name, age, gender, habitat pertaining to rural or urban, who classification of leprosy, disability type.
Results:— EYE:—2(2.89%) patients had disabilities of eye, all of them were from rural areas with no exposure to leprosy information, duration of disability was less than 6 months, 2 patients (66.67%) were treated for reactions at the time of diagnosis, 1(33.34%) of them expenditure for reactions, 2 patients (66.67%) were approached to general practitioners first. HAND:-21 (30.43%) patients had disabilities of hand, 15 (71.42%) were from rural areas, 3 (14.28%) from urban areas were exposed to leprosy information, 1 (4.7%) from urban areas were exposed to leprosy info. 3 (14.28%) received treatment from 2 weeks to 6 months, 6 (28.57%) received treatment from 6 months to 1 year, 12 (57.14%) received treatment after 1 year, 16 (76.19%) approached first to general practitioners for treatment, 5 (23.80%) approached first to government health facilities for treatment. FEET:-38 (57.97%) patients had disabilities of feet, 27 (67.5%) were from rural areas, 3 (11.12%) from rural areas were exposed to leprosy information, 17 (44.73%) were from urban areas. 6 (46.15%) from urban areas were exposed to leprosy info. 8 (21.62%) received treatment from 2 weeks to 6 months, 7 (18.91%) received treatment from 6 months to 1 year, 21 (56.75%) received treatment after 1 year. 32 (84.21%) approached first to general practitioners for treatment, 13 (34.21%) approached first to government health facilities for treatment.

Conclusion: The areas chosen for the study are low endemic for leprosy if prevalence

Keywords: grade 2 disabilities, visible disabilities, prevalence rate, low endemic areas, exposure to leprosy information
ILC4.1-057
Analysis of the epidemic situation after basic elimination of leprosy in Lianyungang prefecture for 18 years
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Objective To analyze epidemic situation of leprosy of Lianyungang prefecture nearly 18 years after realization of basic elimination of leprosy to provide a scientific basis for the formulation of leprosy control for the present stage.

Method The statistics of detective rate and prevalence rate were analyzed, which combined with the new leprosy cases of them gender, diagnosis age, duration of illness, detected way, type, ratio, the source of infection and disability rate. Descriptive epidemiological method was used to analyze the data.

Result There were total of 90 new cases were detected in Lianyungang Prefecture and they distributed over the city's 4 districts and 3 counties, of which Guanyun county is the most. Cases of male were more than female with proportion of 3.29:1, and the occupational mainly for farmer with ratio of 95.56% (86/90). The age of cases ranged from 17 to 84 years old with an average age of 45.83 and the range of 30 to 44 years of old is more with ratio of 41.11% (37/90). Cases infected by families was of 28.89%(26/90) and families affected by leprosy became main source of infection. The ratio of Type of MB to PB is 10.13:1. 60.00% (54/90) of cases were found in dermatology clinics found. Conclusion Leprosy is in a state of low popularity in Lianyungang prefecture, but authors advocate the combination of active and passive case finding way in order to early detection of patients, timely treatment, control the source of infection.

Keywords: leprosy, epidemiology, control measures
ILC4.1–058

To access the importance of inclusion of Grade 2 Disability (G2D) among Children in the Routine Reporting system – Experience from a pilot study in two districts in state of Bihar, India
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Introduction
India contributes around 120,000 leprosy cases annually to the global burden of leprosy. Among them around 12,000 cases are children (below 15 years of age). It has remained to an average of 9% for the last 10 years. The G2D cases among new cases are about 3,500. The data on G2D among child cases is not available in the state and also at the national level. Since leprosy in children contributes to 9% of the total new cases there is an indication of active transmission of infection in the society. The exact magnitude of the problem of G2D among child leprosy cases is not known, as the data is not available or is not collected. Present study of G2D among children due to leprosy in two districts (Gaya & Nalanda) in Bihar State is an attempt to learn and understand the extent of G2D among children due to leprosy.

Objective
The main objective is to study and access the prevalence of G2D among children (below 15 years) due to leprosy in two districts in State of Bihar during the period of 2011 to 2013.
Method
Present study is a retrospective analytical study of child cases (below 15 years of age) that were found affected with leprosy during the period from 2011 to 2013 and have taken some anti-leprosy treatment in the past. The data was collected from districts & state Leprosy Office and Master Registers in the PHCs. After collection of data, attempts were made to visit these patients at their residence and further information was collected through observation and interviews with their parents. Grading of disabilities was considered based on WHO classification of disability.

Results
Amongst 3926 total number of cases registered there was 138 (4.2%) adult cases with G2D and among 658 new child cases registered 10 (1.5%) were G2D cases as reported by the system. Among these child cases attempt was done to visit 76 children. All except 03 children had completed full course of MDT treatment. We found 25 (34.2%) children with G2D among these 76 cases. Among these child cases 06 children had developed G2D during the course of treatment while 10 children developed G2D after completion of treatment.

Conclusion
The routine information system is not capturing the complete data of child cases with G2D. This small study shows us the extent of the problem in the routine system of collection of data. Even one child with G2D due to leprosy is considered to be a serious problem. Hence, this issue should be significantly addressed and G2D among children should be the part of routine information system in the district/state and national level.

Keywords: India, Children, Bihar, G2D, Reporting System
ILC4.1-059
Investigation on Quality of Life in Cured Patients with Leprosy in WenZhou, Zhejiang Province
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To explore the quality of life in cured patients of leprosy. Methods In accordance with unified technical standards and methods to investigate the city all registered cases completed the questionnaire. Results Competence and familiarity with the idea of leprosy diagnosis can be timely and accurate diagnosis of leprosy. 62 cases of the survey, 45 cases Live Alone (or half Live Alone), the number of 30 (48.4%) people with disabilities, the shortest deformities time were 59 months, up to 635 months, with an average 298.78 ± 190.32 months. Conclusion leprosy patients had a poor living conditions of in Wenzhou, needed to provide basic living and medical assistance, to reduce the burden of diseases, not only to eliminate leprosy, and to eliminate the harm caused by leprosy.

**Keywords:** Leprosy, Living conditions
ILC4.1-060
Epidemiological Analysis of New Leprosy Cases Detected in Beijing From 1990 - 2013
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Objective: To analyze the epidemiological trend of leprosy and the delay in diagnosis of new cases in Beijing, China from 1990 to 2013.

Methods: This retrospective study of the clinic records of 65 leprosy patients registered at Beijing Tropical Medicine Research Institute (BTMRI) from 1990 to 2013, revealed the geographic distribution of the cases and the delay in obtaining a confirmed diagnosis.

Results: Patients were classified clinically into five groups defined by the Ridley - Jopling criteria. These included 30 patients with lepromatous leprosy (LL, 46.2%), 17 with borderline lepromatous leprosy (BL, 26.2%), three with borderline leprosy (BB, 4.6%), nine with borderline tuberculoid leprosy (BT, 13.8%), and nine with tuberculoid leprosy (TT, 9.2%). Multibacillary leprosy (MB), seen in 50 patients (76.9%), was far more frequent than paucibacillary leprosy (PB), which occurred in 15 (23.1%). The means of misdiagnosis time from the onset of symptoms to the final diagnosis were 181.5 months for TT, 50.2 months for BT, 44.0 months for BB, 53.0 months for BL and 57.9 months for LL. All the cases had been imported from 18 provinces or autonomous regions. Annual trends indicated an overall rise in the annual incidence, with detection of the disease increasing from 1 case (0.005 per 100,000 population) in 1990 to 6 cases (0.03 per 100,000 population) in 2013.

Conclusion: Contrary to the general belief that leprosy had been eliminated in China in 1998, we found a trend toward yearly increases in the number of imported cases in Beijing. Initial misdiagnosis was frequent, and the time required to confirm leprosy is very long.

**Keywords:** leprosy, Beijing, epidemiological tendency, diagnostic delay
Advances on the research of influencing factors of quality of life among leprosy affected persons

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Leprosy can have impact on the leprosy affected persons in the aspects of physiology, psychology and social functions, et al., which lead to the declining of quality of life. The paper summarized the influencing factors of the quality of life, including individual physiological factors, leprosy related factors, mental factors and external environmental factors, which provided a feasible way for the later comprehensive intervention on the quality of life among persons suffered from leprosy.

Keywords: Leprosy, Influencing factor, Advancement, Quality of life
ILC4.1–062
The Epidemiology Analysis Report of Leprosy
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Objective
To summarize and analyze the epidemic condition of leprosy between 1955 and 2015 in Yushui district and provide scientific basis for the prevention and control in future.

Methods
To analyze the epidemic condition of leprosy cases between 1955 and 2015 in Yushui district

Results
There are 92 leprosy patients been found in total over the years, 18 alive, 17 cured, 1 lost to follow up, and the cure rate has been to 94.44 percent. The highest prevalence rate was in 1973, reaching to 8.90 in one hundred thousand, which reduces to 0.12 in one hundred thousand now. The highest average prevalence rate in five years was between 1960 and 1964, reaching to 1.51 in one hundred thousand, which reduces to 0.00 in one hundred thousand in recent five years.

Conclusion
In terms of superior document spirit, leprosy has been the critical disease, and the prevention and control strategies and measures have been put into effect further. Leprosy patients have got regular treatment, and they have been cured without one lost follow-up. The epidemic condition of leprosy has been controlled basically.

Keywords: leprosy, epidemiology, analysis
ILC4.1–063
Epidemiology and treatment of tinea capitis in Nanchang and surrounding area
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Objective To study the epidemiology and clinical treatment of tinea capitis in Nanchang and surrounding area.

Methods All patients diagnosed with tinea capitis on their first visit during June 2013 to July 2014 were enrolled in this study. The questionnaire was conducted, while fungal direct microscopy and fungal culture were operated. The etiological agents were identified by morphology and ITS sequencing. Clinical treatment and prognosis were analyzed by 4 weeks of follow-up after the end of treatment.

Results A total of 118 cases of tinea capitis were recruited, among which 16 were older than 15 years. Tinea black dot was the predominant clinical pattern, taking account of 70.3% (83 cases), followed by kerion (27.1%, 32 cases) and gray patch tinea capitis (2.5%, 3 cases). The two methods had a full agreement and can complement each other. Totally 110 strains of dermatophytes were isolated, among of which 70 were Trichophyton violaceum, 18 T. mentagrophytes complex, 7 T. tonsurans, 6 T. rubrum, 5 Microsporum canis, 4 M. gypseum. Eight-eight percent patient cured by standard antifungal therapy. As for 9 patients failed, 7 cases are caused by wrong prescription.

Conclusions T. violaceum corresponds with a dominant black dot type of tinea capitis Nanchang area nowadays, whereas T. mentagrophytes are responsible for most kerion. Treatment failure is related to wrong and irregular antifungal therapy.

Keywords: tinea capitis, epidemiology, treatment, dermatophytes
ILC4.1-064
Epidemiological analysis on 928 leprosy cases registered from 1994 to 2013 in Jiangsu province
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Objective To provide scientific basis for effectively implementing The Program of Jiangsu Province for Eliminating the Harm of Leprosy (2012–2020) through analyzing the epidemiology of 928 newly registered leprosy cases and discussing the epidemic characteristics and influencing factors of leprosy from 1994 to 2013 in Jiangsu province. Method Data for the study were obtained from the annual information of Jiangsu province from 1994 to 2013 and were analyzed by sorting, contrast, and statistics.

Result The average number of annual new registered cases in Jiangsu province in recent 20 years is 46.4 cases. During the recent 20 years, the number of the newly registered patients significantly declined from 611 cases of e1994–2003 to 317 cases of 2004–2013 ( T = 5.33, P < 0.01). The proportion of 54.35% cases of whole province were found in The Northern Part of Jiangsu province which plays an important role of burden of leprosy control of the province. 64.33% of cases were found during months from January to June and 69.72% of them were detected by dermatology clinics. In recent 10 years, there were none children cases. The average age of cases diagnosed, the proportion of MB cases in whole new registered cases, and the proportion of cases of floating population and so on went up compared with two decades of 1994–2003 and 2004–2013. The average delay duration of cases diagnosis is 28.27 months and the degree 2 disability is 32.75% in newly registered cases in the past 20 years, but the degree 2 disability dropped obviously in the recent 2 years.

Conclusion The prevalence of leprosy in Jiangsu Province keeping a low epidemic situation has been lasted long time. For this situation, the author emphasizes that the leprosy control should concentrate on monitoring leprosy symptoms, should pay attention to the trainings and it’s quality on medical staffs about leprosy knowledge, should improve the level of case early detection, and should ensure the professional staff and funds input under the low epidemic condition. All of this are important measures to realize the goals of Program For Eliminating the Harm of Leprosy.

Keywords: Leprosy, Newly registered cases, Epidemiology
Epidemiological Analysis on New (recurrence) leprosy cases of Xuzhou during 1994–2013
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Objective The epidemic patterns and characteristics of leprosy in Xuzhou City were explored, and the purpose of this paper was to provide scientific countermeasures for further control and ultimate eradication of leprosy epidemic. Method 132 leprosy cases discovered in Xuzhou city during 1994–2013 of the new (recurrence) issued cases were descriptive epidemiological analysis.

Result Grand total 132 cases were founded in Xuzhou city during 1994–2013, passive discovery accounting for 83.33%, the average annual detection rate was 0.07 / 100,000, the average annual prevalence was 0.26 / 100,000, type ratio was 78.78%, the distribution of leprosy was area limited and clustered, farmers accounted for 95.45%, accounting for 18.93% of infection within the family, the ratio of male and female was 2.22: 1, the average age was 40.8 years old, deformities ratio of new cases was 33.59%, the early detection rate was 56.81%.

Conclusion leprosy prevalence was low in Xuzhou city and the control effect is obvious. But the insufficient was still exist, for example: early leprosy found. The leprosy prevention work should continue to adhere to focus on rural area; strengthen monitor of the foreign population leprosy epidemic; insist on an annual medical examination for close contact people; training efforts of leprosy knowledge should be increased for the medical staff; and the health education of leprosy core knowledge should be strengthened.

Keywords: Leprosy, Monitor, Epidemiology
ILC4.1–066
Evaluation of Yunnan leprosy control work in last 60 years
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Objective: Comparative Strategy and epidemiological characteristics of leprosy control work in Yunnan Province, since 1983 the experiments in MDT started, analysis strategies and problems of leprosy MDT Work and transition effects control, to provide evidence for future development of leprosy disease prevention and control strategies. Methods: Collect and analyze leprosy control strategy and surveillance data in Yunnan Province since 1949.

Results: ① prevalence dropped significantly. According to statistics, more than 56,000 leprosy patients were founded, 44,000 of patients were cured, including more than 16,000 cases were cured by MDT in Yunnan Province. By the end of 2015, the prevalence rate was 0.16 / million, decreased by 97.09% compared with 1980. ② recurrence rate decreased significantly. 1211 recurrence cases were found in Yunnan Province cumulatively, of which 1118 cases of DDS recurrence, and 93 cases of MDT recurrence, the recurrence rate was 3.98% and 0.59% respectively, MDT recurrence rate was significantly decreased. ③ popular range was significantly reduced. In 1980 there are 25 high–prevalence counties (prevalence> 10 / million), and low prevalence counties only 19 (prevalence)

Keywords: Leprosy, prevention and contro, strategies, assessment
ILC4.1–067
18 years of longitudinal follow-up post leprosy elimination in 43 counties in Yunnan province—An epidemiological report
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Results: During the study period, post elimination, 16 counties failed to maintain elimination targets, of which 8 counties exceeded target prevalence and 5 year average detection rates, 6 counties exceed target prevalence rates and 2 counties exceed 5 year average detection rates.

Conclusion: There is still a long road to travel for our province in the fulfillment of the objective of leprosy elimination and maintenance of leprosy control. There is a present need for research targeted at leprosy control strategies

Keywords:Leprosy, elimination, epidemiology
ILC4.1-068
Analysis on the epidemiological characteristics of leprosy in Yunnan Province in 2010
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Objective and Methods: Descriptive and analysis leprosy surveillance data in Yunnan in 2010, to understand the epidemiological characteristics of leprosy, and for the development of targeted prevention and control measures to provide evidence.

Results: 2010 total of new cases of leprosy were found 293 cases, discovery was 0.641/100,000, of which children accounted for 3.75%, serotype accounted for 80.55%, 2 levels of disability 20.48%. 9 cases of relapsed cases discovered in 2010, of which 2 cases of recurrence after chemotherapy. Until the end of 2010, there are now cases in our province in 1369; prevalence is 0.299/universal, 640 patients receiving chemotherapy.

Conclusion: the General of leprosy in a low prevalence level in our province, the province's 16 cities and States have an onset, focus area in southeastern Yunnan, Yunnan and southern city of 8 States.

Keywords: Leprosy, surveillance data, epidemiological characteristics, prevention and control
ILC4.1–069
Yunnan leprosy training needs analysis
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Objective: Better and more effective prevention and treatment of the province’s existing staff leprosy row adequate professional training.

Method: questionnaire form survey province 16 State, and city, 129 County (urban) anti-business personnel basic situation and training needs.

Results: province existing 21 a independent skin anti–Hospital (station, and by), which 2 a State by; 25 a independent Department; 100 a common set Department. 129 a leprosy village homes, cure remain hospitalized after village number 2995. Total number of control staff across the province: 808, 524 men, 64.85%, 284 women, 35.1%; full-time staff of 548, 67.8%, part-time workers and 260, 32.2%. Full-time staff of 548, 13 senior people (2.4%), 211 of the intermediate grade (38.5%), junior titles, 281 (51.3%), 20 people with no title (3.6%), admin 23, 23 people receiving State–level education (4.2%), the provincial training 29 people (5.3%).

"Conclusion" the succession of leprosy prevention and treatment professionals exist, numbers. Facing the loss of knowledge and experience in the management of leprosy. According to the province, the epidemic characteristic and control of leprosy situation, in order to maintain professional and technical strength, still needs to carry out leprosy prevention and treatment literacy training. Leprosy is a chronic infectious disease of a serious hazard to human health, in the province remains a serious public health problem. To promote the process of leprosy prevention and treatment in our province, effective control of the prevalence of leprosy, achieve the goal of basically eliminating leprosy at an early date, to protect people's health, promoting the harmonious development of society. After the reform, personnel changes is large, in order to better and more effectively to the province’s existing leprosy staff comprehensive professional training, on leprosy and its Yunnan province structure for statistical analysis.

Keywords: Leprosy, prevents and controls, professional training, questionnaire
ILC4.1-071
Discuss the leprosy patients’ detection method under the situation of Low prevalence
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objective: Through in a leprosy prevention and treatment knowledge health education propaganda and training, to play the role of grassroots network of prevention and cure, found hidden leprosy patients.

Methods: To the township as a unit carried out in batches health education training and lectures; For students of screening and all village line cable access survey, over the years to heal their review and public leprosy knowledge awareness rate were investigated.

Results: Public leprosy knowledge awareness rate and leprosy suspicious clues reported significantly improved the quality and detection of leprosy in 4 cases.

Conclusion: To improve the social public leprosy knowledge awareness rate, for leprosy epidemic early detection of patient has laid a solid foundation; Leprosy Disease of key villages clue survey and school students skin nerve medical screening and over the years to heal their review is a effective technique for finding leprosy patients.

Keywords: Leprosy, Health education, Propaganda, Effective way
**ILC4.1-072**

**Comparison of trends in overall and grade 2 disability among new cases detection rates of leprosy by geographical regions. Brazil 2008–2014**

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**OBJECTIVE:** To compare the evolution of the overall and grade 2 disability among new cases detection rates of leprosy.

**METHODS:** A descriptive epidemiological study with an ecological time series on the new cases overall and case detection with physical disability G2 in the diagnosis from 2008 to 2014. In the model considered each rate as the dependent variable (Y) and the years studied as an independent variable (X). Simple linear regression models were adjusted for each time series. Centralized is the independent variable, subtracting the midpoint of each series value (X (value 2011) / 2) to avoid autocorrelation between the terms of the regression equation. The estimated model = (Y = B0 + B1 (X – (value 2011) / 2)) at a significance level of 5%.

**RESULTS:** We found a statistically significant linear reduction for the two rates under consideration in Brazil and in all geographical regions. The slope estimator trend was inversely proportional to endemcity. The higher the greater the reduction endemicity.

**CONCLUSIONS:** Given that G 2 detection rate presents additional information to the IF detection rate as analyzed by trend, it was concluded that the reduction of leprosy in Brazil is consistent.

**Keywords:**
ILC4.1-073
Leprosy profile through the post-leprosy elimination era: Epidemiology and clinical characteristic of diseases from a tertiary care hospital
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Objective: to study the epidemiological and clinical trends of leprosy cases in a tertiary care hospital in Indonesia during January 2011 until December 2013.

Method: a retrospective study was undertaken analyzing the medical records of patients with leprosy registered at leprosy clinic of Cipto Mangunkusumo Hospital, Jakarta, Indonesia over three years period. Demographic and disease characteristics including age, sex, clinical pattern, bacteriological parameters, reactions and disabilities were noted from a predesigned format.

Result: there are a total of 501 subjects, which consist of 208, 175, and 118 subjects from 2013, 2014, and 2015, respectively. Most of the subjects were categorized into multibacillary leprosy (88,6%), whereas with Ridley and Jopling’s classification system there are more patients grouped in borderline tuberculoid (BT) and borderline lepromatous (BL). Leprosy is diagnosed more in males (68,1%) than females (31,9%) and affected mostly in adult (84,2%) that belong to the working age group. We still found children with leprosy, but it has been declining over the past three years. There are more subjects that are suffered from reversal reaction (RR) than erythema nodosum leprosum (ENL). Grade II disability is still found in leprosy cases and detected more in BT and BL type.

Conclusion: Despite the statistical elimination of leprosy in this region, new case still continue to present in alarming number.

Keywords: Leprosy, Epidemiology, Indonesia, Hansen’s disease
ILC4.1–075
Analysis of Epidemic situation of leprosy in Hunan province during 1993–2012
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Objective: To explore the epidemic feature of leprosy in Hunan province and to make corresponding prevention and control strategy, and led to reach the aim of leprosy elimination finally.

Methods: By using epidemic method, the clinical data of leprosy including epidemic intensity, distribution, type of the disease, manner of case-detection, disability and as well as lag of detection of Hunan province during 1993–2012 were analyzed, respectively.

Results: Leprosy in Hunan area of low endemicity and showing extraordinarily unequal; the propotion of recurrent in all case getting higher, the annul incidence decline, the lag period become longer, and the disability is more higher in the period of 1993–2002, compared with the period of 2003–2012.

Conclusion: It is urgent for us to pay more attention to high risk area such as Xiangxi, Huaihua, zhangjiajie. In addition, it is also important for us to reduce lag period and disability by strengthening the train of the stuff’s capacity and the power of case-detection.

Keywords: leprosy, Disease surveillance, Epidemiology
ILC4.2-001
Leprosy Outreach: An Effective Tool for Early Case Detection in a High Prevalent District Bardiya, Nepal
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Objectives: The objective of this case study was to assess the preliminary results of outreach clinics whose main objective was to increase community awareness and increase leprosy case finding through reaching un reach ed populations.

Methods: Bardiya district is one of the high prevalent leprosy districts of Nepal. The prevalence rate of leprosy has been continuously >1 case per 10,000 population for the last five years. Despite the integration of the leprosy control program at government health facilities, the prevalence rate has not declined. Case finding and prompt treatment urged to be geared up to stop transmission of leprosy. Due to resource limitation, out of the 34 health facilities within the district, only four were selected for outreach clinics. An experienced team from INF Leprosy Treatment Center Nepalgunj (INF-LTCN) started to reach the outreach clinics at pre-scheduled dates. Patient check-up and treatment as well as community awareness activities were carried out during the visits. Records were reviewed from the registers from both outreach clinics and INF-LTCN after 6 months of outreach clinics operation. Analysis of data was linked with district annual statistics from Bardiya DPHO.

Results: Of the total 328 patient visits, 88% of them had never been diagnosed for leprosy, and among them 13 (4.5%) (MB=2, PB=11) were identified leprosy cases. The low degree of disability grade (DG0=77% and DG1=33%) among those diagnosed, suggests early presentation. Contribution to the annual total number of new cases of the district was 13% just within 6 months operation of outreach clinics. Comparing this to the data of the 6 months period before and after the outreach clinics, the case flow at INF-LTCN increased significantly. In later 6 month period, patient flow increased from 420 to 1685 which is 4 times more with a growth of 301%. Detection of new cases of the outreach coverage area also increased from 2 to 23 (MB=7, PB=16), 11 times more with an increase of 1050%. Although there might be some other factors influencing the increase, one of the main reasons for this increase was the conducting of outreach clinics and community awareness raising activities.

Conclusion: The outreach strategy is an effective tool for increasing case findings and early detection of cases in high prevalent areas. The strategy could be applied in wider coverage areas and case detection could be geared up ultimately so that elimination levels could be reached.

Keywords: Leprosy, Leprosy Outreach, Case detection, Nepal, International Nepal Fellowship
ILC4.2–003
Active case detection of Leprosy through School Medical Inspections in Sri Lanka
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Objective:
Early detection of cases, and timely registration of identified cases for multidrug therapy (MDT) remains the key strategy for leprosy control. Early diagnosis and treatment of cases will lead to prevention of disability. The number of child leprosy cases is an indicator of active and recent transmission of the disease. Children under 15 years constitute 25.3% of the population in Sri Lanka. Annual School Medical Inspections conducted in all schools in the country could be utilized to promote early case detection among this vulnerable target population. To promote early case detection among school children, five districts supported by FAIRMED Foundation initiated screening for leprosy in schools in the high risk Medical Officer of Health divisions.

Methods:
Prior to the school health survey, public health officials visited the schools and educated the staff regarding the screening for Leprosy case detection. The school staff was made aware of the signs, symptoms, and the importance of preventing stigma & discrimination. One week before the arranged day of screening, a printed format with a diagram depicting the human body was distributed to the children through the teachers. They were advised to do a self-examination or with the assistance of the parents or caregivers to mark any skin lesions detected in the body in the printed diagram. The completed forms are collected by the class teacher and handed over to the Health staff. The medical officers trained in screening & case detection examined the school children with lesions. Children with suspected leprosy were referred to the Dermatology clinic for confirmation of diagnosis and management. Other dermatological lesions were treated on the spot or referred to the clinic according to the severity and type.
Results:
The results were productive. Data were analyzed from 96 schools in 5 districts. During 2015, approximately, 50,000 printed forms were distributed among the school children prior to screening. The health personnel collected approximately 46,000 formats of which 12,778 formats were marked with lesions on the day of the screening. The response rate was more than 90%. The Medical officers examined all the children who had marked any skin lesion in the Pictogram. Among these children there were 16 new leprosy cases. There were no MB cases. Child NCDR per 10,000 population was 12.52.

Conclusion:
School screening in high-risk areas is effective to increase early case detection rate. To mark suspected skin lesions in printed formats in school health screenings is a good method to manage time and resources in resource poor settings.

Keywords: Active Case Detection, School Medical Inspections, Leprosy
ILC4.2-004
Acceptability And Benefit Of Annual Contact Examinations Beyond The Standard 2 Or 5 Year Practice
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Objectives
To assess whether late examinations of household contacts would be acceptable to concerned families and produce useful results in terms of early case detection.

Method. This is a mixed methods study of household contacts of leprosy cases newly diagnosed in 1998 and from 2000–2014, in NW Bangladesh. Staff reviewed the case records for previously completed household contact examinations, and carried out a fresh survey of as many of the original household contacts as could be enrolled. A sample of the index cases were approached to allow interviews of household members to establish their attitude to late contact examinations. Data will be analysed in terms of number of new cases found per year per index case and per 100 contacts examined, for each year from 1–15 and 20 years after diagnosis of index case. Also the characteristics (age, gender, classification, Bl, disability grade at diagnosis) of new cases detected through such contact examinations will be analysed. The interview data will inform us about acceptability of introducing such late examinations as part of leprosy control strategy in a high risk section of the population.
Any index cases or their contacts who had an intervention likely to affect the probability of secondary leprosy cases in the household, and those who declined participation, were excluded.

Results
Approximately 19000 potential index cases have been identified; after exclusions, we expect to enrol about 75%. The contact groups related to about 1000 eligible index cases have been interviewed and the subjects are generally in favour of later contact examinations being carried out by health workers.
Early results of active examinations of groups of household contacts, 1–15 years and 20 years after diagnosis of index case, will be presented, with details of characteristics of newly detected cases. Within first 6m, 17 new cases were detected through this study.

Conclusions As household contacts of known leprosy affected people are at higher risk of leprosy than the general population, late contact examinations might be an effective way to increase early case detection. Such examinations are considered acceptable by affected families in Bangladesh.

Keywords: case detection, household contacts, acceptability, annual contact survey
ILC4.2–005

Genogram application in families with leprosy cases in eastern of Minas Gerais Brazil for assist in socio-demographic and clinical characterization.

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Leprosy is a major public health problem in Brazil, considered the second country in the world with most new case detection rate. In 2011 the MS recommended that all contacts of the new cases were examined, however the indicators showed that this action is much less than required to achieve an impact in reducing transmission sources. In an attempt to better understand the distribution of leprosy in family groups, it adopted a strategy of construction of the genogram used as a tool for the graphical representation of the family. It different members are represented, the relationship pattern and its main morbidities. In addition, the aim of this study was to analyze clinical and socio-demographic data of a family of a patient with leprosy for construction of a genogram. The data generated from the genogram will assist in the monitoring of family members, especially those who have clinical suspicion in order to make an early diagnosis of leprosy, besides favoring the interruption of the transmission chain of the disease. The study was conducted in the municipality of Inhapim, near GV, located in eastern Minas Gerais, Brazil. And, involved a total of 20 individuals, a patient with lepromatous leprosy, and other members of the same family, a total of 04 household contacts and 15 outside the home. The genogram presented four generations (I, II, III and IV) which contemplated the parents of the index case, the index case with his 11 brothers and sisters, 08 sons and daughters, and also nephews and grandchildren. Financial support: FAPEMIG, CNPq/DECIT, FNS/SVS/MS TC 304/2013

Keywords: genogram, families, socio-demographic and clinical characterization
ILC4.2-006
The Important Role of Mobile Phone in Monitoring Leprosy Cases in Cebu, Philippines
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Objective: To assess the role of mobile phone in monitoring leprosy cases in a well-defined leprosy community in Cebu, Philippines.

Methodology: Surveillance records of more than 300 leprosy cases detected and treated between 2011–2013 at the Cebu Skin Clinic, a leprosy case detection and treatment facility of the Leonard Wood Memorial Center for Leprosy Research in Cebu, Philippines were reviewed; these were compared with cases detected and treated in the same facility before the mobile phone era, between 2001–2003. The rate of attrition/treatment default and treatment completion attained by two groups were reviewed, compared and analyzed. Likewise, output on other leprosy-related services rendered by the clinic staff between two periods were compared. For the 2011–2013 cases, one particular phone was dedicated exclusively for patient monitoring. The phone contained a central directory of all registered cases. It was held by the surveillance staff who knew the patients well. Patients were encouraged to phone in if they had questions about treatment or possible complications and were reminded of their scheduled clinic visits. Those who needed personal attention were advised to visit the clinic sooner than planned. Because a subset of this population had no mobile phone and were personally followed up by the surveillance team, staff time and monitoring costs between the mobile and non-mobile phone subgroups were also compared.
Results: Initial findings suggest significant reduction in staff time and patient monitoring costs, higher treatment completion and lower attrition rates among mobile-phone monitored cases compared to cases personally followed-up by the field surveillance team.

In particular, the use of mobile phone saved a lot of staff time. Staff were instead assigned on other leprosy related clinic-based services. This resulted to an increase in the number of patients covered per day at 10–15 patients per staff, compared to only 3–4 patients per staff a day if the surveillance team were to go out to the field to personally locate and monitor patients.

Detailed findings will be presented during the congress.

Conclusion: Mobile phone is a time-efficient and a cost-effective field monitoring tool in leprosy. It is a very affordable monitoring device which allows regular communication with patients resulting in an improved quality and a wider coverage of patient services. With the mobile phone, a higher treatment completion rate and a reduced attrition rate particularly among cases on post-MDT surveillance are readily attainable.

Keywords: mobile phone, surveillance, attrition rate, treatment completion
ILC4.2-007
Trends of slit skin smear cases in positivity among new leprosy cases reported in The Leprosy Mission hospital Shahdara Delhi.
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Objective:
To determine the trends of smear positivity among newly detected leprosy cases reported to The Leprosy Mission Hospital, Shahdara Delhi.

Methodology
Data was collected retrospectively, from the hospital management system. All the new patients with smear positive, who reported to hospital between 2011 to 2015 were recorded.

Result:
A total of 1414 smears of new leprosy patients were studied from 2011 to 2015, out of which 30.69% of were positive. Out of the total positive cases 65.43% were male and 28.11% were female, and 6.5% were children. Out of 30.69% of the total positive cases around 46.77% were highly positive with BI of four and above at any site.

Conclusion:
Trends from the data collected reflects that still positive cases are reporting to hospital which suggest still patients are reporting late to hospitals for the treatment of leprosy. So, it is very important that leprosy eradication program should include special tracing mechanism for highly positive cases.
Presence of positive cases among children reflects that some how transmission is going on in the society from much earlier stage which is not yet understood.

Keywords: slit skin smear, positive cases
ILC4.2-008

The Brazilian Active Leprosy Case Finding Campaign Among Schoolchildren Must Be Improved

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Objectives – Proactive strategies to improve the early diagnosis of leprosy are essential to eliminate the disease as a public health problem in endemic countries. Since 2013, the Brazilian Ministry of Health active leprosy case finding campaign is based on the self-report of suspected lesions in schoolchildren aged 5 to 14 years by their families, followed by clinical examination at basic health units for confirmation or not of the cases. The main objective of this study was to evaluate the efficiency of this Brazilian strategy, evaluated by well-trained health professionals, particularly in schools located in or nearby hotspots of disease transmission in hyperendemic municipalities.
Methods - Over 6.6 million students countrywide answered a self-image questionnaire during the 2013 and 2014 Brazilian campaigns. Among them, 645 (0.001%) children were diagnosed with leprosy by local health professionals. Paragominas is a hyperendemic city in the State of Pará, Brazilian Amazon Region, where 12,300 schoolchildren were screened during the 2015 official leprosy campaign and 3 new cases were detected (0.02%). In December 2015, we traveled to Paragominas and selected two elementary public schools to clinically evaluate their students. These same schools were previously screened using the official strategy three months before our visit. Three dermatologists, including the president and the vice-president of the Brazilian leprosy society evaluated 253 students aged 5 to 14 years.

Results - Fifteen (5.9%) new cases were detected among the students by our team, based on well-defined clinical signs and symptoms (1 primary neural, 2 indeterminate, 9 borderline tuberculoid and 3 borderline borderline). One student was detected with grade 1 disability and the others with grade 0. Half of them reported previous contact with leprosy cases, including grandfathers, grandmothers, uncles, aunts, nephews and nieces. None of them reported suspected lesions during the official campaign. Additionally, 8 (14.3%) out of 56 household contacts of those students newly detected with leprosy were also diagnosed with leprosy during the domiciliary visiting (2 primary neural, 1 indeterminate, 4 borderline tuberculoid and 1 borderline borderline with grade 2 disability), including their parents, brothers and sisters.

Conclusions - Our results strongly indicate that the current Brazilian leprosy campaign based on schoolchildren and their families self-report of suspected lesions is lacking in identifying as many new cases as was expected. The detection rate would be significantly higher if all schoolchildren could be clinically

Keywords: Leprosy, Schoolchildren, Epidemiology, Prevention and control
ILC4.2-009
Profile of Leprosy among Children attending a Referral Hospital for Leprosy in Northern India
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Objectives: To determine the profile of leprosy among children newly registered (never treated before) for treatment at a referral hospital for leprosy in Northern India.

Methodology: The study was conducted at The Leprosy Mission (TLM) Hospital, Naini a unit of The Leprosy Mission Trust India. This hospital is a 150 bedded specialized Leprosy Referral Centre in North India with over 2500 new Leprosy registrations. All the children (age 14 and below) newly registered for leprosy treatment during the period between January 2012 and December 2015 were included in the study. The details on demographic, clinical and disability status at the time of diagnosis were extracted from electronic records of each patient to determine the disease profile among children. Descriptive statistics were used to describe the results. The z-score test was used to determine the difference in proportion between groups.

Results: There were a total of 5720 new patients registered (as never treated before) for treatment during the study period. The proportion of child cases (

Conclusions: The considerably higher proportion of child patients indicates the active transmission of disease in the community. There is a high incidence of children developing visible deformities before reaching the hospital for treatment. The higher proportion of MB cases, smear positive and disability at the time of diagnosis indicates the delay in diagnosis and start of effective treatment. The consistent rise in all the indicators may be due to study participants being selected from referral hospital for leprosy. There is still a long way to go to achieve the target set by WHO global leprosy strategy of “zero” disabilities among child cases by 2020 in the study area.

**Keywords:** Children, Epidemiology, Grade 2 disabilities, India, Leprosy
ILC4.2–010
Leprosy and Buruli Ulcer Control in Nigeria: Taking Stock and Planning for Impact
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Introduction
The National Tuberculosis, Leprosy and Buruli Ulcer Control Programme (NTBLCP) commissioned a nation-wide review of leprosy and Buruli Ulcer (BU) services in July, 2015.

Objective
To produce a guiding document for development of a new National Strategic Plan (NSP) 2016–2020 for Leprosy and BU Control.

Methods
Eight states were purposively selected from the 36 states and Federal Capital Territory. The criteria included ‘burden’ of disease, centres with innovative practices as well as centres offering BU services. A standardized evaluation matrix was used. In addition to field visits, study of routine documents, observations, meetings, individual and group discussions and internet based survey were employed.
Results
MB and PS treatment completion rates for 2014 were 91% and 97% compared to the targets of 85% and 95% respectively in the 2010–2015 NSP. Nigeria surpassed the regional/global targets for treatment completion. The rate of new cases with disability grade 2 (DG2) was 0.23/100,000 (target = 0.19/100,000). The proportion of patients who developed new/additional disabilities at the end of treatment could not be assessed because data was not available. District or Local Government Area data were not available at the central level. Looking at cumulative data per state and using a set of agreed criteria, 18 states mainly from the northern part of Nigeria were categorized as high burden states. Policies for leprosy were in place but without prioritization. New leprosy case notification was declining with high child and impairment proportions; Case detection was largely passive but some states employ active case detection strategies by engaging patent medicine vendors/traditional healers, dermatology clinics, mini-surveys, contact examination and collaboration with National Programme on Immunization. Others include decreased political attention/funding from government/NGOs and less attention to persons with life-long disabilities even though Nigeria ratified the UN convention on the rights of persons with disability. Capacities for leprosy are declining with no structured capacity building plan. Supervision was of reasonable quality. For BU, activities were limited to only 4 states in southern Nigeria. PCR confirmation rate for 2014 was 65% (global target ≥ 70%) while proportion of category III lesions was 90% (global target <25%). There was no NSP for BU.

Conclusions
‘Smarter and leaner’ leprosy case-finding activities should be integrated with BU in the new NSP. Other areas to be prioritized include mapping of cases, management of complications, rehabilitation and improved funding.

Keywords: Leprosy, Buruli Ulcer, The National Tuberculosis, Leprosy and Buruli Ulcer Control Programme, treatment completion rates
ILC4.2-011
Cost Effectiveness of Leprosy Control Program Models in Thailand
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Abstract
The current leprosy control programme need to be adjusted to suit low endemic situation under limited health resources.

Objectives: This study was aimed at comparing the cost effectiveness of conventional leprosy control, and four new models.

Methods: The main outcomes (effectiveness) may be to identify cases without disability (well) or being disable once individuals were diagnosed as having leprosy and completed their treatment including prevention and rehabilitation. The cost is considered in the view of health service providers only. Secondary data was collected during 2009 fiscal year from literature search, annual situation report, and leprosy experts. Primary data regarding leprosy diagnosis related costs was collected from Chumphonburi community hospital.

Results: After using decision analysis model to analyze the data, it showed that the 3rd new model had lowest cost, 2,339,737 baht per one region. For the effectiveness, the 2nd and the 4th new models had largest number of 323 patients cured without disabilities. The 3rd new model was the most cost effectiveness one with 307 patients cured without disabilities and with 2.6 million baht used per one regional center. In conclusion, if the 3rd initiative model is selected, the number of regional centers will have to be increased in line with the magnitude of leprosy problem, and the area difficulties. Combination of different models may be needed to suit the local situation and the context in each area.

Keywords: Leprosy control, Cost effectiveness, Leprosy control control
Trends in Leprosy Diagnosis during Pre-And Post-Elimination at an Outpatient Referral Clinic

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Introduction/Objectives
LEPR Society is operating a leprosy referral clinic under the seal of Blue Peter Public Health and Research Centre in Hyderabad, Telangana, India since 2000. The clinic renders services to all components related to leprosy control. Early diagnosis and adequate treatment is the mainstay of any infectious disease to check the transmission and achieve eradication. The National Leprosy Eradication Programme (NLEP) is striving hard to eradicate the disease from the country. Although, India achieved elimination of leprosy by 2005; it is still accounting for 58% of the global burden. This paper aims to analyse the trends of disease diagnosis in pre- and post-elimination era.

Methods
It is a record-based retrospective data collected from the patient records maintained in the clinic for the period 2000 – 2015. Pre-elimination era is considered from 2000 – 2005 while the post is considered from 2006 – 2015.

Results
A total of 836 cases were diagnosed with leprosy during the study period. Of them, 350 cases were diagnosed in the pre-elimination era where the PB & MB category were found to be 50% each with 175 cases in every group. On the other hand, 486 cases were diagnosed in the post-elimination period with 82.5% (401/486) preponderance of MB category. Though the average case reported for diagnosis is reduced by 10% when compared to pre-elimination era, more than 30% raise in MB category was observed during post-elimination. In contrary to that the average smear positive cases among MB category is reduced by 18% in post-elimination era.
The year-wise details, including skin smear status, will be presented during the conference.

Conclusions
There should be candid efforts to re-introduce the active disease search methods as in pre-elimination era and also efforts towards reduction of MB category in order to check the transmission. Thus eradication of disease can be achieved. Eighteen per cent reduction of smear positive cases in the post-elimination period is an encouraging sign towards prevention of transmission.

Keywords: leprosy, diagnosis, elimination, smear positive, transmission
IlC4.2-013
Evaluation of FAIRMED’s (FM) pilot POID project in India
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Objectives:
1. To assess the implementation and effectiveness of the pilot POID project.
2. To assess the process in fulfilling the project objectives and goals.
3. To prioritize activities that will provide future directions towards scale-up.

Methods:
FM’s pilot POID project received the ‘Young Scientist Award’ from the International Leprosy Congress (ILC), 2013. As the pilot project was drawing to a close an end stage formative evaluation exercise was successfully completed. An evaluation team comprising of a project management specialist along with a leprosy technical expert together embarked on the task to accomplish the abovementioned objectives. The evaluation team met various stakeholders including the Government officials, general health staff, other government department staff such as the District Rural Development Authority & the National Blind Control Program, and the people. The outcome of the evaluation was disseminated with all partners to deliberate on the future course of action.

Results:
The pilot POID project has successfully provided access to affordable services through the POID camps within the wider network of general health care establishment. Promotion of self-care practices among people along with supplying 13,711 pairs of MCR and 18,871 self-care kits was an encouraging aspect of this project.
Sensitization and training of health care staff including the ASHA’s has promoted their active participation in the POID activities such as early diagnosis of people without deformity. A significant contribution of the project has been the collaboration with other government departments such as disability affairs that has issued disability certificates to 2,355 people that entitles them to various subsidy and social security. Finally, the project has also successfully established a strong referral and linkages with tertiary care services to the people.

Conclusion:
The evaluators concluded that there was evidence in POID activity being implemented that has resulted in significant change to the leprosy service delivery. They’ve also recommended that FM supported project partner should capitalize on this strong position to further monitor leprosy services to a point that general health care is able to assume the entire responsibility of service provision. Finally, the project has a unique position to influence policy both at the Central and State Government levels so as to make early diagnosis of people through routine active case finding and thereby prevent deformity as a result of leprosy.

**Keywords:** Evaluation, POID, early diagnosis, treatment, leprosy
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Introduction:
Leprosy is a chronic infectious disease, which still strikes fear in societies as an incurable disease. Since 2005, leprosy services were made to be delivered from all General Health Care institutions with active support from the vertical staff. The leprosy situation as on March 2014 revealed an increase in grade II disability from 1% in 2004 to 5% in 2014. There are 33897 disability cases in the state for care services.

Objective: To assess the current situation in leprosy and role of referral centres in providing specialised leprosy services

Methods:
It is a descriptive study conducted within the referral centres established in five districts covering rural villages and urban slum areas. It describes the situation, problem, phenomenon, services of Leprosy in the 5 districts of Andhra Pradesh. Quantitative data was collected and analysed for the period 2012-13 and 2013-14 to know the leprosy related and their sources of referrals and compared with the government NLEP (National Leprosy Eradication Programme)data
Results:
The training status of medical officers and multi-purpose workers in leprosy was low in undivided Andhra Pradesh (6.9 and 22.4%). Thirty eight per cent did not get MDT in the nearest health facilities during their treatment period. The MB rate noticed is 49% and 53% in the state. Above 90% Reconstructive Surgery conducted at specialised leprosy hospitals is managed by ILEP NGOs. It is observed that 12% of cases are detected with early nerve impairment at Referral Centres, 8% cases treated for complications e.g.: reactions and neuritis, 27% cases found skin smear positive for difficult-to-diagnose consultation, 39% of cases with plantar ulcer healed and 32% cases in the state received MCR footwear at Referral Centres.

Conclusion:
Increase in proportion of cases with grade 2 deformities, management of reaction, ulcer management and Micro Cellular Rubber footwear are matters of concern and suggest continued need of referral centres for their management and to assist the General Health Care system. The bacteriological positive cases have shown the presence of risk of infection in the community and it is a positive sign of effective coverage in the post-integration scenario. Patients still face problems in getting free leprosy care services.

Keywords: leprosy, MDT, referral centres, NLEP, specialised services
ILC4.2-015
Role of Local Stakeholders in Enhancing Leprosy Case Detection in Tribal Areas
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Introduction:
Despite several leprosy control measures in the Adilabad district of Telangana state, Multi bacilli proportion and Grade 2 disability cases were high and new cases have not reduced, indicating continuing spread of disease. Hence, there is a drastic need to review detection methods, enhance identification of early cases for effective control and prevention of permanent disability.

Objective:
Improve leprosy case detection by engaging local frontline health workers and with community participation in the tribal area methodology. In 2015, an attempt was made in seven tribal mandals of districts to identify local community health workers who were trained in one day for identifying leprosy cases. The analysis of all the newly detected cases is presented.

RESULTS:
Two hundred and nine community health workers from villages in tribal areas were selected and trained in early identification and referral. The seven selected mandals has a population 3, 58,104 with 475 villages. The trainees conducted a house-to-house survey of 80,502 households covering 3, 58,104 people. They were screened as per the training and 453 suspects were identified. All persons suspected for leprosy were examined by the trained leprosy workers. Among the total suspects, 71 (15.6%) were confirmed as new leprosy cases. Among the 71 cases, 43(66.1%) were MB and 28(33.9%) were PB. Four (5.6%) child cases were registered. Three (4.2%) were disability cases. Normally in the previous years, only 0–1 cases were reported from these mandals.

CONCLUSIONS:
The survey helped in the detection of leprosy cases. Ignorance, remoteness and lack of education on early symptoms and self-stigma in the tribal areas are a hindrance for self-reporting of leprosy cases. The government is also implementing the special case detection drives in the endemic areas, but there is a need to conduct surveys in the areas that are not currently endemic. Screening of leprosy needs to be integrated with household visits of all the health workers and this should be continued as an ongoing activity, rather a special focused activity in identifying the missed out cases.

Keywords: leprosy, tribal, frontline workers, new cases
ILC4.2–016
ROM TREATED CASES FOR SINGLE SKIN LESION LEPROSY IN SOUTHERN INDIA: A 12 YEAR FOLLOW-UP STUDY
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Introduction: 7th Expert Committee on Leprosy, in 1997 recommended Single Dose ROM (Rifampicin 600mg, Ofloxacin 400mg and Minocycline 100mg) for the patients with Single Skin Lesion (SSL) leprosy without clinically thickened peripheral Nerve. A very few studies were available on follow up of ROM cases. The study aimed to conduct the 12 year follow up of the single dose ROM intervention, in those patients who were treated during 1998 to 2002.

Methodology: The study design was Cross Sectional, Non interventional, conducted outskirts of Chennai. 222 patients with Single Skin Lesion were screened and treated with the Single dose ROM during year 1998–2002. A Twelve year follow up of those cases was conducted during 2013 and 2014 for further clinical re-evaluation. The cases were examined after taking written concern in local language. Maximum effect has been taken to reduce attrition.

Results: Total 222 cases who received ROM were identified from the records. 122 cases (55.0%) were found and examined, 6(2.7%) cases were died, 38 (17.1%) cases were migrated and 56 (25.2%) were untraceable. Among the examined, 120 cases (98.4%) were cured, 2 cases (1.6%) were relapsed. Status of old lesion in the cured (120) patients: complete Clearance of lesion in 105 (87.5%) cases, present in an inactive status in 11 (9.2%) cases, and decreased in 4 (3.3%) cases. In 2002 and 2005 two cases were declared relapsed, treated with MDT, made RFT, presently lesion is inactive state.

Conclusions: Among Examined study subjects, Cured Rate 98.4 % and Relapse observed was 1.6% during follow-up

Limitations: This study was 12 year follow-up in the outskirts of Chennai which was rural, which turned peri-urban area of Chennai Municipal Corporation. The attrition (lost to follow up) is very high.

Keywords: ROM, SSL, FOLLOWUP, SOUTHERN INDIA
ILC4.2-017
Integration of Leprosy Services into General Care in Bangladesh: Approaches and Tools to Facilitate Changes
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Objectives: Integration is better understood as a Health Systems Strengthening (HSS) approach when HSS is broken down into its scope of work at different levels of care and into health systems blocks where changes happen. Integration of leprosy services in Bangladesh was approached with this broad vision of change, but the practical changes were attempted at each level of health care delivery. The objective of this study is to share the lessons learnt during the integration process and highlight the important outcomes.

Methods: Three strategies adopted: 1. Ownership of the programme by the existing service system. 2. Continue to support integration activities at all levels 3. Integrated management and coordination. Several tools were developed to facilitate the proposed integration activities and piloted in two districts (Bogra, Moulibazar). The main areas of integration activities identified were: Disease surveillance through monthly meeting, Visual display of epidemiological information on leprosy, Referral systems and management of complications, Joint supervisory feedback meetings, joint messaging, improved monitoring and supervision and improved recording and reporting.
Results: A functional referral system was initiated through newly introduced referral card and patient identification card. Disease monitoring was facilitated by the health managers at their monthly meeting through newly introduced displays and check-list. The redesigned recording and reporting formats could track adequately the suspects examined and the cases detected. The number of suspects examined in one pilot district became doubled from 1985 to 4205 during 2013 to 2015. Case detection also increased from 87 to 150. In another pilot district, the suspect examination and cases detection changed from 1361 to 2705 and 116 to 207 respectively in the same period. The key changes happened in Bogra, where for the first time in Bangladesh, one third of the suspects examined were referred by general health care workers, particularly by the community health care providers (CHCP), who works at the lowest tier of health care facility in the country.

Conclusions: Tools when need based and practical could facilitate integration of leprosy services to general care as these are linked to actions and facilitate a task. Use of tools at all levels initiated good practices and impacted in increased suspect and case identification. Moreover these tools inspired and instigated general health workers to participate in leprosy care at least in the suspect referral and case identification.

Keywords: Leprosy, Integration, Tools, Bangladesh
ILC4.2-018
Leprosy new case detection trends and the future effect of preventive interventions in Pará State, Brazil: a modelling study
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Objectives
Leprosy remains a public health problem in Brazil. Although the overall number of new cases is declining, there are still areas with a high disease burden, such as Pará State in the north of the country. We aim to predict future trends in new case detection rate (NCDR) and explore the potential impact of contact tracing and chemoprophylaxis on NCDR in Pará State.

Methods
We used SIMCOLEP, an existing microsimulation model for the transmission and control of M. leprae in a population structured by households. The model was quantified to simulate the population and observed NCDR of leprosy in Pará State for the period 1990 to 2014. The baseline scenario was the current control program, consisting of multidrug therapy, passive case detection, and active case detection from 2003 onwards. Future projections of the NCDR were made until 2050 given the continuation of the current control program (i.e. baseline). We further investigated the potential impact of two scenarios for future control of leprosy: 1) discontinuation of contact tracing; and 2) continuation of current control in combination with chemoprophylaxis. Both scenarios started in 2015 and were projected until 2050.

Results
The modelled NCDR in Pará State after 2014 shows a continuous downward trend, reaching the official elimination target of 10 cases per 100,000 population by 2030. The cessation of systematic contact tracing will not result in a higher NCDR in the long run. Systematic contact tracing in combination with chemoprophylaxis for contacts will reduce the NCDR by 40% and bring attainment of the elimination target two years forward to 2028.

Conclusion
The NCDR of leprosy will continue to decrease in Pará State. Elimination of leprosy as a public health problem can possibly be achieved around 2030, if the current control program is maintained. Providing chemoprophylaxis decreases the NCDR further and will bring elimination forward by two years.

Keywords: Leprosy, Epidemiology, Control, Modeling, Chemoprophylaxis
ILC4.2-019
The results of the clinical examination population of the Republic of Karakalpakstan on Hansen disease
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Objectives
Republic of Karakalpakstan (Karakalpakstan) is located in the north-western part of Uzbekistan, in the lower reaches of the Amudarya river and the southern shores of the Aral Sea. The incidence of leprosy (Hansen disease) in the Karakalpakstan sporadic. Total number of registered patients 270 persons, contact persons 1800 people in 2015 year. Three new cases of Hansen disease were detected in 2015 year. Factors which may adversely affect the epidemiological situation in the region: migration, incorrect knowledge of doctors, paramedics and the population about leprosy, leprophobia and ecological trouble.

Methods
372 people were examined in conditions of the expedition in June 2015 year. They lived in 10 regions Republic and Nukus which the capital of Karakalpakstan. The clinical study included a physical examination of the skin and peripheral nerves (palpation, sensitivity tests). Hansen disease diagnosis was confirmed by clinical symptoms and research on smear microscopy Mycobacterium leprae (WHO, 1982, 2012).
Results
Among contact persons for Hansen disease it was found 7 (1.9%) new cases: 5 patients multibacillary Hansen disease (MB) and 2 patients paucibacillary Hansen disease (PB). It was damaged the peripheral nerves in all cases. In addition, we found 4 (1.08%) patients with recurrent MB. Educational training conducted among 446 healthcare workers and population, including information on the diagnosis and prevention of leprosy leprophobia.

Conclusion
International cooperation is very important aspect of the fight against Hansen disease. Damage to the peripheral nerves is an important early manifestation of Hansen disease. Medical examinations of Hansen disease patients and contacts make it possible to identify the disease and its recurrence at an early stage. Training knowledge of Hansen disease among health workers and the public patients to help early detection disease. All this a top priority in the stop transmission of the infection and preventing medical social discrimination patients and their relatives. The authors express their deep gratitude Mr. D. Khodijev (Ministry of Health of the Republic of Karakalpakstan) for their help and support during the expedition.

Keywords: International cooperation, contact person for leprosy, diagnosis of leprosy, educational training
ILC4.2-020
The Survey on Self-examination Behavior among Leprosy’s contact at high risk area in Thailand, 2015.
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1
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Abstract
Introduction:
Today no prophylaxis or vaccinations for prevent leprosy. The screening of leprosy by examination to find out skin patch is the best way to detection new leprosy case especially among risk group. Although the examination towards contact case is routine after treatment but coverage rate was lower than 60 percent.

Objectives
This study aims to screen a suspect case of leprosy for prompt treatment and increase understanding self-examination behavior among leprosy’s contact.

Methods
This survey study conducted in collaboration with the 12 offices of Prevention & Control Region Zone during Raj Pracha Samasai day campaigned (Jan.- Apr., 2016). Information was obtained by using self-report questionnaire divided into three parts: identification and family history, epidemiological and perception regarding knowledge about leprosy such as cause, symptoms, transmission, treatment-seeking, prevention of disabilities and prevention behaviors such as self-examination and treatment-seeking. Each zone draws its 200 samples from selected area setting in 2015 by Raj Pracha Samasai Institute. The participants were advised to self-examine their body or their member at least once a month.
Results.
A total of 2,400 contacts, aged 15 to 65 years completed a questionnaire and inform consent were enrolled in this survey. No difference between gender, 58 percent were female, average age were 43.4 years, the most education finished primary school 80%. Family status was couple 60%, single 25%, and widow 15%. There are 36% moved from endemic area (longest >10 years and shortest 6 months). For contact history, there were 30 % has close relative getting leprosy, 17% has family member getting leprosy, 9% has known village member getting leprosy. The perception towards leprosy, there were 57% know cause of leprosy, 35% know about symptoms, 14% know about transmission, 76% know where can treatment and 12% know how to prevention disability. For self-examination behavior, 14% usually examination their bodies while shower or examination their house member such as child or elder, 52% sometimes examination their bodies, and 34% never check up their bodies. And treatment-seeking, only for who had skin problem, there are 59% go to doctor, 38% go to drug store and 3% use herbal medicine.

Conclusion:
They can be used by those responsible for screen of general population to detect new case of leprosy in order to cut transmission or reduce disability among new case.

Keywords: **Self-examination behavior, Leprosy’s contact, High risk epidemiology area**
ILC4.2–021
Model development of referral system for leprosy patients and enhancement of quality of leprosy control under low endemic condition, Surin province yada touchnon, Suchanya Manitsirikul
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The leprosy is a contagious chronic disease causing permanent disability in patients. Therefore, it has been a crucial problem for public health, economics and society. Disability causation in leprosy mainly is from delay treatment. The study aimed at development model of referral systems for leprosy patients and increase the quality of leprosy control under the low endemic conditions of Surin Province. We gathered information for the study through situation analysis, observation, academic documents, and leprosy experts’ recommendation. The data from the observation and relating conferences provided the design of development pattern. The study was divided into 4 stages; 1) Study and assess operational situation of leprosy prevention and control. 2) Specify a new model of referral system. 3) Following, and monitoring the operation according to the predetermined model. 4) Evaluate the results was performed in. In 2014, by assessment of the operational results of leprosy control after developing the new referral system at Surin Province. We found that the competency and quality of leprosy control at Surin Province was changed more effectively, such as the formation of having the visit teams from several hospitals in Surin Province to visit the leprosy patient at home and perform contact examination. In addition, they also provided on the spot training to the village health volunteers about how to screen people with chronic skin diseases in order to find new leprosy patients. The finding number of new cases of leprosy patients in 2011–2014 had increased to 10, 21, 8, and 16 cases respectively. The number of new leprosy patient with second grade of disabilities had decreased from 7 cases to 4 cases. The completion rate of treatment are likely to rise. They are more able to diagnose the new cases from household contact tracing. Thus, we recommend the other provinces to apply this referral system model by better utilization of regional hospital as hospitals at lower levels can help supporting contact tracing and screening of suspicious cases and sent to the regional hospital. Apart from that, they also recommended that survey for the leprosy patients’ satisfaction toward the service of leprosy clinic should be conducted in order to evaluate the quality and effectiveness of the new referral system model. These will further enhance the quality and standard of the referral system of leprosy control under low endemic condition.

Keywords: model, low endemic, referral system, leprosy
ILC4.2-022
Factor of Delayed Diagnosis and Treatment in Leprosy at health region 9
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Leprosy is a contagious chronic disease causing permanent disability in patients. Therefore, it has been a crucial problem for public health, economics and society. Many studies found that the disability is related with delayed treatment. Hence, this study aimed to determine the factors related to the delayed diagnosis and treatment in leprosy patients. The study was done among 36 leprosy patients who received the treatment less than 9 months, including theirs relatives, the community leaders and the public health officials responsible for these leprosy patients in general hospital and community hospitals located at Health region 9. The data was collected by structured interview during July–September, 2015. Then, content analysis was used to analyze the data. The results revealed that majority of samples were female, mean age is more than 60 years, graduated from primary school, very poor and more than half of patients received the delayed diagnosis and treatment. They have never thought that they would be leprosy. The first symptoms were white patch, anesthesia and no itching. So they bought the drugs by themself, until the rashes spread over theirs body or face. Then they will seek the treatment from doctor. The community also understands that leprosy is hereditary, and fear to contact the leprosy patient. The patients who have a lot of signs and symptoms such as wound and disability would be undesirable. The cause of delay in diagnosis and treatment of leprosy was health system’s delay, particularly in community hospital’s delay. The results of the study will be useful for the policymakers to plan about leprosy control and prevention strategies, to reduce the delayed diagnosis and treatment of leprosy. In the endemic areas should be provide the knowledge about leprosy to new internship doctors. Especially provide the health education to the communities and people about early symptoms, complications and risk of leprosy. For motivate the patient to come to treat in early stage of disease.

Keywords: delayed, diagnosis, leprosy
ILC4.2-023
Data Quality Audit (DQA) of FAIRMED supported leprosy hospitals in India
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Objectives:
1. Check the validity and reliability of the data received through HIS
2. To validate the process of data entry and recording at the hospitals as prescribed by SEI
3. To highlight the strengths and limitations of the HIS software

Methods:
FM supports tertiary care services through its hospitals in India where both in-patient and out-patient services are provided. A total of 11 standardized services are provided by all the FM supported hospitals. The abovementioned services are supported through a funding mechanism called output based Aid (OBA), where grants are provided in advance for the services being rendered. Each hospital shares a yearly patient target that is divided across 4 quarters and funds for the specified numbers per quarter is advanced to the hospital project so that services are rendered. The uptake of service is reported through FM’s hospital information system (HIS), which reports services provided under each category. As grants are advanced solely based on the service provided and reported via HIS, a data quality audit was undertaken based on the aforementioned objectives. The Consultant visited 3 FM supported hospitals and met with hospital staff, district Government officials, general health staff, and most importantly validated by meeting the people who were rendered the service.
Results:
A combination of both verification and validation of hospital records and patient contact was undertaken as a part of this exercise that included 3 FM supported hospitals. A total of 604 patient’s information was verified by physically checking the records from both registers as well as data reported via HIS. In addition, 176 patients were contacted and met during the exercise to validate the cases as reported via HIS. It was found that all the 3 hospitals had meticulously maintained the registers. However, only 2 out of the 3 had regularly updated entries in the HIS. With regard to validating information with patient contact it was observed that the information provided by the patient about their last visit to the hospital was the same reason the hospital reported in their HIS. Only 6 out of the total 176 contacted were unable to recollect due to reasons memory lapse.

Conclusion:
The data audit exercise clearly highlighted a very level of accuracy of data being reported by all the 3 FM supported hospitals. A similar exercise could be extended in the future to ascertain the synergies between the field-based data being captured and reported via the tablet information system with the HIS.

Keywords: Data, Quality, Audit, Leprosy, hospital Information System
ILC4.2-024
How Big or Small Leprosy in Bangladesh: A Country Situation Analysis, Epidemiology, Programme and Policy Implications
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Objectives: After the achieving the nation level elimination (WHO goal of

Methods: The situation analysis was carried out in 2013-2014 which included case validation studies, facility assessment, and qualitative information through case study, in-depth interviews with providers and manager, quantitative information through community and provider surveys and a stakeholder analysis. Both quantitative and qualitative methods were undertaken. Major indicators were adopted from WHO LEM and NLEP guidelines. The study activities were carried out in 10 districts, selected in a proportion to population size, randomly from three strata of high medium and low endemic areas of the country.

Results: The prevalence of about 4000 new cases annually and around 11% grade 2 disability (G2D) among the detected cases became static since 2006. The proportion of infected cases (MB cases about 40-50%), child (5.0%) and female cases (35.0%) also did not change in this period. Stigma was high in the community with very little knowledge on transmission (< 10%) and cardinal signs and symptoms of leprosy (< 1%). Most of the leprosy patients detected were poor (> 70%), had little or no education (> 72%) and engaged in manual labour (>40%). Only half of the physicians and 23.0% other service providers were knowledgeable about cardinal signs and major types of leprosy. The proportion of cases self reported remained at around 30.0% and only a few or no cases were reported from half of the country where NGOs are not working.

Conclusions: The major areas of gaps were in the pre MDT and post MDT phases when people affected by leprosy are not directly under the systems. Vertical activities remained focused in certain pocket areas only and rest of the country stayed out of the reach of the programme. These are the areas where the systems needs to be strengthened, extend collaboration, forged new partnerships and improve services. The key issues to be pursued are to know the health systems considerations necessary to facilitate and strengthen integration of leprosy services into general health care systems.

Keywords: Leprosy, Bangladesh, "Situation Analysis", "Policy Implications"
ILC4.2-025
Accuracy of the Leprosy Alert Response Network and Surveillance (LEARNS) System of the Novartis Foundation and Philippine Department of Health – National Leprosy Control Program

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While leprosy has been eliminated as a global public health threat in 2000, hyperendemic areas remain to exist in the Philippines, most of which are found in geographically inaccessible areas. In response to this, the Novartis Foundation engaged in a public-private partnership (PPP) with the Philippine Department of Health’s National Leprosy Control Program (DOH-NLC) to develop the Leprosy Alert Response Network and Surveillance (LEARNS) System, a mobile health (mHealth) system for early detection and diagnosis. This study measures the accuracy of LEARNS in diagnosing leprosy.

From September 2015 to January 2016, 676 leprosy suspects from the dermatology outpatient clinic of Jose R. Reyes Memorial Medical Center in Manila City were included in the study. Patient information, clinical examination data, and at most three photos of suspected leprosy lesions were submitted to an offsite teledermatologist via LEARNS. The gold standard used was the diagnosis of the on-site dermatologist, as part of standard protocol in the outpatient clinic.

The sensitivity, specificity, overall accuracy, positive likelihood ratio, and negative likelihood ratio of LEARNS was 83%, 77%, 78%, 3.64, and 0.23, respectively. When the photos were not included in the teledermatologist's diagnosis, the values change to 96%, 6%, 9%, 1.02, and 0.69, respectively.

When resources allow, LEARNS with photos of the patients' lesions is recommended for use in the field to attain a good level of sensitivity and specificity. This minimizes the need for a dermatologist to personally see the patient. LEARNS is an innovative solution in solving the "last mile" problem of leprosy - detecting the last few cases for total elimination.

**Keywords:** LEARNS, early diagnosis, Novartis, accuracy, health
ILC4.2–026
Role of Community Health Volunteers in promoting early diagnosis in Leprosy Care: Findings from a multi-centric study in India
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Objectives: Accredited social health activists (ASHAs) are community health volunteers instituted as part of National Health Mission. As per NLEP (2012–2017) strategy, involvement of ASHA is preferred approach in the early detection of leprosy cases. The study investigated the role of ASHAs in early detection of leprosy cases.

Methods: A case control study was conducted (supported by Indian Council of Medical Research) to measure the association of potential risk factors for late diagnosis among new leprosy patients registered for MDT. We analyzed data of 1120 patients that focused on health-seeking pathways from the time first symptom was noticed until they were diagnosed, collected using a structured questionnaire. The patient delay was defined as time from notice of the first symptom to any first health care consultation. The healthcare provider delay was defined as time from the first health care consultation to the confirmation of diagnosis. The total delay was sum of patient and provider delay.

Results: A total of 146 (13%) leprosy patients came in contact with ASHA during their health-seeking pathway; 132 (12%) respondents met ASHA in their first or second visit. Among those who came in contact with ASHA at any point of time, their median duration of total delay was 7 months while those who did not meet ASHA was 12.3 months (p<0.001). The median duration of patient delay was 5 months for those who met ASHA while those who did not meet ASHA was 8 months (p<0.01). The median diagnosis delay was reduced by 5 times among those who came in contact with ASHA was median 0.2 months at some point of time during their health seeking pathway compared to those who did not come in contact with ASHA was median 1 month (p = 0.001).

Conclusions: The results concluded that community volunteers had substantially contributed in early detection of leprosy. Further efforts to improve their engagement would play a key role in reducing the patient delay and leprosy control in India.

Keywords: Community Volunteer, Leprosy, Early diagnosis, Delay
ILC4.2–027
Leprosy, Elimination and Continuing Challenges in Nepal
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Leprosy has been recognized as a public health problem in Nepal. Efforts from different levels had been endorsed for the elimination of this disease. These efforts resulted in the January 2010 declaration that leprosy had been eliminated at national level with prevalence rate (PR) 0.79 per 10,000 populations. Nepal has sustained elimination of leprosy however in 2015 a PR 0.89 of was recorded. This rate has increased slightly compared to 2014 records that indicate PR of 0.83 per 10,000 populations. Looking at the PR trends of the last 5 years since the 2010 declaration of elimination of leprosy, prevalence rate is gradually increasing which possess a serious threat to the government.

In 2015, a total number of 2959 new cases were detected with new case detection rate (NCDR) 10.8 per 10,000 populations and 53.86% of Multi Bacillary cases. Endemicity of leprosy is mainly confined to the lowland Terai region bordering with India accounting to 80% cases under treatment and 82% new cases detected. 36.67% of the new cases were female and 10.85% were children. Similarly, 135 cases of Grade 2 disability (G2D) were recorded and proportion of G2D among new cases was 4.56%. G2D among new cases and rate per 100,000 populations are major monitoring indicators of early case detection as per National & Global Strategy (2011–15).

Leprosy control programme has been sustaining the elimination at national level however elimination at sub-national level is still a challenge. Nineteen out of 75 districts have prevalence rate above 1/10,000 populations which was limited to merely 17 districts last year. Similarly, G2D rate is not decreased satisfactorily in order to achieve the target. Therefore, it indicates that there is need to expand and strengthen the early case detection and treatment activities. Early detection and timely treatment is very crucial for prevention of disability due to leprosy. Rigorous effort to manage leprosy in these districts should be continued even though it is declared eliminated nationally.

Keywords: Leprosy, Nepal, Elimination, Disability, Early detection
Risk Factors Associated with Delayed Diagnosis of Leprosy in Maharashtra, India

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Objectives
Delay in diagnosis is very common in leprosy and a risk factor for disability. Data on the reasons for delay in leprosy diagnosis would assist to design an intervention strategy to improve timely diagnosis. This study investigated the quantitative relationship between delay of diagnosis, risk factors and disability among new leprosy patients.

Methods
A matched case control study was conducted (supported by Indian Council of Medical Research) among new leprosy patients registered for MDT from January 2013 in Maharashtra. Cases were new leprosy patients with grade 2 disability and Controls were new leprosy patients with grade 0, at the start of MDT. A total of 70 grade 2 disability patients and 140 grade 0 patients were interviewed using a pre-tested, locally translated structured questionnaire. Two-stage cluster sampling was chosen to sample the study districts and study participants.

Results
The median patient delay (time from notice of the first symptom to any first health care consultation) was 7 months in cases and 2 months in controls. The median healthcare provider delay (time from the first health care consultation to the diagnosis) was 5.5 months in cases and 1.2 months in controls.

Factors associated with grade 2 disability among new cases were those who: had sensory impairment symptoms noticed as first symptom (OR 8.4; 95%CI, 3.1–22.9), visit to non-qualified practitioners (OR 3.6; 95%CI, 1.3–9.6), first health care consultation to a private practitioner (OR 2.6; 95%CI, 1.3–4.9), patient delay > 6 months (OR 3.8; 95%CI, 1.9 – 7.5), provider delay > 6 months (OR 2.5; 95%CI, 1.2–4.9), low knowledge level about leprosy symptoms before diagnosis (OR 2.8; 95%CI, 1.2–6.7).
Logistic regression analyses revealed that low knowledge about leprosy symptoms before diagnosis (Adjusted OR 2.9; 95%CI, 1.1–8.0), visit to non-qualified practitioner (Adjusted OR 6.8; 95%CI, 2.0–22.3), patient delay > 6 months (Adjusted OR 4.3; 95%CI 2.0–9.2) and alcohol abuse before the diagnosis (Adjusted OR 2.3; 95%CI 1.1–5.1) were significantly associated with increased risk of grade 2 disability among new cases.

Conclusions
To reduce the health service delay, healthcare providers at different levels, including non-qualified practitioners, should be trained to maintain a high index of suspicion of leprosy. To reduce patient delay, public health promotion is needed to raise the awareness of leprosy. Thus identified risk factors should be utilised in formulating targeted public health interventions to improve early diagnosis, prevent disability and ultimately the extent of transmission of the disease.

Keywords: Leprosy, Delay, Risk, case control study
**ILC4.2-029**  
**The Survey on Self-examination Behavior among Leprosy’s contact at high risk area in Thailand.**  
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**Abstract**

**Introduction:**  
At present, there is no vaccine to prevent people from having leprosy. Leprosy screening to early detect leprosy related lesions is the best way to identify new leprosy case especially among risk group. Although examination in contact cases is suggested but the coverage rate was lower than 60 percent.

**Objectives**  
This study aims to screen leprosy suspected case for prompt treatment and understanding self-examination behavior among leprosy contacts.

**Methods**  
This survey conducted collaboratively between Raj Pracha Samasai Institute (RPSI) and the 12 regional offices of Disease Prevention & Control all over the country during Raj Pracha Samasai day campaigned (Jan–Mar). Information was obtained by using self-report questionnaire which divided into three parts namely 1) identification and family history 2) epidemiological and perception regarding leprosy knowledge such as causes, symptoms, transmission, treatment–seeking, prevention of disabilities 3) prevention behaviors such as self-examination and treatment–seeking. Each region drew its 200 samples from selected area determined in 2015 by RPSI. The participants were advised to self-examine themselves or their family members at least once a month. Informed consent was obtained before collecting information.
Results.
A total of 2,400 contacts, aged between 15 and 65 years. There was no differences between genders, 58 percent were female, average age was 43.4 years, 80 percent completed primary school. Regarding the family status; 60 percent were married, 25 percent were single, and 15% were widow. There were 36 percent of them had moved from endemic area (longest >10 years and shortest 6 months). For contact history, 30 percent had leprosy cases among close relatives, 17% had leprosy cases among family members, 9% knew that there were leprosy cases among community members. For the perception on leprosy, there were 57% knew the cause of leprosy, 35% knew the symptoms, 14% knew the transmission, 76% knew where to get treatment and 12% knew how to prevent disability. For self-examination behavior, 14% usually examine their bodies during showering or examine their family members such as the children or the elderly, 52% sometimes examine their bodies, and 34% never examine their bodies. Treatment-seeking was practiced among only those who had skin problems, 59 percent visited doctor, 38 percent went to drug store and 3 percent used herbal medicine.

Conclusion:
The officer can be used by those responsible for screening general population to detect new cases of leprosy in order to interrupt transmission or reduce disability among newly detected cases.

**Keywords:** Self-examination Behavior, Leprosy contact, High risk area
ILC4.2-030
Analysis on Value of Active Survey in Case Detection of Leprosy at Five Major States in India
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OBJECTIVES:
In India, leprosy was integrated in general health care services and declared elimination of leprosy as a public health problem in December 2005. This promoted passive reporting of cases through community awareness and active survey was carried in special situations in endemic and non-endemic areas. The objective of this study was to assess the value of active survey in early detection of leprosy cases.

METHODS:
A case control study was conducted (supported by Indian Council of Medical Research) in five states of India (Gujarat, Maharashtra, West Bengal, Delhi and Andhra Pradesh) to measure the association of potential risk factors for late diagnosis among new leprosy patients registered for MDT. Two stage cluster sampling was chosen to sample the study districts and study participants. We analysed the data of 1400 patients that focused on survey related items and delay related items using a structured questionnaire.
RESULTS:
A total of 360 (26%) leprosy patients reported that they were identified in survey. The odds of delayed diagnosis (more than 12 months) is 2.5 times higher when health care provider did not meet the patient in any survey compared to when health care provider met the patient in any survey (OR = 2.5; 95% CI, 1.9 – 3.2). Among patients identified in survey, the median patient delay (time from the notice of first symptom to any first health care consultation) was 4 months and among patients not identified in survey was 8 months (p<0.001). The median healthcare provider delay (time from the first health care consultation to the confirmation of diagnosis) was 0.7 months for patients identified in survey while it was 1 month for those not identified in survey (p<0.005). The median total delay (sum of patient and provider delay) was 6.2 months for those identified in survey while it was 13.5 months for those for those not identified in survey (p<0.001).

CONCLUSIONS:
The findings concluded that active survey is a useful method to promote early diagnosis in leprosy. This study showed that there is a significant delay in detecting new cases under the routine (non-survey) programme. Periodic active surveys should be incorporated in endemic and non-endemic populations to promote early diagnosis.

Keywords: Leprosy, Delay, Yield of survey, case control study
ILC4.2-031
Appraisal of Epidemiological Risk Areas and Effects of Leprosy Detection Interventions: Evidence from Leprosy Elimination Project, Deep South of Thailand
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Objective:
In Thailand, integrated programme for leprosy control is adopted. New case is detected and submitted to appropriate treatment, however benefit of integrated leprosy detection interventions are unclear. This paper identified whether leprosy detected by integrated six group’s activity to three different epidemiological risk areas is worthwhile.

Methods:
This retrospective study is part of the intensive leprosy elimination project, in 12th health area (seven provinces in lower South Thailand). First, only three leprosy endemic areas (Yala, Narathiwat, and Pattani province) that located in Deep South Thailand were recruited. We defined and divided epidemiological leprosy risk area into three groups (high, moderate, and medium epidemiological risk area). All was done based on the national leprosy control guideline and the 12th health area specific criteria. Second, we revised leprosy registration system (2000–2014) in the 12th health area. It was used as a basis data to define epidemiological risk area, assign group of integrated interventions, and organize leprosy detection activities. Then, integrated leprosy detection interventions that were delivered by the Rajapracha Raj Pracha Samasai Institute were reviewed, adopted, and implemented. Next, we launched six different groups of integrated leprosy detection interventions to those three epidemiological risk areas during January–December, 2015.
A new leprosy case was diagnosed based on the standard case definition recommended by the World Health Organization. Last, each new leprosy case detected was analyzed, according to general characteristics, place of resident, type of epidemiological risk areas, and group of integrated case detection interventions.

Results:
The results showed that, 45 new leprosy cases were diagnosed, 36(80.00%), 8(17.78%), and 1(2.22%) cases were detected in defined high-, moderate-, and medium epidemiological risk area, respectively. 23 and 13 leprosy patient (51.11% and 28.89%) live in Narathiwat and Pattani province. We revealed that rapid village survey (RVS) to 23 villages defined as the high epidemiological risk area, only 8 villages (34.78%) or 12 cases (33.33%) were detected. On the other hand, 73.33% (24, 8, and 1 of new leprosy case) were detected by strengthen ‘regular case-detection efforts’ in high, moderate, and medium epidemiological risk area.

Conclusion:
Strengthen regular case detection effort to all epidemiological risk area is worthwhile, while the RVS, resource requiring, provides little effects. We anticipated that case detection policy should be appraisal. Economic evaluation of existing case detection interventions is needed for better resources allocation to eliminate leprosy in un-arrested area of Deep South Thailand.

Keywords: Appraisal of Epidemiological Risk Areas, Effects of Leprosy Detection Interventions, Leprosy Elimination Project, Leprosy in Deep South Thailand
ILC4.2-032
Comprehensive District Leprosy Control Program (CDLCP): Combining FAIRMED’s (FM) tertiary hospital services with field-based services in India
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Objectives:
1. Annual new case detection rate (ANCDR) of the district increases.
2. Increase in no. of cases managed for reaction / neuritis by PHCs / district.
3. Disability gr-0 cases among the new cases remain on gr-0.
4. Disability gr-1 among the new cases remain on gr-1 or improve to grade 0
5. Reduction in gr-2 disability cases among the new cases

Methods:
Following the successful completion of the pilot POID project, which won the ‘Young Scientist Award’ from the International Leprosy Congress (ILC), 2013, the POID project was integrated with the tertiary hospital services that together formed the Comprehensive District Leprosy Control Project (CDLCP). The CDLCP project identified 5 sources from where people with leprosy can be diagnosed without deformity. Each of the districts were divided amongst 5 divisional coordinators (DC’s) who visited each of their designated primary care health centres (PHC) to monitor & support the services for people. The DC’s captured their information on a tablet information system that enabled data being captured and stored on the server on a real time basis. The project also envisaged that all the good practices that were initiated and implemented during the pilot POID phase was continued and sustained.
Results:
Majority of the people diagnosed were men (64%) when compared to women (36%). Equally interesting to note is that most of the children diagnosed were below the age of 10 years. Close to 37% of people diagnosed were with gr-0 and a large proportion were gr-2 (62%). Majority of diagnosed were with multi-bacillary (MB) type of leprosy who were predominantly referred to by the Accredited Social Health Activist (ASHA’s). It is interesting to note that close to 5.4% of the total 5,691 contacts examined were diagnosed and confirmed with leprosy. With regard to School Health Program (SHP), it’s noteworthy to share that out of the 3,215 children referred as suspects close to 3% were diagnosed and confirmed with leprosy.

Conclusion: The CDLCP project has been extremely successful in diagnosing early cases of leprosy without deformity. It has also been able to address disability, where the disability status has improvement over a period of time. FM believes that a combination of providing both tertiary leprosy care along with field-based intervention will hopefully facilitate us in reaching to the last case of leprosy.

Keywords: leprosy, disability, early diagnosis, india, primary health
ILC4.2-033
Reaching to unreach people – Mobile Information, Education, Communication Van in Bihar, India
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Background: Leprosy continues to be a public health problem in many countries with 61% of the world’s leprosy cases being diagnosed in India. In the rural area of Bihar, it is a different problem with Leprosy being feared and a lack of knowledge about the disease leading to the exclusion of sufferers from the community. 89% population lived in rural Bihar. This prevents sufferers from obtaining the services of a doctor. What they do not realize is that the disease is treatable through chemotherapy and multi-drug therapy. Although the Prevalence rate has decreased, the number of cases detected every year remains high. In order to fight against the stigma associated with leprosy, and prevent the isolation of the patients, LEPRA Society has started Mobile IEC Van in Bihar.

Objectives: To aware the people about disease, treatment and availability of treatment, so that they can report to nearest Public health system for treatment.

Methods: LEPRA has two Mobile IEC Vans in Bihar. These vans are fitted with LCD, Video player, Public Address System with Genset (For power supply). Each day this van shows 2 movies on leprosy (in local language) and in the daytime it’s do the 2–3 exhibitions in villages. This van runs for 22 days in a month. The driver and IEC assistant stay in the field for week and come back on Sunday. The concern supervisor is making pre meeting with local leader for the programme.

Results: We have analysed the one year report and findings are given below. No. of Film Showed Approx. person attended No. of Village Exhibition done Approx. person attended No. of Suspect referred No. of cases confirmed Remarks 102 20500 256 76700 556 101 Person reached to PHC and received the treatment

Confirmed cases are less because many suspects are not coming forwards in fronts of their villagers. They are reporting later to Primary Health Centre. We have seen where ever our IEC Van is moving, new case detection are quite high till three months.

Conclusion: We have seen these initiatives are very effective in the rural area where literacy rate is low and people cannot read and understand. Cinema connects very well the villagers and we deliver the messages through the Picture.

Keywords: Information, Education, Communication, Leprosy
ILC4.2-034

Etude sur l’'accès aux soins de santé chez les malades lépreux au Burundi
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Objectifs : Une étude a été conduite au Burundi en vue d'évaluer l'accès aux soins chez les malades lépreux dans trois (3) des cinq (5) provinces endémiques. Les objectifs étaient de déterminer les besoins et attentes des malades et ancients malades lépreux et de recueillir les suggestions en vue de développer des approches plus adaptées.

Méthodologie : Il s’agit d’une étude cas témoin, avec appariement de l’âge et du sexe. L’étude a été menée auprès de 240 malades et anciens malades lépreux (cas) et 240 non porteurs de la lèpre (témoin) soit au total 480 personnes. L’étude s’est déroulée dans les Hôpitaux de références et les centres de santé.

Résultats : Parmi les enquêtés, 63% sont de sexe masculin et plus de la moitié a entre 30 et 60 ans; 70% pratique l’agriculture. Parmi les cas, la plupart sont des anciens malades lépreux (66,5%) dont un grand nombre multi bacillaire (64,3%). Parmi les malades encore sous traitement, près de 4 cas sur dix sont porteurs d’ininvalidité de grade II (37,6%) et plus de la moitié des nouveaux cas (54,5%). Parmi les anciens malades enquêtés, trois quart avaient terminé le traitement et la carte portait l’information (75,6%) et un peu moins d’un malade sur cinq ne disposait pas d’informations sur la carte (17,6%). Plus de la moitié des cas payent au comptant (66,3%) contre 53,3% des témoins (p=0,001, OR=1,58 IC 95% 1,196–2,087). L’attestation d’indigence est plus utilisée chez les cas (18,4%) contre 7,9% (p<0,0001, OR=0,0086 IC 95% 0,06–0,15). La carte d’assistance maladie (CAM) est moins utilisée chez les cas (15,4%) que chez les témoins (18,8%) (p<0,0001, OR=0,22 IC 95% 0,16–0,30). Les non lépreux font très souvent appel à la Mutuelle de la Fonction Publique (20% contre 1%, p<0,0001, OR=0,96 IC 95% 0,143–0,268).

Conclusion
L’étude conduite au Burundi en vue d’évaluer l’accès aux soins chez les malades lépreux dans trois (3) des cinq (5) provinces endémiques de la lèpre montre que les non lépreux utilisent le plus souvent les Mutuelles ou les Cartes d’Assurance Maladie, pendant que les malades lépreux paient pour les soins au comptant ou utilisent des attestations d’indigence.

Un effort devrait être fait pour que les malades lépreux puissent accéder au système de paiement de soins basé sur les mutuelles de santé.

Keywords: insertion sociale, accès, soins de santé, Burundi
ILC4.2–035  

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Nigeria is among the seventeen countries in the world that are still reporting more than 1,000 new cases of Leprosy annually. The control programme in Nigeria has consistently reported over 3,000 new Leprosy cases annually in the past 8 year, though there is a consistent decrease in new leprosy cases notified from 4,665 in 2007 to 3,076 in 2014.

The aim of this study is therefore to assess the trend of Grade 2 disability among the new leprosy cases notified by the programme from 2007 –2014 and document the lessons learnt to guide further programme implementation.

Methodology
The National recording and reporting formats was used in all the MDT clinics in the country to capture all the patients level information including Grade 2 disability among new Leprosy patients; this was further analyzed taking into consideration the quarterly reports from all the states in Nigeria.

Results
The number of new leprosy cases notified in Nigeria decreases from 4,665 in 2007 to 3,623 in 2011 from where it increased to 3,805 in 2012 and thereafter dropped to 3,076 in 2014. The proportion of new cases with Grade 2 disability on the hand has been on gradual increase from 12% in 2007 to about 14% in 2014. About 70% (26 states) of the 37 states in the country has Grade 2 disability above 10% in 2014; the grade 2 disability among new leprosy cases in these 26 states in 2014 ranges from 11% to 57%.
Almost 100% of the Grade 2 disability among new cases are MB cases. A further analysis of the 2014 report shows that 10 (27%) of the 37 states reported more than 100 new leprosy cases in 2014, with only a total of 2 of the 10 states having grade 2 disability grading among new cases to be below 10%, an indication that most cases are detected very late.

Conclusion and Recommendations
The study shows that as the number of new leprosy cases notified in the country dropped, the Grade 2 disability among new cases on the hand was on the increase. An indication of late and low case finding as a result of dwindling capacities. As the burden of leprosy decreases, capacity for leprosy case findings also decreases, efforts must therefore be put in place to ensure that capacity of programme staff, health staff and community workers are continuously enhanced to ensure early case Leprosy findings. System for immediate validation of leprosy cases and also on-the job training must be put in place to strengthen diagnosis of leprosy cases.

Keywords: Grade 2 disability, Leprosy, Capacity
ICLC4.2-036
Active case-finding for intensifying leprosy elimination in 8 Provinces of the Democratic Republic of the Congo and achieve the Bangkok Declaration of July 2013
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Abstract text
Objectives
The Democratic Republic of the Congo is one of the seven countries with a heavy leprosy burden in the WHO African Region, detecting more than 1,000 cases of leprosy per year. The country therefore submitted a project to intensify the elimination of leprosy for funding by the special funds of The Nippon Foundation, in order to attain the objective of the Bangkok Declaration “towards a leprosy-free world”. Specific objectives for achieving this goal were to increase the screening of new cases of leprosy by more than 50% compared to the screening in 2013 in the health zones covered by the project; treat 100% of leprosy patients screened using WHO-recommended Multidrug therapy; provide care to all new cases showing disabilities due to leprosy.

Methods
The activities mentioned below were carried out by eight leprosy provincial coordination Offices in Bas-Uele, Equateur, Haut-Katanga, Haut-Uele, Mai-Ndombe, Tanganyika, Tshopo and Tshuapa; 24 health zones and health centres of targeted areas, with support from the National Leprosy Elimination Programme, collaboration of the WHO and the NGO Action Damien:
• Allocation of financial resources, sensitization equipment and drugs to the targeted areas;
• Sensitization of the political and administrative authorities of the eight targeted provinces;
• Organization of a briefing with the provincial coordination team of the leprosy programme and management teams of the health zones hosting the project;
• Training health workers and community relays;
• Sensitization of the population of the villages;
• Selection of suspected patients and diagnosing leprosy through active screening and home visits in villages of former leprosy patients;
• Prescription of Multiple Drug Therapy (MDT) for cases detected with leprosy signs;
• Treatment of other cases of dermatosis observed in screened suspected cases;
• Identification and treatment of patients showing complications due to leprosy.

Results
These activities enabled to detect 1,488 new cases of leprosy who were treated with WHO recommended MDT. This represents an increase of 75% compared to the detection made in the same health zones in 2013. Increased detection was higher in the health zones which had not conducted similar active screening in previous years (Haut-Uele, Tshuapa and Tshopo).

Conclusions
The success in the first year of implementation of the project to intensify the Elimination of leprosy should advocate for continuing in 2016, during which 22 health zones are targeted in the same eight provinces visited in 2015.

Keywords: Multidrug therapy (MDT), New cases, Detection, Health zone, Sensitization
ILC4.2–038
Global elimination of leprosy by 2020: are we on track?
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Objectives
Every year more than 200,000 new leprosy cases are registered globally. This number has been fairly stable over the past 8 years. WHO has set a target to interrupt the transmission of leprosy globally by 2020. The aim of this study is to investigate whether this target, interpreted as global elimination, is feasible given the current control strategy. We focus on the three most important endemic countries, India, Brazil and Indonesia, which together account for more than 80% of all newly registered leprosy cases.

Methods
We used the existing individual-based model SIMCOLEP to predict future trends of leprosy incidence given the current control strategy in each country. SIMCOLEP simulates the spread of M. leprae in a population that is structured in households. Current control consists of passive and active case detection, and multidrug therapy (MDT). Predictions of leprosy incidence were made for each country as well as for one high-endemic region within each country: Chhattisgarh (India), Pará State (Brazil) and Madura (Indonesia). Data for model quantification came from: National Leprosy Elimination Program (India), SINAN database (Brazil), and Netherlands Leprosy Relief (Indonesia).

Results
Our projections of future leprosy incidence all show a downward trend. In 2020, the country-level leprosy incidence has decreased to 6.2, 6.1 and 3.3 per 100,000 in India, Brazil and Indonesia, respectively, meeting the elimination target of less than 10 per 100,000. However, elimination may not be achieved in time for the high-endemic regions. The leprosy incidence in 2020 is predicted to be 16.2, 21.1 and 19.3 per 100,000 in Chhattisgarh, Pará and Madura, respectively, and the target may only be achieved in another 5 to 10 years.

Conclusions
Our predictions show that although country-level elimination is reached by 2020, leprosy is likely to remain a problem in the high-endemic regions (i.e. states, districts and provinces with multimillion populations), which account for most of the cases in a country.

Keywords: Future leprosy incidence trends, Leprosy elimination, Current leprosy control, National and subnational, Individual-based modeling
Factors responsible for delay in reporting for leprosy diagnosis and treatment

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Objective: Leprosy is a disease of nerves and skin. Early diagnosis of the disease or nerve function impairment in those that have been diagnosed can prevent permanent nerve function impairment in the large majority of newly diagnosed leprosy patients.

Method: In two multi-center prospective clinical trials (n>1000) – Treatment of Early Neuropathy in LEProsy, TENLEP – all enrolled patients were asked by means of a semi-structured questionnaire about their first signs and symptoms, whether leprosy was suspected, possible reasons for delay and, when leprosy was suspected, this was made known to spouse, immediate family and/or larger social network. Additionally, patients were asked about health seeking behavior prior to diagnosis. The research took place in six centers in four leprosy endemic countries in Asia: Indonesia, India, Bangladesh and Nepal.

Results: Different cultural factors and prevailing attitudes play an important role in delay for diagnosis and treatment.

Conclusions: Knowing the factors that contribute in delay in reporting for treatment may help develop strategies to address these and hence are expected to result in earlier reporting for diagnosis and treatment thereby contributing to the prevention of NFI and subsequent impairments. ((Data are currently being analysed)

Keywords: Early diagnosis, Stigma, prevention of disability
ILC4.2-040
A STUDY OF NEW LEPROSY CASE FINDING BY ACTIVE SEARCH IN DERMATOLOGICAL DISEASE PATIENT (ADP) DATABASE IN KANTARALUK HOSPITAL, SISaket
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This study was conducted as the operational epidemiology. Its goals were (1) to develop a method of identifying new leprosy cases by screening existing dermatological disease patients at Kantaraluk Hospital, Sisaket; the method being developed was aimed to be inexpensive, efficient, and appropriate to its low prevalence rate, and (2) to estimate a per-case expense involved in this method. The target group was a group of dermatological disease patients who had made over 2 visits to the hospital for treatment and were residents of Kantaraluk and Benjaluk districts. Letters were mailed to them that invited them to take a screening test for leprosy at the hospital. Based on the information gathered between October 2008 and February, 2009, those who met the above criteria were 769 patients of the entire dermatological disease patient population of 5,730.

The results of the study showed that 73.73 percent of 769 patients (N=567) came for the test. The majority (54.10%) of these were females. The youngest and oldest patients were 2 and 95 years of age, respectively. The majority (69.83%) of these patients lived in leprosy-free villages. Three leprosy cases were found as a result of the screening; one case lived in a then leprosy-free village and the other two lived in a village with leprosy cases 5 years prior to the time of the study. The results of this study showed a detection rate of 1.28 cases per 100,000 tested patients. That is, a new case was diagnosed for every 189 patients being tested. The average expense in identifying a case was 2,887.67 baht. The method required one worker to conduct this search. The results suggested that the approach to finding new leprosy cases is still aggressive rather than passive. However, the fact that budget management has changed may force hospitals to actively search for new cases in their own database of existing patients with dermatological diseases. The results also indicated that leprosy-free villages and villages with leprosy cases 5 years prior should not be ruled out as a potential location. This method is simple enough to be integrated as part of the outpatient-department (OPD) work at general hospitals or primary care units, which are easily accessible to patients. For this reason, staff at these two places should be enabled to perform the screening method and refer suspected cases to other units for further leprosy screening.

Keywords: NEW CASE FINDING, ACTIVE SEARCH, LEPROSY, DERMATOLOGICAL DISEASE, KANTARALUK HOSPITAL
ILC4.2-041
Role of grassroots level health care workers in leprosy programme with particular reference to Accredited Social Health Activists (ASHA) in India
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In the wake of integration of leprosy services into the general health system and lack of enough trained paramedics, dependence on the grassroots level health workers is crucial for timely case detection. Dependence on grassroots level workers is not a solution for delayed case detection in leprosy. But training and motivation are very important for the grassroots level workers in supporting leprosy programme. “Every village/large habitat will have a female Accredited Social Health Activist (ASHA) – chosen by and accountable to the panchayat—to act as the interface between the community and the public health system”.

Objectives
To identify the role of ASHA in early case detection of leprosy cases
To identify key factors affecting involvement of ASHA in leprosy programme
To suggest measures to improve grassroots level interventions for early case detection

Methods
The study was conducted in one of the high endemic districts of India Vizianagaram in Andhra Pradesh.
Qualitative methods - In-depth interviews with different stakeholders with more emphasis on primary target group, Group discussions and case studies were used.
Results
Previous studies on efficiency of ASHA workers in leprosy case detection show that their referrals contribute only a small percentage of the cases actually existing in the community. In the study district ASHAs contribute 31.1% of all new cases for the past 3 years. Following are the number of cases referred by ASHA out of the total new cases:
2013: 133 out of 395
2014: 139 out of 535 (active search in endemic pockets account for higher total)
2015: 128 out of 356
The participants of group discussions expressed the need to get reasonable financial rewards though they are committed to the health and well-being of the local community. “Currently we are involved in so many activities for nominal rewards and sometimes for nothing.” Incentives – however small the amount is – play a major role in participation of ASHAs in leprosy programme. ASHAs expect greater motivational support from health system and the programme for a reasonable allocation of their time for leprosy awareness and suspecting and referring cases.

Conclusions
The major role of ASHAs in leprosy programme is supporting early case detection by suspecting and referring cases. They play an important role in treatment completion. ASHAs can take part in raising awareness and supporting self-care. But required skill development activities and human resources to coordinate leprosy programme at grassroots level remains a challenge.

Keywords: Grassroots level health care workers, leprosy programme, early case detection, ASHA
ILC4.2-042
Epidemiology and assessment of the physical disabilities and psychosocial disorders in new leprosy patients admitted to a referral hospital in Belo Horizonte, Minas Gerais, Brazil
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Purpose: Despite intensive campaigns initiated in 1990, leprosy remains endemic in Brazil. It is essential that simple and efficient methods of assessing the extent of disease-related disabilities be established so that appropriate treatment and rehabilitation can be provided to patients in order to break the disease transmission chain.

Method: The socioeconomic, clinical, and physical/psychosocial disabilities of 56 new leprosy patients admitted to a referral hospital in Belo Horizonte, Minas Gerais, were assessed using available rating scale tools namely, WHO Impairment Grade (IG), Eye-Hand-Foot (EHF) Impairment Sum, Green Pastures Activity Scale (GPAS), Screening of Activity Limitation and Safety Awareness (SALSA), Participation, Jacoby stigma and Hamilton depression scales.

Results: Approximately 60% of the patients exhibited grade 1 or 2 physical disabilities, 46% presented activity limitations and lacked safety awareness, around 30% presented difficulties in social interaction and perceived leprosy-related stigma and about 60% exhibited some degree of depression.

Conclusions: Intensive educational campaigns in schools, administration of proper medical and psychological care to patients with disfigurement/deformities and rethinking the role of specialized referral hospitals are some of the proposals presented herein with the aim of eliminating leprosy from the list of public health diseases in Brazil.

Keywords: Leprosy, Hansens disease, leprosy-related disabilities, rating scores
ILC4.2-043
Improvement of leprosy detection through a one-day basic dermatology training of Primary health care workers in Mali
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Introduction:
In many developing countries, primary health workers (PHW) are managing a large number of patients with skin diseases including leprosy. Acquisition of basic dermatology knowledge will help them to provide a better leprosy detection and quality of care. Back in 2004, we conducted a pilot project based on a short term training programme for PHW focusing common skin diseases including leprosy. This study is aimed to evaluate the impact of such programme on the detection of leprosy.

Methods: We invited all the PHW in the study area to participate in our one-day training programme on the detection of early stage leprosy and management of common skin diseases. We taught trainees to suspect any “pale patch” as leprosy and to perform the sensory testing appropriately to eliminate others diseases presenting with similar signs. All the trainees were submitted to an anonymous written test before training, immediately after and 12 to 18 months post training. We used as outcome measure the increase in the number of suspected or referral leprosy cases diagnosed with exactitude by HCW after training.
Results: Overall, 495 HCW attended the one day training session. The proportion of participants who provide correct answers before training, just after were respectively: 33% and 57% for correct diagnosis of early leprosy, 5% and 39% for test of sensation when facing a pale patch, 28% and 47% for referral. Prior to the training, no case of leprosy was suspected in the study area, but after training, we confirmed 5 cases of leprosy out of eight total suspected and referred by the HCW to us for further examination.

Discussion: The training resulted in significant improvement in the ability of the HCW in detecting and referring leprosy cases. This study addresses how leprosy control can be improved by involving primary health care staff and by the implementation of only a single day’s training on basic dermatology.

Conclusion: The role of the dermatologist in this post–elimination era of leprosy should be reconsidered. Multiple training programmes need to be developed and implemented to empower primary health care providers with basic dermatology and leprosy knowledge across the country.

Keywords: leprosy detection, Training, Primary health care
ILC4.2-044
The development of communication model in commercial area along Thai-Cambodian borders
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Introduction
In the light of ASEAN community, population migration is common. This phenomenon results in the risk of disease transmission; for instance the transmission of leprosy, a communicable disease in man, in congested commercial border areas.

Objectives
To develop a leprosy communication model by involving opinion leaders.

Methodology
This is the combination of survey, action and theory applied studies. The study is divided into 4 phases. Phase 1: A survey on knowledge, attitude and behavior of people in Chongjom market, and a selection of equal sex-age study subjects to be interviewed in both pre- and post-intervention. All people presented at Chongjom market on the data collecting days were included. Phase 2: The participatory development of communication model. All opinion leaders participated in this phase. Phase 3: Adjustment of the model. Phase 4: Evaluation of the model. Data collection was conducted using semi-structured questionnaire. Frequency and a Chi-square were used to describe and analyze data respectively. A p-value of
Results
The crucial result of this study was the opinion leader’s communication model which was conducted in two steps; health workers sent messages to opinion leaders, the opinion leaders then forwarded the message to the people in Chongjom market. These steps were conducted in accordance with the ‘two step flow theory’. The two-language leprosy messages were participatory formulated in the form of short and easily understood printed-media, and radio spot. The evaluation results showed that the percentage of the 300 respondents who had leprosy knowledge had increased significantly, from 48.2% in pre-intervention to 54.6% in post-intervention. The percentage of the respondents who had positive attitude on preventive self-care behaviors had increased significantly from 71.7% to 97.4%. That of the opinion leaders who performed leprosy related activities had increased significantly from 23% to 32.8%.

Conclusion
The Department of Disease Control is suggested to promote the communication model which is conducted by sending messages through an opinion leader group who will forward the messages to a target group by using village broadcasting posts and distributing two-language leaflets. This is to prevent leprosy transmission along the border where people of the two countries sell and buy goods.

Keywords: leprosy messages, communication, participatory development, leprosy related attitude, leprosy knowledge
ILC4.2-045
Maintien de l’expertise lèpre au niveau des acteurs du système de santé : Expérience de la côte d’Ivoire
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Contexte : La Côte d’Ivoire atteint le seuil de l’élimination de la lèpre comme problème de santé publique en 2001. L’un des défis importants dans le contexte de post-élimination est la démobilisation des acteurs du système de santé avec une perte progressive de l’expertise lèpre. Une intervention pilote de supervision formative a été mise en place pour remédier à cette situation.

Intervention : Le pays a été organisé en 4 circuits opérationnels doté chacun d’un centre de référence (COR). Sur une base trimestrielle, les infirmiers superviseurs lèpre (ISL) de chacun des 4 circuits sont regroupés pour une mise à jour des connaissances par le programme. Un planning de supervision est organisé et exécuté en fonction des problèmes identifiés lors du regroupement.

Résultats : En trois ans 12 circuits ont été organisés pour l’ensemble du pays. Les 83 ISLs du pays ont systématiquement bénéficié d’un recyclage annuel. Sur les trois années 2970 malades ont été dépistés en pris en charge dans les 4 COR. Il a été en outre observé un meilleur suivi des patients, avec une amélioration substantielle des indicateurs du programme.

Conclusion : Cette intervention pilote a permis de dynamiser et de relancer le PNEL. La pérennisation de cette stratégie dépend essentiellement de la disponibilité des ressources et de la volonté politique du ministère de la santé.

Keywords: expertise, supervision, formative
ILC4.2-046

A comparison of three types of targeted, community-based health education aimed at promoting early detection

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Objective:
The objective of this study is to compare three different community-based methods for early detection of leprosy, in the context of a general health care programme.

Methodology:
The study is being conducted in three endemic states in India, by The Leprosy Mission Trust India, German Leprosy Relief India and Netherlands Leprosy Relief, India.

The Community based methods which will be implemented and studied are:

• Training Local non-formal practitioners (non-allopathic healers)
• Giving Health education and motivating newly diagnosed leprosy patients to bring close contacts/suspects for confirmation of diagnosis
• Increasing awareness in the community regarding early signs of leprosy. Each of these interventions is carried out in a geographically limited area, involving the general health care system and the National Leprosy Elimination Programme (NLEP) staff. The first two interventions have been tried successfully in a hospital setting, so we are trying to assess the efficacy and sustainability in a field setting. At the end of the project we will know whether these are effective in improving new case detection, and if they are which method is better.

Results:
The interventions will be started in March so it will be too early to get the final results, but we are sure we will be learning and gaining considerable insight into these issues as we implement the activities and document the process. These will be presented.

Conclusions:
As above, it is too early to come to any conclusions.

Keywords: community, early detection, index case, nonformal practitioners, awareness
ILC 4.2-047
Une expérience pilote de consultation avancée de dermatologie pour améliorer la détection des cas de Lèpre à Madagascar.
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Problématique: A Madagascar ont dépisté plus de 1500 cas annuel de Lèpre dont 81% de MB, 20% d’invalidité et 10% d’enfants. La sous-détection est liée à la faible fréquentation des centres de santé, essentiellement pour raisons financières. Le PNL a donc développé à titre pilote, des consultations avancées pour les maladies de la peau, en zone rurale.

Méthode: des districts « pilote », ont été identifiés. Puis ont été organisées :
- des stratégies mobiles de dépistage gratuit des dermatoses en zones isolées
- une sensibilisation des populations avec l’appui des communautaires
- la formation des agents de santé au dépistage et diagnostic différentiel
la stratégie thérapeutique par les agents de santé avec l’appui des agents communautaires
la stratégie PIRP

Résultats: 15 districts sur 111 ont été impliqués en 2015. On note dans ces zones d’intervention :
- une augmentation du dépistage au district de 44%.
- une augmentation de la détection dans les communes bénéficiaires de 170%.
- un taux d’invalidité supérieur à 22%.
- 200 agents communautaires formés pour pérenniser la référence des suspects.
- 5% des consultants pour problèmes de peau présentent une lèpre.
- Coût par consultant, des produits dermatologiques : 0.7 USD
- Coût par malade d'épistage : 14 USD

Discussion: rapprocher la consultation et stimuler la demande de soins par la gratuité augmente la fréquentation du système de santé, et la détection des cas de lèpre. Le dépistage n’est pas précoce car de nombreux cas évoluent depuis longtemps. Ces stratégies mobiles améliorent la connaissance de la prévalence et renseignent sur l’accessibilité des femmes et des enfants suspects. Le coût d’intervention est élevé mais l’implication communautaire et des anciens malades permettent de pérenniser la référence des suspects à moindre coût.

Conclusion: le dépistage avancé est efficient. La stimulation de la demande de soins augmente la détection lorsque les populations sont pauvres. Une extension de cette stratégie est envisagée en 2016. Néanmoins, si la fréquentation du système de santé continue à diminuer au niveau national, la détection n’augmentera pas sensiblement du fait de l’inefficacité du dépistage passif maintenu dans la plupart des régions. Aussi d’autres stratégies sont étudiées pour une extension à moindre coût.

Keywords: leprosy, dermatology, active detection
**LC4.2–048**  
Mise en œuvre pilote au Tchad d’une stratégie de dépistage avancé de la Lèpre sur des districts ciblés  
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Résultats: sur les 32 districts endémiques 9 ont bénéficié de cette stratégie pilote. On constate une augmentation du dépistage par rapport à 2014, supérieure à 100%. Ce dépistage actif a permis une augmentation de la détection au niveau national supérieure à 50% sur 1 an (392/258).

Discussion: la fréquentation du système de santé est augmentée. La détection augmente. Le taux d’invalidité (gréde 2) rapporté aux nouveaux cas baisse, (18%/25%) suggérant un dépistage plus précoce. Mais ces « invalidités grade 2 » augmentent en taux rapporté à la population. Ceci semble lié aux cas résiduels non dépistés en stratégie passive. Les données épidémiologiques sont étudiées sur les taux respectifs de femmes et d’enfants et le dépistage passif et actif. La préservation du suivi thérapeutique et la stratégie PIR séminaires sont prises en compte. L’efficacité est étudiée.

Conclusion: la stratégie de dépistage avancé est efficace dans un pays de faible fréquentation du système de santé. Ceci améliore les données épidémiologiques. A court terme, la présentation des indicateurs rapportés à la population générale (recommandée par l’OMS), notamment du taux d’invalidité, devrait être discutée; en effet la prévalence des invalidités augmentent naturellement quand le dépistage augmente. De telles stratégies sont néanmoins coûteuses mais une extension est souhaitable aux autres districts endémiques. La même approche sans participation au financement des produits dermatologiques devra être comparée.

**Keywords:** leprosy, active detection, dermatology
Family Health Strategy Digital Mapping Can Improve the Leprosy Control Program in Brazil
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Objectives – Brazil’s Family Health Strategy (FHS) is the national approach for delivering community-based primary care in a universal health system. The FHS teams are responsible for detecting and treating leprosy cases in the decentralized Brazilian system. They are organized geographically, covering a population of up to 4000 people each. Despite this organizational effort, much of the territorial information is not digitally available, limiting the ability for data management and analysis. This study aims to: 1) draw the FHS digital map of Castanhal, a hyperendemic city for leprosy in Pará State, Brazilian Amazon region; 2) map the leprosy cases reported during 2004–2013; 3) identify the spatial distribution pattern considering the FHS territories; 4) develop a spatial database comprising information about the local health workers and leprosy cases aggregated in each FHS territories.

Methods – The streets, neighborhoods and FHS coverage territories digital maps of Castanhal were developed using a free and open source geographic information system (QGIS). We adopted the participatory mapping to draw the FHS coverage. Each FHS team contributed actively to the acquisition of spatial and non-spatial data given their local knowledge. Then, the spatial data was georeferenced in GIS and associated to non-spatial data. The leprosy cases reported during 2004–2013 were mapped through field work using a portable GPS receiver. Spatial statistics were applied to identify clusters of leprosy.
Results - We mapped 288 FHS territories (micro-areas) and collected personal information of 36 FHS teams. From 2004 to 2013, 929 new cases were reported in Castanhal, 90% in the urban area. We georeferenced 731 (87.4%) cases in the urban area. Spatial analysis indicated the most likely cluster of leprosy in the city. The FHS teams in charge of the high risk areas were identified. Many areas of the city were not covered by the FHS, especially those newly inhabited in the periphery of the city.

Conclusions - It has been suggested that contact surveys should also be extended to entire neighborhoods. Our results indicated high risk/priority areas in a fine local spatial scale. We also identified those specific FHS teams that should be mostly stimulated to actively survey the entire population of those areas in order to decrease the hidden prevalence in such settings. Additionally, we identified the regions uncovered by the FHS in the city (higher hidden prevalence?) and developed a spatial epidemiology database that can help the local control program to increase their efficiency.

Keywords: Leprosy, Family Health Strategy, Spatial Epidemiology, Geographic Information Systems
ILC4.2-050
Expérience de l’ enquête autour des cas de lèpre multi bacillaire au Bénin: Résultats et leçons apprises
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Contexte
Le PNLLUB au Bénin organise depuis 4 années des enquêtes autour des contacts des malades multibacillaire. Cette stratégie vise la recherche de nouveaux cas de lèpre pour réduire la proportion de cas avec infirmité dégré 2 qui est de 20%.

Intervention : Trois groupes de cibles sont visées par l’ intervention, à savoir le cas index, les contacts intra domiciliaires et les contacts extra domiciliaires. Des équipes du programme visitent le cas index, organisent des séances d’ IEC et examinent les sujets contacts.

Résultats : Pour les années 2012, 2013, 2014 et 2015, 372 cas index sont visités, 3697 contacts ont pu être examinés soit en moyenne 10 sujets contacts pour un cas index, 68 nouveaux cas de lèpre (dont 33 PB et 35 MB) ont été dépistés soit 2 cas dépistés pour 10 cas index ou 2 cas pour 100 sujet contacts. Le total cumulé de nouveaux cas de lèpre dépistés pour la période est de 863 dont 8% (68) sont dépistés lors des enquêtes autour des MB.

Conclusion : La stratégie de l’ enquête autour des MB a été exécutée avec succès au Bénin. Il est nécessaire d’améliorer son efficacité à travers une stratégie intégrée avec d’autres MTNs à manifestation cutanée.

Keywords: cas index, contacts domiciliaires, Bénin
La lèpre au Cameroun quinze années après l’élimination en tant que problème de santé publique.

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Principaux résultats: Le Cameroun a atteint un taux de prévalence de 0,94 / 10,000 habitants en 2000. En 2014 ce taux est de 0,20 / 10,000 habitants (réduction de 78%). De même, le taux de détection a chuté de 4,88 / 100,000 habitants en 2000 à 1,46 / 100,000 habitants (réduction de 85,3%) en 2014. Toutes les 10 régions du pays ont atteint l’élimination de la lèpre, entre 2000 et 2014. Toutefois en 2014, au niveau des districts sanitaires, 18 restent encore hyper endémiques.

Conclusion: La prévalence et la détection de la lèpre a considérablement diminué entre 2000 et 2014. Cependant nombreux districts sanitaires restent avec un taux de détection élevé. Le Programme national de lutte contre la lèpre devrait concentrer les efforts districts de santé dans les années à venir afin de réduire davantage le fardeau de la lèpre dans le pays.

Keywords: Fardeau de la lèpre, Cameroun
ILC4.2-052
Cambodia Retrospective Active Case Finding project: recommendations for targeting high-priority districts in phase 2
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Background
The National Leprosy Elimination Programme of Cambodia in collaboration with CIOMAL and with support from Novartis Foundation conducted phase 1 of the Retrospective Active Case Finding project in 2011-2015. The project included the tracing of all leprosy cases diagnosed since 2001 and the screening for signs of leprosy disease or their household, immediate and more distant neighbor contacts. The tracing and screening was organized in “drives”, i.e. focused efforts of a dedicated team covering one or several operational districts (OD) in a short time period. For phase 2 of the project, criteria for prioritizing ODs were developed to maximize the impact of the intervention.

Objectives
The objectives were: (i) to identify a list of criteria for prioritization, and (ii) to identify high-priority ODs for phase 2 of the project.

Methods
All available data from phase 1 of the project and routine information (passive case detection) from 2006-2014 were analyzed, and key informant interviews and expert consultations were conducted to identify the most relevant indicators for OD prioritization. The final list of indicators was: a relatively high number of new cases detected per 100,000 population, or at least two of the following sub-criteria: high ratio of MB/PB, high ratio of child/adult, and low ratio of female/male cases. For each indicator, a value in the most extreme quartile was required for possible inclusion of the OD into the priority list.
Results
Overall, 31 ODs were prioritized for inclusion into phase 2. Twenty ODs had a relatively high number of new cases (top quartile of all districts), indicating problems in early diagnosis and/or prompt treatment. One additional OD fulfilled all three sub-criteria, i.e. a high proportion of child cases (indicating ongoing transmission) and MB cases (diagnosis and/or treatment delay) and a low proportion of female cases (indicating stigmatization or unequal access). Ten ODs fulfilled two out of the three secondary sub-criteria. High-priority ODs were clustered in the northwest, center and southwest of the country.

Conclusions
Routinely available indicators can be used to prioritize ODs for special activities, underscoring the value of complete data and basic analysis skills in leprosy control programs. Additional criteria including accessibility, the need to strengthen local capacity, synergies with other activities, and available resources must be considered when defining the final list of ODs. Furthermore, operational aspects including the grouping of neighboring ODs into single drives and other logistic factors need to be considered when planning phase 2.

Keywords: control, contact tracing, retrospective, Cambodia, targeting
ILC4.2-053
Trends in Childhood Leprosy in Bangladesh
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Objectives: To discover trends in childhood disability rates over past 10 years in Bangladesh. This is important in view of new WHO strategy which emphasizes aiming for zero childhood disability.

Methods: The study design was based on a retrospective analysis of routinely collected data from 3 LCPs in Bangladesh, for the cohorts of 2005-2014, extracting Number of New cases, Number of disability grade 1 or 2 new cases, Disability grade 1 or 2 at RFT, and their Classification (PB/MB), for all cases & for children separately. The patient data has been analyzed using Microsoft excel. For a clearer picture of changes year by year, findings are expressed as disabled new cases/100,000 population and also as child rate/100,000 population, in addition to traditional indicators of disabled proportion / child proportion amongst new cases. Since grade 1 disability at diagnosis may deteriorate to grade 2 disability before RFT we also considered grade 1 disability rates.

Results:
Total population of 13.4 million population spread over 7 districts in Bangladesh
Total child new cases=1350 = 8.53% of all (15,830) new cases, and not decreasing over 10 years
Rate of new case detection in children = 1.0/100,000 pa (falling over 10 years)
Average disability grade 2 (DG2) proportion amongst all cases= 8.41% (rising over 10 years) Average DG2 proportion amongst child cases= 1.41% (reducing over 10 years)
Average MB proportion in all new cases= 32.5%
Average MB proportion in new child cases= 15.26% (no consistent change)
For comparison: national data shows recent average new child cases 7.4% all new cases (356pa), and average disability grade 2 new cases = 9.89% all new cases, average MB proportion= 40.9% all new cases

Conclusions: These findings suggest that the frequency of new childhood cases with grade 2 disabilities is decreasing over the past 10 years but only slowly. It is necessary to consider also grade 1 disability. “Rate per 100,000 populations” illustrates trends among children better than percentages of new cases. Routinely collected population-based data throws light on changing epidemiological situation and helps in advance planning to meet the needs of leprosy-affected children with disability.

Keywords: Disability grade, Child rate, Disability rate, MB proportion, Trends
ILC4.2-054
The trends child cases reported to The Leprosy Mission Hospital Nandnagri Delhi-93 in last 5 years (2011–2015)
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Objective:
To determine the trends of child cases reported to The Leprosy Mission Hospital.

Methodology:
Data was collected retrospectively from the hospital management system regarding the child cases which reported to The Leprosy Mission hospital Shahdara between the period of 2011–2015. Data was recorded in terms of region or the area from where the child cases were reported (from Delhi or Outside Delhi), whether anybody in the family is on anti-leprosy treatment, classification of the leprosy whether Multibacillary and Paucibacillary.

Results:
In 2011 total 19 cases reported to hospital out of which 5 were smear positive, in 2012 31 child cases reported to hospital out of which 6 were smear positive, 2013 27 cases reported to hospital with 6 smear positive cases, in 2014 33 child cases reported to hospital with 2 smear positive cases while in 2015 29 cases reported to hospital with 4 smear positive cases. Further out of the total child cases reported to hospital between the 2011 to 2015 47% of the total cases were from Delhi. Out of the total cases 5 child cases were reported from the family in which one family members were already taking anti-leprosy treatment.

Conclusion:
As significant number of child cases are being reported to hospital between 2011 to 2015, it clearly reflects that transmission is there in the society and it is not being stopped. Further as five cases were from the family in which members were in anti-leprosy treatment which clearly indicates that healthy contact examination is very important. Further as 23 cases were positive in last five years which clearly shows that transmission is there. Further as the 47% of the cases were from the Delhi it is very important to map the patients and try to match the data from the other hospitals as well so that the pockets can be identified.

Keywords: child cases, smear positive, trends
ILC4.2-055
LEPROSY MAPPING IN ETHIOPIA
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Introduction:
Although, the leprosy elimination target of less than 1 case per 10,000 inhabitants has been reached at national level since 1999, the new case notification has remained the same for over ten years. The proportions of multi- bacillary (MB) cases, children with leprosy, and new cases with disability grade II among have remain high which indicate that there is still an ongoing transmission of the disease within the community. There are places and communities in Ethiopia where the prevalence of leprosy is above the elimination target and that need special attention. It is therefore necessary to study the spatial distribution of cases at different levels of administrative units to identify areas and groups of population with high endemic or high leprosy burden areas in order to utilize the limited resource appropriately and provide the necessary response in further reducing the burden of the disease at all levels of the health system- National, Zonal, Woreda and health facility.
Methods:
Data collection tools were prepared by national team and Leprosy data was collected from all districts found in the country by regional team. Data entry to excel sheet by zone and woreda was carried out by national team and leprosy burden maps produced identifying areas with high, medium and low leprosy burden over the last 6 years. Findings were communicated to the regions.

Results:
The mapping exercise has identified 93 leprosy hot-spot Woredas contributing to over half of national burden as well the level of leprosy services and training provided. Result will be presented.

Conclusion: These finding will help the control program to institute a locally adjusted intensive and targeted leprosy interventions to reduce the burden in hotspot areas. This was a very useful low budget exercise that focused the attention of TBL workers, but further studies will be needed in order to verify data on the ground by conducting active case finding in selected areas. This baseline data will assist any pilot projects of adjusted responses in the leprosy control program with the inclusion of contact tracing, geographical distribution of cases, environmental studies and education campaigns.

**Keywords:** leprosy, mapping, control, Ethiopia
ILC4.2-056
Achievements and experiences of China’s leprosy control in more than sixty years.
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Abstract: Objective: To explore the achievements and experiences of China’s leprosy control over sixty years.

Methods: The leprosy control course after the founding of People’s Republic of China in 1949 was fully studied and analyzed and the achievements and experiences were summarized with the epidemiological methods and the qualitative and quantitative study of social medicine.

Results: The Chinese government paid more attention to the leprosy control work since 1949 and the national leprosy control plans were developed successively and the professional organizations were established all over the endemic areas and the comprehensive leprosy control work including survey, isolation, treatment, management, research, propaganda, rehabilitation, et al., were carried out over sixty years. Now the active leprosy cases in China has declined from the 300,000 cases in the 1950s to 3230 cases in 2015, the annual detection rate from 5.56/100,000 in 1958 to 0.05/100,000 in 2015, the newly detected cases was only 678 in 2015. All the counties or cities in China reached the goal of leprosy prevalence below 1/100,000 in 2015. The visible disability ratio of newly detected cases declined from 58.8% in 1949 to 20% in 2015. From 2004, over 100,000 disabled leprosy cases were included in the special care project of national leprosy control fund. The society begin to accept leprosy affected persons instead of the previous fear and stigma against leprosy. China has implemented a trinity control strategy of early detection, timely treatment and overall rehabilitation for a long time, meanwhile more attentions were paid to the role of public health network and comprehensive medical agencies. China encourage the participation of social powers and foreign organizations, which kept the consolidation of leprosy control results and trend of sustainable development.

Conclusions: China has achieved the goal of elimination at county level and has begun to systematically solve the disability and social problems except strengthening the control of leprosy prevalence. The achievements of China’s leprosy control are due to the strong willing of governments, a sound leprosy control system, the wide participation of society and foreign agencies, and the adoption of correct control strategy suitable to China’s conditions.

Keywords: Leprosy, Control, China, Achievement, Experience
ILC4.2-057
Evaluation of Cost Effectiveness of Leprosy Control Program Models in Thailand
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Background: Integrated leprosy control program under low endemic condition need to be adjusted in terms of case finding and case holding with optimum cost effectiveness.

Objectives: The researches therefore selected 4 new models to compare the cost effectiveness of these four new models with normal integrated leprosy control.

Methods: Model 1,2 focus on utilization of regional leprosy coordinator (RLC) to provide diagnosis and treatment at home and sub-district hospital respectively while Model 4 emphasized on role of central and regional expert to provide diagnosis and treatment at regional or provincial hospital. In addition, Model 3 has established regional expert center for walk in suspected cases. The effectiveness of the study is to identify cases without disability (well) or being disable once individuals were diagnosed as having leprosy and completed their treatment including prevention and rehabilitation. The cost is considered in the view of health service providers only. Secondary data was collected during 2009 fiscal year from literature search, annual situation report, and leprosy experts. Primary data for diagnosed leprosy costing was collected from Chumphonburi community hospital, Surin province.

Results: After using decision analysis model to analyze the data, it showed that Model 3 had lowest cost, 2,339,737 baht. For the effectiveness, Model 2 and Model 4 had largest number of 323 patients cured without disabilities. Model 3 was the most cost effectiveness one with 307 patients cured without disabilities and with 2.6 million baht used per 1 regional expert center.

Conclusion: If Model 3 is selected, the number of regional expert centers will have to be increased in line with the magnitude of leprosy problem, and the area with difficulties.

Recommendation: Combination of different models may be needed to suit the local situation and the context in each area.

Keywords: Evaluation, Cost Effectiveness, Leprosy Control Program Models
Reducing the Burden of Leprosy, a Challenge in Kailali District of Far West Region of Nepal
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Abstract
The far west region of Nepal has limited access to basic services and increasing the access to services is a challenge due to the difficult topography and the distance from central facilities. Socio-economic condition is one of the major causes of poor health services in the region. Various cultural barriers and participation restriction is playing a vital role especially in women’s health. High migration rate, particularly to India, has been the root cause of transmission of communicable disease. Leprosy is still a burden in the region particularly in the Terai districts.

Objective:
The objectives of this case study is:
• To illustrate the result of routine leprosy control program based on the important indicators in a Kailali district of far-west region of Nepal
• To investigate the deviation of epidemiological and operation indicators with the regional data
• To recommend the possible action in order to reduce the burden in the district

Method:
The routine leprosy control program is in place since many years back in Nepal and recently explained with a vision, mission and strategy to make leprosy free society in the country. The major activities under leprosy control program carried out in all districts are case detection and treatment, trainings to the health workers, management of reactions and complications.
In addition, the IEC/BCC activities, contract examination case validation and POID activities are also taking place to some extent. The ten years data of the Kailali district are gathered and analyzed and compared it with the regional and national data. The result shows a big variation between the regional indicators as about 50% of the region’s case load lies in the district itself.

Results:
The number of new cases has not been reduced in the district and neither shown an indication just with the routine program although the regional level number has been decreased to some extent. The high scattered in-migration pattern of the district is also a cause of difficulty in tracing the population for those who need. Furthermore, due to the complex socio-economic structures and widespread gender and caste based discrimination, traditional systems associated with religion, culture and customs also have a great impact on overall health status including leprosy.

Conclusion:
The recent leprosy indicators of the district shows that a special intervention is immediately required at least in some of the area in order to reduce the disease burden.

Keywords: Nepal, disease burden, Kailali district, intervention, leprosy control
TREND OF SMEAR POSITIVE CASES IN THE URBAN SLUMS OF MUMBAI – FIELD OBSERVATIONS
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Introduction
In a megapolis like Mumbai, Bombay Leprosy Project (BLP) covers an urban population of approx 2 million comprising mainly of slums including Dharavi one of the biggest slums in Asia. How leprosy case detection and treatment is managed in the post integration scenario in Mumbai was reported earlier in 2008 (Ganapati et al 2008) and the trend of new smear positive cases in urban slums was reported in 2013 (Pai et al). We now share our experience pertaining to further observations on the trend of occurrence of new smear positive patients in urban slums of Mumbai in the decade long post integration period (2005 to 2015).

Methods
In Mumbai leprosy programme was integrated with the Health Posts (HP) of the General Health Care System (GHC) (population: 12 million) in July 2004. Health delivery in the city of Mumbai is highly complex as health structure primarily comprises of HP, medical colleges besides the non teaching hospitals. Besides General practitioners and Practicing dermatologists there are several specialists and other corporate and private hospitals. Keeping this in mind, BLP has been offering services after reorganization post integration through few necessary satellite clinics and extension units in public hospitals. These clinics are being strengthened and retained at the ward level and services sustained. Monitoring of detection of new cases with special emphasis on smear positive cases was undertaken and analyzed for the decade long period after integration in the city of Mumbai.
Results
From 2005 till December 2015, a total of 200 smear positive cases were detected out of 1036 total new cases detected and registered for treatment in the Project area in a population of 2 million with an average of 18 (19.3%) new smear positive cases every year. Most of these cases reported directly to the satellite clinics and referral centre and some in teaching medical colleges and a few to practicing dermatologists. These cases as well as those identified through catchment clinics of BLP were confirmed by medical and paramedical team.

Conclusion
We find that there is a constant trend in occurrence of new smear positive cases in project area during the study period indicating a continued pool of reservoir of infection in the community responsible for chain of transmission of infection in the slums.

**Keywords:** Smear positive, Trend, Transmission
ILC4.2-060
Early detection and sustainable leprosy care: an approach through community participation
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Objectives
1. To detect leprosy early by capacitating communities in remote rural locations.
2. To advocate and support for sustainable referral and service delivery at community level.

Methodology:
Identification of Geographical Locality using available data from District Leprosy Office. Identification of Community leaders, Volunteers duty bearers, other stakeholders through human resource mapping. The local community members who were involved in Government programs and other volunteers were trained in early detection of leprosy. Rapid Village Survey: In this process, experts from TLMTI project, the local community volunteers, Primary Health Centres, persons cured from leprosy and duty bearers are involved. 3 pockets were identified with the support of District Leprosy Office. The tools used: Photo card, WHO grading, Mono filaments, SALSA Scale for those with disabilities.
Duration of study: 6 weeks

Results:
In the 3 localities, a population of 8890 were surveyed. In that 19 persons were newly identified to have leprosy. In that 10 were found to have Multibacillary type of leprosy and 9 were of Paucibacillary type. Among them, 3 are children. As soon as the detection, they are linked to the Primary Health Centre who ensured timely administration of drugs. The community members did the follow up and ensured the necessary rehabilitation services along with the project team. All the localities that were surveyed, now have their local people trained in early detection and also knowledge about services availability. This also resulted in advocating for similar surveys and mainstreaming of leprosy services.

Conclusion:
Rapid Village survey, by involving the local community members after capacitating them leads to effective survey and also sustainable leprosy care in the community. A system is developed along with Government, NGOs and local community.

Keywords: Early detection, community participation, sustainable care, Rapid Village Survey
ILEC.2-061
IMPROVING LEPROSY CASE DETECTION THROUGH LEPROSY FRIENDLY VILLAGES
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Leprosy is still a public health problem in North Sulawesi Province, Indonesia. Over the last 10 years, the number of new cases remained stable with a high proportion of child cases and cases with grade 2 disability. This situation is mainly due to the lack of a consistent early case finding approach.

Objectives
To improve leprosy case detection in North Minahasa District through increasing the knowledge and participation of influential community members (ICM) and health center (HC) staff

Methods
The Leprosy Friendly Village (LFV) approach has been used in North Minahasa district. Village mapping in 2011 showed that, among 120 villages; 44 were high-endemic for leprosy, 27 endemic and 49 low endemic. LFV started in 2012 in 15 high endemic villages. This number increased to 47 villages in 2013 till 2015. All HC leprosy field workers (LFW), doctors and health promotion staff were trained in this approach and they trained other staff in their HC. Health promotion staff, village health staff and LFW were made responsible to promote and persuade the ICM in the village (including people affected by leprosy).
Involving the ICM is seen as an important aspect of the approach. All people suspected to have leprosy were diagnosed by LFW and the diagnosis was confirmed by the district leprosy supervisor. All new cases were treated promptly with MDT, attention was given to prevention of disability. Home visits were done for contact examination. These activities were carried out consistently each year. The intervention was supported by the district health authority.

Results
During 4 years of implementation of LFV (2012-2015), the involvement of HC staff in leprosy control has increased from in average 10 to 130 staff (from 10 HCs). The involvement of ICM also increased from zero to 566 people (in 47 villages). The number of new cases of leprosy detected increased from 20 in 2011 (before implementation) to 44, 56, 65 and 44 (in subsequent years). The district government has made budget available for 32 LFVs each year. In addition, the enthusiasm and participation of HC staff for the leprosy program increased. Recently six other districts in this province have adopted this approach.

Conclusions
Leprosy case finding can be improved by strengthening and consistently involving the community and the HC staff. This approach, which we called ‘Leprosy Friendly Village’, increases motivation of leprosy workers and commitment of the government. Further research is needed to measure the impact regarding stigma.

**Keywords:** community, case detection, endemic village
ILC4.2–062
Analysis of 124 Leprosy Relapse Cases after MDT in China
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Objective: To study the characteristics of leprosy relapse cases after MDT, and analysis the possible reasons for the results.

Method: Descriptive and survival analysis were used for the data about leprosy relapse cases after MDT based on the Leprosy Management Information in China (LEPMIS) from 2008 to 2012, which also contain their initial leprosy records before recurrence.

Results: Totally, 125 person-times recurrences happened during the 5 years, with 2 children cases. When diagnosed as MDT recurrence, 4.03% patients had type- I reaction, and 10.48% patients had type- II reaction, and 29.03% patients had disabilities of Grade II, and 66.13% patients were classified as BB and LL. There were 88 patients (70.97%) with BI > 0 which dropped to 2.05 ± 1.30 after retreatment, and 118 patients (95.16%) with MB retreatment which cost 23.37 ± 5.40 months. The survival analysis results showed that the factors such as the areas where the MDT replace patients registered residence, the age first diagnosed as leprosy before recurrence which maybe one of the risk factors, and whether happened leprosy reaction or not in the first treatment may affect the rate of recurrence.

Conclusion: Most of 124 MDT repalse patients came from the southwest areas of China where the high leprosy epidemic regions with more chance to secondary infection were. Through the evaluation of treatment on the first and recurrence records, we found that MDT had good curative effect and low recurrence rate. The factors, which may effect on MDT recurrence, needs further research.

Keywords: leprosy, multidrug therapy, recurrence
ILC4.2-063
Trend of leprosy disability among newly diagnosed patients amidst a decline in number of new cases in Southern Nigeria: a nine year review

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Objective: Aim of the study was to determine the trend of leprosy disability (WHO Grade 2) among newly diagnosed patients amidst a decline in number of new leprosy cases in Southern Nigeria.

Methods: A retrospective descriptive desk analysis of leprosy case notification data reported routinely from the 14 GLRA – supported states in Southern Nigeria between 2006 and 2014 was done. The proportion of patients with WHO grade 2 disability among the newly notified cases was compared with number of new leprosy cases notified within this period.

Results: A total of 8094 new leprosy cases were notified across the 14 states between 2006 and 2014. Female made up 42.4%. Number of notified cases in 2006 was 950, it reached its peak in 2009 with 1070 cases and declined to 687 cases in 2014. However, the proportion of new cases with WHO grade 2 disability increased from 15% in 2006 to 23.7% in 2014 with the year 2012 having the highest proportion of 24.4%. Also, while the proportion of new cases who were children was 7.7% in 2006, it reduced to 6.7% in 2014.

Conclusions: The proportion of patients with WHO grade 2 disability among newly diagnosed patients was on the increase in the nine year review period even though the number of newly notified cases was on the decline. There is the need for further studies to determine the contributory factors to this trend in-order to reduce the disability rates among new cases. This is of relevance if the Universal Elimination of Leprosy strategy which aims at zero disabilities among new child cases by 2020 is to be realized.

Keywords: Trend, Disability, Leprosy, notification, Nigeria
ILC4.2-064
The Difficult Diagnosis of Early Leprosy in Childhood
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Introduction
Recently Brazil has promoted campaigns in schools as an important tool for leprosy control at the municipal level. Leprosy in childhood can be difficult to diagnose as most cases are paucibacillary with minor nerve damage, which presents a challenge for school-based campaigns.

Objectives
To analyze the leprosy new case detection rate (NCDR) during campaigns in school-age children from a hyperendemic municipality. To discuss clinical and laboratory findings for leprosy diagnosis in this age group.

Methods
Mossoró is located in Rio Grande do Norte State (Brazil), where leprosy NCDR was 3.34/100,000 residents in 2014. The study was conducted within previously identified cluster where 46.5% of new cases had lived in the prior five years. All schools located in this area were included. Children who accepted the exam and had a parent’s written authorization had a full skin check for leprosy lesions. Skin lesions were tested using monofilaments (Semmes-Weinstein). Suspected cases had a second examination by leprologists at a clinical health unit, where lesions were also checked for heat (450°C) sensitivity. Incomplete histamine test was required to confirm indeterminate leprosy. Children with suspected leprosy had a skin biopsy, dermal smears for M. leprae PCR, and PGL-1 serology with ML-Flow.
Results
1408 out of 3248 (43%) eligible students were examined. Age ranged from 5 to 17 years (median=10). Forty-three children (3%) were identified for second examination. Eighteen cases were clinically confirmed as leprosy (age ranging from 6 to 14 years; median=11.5). All cases were classified as paucibacillary (9 indeterminate, 6 tuberculoid and 3 borderline–tuberculoid). Skin biopsy was conclusive of leprosy in 6 out 17 patients (35%). Serology was positive in 7 cases (39%) and PCR for M. leprae was positive in 5 cases (26%). In 7 of 9 cases with nonspecific histopathology there were a positive serology or PCR (77%). Two years after the campaign 16 out of 25 children (64%) screened but not confirmed were reevaluated and none had signs of leprosy.

Conclusions
School campaigns for leprosy are very important especially in endemic areas. In this study NCDR was 1.27%, which is extremely high. In our experience, monofilaments were not a good tool to diagnose leprosy skin lesions, possibly because most cases were paucibacillary with early lesions and because in the school environment attention to skin test can be compromised. We suggest that these campaigns should be used for primary screening with a secondary examination in a more controlled clinical setting.

Keywords: Leprosy, Diagnosis, Campaign
Towards the Development of a Scale to Measure the Quality of the Actions in Contact-Tracing Programmes: The Experience of IntegraHans Scale Use in the North and Northeast Brazil

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Effective contact-tracing programmes represent a key strategy for the control of leprosy. Brazilian operational indicators have shown a low coverage of household contacts examinations. In addition, there is a lack of practical scales to assess the quality of the contacts evaluations performed in the Unified Health System. This study aims to evaluate the applicability of a new scale for evaluation of the quality of all control actions for household contacts of new diagnosed leprosy cases, defined by the Brazilian Ministry of Health (MoH). The study was carried out from 2001–2014, in 2 Brazilian states (2 cities in each),
North and Northeast regions. This is an operational research, with a descriptive analysis, including household contacts of 834 leprosy cases notified (Notifiable Diseases Information System), between 2001–2014: Rondônia State (Amazon Region) – Rolim de Moura and Cacoal municipalities; Bahia State (Northeast Brazil) – Vitória da Conquista and Tremedal municipalities. We apply a structured instrument containing six components, each related to a specific action, for the evaluation of household contacts. We use as a reference the ordinances and technical guidelines of the MoH. The “Integrahans” Rating Scale was developed using weights based on the existence knowledge and the relevance of each action of prevention and control: Perform a complete dermatological examination (weight 6); Perform a complete neurological examination (weight 5); Use of BCG vaccination as indicated (weight 4); Orientation to return to health services in case of new symptoms or an appointment scheduled by a health professional (weight 3); – Orientation about the use of BCG vaccination (weight 2); Orientation to mobilize other contacts (weight 1). Integral-hands scale was used to compose a retrospective scenario of the patterns of the control actions from the experiences of contacts. In addition, we conduct a clinical evaluation in all contacts for leprosy diagnosis. We analyzed 1,058 household contacts during the study period. 24 (2.2%) new leprosy cases were diagnosed. We define a 3-point Likert Scale ranging to: 0–6 points – poor quality, 7–14 points – average quality, and 15–21 good quality. Among the evaluated contacts in Bahia, 60% in Vitória da Conquista and 54.5% in Tremedal showed a poor quality. In Rondônia State, 45.4% in Rolim Moura and 25% in Cacoal had a poor quality. The Integrahans scale proved to be easy and fast application for the researchers and the health care professionals, indicating its feasibility. In addition to the low coverage, the low quality of the contacts approach demonstrates a low effectiveness of health services. The actions for leprosy contacts surveillance should be prioritized and enhanced.

**Keywords:** Leprosy, Control and Prevention, Surveillance, Contacts, Evaluation
**ILC4.2–066**

**Analysis of Leprosy Endemic and Its Control in HeBei Province**

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To analyze the trends of Leprosy epidemic and evaluate the effects of its control in HeBei Province. Methods: The epidemiologic data were analyzed. Results: There were 1591 Leprosy patients detected in HeBei during 1952—2015. 1321 were cured, 258 died or dropped out, 12 active patients. The incidence was 0.484 / 100000 in 1961. The incidence was 0.23 / 100000 during 1952—1961. The incidence was 0.0017 / 100000 during 2010—today. MDT was the first to use in 1986.

Conclusion: several measures we taken for detecting and treating Patients effectively and the endemic and incidence decreased by a big margin as well.

**Keywords:** Leprosy, Incidence, Prevalence
ILC4.2-067
"Early case detection through active search method Leprosy control - in underserved area of Meghalaya State - North East Indian Region - difficulties faced analysis "
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Meghalaya is one of the 7 North East States of India. It has a population of 2,964,007 (2011 Census) estimated population of 3,27,0432 (2014–15) with 11 Districts, 39 Development Blocks. It is a Low Endemic State with ANCDR of 0.76, PR of 0.07, detected 25 new cases during 2014–15 (88% MB, 40% Gr.II, 40% Female and 12% Child cases). This State has a large area of under served population and needs special action plan for case detection activities. The purpose of the study is to find out factors which adversely affect the case detection programme, which includes, clinical competence, operational factors, seasonal variations, public understanding and awareness of sickness in relation to leprosy manifestations. To further improve case detection activities in Meghalaya, from the lessons learnt.

Methods:
The State Leprosy Programme Officer was sensitized the need for this study. District Leprosy Officers from the two districts Ri Bhoi and East Jaintia Hills, Medical Officers in-charge of PHC, and Supervisory staff were introduced to a mini- workshop looking into the Planning and conduct of Case detection active search. From these two districts a total of 12 staff each with 2 resource persons were deployed for the case detection activity. These teams had a training programme for one day dealing with programme implementation. All survey logistics were carried out - house to house enquiry survey was carried out.
Results:
The case detection activity concluded within the time period of 10 days covering a population of 9606, examined population was 6395 (66%) coverage. Two cases of leprosy was detected (Pauci- bacillary) and 3 cases kept under observation.
• Non of the suspects who reported with skin lesions had shown to be early
• Most of the suspects had more than one skin condition when they reported for examination
• The District Programme Officer from Ri Bhoi had arranged for a skin camp for a village which had underserved population – and here there was a good community participation and two cases were identified
• Weather conditions was appropriate in the area – hot and humid which supported self examination among households than during cooler climate
• Local Holiday had affected staff working conditions– programme lost one day.

Conclusion:
It is worthwhile to conduct a trial to analyse limitations and challenges of Active search in leprosy case detection. It is a limitation to identify early changes in the body to report seeking medical advice. There are more operational reasons which go unidentified and not recognized, which indirectly affect case detection. Results and methodology will be discussed during presentation.

Keywords: Active Search, underserved, Case detection
ILC4.2-068
An Overview on Prevention and Control Status of Lepriasis in Guangyuan City
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The mean incidence of measles in Guangyuan city in the past 5 years was 0.42/105 and increased to 2.22/105 by the end of 2014. At present, there are 56 leprosy patients and 797 cases are alive, among which 243 are of second level disabled. As a burdensome disease of the nation, Guangyuan is now facing marginalization of the prevention and control work. The prevention and control unit and personnel is not qualified for the diagnosis and treatment. The cooperation is not enough between departments basic level and organizations. The launch of the recovery work is difficult. Based on this condition, Guangyuan city took full advantage of the serious infectious disease committee platform, and promoted the government to give great attention to this issue and established the medication and referral center to forge a new model of combination of clinic and prevention. The communication platform is established by the academy of sexually transmitted diseases and the personnel capacity has been strengthened. The prevention and control work has been embraced into the primary public health equalization and the resumption of the basic level is promoted. The resources have been integrated and the recovery work is full launched. By the above measures, the work is expected to be practicable and the disease is to be effectively controlled, meanwhile the affected individuals are in fully recovery. The goal of extinct the disease is reaching to. It is suggested that similar area could be follow the example of this area to ensure that extinction of leprosis in 2020.

Keywords: leprosy, prevention and control, status, overview
ILC4.2-069
The research of dynamic and countermeasures of the prevention and treatment of leprosy in Qingyang, Gansu, 1949–2013
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Objective To study the development trends and control effect of leprosy from 1949 to 2013 in Qingyang, in order to provide effectively countermeasures basis for leprosy prevention and treatment. Methods Descriptive epidemiological analysis was conducted on the historical data about the prevention and treatment of leprosy in Qingyang. Used the excel 2003 to statistical data.

Results During 1949 to 2013, there were 227 leprosy patients in Qingyang. The highest incidence area was Zhengning county, accounting for 7.84/lakh, and the lowest incidence area was Zhanyuan county, accounting for 0.58/lakh. The sex ratio was 3.9/1. The highest incidence year was 1996, accounting for 1.59/lakh. The incidence peak age of leprosy was 20 to 39, accounting for 42.3%.

Conclusion The existing preventions and control strategies have achieved better effect, but there are still has new case arising, and epidemic in low situation. The prevention and treatment of leprosy is still need long-term persistence and unremitting efforts.

Keywords: leprosy, prevention and treatment of dynamic, countermeasures
ILC4.2-070
May be WHO elimination target hiding patients instead of eliminating leprosy? A case in Pará State, Brazilian Amazon
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Objectives - Since 2009 we have been conducting field research at Pará State, northern Brazil, Amazon Region, examining schoolchildren (SC) and household contacts (HC). As we go countryside with leprologists, our group always find a high number of cases in comparison to the official numbers. The main goal of this study was to show how difficult can be to find and include new leprosy cases on the official numbers in a situation of a supposed declining trend of leprosy with an elimination target ahead.
Methods - In a week 2-4 groups of a leprologist doctor, a physics therapist, a technician for blood and skin smear collection and an IT professional go to an area at Pará State and examine 600 to 1,200 SC and HC. Based on clinical signs, patients are diagnosed and classified for treatment onsite. When a child is diagnosed at the school, another group goes to his/her house to examine SC contacts and collect biological material.

Results - Among 3,705 SC in 13 municipalities, we found 234 (6.2%) new cases, and another 1164 (49.6%) in 76 families when SC houses were visited. Examining 2,513 HC of cases diagnosed on the last 10 years, we found 188 (7.5%) new cases in 152 families. Mosqueiro island, a touristic set an hour by car from Belém, has a decreasing trend of leprosy incidence, with a new case detection rate of 14,1/100,000 people in 2013, while Pará rate was 50,7/10,000. Family health strategy covers only 50% of Pará population, and still less, 22% of Mosqueiro population. On May, 2014 we went to the island and diagnosed 110 new cases, that were not accepted nor notified by the municipality. They decided to send another doctor there to “validate” our diagnosis. He saw only 69 (62.7%) patients and confirmed 13 (18.8%) as leprosy. While 41 (37.2%) patients were just ignored by the health authorities, 58 (50.9%) were sent to their homes with no treatment, and we were accused to inflate the numbers of leprosy in Pará State, although we diagnosed less than 2% of all cases from 2009-2014. RLEP PCR of skin smear of 44 cases and 77 HC randomly selected resulted in 81.8% of the cases positive, against only 23.8% of the HC.

Conclusions - Elimination target became a mantra everywhere, but it is now meaningless. It is urgent to have new targets to remove leprosy patients from the shadow, where they are now, invisible to the general community. Grade 1 and grade 2 disabilities rates and contact tracing capabilities are amongst the most important indicators for the remaining leprosy areas worldwide.

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**Keywords:** leprosy, diagnosis, epidemiology, control, elimination
ILC4.2–071
RECURRENT OF LEPROSY CASES IN BRAZILIAN FAMILIES CIRCLES: THE OPERATIONAL ROLE OF INTRADOMICILIARY CONTACTS, RESIDENTS CO-INHABITANTS AND SOCIALS CO-INHABITANTS IN NORTHEAST BRAZIL
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Leprosy remains as a chronic infectious condition with a high burden in Brazil. The surveillance in contact-tracing programs constitutes the main way to control this disease. The recurrence of leprosy cases in different members and generations, in the same family circle, need to be better evaluated and included in valid operational approaches, expanding the concept of leprosy contacts. This study aims to analyze the history of leprosy recurrence among families circles (intradomiciliary contacts, residents co-inhabitants and socials co-inhabitants) living in municipalities of Southwestern Bahia, Northeast Brazil. This is an operational research, with a cross-sectional and descriptive design. We evaluate reference cases of leprosy with residency in Tremedal and Vitória da Conquista municipalities identified by the analysis of the official database of the National Notifiable Diseases Information System (MoH) from 2001–2014.
Following the identification of these cases, we included the analysis of leprosy diagnosis history in their household contacts – who resides or resided with the reference case 5 years before the diagnosis, their residents co-inhabitants – who resided with the case until the time of data collection in the study, but had no contact with the patient during or before the diagnosis, and their social co-inhabitants – who do not live or lived with the case in the same house, but regularly attending the residence for at least one year. Data were collected by the research team through a semi-structured interview with the participation of primary health care professionals (community health workers, nurses, doctors) to evaluate the perception of the broader concept of contact and its applicability. A total of 372 leprosy reference cases was included, with evaluation of 471 household contacts, 84 residents co-inhabitants, and 253 socials co-inhabitants, both in the urban and rural areas. The occurrence of leprosy in the time of this survey or previously was verified in 69 (14.6%) household contacts, 3 (3.6%) residents co-inhabitants and 16 socials co-inhabitants (6.3%). This broader definition provides a reliable, practical, and easy-to-use way for collecting detailed local data on family aggregation of leprosy cases for the use by health care providers. Contact-tracing programs for epidemiological surveillance should consider the use of a broader criteria for the contact definition. Familial aggregation of leprosy in the closest family environment is a potential operational indicator of epidemiological severity to guide control interventions in these communities. This approach must respect all ethical issues involved in in leprosy-experienced families and their communities.

Keywords: Leprosy, Contacts, Surveillance, Control and prevention, Health indicators
ILC4.2-072
A discussion on strategies for control of leprosy in Liangshan in the next five years
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Objective To systematically evaluate the achievements of leprosy prevention and control in liangshan prefecture and to discuss control strategies in the next five years. Methods Statistical analysis and assessment of leprosy prevention and control in liangshan prefecture in recent five years were performed, and the consolidation measures were explored.

Results Some effects were obtained on leprosy prevention and control in liangshan prefecture in recent five years, but there are still some problems. Based on the analysis, the corresponding solutions and targets and control strategies were put forward.

Conclusion During the “Thirteenth Five-year Plan” period, liangshan prefecture need stick to the strategies of “leding by the government, departments cooperating, social participation, training education, stable investment, guaranteeing prevention and control”, and continue to cultivate and recruit health technicians, enhance the management, earnestly implement rewards and punishment mechanism, and, ensure the prevention and control work being carried out according to the facts, and the information of leprosy prevention and control being true.

Keywords: leprosy, control strategy, Liangshan Prefecture
ILC4.2-073
Analysis on epidemiological characteristics of leprosy in Guangxi province from 2006 to 2015 and strategy for leprosy
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Objective Provide a scientific basis for the further development of prevention strategies through the epidemiological characteristics and effective protective measures of leprosy, so as to realize the target of the program for elimination harm of leprosy from 2011 to 2020 in Guangxi province.

Methods The data was collected from 2006 to 2015 and be analysed by the method of descriptive epidemiology.

Results From 2013 to 2015, leprosy affected about 50 people each year, and the annual discovery rate and prevalence were below 0.11/100000 and 0.48/100000, respectively. Children under 14 years of age were accounting for 2.4%. The Leprosy epidemic tendency tended to be steady in Guangxi. Patients mainly came from northwest and southwest, and be diagnosed in out-patient department, accounting for about 46.53% and 58.27%, respectively. The average time interval between onset and diagnosis was 6.46 months. The disability (Grade II) rate was 15.38% in 2015.

Conclusion It tended to turn to medium endemic area in Guangxi. But prevention and treatment of leprosy still had to go on under the leading of government and multisectoral cooperation.

Keywords: leprosy, epidemiological characteristics, strategy.
ILC4.2-074
Survey on the awareness rate of leprosy control core knowledge for close contacts of leprosy in Guizhou province
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Objective To understand the awareness of leprosy knowledge related in close contact with leprosy patients in Guizhou Province, so as to provide a scientific basis for the future development of leprosy health education in Guizhou Province.

Methods Household survey was carried out in close contact with all surviving leprosy patients found in Guizhou province since 2005. Using the questionnaire of “The rate of awareness of leprosy control core knowledge questionnaire” to evaluate the knowledge of the object of investigation. Univariate analysis using chi square test, Multivariate analysis using Logistic regression analysis. Results 5497 sample, answer 5 questions or more respondents to the number of 4275 people, the general awareness rate was 77.77%.The awareness rate of single core information is between 70.00%-84.00%. The main source of the core knowledge of close contact with leprosy was the promotion materials (47.88%), followed by family, friends or colleagues (46.72%) and doctor's advice (44.70%). Gender, age and educational level were related to the level of awareness.

Conclusion The core knowledge awareness rate of leprosy in close contact with leprosy is higher. We can try to make use of them to carry out health promotion for around the crowd of them.

Keywords:leprosy, close contacts of leprosy, leprosy control core knowledge, Survey on the awareness rate
**ILC4.2-075**

**Analysis of disability status of new leprosy in Qiandongnan from 2003–2012**

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Objective Understanding of QianDongNan prefecture in nearly 10 years of leprosy patients with new abnormal residual condition, to provide scientific evidence for the preventive measures.

Method From 2003 to 2012 Qiandongnan counties (cities) of new cases of leprosy cases registered 175 cases of data for statistical analysis after verification.

Results 2003 in qiandongnan Prefecture of leprosy patients with new-onset disabilities than for 8.33%, 2012 is 50%; level I deformities ratio from 4.17% in 2003, to 36.36% in 2012; deformities than eight counties (cities) of more than 40%. In those people, I, II level deformities is 19.43%, II level deformities number of more than 50% in the 8 counties (cities). Deformities than aged under 15 years of age is 42.86%, 15 to 65 years of age is 37.50%, over 65 years of age was 62.5%. Leprosy period within 2 years occur deformities ratio is 37.58%, more than 2 years and 5 years was 23.08% and 69.23%, Paucibacillary patients with level I deformities ratio (63.64%) was significantly higher than multibacillary (33.10%).

Conclusion Qiandongnan new cases of leprosy disability is high, no obvious change in recent 10 years degree. Because of leprosy diagnosis delay, leprosy reaction and other different leprosy type, deformities ratio difference is very apparent, there was no significant difference between age and sex. Early detection of patients, the rules for anti-leprosy chemotherapy, effective management and control of leprosy reactions are effective methods of preventing of deformity and disability in patients with new-onset.

**Keywords:** leprosy, newly diagnosed patients, Disability situation
ILC4.2-076
Comparative study on 4 case-detection methods of leprosy in Guangxi, China
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Introduction: Guangxi is located in the southern area of China and covers a population of 51000000 with 236700 square kilometer where ever was a high-epidemic leprosy focus in China, through comprehensive control of leprosy, the endemicity of leprosy is declined now. In order to explore the more effective case-finding methods in the low-epidemic status and areas for the future, we have compared and analysed the efficiency and effect of 4 case-detection methods of leprosy which included dermatology clinic, clue screening, epidemic focus survey and close contacts examination conducted in Guangxi, China, during the period of 2005-2014.

Methods Multivariate statistical analysis on 1806 leprosy cases been detected during past 10 years in Guangxi region, of them, 508 cases (60.40%) came from dermatology clinic of various kinds hospitals, CDC organization and leprosy professional units, 75 cases (8.52%) came from the clue screening which through handing out widely the publicity material of leprosy symptom then to collect the suspected clues it provided by the masses; 140 cases (16.65%) came from the epidemic focus survey it been carried out by leprosy control professionals in main leprosy epidemic focus and 108 cases (12.85%) came from the Close contacts examination.it includes leprosy patients’ family members and neighbour crowd, the “leprosy patients” include the cases been detected quinquennium.
Results Of the 4 cases detection methods, the cases who were detected in dermatology clinic was the lowest in funds cost, of it, 508 new leprosy cases were found and only cost 0.9 $ for per case as well as gave a rate of disability II 25.33%; The number of the new cases who were found by the clue screening was 108 and cost 7.6 $ for per case it gave a rate of disability II 30.56%; the number who was detected in the close contacts examination was 75 cases who cost 41.2 $ for per case and gave a disability II rate 16.73%; The last method is epidemic focus survey, it detected 140 new patients and cost 103.74 $ for per case as well as gave the disability II rate is 12.14%.

Conclusion Dermatology clinic could found more new cases and need less funds input, but it is a passivity method could not find the patients in early and carried a high disability rate, so this method is more suitable be used in low-epidemic areas where were less new leprosy cases yearly.. The close contacts examination and epidemic focus survey belong to the active behaviour, it could found the new cases in very early as well as a lower disability rate but it needs a great funds input, so in general it was deemed to more suit the high or medium leprosy epidemic areas.

**Keywords:** Leprosy, Detection-method, benefits, Comparative
ILC4.2-077
Analysis of 6 cases of severe ammonia—phenyl—syndrome in Qiandongnan
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Objective Severe dapsone syndrome investigate the clinical characteristics and
the principle of comprehensive treatment.

Methods Clinical and therapeutic situations occur during treatment of severe
dapsone syndrome manifestations 6 cases of leprosy were analyzed. Results
6 patients taking dapsone 29–75 days after rash accompanied by fever,
anemia, mononucleosis, dapsone syndrome of severe liver damage and other
performance After disabling dapsone, corticosteroids 4 cured , 2 died.

Conclusion Leprosy patients in 1–2 months before the use of MDT–MB in the
treatment of leprosy prone to severe dapsone syndrome. If timely disable dapsone
and use of corticosteroids in sufficient quantities, Prevention of secondary
infection, strengthen symptomatic and supportive treatment, strengthen nursing
and topical medications can reduce severe Dapsone syndrome mortality rate.

Keywords: Leprosy, ammonia—phenyl—syndrome
ILC4.2-078
The mentality of how to prevent and cure leprosy in low endemic area under the new situation
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Neijiang as the low endemic area, the leprosy morbidity was zero point seven per one hundred thousand until December of 2015. The dilemma of prevention and cure were the lack of attention, marginal situation and people without qualification. Basic medical institution, moreover, Participation were not strong at relevant departments and basic medical institution. Based on the major infectious diseases prevention and control committee to encourage departments cooperation, building the new prevention and control combining pattern, in combination with carry out various kinds of major diseases; Integrating society association etc to build communication platform; Strengthen inspection quality. Integration of various resources to carry out the mobilization and publicity, setting up the diagnoses and treatment pattern, the next mentality prevent and cure leprosy in CDC is backing to origination in low endemic area.

Keywords: low endemic area, leprosy, prevent and cure, mentality
Promoting the construction of a new service system for leprosy control implemented by CDC and hospital collaboration

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Objective To advocate and promote the construction of a new service system of leprosy control implemented by Center for Disease Prevention and Control (CDC) and hospital collaboration.

Method To analysis the problems and disadvantages appeared from CDC is responsible for leprosy control in recent 10 years and to put forward to try to run the solution ways.

Result After 2000, with the reform of health system, stations for skin disease control at the provincial and municipal levels, and most part of county level were cancelled and consolidated, which were charge with leprosy control. CDCs were build at different levels to undertake the function of Leprosy control. Along with CDC operating leprosy control in the passed 10 years, some drawbacks and problems gradually appeared, such as the CDC providing the service on the leprosy patient’s treatment was objectively deviated the orientation function of CDC and was easy to delay the patient’s condition or to cause medical disputes. In addition, it is difficult that CDC dealt with the serious leprosy adverse reactions and other medical problems. So, the functions of diagnosis and treatment of leprosy by CDC has been stripped since 2014 in Jiangsu province. The designated hospital for diagnosis and treatment of leprosy was established in each municipals. The pattern of new service system for leprosy control which operated by CDC and designated hospital has been built and run very well.

Conclusion It is imperative to promote the construction of leprosy control service system led by the government and run by CDC and hospital.

Keywords: CDC and Hospital Collaboration, Leprosy Control
ILC4.2-080
The analysis of new cases of leprosy in Guizhou Province from 2011 to 2015
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Objective Through the analysis of new cases of leprosy in Guizhou Province during 2011-2015, to provide suggestions for the next step of discovery.

Method Use the Excel to analyzed the newly detected leprosy cases of National Leprosy Prevention Management information System (Leprmis).

Results In this survey of 942 new cases, the mainly way of the discovery is clue survey, accounting for 56.16%. Case report, Department of Dermatology, outpatient and contact examination is another important way, respectively 137 cases (14.54%), 136 cases (14.44%), 106 cases (11.25%). Ability to discover patients is improve after training (χ² = 31.95, P < 0.01); Compared with the clue survey and contact check, dermatology clinics and case report are more likely to find much bacterium type cases. The difference between the two was statistically significant (χ² = 31.36, P< 0.01).

Conclusion The current main findings is still a continuation of the significance in the next period. It has a great significance to effectively carry out the prevention and control work in the future for strengthen the training of doctors, township and village doctors in the outpatient department of Dermatology.

Keywords: leprosy, new cases, discovery mode
ILC4.2-081

Study on Control Strategies and Epidemic Characteristics of Leprosy in Qiandongnan Prefecture from 2003 to 2012
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Objective Analysis leprosy epidemic situation of Qiongdongnan prefecture in recent 10 years in order to provide decision-making basis for control and to eliminate leprosy. Methods Statistic analysis on epidemiological indicators was applied Excel2003.

Results Detection rate of leprosy mildly fluctuated between 0.26/100,000 to 0.59/100,000 in recent 10 years. Prevalence rate of leprosy showed decline trend from 0.96/100,000 to 2.07/100,000 year by year. About 20 new cases were detected in each year which presented punctate distribution. MB (multibacillary Leprosy) case account for 80.85% and 188 cases (93.62%) were farmers. Average of new case in recent 5 years gradually increased.

Conclusion Although leprosy in Qidongnan prefecture gradually came to low epidemic situation, it was not effectively controlled in packet areas which was still a challenge for eliminating leprosy. Early detection and treatment patient were key strategies to further control leprosy. The priority among priorities in future leprosy control work were to strengthen leprosy control knowledge training on field medicinal professional and propaganda of leprosy prevention knowledge on rural population.

Keywords: Leprosy, Epidemic Characteristics, Control Strategies
ILC4.2–082
Problems and Countermeasures on the Writing of Medicine Record & Electronic Medicine Record about Leprosy in Guizhou Province
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Medicine record & Electronic medicine record about Leprosy must be consistent with the objective, accurate, timely, complete, and the basic principle of specification, and it is conducive to the training and improvement of the basic skills of Leprosy diagnosis and treatment. Through the 5 years of actual provincial leprosy prevention and control work, summarized the problems found in the process of Guizhou Province leprosy records, put forward corresponding solutions, to improve the diagnosis and treatment of Guizhou Province leprosy and low prevalence state of leprosy discovery and prevention & controlling force.

Keywords: Leprosy, Medicine Record, Electronic Medicine Record, problems and countermeasures
ILC4.2-083
Discussion on the prospect and evaluation the preliminary results of implementing the program of eliminating the harm of leprosy for early cases finding
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Objective To preliminarily evaluate the effect on the early cases finding of the program of elimination leprosy hazards from 2011 to 2014 and to explore the prospect of implementation of the program for the future in Suqian Prefecture.

Method To compare case date of two stage of the duration of 2007~2010 and 2011~2014 and to analyze retrospectively.

Result Epidemiological characteristics has been changed from 2011 to 2014 in Suqian Prefecture, mainly the rate of early case finding increased from 35% to 76.92%, the proportion of new cases with grade 2 disability decreased from 28.57% to 23.08%, the average delay diagnosis time of the new cases decreased from 95.85 to 28.59 months, and the average annual incidence of leprosy by dropped from 0.10/100000 to 0.06/100000. For the new patients, the average age down from 54.48 years old to 46.11 years old, the ratio of male to female rose 1.33 to 3.33, and the proportion of lepromatous patients dropped from 61.90% to 46.15%.

Conclusion It is good that the effect of early cases finding shown by carrying out the program of elimination for leprosy hazards form 2011 to 2014 in Suqian Prefecture and showed that the program should continue to carry out by next step. Authors strengthen that it is the important to detect the new cases among the group of middle-aged regional men and to pay attention to training the leprosy control stuff and dermatologists to symptoms of PB leprosy.

Keywords: Leprosy, Program, Effect, Evaluation
ILC4.2-084
Analysis of 2 cases of misdiagnosis of leprosy
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a report of 2 cases of misdiagnosed cases of leprosy. The patient, male, 35 years old. Double upper limbs erythema since 2 years, with facial redness in February. Acid-fast bacillus bacteria index 1.4. Histopathology of blood vessels in the dermis and around adnexal see epithelioid cell granulomas and a small amount of infiltration of macrophages, lymphocytes and less. Nerve perineurium mild layered variable and cell infiltration, acid-fast staining positive in 3.5. A diagnosis of borderline leprosy type (BB) with type I reaction. The second patient, male, 29 years old. The double eyebrow loss for 3 years, with his hands clasped floating swollen nodules in 2 years. Acid-fast bacillus bacteria index 4. Histopathology of blood vessels in the dermis and around adnexal foam cells, macrophages, a small number of lymphocytes granulomatous infiltration, no nerve branch. 5 + positive acid-fast staining. A diagnosis of borderline lepromatous (class BL) leprosy with type II reaction and acute neuritis. Two patients are more regular in leprosy combined chemotherapy regimen in the treatment of leprosy reactions in 2 years and the treatment of skin lesions subsided, most, curative effect.

Keywords: leprosy, Misdiagnosis
ILC4.2-085
2 cases of tuberculoid leprosy relapse
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report 2 cases of tuberculosis leprosy relapse cases sample type. 1 patients, male, 30 years old. Under the right knee numbness, facial erythema in August 1 time. In July 2012 in patients with right knee joint of the lower lateral appear numb, sweat less consciously, and gradually spread to a foot, because work too busy, did not take any treatment measures.

Keywords: leprosy, tuberculoid leprosy, relapse
ILC4.2–086

2 cases of Paris polyphylla and other external medicine cure leprosy plantar ulcers

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Objective Leprosy trophic ulcer is left after the cure of sequelae of leprosy patients. There are the simplicity and complexity. The simplicity is easy to recover after debridement and repair, and the complexity is difficult to recover. At present, there is no special method for the first half of the year. To this end, I looking for a shortcut method to relieve the pain of patients. After repeatedly visited folk Chinese herbal medicine doctor, it was found that Paris polyphylla, rhizoma arisaematis, garlic after mash topical application can treat chronic unhealed ulcer. The results were reported as follows: 2 cases were successfully obtained.

Keywords: leprosy, leprosy plantar ulcers, Paris polyphylla, External application
ILC4.2-087
The effect of the project carried out actively cases finding measures in low prevalence area of leprosy
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Objective To explore the value and method for a project in the low epidemic area of leprosy to carry out the initiative measures to find new cases of leprosy.

Method The project named actively finding leprosy new cases carried out in Pizhou County with low prevalence of leprosy in the past years from 2011 to 2014. The initiative and comprehensive measures included surveying the clue of leprosy, following the live and cured people affected by leprosy and their families, checking the people close contacted with active cases, investigating epidemic focuses and monitoring of leprosy symptoms by comprehensive medical institutions outpatients.

Results Tally 10 new cases were were found during 4 years, which compared to that 3 cases were found from 2007 to 2010 increased in 7 cases; The proportion of cases with standard of suspected leprosy among cases reported on the clue with leprosy rose from 34.2% of 2011 to 66.7% of 2014, which reported by doctors coming from comprehensive medical institutions outpatients and rural areas respectively. That shows the ability of finding leprosy in the medical staff from the county being enhanced.

Conclusion It is still great value to carry out actively cases finding measures to promote the elimination of leprosy harm in the areas with low prevalence of leprosy in a timely manner, of which high quality training medical staff with leprosy knowledge is the key.

Keywords: Leprosy, Low epidemic area, Project of actively cases finding
ILC4.2-088
1 cases of treatment experience After amputation wound healing
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Abstract: male, 63 years old. Because of the "complexity thenar ulcer amputation wound is nonunion after 40 days" to the hospital. A diagnosis of: 1, amputation wound after minor improvement; 2, mild malnutrition; 3, alcohol withdrawal syndrome. Diminish inflammation, protect liver, nutrition, support, debridement treatment after 15 days or so, wound improved markedly, 60 days basic recovery, 6 months wounds healed the prosthesis.

Keywords: Leprosy, amputation wound healing, treatment experience
ILC4.2-089
institutional teen age leprosy cases –discussion on various dimension
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OBJECTIVE -- Teen age is the base of human life for building health, education and also for wealth - the pillars for being establishing in life. Moreover this age is also touches easily by soft corners and emotions. Childhood leprosy hammerers at this base and cripples a budding future. Social dimension is beyond measurable. So steps should be taken to prevent deformity, disability of child age group so that they can continue treatment at home side by side of their studies.

METHODS:- 15 cases of teen age patients at age group 14 –15 admitted at Gouripur Leprosy Hospital ,West Bengal ,India has been analyzed according to their age ,sex, duration of illness, area of origin, causes and duration of hospitalization, H/O contacts with family members, present status of links with family / school /studies. Data’s has been analyzed.

RESULTS:- Female cases are predominant (8/15),nine cases are from Bankura district,eight patients has been admitted for reaction, and eleven cases have ulcers or deformity including claw hand .Five patients has no deformity. Patients have been diagnosed as leprosy (time range ten yrs in longest duration and at the time of admission shortest duration).Four cases have definite h/o contact at family. Four cases are running on MDT (One has been diagnosed as relapse) , eleven cases are RFT. Duration range of hospitalization is 8 yr to 1 year. None of them are continuing formal or non formal education i.e all are school dropout, no GOVT /NGO has been enquired for their education. Only four patients has a continuing relation with family others are almost destitute they have no idea (and it’s very difficult to get epic cards without family identity ) how to collect their identity cards . Other details will be presented at conference.

Conclusions– Even after post MDT and elimination era childhood cases are coming to picture and requiring hospitalization. But they are being thrown out from their education. So special emphasis should be given at this point. Family members, community, programme-managers must be more careful at this point.

Keywords: teenage, contacts, deformity
ILC4.2–090
Analysis of epidemiological characteristics and control measures of Leprosy during 1991–2012 in Baoan, Shenzhen city
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Objective: To understand the epidemiological characteristics of leprosy and influencing factors in Baoan Shenzhen city from 1991 to 2012.

Methods: Epidemic data of leprosy in Baoan from 1991 to 2012 were analyzed.

Results: Three were seventy–one newly diagnosed patients with leprosy from 1991 to 2012 and the annual average detection rate was 0.145/100,000. The main detection way was through dermatology clinic (92.95%). 88.73% of the patients were non–shenzhen natives. The ratio of MB to PB was 2.94:1. The duration of illness was within 2 years in 34 patients (47.89%). The grade–2 deformity rate was 22.54%.

Conclusions: The epidemic of leprosy is still fluctuating Baoan. The first source of patients was migrated cases. The active methods in case detection, such as clue investigation, annual physical examination should be strengthened.

Keywords: Leprosy, epidemiology, Control measures
ILC4.2–091
Introduction to the villages and towns part–time doctors of leprosy for manage and work thinking
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Objective: To arising the villages and towns part–time doctors of leprosy carry out the prevention and treatment of leprosy work proactive In eliminating the detriment by leprosy . Methods: The introduction about how to manage the villages and towns part–time doctors of leprosy from these four main aspects : building leprosy control lattice ,personal training ,sending down the work scheme and notice ,the midyear guidance and year–end examine . The brief introduction about

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sketching the villages and towns part–time doctors work thinking from the villages and towns rank work ,manage the villages doctors ,cooperate with work and the materials collected , sorted out and pigeonholed.

Results: The villages and towns part–time doctors of leprosy are hundreds of times in the local , who can be early discovery and reporting the leprosy patients . In the present the country health agency gived the main method is health education while discovery the leprosy person . The work that manage the villages and towns part–time doctors and give right guidance are very important .

Conclusion: The leprosy control work would be have a good benefit with the villages and towns part–time doctors take part in , meanwhile , the situation those country agency professions are poor and work alone can be solved , It’s conform to the big health guidance , and then it would be have inestimable social benefit and economic benefit in the eliminating the detriment by leprosy.

**Keywords: part–time doctors, manage, work thinking**
Assessment for the effect of leprosy suspicious symptom surveillance system in Zhejiang province
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Objective: To evaluate the effect of leprosy suspicious symptom surveillance system. Methods: The effects of leprosy suspicious symptom surveillance system were assessed, in terms of early diagnosis of leprosy and disability rate, through analyzing the trend of leprosy incidence in the recent years and comparing the various surveillance indicators before and after implementation of leprosy suspicious symptom surveillance system, in Zhejiang province.

Results: the proportion of the leprosy patients among migrant was increasing year by year. After implementation of leprosy suspicious symptom surveillance system, the average delay period of newly diagnosed leprosy patients was shortened from 36.64 months to 17.86 months. The rate of grade-2 disability was decreased from 23.15% to 12.12%.

Conclusion: The implementation of leprosy suspicious symptom surveillance system can improve early detection of leprosy cases and reduce grade-2 disability among newly diagnosed leprosy patients.

Keywords: leprosy, surveillance, effect evaluation
ILC4.2-093
The Role of Leprosy Suspicious Symptom Monitoring System in Early Detection
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Objective: To explore the mode for prevention and treatment of leprosy in the low prevalence state. Methods: According to the average delay of new leprosy patients, the rate of grade 2 disability, the misdiagnosis rate, the discoverable way and other indicators before and after operation of leprosy suspicious symptom monitoring system in Zhejiang province, analysis and evaluate the foundation of monitoring system in the early detection of work.

Results: after the operation of the monitoring system, cases which are found and confirmed in comprehensive medical institutions increased ($\chi^2 = 26.13, p < 0.05$), the average delay of new leprosy patients shortened from 37.34 months to 17.89 months, Upon examination ($p < 0.05$), so the difference is statistically significant; the rate of grade 2 disability shortened from 28.38% down to 12.50% ($z = -6.44, p < 0.05$); The misdiagnosis rate of confirmed cases shortened from 79.73% down to 26.56% ($\chi^2 = 39.21, p < 0.05$), the average number of misdiagnosis cut down from 2.6 times to 0.8 times.

Conclusion: The operation of leprosy suspicious symptom monitoring system is conducive to the early detection of cases, and reducing the incidence of disability, which is a new mode for prevention to popularize in the low prevalence state.

Keywords: leprosy, symptoms, early detection
Study on the awareness status of key message on leprosy control among publics in Zhejiang

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Objective: To investigate the awareness status of key message on leprosy control among publics in Zhejiang, and thus formulate sensible leprosy health education policies. Methods: 1063 masses lived in Shangyu, Haining, Cixi cities were selected as subjects with multi-stage sampling method and questionnaire survey was conducted by leprosy control staffs to understand awareness status of 7 items of key messages on leprosy control. Analysis of the data was made by SPSS11.5.

Results: The study surveyed 1063 publics, with a total awareness rate of 40.73% (3031/7441) and a basic awareness (aware of 4 or more among 7 items) rate of 35.8% (381/1063). The awareness rate of free diagnosis and treatment is the lowest, with a rate of 18.06%. There were significant differences in basic awareness rates between different age groups (P<0.05).

Conclusions: Leprosy health education on key message of leprosy control and the propaganda of leprosy early symptoms and free treatment policy should be strengthened to reach the goal of eliminating the harm of leprosy in China by the end of 2020.

Keywords: Leprosy, Public, Key message on leprosy control
ILC4.2-095
Advances in leprosy control and research
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Despite of widespread implementation of MDT, over 200,000 new leprosy cases have been detected every year worldwide, with about one third of them probably developing nerve damage and disabilities. It is still a big challenge to eliminate leprosy. In recent years, to reduce the high rate of new cases with grade 2 disabilities becomes the key goal of leprosy control, the extent of leprosy integration services have deepened, passive case-detection gradually turns into main ways of case-finding, the duration of leprosy MDT have shortened, leprosy reaction and disability prevention have been paid more attention, and the comprehensive rehabilitation of persons suffered from leprosy becomes main contents of leprosy control activities. The authors have reviewed the current new evidences in leprosy and recommended for leprosy detection, diagnosis, treatment and rehabilitation, et al, to give guidance for leprosy elimination strategy.

Keywords: Leprosy, Control, Research, Advance
ILC4.2–096
The health economic evaluation of the leprosy suspicious cases and monitoring system in Zhejiang
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Objective To explore the mode for prevention and treatment of leprosy in the low prevalence state, and provide a scientific basis for the investment and use of health resources. Methods Using the cost-effectiveness, cost-utility and cost-benefit analysis, statistics and analyze the data from the system of the leprosy suspicious cases and monitoring in Zhejiang.

Results The total investment of the system was ¥1,572,300; The system increased spent ¥20,400 on diagnosis and management leprosy patients in average; ¥137,400 was needed to spend to avoiding each abnormal and residual patients; Each patient is reduced by one misdiagnosis, the cost was ¥9911; each patients drop one month in average delay, the cost was ¥98; The expenditure was ¥4084.00 to save one disability adjusted life year; Project net benefit was ¥20.0095 million, the cost–benefit ratio of 1:13.73.

Conclusion Since the operation of the system, it improved case detection sensitivity, reduced the abnormal and residual rate of cases which are found newly, reduced the economic burden of the leprosy patients, and achieved remarkable social and economic benefits.

Keywords: Leprosy, the system of the leprosy suspicious cases and monitoring, health economic evaluation
ILC4.2–097
Burden of Disease of Leprosy Involved Patients in Zhejiang Province and Its Health Service Utilization
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Objective To investigate the burden of disease of leprosy involved patients in Zhejiang province and its health service utilization, and provide the basis of develop strategies for leprosy prevention. Methods Investigate 158 leprosy involved patients face-to-face by self-designed questionnaire on burden of disease and health service utilization. The survey was made by the leprosy control workers.

Conclusion 15 among 37 leprosy patients had appeared complications such as leprosy reaction. Economic burden with 37 leprosy patients for disease diagnosis: the average economic burden of direct and indirect was 3229.5 ± 149.7 Yuan and 556.4 ± 69.8 Yuan; 15 patients cost of direct and indirect was 1983.9 ± 159.9 Yuan and 267.4 ± 42.7 Yuan for treatment complication (Leprosy reaction). There were a number of leprosy involvement didn’t enjoy better health resources among 158 leprosy involved patients. And not to see the doctors because of 66 cases (41.77%) had no money or 36 cases (22.79%) for discrimination phenomenon; And satisfied with the current medical and rehabilitation services has only 97 (61.39%).

Results As leprosy prevalence keep very low state, the leprosy patients were need to bear the heavy economic burden in the process of diagnosis and treatment. It should be rational allocation of health resources and improve diagnosis level of the medical staff, and increase the Coverage and reimbursement with all kind of medical insurance to reduce the financial burden and improve the quality of life with leprosy involved patients.

Keywords: Leprosy, Burden Of Disease, Health Service Utilization
ILC4.2-098
A long way to wipe out leprosy thoroughly with great responsibility
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Objective: To appeal to the society to focus on the prevention and control of leprosy continuously. Methods: Analyze the status quo of the prevention and control of leprosy through subjective factors and objective factors, and then recommend the theoretical basis of the difficulties of the prevention and control of leprosy.

Results: There are great difficulties in preventing and controlling leprosy and it needs multiple roles to take part in. And it has already got the staged achievements.

Conclusion: It needs a long time to eliminate the leprosy thoroughly and it requires a variety of support of policy, capital, technology and so on.

Keywords: the prevention and control of leprosy, wipe out leprosy, analysis of the status quo
Effect evaluation of Leprosy health education among floating population in Haining city
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Objective: To investigate the Knowledge, attitudes, and practice about Leprosy, and the requirement of the forms of health education on leprosy among floating population. Evaluate the effect of Leprosy health education for floating population.

Methods: 359 floating population were investigated before and after the health education using the same questionnaire. Results: 57.66% of the floating population came from the high-epidemic state of Leprosy. 82.73% of them had heard leprosy or seen lepers before health education. The rate of knowledge related to leprosy had distinctly improved after the health education, the rate of Fear and discrimination against leprosy had reduced, and the percentage of the floating population who were not afraid of lepers and would be able to contact with the cured lepers rose from 25.91% to 45.13% and 15.60% to 31.75% before and after the health education.

Conclusion: The special course and folding were the effective measures to carry out leprosy health education among floating population.

Keywords: floating population, Leprosy, health education, effect evaluation
ILC4.2-100

An report on advance in leprology discipline of Jiangsu Province from 2005 to 2014

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Objective To study the advance and to promote the development of the leprology discipline of Jiangsu province. Methods The advance in leprology discipline of Jiangsu province was reviewed, summarized and evaluated from 2005 to 2014.

Result Leprology disciplines play an active role for providing advise services for government and society of Jiangsu province from 2005 to 2014. During the time, new measures for the construction of academic ability promoted the rapid development of the discipline team composed of professional and social support. The discipline researched and developed the strategy of leprosy control by the turn from controlling transmission to eliminating hazards and innovated some policies and ideas of leprosy control either. Moreover, in the course of development of the discipline, the formation of norms and experiences including monitoring, training and patient care created a good social benefits. The discipline has made an important contribution for the prevalence of leprosy keeping a steady decline in the low epidemic situation in Jiangsu province.

Conclusion To promote the development in leprology discipline in a low endemic situation, it should keep innovative thinking, find the weak links of work, use the new achievements of science , make a breakthrough in fields such as basic research, early diagnosis, early prevention of disability and social medicine, and make a new contribution for the eradication of leprosy.

Keywords: Leprology , Discipline , Advance
ILC4.2–101
The strategy and its effect of leprosy control after basic elimination of leprosy in Jiangsu province
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Objective To explore on effective strategy of leprosy control after realization of the goal for basic eliminating leprosy and to promote the process of eliminating the harm of leprosy in Jiangsu Province.

Method Jiangsu Province passed through the assessment of basic elimination of leprosy by the Ministry of Health of People’s Republic of China in 1998. Leprosy control system actively responded to Reform of National Health Prevention System to Center for Disease Prevention and Control System(CDC) as a business led in Jiangsu province from 2000. For the new situation, the strategy concluded the combination of clinics and CDC, early cases detection and early prevention of disability as the focus of daily work, popularization of leprosy symptoms monitoring and increasing the training of Dermatology doctors and village doctors with lepra knowledge, guidance with classification of different prefectures and their counties, increasing investment on leprosy control, carrying out projects of active case finding and lepra monitoring and the integration leprosy control into general hospital step by step in whole province.

Result There are tall of 558 new cases, of which with mean of 34.8 cases yearly and no cases of children, were detected from 2000 to 2015. The detective rate and proportion of new case with grade–2 disability were down from 0.081/100000 and 44.26% of 2000 to 0.016 / 100000 and 15.38% of 2015 respectively. 72.58% of 558 new cases were reported by dermatology clinics. It is showed that the epidemic of leprosy in Jiangsu province continues keeping a steady decline in low flow trend. There were only 13 new cases were detected and only 97 active cases of leprosy left in 2015, all of them, the diagnosis and treatment of leprosy were respond by the designated medical institutions.

Conclusion In low leprosy epidemic situation, Jiangsu province takes the strategy mentioned above for leprosy control is effective. To achieve the ultimate elimination of leprosy harm still need to ensure funds and more stable stuff, but need to deepen the working mechanism of leprosy monitoring and combining clinics and CDC.

Keywords: Basic elimination, Leprosy control, Strategy, Effect
Investigation and analysis on the current situation of leprosy control team in Jiangsu Province

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Objective To grasp the present situation of the leprosy control team in Jiangsu Province and provide the foundation for promoting team and capacity building.

Method The unified form was designed to register both the full-time and part-time staff for leprosy control. The symposium was held. And the related data was collected and analysed.

Result At the end of 2014, there were 2020 staff registered for leprosy control at the town level and above including both the full-time and part-time, with the disease control and prevention institutions, the diagnosis and treatment of medical institutions, the comprehensive medical institutions at or above the county level and township hospitals accounted for 12.82%, 2.23%, 4.11% and 84.55% respectively. The team in the province was respectively sound and played an important role, but also with weak links such as the lack of staff, aging, imbalanced participation of the comprehensive medical institutions and so on.

Conclusion Although leprosy in Jiangsu Province maintain a lower prevalence and descended reposefully, but to eliminate the harm until eradication, it still needs to continue strengthening team and capacity building and maintain stability of the team.

Keywords: Leprosy, Team, Current situation
LC4.2–103
Analysis of recurrence Leprosy cases after MDT in Yunnan in 2005—2014
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[abstract] Objective: Analysis of MDT recurrence leprosy cases data, and compared with the DDS recurrence cases. Methods: All data are from LEPMIS system, and statistical analysis of DDS recurrence cases and MDT recurrence cases in 2005—2014.

Results: there are 44 MDT recurrence cases, in accounting for 1.3% of all patients, including 36 cases of MB recurrence, and 8 PB recurrence cases; all patients emergence of new lesions, 8 cases of neural response, 9 cases of leprosy reactions; The average recurrence interval 129.7 months, including DDS recurrence in 54 cases, the DDS recurrence cases interval was significantly longer than MDT recurrence cases.

Keywords: leprosy, multidrug therapy, recurrence; report
ILC4.2–104
Cases analysis of newly diagnosed leprosy in Yunnan in 2009—2013
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[abstract] Objective: To study the epidemiological situation and discovery methods of newly discovered cases of the 2009–2013 in Yunnan.

Methods: analysis incidence of newly leprosy cases, the delay period, the age of onset and find methods etc. in Yunnan in 2009—2013. Results: The five were found in 1502 cases of patients, with an average 300 cases per year, with an average age 43.4 years, the average delay of 28.3 months, MB rate was 62.5%, 18.6% rate of deformities, the incidence among the general five-year downward trend in the process, outpatient found by most patients (30.6%), followed by clues and self-reported survey, 18.5% and 18.3%.

Conclusion: MDT has been carried out for 30 years, was still found to 5/100,000, MDT leprosy can not be controlled in a short time; by strengthening the construction of clinics and leprosy health education can be found in a greater proportion of patients.

Keywords: Leprosy, New cases, Analysis
Clinical and epidemic analysis of Children leprosy cases in Yunnan in 2008—2012
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Objective: Observe annual epidemic and clinical characteristics of children leprosy cases in Yunnan in 2008—2012. Methods: Get information through LEPMIS system about the incidence rate, average delay of skin lesions, the source of infection and other information, and analyzing the information. Results: 2008—2012, there were 46 cases of leprosy children, accounting for 2.9% of the total number of patients; the longest delay of 3.3 years, a minimum of four months, an average of 1 year. 46 cases of children from leprosy infections accounted for 80.4% in the home, outside the home of 13%, unknown 6.5%; only one case of diagnosed lesions does not appear, appear two or more accounted for 82.6%. 82.6% had nerve damage, all leprosy patients had no leprosy reactions, only 1 patient had visible disabilities. Conclusion: With the repeated conduct LEC, the source of infection is reduced from the crowd, children are more easily transmitted leprosy in the family. Research how much skin lesions, nerve damage to different conclusions; I think that skin lesions and neurological research has no real meaning.

Keywords: Children, Leprosy, attack; clinical
ILC4.2–106
Analysis of incidence of leprosy in families with members affected by leprosy in Wenshan City in 1999–2014
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[Abstract]Objective: Discussion leprosy incidence characteristics on the families of people affected by leprosy, provide the basis for developing control strategies. Methods: data analysis of leprosy cases since 1957 in Wenshan City, especially the leprosy cases information in recent 16 years in families of people affected by leprosy. Results: The incidence rate in families of people affected by leprosy is much higher than the general population incidence. 106 new cases were family members of people affected by leprosy, the cumulative incidence rate of 570 / ten thousand and local residents’ cumulative incidence rate of 3.2 / ten thousand. And children’s cases are all children of leprosy patients. Conclusion: The family members of people affected by leprosy is still the focus groups of leprosy control, should strengthen physical examination of them, and to consider the implementation of preventive medication.

Keywords: Leprosy, household contacts, Epidemiological feature, Prevention and control strategy
ILC4.2–107
Evaluation of the implementation of the central subsidy leprosy control projects in Yongren County
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Objective: To evaluate the Yongren County implementation of central subsidies for leprosy prevention and control project effect.

Methods: Since 2008 since the implementation of the project (from 2008 to 2011) and previous (2004–2007) rural doctor training rate and social public leprosy knowledge awareness rate and the leprosy suspicious clues on numbered off found patient number comparison, implement reported disease award. Results: Rural doctors training rate, social public leprosy knowledge awareness rate of rise, reported suspicious clues 191, was found in 13 cases of leprosy, bacteria in 11 cases, grade II or more disability rate 15.38%.

Conclusion: In the implementation Central government subsidies to leprosy prevention and control projects 4 years diagnosed in 13 patients, indicating that central government subsidy of leprosy prevention and control project effect is apparent, greatly reducing the source of my county leprosy infection, the broad masses of the people is an excellent health education

Keywords:Leprosy, Prevention and control, effect, Evaluation
**ILC4.2–108**

The research of the cure effect evaluation of the leprosy MDT in Xishuangbanna prefecture

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[Abstract] Objection: Researching the effect of the leprosy MDT for 30 years in Xishuangbanna, and its influences for the leprosy epidemics and the contribution to the society, the economy and the work for the leprosy prevention and control.

Methods: the research is adopted the retrospective review. First, the data were collected from all kinds of report forms in 1983–2012. Then, according to the morbidity by years, calculating the conic equation, the theory morbidity and epidemic trend charts. At last, the leprosy morbidity by years was compared by chain proportion. Results: MDT is the fastest method of reducing the leprosy morbidity in all leprosy treatment methods.

Conclusions: MDT made Xishuangbanna leprosy epidemic get effective control, the epidemic scope decrease and produce great effect to the society and economy. For this, it made great progress to the leprosy healing and health education. But there was some limitation for the MDT.

**Keywords:** Leprosy, Combined with chemotherapy, Control effect
ILC4.2–109
Leprosy prevention strategies
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Propose To provide theoretical basis for leprosy prevention strategies, methods
Through the literature search, the leprosy prevention and control strategy are
discussed. Results to sustainable development of leprosy medical rehabilitation
work motivation; Leprosy profession and the development of the economic
recovery are constrained by the policy, capital and talent serious; Leprosy
discrimination intervention and intervention strategy of social rehabilitation work
relative single; Leprosy patients counseling and psychological rehabilitation work
quality is not ideal. Conclusion leprosy prevention strategies should strengthen the
related policy, money and talent, strengthen the diversity of leprosy discrimination
intervention and social rehabilitation work.

Keywords: leprosy, prevention, strategies
Early diagnosis of and disability prevention from leprosy through enhanced contact examination in selected high endemic districts in Nepal

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Background: Although in 2010, Nepal was declared as having eliminated leprosy as a public health problem, over 3000 new cases have been reported annually between 2010 and 2014 (incidence rate between 11.2 and 12.3 per 100,000). In the same period, the proportion of new cases that were children was between 4 and 8%, and between 2.8% and 4% of all cases had grade 2 disabilities (G2D). With support from Bangkok Declaration Special Fund, Nepal initiated active case finding to enhance early diagnosis and reduce G2D.

Objectives: To detect hidden and unreported cases and disability prevention through early case detection.

Method: Active house-to-house was carried out in June–July 2015 to search for suspected cases among household and community contacts of 237 confirmed leprosy cases in 82 selected pockets of 4 high endemic districts. Health workers, female community health volunteers and people affected by leprosy were mobilized for the search, using pictorial search cards. People who were provisionally diagnosed during the search as suspected leprosy cases, were later clinically examined at designated health facilities by senior and experienced leprosy service providers, who either confirmed or discarded the provisional diagnosis.
Results: In total 1207 household contacts and 7240 neighborhood contacts of leprosy cases were examined during house to house search yielding 4 cases from family contacts and 14 from community contacts after further examination by senior health workers and leprosy supervisors. Total new case detection rate was 213/100,000 people examined; the rate was higher in family contacts (331/100,000) than in neighborhood contacts (193/100,000). Only one (5.5%) case was MB, while 5 (28%) cases were children and 11 (61%) were female. The proportion of positive contacts who were children or female was higher than the national average for leprosy cases, whereas the proportion of cases with MB was less than the national average. The only detected MB case was an adult male and a family contact. None of the new cases were found with grade 2 disabilities.

Conclusion: The results indicate that focused screening of household and community contacts can yield large numbers of leprosy cases living in the community. Cases were detected early enough before they manifested grade 2 disabilities. Capacity building of health workers and volunteers, and increased community awareness were some of the added advantage of this activity.

Keywords:
Analysis of Epidemic Feature of Newly Detected Leprosy Cases from 2005 to 2014 in Sangzhi County

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Objective: To develop measures effectively for leprosy prevention treatment under the low prevalence through analysing of newly detected leprosy cases in recent ten years in Sangzhi County.

Methods: Collecting and analysing the new case registration documents of the whole county from 2005 to 2014.

Results: Detecting 36 leprosy cases in recent ten years, including 34 new cases, 2 relapses (3 males, 6 females). The average age is 48.7 years old, and the disease period is 26.5 months. 14 cases of household contact infection, 8 cases family contact infection. 13 cases were found by clue investigation, 13 cases were found in outpatient department of dermatology.

Conclusion: Leprosy is a chronic infectious disease. The current main methods of work are professional clinic, close contact examination of family members, early detection and timely standardized treatment.

Keywords: leprosy, epidemiology, detect, treatment
ILC4.2-112
The capacity of case finding before and after cancellation or merging of Some Professional Leprosy-control Institution in Hunan Province
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Objective: To understand the impact on case-finding ability in areas whose professional leprosy-control institution was cancelled or merged, and provide scientific evidences for development of prevention policy.

Method: In this study, all professional institution for leprosy control in the province was classified as three Kinds (I, II and III) on basis of the fact whether a county-level institution was existed or not during 1992 to 2002, or that the original existed one was either cancelled or merged ever since 2002. Compare the case constituent ratio during period 1992-2001 and 2002-2011 respective in three different area. Assume that the case constituent ratio in area III is all the same during the two stage, and its ratio of case number in 2002-2011 by 1992-2001 is equal with that of area I and area II. Infer the possible underreported cases in area III.

Results: The difference of case constituent ratio in three areas had statistical significance (P <0.01) ten years before and after institution cancelation or merging. Case percentage of area III was estimated having declined, and underreported cases amounted to 76-160, with 96 might be relative accurate data. The underreported rate reached 39.67%.

Conclusion: It’s proved that the cancelling and merging of institutes for leprosy control has resulted in great impact on case finding of the illness. Targeting measures are hereby suggested to reduce the adverse effect, so that the control of leprosy can be promoted to sustainable development.

**Keywords:** leprosy, disease surveillance, capacity
ILC4.2-113
The survey of the current situation of prevention and treatment of Hunan talents in leprosy control field
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Objective: To understand the current situation of prevention and treatment of Hunan talents in leprosy control field, and provide scientific evidences for development of prevention policy.

Method: In this study, 70 professional institutions for leprosy control in Hunan province was investigated, investigating contents cover the number, education background, profession, the technical post, the situation of continuing education, the satisfaction degree for their work of full-time and part-time staffs.

Results: There are 391 full-time and part-time staffs in 70 professional institutions for leprosy control in the province, 79.3% are from university and secondary school and below, 94.1% are medium-grade professional title and below, 65.2% are clinical specialty and preventive medicine, 64.2% cannot get the good continuing education, and only 35.5% content with the present job.

Conclusion: The current situation of prevention and treatment of Hunan talents in leprosy control field cannot adapt to a new situation. The more government support and the better treatment of staffs would be need.

Keywords: leprosy control, the talents in leprosy control field, survey
Operationalizing Pilot Project Post-exposure prophylaxis with immune and chemoprophylaxis for leprosy contacts: PEP–hans Brazil
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Background: The post-exposure leprosy contacts prophylaxis (PEP–hans) includes immuno- and chemo-prophylaxis. It consists of conducting all leprosy epidemiological surveillance activities and including providing healthy contacts with a single dose of rifampicin when the BCG vaccine, recommended by Brazil’s Ministry of Health protocol, is administered. Knowing that the implementation of PEP–hans strategy for leprosy contacts needs to be planned and evaluated in the routine of health services, Brazil and other six endemic countries are conducting pilot projects.

Objective: To present Brazil’s PEP–hans pilot project which aims to analyze the effectiveness of chemoprophylaxis in preventing leprosy, by means of a single dose of rifampicin among leprosy–negative contacts for the disease, as well as to evaluate the effectiveness of the post-exposure immuno- and chemo-prophylaxis among leprosy contacts in the routine of the leprosy program in defined areas for pilot study prophylaxis.

Expected results: Reduction in the incidence of leprosy in endemic areas by more than 46% after two years of chemoprophylaxis, corroborating the results available of similar studies running in other countries; identification of aspects necessary for the implementation of the PEP–hans strategy of leprosy contacts surveillance throughout the country.
ILC4.2–115
A retrospective study of patient’s reported delays in leprosy diagnosis in Nepal
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Objective
To evaluate factors and time between patients’ first leprosy symptom and diagnosis.

Methods
A retrospective study was performed in newly diagnosed leprosy patients reporting to Anandaban Hospital, a tertiary referral center for leprosy in Nepal, from January 2010 to December 2015. Data were collected on age, sex, ethnicity, number of skin lesions, WHO disability grade, leprosy classification, and address. Data were entered and variables were analyzed using Epi Info. Time between the patients’ reported onset of the first lesion or symptoms and diagnosis was defined as delay.

Result
A total of 805 new leprosy cases were reviewed demonstrating a male: female ratio of 1.8: 1 (518 males: 287 females) with a mean age at leprosy diagnosis of 37.5 years (3–85 years). At the time of diagnosis, 11.8 % were reported as WHO grade 1 and 17% as WHO grade 2.
The mean diagnosis delay was 1.8 years (0.5–3 years), significantly differing between multibacillary (MB) with 2.0 years and paucibacillary (PB) slightly earlier with 1.6 years (p value= 0.017). Mean delay in diagnosis increased in correlation with patient age: age 60 years, 2.6 years (p value=0.02). The mean delay in those with visible skin lesion (79.2% of patients) was 1.6 years, infiltration (11.4%) was 2.7 years and nerve involvement only (no skin symptoms; 9.3%) was 3.1 years (p value=0.00089). Ethnicity or caste was not associated with mean diagnosis delay: Brahmin/Chehtri (high caste), 1.7 years; Dalit (low caste), 2.1 years; Janjati (local tribe caste), 1.9 years; Madhesi (Southern plains caste), 1.7 years; Muslim, 2.6 years (p value=0.71). Only 34.4% of patients were diagnosed within 6 months of first signs and symptoms of leprosy.

Conclusion
Delay in diagnosis remains a great challenge as 65.6 % of patients were diagnosed after > 6 months of symptoms with a mean of 1.8 years and longer delays significantly more evident in older age groups. While screening for leprosy, nerve assessment should be a priority as those presenting with nerve only symptoms experienced longest delays in diagnosis, thereby incurring greater risks of disability development.

Keywords: Leprosy, Delay in diagnosis, Ethnicity, Nerve assessment, Disability
WORKSHOP: “Information systems and indicators for the Global Strategy 2016–2020” - 19th International Leprosy Congress - Beijing, China

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The Global Leprosy Strategy 2016–2020 “Accelerating towards a leprosy-free world” is built around three pillars: (i) strengthen government ownership, coordination and partnership; (ii) stop leprosy and its complications; and (iii) stop discrimination and promote inclusion.

The identified key processes in implementing the Global Leprosy Strategy include cutting transmission, coverage of high endemic pockets of leprosy with innovative active case detection methods; integration of the strategy into other disease control programmes; improved leprosy programme monitoring, inclusion of persons affected by leprosy and steps to eliminate discrimination against persons affected by leprosy and their family members. In endorsing the Global Leprosy Strategy, national programmes agreed on three main targets. These are: (i) zero grade-2 disability (G2D) among children diagnosed with leprosy; (ii) reduction of new leprosy cases with G2D to less than one per million population; and (iii) zero countries with legislation allowing discrimination on the basis of leprosy.

Continuous flow of reliable information and a minimum set of user-friendly indicators are crucial for describing leprosy programmes in terms of coverage, effectiveness, efficacy, impact and sustainability.

The workshop aims at disseminating a set of indicators suggested for monitoring the implementation of the Global Leprosy Strategy 2016–2020 and reviewing recent experiences in data collection and compilation in leprosy control programmes. Some of the presentations and discussions will cover monitoring of stigma and discrimination against persons affected by leprosy and their family members. The discussions will be moderated to decide on how to report against the set of essential indicators to monitor the progress in implementing the Global Leprosy Strategy 2016–2020.
ILC4.3–002
Safe and Effective Post–Exposure Prophylaxis With The LEP–F1/GLA–SE, but not BCG, Vaccine In M. leprae–infected Armadillos.
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OBJECTIVES: Because the BCG vaccine confers only partial protection against leprosy, the infectious peripheral neurological disorder caused by Mycobacterium leprae. Re–immunization of individuals infected with M. leprae, but not displaying symptoms, with BCG may also precipitate PB leprosy. There appears to be a need for an alternative vaccine within control programs. Among the unique attributes of experimental M. leprae infection in nine–banded armadillos are a controlled and known infection status, and a compressed time until emergence of a functional recapitulation of leprosy as seen in humans. We therefore used the armadillo model to investigate the impact on motor nerve function of post–exposure immunoprophylaxis with either BCG or LEP–F1/GLA–SE, a defined subunit vaccine currently under development.

METHODS: Armadillos were infected by intravenous inoculation one month before the initiation of immunization with BCG (once) or LEP–F1/GLA–SE (3 times, at monthly intervals). Animals were then monitored for motor nerve conduction abnormality, primarily CMAP. At termination of the experiment, a part of post tibial nerve will be fixed and Remak Schwann cells carrying unmyelinated axons will be identified and quantified using previously established criteria.
RESULTS: Post-exposure BCG precipitated conduction abnormality more rapidly and severely than was observed for the both the LEFF1/GLA-SE and control groups, such that armadillos receiving BCG had to be humanely removed from the study. In contrast, nerve injury in armadillos treated with LEFF1/GLA-SE was appreciably delayed over that observed for control infected armadillos. Edema, resulting in dilated axons, appeared to be occurring in M. lepra cells/ small unmyelinated axons. In armadillos provided post-exposure prophylaxis with LEP-F1/GLA-SE, however, regression of axonal caliber, resulting in relief and clearing of edema and restoration of the cells to normal size, was indicated.

CONCLUSIONS: Our data provide further evidence that armadillos are an excellent model of early leprosy, and indicate that post-exposure prophylaxis with LEFF1/GLA-SE not only appears safe and does not exacerbate disease but alleviates and delays the neurologic disruptions caused by M. leprae infection.

Keywords: vaccine, BCG, armadillo, post-exposure, prophylaxis
ILC4.3-003
Integrating leprosy post exposure prophylaxis into an existing health system: the Sri Lankan experience
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Objectives
In Sri Lanka, about two thousand new leprosy cases were reported every year for the past decade, a new case detection rate of 9-10 cases per 100,000 population. The ongoing transmission indicates a need of exploring new early case detection measures in order to bring down the caseload in the country. Leprosy post exposure prophylaxis (LPEP) is a novel strategy that has the potential to reduce incidence among the contacts of leprosy patients. A pilot project testing the new intervention in two districts in Sri Lanka is currently under way.

Methods
The process of integrating the new strategy into the existing Sri Lankan leprosy control program involved different key steps. They included getting the approval from the Advisory Committee on Communicable Diseases, presentation of the draft pilot project to all stakeholders and establishing consensus, development of the project proposal and selection of the two pilot districts, adaptation of the strategy to fit into the existing health system, ethical review and approval, development of the training manual, development and establishment of the data collection system, development of mechanisms for drug procurement and delivery, training of public health staff and establishing a project monitoring and supervision system.
Results
The two districts selected had an average new caseload of 103 (Puttalam) and 212 (Kalutara) for the past five years. Two main concerns identified in the Advisory Committee meetings were the development of resistance to Rifampicin in tuberculosis patients and coordination of distribution of Rifampicin to contacts. To alleviate fears about uncontrolled use the drug, it was decided to use the existing distribution system with monitoring by the Tuberculosis Control Program. Adaptation of the strategy to the existing health system was relatively easy since there was an existing public health infrastructure at grass root level to handle contact tracing and screening. However, it was a challenge to develop an appropriate information system for the project since contact tracing mechanisms were not fully operational at the time the project was planned.

Conclusions
The main challenges identified in the process of integrating the post exposure prophylaxis strategy into the Sri Lankan leprosy control program were concerns over Rifampicin resistance and the drug distribution process, and the development of an adapted health information system. The challenges were overcome by consulting appropriate expertise and developing the health information system using bottom-up approach.

Keywords: Prophylaxis, Single dose Rifampicin, Prevention, Transmission, Contacts
ILC4.3-004

Development and implementation of a health information management system for leprosy post-exposure prophylaxis: challenges and issues

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Objectives
The leprosy post-exposure prophylaxis (LPEP) project has started in two districts in Sri Lanka. For this project a data collection and reporting mechanism was needed. Although the country has an existing paper based leprosy reporting system, it was decided to develop and implement a web-based health information management system (HIMS) to address the shortcomings of the paper-based system.

Methods
District Health Information Software –2 (DHIS2) format was used for the HIMS system. The first step towards developing the electronic HIMS involved mapping the data flow and identification of key data levels via document reviews and key informant interviews. The second stage involved planning the logic of the whole HIMS system. Programmers were employed in this step with input from the national campaign. The web-based system was developed using a server side scripting language. Interface designing was the third stage using the already developed paper-based formats as templates. The final stage involved pilot testing the system with the district health staff. The entered data was cross-validated with data from the paper-based system in the districts. A special training was provided for the district staff in web-based data entering and validation.
Results
The initial HIMS framework considered three levels, field level, district level and national level. However, the first two levels were later amalgamated to allow data entry at district level only. This was due to lack of resources and capacity at the field level. Defining the validation rules for the logic of the HIMS system was found to be very difficult. An in-built time based monitoring system was incorporated into the system to allow monitoring the data entry and the data flow by the district managers and the Anti Leprosy Campaign. The server side scripting language was used to develop the system since it allowed fast data input and retrieval in a low bandwidth district setup. Out of the entered data 10% (n=10) was cross-validated with the paper-based system and 90% of the records matched the paper-based format.

Conclusions
The HIMS system developed for LPEP was found to be reliable and robust. The system can be up scaled to other districts as necessary, and it is expected that it will become the standard system for the leprosy control program. Defining the validation rules continues to be a challenge in the process.

Keywords: Prophylaxis, HIMS, Single Dose Rifampicin, Database, Monitoring
ILC4.3-005

The preventive effect of rifampicin as chemoprophylaxis on the incidence of leprosy remains evident after nearly 10 years of active follow-up.

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Objectives: In 2000 a controlled chemoprophylactic intervention on five Indonesian islands highly endemic for leprosy was implemented. The aim was to determine whether rifampicin can be used as chemoprophylaxis to prevent leprosy. We present the long-term effects on the incidence of leprosy after 10 years of follow-up.

Methods: The population was actively screened before the intervention and subsequently once yearly for the first six years and biennially for the following four years. On the control island no chemoprophylaxis was given. On the largest island (‘contact group’) chemoprophylaxis was only given to household and neighbour contacts of leprosy patients and on three small islands (‘blanket group’) to all eligible persons. The prophylactic regimen consisted of two doses of 600 mg rifampicin for adults or 300 mg for children (5–14 years) with four months between doses. At all islands the leprosy patients received regular treatment. The total cohort consisted of 3963 persons free of leprosy at first screening. The contact group consisted of both persons who received prophylaxis (contacts) and persons who did not receive prophylaxis (non-contacts).
Results: Blanket prophylactic strategy significantly reduced the cumulative incidence after 10 years follow-up after adjusting for the known risk factors in the cohort (adjusted Hazard Ratio [aHR]: 0.37; 95% confidence interval [CI]: 0.17–0.80). No significant reduction was seen in the contact group (aHR: 0.76; 95% CI: 0.42–1.4). The effect of the prophylaxis was mainly seen among the non-contacts in blanket group, showing an aHR of 0.11 (95% CI: 0.01–0.9) compared with the non-contacts in the control group. The reduction of the incidence in the blanket group occurred in the first three years after the intervention. Supervision of intake was shown to be important and two doses instead of one dose did not seem to have an additional benefit.

Conclusions: This is a non-randomised-controlled non-blinded study, which limits the interpretation of the results. However, we were able to adjust for the known risk factors for developing leprosy in the cohort. After 10 years of follow-up we still conclude that in this high endemic area for leprosy chemoprophylaxis to only contacts of leprosy patients did not have a significant effect on the leprosy incidence in the whole community, while chemoprophylaxis for the whole community significantly reduced the cumulative incidence compared to the control group.

Keywords: LPEP, blanket approach, trial, Indonesia
Sis–PEPHans: A Web System to Support the Application of the Post–Exposure Chemoprophylaxis Pilot Program for Leprosy in Brazil

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The chemoprophylaxis offered to contacts of known cases has been tested in various protocols, such as an intervention to reduce the incidence of leprosy. It is in this context that is being conducted the pilot project PEP–hans Brazil implementation focused on the evaluation of the operation of post–exposure prophylaxis (PEP), in routine leprosy program in defined areas for pilot study in Brazil. This strategy is based on the expansion of household contacts of coverage, including also neighborhood and social or community contacts in territorial areas at high risk of disease transmission, with a view to improving the quality of contact records tests, BCG vaccine administration and chemoprophylaxis with rifampicin in a single dose. In line with the National Plan for Information and Information Technology in Health, the objective is to build a health database arising from the operation of PEP–hans–Brazil pilot project with the use of an information system in development, called SIS–PEP–hans. The system meets the standards of the W3C Web Standards using HTML, CSS, JS and PHP with SQL database and MySQL management. The Jquery frameworks and Bootstrap were used for field validation mechanisms, visual effects and system stylization. The security module controlling access to SIS–PEP–hans, meets the criteria: 1. Identification: Allows the user to identify; 2. Authentication: verifies that the user is logged into the system; 3. Authorization: determines the actions that each user type can perform; 4. Integrity: protect the information from unauthorized changes; 5. Confidentiality: protecting of information against unauthorized access; 6. Non–repudiation: prevents the user can deny that performed a particular action; 7. Availability: ensures that a resource is available whenever needed. The criteria mentioned are met through the use of username and password, with LOG recording relevant events. The information registration forms in the system are protected with anti–SQL injection, and saving files is protected with pre–defined file types. The system provides backup functionality of the database, enabling the restoration of data. The collection and storage of online data will facilitate the sharing of the same and the monitoring of actions in different regions of Brazil by those responsible. A thorough investigation of the data obtained can allow the improvement of the efficiency and effectiveness of the processes involved in PEP–hans Brazil program. In the future the system will be able to add specialized search and scientific visualization tools that enable new forms of data analysis.

Keywords: chemoprophylaxis, epidemiological surveillance, leprosy, post–exposure prophylaxis, Brazil
Modeling the long term impact of additional interventions on the new case detection rate of leprosy in three endemic countries and regions

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Objectives
In this study we examined the long term impact of eight interventions on the new case detection rate (NCDR) of leprosy in three countries - India, Brazil and Indonesia - and three high endemic regions in these countries - Chhattisgarh (India), Pará State (Brazil), and Madura (Indonesia). We also investigated to what extent they could speed up interruption of transmission.

Methods
We used the individual-based model SIMCOLEP to predict the impact of interventions on the new case detection rate (NCDR) until 2050. All interventions started in 2016 and were considered modifications of the baseline, which consisted of the current combined approach of multidrug therapy, passive case detection, contact tracing, and BCG vaccination in infants. Quantifications of the baseline were based on previous work. We evaluated four single and four combined interventions: 1) more intensive contact tracing, 2) additional chemoprophylaxis, 3) early diagnosis of subclinical infections, 4) improved passive detection, 5) early diagnosis of subclinical infections with chemoprophylaxis, 6) additional chemoprophylaxis with improved passive detection, 7) early diagnosis with improved passive detection, and 8) early diagnosis and improved passive detection with additional chemoprophylaxis.
Results
The single intervention of early diagnosis of subclinical infections has the highest predicted impact on the NCDR in all countries and regions, followed by additional chemoprophylaxis and improved passive detection. Intensive contact tracing alone showed a minor impact on the NCDR. Combining single interventions would further reduce the NCDR. Early diagnosis with improved passive detection is predicted to be the most effective strategy in India and Indonesia. Adding chemoprophylaxis to this intervention would yield the most effective strategy in Brazil. At country level the most effective intervention strategy could bring forward a hypothetical target of < 1 per 100,000 by nine years in Brazil and Indonesia and by six years in India. At regional level a target of < 10 per 100,000 could be brought forward by seven, five and two years in Madura, Paró and Chhattisgarh, respectively.

Conclusion
Additional interventions aimed at contacts of leprosy patients could reduce leprosy NCDR substantially. Combined strategies focusing on earlier detection are the most effective. Because the impact of interventions differs across countries, country specific intervention strategies might be needed to optimally interrupt transmission of leprosy.

Keywords: Interruption of transmission, Intervention strategies, Chemoprophylaxis, Early Diagnosis
ILC4.3-008
Skin- and nerve lesion in leprosy: an intimate risky relationship?
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Objective: The nerve function impairment prediction rule predicts the possibility of further nerve function impairment subsequent to diagnosis based on the classification of the disease and presence of nerve function impairment at the time of diagnosis. Is the presence of a (reactive) skin lesion in proximity of the peripheral nerves at risk in leprosy related to the presence of nerve function impairment and/or enlargement and could the prediction rule be modified?

Methods: Two large cohorts of mainly newly diagnosed patients were used to look into the association between a skin lesion and nerve pathology in the same extremity versus the contralateral site without a skin lesion.

Results: A significant association between skin and nerve lesion was found for most nerves that can be affected in their motor and/or sensory function.

Conclusions: The fact that skin lesion and nerve lesion often are associated is important: From a treatment point of view physicians should consider treating the patient with a course of immuno-suppressive / anti-inflammatory drugs when skin lesions are in proximity of a peripheral nerve as is common practice for facial skin lesions or “red-flag” these patients and monitor these patients carefully.

Keywords: nerve function impairment, disability prevention, treatment, POD
**ILC4.3–009**

**LPEP and Implementation Experiences From Nepal**

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**Objective:**

The general objective of this project is to demonstrate:

- The impact of post-exposure prophylaxis (PEP) on the incidence of leprosy in a population
- The operational feasibility of PEP under routine programme conditions

**Method:**

A single dose of rifampicin (SDR) is given to contacts of leprosy patients, based on age and body weight (150 mg, 300 mg, 450 mg, 600 mg), through the leprosy control programme in three districts in Nepal with a total population of 2,511,296.

Target groups of this project are contacts (household members, neighbours and social contacts) of leprosy affected persons who were diagnosed since July 2013. SDR distribution to contacts of leprosy patients is done through the routine contact examination programme. SDR is given after complete screening for exclusion criteria such as persons with leprosy or TB, who are

The main expected outcomes of the project are an assessment of the feasibility on the basis of which guidelines can be formulated on integrating SDR distribution into the routine leprosy control programme and a reduction in the number of new leprosy patients detected annually in the intervention districts. The latter is expected to be visible 3 years after the start of the intervention.
Results up to January 2016:
13,503 contacts of 614 persons treated for leprosy since July 2013 were listed. Out of these, 51 refused to participate in the project and 369 could not be traced. Since the number of contacts that could not be found was high, a sample survey of 100 contacts is currently being done to identify the reasons. Out of the 13,083 (97%) contacts screened, 12,352 (94%) were eligible for SDR, 731 persons were excluded on the basis of exclusion criteria, of which 56 were diagnosed with leprosy and 10 new TB cases were identified. On average 20 contacts per index case received SDR.

Conclusion:
SDR is very well accepted by contacts, less than 0.5% refused to participate. Integration of SDR distribution into a leprosy control programme, where contact screening is already routinely carried out, strengthens the programme and contributes to early diagnosis of leprosy and TB.

**Keywords**: post-exposure prophylaxis (PEP), single dose of rifampicin (SDR), routine contact examination programme, exclusion criteria, early diagnosis
ILC4.3-010
Field Evaluation of Novel Immunodiagnostic Tools for Early Detection of Leprosy in BCG Vaccination Field Trial amongst Contacts of Leprosy Patients
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Objectives: Single-dose rifampicin (SDR) has been shown to prevent 57% of incident cases of leprosy in the first two years, when given to contacts of newly diagnosed cases. Immunization of contacts with BCG has been less well documented, but appears to have a preventive effect lasting up to 9 years. A major disadvantage is the occurrence of excess cases within the first year after immunization. The objectives of this study are to: 1) examine the effect of chemoprophylaxis with SDR and immunoprophylaxis with BCG on the clinical outcome and on the host immune responses and gene expression profiles in contacts of leprosy patients; and 2) describe contacts of leprosy patients who develop leprosy within 12 weeks after receiving a single BCG dose.

Methods: Through a cluster randomized controlled trial we compare immunization with BCG alone with BCG plus SDR in contacts of new leprosy cases. Contact groups are established for each of the 1,300 leprosy patients included in the trial. In total 10,000 contacts will be included in each intervention arm. BCG is administered to the intervention group followed by SDR, 8–12 weeks later. The control group receives BCG only. Follow-up takes place 1 and 2 years after intake. The primary outcome is the occurrence of clinical leprosy within 2 years. Simultaneously with vaccination and SDR, blood samples for in vitro analyses will be obtained from 300 contacts to determine the effect of these chemoprophylactic and immunoprophylactic interventions on immune and genetic host parameters.
Results: In this ongoing trial, we identified 21 contacts who developed leprosy within 12 weeks after BCG among 5,196 vaccinated contacts (0.40%). All 21 cases presented with paucibacillary (PB) leprosy, including children and adults. About half of these cases had previously received BCG as indicated by the presence of a BCG scar; 43% presented with signs of nerve function impairment and/or Type 1 (reversal) reaction, and 56% of the index patients had multibacillary (MB) leprosy.

Conclusion: An unexpectedly high proportion of healthy contacts of leprosy patients presented with PB leprosy within 12 weeks after receiving BCG, possibly as a result of boosted cell-mediated immunity by homologues of M. leprae antigens in BCG. Various immunological mechanisms could underlie this phenomenon, including an immune reconstitution inflammatory syndrome (IRIS). Further studies are required to determine whether BCG vaccination merely altered the incubation period or actually changed the course of the infection from self-limiting, subclinical infection to manifest disease.

Keywords: leprosy, early diagnosis, trial, BCG, contact
ILC4.3-011
Negotiating and Implementing the Leprosy Post Exposure Prophylaxis Project in the Centralized Health Service of the Union of Myanmar
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Background
The Union of Myanmar has a centralized health service. A flow of responsibility for leprosy control cascades from the office of the Director General of the Department of Public Health and Disease Control through Regional Directors and District Directors until it reaches Township level where Specialist Leprosy Services (SLS) are maintained through the agency of a Junior Leprosy Worker. At the periphery of the health service are Rural Health Centres; at that level it is Basic Health Service (BHS) personnel (midwives and Public Health Supervisors Grade 2) who are responsible for administering leprosy treatment. The BHS personnel are supported by SLS in the persons of Junior Leprosy Workers and District Team Leaders.

Objectives
We will describe the process by which the Leprosy Post Exposure Prophylaxis (LPEP) project gained support at each level within the health service and how it has been implemented at field level. We will also present the achievement of the project at the close of 2015.

Method
Following the attainment of approval, three endemic districts were selected for implementation of the LPEP project. Case detection rates in those districts were similar: Nyaung-U and Tharyarwaddy around 10/100,000; Myingyan 8/100,000. Junior leprosy workers were responsible for identifying and registering index cases.
BHS personnel assisted by securing informed consent from index cases and by listing their household and neighbourhood contacts. Primary interaction with contacts was the responsibility of BHS personnel. They explained what LPEP was and what it hoped to achieve, they also secured informed consent from contacts and recorded contact specific data. Screening for leprosy and for contraindications for LPEP was the responsibility of Team Leaders who also supervised administration of a single dose of Rifampicin (SDR).

Results
The first SDR was administered in May 2015. By the end of December 2015, 197 index cases had been located and 3727 contacts had been screened. No contact that was encountered refused to be screened or refused to take SDR. Out of those screened, 94 % received SDR; the other 6% were ineligible in accordance with criteria stated in LPEP protocol. Among those contacts who were ineligible for SDR, 17 had received Rifampicin treatment for TB and 5 were symptomatic for TB. Another 8 contacts were ineligible for SDR because they were found to be new cases of leprosy.

Conclusion
An interim assessment of the LPEP project suggests that chemoprophylaxis, as an integral component of a health service, is feasible where SLS and BHS personnel interact productively, as in Myanmar.

**Keywords:** LPEP, chemoprophylaxis, Myanmar, Specialist Leprosy Service, Basic Health Service
ILC4.3-012
Emerging evidence from the Leprosy Post-Exposure Prophylaxis project
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Background
The Leprosy Post-Exposure Prophylaxis (LPEP) project intends to demonstrate the feasibility of integrating into routine leprosy control programs the concept of post-exposure prophylaxis (PEP) with single-dose rifampicin (SDR) for contacts of leprosy cases. The project includes sites in 6 countries, and following an intensive preparation phase, field work started in all sites in 2015. A standardized data collection system has been developed to collect comparable data across countries.

Objectives
To analyze the data generated in the first 18 months, and to present results for the main process and outcome indicators describing the feasibility and impact of the intervention.

Methods
Country-specific protocols taking into account the structure and routine activities of the national leprosy control program were developed based on a generic guidance document describing the basic interventions and possible modifications. With a view towards eventual integration, the generic project data collection and reporting system was aligned with the routine leprosy data collection system wherever feasible. Paper-based individual data are reported to the district or national level for entry into a project-specific database.
A copy of the national database is shared with the academic project partner every 6 months and integrated into the global LPEP database following rigorous quality control. Data analysis is performed on the validated global LPEP database, for each country separately and across the project.

Results
The introduction of systematic contact tracing, screening for leprosy and SDR administration to eligible contacts proved feasible in each study setting. Marked differences have already been observed between countries in the frequency of new cases among contacts. SDR acceptance appears high. Rifampicin is well tolerated and only few and mild side effects have been reported. Mid-term results on the socio-demographic characteristics of contacts including those refusing participation, and on the efforts to trace contacts and reach a final diagnosis will become available in summer 2016. Details on new leprosy cases detected through the study will be compared to the leprosy population diagnosed through the routine program activities to describe and predict the impact of strengthened contact tracing on the local disease epidemiology.

Conclusions
The LPEP project proved the feasibility of strengthened contact tracing, introducing leprosy PEP with SDR and collection of high-quality individual data in different settings. Local leprosy control efforts were invigorated through increased motivation resulting from the addition of a novel tool to the current leprosy control efforts and better training.

Keywords: control, contact tracing, prophylaxis, rifampicin, single dose
ILC4.3-013

Hidden leprosy cases in Tanzania found through community empowerment and Leprosy post exposure prophylaxis activities
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Background
The overall case detection rate (CDR) decreased towards 4 per 100,000 populations in Tanzania. Still, 19 districts had case detection rates above 10 per 100,000 populations. It has been suggested that the true number of leprosy cases in Tanzania is much higher, and that therefore further activities are needed towards the eventual elimination of the disease. Indeed, there is plenty of opportunity for improving various aspects of leprosy control, especially at district level.

Objectives
To analyze the effect of community empowerment programs on targeted contact tracing and screening as part of the Leprosy Post Exposure Prophylaxis (LPEP) project.

Methods
The empowerment of communities through the “Promotion of prevention of disability (POD) for persons affected by leprosy” project in Tanzania aims to raise awareness and find new leprosy cases. It was conducted between 2012 and 2014 in nine of the highly endemic districts. The main activities were: leprosy awareness raising campaigns, training for suspect and referral of new cases and dissemination of IEC materials on leprosy to increase knowledge and reduce stigma in the community of people affected by leprosy.

In order to implement the project, POD committees were formed in all districts. The committee members were trained by experts from National Tuberculosis and Leprosy Program (NTLP) and German tuberculosis and Leprosy Relief Association (GLRA). The trained committee members had a responsibility of training village health committees.
The LPEP project intends to integrate contact tracing and single dose rifampicin administration (SDR) into routine leprosy control programs. It followed the empowerment project in three districts in 2015, using the POD groups and village health committees.

Results
Through the community programs, 145,492 people of general population were reached between 2012 and 2014. In total, 434 new leprosy cases were detected among the target population, resulting in a new case detection rate of 300/100,000 populations. The contact screening in the frame of LPEP targeted 895 index case households’ members and resulted with the detection of 18 new leprosy cases. The detection of 18 new leprosy cases gives a case detection rate of 2010/100,000 among leprosy patient contacts.

Conclusion
There are high numbers of hidden cases especially in high endemic areas in Tanzania. Active case finding and awareness raising activities are needed in the general population. Additional contact tracing among index case households’ members ideally combined with the administration of SDR is needed to reduce leprosy transmission.

**Keywords:** LPEP, SDR, transmission, community empowerment, case detection
ILC4.3-014
An interim report on the operational feasibility of leprosy post-exposure prophylaxis in Dadra and Nagar Haveli, India
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Dadra and Nagar Haveli (DNH) is a Union Territory with a population of 409,016 (March 2015). The leprosy prevalence rate of around 5 / 10,000 population and the annual new case detection rate of around 78 / 100,000 population has remained static for the past decade. Only two persons with disability grade 2 were detected in 5 years leading to 2015. The proportion of children among new cases, however, was remarkably high at around 20% suggesting that leprosy transmission is ongoing. On consideration of these issues and with assurance of technical support from the German Leprosy Relief Association, Netherlands Leprosy Relief Foundation, Erasmus MC and with financial support from Novartis Foundation, the state government of Gujarat and the government of DNH, decided to implement the Leprosy Post-Exposure Prophylaxis (LPEP) project.

Objective: To test the operational feasibility of the administration of a single dose rifampicin (SDR) as post-exposure prophylaxis (PEP) to the contacts of leprosy cases diagnosed as of April 2013 in the Union Territory of DNH, India.
Methods: All new leprosy cases registered from April 2013 onwards (index cases) and their contacts (household contacts, neighbors and classmates for child leprosy cases) were listed and screened. The implementation of the LPEP project was launched in March 2015. Informed consent was taken from index cases and every contact. Contacts were excluded in the event that they had symptoms of leprosy, were TB suspects, children below 2 years, pregnant women, had a history of liver or renal disorders or had taken rifampicin in the two previous years.

Results: By December 2015, out of 690 registered cases, 686 (99%) were included in the study. From the 13,523 contacts listed, 983 (7%) were not eligible for SDR administration (18 were leprosy cases, 17 were TB suspects, and the rest met other exclusion criteria), or could not be found. Of the 12,540 eligible contacts, 64 (0.5%) refused to be included in the study. The other 12,476 (99.5%) accepted SDR. No untoward effects or complications were reported from any person given SDR. The project is ongoing.

Conclusions: The fact that 99.5% accepted SDR and that no adverse effects or complications were reported, shows that SDR is generally well accepted and safe to administer in DNH. Furthermore, 18 leprosy cases were detected and 17 TB suspects were identified; this is considered an added benefit. This interim appraisal suggests that SDR is a promising intervention.

**Keywords:** Leprosy, Single doze Rifampicin, Chemoprophylaxis, Prevention
ILC4.3-015
Single-dose Rifampicin Chemoprophylaxis for leprosy contacts in Morocco
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Objectives: Leprosy in Morocco is a rare disease that still presents many challenges. Less than 10 000 cases were registered since 1950. Morocco registered a mean of 40 new cases of leprosy in the five years before the study (detection rate 0.15/100 000 habitant. In order to achieve the vision toward a Morocco without leprosy, the national program for leprosy control introduced, in 2012, the Single-dose Rifampicin Chemoprophylaxis (SDRC) for leprosy contacts. The aim of this study was to describe the achievements in SDRC in the Moroccan experience and to achieve at least 80% coverage among contacts of cumulative leprosy patients of the last 10 years with a SDRC under field conditions.

Methods: A prospective study that was carried out from 2012 to 2015 in the 12 districts of Morocco in contacts of 648 cumulative leprosy cases registered from 2002. Inclusion criteria were household contacts aged over 5 years (blood related contacts and people living in the same house). Neighbor contacts (people living next door) were also included were possible. Exclusion criteria were contraindication of Rifampicin and suspicion of leprosy. Consenting contacts were systematically and clinically examined, and SDRC administered (10mg/kg) by a trained healthcare provider with respect of ethics and confidentiality.

Results: A total of 4838 household contacts were registered in the study from 2002, 838 were lost to follow up, 3617 contacts (75%) were clinically examined in the investigations, and 3259 (91%) have received the SRDC. A total of 383 contacts were absent in the investigations: issued by local leprosy teams, 24 contacts refused to participate in the study, 297 contacts presented contraindication of Rifampicin, 37 contacts were suspected of leprosy and 7 contacts had a confirmation of leprosy. Regarding leprosy case detection, a decline was observed before and two years after the introduction of SDRC (0.15/100 000 habitant in 2011 and 0.08 in 2014 and 2015).

Conclusions: The SDRC seems to be effective in our context and may contribute to reduce leprosy transmission among contacts. An analytical study is required in order to confirm our results.

Keywords: leprosy, contacts, chemoprophylaxis, rifampicin, morocco
ILC4.3-016
Global Strategy of Decreasing Delayed Diagnose and Disability for Leprosy Patient
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Leprosy is a chronic disease caused by Mycobacterium leprae. It is involving the skin and peripheral nervous system, but has a diverse clinical manifestations and is a major cause of physical disability. The time now before the diagnosis and treatment of nerve damage is the most effective way to prevent disability due to leprosy. “The burden of Leprosy” can be described as the detection rate of new cases, the prevalence of leprosy registered, and eye defects that occur in leprosy. “Quality Leprosy Service” not only improve the ability of health workers at all levels of health services, as well as patient-centered itself. “Principles of Equity and Social Justice” means that leprosy services should be the same as other health services available in the community. Social justice refers to the absence of discrimination on any reasons, including the type of disease, the level of disability, race, gender, social class or religion, as well as incorporating the principles of privacy and confidentiality. The risk factor in the delays included the lack of health-seeking behavior of patients with leprosy, while the health service delay associated with low awareness and lack of knowledge and skills of health care providers. To decrease the delay in diagnosis and disability in leprosy required the collaboration between governments, health care providers, as well as leprosy itself.

Keywords: Leprosy, Leprosy Quality Service, Principles of Equity and Social Justice, Principles of Equity and Social Justice
ILC4.3–017  
DELIVERING LEPROSY POST-EXPOSURE PROPHYLAXIS IN A REMOTE AREA: A Case of Lingat Village, Maluku, Indonesia  
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In Indonesia a pilot is carried out as part of the international Leprosy Post-Exposure Prophylaxis (LPEP) project, distributing Single-Dose Rifampicin (SDR) using a blanket approach.

OBJECTIVES: To interrupt leprosy transmission in high endemic populations (case detection rate (CDR)>100/100,000) in remote areas using SDR as post-exposure prophylaxis for leprosy, and to collect information on the operational feasibility of this intervention in order to maximize the coverage. This paper focuses on the second objective.

METHODS: Lingat village on Selaru Island, Maluku province, was chosen for blanket SDR distribution. The village has an estimated population of 1,950 people and recent data showed that the leprosy CDR is >100/100,000. The high endemicity of this remote, isolated and small village puts the entire community at risk of developing leprosy. The village was visited twice; in November 2014 and November 2015. Three medical doctors and seven leprosy workers divided into 5 teams visited every house in the village during 10-day visits. After giving consent, people were screened for symptoms of leprosy and for exclusion criteria for SDR (e.g. TB symptoms, pregnancy, < 2yrs of age, liver and renal disease). Those who were eligible were given SDR.

The area will be revisited next year for follow-up and to measure the impact on leprosy incidence.
RESULT: Of an estimated 1,950 population, 1,639 (84%) villagers were screened (68% during the first visit, an additional 16% during the second visit); 311 people could not be traced. Of the total number screened 1,507 (92%) people were given SDR, among the other 132, 46 were diagnosed with leprosy (of which 29 during the first visit), representing a prevalence rate of 235/10,000. The rest met one of the exclusion criteria. Despite clearly announcing the visit, people had still left the village. November was chosen for the activity because in this period the weather is calm enough for a safe trip to the islands. This is however also the preferred time of the year for the villagers to prepare for the harvest.

CONCLUSION: Using a blanket approach for the SDR distribution in Lingat village a satisfactory coverage was reached: 84% of the population was screened, 46 new leprosy cases were identified and 92% of the people screened were given SDR. It took two consecutive visits to come to this result. If a community participatory approach had been chosen to select the dates for the visit, this result could possibly have been achieved in one visit.

Keywords: LPEP, Blanket Approach, Remote area, Indonesia
DISTRIBUTION OF LEPROSY POST-EXPOSURE PROPHYLAXIS THROUGH EXTENDED CONTACT-TRACING WITH SELF-SCREENING APPROACH IN SUMENEP DISTRICT, INDONESIA.

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In Indonesia a pilot is carried out as part of the international Leprosy Post-Exposure Prophylaxis (LPEP) project distributing Single Dose Rifampicin (SDR) using an extended contact-tracing with self-screening approach.

OBJECTIVES: To collect information on the operational feasibility and impact of Single Dose Rifampicin (SDR) using an extended contact-tracing with self-screening approach.

METHODS: Sumenep district in East-Java Province is high endemic with a CDR >50/100,000 for the past 5 years. Routine leprosy control is well-established and includes contact examination (20 contacts per patient). The LPEP project in Sumenep aims to reach a higher number of contacts for SDR distribution without increasing the workload of the leprosy workers, by using a self-screening format (SSF). Newly diagnosed patients are asked for their consent to participate, before distributing the SSF to the household of the index case and to the closest neighboring households (on average 10). Contacts are asked to examine themselves and their household members and report to the leprosy worker who visits the community on an agreed date. The leprosy worker examines the contacts reporting with symptoms of leprosy. New cases detected are treated and the other contacts are screened for exclusion criteria such as TB symptoms, pregnancy, < 2yrs of age, liver and renal disease. All eligible contacts are given SDR.
RESULT: In the first year of implementation (2015), of 351 new cases detected, 303 took part in this intervention (86%), 40 cases refused participation because of fear of disclosure of their leprosy status. Eight index cases could not be found. From 11,605 contacts registered, 50 contacts could not be traced, 11,373 (98%) received SDR, 181 contacts met the exclusion criteria and 1 refused to participate. The average numbers of contacts receiving SDR per index case is 38. 20 new leprosy cases were detected through this activity and 14 cases were suspected to have TB. How the extended contact approach using self-screening affects the workload of the leprosy health workers is still being studied.

CONCLUSION: In the first year of the LPEP project in Sumenep, Indonesia, 86% of cases agreed to participate and to providing their contacts with self-screening formats. An average of 38 contacts per index case was given SDR, which yields a higher average than in the other countries where the LPEP project is implemented without self-screening. The participation of leprosy patients could be improved by providing more intensive pre-consultation to address the issue of confidentiality.

Keywords: LPEP, Contact Tracing, Self Screening, Indonesia
ILC4.3-019
Chemoprophylaxis with single-dose rifampicin could provide short-term protection against PB leprosy after BCG vaccination: Protocol
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Background: Chemoprophylaxis and immunoprophylaxis independently protect against leprosy. Conversely, among household contacts, BCG vaccination is known to precipitate the disease. Some may be asymptomatic and/or have subclinical disease (as human reservoirs) that advances to clinical leprosy after this immunological challenge. The use of rifampicin chemoprophylactic all would be better applied prior to BCG revaccination to decrease the mycobacterial load and improve vaccine efficacy.

Objective: To determine the effectiveness of chemoprophylaxis with a single dose of rifampicin prior to BCG vaccination in preventing leprosy in the short term after vaccination among contacts of newly detected multibacillary leprosy patients and compare the immunological and molecular markers indicative of subclinical infection in those administered chemoprophylactic treatment or a placebo.

Methods: A randomized, double-blind, placebo-controlled trial began in September 2015 and will proceed until September 2021 at the Leprosy Laboratory of the Oswaldo Cruz Foundation (Fiocruz) in Rio de Janeiro, RJ, Brazil. Inclusion Criteria: Contacts of MB index cases under MDT treatment between the ages of 6 months and 70.
Exclusion Criteria: Leprosy diagnosis, pregnancy, previous or current TB, and a BCG vaccination 12 months before the examination. Study design: At the beginning and final examinations within a 12-month period, all contacts are physically examined and finger-prick blood samples are collected for anti-PGL-1, anti-LID-1 evaluation from those under 12 years. In those over 12 years, blood/PCRs collected for evaluation for M. leprae-specific cellular immune response. Chemoprophylaxis with a single dose of rifampicin or placebo administered immediately after the initial examination and blood collection. Two months later, contacts receive a BCG vaccination and another sample blood for sera is taken. There will be a one-year follow-up. Sample size: Calculations were performed via PASS11 software, considering a 20% loss during surveillance. The study will include 1,493 contacts. Intervention consists of two different treatments: A single standardized dose of rifampicin plus BCG vaccination (995 contacts) versus a placebo plus BCG vaccination (498 contacts). Principal measures: The primary consideration is the number of new leprosy patients that emerge from the rifampicin and placebo contact groups. These numbers will be compared at one-year intervals and then analyzed to define the at-risk groups and calculate their 95% confidence intervals. The main explanatory variable is the treatment group (rifampicin / placebo). Conclusion: It is hoped that the present study will be able to identify the principle markers of asymptomatic M. leprae infection.

**Keywords:** leprosy, contacts, chemoprophylaxis, immunoprophylaxis
ILC4.3–020
Impact assessment of the implementation of comprehensive mechanism of leprosy prevention and control
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Objective: Assessment of mechanisms of Government–led, multi-sectoral coordination, and participation of the whole society integrated control for the elimination of leprosy hazards, provide the basis data for post-adjustment measures.

Methods: collect leprosy prevalence data and implementation of government responsibilities in 2011–2015 in Yunnan Province, to eliminate leprosy hazards planning and implementation results.

Results: ① Yunnan Province implemented a plan to eliminate leprosy hazards, establish and improve the mechanism of government–led, sector coordination, comprehensive prevention and the whole society to participate in leprosy control. By the end of 2015, the province has in the treatment of cases 737 cases, compared with the end of 2010 (1369 cases) decreased 46.17%. 78 counties (cities, districts) meet the basic elimination of leprosy standard, with no high prevalence county, which reduced 11 than that at the end of 2010, the basic elimination of leprosy County increased by 23. 2015 grade 2 disability rate in new patients was 16.04%, decreased 21.68% compared with the end of 2010. ② Leprosy patients living conditions and living standards have been improved significantly improved. Persons live in leprosy villages and towns participate in the new rural cooperative medical insurance rate reached 99.22 %, and disability card processing rate of 43.19%, booklet handling rate of 99.89%, ID card rate of 99.52%, People affected by leprosy live outside the village subsistence allowances apply rate of 38.86%.

Conclusion: The government–led, sector coordination, integrated control leprosy disease mechanisms for the participation of the whole society to eliminate leprosy hazards obvious effect, epidemic has been effectively controlled, patients receive standard treatment and early detection, core knowledge and awareness of leprosy had been gradually increase, leprosy control teams get promoted, people affected by leprosy living condition have been greatly improved, played an important role in protect people’s health, promote social harmony.

Keywords: Leprosy, prevention and control, effect, assessment
ILC4.3-021
Effect of single dose rifampicin or rifapentine on prevention of leprosy in household contacts of patients with diagnosed leprosy from in southwest China: cluster randomised controlled trial
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A total of 207 counties or districts in four provinces (Yunnan 78, Guizhou 55, Sichuan 34 and Hunan 40) were included. Firstly, a baseline survey was performed in the above trial areas to list the entire patients diagnosed leprosy since Jan 2010. Then household contacts corresponding to these patients were preliminary determined. We finally selected the enrolled household contacts according to the above inclusion and exclusion criteria.

This trial contained three groups, two chemoprophylaxis groups (single dose of rifampicin and rifapentine) and non-chemoprophylaxis group (control group). These 207 trial areas were randomised divided into three groups (specifically, 71 of rifampicin, 68 of rifapentine and 68 of control group). As to chemoprophylaxis group, household contacts were demanded to have blood, urine routine tests and functions of liver and kidney before and two weeks after taking single dose of rifampicin or rifapentine. If there were abnormal outcomes of these tests after chemoprophylaxis, this household contact were given clinical intervention by local dermatologists refer to this trial regimen. Severe adverse effects should be reported to national center of leprosy control in 24 hours. Oral doses of rifampicin and rifapentine were singly 600mg for contacts more than 15 years old, singly 450mg for children (10-14 years old). Rifampicin and rifapentine were demanded to be taken before breakfast and this procedure should be supervised by local trial staffs. All these two drugs were bought from Sichuan Longmarch Pharmaceutical Co., LTD. (NO.) by national center of leprosy control and supplied to every chemoprophylaxis areas. All household contacts should avoid taking drugs that could interact with or affect the plasma concentrations of rifampicin and rifapentine. Other concurrent applyling drugs also should be examined and recorded. Contacts of control group didn’t need to take these two drugs, but were demanded for tests of leprosy antibodies (ND-O-BSA, LID-1 and MMP II ). Once household contacts had accomplished the above phases of baseline and intervention, the next is follow-up phase. Follow-up time in this study was measured in person-year to adjust for various lengths of participation. Visits were given at the 1st, 2nd and 3th year in sequence. The key contents of every visits were skin examination and tests of leprosy antibodies. Once there was hypopigmented or reddish patches with definite loss of sensation, thickened peripheral nerves, further examinations would be performed, such as skin smears or biopsy. Household contacts would be excluded when confirmed infection of leprosy.

Keywords: leprosy, household contacts, chemoprophylaxis, rifampicin, rifapentine
ILC4.3–022
Comparison of Implementation Aspects of Leprosy Post–Exposure Prophylaxis in India, Nepal and Indonesia
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Objectives: The Leprosy Post–Exposure Prophylaxis (LPEP) project is being implemented in six countries using various contact tracing approaches to evaluate the operational feasibility and the impact of Single Dose Rifampicin (SDR). Before recommending to up-scale SDR distribution, assessment of the different contact tracing approaches in various epidemiological, cultural and programmatic settings is necessary. India and Indonesia are important players as they contribute substantially to the global leprosy burden. The objective of this study is to compare the country specific LPEP strategies in India, Nepal and Indonesia against the background of the already existing national leprosy control programs, and to summarize the lessons learned during the first year of implementation.

Methods: In a two stage process, we firstly reviewed the epidemiological situation and the national leprosy control programs in the three countries. Data were collected by desk review and field visits. Associated staff were interviewed with open ended questions to explain the epidemiological situation, current practices and challenges. Secondly, we conducted two field visits in each country in 2015, collecting quantitative information on coverage, and qualitative information on LPEP implementation practices, through observation and semi-structured interviews. We developed a standard format for inter-country comparison by identifying common emerging themes.
Results: The general health care system is based on a three tier structure in all the three countries, i.e. national, provincial and district level. However, the leprosy programs are highly diversified based on organizational hierarchy, human resource quantity and capacity. Indonesia has the most decentralized program in comparison to the others. Contact tracing was already in place in India, Nepal and Indonesia, but implemented in varying intensity. In LPEP, Indonesia is practicing extended contact tracing using self-screening, whereas screening in India and Nepal is performed by health workers. The SDR coverage (average number of contacts per index case) in Indonesia (38), Nepal (20) and India (18) indicates that contact tracing is intensified. Indonesia distributes SDR in community gatherings, whereas India and Nepal are focusing on household and neighbour visits. The participation of volunteer health workers in LPEP is strongest in India.

Conclusions: The compatibility between the national programs and LPEP is high, as contact tracing system (including infrastructure and staff) is retained, which enhances the chances of sustainability after completion of the project. The contact tracing is intensified due to LPEP, which needs to be maintained after project completion through full integration into the national programs.

**Keywords:** Prevention, Programme, Leprosy, Chemoprophylaxis
ILC4.4-001
Active screening for close contacts of highly infectious leprosy affected persons to interrupt the transmission of leprosy
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Objective of the study: To assess the implementation of healthy Contact examination of all new cases attending in a referral centre at Champa (Chhattisgarh).

Methodology: Bethesda Leprosy Mission Hospital is one of the referral centers of Janjgir-Champa district which is situated in the center of Chhattisgarh, one of the endemic states of India. This study was conducted at this hospital among all newly diagnosed and patients under treatment who were highly smear positive (Bacterial Index 4) during between April 2012 – December 2015.
The need for physical examination of the family members was explained clearly to the patients, and the patients requested to bring their family members (those sharing the same house) to the hospital on their subsequent visit. When they came they were examined under the supervision of medical officer, by the physiotherapist and laboratory technician. The individual forms were filled with demographical and clinical details for both the registered patients and their contact family members. The filled forms were entering in excel data for analysis.

Result: 312 Leprosy affected persons with Bacterial index over 4+ were included in this study till the date of December, 2015. Their ages ranged from 12 to 75 years. From 312 cases 194 (62%) were newly diagnosed for leprosy, 118 (38%) were under treatment. Their disability scoring according to World Health Organization were Grade ‘0’, 155 (50%) persons, Grade ‘1’, 101(32 %) persons and Grade ‘2’, in 56 (18%) persons. All were motivated and requested to bring their family members to hospital for screening. The 312 leprosy patients reported having 1207 close contacts. Of these 1207 contact 624 contacts came to the hospital and were screened for signs of leprosy, of these 624, 98 (8.1%) persons have been found to have cardinal signs of leprosy. Among these 98 cases 66 persons were classified as multibacillary (MB) and 32 were diagnosed as paucibacillary (PB).

Conclusion: The result will provide evidence to show the usefulness of healthy contact examination and the correlation between high bacterial index and the risk to healthy contacts compared to the general public.

Keywords: Active Screening, Close Contacts, Highly Infectious, Transmission
ILC4.4-002
The incidence of leprosy in Firozabad District, Uttar Pradesh (India)
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Objective: To assess incidence of leprosy in Firozabad District (U.P.).

Methods: A random sample of 148,061 populations is covered by resurvey methods, spread over 259-230 rural/29 urban units. The survey was conducted during March 2011 to November 2012. All clinically confirmed cases detected in disease free population in first survey, are labeled as incidence cases and treated as per standard treatment regimens for PB/MB disease.

Results: The overall incidence of leprosy was found to be 3.40 per 10000 Person Years; 3.12 in Healthy contacts, 29.69 in PB contacts and 89.26 in MB contacts. The rise from Healthy contacts to PB Contacts to MB Contacts is significant (p<0.001). Incidence rate also increased significantly by age; from 1.14 in young 44 years of age, and in high endemicity areas with 3 or more cases. In terms of Odds Ratio, incidence increased significantly: 7 folds by age groups, 10 folds in PB contacts and 29 folds in MB contacts and 2-3 folds by endemicity status. Incidence rate also found to be significantly high (3 to 3.5 folds) in Tundla, Narkhi and Aravon blocks as that of Aeka block of the district.

Conclusion: Incidence of leprosy is a useful parameter to assess transmission status and present study suggests that transmission is significant high in the areas under study.

Keywords: Leprosy, Incidence, endemicity, transmission, contacts
A Double-Blind Evaluation on the Concordance Rate (Sensitivity) of a Lateral Flow-Based Rapid Immunodiagnostic Test with Clinical, Bacteriologic and Histopathologic Findings among New Leprosy Patients

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OBJECTIVES: To determine the reliability and sensitivity of OnSite Leprosy Ab Rapid Test as a serodiagnostic tool among leprosy patients.

METHODS: Consenting new leprosy cases were recruited in order of attendance at the Leonard Wood Skin Clinic, Cebu, Philippines. Patients were subjected to routine leprosy diagnostic work-up for leprosy such as clinical, bacteriologic and histopathologic examination. Patients were also evaluated based on serodiagnostic procedures detecting and quantifying serum antibodies against LID-ND0, a novel conjugation of M. leprae antigens ML2331, ML0405 (LID-1) and PGL-1 (presented as the synthetic mimetic ND-0). The platform evaluated was OnSite Leprosy Ab Rapid Test fabricated by CTK Biotech (San Diego, CA, USA), a lateral flow-based rapid diagnostic test (RDT). Evaluations involved the addition of undiluted serum (10 μl) and running buffer (2-3 drops; ~100 μl) to a sample well, followed by readings of line development in the detection window after 15-20 minutes. A positive result was defined by the staining of both the control and the test bands; development of the control band coincident with no coloration of the test band was considered as a valid negative result. Visual readings were performed by a minimum of two independent readers unaware of the categorization of the sample’s source. To avoid bias, blinding was maintained between staff conducting serological, clinical, bacteriological and histopathological evaluations. Results were collated and analyzed by a third party with no involvement in data collection or patient evaluation.
RESULTS: A total of 157 leprosy patients were evaluated, with 145 defined by current WHO criterion as MB and 12 defined as PB. Among MB, an overall concordance rate of 81.4% (118 of 145) was observed, rising to 92.5% (111 of 120) among MB with ABI > 1+. Among MB cases with ABI 0-1+, sensitivity was 28.0% (7 of 25), a rate similar to that observed with PB patients (33.3%; 4 of 12). Based on lesion count, the sensitivity rate was 87.3% (103 of 118) among cases with >5 lesions and reduced to 48.7% (19 of 39) among cases with <5 lesions. The specificity of the RDT was also evaluated among endemic controls or community contacts and was found to be 96.6% (8 positive tests among 236 controls).

CONCLUSIONS: Our data indicate that OnSite Leprosy Ab Rapid Test is a reliable, highly sensitive tool that is readily applicable in a field setting to expedite the diagnosis of MB leprosy. Considering that false negative readings (indicating antibody levels below the level of detection or absent) are commonly seen among PB and low BI-MB patients, a negative reading does not, however, necessarily exclude leprosy.

Keywords: diagnosis, antibody, serology
Validation of a ND–O – LID ELISA as a tool for the detection of multibacillary and paucibacillary leprosy in Colombia

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Delays in clinical diagnosis of leprosy indicate that new and simple diagnostic tools to improve early detection that impact in leprosy control would be highly beneficial. With the aim of evaluating the diagnostic sensitivity (SE), specificity (SP), positive predictive value (PPV), and negative predictive value (NPV) of an enzyme-linked immunosorbent assay (ELISA) using the ND–O – LID conjugate, we studied three groups of Colombian volunteers: Group 1: 331 multibacillary (MB) leprosy patients; Group 2: 63 paucibacillary (PB) leprosy patients; Group 3: 292 non-symptomatic population. We assessed the performance of a rapid system (Leprosy DetectTM fast ELISA; InBios International, Inc., Seattle, WA, USA) based on ND–O – LID capable of generating results within 1.5 hours of sample addition. For MB patients the ND–O – LID test had SE=96% (CI: 92–97), SP=98% (CI: 94–100), PPV=99% (CI: 98–100), NPV=88% (CI: 81–95). For PB patients this ELISA had a SE=26% (CI:14–38), SP=98% (CI: 94–100), PPV=88% (CI: 70–100), NPV=67% (CI: 59–75), showing that PB diagnosis using serological tests remains challenging. When compared against the PGL-1 antigen, our data indicate that the ND–O – LID conjugate exhibited greater efficiency to facilitate the diagnosis of MB and PB leprosy.

Keywords: diagnosis, antibodies, serology
ILC4.4–005
Lymph and Slit Skin Smear Samples May Help Etiologic Diagnosis of Leprosy Using Polymerase Chain Reaction with Ag85B, TTC, RLEP and MntH primers.

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OBJECTIVES: As the etiological diagnosis of leprosy remains challenging due to the difficulty in detecting Mycobacterium leprae in host’s samples, we aimed to detect the bacillus by standardized PCR with different primers in feasible samples collected from leprosy patients.

METHODS: Three multibacillary leprosy patients were submitted to samples collection: i) a superficial incision was made with a blade allowing the lymph to flow from ear lobes, elbows, knees and skin lesion, which was collected by pressing a filter paper to the site; ii) The same blade was used to scrape the bottom of the incision and the resulting material was smeared, first in a filter paper and then in a microscope slide for Ziehl–Neelsen staining. A piece of filter paper containing each sample was cut out into an eppendorf tube with 50–100 µL of water and heated to 95 ºC for 10 minutes for DNA extraction. The DNA samples of ears, elbows and knees were then pooled together. PCR standardization was performed with the samples using six pairs of primers: Proline–rich antigen (Pre–36kDa); Ag85B; 16sRNA; RLEP; TTC microsatellite sequence and MntH. DNA samples from skin biopsies positive and negative for M. leprae on PCR with MntH primers, and from M. tuberculosis and M. avium complex (MAC) cultures were used as controls. The resulting products were submitted to electrophoresis in 2% agarose gel for analysis.

RESULTS: The three patients presented bacillary index of 2 or more, according to Ridley–Jopling scale. Ag85B, TTC, RLEP and MntH primers permitted amplification in all samples. Using Pre–36kDa, control skin samples showed unspecific amplifications with molecular weight close to the desirable amplicon for M. leprae, and with 16sRNA primers, positive reaction in the MAC sample was seen.

CONCLUSIONS: Lymph sample is a simple and cheap method for collecting, extracting, transporting and storing DNA; it can be used in field research and communicants surveillance. The similar results using Ag85B, TTC, RLEP and MntH primers encourages their use in lymph sample from paucibacillary clinical forms of leprosy.

Keywords: Leprosy, Diagnosis, Polymerase Chain Reaction, Mycobacterium leprae, Molecular Biology
ILC4.4–006
Polymerase Chain Reaction Method as an early detection of Mycobacterium leprae in asymptomatic leprosy cases in leprosy endemic area of Papua–Indonesia
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Papua is high endemicity of leprosy disease in easternmost part of Republic Indonesia. Many efforts have been done to reduce the new cases of leprosy patients but the incidence number shows the stability. Aims of this study are to detect Mycobacterium leprae using Polymerase Chain Reaction (PCR) in asymptomatic household contact in order to observe the transmission of M.leprae in early stage before the clinical manifestation and to observe the risk factors of transmission, both of environmental and blood glucose factor. This is cross sectional with descriptive design study. Sample population were 35 symptomatic leprosy patients and 4 asymptomatic household contacts for each patient. Environment factors that observed are period of living with the patient, intensity and number of person in a house. The nasal swab, skin silt and blood samples was collected from all subjects. The DNA was extracted from nasal and skin silt. PCR using LP 1 and LP 2 primer was performed for detected M.leprae.

Thirty five leprosy patients and 107 asymptomatic household contact were recruited as subjects in this study. Polymerase Chain Reaction result show that M.leprae can be detect on 100% leprosy patients and 19.62 % of household contact. Risk factors that statistically significant associated with transmission of M.leprae is the period of living together with leprosy patients ($P$: 0.002). The household contact that live together with leprosy patients have 12 fold risk to be infected with M.leprae ($OR$: 12.45 CI: 1.595–97.20). The conclusion of this study is PCR can be used to detect M.leprae in household contact without clinical cardinal sign as well as in leprosy patients with cardinal sign. The risk factors that influence the transmission of M.leprae is the period of living together.

Keywords: early detection, asymptomatic, leprosy, transmission, PCR
Use of cellular and serological tests in dermatology clinics to aid the differential diagnosis of leprosy from confounding presentations

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OBJECTIVES: Leprosy is an ancient human dermato-neurological disease. The diagnosis of leprosy is still based on clinical manifestations which can easily be confounded with many other skin conditions. We evaluated tests detecting wither serum M. leprae antigen-specific antibodies or cell mediated immunity (CMI) for their ability to provide differential diagnosis of multibacillary (MB) and paucibacillary (PB) from typical dermatological presentations in two highly endemic areas in Brazil.

METHODS: ELISA was performed to detect serum IgG to LID-1 and IgM to PGL-I antigen. CMI was evaluated by whole blood assay (WBA) stimulated with LID-1 antigen (10 μg/ml), with IFNγ secreted into the plasma measured by ELISA (QuantIFERON®-TB Gold, Qiagen).

RESULTS: Seroreactivity to LID-1 and PGL-I in MB patients was significantly greater than all other groups (p<0.05). Serum anti-PGL-I IgM was detected in 67% MB (32/48), 8% PB (5/60), 6% other dermatoses (3/46) and no healthy endemic controls (0/60). Its sensitivity for MB leprosy was 66%, specificity was 93%, with an area under the curve (AUC) of 0.88. Its positive predictive value (PPV) was 91%, and negative predictive value (NPV) was 72%.
Most MB leprosy patients (87%, 42/48) and 7% PB (4/60) had detectable serum anti LID-1 antibodies; all other participants (dermatoses/endemic controls) were seronegative. The sensitivity of IgG anti LID-1 serology for MB leprosy was 87.5%, the specificity was 100%; AUC was 0.97. Its PPV was 100%, and NPV was 88%.

IFN production to LID-1 was detected in 72% PB (29/40), 11% MB (3/28), 38% other dermatoses (10/26) and 40% EC (25/62). Positivity in PB was higher than all other groups (p<0.05). Receiver operating characteristic curve indicated the sensitivity of WBA-LID-1 for PB leprosy versus other dermatoses was 72.5%, specificity was 61.5% and AUC was 0.75. Its PPV was 74%, the NPV was 59%.

CONCLUSIONS: The application of immune response-based tools in highly endemic areas appears to have utility in aiding the differential diagnosis of MB and PB leprosy from other confounding conditions.
THE USE OF IFNγ AND CXCL10 BIOMARKERS FOR M. LEPRAE-SPECIFIC CELL MEDIATED IMMUNITY BY WHOLE BLOOD ASSAY IN HIGHLY ENDEMIC AREAS IN BRAZIL

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Mycobacterium leprae-specific cell mediated immunity (CMI). IFNγ has been used as a surrogate marker of CMI to M. leprae, however other biomarkers capable of differentiating exposure/infected from active disease are needed. CXCL10 has been indicated to distinguish active from latent tuberculosis (TB). We evaluated a prototype whole blood assay (WBA) to assess M. leprae-CMI based on IFNγ and CXCL10 in two highly endemic areas in Brazil.

Methods: M. leprae antigen combinations (ML46f+LID-1 and ML0276+LID-1) and controls (PBS, PHA, M. leprae cell sonicate/MLCS and PPD) were incubated with heparinized whole blood in tubes (24 h, 37°C, 5% CO2). ELISA were used to measure IFNγ (QuantiFERON-TB Gold/QFT-G*, Qiagen, Carnegie, Australia, cut-off: 50 pg/mL) and CXCL10 (Sigma–Aldrich®, St. Louis, Missouri, USA, cut-off: 500 pg/mL) in plasma supernatants. Study groups comprised: newly diagnosed untreated PB (n=38) and multibacillary/MB leprosy (n=30), household contact of MB patients (HHC; n=27) and endemic controls (EC; n=61). Participants were recruited in Goiânia, Goiás State, Central-Western Brazil (2.71 leprosy cases/10,000 inhabitants, 2013) and in Fortaleza, Ceará State, Northeast Brazil (1.96 leprosy cases/10,000 inhabitants, 2013).
Results: WBA incubated with ML46f+LID−1 secreted higher production of IFN-γ among PB patients (84%, median=113 pg/mL) compared to MB patients (10%, median=16 pg/mL) and EC (33%, median=27 pg/mL) (p<0.0001). Similar responses were observed with ML0276+LID−1: higher IFN-γ levels were detected among PB patients (71%, median=135 pg/mL) compared to MB patients (13%, median=13 pg/mL) and EC (29%, median=29 pg/mL) (p<0.0001). The IFN-γ responses to both antigen combinations in HHC and PB patients were similar (HHC:ML46f+LID−1: 55%, median=64 pg/mL; ML0276+LID−1: 55%, median=89 pg/mL). Although similar, the pattern of CXCL10 response was higher. In WBA with ML46f+LID−1, the CXCL10 response of PB patients (74%, median=720 pg/mL), HHC (67%, median=821 pg/mL) and EC (45%, median=460 pg/mL) was similar (p>0.05). Using ML0276+LID−1 stimulation, the production of CXCL10 differed between PB patients (82%, 977 pg/mL) and EC (31%, 233 pg/mL) (p=0.001).

Conclusions: The simultaneous detection of IFN-γ and CXCL10 increased WBA sensitivity, but decreased its specificity in two highly endemic areas in Brazil. While the WBA in tube based on IFN/CXCL10 production was able to identify PB leprosy, it did not distinguish PS patients with active disease from asymptomatic exposed/infected individuals (HHC).

Keywords: diagnosis, T cell
ILC4.4-009
Surveillance of resistant M. leprae strains at Lauro de Souza Lima Institute, Bauru–SP, Brazil
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Objective: this study aims at characterizing and quantifying the mutations in genes folP, rpoB and gyrA, evaluated in samples collected from leprosy patients for drug sensitivity testing at Lauro de Souza Lima Institute (ILSL), Bauru, SP, BR.

Material and methods: samples come mainly from São Paulo, Minas Gerais (MG), Pará (PA) and Maranhão (MA) states, between 2008 and 2015. DNA was extracted from skin biopsies or slit skin samples using the DNAsasy Blood and Tissue® (Qiagen) and amplified by Nested-PCR. Amplification products were visualized in agarose gel electrophoresis, purified and then sequenced in the ABI Prism 3130.

Results: a total of 546 samples were evaluated, 9(1.5%) had mutations in the folP gene, 12(2%) in the rpoB, 28(4.7%) in the folP and rpoB, 1(0.1%) in the three genes. The mutations in the folP gene were present in codon 53 (ACC–GCC; Thr–Ala) and codon 55 (CCC–CGC/Pro–Arg, CCC–CTC/Pro–Leu). In the rpoB gene, mutations were in codon 451 (CAC–TAC/His–Tyr), codon 456 (TCG–ATG/Ser–Met, TCG–TTG/Ser–Leu), some of them with double peaks in the electropherogram. One mutation was observed in codon 442 (CAG–TAG). For the gyrA gene, the only mutation observed was in codon 91 (GCA–GTA/Ala–Val). 70% of the isolates showed double mutation.

Conclusions: Most mutation were found in codons 55 in folP and 456 in rpoB; such findings are common to other reports in several countries besides Brazil and may be related to transmission patterns. The finding of double peaks can be related to mixed populations of sensitive and resistant strains in the same individual. Most cases of resistance came from relapse patients, however, primary resistance was found within the evaluated samples. The significance of resistance in leprosy patients has to be assessed in the larger scale in Brazil.

Keywords: leprosy, drug resistance, rifampin, dapsone
ILC4.4–010
Use of a rapid test containing the ND–O–BSA and the LID–1 for the serodiagnosis of leprosy in endemic regions of Brazil
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Objectives: To validate the rapid lateral–flow test (NDO–LID) for early leprosy diagnosis and to compare the measurement of serum antibodies by PGL–I ELISA and NDO–LID.

Methods: Clinical examination and serology were carried out in patients evaluated between 2009 and 2010. The cut–off for the ELISA PGL–I was the optical density (OD) ≥ 0.150. The NDO–LID rapid test positivity was defined by the staining of both, the control line and the test line (visual reading scores: weak positive 0.5+/1+/2+/3+). Faint test line staining was considered result. The study included 174 leprosy patients previously diagnosed in a high endemic leprosy area in Brazil, their household contacts (n=409), healthy endemic controls (n=53) and twelve tuberculosis patients (TB). Leprosy patients were classified according to Ridley & Jopling’s criteria, among then 19 were indeterminate patients, 43 tuberculoid (TT), 63 borderline–tuberculoid (BT), 30 borderline–borderline (BB), 12 borderline–lepromatous (BL) and 7 lepromatous (LL).

Results: Among patients, 44 sera were positive and 22 weak positive in the rapid test and 43 were PGL–I ELISA positive. Most positive sera were from multibacillary patients (100% for LL, 100% for BL and 73.3% for BB), the similar positivity was obtained in the PGL–I ELISA. Among household contacts, 09/409 (2.2%) were clinically diagnosed with leprosy, in this group only one sera was seropositive and two weak positive for NDO–LID test, the other patients were all paucibacillary. Nine household contacts were positive and 51 weak positive in the rapid test, and 13 were PGL–I ELISA positive. The 51 endemic control sera were rapid test negative and 2 weak positive, all of them were ELISA negative. TB patients were negative to both tests.

Conclusions: The NDO–LID–1 assay can be easily performed, therefore, it can be applied in resource–poor settings, where specialized personnel and logistics are not available. In spite of that, this test showed to be useful for detection of multibacillary cases, which in long term will help decreasing transmission of the disease.

Keywords: leprosy, serology, PGL–I, ND–O–LID–1, M leprae
ILC4.4-011
Diagnostic, Follow Up and Household Contact of Leprosy Patients in Misiones, Argentina
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Although leprosy is not endemic in Argentina, new cases continue to be diagnosed every year. Between the years 2011 to 2014, in the North part of the province of Misiones (Area of action of the Hospital SAMIC, Eldorado), 30 new cases of leprosy were diagnosed.

Objectives
Carry out the post-treatment follow-up of the patients diagnosed between 2011–2014, together with an active search of new cases among contacts.

Methods
A dermatological study of the patients and their contacts was carried out, evaluating the clinical cardinal signs of leprosy: hypopigmented or erythematous skin lesions not typical of any another cutaneous disease with loss of sensibility (thermal, pain and / or of touch), with or without cutaneous injury, and / or nervous trunks or cutaneous affected nerves.
A lymph sample from an ear lobe, an active lesion edge, nasal mucus and/or biopsy if it was considered to be pertinent were taken from every patient and household contact together with nasal swabs from patients and contacts even if they didn’t present suspicious injuries. The density of acid-fast bacilli (AFB) was recorded by the Ziehl-Neelsen (smear) method. Nasal swab, smears and biopsies were analyzed by nested PCR.

Results
Between August 2014 and September 2015, 33 patients (13 women and 20 men, with a middle age of 52.5 years) and 121 household contacts were examined (average age 21.5 years). From 52 smears, AFB were observed in 21 (17 corresponded to patients during clinical check-up and were 4 contacts) and 11/39 smears were positive by PCR. A total of 28 individuals (21 patients and 7 contacts) were positive by smear or PCR.

From 129 samples of nasal swab collected and analyzed: 27.1% were PCR positive (20 patients and 15 contacts). Three biopsies processed by PCR technique were positive (1 patient and 2 contacts).

Conclusions
This study has diagnosed active disease in 28 individuals (21 patients and 7 contacts) and it also has demonstrated that the transmission of leprosy is still active in Misiones.

Keywords: Leprosy Patients, Household Contact, Misiones, Non Endemic Country, Argentina
The minimum requirements of a leprosy diagnostic test for subclinical cases to reduce leprosy transmission: a modeling study

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Objectives
Earlier diagnosis of leprosy and subsequent treatment, preferably in the subclinical stage, is crucial to interrupt the transmission of M. leprae. While the identification and validation of new sensitive biomarkers for (subclinical) leprosy is still ongoing, we also need to determine minimum requirements of a diagnostic test to facilitate effective reduction of transmission. In this study we investigated the impact of a leprosy diagnostic test for subclinical cases with a range of sensitivities on the new case detection rate (NCDR) of leprosy for two testing strategies and three endemcity levels.

Methods
We used the SIMCOLEP model (quantified on data from Bangladesh), accounting for within-household contacts. The baseline consisted of passive case detection (2 years detection delay), multidrug therapy, active contact tracing, and BCG vaccination in infants. We predicted the impact of a leprosy diagnostic test for subclinical cases assuming a sensitivity ranging from 40%–100% on the NCDR trend over 50 years.
Specificity was ignored because incorrectly diagnosed non-leprosy cases do not impact on the transmission of M. leprae. We examined two testing strategies: 1) continuous household contact testing, and 2) a one-time and two-time total population survey. We also analyzed the impact by endemic setting: high (25 per 100,000), medium (5 per 100,000), and low (1 per 100,000).

Results
A diagnostic test in a population survey would have a higher impact on the NCDR at higher sensitivities (≥ 60%) compared to contact testing alone. Two-time surveys would reduce the NCDR even further compared to a one-time survey. However, a diagnostic test with lower sensitivities (≤ 50%) would be more effective in time with continuous household contact testing. In a population survey, a test with at least a 60% sensitivity would already bring elimination (less than 10 per 100,000) forward by about 10 years. A population survey is predicted to have the highest NCDR reduction in a medium endemic setting, followed by a high and then low endemic setting. The number needed to test decreases with increased sensitivity and is more favorable in high endemic settings.

Conclusions
In this study we showed that a diagnostic test with at least a sensitivity of 60% applied in a total population survey would reduce the NCDR of leprosy substantially in settings with a comparable leprosy situation to Bangladesh. Elimination could be achieved about 10 years earlier. At lower sensitivities a policy of continuous household contact testing would be more effective.

**Keywords:** Sensitivity of diagnostic test, subclinical cases, testing strategies, reducing transmission
ILC4.4-013
Genomic Diversity in Mycobacterium leprae Isolates from Leprosy Cases in South India; Genotyping of Strain Specific Single Nucleotide Polymorphisms.
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Objective:
Molecular diversity of Mycobacterium leprae (M. leprae) is determined by the presence of single nucleotide polymorphisms (SNP) within specific genes that differentiate the bacilli into 4 types and 16 subtypes. These SNP types demonstrate geographical association and hence are used in understanding the patterns of focal transmission of leprosy in endemic disease clusters. In the current study, we investigated SNP types of M. leprae in clinical isolates of leprosy cases from southern states of India in order to determine the SNP based strain types within this geographical region of the country.

Methods:
DNA was extracted from excisional skin biopsies of a total of 80 newly diagnosed untreated leprosy cases that attended the Dermatology out-patient department of SIH-R&LC, Karigiri, Tamil Nadu, India. Clinical, demographic and epidemiological data was collected at diagnosis and leprosy was confirmed through bacteriological smear examination and PCR for M. leprae specific RLEP region. SNPs in the M. leprae genome at positions 14676, 1642875, 2935685 were successfully amplified SNP types were determined through Sanger sequencing of PCR products. Further the sub-types were also determined by amplifying and sequencing fragments that traverse the loci that are specific for sub-types 1A-D and 2E-H. Hunter Gaston Discriminatory Index (HGDl) was calculated for each allele using discriminatory power calculator (http://insilico.ehu.es/mini_tools/discriminatory_power/index.php).
Results:
M. leprae specific RLEP gene amplification was achieved in all the samples. SNP typing and subtyping revealed that among 80 clinical isolates 61 (76.25%) were Type-1 and 19 (23.75%) were Type-2 (HGD= 0.3685). Further when sub typed 46 (75.43%) out of 61 samples were found to be sub type 1D, 12 (19.67%) 1C and only 3 (4.9%) samples 1A (HGD = 0.399). Sub typing of all type-2 samples showed the presence of 2G.

Conclusion: Our results indicated that type 1D is predominant in the south Indian population which is in accordance with the earlier reports from various other parts of India. Interestingly we have noted 23.75% of the samples to be of type 2 with 2G subtype which indicates similarity in the existence of sub-types from other south east Asian nations.

Keywords: SNP typing, Transmission, RFLP, Mycobacterium leprae, South India
ILC4.4–014
Emerging zoonotic leprosy in the United States and pathological variants of Mycobacterium leprae
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Humans were considered exclusive host of M. leprae until nine–banded armadillos (Dasypus novemcinctus) were found susceptible to leprosy in 1970s. Free ranging armadillos in the Southern United States are also harboring a natural infection of M. leprae and zoonotic transmission of leprosy is plausible. We sequenced the whole genome of M. leprae from leprosy patients and armadillos, and identified an exceptionally conserved genotype (3I-2) of M. leprae and 52 genomic markers specific to this genotype. All 33 armadillos and 26 of the 29 patients with no history of foreign residence were carrying this strain. Further discrimination of this strain was achieved by analysis of 10 VNTR (Variable Number of Tandem Repeats) loci, and we identified first zoonotic strain (3I-2-v1) of M. leprae shared by 28 wild armadillos and 25 patients from Louisiana, Texas and Mississippi. Armadillos in Georgia and Florida were found free from the infection in 1980s, however, we recently examined 645 armadillos in that region and 16.43 % (106/645) animals appear to have acquired the infection in last 2 decades. A second zoonotic strain of M. leprae (3I-2-v15; differing at three VNTR loci in comparison to the 3I-2-v1) was also identified from central Florida indicating the emerging zoonotic leprosy in the United States.
SNP (Single Nucleotide Polymorphism) and VNTR based algorithms were able to classify the M. leprae strains according to their geographical affiliation and deducing the local transmission network. However, it is unclear if these strains vary in pathogenicity to the host. Recently a whole genome comparative study predicted that SNP type 4P strain of Brazilian origin could be hyper virulent because of a frameshift mutation converting a putative repressor gene ML0825c into the pseudogene. Considering the dominance of zoonotic strain among armadillos and plausible pathological difference of Brazilian strain we investigated if 31–2–v1 strain had any selective growth or pathogenic advantage infecting non-human host or type 4P strain grows faster. Six armadillos were co-infected with equal numbers of viable bacilli from both strains, animals were harvested after 2 years of infection and the relative growth was assessed by Whole Genome Sequencing of M. leprae. Sequencing reads derived from the Brazilian strain (66.81%) were significantly (P<0.0001) higher than those from the 31–2–v1 zoonotic strain (33.19%) suggesting there is no adaptive growth advantage to the zoonotic strain in the non-human host. Subsequent analysis provided the first evidence of pathological variation among different strains of M. leprae.

**Keywords:** Armadillo, Genotyping, SNP–VNTR, pathological variant, co-infection
Utility of recombinant proteins to detect leprosy patients lacking antibodies against PGL-I

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OBJECTIVES: Diagnosis of leprosy is not easy for non-experts and simple immunodiagnostic tools to use in support of clinical suspicion would be highly beneficial. With a goal of identifying antigen-specific antibody responses that could complement antibody responses to phenolic glycolipid (PGL)-I, we analyzed reactivity of serum samples from Colombian leprosy patients.

METHODS: Sera from Colombian volunteers were analyzed by enzyme-linked immunosorbert assays (ELISA). Thresholds were set based upon optical densities obtained from sera of healthy individuals from non-endemic regions. Clinically diagnosed leprosy patients, all with measurable bacterial indices, were stratified on the basis of having detectable anti-PGL-I IgM antibodies or not. Antigen reactivity of some patient’s family members was also assessed. Reactivity against proteins LID-1, ML2028, ML2044, ML2055, ML2331 and ML2380, along with the protein conjugate of ND-O-LID, was assessed. Antibodies were detected with anti-human IgG, anti-human IgM and protein A to determine the diagnostic sensitivity, specificity, positive predictive value (PPV), and negative predictive value (NPV) of each assay.

RESULTS: As expected, few patients had circulating IgM antibodies against the proteins but they did possess IgG antibodies. Among all of the antigens tested, LID-1 provided the best performance. Anti-LID-1 IgG responses were detected in all of the anti-PGL-I positive patients and 7 of the 10 PGL-I negative patients.

CONCLUSIONS: Our data indicate that analyses of antibody responses to protein antigens can complement the immune detection achievable by PGL-I to further assist the diagnosis of leprosy.

Keywords: diagnosis, antibody, serology
ILC4.4-016
Molecular Evidence for the Aerial Route of Infection of Mycobacterium leprae and the Role of Asymptomatic Carriers in the Persistence of Leprosy

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Objectives: Investigated the route of infection and disease onset, from airways exposure, colonization, and bloodstream dissemination. Methods: Unprecedented study to evaluate in the same individual the detection of M. leprae DNA through real-time qPCR in nasal vestibule, nasal turbinate mucosa, and peripheral blood; in addition to anti-PGL-I ELISA serology, and the Mitsuda test (lepromin reaction), of 113 leprosy patients and 104 household contacts of patients (HHCs).

Results: DNA positivity among patients: 66.4% (75/113) nasal swabs, 71.7% (81/113) nasal turbinate biopsies, 19.5% (22/113) blood samples, and seropositivity 62.8% (71/113); with increasing incidences towards the multibacillary (MB) pole of the clinical spectrum. Mean quantities of M. leprae detected in the different patient samples: 1.8E+07 bacilli/reaction nasal swabs, 4.1E+07 bacilli/reaction nasal turbinate biopsies, and 9.3E+03 bacilli/reaction blood. Statistically significant relationships between every pairwise comparison and intricate multivariate congruence were observed for patients’ data (P<0.05). Positivity among HHCs: 18.3% (19/104) anti-PGL-I, 49% (51/104) nasal swabs, 53.8% (56/104) nasal biopsies, and 6.7% (7/104) blood. Mean quantities of M. leprae: 1.8E+04 bacilli/reaction nasal swabs, 1.3E+05 bacilli/reaction nasal biopsies, and 1.4E+04 blood. Comparison between the mean ELISA indexes obtained for HHCs of PB patients versus the results from contacts of MB patients were significantly different (P=0.0037).
The multiple correspondence analysis of HHCs’ data revealed associations between: positive results to both qPCR in blood and anti-PGL-I, and positive results to both qPCR in nasal swab and nasal biopsies. The comparison between the mean values obtained for patients vs. HHCs, shown that for the both sites in the nose (surface and mucosa), and for the anti-PGL-I, means differed significantly (P<0.0001). During a minimum follow-up period from 5–7 years, out of 104 HHCs, 7 developed leprosy (6.7%). Risk for the disease outcome was estimated comparing results of HHCs affected with healthy. Neither nasal passage nor mucosa positivity was determinant of later disease onset; however, blood presence increased the risk for disease development [RR/LR+ 5.54 (IC 95% 1.30 – 23.62)], as well did the seropositivity [LR+ 3.69 (95%CI 1.67 – 8.16); RR 5.97 (95%CI 1.45 – 24.5)].

Conclusions: Our findings strongly suggest that the aerial route of infection and transmission is predominant. The overall frequency of positivity among HHCs revealed that: M. leprae is widespread among them; HHCs experience high bacillary burden regardless of their index case disease manifestation; and that, HHCs comprise a recognizable group of individuals that contribute to the infection risk to themselves and most probably to others.

Keywords: Epidemiology, Quantitative Real-Time PCR, Enzyme-Linked Immunosorbent Assay, phenolic glycolipid I, Transmission
ILC4.4–017
Skin Smear Positive among New Leprosy Patients from Allahabad District Attending a Referral Hospital in Northern India
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Objectives
To study the demographic and clinical characteristics of new leprosy patients (never treated before) with slit-skin smear positive among patients from Allahabad district attending a referral hospital in Northern India during the period 2005 to 2014.

Methods
The study was conducted at the The Leprosy Mission (TLM) Hospital, Naini a unit of The Leprosy Mission Trust India. This hospital is a 150 bedded specialized Leprosy Referral centre over 2500 new Leprosy registrations in a year. All new leprosy patients from Allahabad district during 2005 to 2014 were included in the study. All the patients registered under leprosy routinely undergo body charting, nerve function assessment and slit-skin smear test and diagnosis of leprosy is always made by the medical officer based on history and these tests. Descriptive statistics and relevant statistical tests were used to describe the findings.

Results
There were 3358 new patients (as never treated before) from Allahabad district registered for treatment during the study period. Among them 934 (27.8%) had skin smear test positive. Of all positives 57.6% of patients had high BI (3+ and above). Proportion of smear positive among male and female was 31.8% and 20.3%, respectively (<0.001). Proportion of patient with grade I or II disability among smear positive patients was 39.5% as compared to 32.7% among those with negative smear test (<0.001). Overall 60% of patient in smear positive group noticed patch as first symptom as compared to 75% in smear negative group. Over 50% of patients in smear positive group reported with symptoms like nodule, infiltration, neuritis and reaction related as presenting complaints as against 25% in smear negative group. The regression coefficient (b) to assess the trend was in positive.
Conclusions
Higher proportion of smear positive at the time of diagnosis indicates the delay in diagnosis. The increasing trend in smear positive shows the continuing transmission of disease in the community. The Information, Education and Communication activity should include symptoms related to Lepromatous spectrum (shiny face, smooth skin, infiltration etc) of disease to identify and diagnose patients early. Skin smear for M. Leprae would aid in diagnosis of Lepromatous patients without patches.

**Keywords:** Lepromatous Leprosy, M. Leprae, India, Slit-skin smear, Leprosy Diagnosis
ILC4.4-018
Clinical and Serological Analysis in Long-term Follow-up of Household Contacts of Leprosy Patients.
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Objective: Household contacts (HCs) of leprosy patients are at higher risk of becoming ill. Seropositive contacts with anti-PGL-1 IgM antibodies evaluated at diagnosis of their index cases have shown greater risk of developing disease. We aim to demonstrate the long-term evaluations on the immunological response of HCs.

Methods: Among 3,241 HCs monitored at a National Reference Centre of Leprosy in Brazil from 2002 to 2016, 545 contacts with at least five subsequent annual serological tests were analyzed.

Results: HCs were characterized by 61% (333/545) females, mean age of 28.8 ± 19.6, 87.1% (475/545) with positive to Mitsuda test, 73% (397/545) with at least one BCG–ID vaccination scar, 83% (453/545) were contacts of multibacillary (MB) index cases and 17% (93/545) were ELISA seropositive for anti–PGL-1 in the first examination, with an odds 6 times higher towards disease development (OR = 6.16; CI95% 1.84 – 20.65; p <0.0032). Six groups of contacts were classified according to their antibody titers: 1 – negative ELISA in all assays (62.9%, 343/545);
2 – positive ELISA in all assays (1.3%, 7/545); 3 – negative ELISA that became permanently positive (3.1%, 17/545); 4 – positive ELISA that became negative and remained negative (8.5%, 46/545); 5 – positive ELISA that became negative and restored positivity (7.3%, 40/545); and 6 – negative ELISA that became positive and restored negativity (16.9%, 92/545). Among 195 contacts with variable serological responses, 55.9% (111/195) anti-PGL-1 negative turned positive after the first examination and 77.4% (86/111) seroconverted to positive across the follow-up period. Among the PGL-1 positives that became negatives, 43% (84/195) occurred after the first examination and 63% (53/84) did so within 2 years. Until now, among these HC with at least 5 tests, 2% (11/545) became sick and belonging to groups 2, 3 and 5.

Conclusion: Our data evidenced the need for monitoring HCs for at least 5 years, and suggest an urgent implementation of serological tests in routine health services of control leprosy, given that the positivity to ELISA test was crucial to reveal the developing of the disease and allow early diagnosis in contacts.

Keywords: Leprosy, household contacts, ELISA anti-PGL1, Mitsuda test, Long-term follow-up
ILC4.4–019
M. leprae DNA detection by qPCR in Skin Smears of Oligosymptomatic and Asymptomatic Contacts with Subclinical Infection Revealed by anti-PGL-1 ELISA.

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Objective: Seropositivity for IgM anti-phenolic glycolipid 1 (PGL-1) has been associated with greater odds towards leprosy onset among household contacts. We aimed detecting M. leprae DNA in skin smears from oligosymptomatic and asymptomatic contacts with subclinical infection as revealed by positive ELISA.

Methods: Forty-eight leprosy cases were included in this investigation notified since January 2015, during epidemiological surveillance of contacts with follow-up of 5 to 7 years. Clinical dermato-neurological examination, serology anti-PGL-1 were performed annually. Quantitative PCR (qPCR) with RLEP3 primers was performed in contacts with at least two positive ELISAs. M. leprae DNA was detected in skin smears of six body sites (lobes of the right and left ears; right and left elbow and right and left knee).

Results: Among 48 contacts notified as leprosy cases, 14.5% (7/48) were co-prevalent, meaning that individuals were already sick when examined for the first time, together with their index cases. Positivity for ELISA, skin smears’ bacilloscopy and qPCR were 43% (3/7), 43% (3/7) and 71% (5/7), respectively. During follow-up, 85.5% (41/48) of contacts became ill. Among them, 48.7% (20/41) were oligosymptomatic, with 40% (8/20) positive ELISA in the first examination, and 50% (10/20) at diagnosis. Bacilloscopy of skin smears presented positive results for 20% (4/20), whereas the qPCR was 80% (16/20). Among 51.2% (21/41) asymptomatic contacts,
ELISA positivity in the first examination was 66.6% (14/21), and 90.5% (19/21) at diagnosis. Positivity for bacilloscopy and qPCR was 9.5% (2/21) and 85.7% (18/21), respectively. Among those contacts that got sick, two positive ELISAs were the trigger to perform bacilloscopy and qPCR, which presented positivity of 14.6% (6/41) and 82.9% (34/41), respectively.

Conclusion: The qPCR of skin smears was capable of detecting bacilli DNA in more than 80% of oligo and asymptomatic patients, while positivity for bacilloscopy was detected in less than 15%, demonstrating the insidious trait of the disease and the difficulty in reaching early diagnosis. These subclinical cases may have favored transmission and development of incapacities due to late occurrence of symptoms. Serology for IgM anti-PGL-1 and qPCR to detect bacilli DNA were fundamental to uncover subclinical infection, and must be employed to prevent peripheral nerve lesions and incapacities during leprosy development.

**Keywords:** Leprosy, ELISA anti-PGL1, qPCR M. leprae DNA, household contacts, subclinical diagnosis
**ILC4.4–020**

**Electromyography and Peripheral Nerve Biopsy in Asymptomatic Leprosy Contacts: a New Strategy for Early Diagnosis**

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Objective: Despite significant progress observed in leprosy control, early identification of cases remains the primary goal of disease control programs. Household contacts are the group at highest risk for developing the disease and, therefore, prospective studies in this group are of great importance for the early detection of new cases. This study aims to provide early recognition of disorders in peripheral nerves of household contacts diagnosed with subclinical infection.

Methods: We performed a prospective evaluation in leprosy contacts, regularly followed in a National Reference Center of leprosy, with subclinical infection diagnosed by serological and molecular methods – positive ELISA anti-PGL-1 and positive real time PCR (qPCR) of intradermal shaved. These contacts were submitted to clinical evaluation and electroneuromyography (EMG).

Results: Were evaluated 66 contacts with subclinical infection, with an average of 31.93 years, 27.3% male. 37.9% (25/66) of infected contacts have at least one change in the EMG, with an average of 1.36 nerves compromised by individual. 72% (18/25) had only one altered nerve. In this group, only 20% (5/25) had neural thickening on physical examination.
Regarding the pattern of nerve involvement, 44% (11) presented a sensory axonal mononeuropathy, 28% (7) focal myelin impairment and 28% (7) multiple mononeuropathy. The most affected nerves were common fibular (41.2%), sensitive ulnar (26.4%), superficial peroneal (17.7%), motor ulnar (11.8%) and others (2.9%). 56% (14/25) of contacts with changes in EMG were directed to neural biopsy and 64.3% (9/14) underwent this procedure without complications. In nerve biopsy analysis, there were no significant histopathological changes or positive bacilloscopy in any case. However, the molecular analysis by qPCR positivity was 66.7%. The analysis between groups (normal EMG x altered EMG) showed no significant difference when evaluated sex, age, clinical form of the index case, the presence of clinical symptoms, neural thickening, Mitsuda, and level of ELISA anti-PGL1 positivity. In the intra-group analysis (altered EMG), there was also no correlation between the pattern of EMG changes, the number of affected nerves and the level of ELISA anti-PGL1 positivity and the Mitsuda.

Conclusion: With the perspective of eliminating leprosy as a public health problem in Brazil, the implementation of more sensitive methods for the detection of M. leprae and its neural involvement, using immunological, molecular and neurophysiological tools are really necessary, allowing an effective control of the disease, establishing an early treatment, with a consequent prevention of disabilities resulting from leprosy neuropathy.

**Keywords:** Leprosy contacts, Peripheral Nerve, Electromyography, ELISA anti-PGL1, qPCR DNA M.leprae
ILC4.4-021
Spatio-Temporal Epidemiology of Mycobacterium leprae Infection among Leprosy Patients and Household Contacts through Geographic Information Systems Analysis of an Endemic Region in Southeast Brazil
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Objectives: Characterize the endemic leprosy and realize epidemiological surveillance of reported cases and of infected contacts detected by immunological tools and geographic information system in endemic municipality in southeastern Brazil (Ituiutaba, Minas Gerais) from 2004 to 2014.

Methods: The spatial distribution pattern of leprosy cases in Ituiutaba was determined by combining information from the National Notifiable Diseases Information System (SINAN), the Brazilian Institute of Geography and Statistics (IBGE), and by mapping in the field. Supplementary data were obtained from the Municipal Secretary of Planning of Ituiutaba. The residences of people affected by leprosy in the urban area, reported during 2004 to 2014, were georeferenced with a handheld GPS (Global Positional Systems) device to produce detailed maps of the leprosy distribution. Applied GIS to explore the distribution of leprosy cases (N=303), reported during 2004 to 2014, and of HHCs (N=53), in a highly endemic area of southeast Brazil, were analyzed according to leprosy classification of the index cases and the subclinical infection determined by serology among HHCs, to evaluate risk for disease onset and transmission.
Results: The detection of new cases presented a 43% decline in the 10 year period of the study (P<0.05), maintaining high standards of endemicity (25/100,000). Positivity of subclinical infection among the HHCs was: 17% for anti-PGL-I ELISA and 42% for anti-LID-NDO rapid lateral-flow test, 70% (38/60) among contacts of multibacillary index cases. Spatio-temporal epidemiology associated to serologic analysis can increase the effectiveness of the control strategies through the identification of areas of disease burden and of M. leprae transmission, providing critical information to support the action planning of health interventions in regions of interest. Spatial distribution of leprosy cases was highly heterogeneous throughout the urban perimeter. Four main clusters of patients and three main clusters of subclinical infection were identified.

Conclusions: This study has shed light into the possibility to use the spatio-temporal analysis together with social aspects and laboratory methodologies to support control strategies. Our group will further explore this spatio-temporal analysis extending the territory and the assays involved in this research.

**Keywords:** Leprosy cases, Household contacts, Serological tests, Spatial Analysis, Epidemiology
**ILC4.4-022**

**Multiple Correspondence Analysis for Characterization of Cytokines in Patients with Leprosy and their Household Contacts**

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Objectives: In this work we applied Multiple Correspondence Analysis (MCA) to a set of specific variables of leprosy, considering laboratory and demographic aspects in order to establish a relationship between the sick individuals and their contacts.

Methods: The study included 164 patients (43 cases of leprosy and 113 household contacts) who were interviewed to obtain demographic data and submitted to blood collection for measurement of cytokines (ELISA).

Results: MCA used in the study showed significant results with only two dimensions that are respectively responsible for 38.47% and 11.73% (summing 50.20%) of the total inertia of the data. It was felt that an association between the laboratory and socio-demographic variables allows the formation of clusters of individuals with respect to their diagnosis of leprosy (PB, MB) and contacts (CPB and CMB). In the Euclidean space demonstrated in the study, there was a group of sick individuals (PB and MB) that share demographic and laboratory characteristics. Moreover, it was observed that the CMB group approaches this cluster of sick patients, while the CPB group distance themselves. It was noted different profiles inside the clusters: the CPB and CMB groups have greater variability inside the groups when compared with PB and MB groups which are more homogeneous each other.
It is clear that sick groups have more homogeneous profiles, which is interesting because these individuals have specific characteristics that assist in completing the clinical diagnosis. Interestingly, the CMB cluster showed high levels of IL-4 and low levels of IFN-γ. It was also possible to evaluate the socio-demographic variables contribution (Age, Gender, BCG, Inbreeding, Time of Treatment) in the allotment of the groups. Conclusions: About the variables analysis in the final solution of the technique presented in this work, we realized that variables like BCG, inbreeding and smear, as well as operational classifications are correlated identically to the two dimensions of the reduced space in question. Another interesting observation is that the laboratory variables tend to be associated. The variable treatment time is more correlated with the second dimension while the variables age and gender, despite their strong relationship with the first dimension, does not have much representation regarding the breakdown of the data, being very close to the origin of Euclidean space presented in the study that it was supported by FAPEMIG, CAPES, UFJF and UNIVALE.

**Keywords:** Multiple Correspondence Analysis, MCA, Leprosy, Cytokines
ILC4.4–023  
Molecular Detection of Mycobacterium leprae in Wild Armadillos and Increased Anti–PGL-I Titors in Individuals Consuming Them in Western Pará, Brazil.
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OBJECTIVES: Besides man, the only other known natural reservoir of Mycobacterium leprae are armadillos. Zoonotic infection of humans by armadillos (Dasypus novemcinctus) has been confirmed by SNP typing of M. leprae strains in the southern U.S. There are only a few reports of finding M. leprae DNA in armadillos in Brazil. We obtained liver and spleen samples from armadillos captured for food in the town of Belterra, western Pará state in Brazil, to determine if they were infected with M. leprae. We also examined the anti–PGL-I titer in residents of this town to determine if there was a relationship between activities related to hunting, handling and consumption of armadillo meat in these residents.

MATERIALS AND METHODS: With informed consent, 146 residents participated in a survey of whether they hunted armadillos; prepared armadillo meat for food; or consumed armadillo meat as part of their diet. A blood sample from each person was obtained to determine the PGL-I antibody titer by ELISA assay, a positive titer being a likely indication of M. leprae infection. Total DNA was extracted from armadillo spleen and liver samples (Qiagen), followed by amplification of M. leprae-specific RLEP sequence using PCR.
RESULTS: Three cases of leprosy relapse and one new case were diagnosed based on clinical signs and symptoms during the visit (4/146, 2.7%). Of the twelve armadillos sampled, seven were positive (7/12, 58.3%) in both liver and spleen; animals that were negative were negative in both tissues. Based on answers to the questionnaire and the anti-PGL-1 titer, there were no differences in mean titer between groups of individuals who either hunted or did not hunt armadillos (p = 0.41), handled or did not handle armadillos to prepare the meat (p = 0.20), or between those who ate or did not eat armadillos (p = 0.33). However, individuals who consumed armadillos more than once per month had a significantly higher anti-PGL-1 titer (p = 0.02) than those who consumed armadillos once per month or less.

CONCLUSION: There was no statistical relationship between anti-PGL-1 serum titers in residents with hunting, manipulation or moderate consumption of armadillo meat. However, there was a significant increase in the titer among those individuals who consumed the most armadillos in their diet. It could be inferred that this increase in antibody titer might be related to the increased exposure to armadillos infected with M. leprae.

Keywords: leprosy, armadillos, anti-PGL-1, RLEP, environmental reservoir
ILC4.4-024

The Use of RLEP Amplification and Anti-PGL-I Titer to Evaluate Leprosy Infection Rates in Families Living in Hyperendemic Cities in Pará, Brazil

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OBJECTIVE: We evaluated the effectiveness of combining RLEP PCR in earlobe slit skin smears (SSS) and anti-PGL-I ELISA titer as a way to identify infection rates in individuals living in seven different cities in Pará, a hyperendemic area in northern Brazil.

MATERIAL AND METHODS: We randomly selected 452 individuals from whom we obtained SSS for this study. These individuals were made up of 53 previously treated cases, 91 newly diagnosed untreated leprosy cases, and 308 healthy household contacts (HHC). New cases were diagnosed based on accepted clinical signs and symptoms identified by experienced dermatologists. DNA was purified from SSS samples (Qiagen) followed by amplification of RLEP sequence by PCR. Within these samples, 197 were randomly selected to assess the anti-PGL-I titer by ELISA in sera.
RESULTS: RLEP positivity varied among the patient groups, with 43.4% (23/53) of previously treated cases being positive, while newly diagnosed cases were much higher (83.5%, 76/91). There was a slightly lower rate of positivity found in PB cases (70.6%, 12/17) compared to MB cases (86.5%, 64/74). RLEP positivity in the HHC group was lower, with 26.3% (81/308) being positive. The anti-PGL-1 titer was positive in 68.8% (23/48) of newly diagnosed untreated leprosy cases, 69.2% (9/13) in treated cases, and 71.3% (97/136) in HHC. When comparing RLEP and anti-PGL-1 positivity among newly diagnosed untreated leprosy cases, 56.3% (27/48) were RLEP+/anti-PGL-1+ while double positives were much lower in HHC (19.9%, 27/136). In contrast, only 6.3% (3/48) of new cases were RLEP-/PGL-1+, while double negatives were much higher in HHC (23.5%, 32/136).

CONCLUSIONS: Examination of individuals for clinical signs and symptoms of characteristic skin lesions with loss of sensation and/or nerve swelling or pain is still considered of primary importance in the diagnosis of leprosy, particularly in resource poor settings. Other laboratory tests, including bacilloscopy, detection of histological changes in skin biopsies, performing RLEP PCR, and assessing anti-PGL-1 titers have been used to confirm the diagnosis, particularly in difficult cases. In this study, RLEP positivity was shown to be the highest in newly diagnosed patients (83.5%), and this group was also found to have the highest percentage of RLEP+/anti-PGL-1+ (56.3%). Ongoing family studies in hyperendemic cities in Pará, Brazil, suggest that individuals who are positive for both have the highest risk of developing leprosy and should be closely monitored.

Keywords: leprosy, RLEP-PCR, anti-PGL-1, biomarkers, family studies
ILC4.4–025
Identification of early diagnostic biomarkers of leprosy

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Objective: To find the early diagnostic markers of leprosy

Method: Blood PBMCs from 4 patients of multibacillary leprosy, 4 patients of paucibacillary leprosy, 4 long-time contacts of patients, and 4 healthy controls were stimulated by M. leprae antigens, followed by RNA sequencing to determine the differences in gene expression among these groups that may serve as early diagnostic biomarkers. The diagnostic biomarkers were validated among large populations by real-time PCR method.

Results: Twenty differentially expressed genes were found and 16 samples were used to evaluate the results and 17 genes were verified. 16 un-stimulated samples were collected for real-time PCR analysis. The expression levels of 12 genes were twofold higher after the stimulation. 66 samples were used to verify the results and the sensitivity was more than 70% for 9 genes and specificity was more than 60% for 6 genes between leprosy and healthy people (5 mRNA of IL8, SERP,CCL2, JAKM, ATP6, 4 IncRNA of LINC000659, LOC1019, MIR22, FLJ10489). The sensitivity and specificity was more than 60% for 4 genes between leprosy and long-time contacts (3 mRNA of CCL2, SERP, JAKM, IncRNA of MIR22). The different disease states of leprosy can be identified by decision tree analysis of the genes for IL8, SERP, MIR22 and FLJ10489. The 18 contacts of the acute leprosy were conducted to diagnose early by the established model, and the 50% contacts were found to be infected by mycobacterium leprae.

Conclusions: Early diagnostic biomarkers were found in this study that can distinguish different leprosy states and infected individuals in close contacts.

Further studies are need to evaluate the significance of these findings in clinical setting. In addition, whether the infected close contacts should be given preventive drugs will be determined in future studies.

Keywords: RNA sequencing, Real-time PCR, Early diagnosis, IncRNA, Decision tree
ILC4.4–026

Active search of leprosy cases among school children with positive serology using a rapid test in an endemic area of Brazil

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Objective: The leprosy elimination strategy is based in active detection of cases and early diagnosis, therefore, evaluation of school children should be a good strategy to control the disease, thus, in the present study students from Rondonópolis, MT were evaluated clinically and serologically.

Material and Methods: Active surveillance of leprosy cases among students in the State and Municipal elementary schools of Rondonópolis, MT. The study enrolled school children from five leprosy most prevalent areas (Municipal School Albides Pereira Santos, State School Francisca Barros de Carvalho; State School Odorico Leocadio Rosa, State School Professor Maria Elza Ferreira Ignatius and State School Maria Lima Cadilha). During the evaluation dermato-neurological examination was conducted, peripheral blood sample collected for serology using the commercial rapid test ND–O–LID–1 and collection of demographic and epidemiological data. Students with positive serology were invited for further evaluation along with their household contacts in the Leprosy Reference Center.

Results: a total of 1279 school children were evaluated clinically and serologically, among those, 54 children presented positive serology. During reevaluation of the positive, 52 children and 232 of their contacts came to the service, and we identified 26 children with leprosy in the family. As a result, 37 contacts presented positive serology to ND–O–Lid which corresponded to 30 families of the school children reevaluated. After clinical evaluation only one contact was diagnosed with paucibacillary leprosy. None of the school children presented with the disease.

Conclusion: positive serology of the school children suggests there may be another source of infection in the peri-domiciliary environment, such as undiagnosed M. leprae–infected, therefore, the surveillance of leprosy cases should be expanded to individuals that consist of neighborhood and social contacts. The result suggests that contacts with positive serology should be evaluated prospectively for the disease.

Palavras-chaves: School children, leprosy, NDO–LID–1
Agência de Fomento: CNPq

Keywords:
ILC4.4-027
Early Detection and Transmission Workshop
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Objectives: Remarkable progress has been made in the treatment and
management of leprosy over the last 60 years. Current control strategies rest on
early detection of disease and appropriate multidrug therapy (MDT) to cure the
patient and halt transmission within the community. These strategies are built
on a solid understanding of therapeutics for mycobacterial diseases but suffer
from an incomplete understanding of transmission of Mycobacterium leprae and
ashortage of tools that can truly diagnose leprosy at an early stage. Accordingly,
transmission continues in many areas of the world. This workshop will present new
approaches for improving diagnostics and reducing M. leprae transmission.

Methods: Presentations include 1) Field Evaluation of Novel Immunodiagnostic
Tools for Early Detection of Leprosy in BCG Vaccination Field Trial amongst
Contacts of Leprosy Patients, 2) A comparison of three types of targeted,
community-based health education aimed at promoting early detection, 3)
A Molecular Assay for Determining Mycobacterium leprae Viability in Tissues
and its application to clinical samples and 4) A participatory, translational, social
science pilot study to inform earlier detection and reduced transmission. A panel
discussion will follow the presentations.

Results: Inform workshop participants of new directions for promoting earlier
diagnosis of leprosy and interventions that hold promise for improved
management of patients and contacts with resultant reduction of transmission.

Conclusion: The next steps needed to reach zero transmission of M. leprae
include: 1) Improved diagnostics that allow earlier detection of infection and
disease and 2) A clearer understanding of the transmission dynamics in various
settings. This workshop will address both aspects by presenting new approaches
currently underway through research projects funded by the Leprosy Research
Initiative.

Keywords:
ILC4.5-001
Business Intelligence (BI) to verify and validate the indicators of the Leprosy elimination as a public health problem in MDG Target 6 in Brazil
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OBJECTIVE: To describe the use of an application tool on the web, developed in BI environment (Business Intelligence) to supports the process of monitoring and evaluation to reaching the Millennium Development Goal 6 related to neglected tropical diseases: eliminating leprosy as a public health problem.

CASE DESCRIPTION: In 2015, the Ministry of Health (MOH), through the Leprosy General Coordination and Disease in Elimination Surveillance Secretariat of Health (CGHDE / SVS) and the Information Department of SUS Executive Secretariat (DATASUS / SE ), has invested in more efficient and effective processes, such as the use of Information Technology (IT) tools in BI environment. This tool was developed to organize, analyzing, sharing and monitoring data and Leprosy information collected from the compulsory notifications stored by the Database the national information system (SINAN). The reports are proposed, taking the point of view the use of Information Technology (IT) in BI environment, contributes to better management of leprosy control program in all three levels of government.

RESULTS: The process used by the BI tool, passes by extracting data from leprosy cases of Notifiable Diseases Information System (SINAN), store in a Data Warehouse (DW), and make available the results to decision makers using panel data on the web (dashboard) and printed reports in spreadsheet or text format. Currently, only the MoH through CGHDE / SVS have access to BI, it is not given direct access to state and municipal managers or health facility,
however, they receive from the Health of the Ministry information extracted and organized according to the indicators of the base of SINAN in different formats, through the reports. The BI tool generates nominal and quantitative reports according to operational category MB and PB. The reports of patient records on treatment and defaulters showed a large number of records that need to be updated, which can directly cause a false increase in prevalence rates.

CONCLUSION: The BI reports allow to verify and validate the indicators of M & E especially in terms of prevalence rates to eliminate leprosy as public health problem, with data quality and health services when the reach the goal of the 6th Millennium Development Goal.

**Keywords:** Business Intelligence (BI), leprosy information systems, MDG Target 6, biomedical technology, Neglected Tropical Disease
ILC4.5–002
EFFECTIVENESS OF INTEGRATED NTD CASE FINDING AND DISABILITY MANAGEMENT: A PILOT PROJECT IN ZAMFARA STATE, NIGERIA
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Introduction:
Zamfara state is located in North-west Nigeria with a population of 3, 278, 873 (2006 census), 70% of which live on <$1.25 per day (IFAD). It is an NTD–endemic state. In 2015, it notified 296 new cases of leprosy of which 10.0% had WHO grade 2 disability while 12.1% were children. According to the Nigeria National NTD Programme, community mapping of Lymphatic Filariasis (LF) in Zamfara State showed a high burden of the disease as it was found to be endemic in 13 out of the state’s 14 LGAs. These diseases constitute a major cause of physical disability in the state.

Objectives:
To assess the effectiveness of integrated approach to NTD service delivery in communities of high prevalence in Zamfara State.

Methods:
Close collaboration meeting held between the TBL and NTD Control Programmes to foster coordination and ownership of a joint NTD programme. Target communities were mobilized and sensitized to conduct intensified Leprosy and LF case finding including universal WASH and prevention of disease; 100 Community Volunteers were trained to identify & refer leprosy and LF cases for diagnosis and treatment; 30 health workers trained in leprosy and LF; 2 designated PHCs renovated and equipped to provide specialized leprosy and LF services including disability access; assistive devices (5 wheel chairs, 50 crutches, 155 protective sandals, 17 moulded shoes) were provided and distributed to people affected by leprosy and disabilities; 10 integrated self care groups trained to provide community based management of leprosy and LF disabilities.
Results:
A total of 240 new leprosy cases were detected which include MB Adult (207 or 86.3%), MB Child (29 or 12.1%), PB Adult (4 or 2%), GD2 (15 or 6.3%), Female proportion (106 or 44%) and Reaction cases (55 or 23%). A total of 79 new LF cases were also detected which include hydrocele (28 or 35.4%), limb swelling (51 or 21.3%) All cases were initiated on chemotherapy and/or referred to a referral centre for appropriate attention.

Conclusion:
The integrated approach resulted in improved case-notification of leprosy and LF cases during the pilot project in Zamfara state. Efficient use of scarce human and other health resources as well as effective community engagement are essential for successful programming. We recommend that the national programme repeat this pilot scheme in other states/zones in the country with a view to adopting its core components in routine programming nationwide.

**Keywords:** INTEGRATED, CASE FINDING, DISABILITY, MANAGEMENT, PILOT
ILC4.5–003
Elimination of Lymphatic filariasis (NTD) ..... Dream or Reality – An evaluation of Mass Drugs Administration (MDA) 2015 in Bihar, India.
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Background: India contributes 40% of the global disease burden and accounts for 50% of people being at risk of infection. Nine Indian states including Bihar, Odisha and Uttar Pradesh contribute 95% of the total disease burden. The WHO aims to eliminate LF globally by 2020. India has set itself the target to eliminate LF by 2015. However, it is predicted that India is very likely to revise its elimination target. Bihar has so far completed nine cycles of MDA.

Objectives: To evaluate the rate of drug compliance in the population covered under MDA during the 8th phase in three districts of Bihar.

Methods: LEPRA has its programme implementation in Leprosy, Lymphatic Filariasis, and Blindness control in 12 districts of Bihar. LEPRA widely involved in morbidity care of Disabled person due to Lymphatic Filariasis and leprosy in four districts of Bihar. MDA campaign has done in three LEPRA districts of Bihar out of four implementing districts. Samastipur has not done the MDA campaign due to shortage of drugs.

The evaluation was undertaken in collaboration with the officials of the Bihar government’s filariasis programme and Lepra Society. The team used survey format given by WHO, to undertake the field evaluation of MDA after 10 days of the MDA campaign. We have only added the male and female column to know separate percentage. The survey data has been checked by supervisors and submitted to the District Filariasis Officers for their endorsement. 10% cross checked has been done by senior member of LEPRA Society.
Results: 31% people (Male and Female) has consumed the MDA drugs in total population. 33% female have consumed the MDA drugs in total population. 35% people (Male and Female) have consumed the MDA drugs in Urban population. 36% female has consumed the MDA drugs in urban population. 31% people (Male and Female) has consumed the MDA drugs in rural population. 33% female has consumed the MDA drugs in rural population.

Conclusion: The evaluation thus revealed poor MDA coverage along with low drug compliance in both rural and urban areas; lower drug compliance in rural areas. In addition, the evaluation revealed that planning for the MDA was very poor. There are very less time for any preparatory activities like health education campaigns and training of health workers. As a result, some districts did not observe the MDA campaign on the prescribed day.

**Keywords:** MDA, Evaluation, Drug, Elimination, Rural
ILC4.5–004  
Mapping cases and morbidity for diseases such as leprosy and Buruli ulcer: a new approach  
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Objectives  
Random sample surveys have been widely used to create prevalence maps of certain neglected tropical diseases (NTDs), in order to guide the implementation of mass drug administration (MDA). Other NTDs, including leprosy and Buruli ulcer, are not susceptible to MDA and require individual case management (CM). Because these diseases are less common and often occur in clusters, random sample surveys are inappropriate. The objective of this study was therefore to develop and validate an alternative, low-cost method of mapping CM–NTDs.

Methods  
New cases of leprosy and Buruli ulcer are routinely registered using standard reporting forms and district registers. Basic details including disability present at diagnosis and place of residence are recorded. We used information from these registers in Ghana to compile a dataset of all cases occurring in 2014, including certain clinical characteristics at diagnosis and their place of residence; place of residence was geo-referenced using a variety of online mapping tools. This new dataset was used to construct a variety of maps showing the distribution of new cases, cases with disability and areas where the diseases overlapped. Information about patients with complications of lymphatic filariasis (lymphedema and hydrocele) was available from drug distribution records, and could be added to the maps.

Results  
Maps produced in Ghana will be presented.

Conclusions  
The goal of this initiative is to encourage mapping of CM diseases and their associated morbidity across Africa, using a standardized approach. The maps that are developed can be used for advocacy, as well as to develop appropriate morbidity management interventions in affected communities; co-morbidities will be easily identified, allowing the training and interventions to be adapted as needed. The final goal of this process is better case management for the target diseases, in particular, the prevention and management of morbidity.

Keywords: leprosy, mapping, morbidity, NTDs, interventions
**ILC4.5-005**
The accuracy of the clinical and microbiological diagnosis of Buruli ulcer


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Objectives: In most BU endemic settings the diagnosis of Buruli ulcer (BU) is often made on clinical and epidemiological grounds only. However, the disease presents with a diverse range of clinical symptoms and, due to possible confusion with other skin diseases, the microbiological confirmation has an important added value. The available laboratory tests in order of reported increasing sensitivity are culture, direct smear examination (DSE) for acid-fast bacilli, and, finally, histopathology and PCR targeting the insertion element IS2404, which are reported to have similar sensitivities. In settings where the number of BU cases is declining, clinical expertise will wane, likely resulting in more misclassification of patients with lesions compatible with BU. In a prospective study on the differential diagnosis of BU we therefore aim to establish the optimal diagnostic approach for BU suspect lesions, as well as the improved identification of patients with alternative diagnoses.

Methods: In two BU treatment centers of Benin patients with BU-like presentations (including non-BU) were recruited. All participants were documented by mycobacteriological analyses and histopathology.
The accuracy of each test was estimated using three different reference standards: PCR, a composite reference standard and a latent class analysis (LCA). The composite reference standard included a final diagnosis by a clinical expert panel based on the history, physical exam, photos and treatment outcomes of the patients with a doubtful diagnosis. LCA allows us to calculate the contribution of each test to the final diagnosis.

Results: A total of 240 patients was included in the study. The accuracy estimates were similar for the three reference standards. In order of increasing:
• sensitivity: DSE, histopathology, PCR and clinical diagnosis;
• specificity: clinical diagnosis, histopathology, PCR and DSE.
Importantly, preliminary findings suggest that the clinical suspicion of BU may not be broad enough, as approximately 15% of clinically “non-BU” skin lesions turn out to be caused by Mycobacterium ulcerans by PCR and/or histopathology. This has important implications for the diagnosis of BU in endemic regions, even by experienced clinicians.

Conclusions: Based on the findings of this study, we will design an algorithm for an improved clinical and microbiological diagnosis of BU and adequate management of patients. By improving the differential diagnosis of BU, we expect that more BU cases will be detected, and that effective management of BU and non-BU patients will enhance patient comfort and outcome, while preserving more toxic antimycobacterial drugs for those who need them.

**Keywords:** Buruli ulcer, diagnosis
ILC4.5–006
Integrated Strategy for Case Management of five Neglected Tropical Diseases (Buruli ulcer, Human African Trypanosomiasis, Leishmaniasis, Leprosy and Yaws) in the WHO African Region.
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Objectives
Further to the adoption of resolutions on Neglected Tropical Diseases (NTDs) by the World Health Assembly and the Regional Committee for the WHO African Region, an integrated strategy for addressing case management NTDs (Buruli ulcer, Human African Trypanosomiasis, Leishmaniasis, Leprosy and Yaws) is being promoted by the WHO Regional Office for Africa (AFRO). The objective of this integrated strategy is to contribute to the achievement of the Global NTD roadmap targets and goals by 2020, which include elimination of leprosy and human African trypanosomiasis, eradication of yaws and control of Buruli ulcer and leishmaniasis. The rationale behind this strategy is the high burden of case management NTDs in the African Region and reducing available resources and support for supporting the control and elimination of these five NTDs.

Methods
For the promotion of the integrated strategy for five case–management neglected tropical diseases (CM–NTDs) a strategy document was developed in 2014 by a group of CM–NTD National Programme Managers, Experts and WHO Staff members. This strategic document was accompanied by revised terms of reference and modus operandi of the NTD Regional Programme Review Group for Preventive Chemotherapy to include some items for a sub–group on Case Management. Later in 2015, three guidance documents on CM–NTDs were further developed by the same group of Programme Managers, Experts and WHO Staff. These three guidance documents are as follows:
• A manual on five case management NTDs for use by peripheral health workers
• A guide for supervision to be used by health district managerial teams
• A guide for monitoring and evaluation of case management NTD Programmes
Results
Five documents were developed and finalised in French and then translated into English and Portuguese for dissemination and use in Member countries of the African Region. This dissemination was initiated during the first regional meeting of CM-NTD National Programme Coordinators and Managers and first meeting of the CM-NTD Sub-group of the Regional Programme Review Group. Some countries (Central Africa Republic, Gabon, Liberia and Malawi) were proposed to receive support and pilot the use of these documents for integrating CM-NTD case finding and treatment in health districts.

Conclusions
With the adoption of the integrated strategy for case management neglected tropical diseases and dissemination of guidance documents, the WHO Regional Office for Africa aims to implement more effective and efficient approaches for addressing these five diseases and achieve the 2020 NTD goals in the Region.

Keywords: Integration, Strategy, Neglected, Tropical, Diseases
**ILC4.5-007**

School-based survey for neglected tropical diseases presenting skin symptoms (skin NTDs) in Côte d’Ivoire: project implementation and preliminary results

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Background Many neglected tropical diseases (NTDs) - such as leprosy, Buruli ulcers, and leishmaniasis - present with skin symptom(s) (skin NTDs) and have overlapping geographic distributions. This characteristic feature may play a key role in early detection and treatment of this set of diseases by fieldworkers in endemic areas as skin symptoms can be easily detected with careful observation and awareness. We aim to leverage fieldworkers to implement a school-based skin survey for skin NTDs in Adzopé health district, Côte d’Ivoire, a country with the highest reported number of Buruli ulcer cases globally.

Objectives To establish school-based skin survey for early detection and treatment of skin NTDs and to describe the distribution and the disease burden of these diseases in Côte d’Ivoire.

Methods This program took place in Adzopé health district, Côte d’Ivoire from 16 November 2015 to 13 January 2016, and consisted of two steps: 1) after obtaining parental consent, a team of village nurses examined all primary school children aged 5 to 15 in a total of 50 schools (38% of all schools in the district). They selected those presenting with any skin lesion(s): rash, ulcers, warts; 2) two dermatologists then visited the schools and examined the selected children for diagnosis and management. Mass chemotherapy with albendazole was offered to all screened children during step 1.
Results We screened a total of 13,019 children. Among them, 3,504 (27%) presented with a skin lesion(s). 1,212 children were then consulted with the dermatologists. Not all children on the list could be consulted due to financial constraint in purchasing medications and unavailability of dermatologists. The majority of diagnoses were fungal infection (n=1,163), followed by scabies (n=15). One leprosy case in a 12-year-old girl, multi-bacillary type before disability development, was detected. Treatment was provided for all diseases other than tinea capitis. Tinea capitis was omitted from treatment target due to its large number and its potential for natural healing after adolescence. The program had a high rate of acceptability. Very few targeted children were not given albendazole chemotherapy because of parental refusal (n=56).

Conclusions This was the first attempt at an integrated, multi-NTD screening and diagnosis in the country. We plan to expand the project to a wider region, especially with higher prevalence of these diseases, to explore its potential as an effective integration strategy for NTDs. This would have implications for the neighboring countries with a similar context as in Côte d’Ivoire.

Keywords: epidemiology, integration, neglected tropical diseases, schoolchildren, sub-Saharan Africa
ILC4.5-008
Profile of Tuberculosis in patients attending a Leprosy hospital in Rural India
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Introduction
Tuberculosis is a disease of the poor causing significant morbidity and mortality in low and middle income societies. India ranks first among the high-burden countries and contributed 24% of the estimated global incident TB cases and about 20% of global TB-related deaths in 2013. The Leprosy Mission Hospital in Purulia caters to the rural poor in West Bengal and neighboring state of Jharkhand. Thus, poverty determined illnesses like TB and leprosy are diagnosed here. In this study we attempted to analyze the sociodemographic and disease profile on registered TB patients from January 2015-December 2015.

Methodology: A retrospective chart study was done on 70 registered TB patients who refused referral to government and chose to continue treatment at the hospital. Demographic and disease profile data was collected and entered in Microsoft Excel and analyzed.

Observation: 77% (54) reported from within the state, Male female ratio was 1.6:1 in the entire cohort, however in the pediatric age group this ratio was 1:2 (4:8). 17% (12) were less than 15 years of age, 58% (41) were in the productive age group of 25 to 45. Pulmonary TB was 44% (31) with 10 (32%) sputum Positive for acid fast bacillus. Extra pulmonary TB ranged from 24% (17) Lymphadenitis, 20% (14) bone comprising of dactylitis (2) spine (6), Hip (1) and ankle (5). There were 3 pleural effusions, 1 miliary TB and 1 abdominal TB. Skin TB 7 % (5) was seen in the form of Lupus vulgaris, Tuberculid and verrucous TB. 2 children reported with tuberculomas. None of the children had BCG scar. 4 patients were leprosy affected on steroids for Type 2 reactions, 1 patient had sputum positive PTB on steroids for Pemphigus. 100 % adult males and 54 % adult females were addicted to tobacco or Bidi.

Discussion- Children are vulnerable since home deliveries continue resulting in missing out on the protective BCG vaccine. More female children with TB imply neglect and malnutrition. Extrapulmonary TB is difficult to diagnose and require Xrays, Biopsies, and CT scan to confirm. A large proportion of patients in the productive age group imply loss of wages and significant morbidity. Malnutrition and anemia further complicate problems. Multiple risk factors like BCG vaccination, poverty, malnutrition, tobacco use, hygiene and overcrowding need to be addressed.

Keywords: Tuberculosis, leprosy, poverty
ILC4.5-009
Cutaneous Leishmaniasis Misdiagnosed as Borderline Tubercloid Leprosy: A Case Report
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Objective:
Though Nepal is an endemic focus for visceral leishmaniasis, a minority present the cutaneous form of disease. Leprosy and cutaneous leishmaniasis (CL) share some similarities in clinical presentation. To present a case report of misdiagnosis of cutaneous leishmaniasis as borderline tubercloid leprosy (BT).

Methods:
Patient's medical chart review

Case History:
A 53 year old male, initially, had a pea sized nodule on the right lateral aspect of his nose which progressed gradually to become an erythematous, raised, indurated, ulcerated, irregular shaped plaque with well-defined borders of about 10 X 8 cm in size, expanding further to cover the whole nose over 6 months. His travel history included a 7-months stay in India 5 months prior to clinical presentation in Nepal. Initially clinically diagnosed as BT leprosy at a peripheral center, he received six months standard WHO paucibacillary (PB) multidrug therapy (MDT) along with prednisolone for type I reaction management. The patient did not respond to treatment and was subsequently referred to leprosy hospital. Slit skin smear for acid-fast bacilli and a rK39 test for visceral leishmaniasis were negative. Following skin biopsy histopathology report, a diagnosis of CL was confirmed; and the patient was treated with intravenous Amphotericin B after which he began to demonstrate signs of recovery. After the course of Amphotericin B, the patient was started with weekly intra-lesional Sodium Stibogluconate for four weeks. The total time from first clinical presentation to CL diagnosis was 8 months.

Conclusion:
Both leprosy and cutaneous leishmaniasis are linked to areas with combinations of poor socio-economic conditions. Although CL is a less common form of leishmaniasis, its clinical presentation can be confused with leprosy. Skin biopsy histopathology can be used in differential diagnosis.

Keywords: cutaneous leishmaniasis, Nepal, leprosy, prednisolone, misdiagnosis
Are intestinal worms relevant to leprosy clinical care and outcomes: investigations of soil-transmitted helminth occurrence in Nepalese leprosy patients

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Objectives:
More than 94% of new leprosy cases originate from areas endemic for soil-transmitted helminths (STH), including all 18 countries reporting > 1000 new cases annually. A growing body of evidence demonstrates that STH infections wield significant systemic influence through long term immune modulation, proven relevant in chronic immunopathologies such as HIV, TB, malaria and allergy. Although research has indicated chronic STH co-infection is associated with increased risk for higher bacillary loads, impact relevance to other clinical outcomes is unknown. We are performing investigations to assess the occurrence of STH co-infection in relevance to clinical outcomes across the leprosy spectrum, before or during multi-drug therapy (MDT) or with immune complications.

Methods:
Across 145 patients of varied leprosy clinical subtypes, stool and blood samples were collected for routine and molecular parasitological and immunological assessments at intake and, as possible, quarterly for up to 9 months. Real-Time Polymerase Chain Reaction (RT-PCR) was employed to detect STH species endemic to Nepal: Ascaris lumbricoides (Al), Ancylostomaduodenedale (Ad), Necatoramericanus (Na) and Strongyloidesstercoralis (Ss). Other patient information was collected during interview using a customized questionnaire and medical chart review.
Result:
Of 145 total patients at intake; the male female ratio was 2.7:1 (106:39); 115 (79.3%) were multibacillary (MB); 78 (53.8%) were in reaction. Seventy-nine (54%) patients demonstrated RT-PCR evidence of >1 STH at intake, while microscopy methods only detected 6 cases (8% of all RT-PCR+). Eleven patients (8%) evidenced eosinophilia, of which 6 (55%) were RT-PCR+ for >1 STH. Incidence of STH species at intake was as follows: A. (34%), A o (17%), S. (18%) and Na (5%). More than 10% of STH+ patients hosted >2 species.

Conclusion:
Increasing evidence indicates that chronic STH immunological subversion effects can be associated with clinical outcomes alongside various immunopathologies. Despite ongoing national deworming campaigns in Nepal, 54% of leprosy patients tested were STH+ for >1 species. Stool RT-PCR is a more accurate tool for detection of STH infection than routine microscopy. Other analyses are ongoing for comparison of leprosy clinical factors, immune responsiveness and their relevance to STH co-infection status.

Keywords: Leprosy, Soil-transmitted Helminths, Real – Time PCR, Stool, Nepal
The minimILC4.5–011
Tuberculosis Co-infection in Leprosy Patients: A decade of retrospective study in Anandaban Hospital of Nepal
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Objective:
Both Mycobacterium tuberculosis (Mtb) and Mycobacterium leprae (Ml) infection are endemic in Nepal. While not uncommon to clinical practice, studies involving leprosy patients also diagnosed with tuberculosis (TB) are limited. In our study we aim to determine the occurrences of tuberculosis (TB) in leprosy patients across the spectrum and their clinical consequences.

Method:
Patients diagnosed with Mtb concurrent to or after diagnosis with MI were retrospectively reviewed from medical charts from 2004 through 2013 at Anandaban Hospital, a leprosy referral hospital in Nepal.

Results:
A total of 2831 leprosy patients were registered in the Medical records during 2004 to 2013. Among them 17 leprosy patients developed TB during (41%) or after (59%) anti-leprosy treatment. Most cases were male (70%) with an average age of 40 years (range 18–84 years old). Of these, 35% of patients were diagnosed with pulmonary TB and 65% with extra-pulmonary TB. The extra pulmonary cases included bone and joint, skin, gland and meningial TB. While TB infection was diagnosed in patients across the spectrum of leprosy, 71% of the TB infections developed in borderline lepromatous (BL, 12%) and lepromatous leprosy (LL, 59%) cases. Among them 67% of BL-LL and 47% of total cases were under steroid treatment for leprosy reaction at the time of TB diagnosis. The average duration of steroid treatment was 2 years (Range 6 months to 5 years) at TB diagnosis.

Conclusions:
Despite partial cross immunity, Mtb and MI infections in the same patient do occur in co- endemic populations, more frequently developing in BL/LL forms. Prednisolone or other immunosuppressive drugs for management of leprosy reactions can make these patients more susceptible to TB. As Rifampin is used monthly in leprosy multi-drug therapy, proper screening for TB at the time of leprosy diagnosis or leprosy reaction management may help in early detection and proper treatment of TB in leprosy patients.

Keywords: Leprosy, Tuberculosis, Co-infection
ILC4.5-012
Comparison Between Two Ways To Recruit The Leprosy Household Contacts: From Index Cases And From Anti-PGL1 Serology
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Since the transmission of the bacillus M. leprae is exclusive from man to man, the transmission chain can only be broken by treatment strategies of the patient and the clinical examination of your contacts.

Objective: Report experience with two forms recruitment of leprosy suspect individuals for clinical examination.

Methods: (ModeA): Eight patients reported with leprosy, already in treatment, were invited to present themselves at the health center bringing their contacts to clinical examination performed by dermatologists. (ModeB): During campaign individuals presented yourself spontaneously to clinical examination, after medical appointment was collected peripheral blood to perform ELISA-assay to search for antibodies against PGL-1. After 6 months, ten individuals who had not been diagnosed with leprosy in the prior examination and showed high positivity (≥2) in the ELISA were invited to perform second clinical evaluation with their contacts. Modified Ridley–Joplin classification was used to classify leprosy cases in Indeterminate(1), borderines: tuberculose(BT), borderline(BB), lepromatous(BL) and lepromatous-leprosy(LLL) clinical forms.
Results: The patients enrolled (ModelA) brought average of two contacts (maximum 5, minimum 1), accounting for 18 contacts examined, of which eight (44.44%) were diagnosed with leprosy (1 BT, 5 BB and 2 BL). Noteworthy the case of a patient, in treatment to 3 months, five contacts were examined: a child was diagnosed BL, leprosy, and daughter and grandson as BB. All ten patients with anti-PGL >2 (ModelB), were re-evaluated by the dermatologists, five of them were diagnosed with leprosy (4 BB and 1 BL), two of these patients reported unaware leprosy contacts. Only five of the ten individuals brought contacts, and a total 16 contacts were examined an average of three contacts per individual (maximum 5, minimum 2). Among them, eight (50%) patients were diagnosed (1 I, 6 BB and 1 BL). In this group we highlight the case of a lady: in the reevaluation she was diagnosed as BB, examining her contacts, daughter, son, grandson and great-granddaughter were diagnosed as BB, and her husband as BL. This lady had been treated in 2005, and none of her contacts had been examined at the time. Another case of this group is a boy.

Conclusions: Certainly the examination of contacts from a new case is of great importance for the control of transmission. The anti-PGL–I proved to be a valuable tool to direct the search of new leprosy cases.

**Keywords:** Leprosy, Examination of household contacts, Surveillance, anti-PGL1
ILC4.5-013
Combined Health Campaign: a successful strategy to face Leprosy, Trachoma and Soil-transmitted helminths (STHs)


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Background: Leprosy, Trachoma and STHs are part of a diverse group of communicable NTDs common in low-income populations without access to clean water, adequate sanitary conditions, and health education. Aligned with the proposal of an integrated plan of strategic activities of surveillance, the Brazilian Ministry of Health conceived a combined health campaign to face these diseases in an integrated approach which target school-age children, from 5 to 14 years old, enrolled in state and municipal public schools.

Objectives: The campaign had three main goals: i) investigate signs and symptoms of leprosy in at least 75% of the students through the use of self-screening forms; ii) provide chemoprophylactic treatment for STHs to at least 85% of school-age children from 5 to 14 years old; and iii) examine at least 80% of students for trachoma and active search and provide treatment for positive cases and its contacts.

Methods: Priority municipalities were selected based on epidemiological criteria combined to the Brazil Without Poverty Plan. The strategy for leprosy and trachoma consisted of active search for new cases detection by using self-screening forms and external eye examination, respectively. Leprosy suspect cases were referred to health units. Trachoma positive cases and household contacts were treated with single-dose azithromycin. For STHs, supervised administration of albendazole was performed.
Results: As a result, a total of 2,292 municipalities participated in the third Campaign edition (2015). From those, 85% (1,942) were selected as priority municipalities and received specific funds for this action. Compared with results obtained in previous years (2013 and 2014), there was an expansion of more than 269% to 2013, where the campaign was implemented in 852 municipalities, and more than 117% to 2014, which counted with 1944 municipalities. In total, more than 1.1 million children were examined for leprosy and 272 students had the diagnosis confirmed after clinical evaluation. 5,475,936 children were chemoprophylactically treated with albendazole for STHs with rare and mild adverse reactions. Trachoma active search was performed in 900,873 students, with 24,042 cases diagnosed. Positive cases and contacts were treated with azithromycin, totaling 61,944 treatments.

Conclusions: The combined national campaign integrated diseases with potential of elimination as public health problems and optimized human, financial and material resources. In its three editions, the campaign allowed the dissemination of information on signs and symptoms of leprosy, trachoma and STHs, and granted the increase in timely diagnosis, reduction of STHs and Trachoma burden, as well as physical disabilities risks.
IILC5.1-001
Leprous Neuropathy Screening: Field Testing of Sensory Testing Devices in Ecuador
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Objectives:
Leprous neuritis represents an important cause of disability worldwide. Screening is typically performed with Semmes-Weinstein monofilament (SWMF) or ballpoint pen testing (BPT). However, important rates of underdiagnosis have been reported with these modalities. The PressureSpecified Sensory Device TM (PSSD) has emerged as an effective way to assess peripheral nerve function. We aimed to determine the diagnostic accuracy of these three screening modalities.

Methods:
A cross-sectional study analyzed a consecutive sample of patients screened for Leprous neuritis during a mission trip to Los Riós, Ecuador. Patients meeting the WHO criteria for Hansen’s disease and complaining of neuropathy symptoms were classified as Leprous neuritis patients. Patients without any sign of Hansen’s disease were used as controls. The same investigator performed bilateral ulnar nerve screening with the PSSD, SWMF (0.07g, 0.4g, 2g, 4g, 10g, 300g) and BPT in all patients. Sensitivity and specificity were calculated and compared across tests.

Results:
A total of 71 patients (142 nerves) were evaluated. The mean age of the population was 39.4 ± 20.1 years. Three (4.2%) patients were excluded due to a potentially confounding cause of neuropathy (diabetes). Compared to the 10g SWMF and the BPT, the PSSD was found to have significantly higher sensitivity (78.3% vs. 0% with p<0.001, for both) with comparable specificity (97.8% vs. 100% with p>0.999, for both). Compared to the 0.07g SWMF (lightest in our series), the PSSD showed similar sensitivity (78.3% vs. 65.2%, p=0.514) but significantly higher specificity (97.8% vs. 51.1%, p<0.001).

Conclusions:
The PSSD provides optimized diagnostic accuracy for detecting leprosur neuritis compared to SWMF and BPT. Future prospective studies should assess the impact of early leprosur neuritis management and should aim to determine the inter-rater variability associated with PSSD screening.

Keywords: Quantitative Sensory Testing, Pressure Specified Sensory Device, Semmes-Weinstein Monofilaments, Neuropathy Screening
ILC5.1–003
Early detection of neuropathy in leprosy: A comparison of five new tests in field settings
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Objectives: Early detection and treatment of neuropathy in leprosy is important in the prevention of disabilities. The INFIR study showed that 12 weeks before nerve function became abnormal with monofilament tests (MFT), Nerve Conduction Studies (NCS) and Warm Detection Thresholds (WDT) were already affected. These two methods are promising for early detection of neuropathy. However, they require climate-controlled rooms and highly trained staff, are very expensive, and are therefore not practical to use under field conditions. Our aim was to find and field-test alternative test methods and compare their ability to detect neuropathy at an early stage.

Methods: Through a literature search we identified five tests that appeared simpler, more affordable, portable and/or battery operated: the Neuropad®, Vibratip™, NC–Stat® DPN–Check™, NeuroQuick and the Thermal Sensibility Tester (TST), assessing respectively sweat function, vibration sensation, nerve conduction, cold sensation and warm sensation. In leprosy patients in Bangladesh, the posterior tibial and sural nerves that tested normal for MFT and voluntary muscle test (VMT), were assessed with the reference standard tests NCS and WDT. The new instruments were then tested on 94 nerves with abnormal WDT and/or NCS results and on 94 unaffected nerves. Sensitivity and specificity were the main outcomes.

Results: The NeuroQuick and the TST on the sural nerve showed the highest sensitivity and specificity (>80%), followed by the Neuropad®, NC–Stat® DPN–Check™ and Vibratip™. On the posterior tibial nerve the NeuroQuick and the TST also showed better sensitivity.

Conclusions: The NeuroQuick and TST should be further tested in the field for reliability and reproducibility, and the costs and options for further development and production should be studied.

Keywords: Subclinical neuropathy, Early detection, Field-test, Warm detection threshold, Nerve conduction studies
ILC5.1–004
Early diagnosis of sub clinical nerve damage in leprosy
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Disability and deformities are synonymous in leprosy. This is because of involvement of peripheral nerves. Till today we don’t have any diagnostic method which can predict the sub clinical nerve damage. We at Jala tried the electrophysiology (nerve conduction) and thermal sensations of ulnar, median, posterior tibial and sural nerves in leprosy cases who is freshly diagnosed and no NFI. Total 730 cases are under taken in this study. 260 cases showed the increased in latency and decreased in sensory and motor conduction velocity and amplitude. While the thermal sensation also decreased from normal in all these cases, these 260 cases were followed up for further one year and 102 cases developed the NFI. The electrophysiological parameters and thermal sensory sensations used as diagnostic predictors for NFI.

WE WILL PRESENT OUR PRELIMINARY OBSERVATIONS OF 730 CASES IN THIS PAPER.

Keywords: amplitude, latency, conduction, peripheral, nerves
ILC5.1-005
The Prevalence Of Neuropathic Pain And Its Impact On The Functional Capacity And Psychological Wellbeing Of Leprosy Patients In Indonesia
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Objectives
Neuropathic pain (NP) is a recognised complication of leprosy. In this study, we assessed treated leprosy patients to:
1. identify patients with NP using the Douleur Neuropathique 4 (DN4) criteria as a screening tool.
2. assess the intensity of NP and its effects on the day-to-day activities.
3. assess the impact of NP on patients’ functional capacity.
4. determine whether NP affects patients’ psychological wellbeing.

Methods
A cross-sectional study was carried out and 71 leprosy patients who have completed their multi-drug treatment were recruited from a hospital in Indonesia. All patients had a detailed history and neurological examination. Four questionnaires were administered:
1. DN4 Questionnaire to identify patients with NP.
2. Brief Pain Inventory (BPI–short) to assess the burden of NP and its effects on the daily activities.
3. Salsa (short) Questionnaire to assess the impact of NP on patients’ functional capacity.
4. General Health Questionnaire (GHQ–12) for their psychological wellbeing.

Results
Eighteen (25.4%) patients, (13 males, 5 females), mean age 39.6 years, were diagnosed with NP. The mean DN4 score was 5.1/10. The commonest symptoms were numbness (100%), burning sensation (83.3%) and touch hypoesthesia (83.3%). All patients with NP in this study had thickened ulnar nerves. The nerves affected are ulnar, lateral popliteal and median nerves in combination causing motor and sensory loss in all 18 patients. Fourteen (77.8%) had tender nerves, mainly affecting the ulnar nerve.
All NP patients had multi-bacillary leprosy and 14 (77.8%) had WHO Disability Grade 2. Thirteen (72.2%) had claw deformity in their hands and/or feet. Two (11.1%) had tender skin lesions and 4 (22.2%) had trophic ulcers. Six (33.3%) had on-going ENL reactions and one with neuritis. The mean BPI scores for the intensity of NP at its worst was 8 (severe) and mood and sleep were worst affected by pain. Twelve (66.7%) with NP reported moderate to extreme limitations of their daily functions on the Salsa questionnaire. Seventeen (94.4%) had psychological morbidity on GHQ-12 with a score of 4 or more, attributing their symptoms to their on-going pain. Nerve thickening and Salsa score were the two most statistically significant variables associated with NP.

Conclusion
The prevalence of NP in Indonesia in a treated patient cohort was 25.4% and it is a disabling condition, which should be diagnosed early to prevent physical and psychological morbidities impacting on the patients’ quality of life. Need to extend this study with a larger sample size.

**Keywords:** Leprosy, Neuropathic Pain, Pain intensity, Functional limitations, Psychological Morbidity
ILC5.1-006
A retrospective analysis of incidence, risk factors and outcome of steroid therapy among 244 MB leprosy cases developed new disability during and after WHO-MDT in 10 districts of Maharashtra
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Objectives
Increased incidence of disabilities in leprosy cases after starting MDT are associated with several ‘risk’ factors and results in poor outcome, if detected late. Hence, detecting ‘early’ disability among ‘at risk’ leprosy cases and treating appropriately during and after MDT can prevent development of new disabilities. Study aims to assess the incidence of new disability, risk factors and outcome of steroid therapy in MB leprosy cases detected with ‘early’ disability and to measure the optimal duration of surveillance.

Methods
5,648 MB leprosy cases without disability (Grade 0) at diagnosis were registered as ‘at risk’ cases during April 2010 to March 2015 at Leprosy Referral Centres established under Leprosy Elimination Action Programme, supported by Anasvad Foundation, Spain. These cases were subjected to standard clinical and nerve function assessment as recommended by NLEP twice a year by trained health personnel for an average period of 1 to 5 years. Of these, 244 (4.3%) leprosy cases developed new disability (Grade 1 & 2) during and after MDT treated with a course of steroid therapy and supportive physiotherapy. A retrospective cohort analysis of demographic and clinical data of leprosy cases was done.
Results
The cumulative incidence rate of new disability among MB leprosy cases during and after MDT was 1.7 per 100 Person Years At Risk (PYAR). 64% were men and majority belongs to age group of 15 to 45 years (73%). Presence of 2+ thickened nerves at diagnosis (58%) and episodes of “lepra reaction and neuritis” (54%) were major “risk” factors. Most new disability occurred due to ulnar (60%) and posterior tibial (32%) nerve palsy. 55% of cases developed disability during MDT and 29% during 1 year after MDT. While disability status improved completely in 29% of cases with steroid therapy, it occurred mostly in claw fingers and insensitive foot.

Conclusions
Although incidence rate of disability is low as compared to other prospective studies, it highlights the significance of applying more sensitive methods to detect early disability and treat effectively. Predominance of male and multiple thickened nerves at diagnosis are the risk factors with high prediction for developing new disability during and after MDT. Need for proper management of lepra reactions and neuritis in field clinic settings is stressed. 3 years surveillance period of “at risk” leprosy cases from the date of diagnosis is recommended to detect and treat new disability effectively in order to reduce the disability burden.

Keywords: Incidence, Disability, Risk factors, Multibacillary, Surveillance
ILC5.1–007
Disability in People Released from Leprosy Treatment in Nigeria: Burden and Associated Factors
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Objectives: To assess the extent of disability and its determinants among leprosy patients after release from multi-drug therapy.

Methods: We conducted a cross-sectional survey of disability among persons affected by leprosy in Nigeria. We obtained lists from a rural hospital cohort register of all people affected by leprosy who had completed and been released from treatment in the past 5 years. Leprosy specialised health workers tracked the patients and assessed their present disability status using both the WHO disability grading and the EHF sum score. Bivariate analysis was done to identify factors associated with disability.

Results: We found 85 leprosy cases; of these 48 (56.5%) were ≤ 40 years, and 44 (51.8%) were females. At treatment completion, 49 (57.6%), 19 (22.4%) and 17 (20%) had grade 0, grade 1 and grade 2 disability, respectively - i.e., 36 (42.3%) had any disability at treatment completion. During the current survey, 52 (61.2%) had grade 0, 13 (15.3%) grade 1 and 20 (23.5%) had grade 2 disability. Overall, 33 (38.8%) of them had any disability. There was no difference in the rate of disability at treatment completion and at present (42.3% versus 38.8%; p = 0.64). There was no differences in the rate of disability according to duration since the patient were released from treatment (chi-square for trends 1.2; p = 0.28). Using the EHF sum score,
The mean (±SD) disability rate at treatment completion was 1.2 (±1.7), while the mean disability rate at present was 1.3 (±2.1) [mean difference; −0.1 (±2.0); p = 0.63] Determinants of having grade 1 or grade 2 disability among leprosy patients released from treatment included: age >40 years (OR 4.9, 95% C.I. 1.9 - 12.6), male sex (OR 2.8, 95% C.I. 1.1 - 6.9), and patients having >3 nerve trunk involvement (OR 3.1, 95% C.I. 1.1 - 8.7). However, corticosteroid use, marital status, receiving protective sandals, and type of lesion were not determinants of disability after release from treatment among leprosy cases.

Conclusions: A large proportion of leprosy patients who had completed treatment reported physical impairment after release from treatment. This justifies the need for the sustenance of monitoring of leprosy patients post-treatment to facilitate early prevention and improve quality of life post-treatment.

**Keywords:** Disability, Leprosy, Nigeria, Burden, Factors
ILC5.1-008
Borderline Leprosy Leading to Neural Injury and Amputation in a Liver Transplant Patient: A Case Report
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INTRODUCTION: Leprosy is a public health challenge in Brazil and cases involving transplant patients are still rare, but growing worldwide. We report a case of reversal reaction in a liver transplant patient who had treated Leprosy eight years before. OBJECTIVE: Describe a case report about a Borderline Leprosy reaction in a patient who, after a favorable evolution of a liver transplantation, had to amputate one of her foot fingers because of leprosy neuropathy. METHOD: Retrospective analysis of a leprosy patient’s hospital records of a high complex hospital in Brazil from 2004 to 2016.

RESULTS: This report describes the case of a 61-year-old Brazilian woman who had treated Borderline Leprosy twice (MDT-MB in 2004 and 2007, for 1 year and 6 months, respectively). In 2009 she underwent a liver transplantation from a cadaver donor, which did not show any evidence of leprosy, for a hepatocellular carcinoma and liver cirrhosis due to C hepatitis. In order to avoid organ rejection, she took Sirolimus, which inhibit the activation and proliferation of T-cells. She could not take Prednisone because of the risk of increasing C Hepatitis virus RNA levels. Despite adequate serum levels of Sirolimus, she has evolved, due to inflammatory neural injury, to anesthesia of the right sole, perforating plantar disease and finally amputation of the fifth toe of the right foot in 2015.
Reaction was confirmed by neural biopsy showing lymphomononuclear infiltrate permeating the endoneurium. Amputated piece was negative for alcohol–acid resistant bacillus (BAAR). Magnetic Resonance of right ankle showed discrete thickening of posterior tibial nerve. Currently patient is stable from the transplant point of view, with regular follow up, maintaining reduction of sensitivity in inferior right limb, but without signs of leprosy recurrence.

CONCLUSION: Neural injuries caused by reversal reaction and its inflammatory process can lead to loss of sensibility and/or motor skills in the related areas, causing sequelae like skin ulcers, edema and loss of strength. Treatment aims to induce immunosuppression in patients in order to reduce the inflammatory activity. We reported a case of reversal reaction quite resistant to immunosuppression, which fatefully led to an amputation and let lifelong sensitive and motor sequelae. It also shows that, although this patient had an adequate high complex care, an earlier primary care support could have prevented and avoided leprosy disabilities, which reinforces the importance of early diagnosis of this disease.

**Keywords:** Leprosy, Reaction, Transplant, Liver Transplant
ILC5.1–009
Comparison of Eye Hand Feet (EHF) Scores at the time of Leprosy Diagnosis and Release From Therapy (RFT)
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OBJECTIVE:
To study the extent of nerve function impairment (NFI) or any form of disability at time of diagnosis and release from therapy (RFT).

METHODOLOGY:
A retrospective cohort study of new leprosy affected patients registered for multi–drug therapy (MDT) who completed the full course of MDT either at Anandaban hospital or its satellite clinics during 2011–2015. World Health Organization (WHO) suggested disability grading scale from 0–2 and EHF score (minimum 0 to maximum 12) for eye, hand and feet for six sites were used for measurement of impairment. Standard Voluntary muscle test and sensory test (VMTST) was used to calculate the EHF score.

RESULT:
A total of 192 patients were included in the study among which 112 were male and 80 were female (1.4:1 ratio), with 37.5% (72) presenting as Paucibacillary (PB) and 62.5 % (120) Multibacillary (MB). At diagnosis, 33.3 % (64) of patients had either WHO grade 1 or grade 2 disability with 42.5% being MB patients and a further 3.65 % (7) developed disability during MDT. Significantly more patients with less than one year duration of symptoms prior to diagnosis had no disability at all compared to those who had more than one year duration of symptoms (OR 2.7, CI 1.2081 to 5.9883).
None of the 59 PB patients who had zero EHF score at diagnosis developed any disability by RFT; whereas 10% (7/69) MB patients who had zero EHF score at diagnosis developed some kind of disability. Though more PB patients (53.8%, 7/13) who had some disability at diagnosis had decreased in EHF score than that of MB patients (35.3%, 18/51), this was not statistically significant. The proportion of PB patients who had an increase in EHF score (2.7%, 2/72) at RFT was marginally lower than MB patients (10.8%, 13/120) (p=0.06). Though more patients who had prednisolone had improvement than those who didn’t have prednisolone, this was not statistically significant (40% versus 16.6%, p=0.19).

CONCLUSION:
Those with delays in diagnosis more than one year after initial symptoms were more likely to have disability. PB patients were less likely to develop disability compared to MB patients. Patients who have significant neuropathy at enrollment or MB need to be more frequently monitored for neuropathy. To best monitor disability development, EHF score should be recorded at the time of diagnosis, RFT and for any visits after RFT especially for those with disability at discharge.

**Keywords:** EHF score, Disability, Leprosy, VMTST, Neuropathy
ILC5.1–010
TENLEP: Treatment of Early Neuropathy in Leprosy: two multi-centre triple blind randomised placebo controlled clinical trials
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Most well-known visible ‘disabilities’ in leprosy can be attributed to the consequences of nerve function loss due to neuropathy, often part of a more generalized leprosy reaction. Timely diagnosis of leprosy and nerve function impairment (NFI) are crucial because permanent NFI can to a large extent be prevented through the treatment with steroids.

Early diagnosis of the disease and early diagnosis of (pending) NFI can prevent permanent NFI. Recently a multi-center prospective double blind randomized clinical trial has been concluded looking into the effect of ‘long-term’ (32 weeks) prednisolone treatment versus a 20 weeks course in the case of recent NFI (N= 868 patients).

In a parallel trial with patients diagnosed with subclinical neuropathy (N=363), prednisolone was given to the intervention group and placebo treatment to the control group. Sub-clinical NFI was defined as patients having normal muscle testing and sensory results but impaired function through electro-neurophysiological and thermal sensation assessments.

After a follow-up of 18 months, the clinical study showed that the 32-week treatment duration did not result in better recovery–improvement of NFI than the 20-week treatment. Recovery–improvement rates were close to 80% in both arms of the trial. The conclusion is that currently a 20-week prednisolone treatment is the preferred treatment option for recent NFI. In both arms of this trial, the protective effect of prednisolone lasted as long as medication was given, and decreased as soon as it was stopped. These findings trigger new research questions, which will be discussed during the workshop.

The trial with patients with subclinical neuropathy, also with 18 months follow-up, showed that 20 weeks treatment had the same effect as placebo in terms of progression to clinical NFI, which occurred in about 8.5% of the cases. There was also no difference in subclinical outcomes between the two arms. Conclusion is that prednisolone is not efficacious as a standard approach to subclinical NFI. Consequences for clinical approaches will be discussed.

It needs to be reiterated that the mainstay for prevention of NFI is in the early diagnosis of the disease. ‘Disability’ related to NFI can be prevented by early diagnosis of leprosy and/or neuropathy and adequate treatment following diagnosis thereof. Non-nerve related disability, mainly due to longstanding untreated, late diagnosed lepromatous leprosy can be prevented by early diagnosis of the disease.

Keywords: TENLEP, neuropathy, trial, subclinical, prednisolone
ILC5.1-011
Ninjurin 1 Gene D110A Single Nucleotide Polymorphism as a Genetic Marker for Nerve Damage Leprosy Patients from South India, arun sundaramoorthy1, Sasikala Keshavaraoo

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Background: Leprosy is a chronic granulomatous infection caused by Mycobacterium leprae, and obligate intracellular bacillus, that attacks cutaneous tissue and peripheral nerves producing skin lesions, nerve degeneration, anesthesia, infection and deformities.

Objectives: Analyze the Ninjurin 1 gene single nucleotide polymorphisms in leprosy patients from South India, and the role of the gene in the nerve damage.

Methods: A total of 106 subjects (Male: 65 Female: 41) with an average age of 37.05 ± 8.62 years Leprosy of experimental subjects with age and gender-matched control subjects were recruited. Genotyping was done by polymerase chain reaction/restriction fragment length polymorphism (PCR - RFLP - SNPs Confirmation for Sequence) methods.

Results: Leprosy patients with the CC genotype (ala/ala) had a higher risk of developing nerve disability when compared those carrying the AA genotype (asp/asp) and the variation observed were statistically significant (P< 0.05).

Conclusion: Present study revealed that D110A Codon variation may be a risk of nerve damage among leprosy patients in Tamil Nadu, South India.

Acknowledgement: We are highly thankful to the Director, Superintendent and outpatient department staffs of Sacred Heart Leprosy hospital, Tamil Nadu, for permitting and helping us to sample collection. I express my sincere thanks to Dr. T.P. Velavan, Scientist, Institute of Tropical Medicine, University of Tubingen, Germany I deeply appreciate the motivations and support the research.

Keywords: Ninj1, nerve damage leprosy, pcr-rflp, case-controls, susceptibility
ILC5.1–012
Deficit in Postural Balance of Individuals with Leprosy, Compared to Healthy Subjects
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Introduction: Leprosy (LP) is an infectious disease, which is considered a public health problem that damages the visual, cutaneous, and nervous systems. Brazil recorded 31,064 million new cases of leprosy in 2014. Nervous changes occur due to action by Mycobacterium leprae on the nerves, which causes peripheral sensory loss. The balance requires proper integration of visual, somatosensory and vestibular systems to produce adequate motor strategy to perform the tasks. Therefore, the knowledge of postural control (PC) of LP patients becomes crucial since a sensory neuropathy may worsen this control. The objective of this study was to analyze the PC of individuals with LP compared to healthy individuals.

Methods: The study comprised 68 individuals divided in two groups: LP Group (LG) with 34 individuals (43.21 ± 10.48 years) and the Control Group (CG) with 34 healthy and age-paired adults (43 ± 10.47 years). We excluded from LG who had amputation of upper or lower limbs (LL); neurological diseases, and/or wounds on the plantar region. The CG participants had no abnormal sensitivity in LL. The LG were selected from Unidade de Atendimento Ambulatorial de Fisioterapia do Hospital das Clínicas da FMUSP, Brazil. Individuals from the CG were recruited among relatives of the students and workers of the hospital. All participants signed a consent form. Subjects stood barefoot on a force plate (Pro Balance Master 8.1.0, Neurocom®, Inc, Oregon, EUA). Verbal instructions were given to subjects to remain motionless. Three 20-second trials were collected under four different sensory conditions (cd): (1) eyes-open on a stable plate (2) eyes-closed on a stable plate (3) eyes-open on a mobile plate and (4) eyes-closed on a mobile plate. Data was transferred from the force plate to a computerized program that transformed the primary data in the center of pressure displacement (COPd) through the duration of the data acquisition. Three variables were acquired from COPd in each sensory condition: area oscillation of the COPd (A) and mean velocity of COPd in sagittal (Vy) and frontal (Vx) planes. Statistical analysis was performed using Mann–Whitney test to compare each variable in each condition between groups. Significant level was adopted as p

Keywords: Leprosy, Postural Balance
ILC5.1-013
Association of the Degree of Physical Disability and Need for Use of Visual and Somatosensory Information for Postural Control of Individuals with Leprosy
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Introduction: Leprosy (LP) is an infectious disease caused by Mycobacterium leprae which can cause visual, systemic and nervous disturbances. LP can lead subjects to physical disabilities and deformities. Physical impairment associated to nerve changes can compromise the maintenance of balance. The balance requires proper integration of visual, somatosensory and vestibular systems to organize adequate motor strategy to perform daily tasks. The objective of this study was to correlate the degree of physical disability (PD) and postural control (PC) in subjects with LP. Methods: The study comprised 34 subjects with LP (age=43.21 ± 10.48 years; BMI=28.30 ± 3.78 kg/cm²), 23 men and 11 women. We excluded subjects who had amputation of upper or lower limbs; neurological diseases; and/or wounds on the plantar region. Subjects were selected from Unidade de Atendimento Ambulatorial de Fisioterapia do Hospital das Clínicas da FMUSP, Brazil. All participants signed a consent form. We evaluated the PD of right (R) and left (L) eye (PDRE; PDLE) and leg (PDRL; PDLL) which ranges from 0 to 11 according to the Ministry of Health (Brazil). Subjects stood barefoot on a force plate (Pro Balance Master 8.1.0, Neurocom®, EUA) to evaluate the PC. Three 20-second trials were collected under four different sensory conditions: (1) eyes-open on a stable plate (2) eyes-closed on a stable plate (3) eyes-open on a mobile plate and (4) eyes-closed on a mobile plate. Three variables were acquired from center of pressure displacement (COPd) for each condition: area oscillation (A) and mean velocity of COPd in sagittal (Vy) and frontal (Vx) planes. Quotients were calculated to quantify the sensory contributions to PC: visual quotient (VQ), the ratio between variables of condition (2) and (1); proprioceptive quotient (PQ), ratio variables of condition (3) and (1); vestibular quotient (VestQ); ratio variables of condition (4) and (1). Spearman’s rank correlation coefficient was used to associate the degree of disability to each quotient value. Significant level was adopted as p

Keywords: Leprosy, Balance Postural
ILC5.1-014

Association of Sensitivity Feet and Need for Use the Visual System in Postural Control in Individuals with Leprosy

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Introduction: Leprosy (LP) is an infectious disease, caused by Mycobacterium leprae which can cause visual, systemic and nervous disturbances. Nervous changes occur due to action by Mycobacterium leprae on the nerves, which causes peripheral sensory loss. The balance requires proper integration of visual, somatosensory and vestibular systems to produce adequate motor strategy to perform the tasks. The objective of this study was to correlate the sensitivity feet (SF) and postural control (PC) in subjects with LP. Methods: The study comprised 34 subjects with LP (age=43.21 ± 10.48 years; BMI=28.30 ± 3.78 kg/m²), 23 men and 11 women. We excluded subjects who had amputation of upper or lower limbs; neurological diseases; and/or wounds on the plantar region. Subjects were selected from Unidade de Atendimento Ambulatorial de Fisioterapia do Hospital das Clínicas da FMUSP, Brazil. All participants signed a consent form. We evaluated the SF using the Semmes–Weinstein’s monofilaments in 20 points of the plantar region (10 in each foot), according to the Ministry of Health (Brazil). Subjects stood barefoot on a force plate (Pro Balance Master 8.1.0, Neurocom®, EUA) to evaluate the PC. Three 20-second trials were collected under four different sensory conditions (cd): (1) eyes-open on a stable plate (2) eyes-closed on a stable plate (3) eyes-open on a mobile plate and (4) eyes-closed on a mobile plate. Three variables were acquired from center of pressure displacement (COPd) for each condition: area oscillation (A) and mean velocity of COPd in sagittal (Vy) and frontal (Vx) planes. Quotients were calculated to quantify the sensory contributions to PC: visual quotient (VQ), the ratio between variables of condition (2) and (1); proprioceptive quotient (PQ), ratio variables of condition (3) and (1); vestibular quotient (VestQ): ratio variables of condition (4) and (1). Spearman’s rank correlation coefficient was used to associate the SF (sum of 10 points on each foot) to each quotient value. Significant level was adopted as p

Keywords: Leprosy, Postural Balance, Proprioceptive Disorders
ILC5.1-015
An overview of monofilaments (MF) for tactile touch testing in leprosy. *Samples of all 6 loose MF available*
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This poster presentation will elucidate the utility, challenges, and assets of Monofilaments (MF) in helping to identify & monitor nerve function impairment in leprosy, including from silent neuritis. A delay in identifying silent neuritis can place the patient at risk of irreversible nerve damage, deformity, disability, and further morbidity. Prevention can be in our hands.

Discussion will include the following:
• Concise historical perspective of MF.
• Examples of use of MF in the context of other diseases and disorders for contrast and common ground.
• Concise narrative of author’s field and clinic experience with MF in the past 25 years across a range of leprosy endemic settings.
• Mechanics of properly applying the MF to the test site, e.g., hand or foot, including illustrations.
• Comparison of MF and other handy sensory testers, including ballpoint pens, peacock feathers, sharp–dull testing devices, 2 pt. discriminators. Which is optimal? An either/or choice—-or—-a both/and choice? Join the discussion at the poster.
• Challenges of using the MF in field, clinic settings, e.g., busy urban setting, outlying provincial setting, and proposed remedies. Join the discussion at the poster.
• Suggestions for establishing a sustainable reservoir of MF.
• As mentioned in title, samples of all 6 MF will be available to take home to your clinic/field setting for mounting and sensory testing.

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Keywords: Sensory testing, Monofilaments, Assessing NFI, Monitoring NFI, Nerve Damage
ILC5.1-016
The Comparison of MFT and VMT between Prednisolone 32 weeks and 20 weeks in Early Neuropathy of Leprosy Patient (Randomized Controlled Trial in East Java, Indonesia)
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Background: Nerve Function Impairment (NFI) is important in leprosy because of the potential to cause disabilities and deformities. NFI could be detected by Mono Filament Test(MFT) and Voluntary Muscle Test(VMT). Research is required to determine the optimal dose of corticosteroids at NFI.

Objective: To compare MFT and VMT between prednisolone treatment of 32 weeks and 20 weeks in patients with early clinical sensory and/or motor NFI.

Methods: A randomized double-blind controlled trial was performed in 103 patients with NFI from Bangkaian, Sampang, and Dr. Soetomo hospital were divided into two groups: arm 1: 32 weeks (54) and arm 2: 20 weeks (49). Patients were started at 1 mg/kg/day and tapered down 5 mg/week till 0.2–0.5 mg/kg/ day. Scale of MFT: Trigeminal(T), Ulnar(U), Median(M), Radial Cutaneous(R), Posterior Tibial(P), Sural(S); VMT: eye closure(E), ulnar little finger(U), median thumb(M), radial wrist(R), lateral popliteal(L), pos tibial great toe up(PU), pos tibial great toe down(PD) were performed in by independent observer every month in baseline; first end point (32 weeks and 20 weeks) and second end point (78 weeks). The comparison of two groups were analyzed using Mann Whitney.
Results: The average of MFT scale in 32 weeks vs 20 weeks were: Right: U 3.34;2.26;2.89 vs 2.6;1.95;2.76, M 1.89;1.63;1.97 vs 2.00;1.27;2.00, R 3.34;2.52;2.37 vs 2.32;1.64;2.64, T 5.89;4.44;4 vs 5.84;5.23;5.08. S 7.37;5.74;6.2 vs 6.04;6.09;6.12. Left: U 3.49;3.26;3.43 vs 2.56;2.73;2.96, M 2.29;2.00;2.14 vs 2.16;2.64;1.84, R 3.31;3.04;3.23 vs 1.52;1.14;1.84, T4.86;4.33;4.09 vs 3.72;4.09;4.52, S 5.74;4.93;5.43 vs 6.2;6.82;6.56. The average of VMT scale 32 weeks vs 20 weeks were: Right: E 4.97;5.00;5.00 vs 5.00;5.00;5.00, U 4.2;4.26;4.43 vs 3.92;4.73;4.12, M 4.63;4.78;4.77 vs 4.72;4.95;4.84, R 4.91;5.00;4.91 vs 5.00;5.00;4.96, L 4.89;5.00;5.00 vs 4.68;4.73;4.84, PU 4.66;4.85;4.86 vs 4.6;4.64;4.6, PD 4.77;4.7;4.74 vs 4.88;4.91;4.84. Left: E 4.97;5.00;5.00 vs 5.00;5.00;5.00, U 3.83;4.11;4.06 vs 4.12;4.23;4.24, M 4.4;4.81;4.63 vs 4.48;4.55;4.68, R 4.89;4.96;4.8 vs 4.96;5.00;5.00, L 4.8;4.81;4.83 vs 4.64;5.00;4.92, PU 4.57;4.63;4.8 vs 4.22;4.91;4.88, PD 4.66;4.81;4.77 vs 4.8;4.95;4.84. No statistically significant.

Conclusion: The trend of MFT and VMT improvement is obtained better in the treatments group of 32 weeks compared to 20 weeks. Further study is required using objective tool.

**Keywords:** early neuropathy, prednisolone, MFT, VMT
ILC5.1-017  
**PATIENTS PERCEPTIONS ABOUT PAIN AND FUNCTIONAL LIMITATIONS FOLLOWING PERIPHERAL NERVE DECOMPRESSION SURGERY IN LEPROSY**

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Introduction: The satisfaction and perception of patients with respect to pain and functional limitation after neural decompression surgery for leprosy has received little attention until now. The purpose of this study is to provide new information and encourage debate in this area. Materials and Methods: Individuals undergoing peripheral nerve decompression surgery at the University Hospital Clementino Fraga Filho up to 2014 were all eligible for this study. The preoperative and medication data was obtained by consulting the patients’ records. The evaluation consisted of applying a physical examination, an evaluation form and structured questionnaires (DN4, McGill and SALSA). Results: In total, fifty-three patients (87 surgeries) were evaluated. The average length of time since the most recent surgery was 5.1 (95% CI 3.9–6.2) years. Most (59%) had one operated member. At the moment of the interview, 38 subjects (72%) declared complete resolution of pain after surgery. There was a 64% reduction in the use of analgesics and 81% of the corticosteroids. Chronic neuropathic pain was prevalent among 15 (28% of the sample) who remained with pain after surgery. Most reported satisfaction (87%) with the results of surgery. SALSA showed that 59% of subjects had mild or no functional limitation. Conclusions: The neural decompression surgery had a strong effect on reducing the pain of patients with leprosy. Most interviewed presented little or no functional limitation, and declared they were satisfied with the procedure.

**Keywords:** leprosy, neural compression, pain, surgery, patient’s perception
The Proportion of Sensory Nerves Improvement Detected by Monofilament: Prednisolone 32 weeks vs 20 weeks in Early Neuropathy of Leprosy Patient (Randomised Controlled Trial in Surabaya & Madura, Ind)

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Objectives: Clinical sensory nerves function impairment (NFI) can be detected using monofilament test (MFT). A comparison between high-dose and low-dose and long versus short duration of steroid for treating clinical NFI have shown that longer dose was more effective than higher doses. Research is needed to determine the optimal dose of steroid treatment regimen for patients with clinical sensory NFI, whether steroid treatment of 32 weeks duration is more effective than treatment of 20-week duration in restoring nerve function in patients with clinical sensory NFI of recent onset.

Methods: A randomised double-blind controlled trial was performed in 103 patients with clinical sensory NFI, from Madura (95) and Dr Soetomo Hospital, Surabaya (8), dividing into two groups: arm 1: 32 weeks (54) and arm 2: 20 weeks (49). Patients were starting treatment with Prednisolone at a dose of 1 mg/kg/day, taken in the morning. In arm 1 a therapeutic dose of more than 0.3 mg/kg/day was maintained for 17 weeks. The total course was 32 weeks, of which the first 20 weeks was prednisolone containing and the remaining weeks were placebo for the purpose of comparison with arm 2. In arm 2 a therapeutic dose was maintained for 29 weeks, with the total course was 32 weeks. Scale of MFT (Trigeminal, Ulnar, Median, Radial Cutaneous, Posterior Tibial, Sural) was performed by independent observer at baseline, first end point (32 weeks) and second end point (78 weeks).
Results: Thirteen patients dropped out during study (7 in arm 1 and 6 in arm 2). The proportion of sensory nerves deterioration by MFT 32 weeks vs 20 weeks in baseline, 32 weeks, 78 weeks: Right Ulnar nerve 45.7%; 25.9%; 40% vs 36%; 26.1%; 28%, Left Ulnar Nerve 45.7%; 37%; 31.4% vs 36%; 26.1%; 28%. Right Median nerve 25.7%; 18.5%; 25.7% vs 40%; 21.7%; 20%. Left Median nerve 37.1%; 25.9%; 22.9% vs 36%; 30.4%; 20%. Right Radial Nerve 37.1%; 29.6%; 25.7% vs 36%; 21.7%; 32%. Left Radial nerve 45.7%; 29.6%; 37.1% vs 32%; 21.7%; 24%. Right Tibial nerve 74.3%; 44.4%; 54.3% vs 76%; 52.2%; 60%. Left Tibial nerve 62.9%; 51.9%; 45.7% vs 44%; 30.4%; 48%. Right Sural nerve 80%; 63%; 65.7% vs 68%; 56.5%; 72%. Left Sural nerve 68.6%; 48.1%; 54.3% vs 72%; 65.5%; 68%.

Conclusions: From the study it appeared that arm 1 had a better tendency in restoring clinical sensory NFI comparing with arm 2.

Keywords: sensory neuropathy, MFT, steroid
ILC5.2-001
People Living with Diabetes and Leprosy-related Disability in Bangladesh
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Objectives
To describe the characteristics of Bangladeshi people with both leprosy-related disability and diabetes

Methods
A survey of blood sugar levels in 3573 leprosy-disabled people was carried out in 2015. For all subjects we recorded age, leprosy disability level as judged by Eye hand foot score (EHF), body mass index (BMI) and Random blood sugar level. People with blood sugar levels >11.0m Mmol/L were referred to the local diabetic clinic for assessment by a doctor. People with random blood sugars >7mMol/L had a second blood sample taken in the community when fasting.

Results
In addition to 97 known diabetics, 47 new cases of diabetes were detected, indicating a prevalence rate of diabetes of about 4% in this disabled population. We also identified subjects who had blood sugars in “impaired glucose tolerance” range (18.6%). Results will be presented comparing the biodata (age, sex, BMI, EHF score) of previously known and newly diagnosed diabetics with non-diabetics who also have leprosy disability. We also similar present data on those who probably had impaired glucose tolerance

Conclusions Compared with screening by a single random blood sugar, only a few more new diabetics were identified by fasting blood sugar. There is not much difference (in this population) between diabetics and non diabetics in distribution of BMI. The severity of their physical disability due to past leprosy makes it difficult for these people to manage their diabetes.

Keywords: leprosy-disability, diabetes, eyehandfootscore, blood sugar level, body mass index
Prediction of the Occurrence of Leprosy Reactions Based on Bayesian Networks

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Introduction: To date, multidrug therapy is effective in curing leprosy-affected individuals. However, during and even after MDT, 30–50% of patients may develop Leprosy Reactions (LR), very aggressive immune-mediated episodes that require immediate diagnosis and treatment. Although intense basic and clinical research have led to the identification of several clinical and molecular risk factors for the occurrence of LR, the combination of these findings in a system suitable for implementation by disease control programs is still limited. Thus, the development of technological tools to assist decision-making based on experimental evidence is highly desirable. Artificial Intelligence (AI) methods seek to address systematically a set of information in order to provide optimum levels of reliability, the basis for decision-making. In healthcare, these techniques can be extremely useful; of particular interest, Bayesian Networks (BN) are among the tools that have been most successful in practical applications in medicine.

Aim: To apply AI tools to the development of a platform able to predict risk of occurrence of LR using available clinical, demographic and genetic data.
Methods: The complete database consisted of 1,450 patients diagnosed with leprosy at different leprosy reference centers located in the Brazilian states of São Paulo, Ceará, Goiás, and Amazonas. Overall, patients have been followed up for >2 years since diagnosis to monitoring LR occurrence. Controls were patients with newly detected leprosy who did not have LR at any time of initial diagnosis and during follow-up. The AI system used is based on BN, as implemented in the shell NETICA. Patient information was used as available at each population sample.

Results: Analysis of the complete database population resulted in the development of a system able to predict risk of LR with 76.4% sensitivity and 75.7% specificity. Of particular interest, when the system was developed using only the Goiânia database, for which genetic information for the IL6 gene was available, the system performance increased to 86.0% sensitivity and 87.7% specificity.

Conclusion: The LR is the main cause of disability associated with leprosy; therefore, to predict its occurrence at diagnosis can have large impact over the quality of life of the patients. We produced an easy-to-use computerized system which allows the identification of recently diagnosed leprosy patients under high risk of developing LR. These individuals will be candidates for priority monitoring to detect early occurrence of LR, thus leading to immediate treatment and reducing the impact of the occurrence of these aggressive episodes.

**Keywords:** Leprosy, Leprosy Reactions, Artificial Intelligence, Bayesian Networks
ILC5.2–004
A comparison between FAIRMED’s two Prevention of Impairment and Deformity (POID) intervention models in India.

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Objectives:
• To provide accessible, acceptable and affordable leprosy services as a part of the General Healthcare System (GHS).
• Reduce the incidence and prevalence of Leprosy and its associated complications through early case detection.
• Provide technical support and assistance to strengthen the GHS.

Methods: Two differing POID intervention models are applied in two districts each in two different states. This includes East Godavari and Chittoor districts in Andhra Pradesh State (Model-1) and Jalgaon and Dhule districts in Maharashtra State (Model-2).
1. Method (Model-1): includes interventions at primary and tertiary levels only.
2. Method (Model-2): focuses on all three levels including primary, secondary, tertiary levels.

Results:
Both the models reported detection of higher number of new cases without deformity (G0D; Model-1 [37%]; Model-2 [92%]). In Model-1, the newly diagnosed cases with G1D were reduced by 10% at RFT (from 66 to 50), and the G2D at diagnosis was reduced by 25% at RFT (from 104 to 79). 197 RCS were done along with physical rehabilitation. I
n the old patients presenting with ulcers there was a 40% reduction in ulcers and government disability pension was facilitated for 5,437 people. In Model–2, there was 19% reduction in the number of MB cases among the newly diagnosed cases when compared to the previous year (2013). And the NCDR increased by 0.77 % in Jalgaon and by 6.33% in Dhule as compared to the previous year (2013), indicating active case finding efforts by the peripheral health workers of the GHS. Among all the cases (both old and new) the G2D deformities increased by 4.39 % in Jalgaon and by 6.33 % in Dhule as compared to previous period indicating prompt referrals of suspects by the Block Coordinators (BC) and the GHS. The BC’s helped in identifying 142 G1D cases in both the districts and 280 G2D cases indicating 31.5 % increase in number of cases with deformity recorded (April 2009–May 2015).

Conclusion
Both the models of POID interventions highlight successful approaches for early case detection and thereby reduce the incidences of deformity among the people. The interventions overtime were able to spread awareness in the community, which in turn facilitated in developing positive attitude towards the people. The GHS has been strengthened and sensitized to consider Leprosy relief and management an integral part of their service delivery mechanism.

**Keywords:** Early Case Detection, Disability Prevention, General Healthcare System, Primary, Secondary and Tertiary Levels
ILC5.2-005
MH-POID PROJECT: FAIRMED’s enhanced model towards preventing disability
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Objectives:
- Reducing the incidence of disability by early diagnosis and treatment of Leprosy.
- Reduction in discrimination towards people.
- Increasing the capacities of the General Healthcare System (**GHS) staff.
- Promoting innovative strategies for sustaining Leprosy control activities.

Method:
Three tier intervention strategy in collaboration with the Maharashtra State Society, Alert India, and FAIRMED (FM) India. The project interventions are:
(a) Primary level: early case detection and management, active case finding and contact screening and awareness drives to reduce discrimination
(b) Secondary level: Capacity building of the GHS leprosy staff, establishing leprosy referral centers (LRC) for follow up and management of G2D cases and referral of people with severe complications to the tertiary level centers.
(c) Tertiary level: Strengthening of tertiary level centers to promote management of complications including facilities for RCS and Physical Rehabilitation.

**The project provides support to the GHS for Leprosy Relief Services through the Block Coordinators (BC) employed by the project.

Result:
As the project relies on the GHC staff or referring suspects to the PHC, 27% of the ASHA’s (Accredited Social Health Activists) were trained in the last 2 years who referred 1,051 suspects and 144 among them were diagnosed with leprosy. Besides the ASHA’s, the block coordinators (BC’s) of MH-POID project continuously provided the much needed monitoring and supervision.
There was an increase in new case detection due to the regular sensitization and mass awareness. A total of over 1062 people were assessed during the POID camps in order to monitor their deformity status to ensure that it didn’t further deteriorate. 416 people were supported with MCR and out of 43 referred for RCS, 39 underwent surgeries. Interestingly, details of around 6,354 people was entered in the line-list from the existing 9,257. Most importantly, over 17,000 contacts were examined along with a host of them receiving additional social benefits such as travel concessions and disability certificates that entitles them to receive disability pension.

Conclusion:
The project could able to emphasized continued focus on integration of Leprosy Relief and Management Services with the GHS. Increased awareness in the community facilitating self reporting as people became conscious of their conditions and the community is responding to their needs. The project laid a foundation for facilitating disability prevention and managing rehabilitation services for the under privileged population.

**Keywords:** POID, BLOCK COORDINATOR, ASHA, DISABILITY ASSESSMENT, GENERAL HEALTH SYSTEM
ILC5.2-006
A New Approach to Lagophthalmos Surgery in Leprosy in Madhya Pradesh state, India
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The eye is particularly vulnerable in leprosy. In the absence of adequate care, damage to the eye occurs in a significant number of leprosy patients. If an affected eye is delayed in a leprosy case, it leads to blindness. Even the ophthalmologists miss cases of lagophthalmos, since a case with history of watering eye or a dry eye is routinely treated conventionally in eye out-patient department without even the thought of an underlying lagophthalmos. In the referral centre supported by LEPRa Society and Fontilles situated at Victoria Hospital Jabalpur, among the total, 1.5% cases out of all disability grade-2 cases operated in the hospital are those of ophthalmic complications.

Objective:
Perform more effective lagophthalmos surgery that would leave minimum scar, and which is cosmetically acceptable to the patient.

Method:
In the hospital 45 patients have been operated for lagophthalmos. The conventional method used is exploring the Palsman tendon and removing it at its insertion as per what is required for travelling from Temporalis muscle to the middle canthus of eye. However, in present day surgery instead of donor tendon from outside, one uses the fascia from the Temporalis muscle itself simply by exploring the muscle and transferring it through fascial sling and tunnelling it through the eye lids to meet at the medial canthus end. This method gives a good cosmetic appearance. Due to softness of the fascia it does not give elevated appearance on the eyelids. Patient learns blinking quickly and synchronises with the jaw movement.
Result:
A total of 45 lagophthalmos surgeries were carried out in the centre in the last eight years. Out of them 30 were of men and 15 of women. Four out of those were bilateral. The average follow-up period was 28 months. After the follow-up, 41 patients showed good results, three were average and one could not be followed-up because he was not available during the period.

Conclusions
It was realised that as compared to other methods used in corrective eye surgery due to leprosy, this technique was found to be easy to perform. Surgery at two places is avoided, at the same time the apprehension in the patient is reduced since the scar is restricted to one place which hides behind the Temporalis hair line. Moreover, this procedure is done under local anaesthesia. The redness of eye and watering disappear faster. The patient learns to adapt to the new situation early.

Keywords: leprosy, eye, lagophthalmos, surgery
ILC5.2–007
Effective Utilisation of Residual Muscle Power in Leprotic Hand– Leprotic Hand Rehabilitation Clinic.
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Introduction:
In leprosy, the commonest complication arises in the hand. At the referral centre which is functioning in collaboration with LEPRA society and Fontilles at Jabalpur (India), 30% of the cases presented are with hand complications. The commonest one is neuroparalytic hand while others are ulcers, contracture, callosities, reabsorption and Osteomyelitis.

Objective:
To reduce the morbidity in leprosy by judicious use of residual muscle power and its up-gradation in leprosy hand rehabilitation clinic by use of surgical and non-surgical methods.

Methods:
The use of FDS (Flexor digitorum superficialis) slip for correction of clawing and loss of adduction of hand is a newer surgical technique where polyneuroparalytic hands were operated. After tightening flexor pulley, remaining FDS slip is reattached, laterally to extensor expansion in little and ring finger. Medially it is attached to index finger and for middle finger by splitting into two and attached on both side of extensor expansion. Preoperative application of ultrasound wave over palmer aspect of hand gives improved results. Distactor plays crucial role in rigid contracture. Non-surgical techniques like HOPE (hydro oleo physical exercise), health education, and physiotherapy are important tools in enhancing performance of neuroparalytic hands.
Result:
A total of 39 patients were operated by this technique in the last three years. The stay of the patients in hospital was reduced. Multiple hand deformity was corrected by this method. The results in practically all the operated patients were good. The self-care procedure—HOPE (hydro olieo physical exercise) in groups has enhanced their self-confidence and desire to do it in their homes years after discharge from hospital.

Conclusion:
Comprehensive surgical and non-surgical care is required for effective utilisation of residual muscle power in leprotic hand.

**Keywords:** leprosy, complications, hand, HOPE, muscle power
ILC5.2-008
A Step ahead Towards Self Reliance – Sewa Doot Scheme in Leprosy Colonies of Madhya Pradesh
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Introduction:
Stigma and discrimination in leprosy has compelled the leprosy affected to leave their homes and settle down in a place where no one knows them. The leprosy colony, with time, has now been placed in the middle of the township. About 3500 persons reside in the 31 colonies of the state, among them about 1345 had leprosy and deformity of hand, eye or feet. As the world is progressing, the leprosy affected also has developed a desire to lead a life with self-esteem. All the time they had to depend on the Government staff for care and treatment. Due to lack of concern or irregularity of services rendered, the ulcer never healed. With the concept of making the colonies self-reliant, a scheme known as Sewa doot was conceptualised.

Objective:
• Meaningful engagement of persons affected by leprosy in promoting and delivering self-care services
Method:
Thirteen colonies were selected out of the colonies having high number of cases with either disability or ulcer. One inmate, either leprosy affected or offspring of the affected among the colony dwellers was selected. A three-day training programme was organised at Regional Health & Family welfare training centre Indore. Practical demonstration was given at the LEPRAS supported referral centre at the Medical College. Each one of the Sewa Doot was provided with instruments and appliances, including autoclave necessary for dressing. Required dressing materials were also given as per need. An incentive of INR 50/- per dressing per patient was sanctioned by the state.

Result:
The Sewa doot is undertaking daily dressing of all patients inside the colony. Self-care is being practised under the supervision of the Sewa doot. Out of the 245 who had long standing ulcer, 46 ulcers have healed, 62 have ulcers but are healthy with granulation, 12 cases need skin grafting and 23 need surgical intervention.

Conclusion:
• The colonies have now become self-reliant and are able to address the self care by themselves
• Ulcers have started healing in most of the inmates in the colonies
• The quality of care rendered by the sewa doot is now attracting the neighbouring community members to get services in their colonies

Keywords: leprosy, sewadoot, ulcer care, selfcare training, government incentive
ILC5.2–009
Integrated Prevention of Disability Programme for persons with disabilities due to leprosy and Elephantiasis In Bihar, India
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India is contributing more than 60% of Leprosy and 40% of Lymphatic Filariasis of the world. Bihar is contributing more than 16% of India caseload and 89% population lives in rural (villages). These diseases producing foot disability among individual. This reduces the function ability of individuals, which leads to stigma, discrimination and separation from the community. Why Integration? Leprosy and Lymphatic Filariasis both produce permanent disability. The strategy on morbidity management and disability prevention primarily focuses on the care of limb, such as skin care, wound care, exercises, protective footwear and health education. Lymphatic Filariasis and leprosy are two major neglected tropical diseases with disabling conditions attached with chronic manifestations affecting health, social and economic status.

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

Methods: Integrated Prevention of Disability (IPoD) camps was organized at the Primary Health Center with the support of District Health Society in April 2014. Prior to camps, Information Education Communication (IEC) campaigns about the camps, group discussions were conducted. All the persons affected were assessed individually with formats and participatory scale. IPoD Kit, customized protective Footwear, Podiatry appliances, has been given to all those have attended the IPoD camp based on their need. In the IPoD camp we adopted “Satisfied customer approach model” which is very well taken by the beneficiaries. 3635 foot disabled [Leprosy– 297, Lymphatic Filariasis (Elephantiasis) – 3338] persons were screened with structured format and received the techniques of Self-care practices, IPoD Kit, Protective Footwear, Podiatry appliances, Exercise (Active & Passive). The Self-Support Groups were formed by the persons affected and the monthly monitoring system is introduced with community and local frontline workers participation.
Results: Completion of one year, data were analysed and found 92% ulcer were healed; only 3% recurrence of new ulcer, swelling of Elephantiasis was reduced 65% on average. Their participation in social, cultural, religious, rituals had increased. The episodes of acute attack have been reduced among 80% members attending the camps and due to good hygiene practices 83% of them healed their infection at entry points.

Conclusions: We found the techniques of I POD were well accepted by the community, monitored by their own self-support group and sustainable. This model can be replicated at a larger scale. The advocacy at policy making level (govt.) will be helpful to reach at larger population.

**Keywords:** leprosy, Lymphatic Filariasis, Integrated Prevention of Disability, foot, camps
ILC5.2-010
Restoring the Mobility of Forgotten People with Mobile Foot Care Unit intervention in Bihar, India
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Introduction: Any impairment in the foot affects the social, personal and economic life of an individual. During an average lifetime, each person walks about 115,000 miles and three-quarters of people have foot problems at some point. People with leprosy are 20 times more likely to have foot problems than the general ones. A person affected by leprosy requires two pairs of specially made shoes each year to facilitate their mobility. For the more seriously damaged foot, these shoes need to be prepared by a well-trained shoe technician after careful examination by a physiotherapist and tailor-made according to exact measurement.

Objectives: To improve the quality of life of people disabled due to leprosy by providing customised footwear, improving mobility and reducing risk of amputation.
Methods: LEPRÁ Society launched a mobile foot care unit to reach out to 1500 people disabled due to leprosy in 63 colonies. This unit is fitted in a vehicle with all necessary equipments, shoes technician, driver and outreach worker. The footwear materials are supplied on a monthly basis. This unit also has a LCD, VCD, public address system and generator to execute the awareness programme. The unit will move from location to location and stay there till all the necessary measurements are taken, ulcers are dressed, individuals are trained in self-care and the disabled get customised footwear before moving to the next location. This unit covered 63 leprosy colonies twice in a year and provided protective footwear to 1500 persons. It is monitored by Samutthan – State forum of disabled persons due to leprosy, State leprosy office and LEPRÁ Society.

Results: In 2015, this mobile unit manufactured and delivered 2565 pairs (Men: 1760, Women: 805) of protective footwear. This unit also trained 820 people (Male 585, Female 235) in self-care technique. It referred 41 suspects for leprosy, and among them, 14 were confirmed as cases. The unit also carried IEC activities and 17000 people have been made aware about leprosy signs and symptoms.

Conclusion: This is the first mobile foot care unit in leprosy programme in India. The results are excellent and the unit has received appreciation from persons affected with leprosy and local NGOs/CBOs.

Keywords: leprosy colonies, mobile foot care unit, persons affected by leprosy, self care, footwear
IC5.2-011
The problem of Leprosy deformities in Sri Lankan children
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The World Health Organization global leprosy strategy 2016–2020 aims at zero disabilities among newly diagnosed children. In Sri Lanka, child cases with disabilities continue to be present in substantial numbers. Early and prolonged exposure to untreated leprosy cases and late diagnosis favour the occurrence of deformities among children.

Aim of this paper is to describe the degree of physical deformities in newly diagnosing leprosy cases under 15 years of age in Sri Lanka and its relation to some factors.

Methods: An retrospective analysis of routinely collected data of all newly diagnosed child cases reported to the national leprosy surveillance system for a period of 5 years (2009–2013) using SPSS.
In Sri Lanka, Leprosy cases are managed by Dermatologists in dermatology clinics. Routine data for all newly diagnosing patients recorded in a special form which is shared directly with the Anti Leprosy Campaign (ALC). ALC maintains a national database at central level.

Results:
During period of 5 years, 1,167 child cases (11.2%) have been reported to the Anti Leprosy Campaign, Sri Lanka. Mean age of children was 10.9 years (range 2–15). Either a grade 1 or 2 disability has been reported in 101 (8.7%) patients of which 27 (2.3%) were grade 2 deformities (G2D) at diagnosis. Most disabilities were seen among 11–15-year age group (79.2%) and 4.9% were among 0–5 group. Even out of reported G2D,
22.7% were within 11–15 years whereas one case (0.99%) was within 0–5 age category. Out of those with deformities, majority (64.3%) were male. Out of the total children with disability, only 55.4% has reported within 6 months of noticing signs. Delay more than 24 months has been recorded in 11 children (10.9%). Out of G2D, only 62.9% have diagnosed within 6 months of noticing symptoms.

Conclusion:
Disabilities due to leprosy have reported among a significant number of Sri Lankan children. Prevention of disability warrants special attention in children because of the lifetime impact of the disability. To achieve zero disability among children, it is therefore important to minimize the delay of presentation by early case detection. Targeting case detection in high endemic pockets and intensifying screening of contacts together with health professional training on early signs and symptoms of the disease should be strengthened. Each new child with disability should be investigated thoroughly to find out the reasons for delayed detection. This information needs to be fed into planning activities for Leprosy control.

**Keywords:** Leprosy disability, childhood leprosy, diagnosis delay
ILC5.2-012
Burden of treatment: An important factor in leprosy-related disability and reactions
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Objective. The objective of this study, undertaken in Myanmar, is to explore the nature and extent of burden of treatment as experienced by people affected by leprosy.

Methods. The study is using qualitative focus group methodology to explore the multiple demands on people affected by leprosy (and their families) as they undergo treatment. A total of 20 focus groups across Myanmar are conducted by “research partner pairs” . Research partner pairs comprise one person affected by leprosy and one local staff member, who are trained to conduct, record and summarise focus groups in their local area. Thematic analysis is conducted of focus group transcripts to identify key aspects of a potential scale / assessment tool, which may assist workers to more clearly appraise potential burden in leprosy treatment.

Results. Burden pertains to the treatment–related “workload” that people with leprosy are required to fulfil. It includes taking medications regularly, managing wounds, monitoring reactions, co-ordinating care, scheduling and attending appointments. For people who are poor or in remote areas this burden is amplified due to extra costs for travel and lost income for attending treatment. Further, the way services are delivered, health system factors, the lack of specialist services, and staff shortages, all add their own burdens on people affected by leprosy.
Consequences of excessive burden, including not following treatment guidelines or opting out of treatment altogether, are described.

Conclusion. Information and concepts extracted from focus group transcripts are a foundation for developing a “scale” for measuring burden of disease in leprosy. The capacity to measure and classify burden of disease will be constructive in steps to reduce this burden, and presumably improve outcomes.

Keywords: Burden of treatment, Leprosy services, disability
MH-POID PROJECT: FAIRMED’s (FM) block coordinators (BC’s) a catalyst in preventing disability

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Objectives:
• Catalyze actions at primary and secondary level of general health care system.
• Timely implementation of project’s planned activities.
• To ensure active participation of General Health Care Staff (GHCS) in the project.

Method:
15 BC were inducted into the project. The interventions include:
(a) Capacity building of the block coordinators on Leprosy.
(b) Primary level: supporting in early case detection and management, active case finding and contact screening and awareness drives to reduce discrimination, updating the PHC data base are the primary activities of the BC’s.
(c) Secondary level: coordination with the secondary level staffs promotion of leprosy referral centres (LRC) for follow up and management of gr~2 cases and referral of people with complications to the tertiary level centers and ensuring linkages with the social security schemes at both secondary and tertiary level.

Result:
Each of the BC covers 4,13,007 population that includes 10~12 primary health centres (PHCs). Due to the regular follow-up with the PHC’s, a lot many of them are providing importance to leprosy activities. In addition, 95 out of 118 PHCs are having an upgraded patient database.
The BC motivate and provide hand holding to the ASHAs (Accredited Social Health Activists) for identification and referral of suspects. 27% of the ASHA’s were trained in the last 2 years who referred 1,051 suspects and 144 among them were diagnosed with leprosy. Details of around 6,354 people was entered in the line-list from the existing 9,257 and most importantly, over 17,000 contacts were examined along with a host of them receiving additional social benefits such as travel concessions and disability certificates that entitles them to receive disability pension. There was an increase in new case detection due to the regular sensitization and mass awareness. The BCs were instrumental in organising the POID camps in order to monitor their deformity status to ensure that it doesn’t further deteriorate.

Conclusion:
The BCs were very much in line with the goal of the project on integration of leprosy relief and clinical management services with the GHS. They have successfully linked with the primary level with the secondary level of operation and in the process created an environment for people to receive prompt leprosy services.

Keywords: Block Coordinators, Database, Disability, contact examination, POID Camps
Follow-up Study on Effectiveness of Customized Footwear: Implications for Involving General Healthcare Staff

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Objectives—Disability prevention and medical rehabilitation (DPMR) services is an important component in delivery of quality care to persons affected by leprosy. The district of Malda is situated in northern part of West Bengal State with an estimated population of 4.2 million. The district reported a high grade 2 disability among new cases of 10.7% in 2014–15. Malda NLEP Project was started by GLRA India in close coordination with the district leprosy cell of Malda district across six out of total 15 blocks to strengthen quality delivery of services to people affected by leprosy in an integrated set-up through capacity development of general healthcare (GHC) staff.

Methods—Line-listing of disability in the intervention blocks revealed 93 persons affected by leprosy with grade 2 disability that included 62 ulcer cases. The line-listing was accomplished through assessment of all existing cases at block level. It provided an opportunity for on-job capacity building of GHC staff including auxiliary nurse midwives (ANMs), supervisors, public health nurses and medical officers in nerve function assessment (NFA) and self-care. In order to provide customization of footwear, footprints were obtained for all the cases and footwear was distributed through Panchayat level camps; providing further opportunity for orientation of accredited social health activists (ASHAs), ANMs and supervisors along with assessment of cases. The providers (ANMs and supervisors) were encouraged to follow-up cases on a monthly basis for compliance to self-care, use of customized footwear and assessment through NFA. In order to study effectiveness, a review of ulcer cases was undertaken through home visit along with ANM and ASHA after a gap of three months.
Results—We observed improvement in size and type of ulcer among 27 cases (44%), healing in 22 cases (35%) and no change in 13 cases (21%). None of the cases reported further worsening. All cases reported practicing self-care; 70% were regular. In the non-intervention blocks, out of 111 cases who had received footwear (including 47 with customized footwear), but had gone without structured skill transfer and supervision, we could not see any improvement.

Conclusions—Merely ensuring supply of special footwear may not be suffice; the outcome of ulcer being better among those who were supervised regularly by GHC staff. The Project demonstrated that the capacity of GHC staff can be developed to carry out NFA and follow-up. The engagement of the latter would lead to delivery of quality care and ensure sustainability.

Keywords: customized footwear, nerve function assessment, general healthcare staff, ulcer, self-care
ILC5.2-015
Risk Factors for Physical Disability at Release from Multi-Drug Therapy in New Cases of Leprosy at a Referral Center in Belo Horizonte, Minas Gerais – Brazil

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Objective: The aim of the study was to investigate the risk factors for physical disability at release from multi-drug therapy (MDT) in new cases of leprosy, registered at a Referral Center in the city of Belo Horizonte, Minas Gerais – Brazil.

Methods: It is a longitudinal and retrospective study that evaluated 260 patients. Clinical and sociodemographic information were collected from the medical records. Comparisons were made between the disability grade upon admission and at the end of MDT, using a marginal homogeneity test. To determine factors associated with physical disability at release from treatment, univariate and multivariate analyses, using ordinal logistic regression and classification and regression tree algorithm, were performed.

Results: At diagnosis, 21.5% of the patients presented with grade 1 impairment and 16.2% with grade 2. The prevalence of disability did not differ significantly between intake and release from treatment. The risk factors for disability at the end of MDT at multivariate analysis were: number of affected nerves, sensory impairment and, mainly, the presence of disability at diagnosis. The analysis using classification and regression tree algorithm resulted in the development of a clinical rule to predict the risk of disability at release from MDT.

Conclusion: Since it is known that the presence of disability at admission is an important indicator of delay in diagnosis, the results of the study draw attention to the importance of early detection and treatment of leprosy in the prevention of disabilities and deformities.

Keywords: customized footwear, nerve function assessment, general healthcare staff, ulcer, self-care
ILC5.2-016
Development of an ICF core set for Lepra – Call for international experts
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Individuals with Lepra can have a variety of clinical courses and disabilities, such as physical impairments, limitations to perform some activities and restriction to participation (Brakel et al. 2012). Those functional incapacities can be facilitated by environment and personal factors (Nicholls et al. 2005).

The aims of this study are: to present the results from the four preparatory phases (systematic literature review, empirical multicenter study, qualitative study and expert’s survey) used to develop an ICF core set to Lepra and to recruit international experts to discuss the categories that will comprise the complete and brief version of Lepra ICF core set.

Each of the four preparatory phases had a specific methodology that will be presented in the conference; during the presentation participants will be asked to volunteer to participate in the international expert panel survey to be held after the congress. Potential participants will be selected following some inclusion and exclusion criteria proposed by ICF branch research guidelines (Selb et al. 2015). Eligible participants should have at least 5 years of experience with Lepra, should reflect an equal distribution across professional disciplines and WHO world regions.
The results of the four preparatory studies will be presented and printed copies of which will be sent to the selected expert participants. The international expert committee will be provided with information on the ICF, procedural steps of the consensus, the categories selected from the four phases and then they will be oriented to their role as participants by email. Leprosy is still considered a public health problem in some countries, because of its high incidence and complex complications associated with this disease (WHO, 2011). Interventions to effectively eliminate leprosy and reduce its consequences include early diagnosis, medical treatment, impairment prevention, as well as motor and psychosocial rehabilitation care (Prasad et al. 2010). The Leprae ICF core set might be used to better understand the overall burden of leprosy, enabling the development of new public health policies, in order to finally have Leprae eradicated.

**Keywords:** ICF coreset, environment, participation, disability, activity
ILC5.2-017
“Study of satisfaction level of patients with Protective footwear in Bihar and Jharkhan, India”
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Introduction: People with leprosy or any other abnormal foot function (circulatory diseases) are 20 times more likely to have foot problems than the general public. India have a large no. of foot problem cases due to abnormal foot function.

“Protective footwear should be worn by all patients with sole sensory loss, whether or not they have sole wounds, throughout their lifetime. MCR Cushioned insole will minimize the risk of wounds at pressure sites and podiatry appliances correct the abnormal foot function.

LEPRA established good manufacturing unit who produces quality Protective Footwear for their own patients. Each patient’s tested for Bio-Mechanical assessment. Than footwear were made with 10 mm Micro Cellular rubber with podiatry appliances as per requirement.

Methods: A simple questioner (Close and open ended question) will be prepared for interview in local language. 630 people will be interviewed by the team (ASHA) with the revised questioners. This study includes those 630 people (418 female and 212 are male) who have received the footwear before 3 to 6 months from the date of study. All are Grade II foot disability and elephantiasis.

The Questioner contents about fitting with feet, quality, color, design, availability, pressure points, durability, etc. Every week data will be sent to principal investigator for entry the data. 10% data will be cross checked for accuracy.

Results: The study shows 81% people are happy with design, color, pattern, finishing, and quality, etc. 21% patients wants the different color and which cover the whole foot (Should not show the claw toes). 3% people have got skin texture due to footwear. 86% people wearing footwear most of the time every day 9% people is wearing every day for some time, 2% people wearing a few days every week and 3% people wearing rarely or never. 76% female has requested for other color (53% Brown, 33- Red, 14% mixed color). 66 % people requested for shoes which can to washable (Not leather).

Conclusion: Even this study shows high level of satisfaction with MCR footwear, there are still need to modify the footwear as per Patients requirement and satisfaction. If we not fulfill the satisfaction, of person than this will lead to noncompliance with wearing the MCR Footwear.

Keywords: MCR, Satisfaction, Footwear, Protective, Bio-mechanical
ILC5.2-018

“Impact study of Protective footwear with Podiatry appliances secondary referral centre in Bihar and Jharkhand”

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Introduction: Plantar ulceration is the most common serious disability occurring in patients of leprosy. 92 patients with planter ulcer due to leprosy from year 2013 (Jan.) to 2014 (Dec.) has been brought under this study, who has attended the clinic. All the 92 with Male - 63, Female - 29 were taken in the study. All cases are RFT cases.

The primary function of protective footwear with podiatric appliances is to provide an underfoot environment capable of distributing the inevitable vertical forces, so reducing areas of peak pressure and ideally the period through which they are applied.

Methodology: This study will look at the importance of plantar pressure measurements on prescription of appropriate footwear with podiatry appliances. The outcome of proper footwear and insoles on dispersing the plantar pressure, and the footwear and insoles benefits in reducing the probability of occurrence of ulcer and the recurrence of healed ulcers. The below given points has been followed for all the cases.

- Taken foot measurement
- Biomechanical assessment of foot (LEPRA Society Format)
- Follow up every 3 months
- Ulcer assessment
- Promote self-care practices
- Wear suitable footwear
- Find out cause of wound and plan avoidance in future
Result: The data was analysed in Dec. 2015 and result was very encouraging. The study showed good result with podiatry appliances. Only 8.13% of the patients have developed the recurrent ulcer, and 92.88% ulcer healed. So proper self-care and regular use MCR footwear with podiatry appliances to help wound healing is achieved to prevent recurrence of the ulceration after.

Proper footwear with podiatry appliances is very important for aesthetic foot. It helps redistribute the pressure and reduce the chance of ulcer development. Patients prescribed shoes (custom designed) are the most appropriate one and were shown to reduce pressure. Shoes should be prescribed with addition of insoles for pressure distributed to achieve a plantar pressure reduction. To help the ulcer healed and preventing recurrence ulcer. It’s also help in correction of foot abnormalities.

Conclusions
This study shows high level of ulcer healing with regular self-care practices. This can be applied at the Secondary Referral centre.

Keywords: Podiatary, Bio-mechanical, MCR, Footwear, Protective
Sustainable Prevention of Disability (SPOD) Services within integrated General Health Services in Coimbatore District of Tamil Nadu—Replication of Salem Model

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Objectives
To study Disability Prevention and Medical Rehabilitation services be implemented in a district through the integrated set-up with facilitation by an NGO and enable the Government to establish sustainable DPMR care services in a large area.

Methods
A District Nucleus Team (DNT) consisting of District Leprosy Officer, Health Educator, Non-Medical Supervisor and Physiotherapy Technician is the core group in the district to ensure implementation of leprosy control activities. Medical Officers and Health Workers in general health system provide primary level leprosy care services. Coimbatore district has 50 Primary Health Centers and 24 urban Health Posts. A support team from German Leprosy and TB Relief Association, India functions in close collaboration with the DNT. The activities include training to personnel in health system in home based disability care and referral system followed by on-job-guidance to health workers to ensure self-care practice by persons affected with leprosy. During this process the list of persons affected with disability is also updated. Persons affected with leprosy are trained on self-care procedures. Outcome is measured during supportive supervision of DNT and the NGO team.

Results
The NGO support team along with district team conducted disability camps and trainings in 100 % of PHCs in the district during 2012–2015. The List of cases with disability is updated and assessed in all 14 BPHCs of the district. 72 % staff (n=652) including medical officers and health workers are trained in self-care and disability prevention besides 310 persons affected by leprosy. Analysis of follow-up assessments in early 2016 revealed that 75% of the patients trained are practicing self-care were leading to 60 % of them free from ulcers.
Conclusions
The Project envisages that good quality prevention of disability (POD) services is available in all Primary Health Centers and urban health posts and a system of sustained supervision of POD care and quality programme management is established in the district. While few challenges still remain, technical support from within government system can be enhanced by technical collaboration with suitable Non-Governmental agency. The approach has brought about marked improvement in quality of leprosy care services. Coordination from Programme managers is essential to percolate the concept to the peripheral levels. Good leadership, effective coordination, systematic field-based training and simplified operational procedures with back-up supervisory and referral support remain very important to prevent disabilities and improve the quality of life of the leprosy affected. The Coimbatore model can be easily adapted to different situations.

Keywords: DPMR, Leprosy, POD
ILC5.2–020
Disability Status of Leprosy Patients at Diagnosis in an Endemic Area of Nigeria: Trends and Determinants
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Objectives: To analyse trends and identify factors associated with the occurrence of disability at diagnosis among leprosy patients in a large rural hospital in Nigeria. Methods: We conducted a retrospective study using data from medical records of patients treated in a large leprosy referral centre in South–Eastern Nigeria, from 2011 to 2015. Disability was recorded using an objective scale for assessing physical impairment in leprosy as defined by the World Health Organization. Chi-square test was used to analyse trends, and associations between categorical variables. Logistic regression analysis was used to identify determinants of physical disability.

Results: During the study period, there were 316 leprosy cases treated in the centre (308; 97.5% were new cases). All the registered cases were assessed for degree of disability at diagnosis: 165 (52.2%) had Grade 0; 86 (27.2%) had Grade 1; and 65 (20.6%) had Grade 2 disability. Thus, 151 (47.8%) of the cases had either grade 1 or 2 disability at diagnosis.
The proportion of cases with Grade 2 disability annually over the study period ranged from 10.6 to 32.8% – an overall upward trend from 2011 to 2015 (P = 0.0002). Factors associated with any disability at diagnosis included: age >40 years (OR = 2.3, 95% C.I 1.5 – 3.6), male sex (OR = 1.9, 95% C.I. 1.2 – 3.0), and when there is involvement of more than 3 nerve trunks (OR = 6.9, 95% C.I 4.0 – 12.2).

Conclusions: A large proportion of leprosy patients present with physical disability at diagnosis with a worsening trend over the study period. Male sex, multiple nerve involvement and age (over 40 years) appear to be associated with higher risk of disability at presentation. The leprosy control programme should adopt active case finding strategies possibly integrated with other endemic neglected tropical diseases for more effective and efficient programming.

**Keywords:** Disability, Leprosy, Nigeria, Determinants, Diagnosis
ILC5.2-021
Partnership with NGOs/Government Leprosy Hospitals and Private Orthopaedic Surgeons to Scale up to Sustain Reconstructive Surgery Services in India: Damien Foundation Experience
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Objectives
The main objective is to study the process involved while scaling up reconstructive surgery services to correct disability among persons affected by leprosy. The minor objective is to study the outcomes of reconstructive surgery in a sample of patients.

Methods
The study used mixed methods approach. Content analysis of project reports was done to collect information on the process involved in scaling up of reconstructive surgery. All the patients who underwent surgery at three referral centers during the period from January 2013 to June 2014 were informed to attend the follow-up camps. Physiotherapists who were not part of the surgical team used a semi-structured interview schedule to assess the outcome of surgery. The outcomes were classified based on physical examination and patient satisfaction as ‘better’, ‘same’, or ‘worse’.

Results
In 2012, Damien Foundation provided reconstructive surgery services in three hospitals and 159 surgeries were done by a retired senior surgeon. Considering the huge unmet need and declining leprosy expertise in reconstructive surgery, it was decided to partner with NGOs/Government leprosy hospitals and train private orthopaedic surgeons. During the period 2012 to 2014, seven new centers were established and four surgeons underwent training in reconstructive surgery. The number of patients who underwent surgery increased from 159 in 2012 to 342 in 2015. New centers established in Tamil Nadu, Kerala and Karnataka faced difficulties in mobilization of patients due to less demand. Whereas centres established in Bihar, Jharkhand and Delhi attracted more number of young patients.
A sample of 114 patients operated was assessed in one of the old and two of the newly established centres. The mean age was 26 years, of which 74.6% were males, 51.3% was never married and the mean duration of disability was 4.9 years. Among them 50% had claw hand, 18.4% foot drop, 7% lagophthalmos and 24.6% had ape thumb deformity. The senior surgeon operated 55.3% of these patients and rest of the cases were operated independently by newly trained surgeons. Post operatively 11.8% had infection and swelling. Analysis of surgical outcomes revealed that 83.3% of these patients got ‘better’ after surgery, 11.4% remained ‘same’ while 5.3% patients deformity became ‘worse’ after surgery.

Conclusions
Partnership with NGOs/Government leprosy hospitals and private orthopaedic surgeons enabled quick scale up and sustainability of reconstructive surgery services in Damien Foundation supported projects in India.

**Keywords:** Reconstructive Surgery, India, Orthopedic Surgeons, Damien Foundation India Trust, Bihar
ILC5.2-022
Leprosy in the Metropolis: The dignity and quality of life of people affected by leprosy should be retaining
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Progress in the eradication of leprosy had been achieved through the synergistic efforts of all the supporting organizations. Despite the number of new cases of leprosy has declined, the disease could not be eliminated and the burden still remained to be done because Bangkok is the capital and most populous city. In addition, the fluctuated human migration both of Thai and international migrants hampers the exploration of this disease. An estimated 566 people in Bangkok were diagnosed with leprosy and participated in treatment program since 1997. It appears that 81 patients (14%) among of those are level 2 maimed victims. They were neglected and stayed alone with fear. Many patients could not help themselves. Recently, passive case finding was used in each community by public health center for cases detection that insufficient for continual remedy in physical, mental, and economical social life of patients.

The methods for this performance consisted with three configurations. 1. Active case finding program; workshop for technique of disease screening, prevention, disability rehabilitation, and patient visiting were educated for public health center members who lack of training. 2. The associated operation; the participation in planning, action, and service be conducted. 3. Counseling and visiting; there is continual improvement and evaluation.

The result from this workshop was shown that the efficacy of case referral centers in each community such 3 NODE special of leprosy located on the corner of the city. Bangkok are necessary for accessing to health service and rehabilitation for all disabled patients including frequency trip and transportation cost decreasing.

Conclusion: Rapid urbanization brings challenges such as migration, overcrowding, marginalized and underserved populations and difficult access to basic health services including leprosy services. Measures to address these issues should focus on training and proper coordination among stakeholders to assure long term sustainability of quality services in urban leprosy. Interventions of varying intensity should be tailored to the major health issues of specific urban localities.

Keywords: Urban, quality of life
ILC5.2-023
Changes in plantar load following flap cover for plantar ulcers over the heel and metatarsal heads
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Plantar ulcers are one of the most common sequelae of leprosy with almost 70% occurring on the metatarsal heads and about 10% of ulceration occurring on the heel and the rest over the toes and other parts of the sole. Calcaneal paring and flap cover is commonly done for the heel defects to prevent recurrence. Flap cover of the metatarsal head ulcers is done if the joint is not involved, to prevent recurrence of ulcers over the metatarsals. To date no studies have quantified the changes in the load on the plantar skin following such surgery. The objective of the study was to validate the assumption that the surgery redistributed body weight over a larger portion of the sole, thus reducing peak pressures.

22 leprosy affected patients with heel ulcers who underwent flap cover and calcaneal paring were included in the study. Similarly 10 patients who presented with metatarsal head ulcers without disruption of the metatarsophalangeal joints who underwent flap cover were included in the study. All of them were assessed on GAIT scan preoperatively and again post operatively after wound healing to find the changes in plantar load following surgery. The GAIT scan assesses pressures on the medial and the lateral heel, mid foot, 1st to 5th Metatarsal heads and toes. Static and dynamic measures were taken. 18 out of 22 heel ulcer patients and 8 out of the 10 metatarsal head ulcer patients had follow up of more than 6 months.

Preoperative and post-operative data of plantar load for the heel and metatarsal heads were collected and analysed. Results show that there is a significant reduction in the load on the heel post-operatively in all the 22 patients who underwent calcaneal paring and flap cover. There was also no recurrence of the ulcer in all cases. Though there was no significant change in the load over the metatarsal heads between the preoperative and post-operative data, the follow up did not show any recurrence of ulcers.

Calcaneal paring and flap cover decreases the load over the medial and the lateral heel. The changes in the load distribution may be attributed to the calcaneal paring which increases the heel contact area. Flap cover does not change the distribution of load in the forefoot, though it does seem to provide a durable cover.

Keywords: Plantar ulcer, load, flap, heel, metatarsal
ICL5.2-024
Disability aid compliance in persons affected by Leprosy in urban and rural Maharashtra, India - a need for comprehensive study.

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OBJECTIVE
Disability is a consequence of nerve damage in some of the persons affected by leprosy and therefore patients need to use a wide variety of disability aids to assist in their treatment, correction of deformity and physical rehabilitation. The objective of our study was to assess the compliance rate among these patients in urban and rural Maharashtra where the Prevention and care of disability programme (POD) is in progress, to improve upon the care of patients with disability and to address the paucity of research that involves these issues.

METHOD
A questionnaire was therefore designed to assess if persons provided with disability aids reported a positive or negative impact on their disability. As well as a series of qualitative questions, demographic and deformity information was collected at the Referral Centre and peripheral clinics operated by Bombay Leprosy Project, (BLP) in urban and rural areas of Maharashtra. Patients who reported a positive or negative outcome defined compliance or non-compliance.

RESULTS
70 interviews were undertaken with 60% of interviewees reporting a good and positive outcome. 32% of patients did not find much change in outcome and 8% of patients did not answer the questions or complete the interview. Compliance was good in persons with mobile claw hand, abduction deformity and foot drop conditions using finger loop splints, adductor bands and foot drop splints respectively. Compliance was poor in patients with hand neuropathy, plantar neuropathy with ulcers and fixed claw conditions using finger loop and gutter splints, micro-cellular rubber, (MCR) footwear and gutter splints respectively. Patients who reported non-compliance cited pain, broken or lost aids and time as factors contributing to a negative outcome.
CONCLUSION
The majority of persons interviewed indicated that the disability aids were useful and a very positive addition to their treatment and rehabilitation care programme. Regular use of aids coupled with physiotherapy resulted in improvements of mobile claw hand and foot drop conditions. A small proportion of patients reported non-compliance especially in using finger gutter splints and MCR footwear for persons with planter ulcers. While compliance was good, the global non-compliance rate suggests there is a continued need for counselling, education and training in using disability aids. Moreover, there is a need to also undertake comprehensive research to enable improving care in persons affected by leprosy disability and reduce the personal burden that the disease brings.

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Keywords: disability aids, compliance, rehabilitation, disability treatment
ILC5.2–025

Footwear for people with anesthetic feet: are options available?

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Objective:
To determine the characteristics which patients seeks in MCR footwear.

Methodology:
Data was collected through the interview from the patients who had plantar anesthesia and were using MCR sandals for a period of minimum of six months. Total of seventy two patients were interviewed who reported the The Leprosy Mission hospital during January 2015 to December 2015. The main focus of the interview was to find out the characteristics which person affected by leprosy seeks in MCR footwear. Total of seventy two persons were interviewed who were using MCR footwear.

Results:
Out of the total seventy two persons who were interviewed sixty eight (68) of the patients said that they want closed footwear for winters and the sandals. All the females said that they want footwear without back strap and front strap. Forty seven patients said that they prefer to have insole in their regular footwear rather than using MCR footwear. Seventy patients were of the opinion that MCR footwear is a good option for prevention of ulcer and protecting the foot and MCR footwear are better than normally available soft footwear in market. Thirty five (35) patients said that they want MCR footwear in more colours and designs apart from the available range. Fifty two (52) patients were of the opinion that putting MCR insole inside the footwear in good choice.

Conclusion:
From the study it can be concluded that patients knew the importance of MCR footwear and were using the footwear on regular basis for prevention of ulcer but they wanted MCR footwear to be available in more colors and designs.

Keywords: disability aids, compliance, rehabilitation, disability treatment
ILC5.2–026
Comparison of in–Shoe Plantar Pressure using MCR and Market Footwear
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Objectives:
To compare peak pressure and pressure time integral of MCR with footwear available in the market as an initial step toward identifying alternative footwear to prevent ulcers associated with plantar anaesthesia.

Methods:
People with leprosy related anaesthesia from the region surrounding DBLM hospital in north west Bangladesh consented to participate in this study. Market footwear was selected by a team consisting of the researchers and several people with leprosy related anaesthesia. Multiple models were screened with the F–Scan to determine a small sample which was likely to be equivalent. Participants were fitted with F–Scan sensors in selected footwear. The footwear consisted of a pair of MCR sandals as a reference, and a selection of market footwear.

Prior to each assessment the sensors were calibrated using the step calibration technique in the F–Scan software. Participants were asked to take a few trial steps to establish an appropriate speed and make sure the sensors were positioned correctly and comfortably. Participants then walked a distance of roughly 12 meters while in–shoe pressures were recorded. The first and last stride were dropped from the recording and remaining steps were averaged by the f–scan software to determine the average peak pressure (PP) and the pressure time integral (PTI).

Results:
17 men (34 feet) and 19 women (38 feet) were assessed. Mean peak pressure for men using MCR was 264.9 Kpa ± 85.3, while the same men wearing market footwear resulted in mean peak pressures of 276.3 Kpa ± 77.4 and 263.3Kpa ± 86.8 respectively. PTI for the same footwear was 43.2 (Kpa*Sec) ± 15.26 for MCR while the market footwear had measurements of 43.15 (Kpa*Sec) ± 14.33 and 42.26 (Kpa*Sec) ± 15.45.
For women using MCR the mean peak pressure was 260.5 Kpa ± 73.7, whereas using two models of market footwear resulted in mean peak pressures of 267.5 Kpa ± 91.0 and 245.8 Kpa ± 70.83. The PTI was in a similar cluster, with an MCR mean value of 36.5 (Kpa*Sec) ± 9.4, and market footwear values of 35.2 (Kpa*Sec) ± 8.87 and 36.1 (Kpa*Sec) ± 7.8.

Conclusions:
The mean peak pressure and mean PTI of the market footwear selected was within 5% of the values measured with MCR for both men and women. To confirm that these measurements apply to the real world in terms of ulcer prevention, the study group will conduct a crossover trial for 8 months to compare the rate of ulcer development between individuals wearing MCR and individuals wearing market footwear.

**Keywords:** MCR, Footwear, Leprosy, Plantar Anaesthesia, F-scan
ILC5.2-027
place actuelle de la chirurgie dans la lèpre francis chaise¹, patrick guyon¹, kim khoa nguyen¹
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Malgré des progrès, des infirmités ou des mutilations limitent l’autonomie des patients et par là même leur intégration sociale. La chirurgie peut être utile dans plusieurs situations : les neuropathies, les paralysies, les mutilations.
La chirurgie peut ainsi protéger ou valoriser un capital tissulaire encore fonctionnel, ou parfois même reconstruire des fonctions permettant au patient de retrouver une certaine autonomie.

La composante mécanique des neuropathies (inflammation avec gonflement des troncs nerveux) qui s’ajoute à l’agression directe du nerf par le bacille est responsable d’une souffrance nerveuse rapidement d’éclectique en l’absence de thérapeutique efficace en particulier dans les canaux anatomiques inextensibles.

La chirurgie peut d’emblée alors les troncs nerveux en souffrance et éviter ainsi l’aggravation des paralysies dans les formes récentes peu d’éclectiques.

Les paralysies des mains ou des pieds responsables de griffe digitale, de paralysie de l’opposition du pouce ou de pieds tombants nous semblent aussi pouvoir bénéficier de la chirurgie (transferts tendineux) avant l’installation des rétractions ou de troubles trophiques menaçant l’extrémité du membre.

Si les grandes mutilations des membres inférieurs relèvent surtout de l’amputation, la chirurgie de sauvetage dans les ulcères plantaires reste une priorité chirurgicale. Au niveau des mains des gestes complexes de reconstruction peuvent être utilisés en particuliers jusqu’aux doigts.

Au niveau de la face les transferts musculaires permettant l’occlusion des yeux peuvent sauver une vision menacée, il faut y ajouter les gestes plus esthétiques comme les reconstructions de pyramide nasale.

La chirurgie offre donc des possibilités de réhabilitation efficaces dont les objectifs restent l’amélioration fonctionnelle et la recherche de l’intégration socio-économique de ces patients.

Keywords: lepro, neuropathie, paralysie, transfert tendineux, mutilations
ILC5.2-029
Sustainable Inclusive Self-care by Persons Disabled due to Leprosy, Lymphatic Filariasis (LF) and Diabetes
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Objectives: To teach persons with disabilities due to leprosy, lymphatic filariasis (LF) and diabetes, self-care practices to prevent secondary disabilities, manage present disabilities and to empower them to help others in practicing self-care.

Methods:
General Health Care (GHC) supervisors were identified and titled ‘‘facilitators’’. Facilitators along with the field staff were trained to assess nerve functions and EHF scoring in leprosy, grades of swelling in filarial lymphedema, and wound status in diabetes. In each batch around 30 affected persons were invited on a pre-fixed day and date at an identified primary health center (PHC). Community volunteers were involved in mobilizing persons with disability. Self-care was demonstrated at the PHC and affected persons were guided to do it by themselves under supervision of facilitators supported by NLR technical staff.

Persons disabled due to leprosy learned to soak their feet in water, scrub and oil their hands and feet and dress their wounds, LF persons learned to wash their legs and feet with soap and water, apply antifungal and antibiotic ointments in the skin creases and folds, while diabetic patients learned to maintain hygiene, treat intertrigo, manage their diet and exercise. Peer group interaction was facilitated and persons were motivated to propagate their knowledge and skills to other persons with similar needs.
Results:
To date, a total of 20 general health supervisors have been trained as “facilitators” in supervision and monitoring of self-care by affected persons. 649 volunteers have been trained in self-care and giving support to people practicing self-care. 396 persons affected by leprosy, 249 persons disabled due to LF, and 4 persons with diabetic feet have been trained and are practicing self-care regularly. By February 2016, 57, out of 147 ulcers due to leprosy, healed within 6 months, the number of acute episodes and swellings decreased in persons with lymphatic filariasis and all 4 diabetic ulcers healed with no secondary infection. The project is ongoing.

Conclusions:
Self-care by a combined group of patients facing comparable morbidity seems to be feasible, efficient and cost effective. With this intervention, more than 649 families will gain knowledge on leprosy, LF and diabetes, which is hoped to decrease stigma in the community and (ex) patients.

Keywords: Leprosy, Self-care, Inclusive, Disability
**ILC5.2-030**

La Prévention des Invalidités et la Réadaptation Physique des malades de la lèpre : L’expérience en Afrique Francophone

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Si le traitement médical de la lèpre par PCT constitue l’un des piliers de la Lutte contre la Lèpre, la prévention et le traitement des infirmités n’en constituent pas moins une priorité absolue. Mais la mise en œuvre de tels programmes n’est pas chose aisée.

Méthode : à partir de l’expérience de terrain dans plusieurs pays d’Afrique Francophone, et après avoir défini le concept de la PIRP, dont le premier volet est le dépistage et la mise sous PCT du malade, les auteurs écrivent la méthode d’implémentation de cette stratégie et les activités essentielles en comparant les expériences selon les pays.

Les résultats sont donnés en termes de processus mais aussi de suivi de cohorte. Les difficultés de cette prise en charge sont nombreuses et discutées, sur les aspects techniques, compétence des ressources humaines, système de référencement, modalités de suivi/supervision et implications financières. Une stratégie de simplification est évoquée et soumise à la discussion.

En conclusion, les auteurs réitèrent l’intérêt démontré de ces activités de PIRP pour le bien-être physique et social du malade tout en expliquant les difficultés pour la prise en charge des malades en réactions, des invalides et pour collecter des informations statistiques fiables.

**Keywords:** disability, neuritis, reaction, prevention, readaptation
ILC5.2-031
The importance of water, sanitation and hygiene (WASH) for lymphatic filariasis (LF) and leprosy care and inclusion

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Objective
Lymphatic filariasis (LF) and leprosy are neglected tropical diseases (NTDs) representing a significant global burden of disease morbidity. Both are most prevalent in poor, rural and marginalized populations. The similarities in disease presentation between LF and leprosy provide a case for a combined exploration of approaches to mitigating disease. Water Sanitation and Hygiene (WASH) which is an important area of disease management and requires adaptation for those with disability as a result of the diseases. This was therefore examined in a literature review in order to consider how interventions for different NTDs may be combined in joint programming.

Method
Literature on both LF and leprosy was collated and analysed by staff of WaterAid, The Leprosy Mission England and Wales, The Leprosy Mission International and the Leprosy Mission Nepal. The research looked at the similarities and differences between the diseases, the role of WASH in disease management in both diseases, how WASH can be implemented to ensure inclusion of those affected by LF and leprosy as well as giving recommendations for future work.

Results
Based on identified practices for LF and leprosy self-care, as well as known indirect considerations in support of self-care, such as preventing infection, the WASH requirements for adequately fulfilling and optimizing self-care for disease management and disability inclusion (DMDI) were identified. Using the social model of disability,
potential barriers to accessing WASH services for people living with LF and leprosy were mapped into environmental, attitudinal and social exclusion. The advantages and disadvantages of using targeted and inclusive approaches to address WASH needs and barriers were discussed. Then integrated approaches for self-care, in the form of priority sector needs and facilitators of success were formulated.

Conclusion
A thorough understanding of the role of WASH in DMDI, self-care, and WASH access and barriers, provides WASH and NTD sectors with the foundations needed to adequately address integration of WASH to improve self-care, and consequently improve the health and wellbeing of people affected by LF and leprosy.

There are currently opportunities for the WASH and NTD sectors to capitalise on to ensure integrated and holistic approaches to eliminating LF and leprosy. All NTD programmes should have active DMDI programmes. It is possible to ensure gaps in past strategy and programming are addressed, and that DMDI is prioritised equally alongside disease prevention and treatment.

Keywords: Water, lymphatic filariasis, disability, DMDI, self-care
IC5.2-032
UTILITY OF DISABILITY CARE SERVICES - BENEFITS AND ITS IMPACT - FIELD OBSERVATIONS IN URBAN SLUMS OF MUMBAI
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Introduction
In a megapolis like Mumbai Bombay Leprosy Project (BLP) covers an urban population of approx 2 million comprising mainly slums including Dharavi biggest slum in Asia. We share our experience on provision of field based disability care and assessment to study the outcome and impact due to services to patients assessed from 2010 to 2015.

Methods
Following integration of leprosy services in Mumbai in July 2004, leprosy elimination programme was to be reorganized and Prevention of deformity and care programme (POD) was also required to be strengthened in urban slums of Mumbai. Despite complex health delivery structures in place specialized disability care service is often lacking. In this complex scenario BLP provides services through its Main Referral centre and a few satellite clinics. The existing disabled patients (treatment completed and under follow up) were identified in project area with grade I and grade II and assessment of their deformity status was undertaken. Special records of disability assessment of individual patients were maintained. Ward wise maps to indicate location of patients and its distribution is maintained for planning delivery of services and follow up. Disability aids like splints, MCR footwear, dressing of ulcers, goggles, foot drop spint have been provided depending on type of deformity. To facilitate wax therapy wax baths have also been provided in these satellite clinics and extension units. Additional physiotherapy measures like muscle stimulation was provided for improving muscle function in early nerve function impairments. Clinical impact of services was assessed using a simplified proforma to ascertain status of deformity in patients with grade II deformity receiving services.
Results
On assessment of 228 patients, we found maximum improvement was observed in 10 (76%) patients with abduction deformity and in 50 (33%) patients with mobile claw hand while in foot in 5 (21%) patients plantar ulcers healed well and in 10 (50%) patients foot drop could be reversed. In the face in 16 (70%) patients with lagophthalmos, the nerve function was restored.

Conclusion
Ascertaining disability burden and distribution is important for planning and implementing field based POD care and services in the community, it is also important to ascertain impact of services to know the utility of POD services to plan better. It was also observed that with early identification of deformity and management with good compliance deformities can be corrected to a great extent.

Keywords: Disability prevention, Impact, Disease burden
ILC5.2-034
3 Dimensional printed, customized protective footwear: An innovative and effective tool for disability prevention and social acceptance.
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Background:
Appropriate protective foot wear is very much essential for the management of foot which are affected due to leprosy. However one of the major concern is the availability of appropriate foot wear in time due to lack of manpower and the time taken for fabrication. This calls for a computer assisted 3 dimensional printed protective footwear which can cater larger population in less time.

Objective:
To establish a 3D printed protective footwear production and supply system for effective disability management of foot.
To find its impact on effectiveness in disability prevention, compliance and Social inclusion due to protective footwear.

Methodology
A Central Fabrication Unit is set up in one of the 14 Hospitals of The Leprosy Mission Trust India. The other hospitals were equipped with portable 3D scan. The measurement of foot taken at Hospitals and communities can be emailed directly to the Central Fabrication Unit. The insoles are taken as printouts and can be placed in footwear which are cosmetically appealing and socially recognized. The foot are protected from further disability due to accuracy in the insole and at the same time are well accepted by the clients. This also enables people to come out of stigma which may be aggravated due to usage of traditional Micro Cellular Rubber Foot Wear.

Findings:
The effectiveness of foot wear in preventing further disability is proved. Also the client satisfaction and acceptance is also higher when compared with the usage of traditional foot wear.

Conclusion:
The service need to be expanded to more people with need of appropriate protective footwear. This leads to more disability prevention, client’s acceptance and social inclusion.

Keywords: 3 Dimensional, protective footwear, social acceptance
ILC5.2–035
Need of community based disability management program in the post integration era.
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Background
Persons affected by leprosy related disabilities needs continual care of eyes, hands and foot throughout life time. Leprosy can be seen as a public health issue in many of the localities and disability care need to be focused at community level. An effort was made to identify persons affected by leprosy, living with disability to identify the need and provide possible intervention.

Objective:
To find the level of disability and appropriate care among persons living in communities
To intervene effectively based on their need for enhancing holistic care.

Methodology:
Collaboration with the Government Leprosy Health Care System. Selection of intervention areas based on the available data. Community mobilization through home visits and announcements through local leaders.
Need assessments on holistic aspects such as health, livelihood, social security, family support, social participation.
Intervention and possible referral services
Follow up with the respective departments for services
Home visits for more specific care.
Results:
We have reached 120 persons with disabilities due to leprosy through 2 community based disability management camps. About 110 of them required protective footwear and were issued. 30 of them were referred for disability certificate and obtained. 12 of them were provided with Maintenance allowance through Government Schemes. 5 of their children were referred for vocational education. 65 of them needed ulcer care and were provided with the help of the Primary Health Centers. All of them were trained on self care activities. All of them were sensitized about the schemes and benefits that are eligible for them through Government Programs.

Conclusion:
It was found that almost all of the persons required rehabilitative care in some means. It is recommended that care after cure programs and specialized disability management programs need to be strengthened at the community level. The need for this at the post integration era still persist. This need to be addressed with the collaborative efforts of Government, Local community and NGOs with focus on leprosy care.

Keywords: community, disability management, collaboration
Adoption of New Criteria to define the degree on physical incapacity: new experience in Brazil.
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Objective: discuss the proposal in changing the methods of evaluation on physical incapacities proposed by WHO and define Brazil positioning.

Methods: the physical incapacity generated by leprosy commits the quality of life of patients, causes self-stigmatization, decreases the work capacity and restricts social life. Ministry of Health, after being aware the WHO document containing the proposal in changing on the definition of the GIF evaluation, promoted a summit of experts with large experience on Physical Incapacities. During this summit a new proposal containing new evaluation criteria and its aplicability to Brazil and the effective measures to its implantation was debated.

Results: the positioning was including muscular force as a definition criterion to GIF and maintain the others adopted in Brazil. A new evaluation GIF form was elaborated and a field test was conducted with this new form and the instructions that was approved by the Technical Committee responsible by teh new criteria application in Brazil. This procedure provoked the anticipation on the reviewing the new technical documents of Ministry of Health to include this new form in Brazil to define the degree of physical incapacity. Among these documents an administrative document called portaria that authorizes the publication of the guidelines to the Surveillance in Attention and the elimination of leprosy as a public health problem, the Surveillance in Health and the Practical Guide on Leprosy and also recommendations to states and municipalities.

Conclusions: leprosy continues to be a challenge to all health professionals, besides being a chronic infective process with a big incapacity potential. Due to this reason, Brazil adopted more sensible criteria to define the degree on physical incapacity with the proposal of reducing incapacities and deformities, unconstructing fears and prejudices that cause discrimination and moral and psychological damages to the injured patients, to the family and to the society. It is promordial that the health staff recognizes the damages and these incapacity degrees and diagnose the situation in an accurate way.

Credits and thankfulnesses: to the following cooperators: Katiuscia Cardoso Rodrigues; Sonia Maria Ferreira da Silva; Geisa Cristina Pereira Campo; Hannelore Vieth; Claudia Escarabel; Maria Kátia Gornos; Tadiana Moreira; Linda Lehman; Lucia Marciano.

Keywords: leprosy, physical incapacity, evaluation degree
ILC5.2-037
DIAGNOSTIC TEST OF KroX-20, PMP22, PROTEIN 0, NGF, AND NRG1 EXAMINATION TO DETECT EARLY DISABILITY IN LEPROSY
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Background: Leprosy is a chronic infectious disease caused by Mycobacterium leprae and had predilection on peripheral nerves especially Schwann cells. Leprosy medications are only for bacterial eradication, but not to prevent or recover peripheral nerve damage along with its components. However, early nerve damage detection is necessary. We examined KroX-20, PMP22, P0, NGF, and NRG1 as early peripheral nerve damage indicator in leprosy.

Methods: 79 leprosy patients of Kediri Leprosy Hospital were examined. Degree of disability was measured based on WHO’s criteria. ELISA and immunohistochemistry was used to measure the study variables. Receiver Operating Characteristic curve was used to determine cut off value.

Results: Overall of 79 leprosy patients (36 patients had degree of disability 0, and 43 patients had degree of disability 1). Analysis of ROC curve shown that cut off value of KroX-20, PMP22, P0, NGF, and NRG1 was 8; 4,42 pg/ml; 11,39; 81,4; dan 18,74 respectively. Leprosy which degree of disability 0 showed higher value for all parameter than those degree of disability 1 (respectively mean: 12,56 vs 4,24 (p<0,05); 9,85 pg/ml vs 2,86 pg/ml (p<0,05); 10,91 vs 7,71 (p<0,05); 100,46 vs 30,56 (p<0,05); 30,04 vs 7,07 (p<0,05)).

Conclusions: There is a significant difference between MB leprosy patients grade 0 and grade 1. Examination of KroX-20 level is very beneficial to evaluate the risk of early disabilities in leprosy patients before the clinical symptom appears. Additional examination can be done to complement the result of kroX-20 examination, from the more sensitive and specific are NGF, P0, PMP22, and NRG level, respectively.

Keywords: degree of disability, KroX-20, PMP22, PROTEIN 0, NGF and NRG1
ILC5.2-038
Cost and specialized service procedures for leprosy carried out by public health services in Brazil, 2013 and 2014.
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OBJECTIVE: Analyze the types of procedures and the cost of specialist services, provided by the Unified Health System (SUS) in leprosy patients in Brazil in 2013 and 2014 as a subsidy monitoring and management.

METHOD: The authors conducted a descriptive study, on specialized services, outpatient and hospital for leprosy. The data sources were the SIH and the CIS which respectively manage authorizations for hospital admissions and outpatient services in the country under the SUS. They also selected the variables type and cost of the procedure, carried out in 2013 and 2014, with code A30 - leprosy - CID 10. They analyzed the groups defined procedures in SUS Procedures Table Management System: No. 03 - clinical procedures, # 4 - # 7 surgical procedures and prostheses.

RESULTS: During the years 2013 and 2014 SIH recorded 9,696 hospital procedures for leprosy, which corresponds to a cost of $ 3,203,996.66. The group No. 03 registered treatment for leprosy in 3276 (77%) procedures, which may be related to reactive states and adverse events. In No. 04, debridement of ulcer / devitalized tissue prevailed with 1,151 (21%), followed by treatment and / multiple surgeries with 453 (8%). Procedures in paragraph 7 were not recorded. In the CIS included 887,570 procedures for leprosy, which cost the NHS U $ 4,444,781.18. The analysis by group shows that in paragraph 3 prevailed physical therapy, with 373,206 (99%). In paragraph 4, curative grade II with or without debridement contributed 6,600 (57%) and in paragraph 7 of prostheses and mobility aids (OPM), prevailed the sural-pedal and static orthosis, with 9,929 (42%), followed by OPM as insoles for neuropathic feet and anatomical footwear, with 7,998 (34%).

CONCLUSIONS: in 2013 and 2014, the costs of specialized procedures for leprosy SIH and SIH were U $ 7,648,777.84. The majority related to treatment reactions and prevention, treatment and rehabilitation of physical disabilities. This demonstrates the need for maintenance actions for early diagnosis, qualified clinical management and investigations on homogeneity in access.

Keywords: leprosy, hansen íase, Cost, service, specialized
ILC5.2-039

Inclusion of Surveillance after RFT into Routine Leprosy Control Activity using “BOK”: lesson learnt from Gorontalo, Indonesia
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Objectives: Gorontalo is one of provinces with high burden of leprosy in Indonesia. In 2014, Gorontalo reports 181 newly diagnosed leprosy case with 10% of them has been found with disability grade 2. Efforts have been done to find cases earlier and improve self-care practice among people with leprosy related disability. Gorontalo reports high proportion of persons affected by leprosy who are at risk of developing further disabilities. The success of Semi Active Surveillance (SAS) program in Gorontalo Municipality which took place during 2009–2012 and supported by NLR has encouraged the province to put surveillance after Release from Treatment (RFT) as one of its priority. Since 2013, surveillance after RFT (“SAS”) has been adopted in all districts in this province with full support from national budget (“Biaya Operasional Kesehatan” /BOK).

Method: During 2013–2014, 162 clients are included. The method is similar to what SAS has implemented in Gorontalo municipality. Clients are listed from cohort and given a monitoring card which should be shown during their 3-monthly visit to Health Center (HC).
Result: Province report shows that approximately 12% of clients show reduction of disability score during 1st year, the rest of them has similar score, and no clients are recorded with higher score. Annual monitoring is taken every year during provincial monitoring and evaluation meeting. Year 2 monitoring shows lower clients’ visit frequency compared to 1st year but no worsen score recorded. However, though leprosy health worker at HC has also been equipped with technical guidelines that clients should be traced if clients did not come to HC according to surveillance schedule, they still mention that it is very difficult to maintain compliance due to many factors. This surveillance will take place for 5 years. Since 2015, one of districts in Gorontalo also has been intervened with mobile technology platform which is in one of its activity includes reminding clients to visit HC every month after RFT.

Conclusion: Though further analysis is needed, this activity in Gorontalo has shown the importance of post-treatment surveillance to be included as a priority in leprosy control. This approach has been patchy in some provinces and yet no system has been developed nationwide to accommodate this need. Sufficiently available budget and capacity at primary care is an advantage to expand this program. In the future, possibility of integrating this activity with mobile platform may promise a greater benefit to both clients and leprosy control program itself.

**Keywords:** disability, surveillance, RFT, program, BOK
ILC5.2-040
Factors influencing access to Leprosy related Reconstructive Surgery in India
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Objective: To study the factors influencing access to Leprosy related Reconstructive Surgery in India.

Methods: An evaluation research study on The Leprosy Mission Trust India’s (TLMT) Reconstructive Surgery Programme was carried out in 2014-2015 across 8 states of India. Teams comprising medical doctors and physio/occupational therapists were trained in the methodology and collected data through field visits. Semi structured interviews were conducted with people affected by leprosy who underwent the surgeries, their family members, the National Leprosy Eradication Programme staff, General Health Care staff and TLMTI staff to identify the factors that influence access to Reconstructive surgery.

Results: The study examines various factors such as the referral system, coordination between various leprosy agencies and reconstructive surgery providers in the locations, gender and age specific issues of patients, availability of trained surgeons and surgical facilities, surgical outcomes and patients’ reasons for delay that influence access to timely reconstructive surgery.

Conclusion: Timely access to reconstructive surgery results in timely restoration of function with less likelihood of worsening of deformities, loss of productivity, exclusion and discrimination of people with established deformities. Understanding the factors that influence access to timely surgery will enable us to develop strategies to strengthen the healthcare system and to minimize delay in accessing surgery thus avoiding needless suffering.

Keywords: Leprosy, Reconstructive surgery, Access, India
ILC5.2-041
Nepal 2015 Earthquakes: Medical response and impact in trauma-related disability prevention by a tertiary leprosy hospital during a national disaster

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Objective:
On April 25 and May 12, 2015, devastating earthquakes struck Nepal (Richter scale magnitude 7.8 and 7.3, respectively), followed by hundreds of aftershocks over the next months resulting in nearly 23000 injuries and 9000 deaths. Anandaban Hospital, a tertiary leprosy referral centre in the capital of Nepal, immediately activated to meet the needs of earthquake victims in hospital and by performing strategic camps in affected districts.

Method:
To perform a retrospective medical records review of the hospital and field medical relief work performed in the aftermath of a national disaster from April 25, 2015 to January 31, 2016.

Results:
Routine leprosy services in hospital primarily remained ongoing throughout this period. Of the 437 earthquake victims who received treatment in hospital, 243 were male (55.6%) and 189 female (44.4%), two of which were pregnant and safely delivered later. Sixty seven (15.33%) were children aged 300 leprosy-affected persons who also attended within these camps.

Conclusion:
Altogether 6063 victims through 46 health camps and 437 victims were treated during the 9 months post-earthquake. Most reporting to hospital required surgical intervention with physical rehabilitation, critically impacting in areas of reduction or prevention of disability development. Holistic care for surgical management, physical rehabilitation and psychological care were provided. These critical efforts and mobilization during the time of national disaster have been recognized within the community and by the government.

Keywords: Earthquake, Injury, Physical Rehabilitation, Disability, Disaster Response
ILC5.2-042
Analysis of development of new disability after MDT among reported cases in State of Assam, India
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Introduction: the State of Assam is a land of hills and valleys, with a population of 3,12,05,576, estimated population of 3,31,18,350. with 27 Districts, 3 (three) Districts are High endemic. About 1000 new cases of leprosy are detected, registered every year, 13.43% of the newly detected cases during 2014–15 already have Gr.II, disability at the time of detection. With effect from 2010–11 to December 2015, 12 (twelve) cases (all Male MB Adults) are recorded as developing new disability after MDT. The purpose of the study is to find out the proper recording, reporting, management and outcome of the cases that developed new disability after MDT and whether there is a scope for improvement of case management in future.

Introduction: Situated in the heart of North East corner of the Indian sub-continent, the State of Assam is a land of hills and valleys. It has a population of 3,12,05,576 (2011 Census) and the present estimated population of 3,31,18,350. It is a low leprosy endemic State but out of the 27 Districts in the State, 3 (three) Districts are High endemic. About 1000 new cases of leprosy are detected, registered and put under treatment every year in Assam during the last 5–6 years. 13.43% of the newly detected cases during 2014–15 already have Gr.II, disability at the time of detection. With effect from 2010–11 to December 2015, 12 (twelve) cases (all Male MB Adults) are recorded as developing new disability after MDT. The purpose of the study is to find out the proper recording, reporting, management and outcome of the cases that developed new disability after MDT and whether there is a scope for improvement of case management in future.
Methods: The cases that developed new disability after MDT were identified, interviewed and examined supported by the records maintained. During the year 2010–11 to December 2015 a total of 5867 were registered and among them 400 cases were of gr II deformity, 5699 cases were released from treatment as on December 2015 – It was reported as 12 cases developed deformity after MDT – The reported cases where reviewed
Results: Among the 12 cases reviewed – 5 were found not having disabilities, management of reactions was not satisfactory, 2 cases completely recovered after treatment and 4 did not show any improvement. It was noticed that there was delay in starting anti reaction treatment.

Conclusion: There is over reporting of cases that developed disability after MDT and also inadequate management of lepra reaction/neuritis. Other points will be discussed during presentation/discussion

Keywords: disability, Assam, North East
ILC5.2–043
Strengthening Disability Care in General Health Care System Through Referral Centres in Odisha (India)
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Objective:
LEPRA Society having its expertise in leprosy related disability care services in seven states of India, ventured for strengthening the health care system in disability care services in Odisha across the state after its successful implementation of DTST (District Technical Support Team) project (2004–07) through a project named TRU & SRS (Technical Support Team and Strengthening Referral System). The present study is to find out to what extent the referral centres established and managed by ILEP (LEPRA Society) meet the expectations in the state of Odisha.

Methods:
A total of 10 Referral Centres have been established to cover 30 districts (44 million population) at district hospitals having one Medical Officer, one physio-technician & one shoe-technician at each centre to cope with the needs of leprosy cases with complications referred from PHCs. On the day of the weekly DPMR clinics, the MO & PT visit the PHCs and train the staff of the PHCs on disability care and complication management. Reconstructive Surgeries were also facilitated through the staff of the RCs and referrals from PHCs.
Results:
A total of 58,736 patients were registered at RCs from Sept. 2007 to December 2015, mostly being referred from PHCs. These patients include management of 4439 new lepra reaction cases & more than the double old reaction cases and also management of 25,734 new & old ulcer cases. 24,319 pairs of customised foot-wears for persons with deformed foot & plantar ulcers were provided through different RCs & DPMR clinics. 12 RCS Centres are being facilitated through these RCs and 2203 surgeries were performed at these RCS centres by the trained Government surgeons through the project. The RCS beneficiaries were benefitted by 11,231 post-operative visits to the RC / RCS centres. The assessment of these persons revealed around 80% ‘good’ results.

Conclusion:
In the integrated setup of NLEP programme, the referral centres in Odisha played a very important role in identification, assessment and expertise service delivery to the persons with disabilities and continued. In order to sustain POD services at primary level, the PHC staff are trained by our RC staff, so that DPMR clinics are managed at PHCs. Government of India accepted this best-practice referral centre model and issued guidelines to be implemented in the country.

Keywords: leprosy, referral centre, disability, disability prevention and medical rehabilitation, district hospitals
Disability and reactions  William R Faber

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Disability and reactions  William R Faber

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“Across the world, more often than their non-disabled peers, people with disabilities do not receive the health care they need and have poorer health. People with disabilities are more than twice as likely to find healthcare providers’ skills and facilities inadequate; nearly three times more likely to be denied healthcare; and four times more likely to be treated badly”.

The 67th World Health Congress endorsed the WHO global disability action plan 2014–2021 to address these disparities.

In this this workshop attention will be paid to basic questions regarding disability in leprosy and possible prevention by therapeutic intervention as well as means of better understanding and investigating “new” treatment of reaction, in this case Erythema Nodosum Leprosum, through presentations of research projects supported by the LRI.

What is the present situation and which factors do influence access to rehabilitation services for persons with disabilities. This is information which is not generally available, and does not apply only for persons with disabilities due to leprosy. Also treatment can be a burden, especially for persons with disabilities, and how can relevant information be obtained.

Prevention of nerve damage and management of reactions are important aspects in the prevention of disabilities (POD). A large scale double-blind placebo-controlled study (TENLEP) addressed the question of treatment of subclinical and also clinical neuropathy can prevent permanent sensory and/or motor impairment in people affected by leprosy. Chronic and recurrent Erythema Nodosum Leprosum leads to a variety of disabilities, and is a major cause of (physical) suffering of patients, also many years after release of treatment. Development and validation of a severity scale in a multicentre study is wanted. Also, alternative treatment for the management of Erythema Nodosum Leprosum is needed, and will be developed.

Keywords: disability, reaction
ILC5.2-045
OUTCOME AND IMPACT OF DISABILITY CARE SERVICES - FIELD OBSERVATIONS IN RURAL AREAS OF THANES DISTRICT, MAHARASHTRA STATE, INDIA
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Introduction
Under the rural disability care programme of Bombay Leprosy Project (BLP), a few talukas has been adopted in rural areas of Thane district adjoining Mumbai for understanding the magnitude of patients with grade 2 deformity and provision of care and services. Observations on magnitude of disability in one taluka with PR of Gr II deformity 25/10,000 was reported earlier in 2013(Pai et al). We now share our observations on magnitude and impact of POD services in another taluka.

Methods
Prevention of deformity and care programme (POD) is in operation in rural areas of Thane district as basic health facilities in the district lack specialized disability care service for persons affected with leprosy related deformity. BLP is offering services through its supervisory mobile units and by engaging local community volunteers. Field campaigns were undertaken to identify existing disabled patients (treatment completed and under follow up) in rural villages with emphasis on grade II disability and assessment of deformity status was undertaken. Special records of disability assessment of individual patients are maintained. Village wise maps to indicate location of patients and distribution were helpful for planning and review of delivery of services. Disability care aids like splints, MCR footwear, dressing kits, goggles, foot drop splints were provided depending on type of deformity. To facilitate wax therapy wax baths have been provided in the PHCs. Clinical impact of services was carried out using a simplified proforma to ascertain status of deformity in patients with only grade II deformity receiving services.
Results
The prevalence of Gr II disability was 34.4/10,000 and we observed maximum improvement in hand in 14 (51.8%) patients with abduction deformity and in 49 (49.4%) patients with mobile claw hand and in foot in 106 (66%) patients simple ulcers healed well while in 6 patients with foot drop 1 improved. In patients with complicated ulcers with additional care healing was seen in 4(34%) patients. Those with plantar ulcers need further follow up care while recurrence of plantar ulcers was seen in 13% of the patients.

Conclusion
We strongly believe that such high magnitude of disability burden and provision of services and follow up of such patients poses a huge challenge. We also believe that consistent care and services will result in correction of deformity and prevention of worsening of deformity in some patients provided disability is identified early to improve the quality of life of such patients.

Keywords: Disability, Prevalence, Impact, POD Care
ILC5.2–046
The analysis of the disability situation among new leprosy cases in Dazhou, Sichuan junbai tang

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Objective: to analyze the disability situation among new leprosy cases in Dazhou, Sichuan from 1998 to 2014. Methods: analyze the disability situation of new leprosy cases from 1998 to 2014, based on the standard criteria of LEPMIS (Leprosy Management Information System in China). Results: the disability rate decreased 12.51%, compared to the rate before the elimination of leprosy in Dazhou. Conclusion: the disability situation among new leprosy cases in Dazhou decreased significantly.

Keywords: leprosy, disability, analyze, new cases
ILC5.2-047
“mPOD – Mobile Prevention of Disabilities; delivering relevant knowledge and treatment in an effective and efficient model”
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Objectives
The vision for Mobile Prevention of Disability – mPOD is to prevent disabilities efficiently using modern technology. An effective prevention of disability will bring impact in reduce stigma towards individuals affected by disability-causing NTDs. These individuals can then, remain as productive as possible, providing economic security for them and their families. Health workers and communities are also empowered and educated so that disabling NTDs are no longer an issue.

Methods
mPOD breaks down barriers to preventing, finding, treating, and managing disability-causing NTDs by bringing greater access to resources and information. mPOD leverages modern technology to contact and communicate with people with disability-causing NTDs and the healthcare workers in their communities. The user-focused mHealth system provides them with the tools they need to monitor these diseases, prevent disabilities, and follow-up on care. Training and resources are communicated both online through mWeb applications and by SMS.

Results
To date, 459 unique users have participated in mPOD’s pilot phase targeted at leprosy: 56% leprosy patients, 32% family members and 12% local health workers. These users sent 5267 replies to mPOD messages; 71% (about 3750 messages) required follow up from the local operator at the health centre.
Such follow up would rarely occur had it not been for the linkages mPOD created. From a sample of current direct beneficiaries, 81% reported satisfied with mPOD’s processes, tools and resources. The support forum, mobilizing social media tools, includes 299 local health workers and 86 people affected by leprosy. The forum has shared information and experiences related to disease and disability. A poll reports that 100% of respondents (n=39) were satisfied with the support forum.

Conclusions

NTDs including leprosy are serious health, social and economic problems in Indonesia. Indonesia reported 16,856 new cases of leprosy in 2013 with 20% of these report an impairment at diagnosis. Access to timely, relevant information among health care workers and individuals impacted by disease continues to be a major challenge for addressing the impacts of NTDs across Indonesia. mPOD helps people prevent and manage disabilities and increases health workers’ capacities to deliver relevant knowledge and treatment in an effective and efficient model. Through social forums, mPOD also creates a network of community health workers and people affected by NTDs for peer support and stigma reduction. In long terms, mPOD has great potential to contribute to the improved health system performance and health coverage for those with disabling diseases across Indonesia.

**Keywords:** Prevention, Disability, technology, leprosy, NTDs
ILC5.2-048
Analysis on the disability distribution of survivals cured from leprosy in Guangxi province
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Objective Provide a scientific basis for the prevention and treatment of disabilities through the investigation on survivals cured from leprosy.

Methods The data was collected and be analysed by the method of descriptive epidemiology. Results There were 5579 survivals cured from leprosy. The total disability (Grade II) rate was 23.41% (1306 people); The disability (Grade II) rate of whom were at least 60 years old was significantly higher than that in survivals under 60 years old ($\chi^2$=29.167, $P < 0.001$). The disability (Grade II) rate in cured multibacillary survivals was significantly higher than that in paucibacillary leprosy ($\chi^2$=5.341, $P < 0.05$). The average delay in diagnosis was 38.60 months. Disabilities had a significant impact on life and working ($\chi^2$=296.890, $P < 0.001$).

Conclusion The disability rate was at a low level in Guangxi province. The risk of disability increased with age. Disabilities had a significant impact on life and working. Survivals cured from leprosy were disabling or not should be included in observation system. Relevant training was necessary for lepers to take care of themselves and improve their quality of life. Multi-sector should work together and harder for early identification and treatment to reduce the risk of disability.

Keywords: leprosy, survivals cured from leprosy, disability, rehabilitation
ILC5.2-049
Physical disability and its repercussion on social and functional patients with leprosy post-discharge from multidrug therapy
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PURPOSE This paper sought to analyze the clinical characteristics, social insertion and functional limitations that occur in patients with leprosy. They were evaluated in a national reference university hospital in southeast Brazil during the period 1998 to 2013. Methods: One hundred thirty-six patients (aged 12 - 82 years) with leprosy were enrolled in a cross-sectional descriptive study after discharge from multidrug therapy treatment. Participants were submitted to clinical and functional evaluations as well as characterization of the restrictions to social involvement, through SALSA (Screening of Activity Limitation And Safety Awareness) and Participation Scales. Results: The patients (79 males, 57 females) had a mean age of 44.67 ± 15.05 years. The most prevalent characteristics were male (79%), multibacillary (86%) and some disability (91.2%). From those, 32.8% were classified as degree 2 disability. At the moment of evaluation 56.5% of patients reported pain and 27.2% had used corticosteroid therapy. Ninety-five patients underwent neural decompression or tendon transfer surgery. Age under 64 years and complaint about pain represented a higher risk to limitation of activity. According to SALSA and Participation Scores, 75% of total patients had functional limitation and 52.2% had social restriction. Conclusion: Despite the context of a reference hospital, it is important to highlight the late diagnostics in this study. Our findings suggest that being over the age of 64 was a protective factor for activity limitations, which may be related with a higher impact of the disease in the young, causing more limitations on activities. There was no association between SALSA score and the presence of deformity, demonstrating adaptation to physical disabilities. The treatment with MDT eradicates M. Leprae, however it does not overcome the physical deformities already in place.

Keywords: leprosy, rehabilitation, limitation of activity, disability, social restriction
ILC5.2-050
The impact of self-care group mode on people affected by leprosy self-care ability and psychological behavior
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Objectives: To explore the effects of Self-care group mode in people affected by leprosy.

Methods: A pilot Self-Care Group (SCG) was organized in Shenzhen, which is relatively large mobile population in Guangdong Province. All of registered leprosy patients enroll to the principle of voluntary in group. Divided into two groups according to region, regularly carry out centralized self-care and functional training. Interviews were conducted to gain the opinions, and qualitative data was grouped according to frequently motioned and displayed in the table.

Results: SCG participants increased the awareness to protect their eyes, hands and feet. The psychological condition was improved, especially on the interpersonal relationship, anxiety and hostility aspects. The difference was statistically significant (P <0.05).

Conclusions: Through the establishment of self-care group, so that people affected by leprosy and rehabilitation are able to take care of themselves, through mutual exchange and encouragement, and jointly promote the deformities rehabilitation and psychological health, in order to investigate effectively improve the patient's self-care model of care, thereby improving the patient's quality of life, reduce leprosy the damage caused by leprosy.

Keywords: leprosy, leprosy disability, Self-Care Group
Impact of Self-care groups of persons affected by leprosy on clinical and social parameters, a comparative cohort study in India, Indonesia and Nepal

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Background
In endemic countries, foot care, wound care and stigma associated with leprosy remain an obstacle for the prevention of future disabilities. To overcome these problems self-care group (SCG) are implemented. However, research of its effectiveness is limited and most research consist of a qualitative approach.

Objectives
The purpose of this study is to investigate whether SCG as an intervention is effective in reducing stigma and participation restriction and in improving wound and foot care, as compared to non-membership of SCGs.

Methods
A 24-month longitudinal study was conducted in Indonesia, Nepal and India. During the study, SCG-members and controls were monitored on foot care, wound status, wound size, recurrence of ulcers, level of stigma (EMIC) and participation restriction (P-scale). Linear mixed models, generalized linear models and survival analyses were used to analyze the differences. To gain more insight into experiences of patients, qualitative research was added. After analysis of the quantitative and qualitative data, in-depth interviews were held with principal investigators in the three countries to better understand the context of the research.
Results
For Indonesia and Nepal, quantitative evidence was found that SCG-members experienced a faster ulcer healing time than non-members. For India no differences were detected in wound size, time to heal and recurrent ulcers between intervention and control groups. Qualitative results showed that the SCG-members of all three countries felt the intervention had a positive effect on the wounds. Most group members noticed improvements and appreciated the fact that they had learned self-care. Further quantitative analysis showed that in Nepal, SCG-members experienced significant less self-stigma and participation restriction compared to non-members. In Indonesia and India no difference between SCGs and non-members were detected. In a qualitative exploration, however, SCG members did express that stigma and participation restriction problems can be overcome by joining a SCG. In-depth interviews with organisers of these groups supported these findings. SCG interventions were considered helpful for wound care, learning self-care and preventing infections. Due to the overall improvement in wounds, self-stigma will reduce and participation in society will increase.

Conclusions
The quantitative analysis provided evidence for the effectiveness of SCG interventions in improving ulcer healing processes, improving foot-care, reduction of self-stigma, and improving participation. Qualitative results and in-depth interview results of all three countries indicated that SCG interventions are effective.

Keywords:
ILC5.2–052
Self-Management Support for Prevention and Care of Neuropathic Feet in Low Resource Settings, a Review.
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Background
Persons with neuropathic feet are at risk for disabilities, a risk that can be reduced through adequate self-management. In low-resource settings, persons with neuropathic feet largely depend on self-management. The number of people that should understand and practice such self-management will increase in the coming decades, especially because of the increase in diabetes and consequently care for the diabetic foot, very similar to the insensitive foot in leprosy. This will challenge health care systems, which will need to move towards supporting effective self-management of persons with neuropathic feet.

Objectives
To determine what tools and implementation approaches are promising in supporting self-management in prevention and care of neuropathic feet, which can be applied in resource limited settings.

Methods
A structured review was undertaken using PubMed, Medline and Embase. Additionally, authors of identified studies were contacted, as were experts in the field of neuropathic feet and wound care. Studies were included if they described an intervention supporting self-management of persons with diabetes or leprosy, or were about supporting home-based management of any other chronic condition. Included studies were graded using the SIGN system of evidence grading.
Results
In total, 51 studies were included: 40 were diabetes and/or leprosy related and 11 concerned other chronic conditions. The studies suggest that group education and training is as effective as an individualized approach and effectively reduces neuropathic ulcers. A training programme that empowered participants resulted in better self-management. Community partners could be an extension of the health care system if well equipped to perform their support role. Involving peers and/or family in self-management support can be another beneficial approach in enhancing self-management. Furthermore, through a variety of cheap technologies the accessibility and communication with health care providers can be improved, increasing effective self-management.

Conclusions
A variety of tools and approaches are supportive for self-management. Combined approaches with empowering patients, involving their social environment, and enhancing access and communication to health care providers, is likely to most support self-management. The choice of method depends partly on the context of self-management and health care, and the availability of resources.

Keywords:
ILC5.2-053
Influence of the Insole (Platform for Tarsus) in the Body Balance Control of the Leprosy Patient with Sensitivity Impairment
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Leprosy is a chronic disease caused by the Mycobacterium leprae with sensitivity impairment as a characteristic that could lead to deformities of hands and feet. The Ministry of Health of Brazil (MS) recommends the use of platform for Tarsus (PT) insoles as a complementary treatment to the Multi-drug Therapy (MDT). Many articles in literature discussed the use of insoles for improving balance and redistribution of plantar pressure in neuropathic patients, but there are no studies that included PT insoles. This study compared the balance control values for the leprosy patient with normal standards and also prospectively compared the influence of PT insole in patients with leprosy, by means of static and dynamic tests performed with the Balance Master (NeuroCom Int. Inc.) device, before and after 3 months. 40 patients following treatment in HCFCRP were selected, of which 19 completed the follow-up to the survey (68.4% male, mean age 51.95), all classified operationally as Multibacillary.
The tests outlined the behavior of these patients with regard to involuntary balance control (modifCTSIB sensory test) and voluntary excursion of the Body Center of Gravity (COG; LOS test) as well as the gait stability (WA test). The results obtained with the modifCTSIB showed that patients with leprosy are more dependent on the visual system than the somatosensation for balance control when compared to normal values (according to the relationship between tests with open and closed eyes, and stable and unstable surface; p 0.05). However the use of insoles interfered negatively in the LOS test for the variables end point and maximum excursion of the COG only on the forward to left position (p < 0.01), and favored the directional control of COG at the same position (p = 0.02). The analysis of the patients file revealed that sensitivity deficits were identified more frequently in the left forefoot, which might explain the observed differences for the excursion of the COG only in this region. The WA test showed that patients have slower walking patters compared to normal values but had their walking speed (p = 0.04) and the length of their step increased (p = 0.04) after the use of the insoles. It was concluded that the PT insoles favored gait stability and voluntary control of body balance. It was also observed that patients became dependent on the insoles, an important factor to be considered by the Health service after the PQT discharge.

**Keywords:** Rehabilitation, Leprosy, Peripheral Neuropathy, Body Balance, Insoles
ILC5.2-054
Influences of the delay detection of leper on disabilities
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Objective To investigate the influences of the delay detection of leper on disabilities, and provide the basis of develop strategies for leprosy prevention, treatment and disability rehabilitation.

Methods On May and June of 2013, two group cases were investigated in this study: cases who are still leprosy patients and had been diagnosed as leprosy from Jan. 2010 to Dec. 2012 in Zhejiang Province (recent patents group), and leprosy cases who had been cured and still stay in my hospital on May. 2013 (cured hospitalized group). Questionnaire were used by the staff of leprosy prevention and treatment to investigate the subjects’ incidence time, diagnosis time, and disability situation etc. Chi-square test, T test were used for analysis the difference between different groups.

Results The delay period from leprosy incidence to diagnose in cured hospitalized group was 69.51 ± 8.36 months, significantly longer than those in recent patents group (35.96±6.05 months, t=29.80, P 0.01). The disability rates in cured hospitalized group was 96.51%, significantly higher than those in recent patients group (26.5%, x²=87.97, P 0.01); The disability rates in cases whose delay period were equal to or less than 2 years in recent patents group were significantly lower than those whose delay period were more than 2 years (x²=4.40, P .05) ; Compare with the type of leprosy patients:MB long time than PB in diagnose(t=12.14, P 0.01),but on disabilities had no significant difference with both(x²=0.20, P>0.05).

Conclusion The delay detection of leprosy influence significantly on leper disabilities. In cases who are still leprosy patients, the disability rates in leper whose delay period from incidence to detection were equal to or less than 2 years may lower than those more than 2 years. As leprosy prevalence keep very low state, the leprosy knowledge training for medical staff should be strengthened to improve their diagnosis level.

Keywords: Leprosy, Delay detection, Disability
ILC5.2-055
DPMR ACTIVITIES—CHENNAI’S EXPERIENCE
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The aim of NLEP is to detect and cure people with Leprosy and to stop the transmission of infection and to prevent the disease and deformity. Tamilnadu has achieved the elimination of leprosy (PR<1<10,000 population) at district level on 2011. Leprosy as a chronic disease in nature, which affects the skin and nerves leading to loss of sensation in the hands, feet and eyes and leads to deformities disabilities and disfigurement.

Chennai, the capital city of Tamilnadu with current population of 8.2 million, is one of the largest cities of South India, and it is the second oldest corporation next to London with population density of 26,803/sq.km. Working in Urban Leprosy is unique experience and challenging.

Current PR accounts for 0.39/10,000 pop with annual cases reporting approximately 300 cases for the last 5 years. No. of Gr II and Gr I deformity cases are 458 and 77 respectively Measures to prevent disabilities (Orthopaedic devices, Splints and RCS) carried out properly and periodic assessment done for all newly detected cases. Maintenance Allowance paid to Leprosy cured persons but with deformity on monthly basis. Detailed information, facts and figures will be presented in the original Paper.

Keywords: Elimination, Disability, Prevalence, Assessment, Splint and RCS
ILC5.3-001
Reconstructive Surgery in Hansen Disease: Nigeria Story
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Reconstructive Surgery in Hansen Disease: Nigeria Story.
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Introduction: Leprosy remains a disease of public health importance in Nigeria with annual new case detection of 4000 people. One of the ways in which stigmatization can be prevented is by correcting deformities resulting from Hansen disease. There was no center in Nigeria where Hansen disease patients could have their deformities corrected. Damien Foundation Belgium thought it fit to establish such a center in Nigeria hence a doctor and a physiotherapist were sponsored for training in reconstructive surgery in India in 2014. On completion of the training, the first and only reconstructive surgery center for Hansen disease patients in Nigeria was established in collaboration with Bowen University Teaching Hospital, Ogbomoso in February, 2015.

Objective: To give a preliminary report of reconstructive surgery in Hansen disease patients in Nigeria.
Methods: Data was prospectively collected for five consecutive patients, who had reconstructive surgery at the center between March, 2015 when the first surgery was done and September, 2015. Patients who had associated contracture had serial manipulation and casting with POP to correct the contracture.
All the patients had preoperative physiotherapy for 7 to 10 days to increase the strength of the muscle intended for transfer and post operative physiotherapy for 4 weeks. The patient with Lagophthalmos had temporalis muscle transfer while the patients with Claw hand had correction by Lasso procedure.

Results: All the patients seen were male and their age ranged from 20 to 60 years. One patient presented with Lagophthalmos while the rest of the patients presented with ulnar claw hands. Out of the four patients who presented with ulnar claw hands three of them had associated contracture. Two of the patients dropped out of school because of the deformity and associated stigma. There was family history of the disease in only one of the patient. None of the patients developed post operative wound infection. They all had satisfactory correction and are still on follow-up.

Conclusion: Reconstructive surgery for Hansen disease patients is one of the ways of eliminating stigma associated with deformities and it also helps in restoring patient’s ability to carry out some basic functions.

Keywords: Reconstructive, Deformities, Hansen disease, Ogbomoso, Nigeria
ILC5.3–002
PUBLIC HEALTH SERVICE WHICH APPLYING HUMAN DIGNITY AND EQUAL RIGHTS for Person Affected by Leprosy, their Family and Community—in Several Areas in Indonesia
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The State of Indonesia is still the country’s third largest for the number of new affected with leprosy annually, the numbers are largest for ASEAN, and include rank two largest in Asia after India, globally Indonesia into the third place for the discovery of new people affected by leprosy every year after India and Brazil, numbers between 18000–20000 people annually! While government programs in the context of healthcare, increasingly weakened and even to the worst point. After funds from abroad in the form of funding from international NGOs associated with leprosy elimination and increasingly focus on the issue of human rights, the researchers saw that the government is increasingly difficult to implement control functions or or at least not as a dynamic factor in eliminate leprosy, so the term of WHO and the Government of the Republic of Indonesia. Indeed, we need a creative and innovative efforts in tackling the problem is still not finished. Low endemic areas instead issue of stigma and discrimination of leprosy getting rocketed, whereas the highly endemic areas, often the issue of stigma and discrimination is not too high, but how to handle still has not focused properly. This study proves that the way to lead and develop leadership and character are qualified not managed properly and clearly, both from the power circles of leprosy or leprosy interpreter, wasor and others, including doctors and nurses. So it needs to be done continuously and directly regardless of existing boundaries. Lateral and innovative thinking is the key to reaching the weakest of the weak, the furthest of which is far, far better for prevention, treatment and education.

Keywords: ASEAN, stigma, discrimination, leadership, character
ILC5.3-003
Functional Improvement and Factors Affecting Outcome after Opponens Replacement in Patients with Median Paralysis due to Leprosy
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Objectives: To determine the functional outcome and the factors affecting the functional outcome after opponens replacement surgery in leprosy.

Methodology: The study was conducted at The Leprosy Mission (TLM) Hospital, Naini, a unit of The Leprosy Mission Trust India. This hospital is a 150 bedded specialized Leprosy Referral Centre in North India with over 2500 new Leprosy registrations, 425 Tendon Transfer surgeries, 543 ulcer admissions and 489 medical complications admission each year. This is a retrospective chart review of patients who had opponens replacement for thumb-in-palm deformity (median paralysis). All patients operated between January 2008 and December 2015 at this hospital were included in this study. The hospital medical records system was computerized since 2007 and each patient given unique identification number to store and retrieve patient related data. The computerized surgical audit form was used to record patient and assessment details. The outcome assessments were done at pre physiotherapy, pre operative, post operative and follow-up periods. The assessment includes nerve function assessment, joint angles and hand function assessment using standard finger goniometer, JAMAR pinch gauge and the frequency of performing specific activities.

Results: There were totally 382 patients who had opponence replacement. Flexor Digitorum Superficialis–Ring finger (FDS-R) as donor tendon was used in 240 hands and Extensor Indicus Proprius (EIP) was used in 142 hands. The analysis showed that those with longer duration of deformity and higher EHF (Eye, Hand and Foot) score had poorer functional outcome as compared to those with shorter duration of deformity and lower EHF score before surgery. Both types of tendon surgery had comparable hand function outcome.

Conclusions: Opponence replacement using either the FDS of Ring finger or EIP improves the functional ability of the hand in terms of buttoning, prehension activities and fastening zip. The functional outcome was not affected by the type of surgery; given that there is a pre–selection of the appropriate surgical technique based on the presenting deformity. Those with duration of deformity greater than 5 years are at risk of poor outcome suggesting that the deformity should be corrected as early as possible to gain the maximum functional recovery after surgery.

Keywords: Leprosy, Opponens plasty, Median Paralysis, Hand function, Disability
ILC5.3-004
Effectiveness of Treadmill Gait Training in Rehabilitation after Surgical Correction of Foot drop
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Objective: To determine the effectiveness of gait training using a treadmill, in optimizing gait for patients who have had Tibialis Posterior Transfer Surgery for foot drop correction.

Methodology: 30 leprosy patients who had Tibialis Posterior Transfer surgery for foot drop correction in 2015 at The Leprosy Mission Community Hospital, Naini, Allahabad were included in the study. They were randomly divided into 2 groups, Group A (control) and Group B (treadmill). Group A received ground gait training as a part of conventional rehabilitation for 3 weeks. Group B received additional treadmill training during the last week of rehabilitation. Step length, Cadence, Stride length, Stance duration, and walking speed were measured at the time of completion of post-operative physiotherapy using standard techniques. Duration of different phases of gait was measured using TOG Scan®. Descriptive statistics were used to describe outcome variables and non-parametric tests were used to determine the significance in difference between groups.

Results: The mean (SD) cadence (steps/min) in control group is 83 (17) while in treadmill group is 95 (20). Similarly walking speed (m/sec) in the control group is 0.56 (0.2) while in treadmill group is 0.7 (0.1). Range of Motion in ankle joint was comparable in both groups indicating no unfavourable results.

Conclusion: Additional use of Treadmill in gait training along with conventional rehabilitation after surgical correction of foot drop improves gait as evidenced by cadence and walking speed.

Keywords: Leprosy, Treadmill, foot drop, Reconstructive Surgery, Gait Training
ILC5.3-005
Evaluation of Long-term Effect of Tibialis Posterior Transfer for the Correction of Foot-drop in Leprosy
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Objective: To evaluate the long term results of Tibialis Posterior transfer surgery for the correction of foot drop due to leprosy.

Methodology: The study was carried out at The Leprosy Mission Hospital Naini, Allahabad, Uttar Pradesh, India a unit of The leprosy Mission trust India. This is a referral hospital for leprosy situated in a high endemic area of leprosy with over 350 reconstructive surgeries performed each year.

All the patients who underwent Tibialis Posterior transfer surgery for foot-drop since January 1999 to December 2010 and had follow-up assessment of 4 years or more were included in the study. The assessment included ankle joint range of motion, gait assessment and short or long term complications after foot-drop correction. All the assessments were recorded on a surgical audit form. The ankle joint range of motion was measured using standard foot goniometer. The gait was evaluated on presence of normal heal to toe pattern based on observation. Long-term complications like inversion deformity, claw toes, recurrent ulcers and amputations were recorded based on clinical notes. All the surgeries were done by the same surgeon and post-operative physiotherapy protocol was same for all the patients.

Results: 185 patients had long term follow-up of 4 years or more. The mean range of dorsiflexion above neutral position (effective range of motion) of ankle joint was 13 degrees, which indicates the ability of the patient to clear the ground while walking. The mean rest position of the ankle was 85 degrees indicating the correction of drop-foot. The rest position and range of motion of ankle joint was comparable for both circumtibial and interosseous routes of tendon transfer surgery. 3 of the 185 patients had had below knee amputation following ulceration on the operated foot. The incidences of inversion deformity and claw toes were minimal.

Conclusions. Tibialis Posterior transfer gives a good long-term result in terms of correction of drop-foot with minimal incidence of short and long-term complications.

Keywords: Leprosy, Foot drop, Tibialis posterior transfer, India, Long term effect
ILC5.3–006
Crossing Barriers: Disability and Dependence to Capability and Self Reliance by a Group of Leprosy Affected.
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Objectives:
To recognise the intrinsic link between disability and poverty and minimize it, identify capabilities of persons with disability due to leprosy and opportunities matching them capabilities. To promote rights based approach for community development, focusing on improving the quality of life of persons with disabilities by involving themselves, their families, care givers, community and the Government.

Methods:
Facilitators from Greimaltes Hospital sensitized the clients and family members on the importance of self care of ulcers in the home setting to remain healthy and for job placement or gainful self-employment. 14 Clients volunteered to form a Group in 2004 named "Anaikum Karnagal" meaning "Helping Hands", soon grew to over 100 Members. They framed Rules and Guidelines for the Group to function democratically. Greimaltes provided the needed guidance for self care and micro credit for self-employment and educational assistance for their children. Qualified and experienced persons guided and mentored them for self employment and job placements. Government departments and service organisations were approached to obtain assistance. Regular monitoring and review is done at individual and group level for better results. Thrift of the Members created a sizable fund of their own from which the Members avail micro loans.
Results:
A study done in 2015 has shown that the Group grew from 14 to 113 Members (Female – 59 and Male – 54) and the average age of the Members was 54. All of them do cleaning and dressing of their ulcers at home which was around 20% before the Group was formed. 100% of them avail micro finance loan from the Group and Government for gainful self employment and the repayment compliance is more than 95%. They earn between INR. 1500/- and 5000/- per month to sustain themselves and the family. 100% of them have obtained disability certificates; 92% of them receive monthly disability/old age pension of INR. 1,000/-; 62% of them have obtained travel concessions, aids and appliances from the Government.

Conclusion:
This multi-pronged rehabilitation effort has instilled new hope in a group of people with leprosy and disability who had considered their condition as fate. Have rediscovered their capabilities and are determined to work for better quality of life for themselves and their families in partnership with the stakeholders. They have crossed the barriers of stigma and dependence and live a better quality life. Thanks to ALERT in Ethiopia as the impetus for this initiative came from a training the author had there in 2003 and the visits to the Self Care Groups there.

Keywords: INR=Indian Rupees, ALERT=All Africa Leprosy Rehabilitation Training Center
ILC5.3-007
“Samutthan” ............... equal Development for all, an initiative by State Forum (Forum of Disabled person due to leprosy) in Bihar, India
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Background: Samutthan is a community based organization (CBO) and a representative body of APAL (Association of people affected by Leprosy); a national forum of India. Samutthan is registered under society’s act of 1860 in Bihar in the year 2012. The head office is established at Gandhi gram Kushta Ashram Motipur, Muzaffarpur Bihar. The purpose of the State Forum is to strengthen the Collective response for inclusion of persons affected by leprosy and to have a coordination mechanism at state and district level in raising the profile of the leprosy disease and in fighting against the discrimination of the persons affected by leprosy. Bihar has launched a pension scheme in Bihar namely “Bihar Shatabdi, Kushta Kalyan Yojna”. Under this scheme government is providing Rs. 1500/- per month for food and 300/- per month for skill development. This scheme is for all disabled (WHO Disabled Gr II) person due to leprosy in Bihar.

Objectives: To accelerate the process of Bihar Shatabdi Kushta Kalyan scheme to reach all the people disabled due to leprosy in Bihar.

Methods: This scheme was launched in 2013 by Government of Bihar, but it has reached only 1223 of the people affected and still 85% of people are not getting this facility till June 2015. LEPRA Society is supporting Samutthan to accelerate and facilitate the beneficiaries with the welfare department, so that they can register and get pension as soon as possible. Member of Samutthan is working in all 38 districts of Bihar to carry out the various advocacy activities with social Welfare Department, District Magistrate, District Leprosy Officer, of all 38 districts for speedy delivery of Shatabdi Kushta Kalyan Yojna. 5 member of Samutthan has carried out the advocacy activities in 38 districts of Bihar State.
In the 1st phase they have conducted more than 62 meeting with District/Block welfare department. This has been well captured by Media (Print and Electronic). 2nd Phase advocacy has started in January and will complete in March.

Results: Through this joint advocacy initiative by Samutthan more than 5575 people affected due to leprosy have received the Bihar Shatatboi Kushtha Kalyan Yojana in Bihar. Within three months 455% have been increased. This is the good example of “small investment big return”

Conclusion: This joint initiative by Samutthan and LEPRO in Bihar was very successful. This initiative has empowered them to raise their voices at districts and State level.

**Keywords:** Pension, Forum, State forum, CBO, leprosy colony
ILC5.3–008
Outcome of morbidity management in elephantiasis (lymphatic filariasis) in five districts of Bihar, India
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Introduction: Lymphatic Filariasis, known as Elephantiasis, puts at risk more than a billion people in more than 80 countries. Over 120 million have already been affected by it, over 40 million of them are seriously incapacitated and disfigured by the disease. Once lymphoedema develops, it cannot revert to normal condition after certain stage. But encouragingly, it also does not deteriorate if regular self-care is adopted. If it is infected repeatedly the condition worsens and it becomes a source of constant suffering. Hygiene of the part prevents infection by fungus and bacteria. If regular care is taken at home acute attacks are prevented to a great extent. Care of an affected part needs to be taken almost throughout life often assisted by family and community.

Objective—This study was designed to measure the outcome and impact of morbidity care in rural setup of Bihar.

Methods: A programme for community home based care were designed for entrusting a person’s either from family, friends or community, apart from the LF sufferer, to assist and monitor the home based care. 1255 (695 female and 560 Male)elephantiasis patients from 102 villages were selected of four districts of Bihar has been selected in 2009. 756 case were between the age group of 30 to 45 year. The key components of this programme was the self-care with Daily inspection, cleaning with soap, drying with cotton cloth, exercise (Active and passive), massage, elevation, customized protective footwear.

Results: After three year data are analyzed and findings are very encouraging. Out of 1255 patients 996 are doing regular self-care practices, which they have, learn in training. This was notice that entry point healed up to 76.7 %, acute attack has been reduced by 91.2%. Reduction of swelling took place 56% on average (All the site). 98% patients wearing protective footwear made by 6mm Micro Cellular Rubber or EVA. No cut, pressure point has been observed due to footwear.

Conclusion: As mentioned above, morbidity control is one of two pillars of eliminating LF globally. WHO (2000a) categorized suffering and disability of LF into four different aspects: physical, social, psychological, and economic. These findings should help design a culturally competent morbidity control strategy at the local level. Likewise, age is an important aspect of public health interventions among lymphedema patients, especially in the treatment of legs.

Keywords: Morbidity, Footwear
ILC5.3-009
The Effectiveness of Mobile Prosthesis Services
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Objectives:
Due to the delay treatment and lack of prevention of disability service and self-care practice, many people affected by leprosy lost their leg which leads them to a further challenging living situation. HADNA Rehabilitation and Welfare Association (HANNA), an organization of the people affected by leprosy set up a prosthesis workshop in Guangdong in 2002 to meet the needs of the people. In order to improve the effectiveness and efficiency of the prosthesis producing, a mobile prosthesis workshop was designed and setup in 2011. Mobile prosthesis workshop is a new approach to provide prosthesis service for the people in very remote area or for the people who are not able to travel to the rehabilitation center. This research is to compare the effectiveness and efficiency of the mobile prosthesis workshop with a common prosthesis workshop located in a rehabilitation center.

Method:
A retrospective review of all the data collected for each prosthesis produced by HANDA prosthesis workshop from 2002 to 2014. The criteria for comparing the effectiveness include the fitness rate (Base on the prosthesis evaluation standard) and the satisfactory rate of the amputees. And the efficiency evaluation will base on the cost and time-consuming for the prosthesis.
Result:
From 2002 to 2014, totally 1352 prostheses were produced and fitted out to the amputees by Guangzhou prosthesis team from 2002 to 2014. Among them 544 were produced in 8 years from 2002 to 2009 in the fixed workshop, and 808 were produced in 5 years from 2010 to 2014 by the mobile workshop for the people in 3 provinces.

With the same prosthesis team, the average product in the fixed workshop is 68 prostheses per year which is much lower than 161.6 prostheses per year in mobile workshop.

When we compare the fitness rate and satisfactory rate, the fixed workshop is 87.3% and 97.2%, and the mobile workshop is 97.8% and 98.4%.

The average time for producing and fitting out a prosthesis by fixed workshop is 3.37 days including travel time, and is 1.42 days for the mobile workshop. The cost of prosthesis produced in fixed workshop is much higher than that produced in mobile workshop.

Conclusion:
The effectiveness and efficiency of mobile workshop is much higher than the fixed workshop. Mobile prosthesis workshop is an effective solution for the people living in remote area and with difficulty to travel for prosthesis.

Keywords: Prosthesis, Mobile Workshop, Rehabilitation, Prevention of Disability
ILC5.3–010
Physiotherapy needs of Persons affected by leprosy: trends of last five years
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Objective:
To determine the reasons due to which persons affected by leprosy report to physiotherapy department for treatment of non-leprosy related problems.

Methodology:
The data of all the patients visited physiotherapy, for the last five years i.e.2011–2015, was collected retrospectively from the hospital management system, regarding the visits of persons affected by leprosy for any kind of physiotherapy treatment. Then the treatments were categorized into leprosy and non-leprosy related problems and further divided into specific reasons.

Result:
The study shows that a total of 14986 visits have been made by the leprosy affected persons over the period of five years, out of which 81.12% are for non leprosy related problems. Among the non leprosy problems required physiotherapy services, maximum are for back pain (22.39%), knee pain (20.63%) and shoulder pain (16.61%) etc. according to the last five years data.

Conclusion:
From the study it can be concluded that if the services are available persons affected by leprosy are willing also to utilize physiotherapy services for general treatment. Further this study also gives insight on magnitude of age related diseases like osteoarthritis, over work related injuries like tendinitis, bursitis etc. which emphasizes that these problems should always be addressed by the treating physician and be referred for physiotherapy.

**Keywords:** person affected by leprosy, physiotherapy
ILC5.3-011

Promoting Inclusive Development - a CBR Strategy in Tribal Location

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Objectives:
Support to People with Disabilities (PWDs), a CBR project with the objective to improve the quality of the life of people with disabilities and enable them to play an active role in their social and economic life with family and community by supporting them in receiving government benefits. The project is co-financed by Ministry of Economic Cooperation & Development (BMZ) and DAHW Germany and is being implemented across predominately tribal communities in Sendhwa block, Madhya Pradesh, India from November 2013. St. Augustine Social Service Society is the implementing organization with the technical assistance of German Leprosy and TB Relief Association (GLRA India).

Methods:
Project intervention was developed after sensitization of key informants and stakeholders. A baseline survey was conducted by community volunteers including PWDs by using structured questionnaire in all 190 villages in the block. Project envisioned, through inclusive effort PWDs are using and access government social benefit with involvement of family, community and stake holders. Formation of inclusive Self-Help Groups, Disabled People’s Organizations and Disability People Federation are the process adopted to perform collective advocacy to access entitlements and social security benefits. Home based self-care training to PWDs and care givers, empowerment training to SHGs and DPOs, vocational training, disability prevention camps and distributing assistive devices are major activities. A process evaluation was conducted to assess the changes by reviewing the documents and statistics.
Results:
Project has identified 5,135 PWDs including 227 (4.42%) people affected by leprosy with visible disabilities. Baseline assessment revealed 12% of the PWDs had disability certificate. In 2 years project has facilitated 1,707 (33%) PWDs includes 152 leprosy affected to receive disability certificate, formation of 154 inclusive SHGs with 1800 members, 30 DPOs with 964 members, 547 (11%) received assistive devices, 210 has undergone vocational trainings, 33 new leprosy cases identified in screening camps, 312 PWDs established income generation with seed money support and 4 garments stitching units in remote villages. A mat making unit established in a leprosy colony and 13 leprosy affected families were enabled to earn their livelihood besides self-care training to 3000 (58%) PWDs.

Conclusion:
Key observation on mid-way of the project, inclusive CBR approach ensures greater reach of PWDs. Social mobilization of PWDs in inclusive SHGs, DPOs and DPF improves their access to social entitlements. While promoting inclusion, disability inclusive development, liaison with local government and affected peoples participation to be ensured to reach larger population in remote locations.

Keywords:CBR – Community Based Rehabilitation, SHG – Self Help Group, DPO – Disability People Organization, DPF – Disability People Federation, PWD – People With Disabilities
ILC5.3–012
Childhood Leprosy through the Post–Leprosy Elimination Era: a retrospective analysis of Factors which influence late reporting—children—Grade–II disability for RCS—an Assessment of Respon Factors
Ananth Reddy Sreepuram¹, Purushotham Rao Paspal¹, Ganapathy Subramaniam K¹, August Beine Otto¹

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Introduction:
Prevention of deformities and disabilities in the Leprosy Eradication Programme is important mainly because of the Potential to cause permanent and progressive physical deformities, with social and economical impacts. In India Grade–II disability among new cases is around 4.48%. For this reason effort should be made to minimize delay between appearance of the first symptom of Leprosy and the start of treatment and recognition of early nerve damage.

Development of visible deformity in Children due to Leprosy is unfortunate especially considering the timely intervention can prevent disability. It also indicates that the machinery put in place for detection and treatment has become complacent and early detection has gone down.

The present study will identify the factors associated with the delayed presentation among leprosy children with a disability Grade–II i.e. various reasons such as medical, social, economical and psychological.

Method:
The present study reports the retrospective analysis of 141 leprosy children (0 to 15 yrs) 56% Male Children & 44% Female Children with irreversible palsy of hand and feet, who underwent reconstructive surgery at Sivananda Rehabilitation Home, Hyderabad, Telangana State, India, between 2005 & 2015.
Results:
A total of 642 patients were registered for reconstructive surgeries between 2005 & 2015 of which 141 were children. The male & female ratio among the children was 56% & 44% respectively. The onset of deformities in 22 children are before treatment, 79 during treatment and 40 are after treatment. Will be discussed on the points viz., (i) time taken by patients from appearance of deformities to reporting to SRH, (ii) awareness regarding RCS for deformity correction, (iii) the personnel who suggested to go to SRH Referral Centre, (iv) reasons for late reporting for RCS, (v) psycho-social and economical impacts etc.

Conclusion:
The study findings emphasize the importance of routine assessment of NFI of all new leprosy patients at beginning of treatment, during treatment, and after treatment to search for disability. Lack of knowledge sharing in Disability Prevention technology and awareness regarding possibility of reconstructive surgery for correction of deformities to the patients, family members, community volunteers and medical health personnel. To reduce new leprosy cases with Grade-II disability, early diagnosis of the leprosy patients and searching for Grade-I disability should be routine procedure in our health system, for which thorough neurological examination along with appropriate preventive measures is the need of the hour.

Keywords: Childhood Leprosy, Late reporting, Grade-II disabilities, Reconstructive Surgery, Assessment of Responsible Factors
ILC5.3-013
A MODIFICATION OF THE SURGICAL PROCEDURE TO PREVENT POST-OPERATIVE SUBLIMIS MINUS DEFORMITY AT THE DONOR FINGER - A LONG TERM FOLLOW-UP
Ananth Reddy, Dr. Sreepuram¹, Purushotham Rao Paspal¹, Ganapathy Subramaniam K.¹, August Beine Otto¹

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Introduction:
Many surgical techniques have been developed to replace the functions of Ulnar Median Palsy of hand.
Among the corrective surgical procedures, the flexor digitorum sublimis transfer (FDS) (stiles - Bunnels) are the most commonly used procedure in tendon transfer surgery.
The advantage of this operation is simplicity of performance and ease of Re-education. However, sublimis (-) deformity post-operatively but the disadvantage of this procedure is consisting of hyper-extension of the proximal interphalangeal joint and flexion of the terminal interphalangeal joint the intrinsic plus deformity which is ugly, crippling and very difficult to correct.
In order to prevent the above, Dr. August Beine used a modified technical procedure which consists of in joining one of the digital stumps of the sublimis tendon to the flexor profundus (FP) tendon of the donor finger which prevents sublimis minus deformity post-operatively.

A modification of surgical procedure to prevent post-operative sublimis (-) deformity at the donor finger - a long term follow-up. During the year 2000 to 2010, 369 patients were admitted and operated for ulnar-low-median palsy using Flexor Digitorum Sublimis (FDS) for restoration of fingers and were follow up till 2016 for occurrence of sublimis (-) deformity at donor finger.
Methods
The present study reports the retrospective analysis of 369 leprosy patients with irreversible ulnar–low–median palsy have undergone RCS at Sivananda Rehabilitation Home, Hyderabad, Telangana, India with the modified technique using flexor digitorum superficialis tendon during the year 2000 to 2010 and followed upto 2016 for occurrence of sublimis minus deformity at donor finger.

Results:
Details to be checked by Physiotherapist long term follow-up -
(i) during open hand no hyper extension of proximal Inter Phalangeal joint and no flexion terminal Inter Phalangeal Joint.
(ii) Ableness to close the fist full.
(iii) Ableness to do the pulp to pulp pinching at the donor finger.

The presentation of the results of the procedure and correlated view are given with specific patient’s factors based on the leprosy patients who underwent this procedure. The whole presentation will be illustrated with pre, post, intra–operation figures and long term data.

Keywords: MODIFICATION, SURGICAL PROCEDURE, PREVENT POST–OPERATIVE, SUBLIMIS MINUS DEFORMITY AT THE DONOR FINGER, A LONG TERM FOLLOW–UP
ILC5.3-014
Inclusive Rehabilitation Approach in Leprosy – An Experience from Backward Districts in India
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Objective: As per census 2011, India has 26.8 million Persons with Disability (PWD); which is an increase of 22% against those identified in 2001. India accounts 50% of the global burden of Disability Adjusted Life Years (DALY) due to leprosy; as per the Institute for Health Metrics and Evaluation’s assessment in 2013. Considering the need, since January 2015, German Leprosy and TB Relief Association (GLRA) India implements an inclusive rehabilitation project through NGOs in five backward districts in India with the support of European Union (EU). Project targets benefiting 1% of PWDs in India. We assessed the effectiveness of our inclusive rehabilitation approach in enabling access of public schemes by the people affected by leprosy.

Methods: We report the assessment of progress made in 2 years of this 5 year project. Baseline assessment was done to benchmark the status of PWDs knowledge of, need and access to Government services; using 30x7 cluster sample method. Available Government Schemes and application forms were collated as booklet in respective regional languages. The PWDs capacity developed in the form of Disabled People’s Organisations (DPO) & Disabled People’s Federations (DPF) at the Block and District levels respectively. PWDs were empowered to advocate with different line departments to access public schemes.

Results: Baseline line assessment revealed that among all PWDs; 57% PWDs had disability certificate, 42% PWDs were illiterates & 31% PWDs were employed mostly in daily waged employment/self-employment.
And among the eligible PWDs; 55% receives disability maintenance grant, 21% has document/s for travel concession, 19% received assistive devices; overall 1% were the leprosy cured and disabled. Project identified and profiled 16,467 PWDs which include 482 leprosy cured disabled people. 30 DPOs and 5 DPFs organized 42 block and 7 district advocacy meetings with Government departmental officials. As a result, 5,428 PWDs received disability certificate (8.9% leprosy cured), 614 PWDs received transport concession (3.9% leprosy cured), 971 PWDs received assistive device (2.3% leprosy cured), 3,612 PWDs received maintenance grant (4.3% leprosy cured).

Conclusion: Inclusive rehabilitation approach enabled the access of public schemes to a significant number of people affected by leprosy and holistically caters all PWDs in the backward Districts; promoting efficient use of resources. Thus, GLRA India’s experience in inclusive rehabilitation approach has been positive and demonstrated that it is doable.

**Keywords:** Leprosy, Rehabilitation, Disability, Persons with Disability, Inclusion
ILC5.3–015
Reasons of precariousness among leprosy patients and how to set rehabilitation approaches in Burundi
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Objectives: A study was led in Burundi in 2015 to estimate the access to healthcare among leprosy patients in 3 of 5 endemic provinces. The objectives were i) to determine needs and expectations of leprosy affected people (patients and former patients) with regard to their social and economic status and ii) collect suggestions for more adapted approaches for economical rehabilitation.

Methodology: This was a pair matched case-control study, with matching on sex and age. The study included 240 cases (leprosy and former patients) and 240 controls (non-leprosy patients).

Results: In all cases and control, 63% are male and more than half aged between 30 and 60. Most of them (70%) are farmers. Most of the cases are former patient (66.5%) and some of them carried the multi bacillary form (64.3%). Among patients under treatment, about 4 of ten have disability grade 2 (37.6%) and 54.5% are new cases. Among former patients, three quarter had ended successfully treatment and hold a treatment card with this information, and a little less than one person of five did not carry it or had no information about treatment outcome (17.6%). The causes of precariousness in non-leprosy patient (controls) are essentially death of family members (6.13% vs 2.3%, P<0.001, OR 0.95 CI 0.66–1.07), debts (23.4% vs 7.3%, P<0.001, OR 0.63 CI 0.32–0.59) and theft (4.21% vs 0.77%, P<0.001, OR 0.07 CI 0.03–0.12) whereas leprosy patients often suggest disabilities (50.2% vs 5.75%, P<0.001, OR 5.5 CI 0.28–1.03). Economical rehabilitation must include in non-leprosy patients, development of small business or trade of small articles (32.0% vs 26.2%, P<0.001, OR 0.44 CI 0.34–0.58) or no project at all (47.5% vs 6.3%, P<0.001, OR 0.50 CI 0.40–0.63). Leprosy patients have a preference for goat farming (67.5% vs 19.6%, P=0.05, OR 0.60 CI 0.41–0.86). The reason is linked most of the time, to exclusion and he fear not to have customers.

Conclusion: A study led in Burundi to estimate the access to healthcare among leprosy patient in 3 of 5 endemic provinces showed that non leprosy patients, in case of economical rehabilitation, should make a small business or trade of small articles. Leprosy patients have preference to goat farming linked to exclusion and the fear not to have customers. Developing economical rehabilitation approaches in Burundi could take in account leprosy patient’s needs.

Keywords: Social and economical status, Leprosy affected people, Burundi
Undesirable results following tendon transfer surgery for ulnar paralysis

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Complications are known to occur following tendon transfer surgery. We proposed to follow-up patients who suffered from a single nerve (ulnar) paralysis who were operated over a period of five years to look for undesirable results following tendon transfer surgery for ulnar paralysis.

Some of the undesirable results looked for specifically were 1. Reclawing (caused by loose tensions of the transferred slips or detachment of the transferred slips), 2. Inability to make a complete fist, (caused by tight tensions of the transferred slips), 3. Inability to fully open the hand, 4. Problems in some activities of daily living.

Between 1st January, 2008 and 30th June, 2014 there were 35 patients operated for problems of ulnar paralysis of the hand due to leprosy in Premananda Memorial Leprosy Hospital, Kolkata. 33 patients out of these 35 patients, were followed up over a period of 6 months to 5 years. In the post operative period, patients were assessed for appearance, function and subjective satisfaction.

Appearance was determined by measuring the interphalangeal and metacarpophalangeal joint angles in the attempted ‘hand straight’ and ‘lumbrical’ positions. Function was assessed by the distance between the finger-tip and the transverse palmar creases in the attempted closed fist, the number of finger segments in contact when attempting to grasp a cylindrical object and other activities of daily living. A visual analogue scale was used to assess the patient’s satisfaction. The complications seen among the patients were documented and they were followed up.

9 patients (27.27%) had long term complications.

5 patients had residual deformity (15.15%), with metacarpophalangeal joint hyper extension and with inability to fully extend the P.I.P and D.I.P. joints. 5 patients (15.15%) could not form a complete fist post-operatively. The overall percentage of patient satisfaction was high (94.28%). Only 2 patients (6.06%) evaluated their result as poor on a visual analogue scale.

The results of objective parameters, though reasonably good, still have a considerable percentage of complications and do not corroborate with the high patient satisfaction index. This may be due to the patient’s low expectation from the surgery, unwillingness to undergo further surgery or inability to comprehend his or her disability.

The problems identified by the professional hand therapist appeared not to be significant in the lives of the patients.

Keywords: Undesirable, results, surgery, ulnar, paralysis
**ILC5.3-018**  
**FUNCTIONAL INDEPENDENCE AFTER TENDON TRANSFER SURGERY IN LEPROSY**  
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Objective: To evaluate the functional independence after tendon transfer surgery in leprosy.

Introduction:  
Deformities in leprosy are the consequence of impairments of nerve function. The consequence of this visible disability would be manifold as it hinders the physical, social and Vocational areas. The aim of reconstructive surgery on the hand, is to increase the capabilities of activities of daily living (ADL), and Vocational performance. This study aims to evaluate the functional independence after tendon transfer surgery and follow ups.

Methodology:  
This study was conducted in The Leprosy Mission Hospital, Vadathorasalur which is the referral centre for Reconstructive surgeries for leprosy in 3 districts of Tamilnadu. Person affected with leprosy who underwent reconstructive surgery in the period of 2009–2012 are 66 but only 62 of them completed the post operative therapy . These 62 were included in our study. The intervention comprised the Reconstructive surgery, pre-operative exercises and post-operative exercises. The outcome scores were measured in Screening of Activity Limitation and Safety awareness (SALSA) scale, Hand grip strength using Dynamometer and Pinch strength using pinchometer. These assessments were done pre-operatively, post-operatively, 1st follow up ( at 3 months post-surgery) & 2nd Follow up ( at 9 months to 15 months) and the scores were recorded and analyzed.
Results:
The results of 62 people who underwent reconstructive surgery during this period were analyzed. In which, 45 (73%) Male and 17 (27%) female participated in the study. Their age group ranges from 16 to 68 years. The types of disability were bilateral and unilateral Ulnar and median nerve palsy. The outcome measure values as follows. The Screening of Activity Limitation and safety awareness (SALSA) Scale score mean values were Pre operatively 35, Post operatively 31, 1st Follow up 29 and 2nd Follow up 27. The Hand Grip strength Mean values were Pre operatively 8.2 kg, Post operatively 4Kg, 1st Follow up 6.2 kg and 2nd Follow up 7.7kg. The Pinch strength Mean values were Pre operatively 2.3 kg, Post operatively 1.6 kg, 1st Follow up 2.1 kg and 2nd Follow up 2.2 kg respectively. These decreasing scores show improvement in safety awareness, functional activity and these will be described in detail in the paper.

Conclusion:
The SALSA scale has shown decreasing in values from preoperatively to follow up. Hence we conclude the activity limitations are limited and increases in functional abilities are seen in areas of Self-care and work after the Reconstructive surgeries in Leprosy.

Keywords: Reconstructive surgery, Screening for Activity Limitation and safety awareness, Self-care
ILC5.3–021
Impact of specially designed Vocational Training Programmes, for persons affected by leprosy on Students, their Families and Communities
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Introduction: Though India has declared Elimination of Leprosy at the country level in 2005, TLMTI is committed to walk the last mile, till leprosy and its consequences are totally eradicated. Young people affected by leprosy still suffer great disadvantage in getting an education or a means for a reasonable livelihood. To address this, TLMTI runs six Vocational Training Centres (VTCs) in six endemic states of India similar to other government (and non-government) run training centres. However, the uniqueness of TLMTI’s VTCs is that 60% of the seats are reserved for the young from leprosy backgrounds with focus on addressing the total needs of youth. Thus focus is on (apart from technical) enhancing socio-emotional development and Life skills, to promote value-based living. These VTCs thus reach out creatively to address the various issues that affect their lives in a more comprehensive and holistic way. For example, apart from earning sustained and decent incomes, they are also taught to manage their incomes, and live authentic value based lives. They can then also contribute in creative ways to the eradication of leprosy and to addressing stigma.

Methods: This is a Field-based – Action Oriented and Participatory Research. 20 graduates from the 6 VTCs were selected through random purposive sampling across categories such as gender and trades 50% for the sample was drawn from women. All faculty of each Vocational Training Centre. Research Tools used included one on one interviews, Focused Group discussions,

Results: The VTCs have been instrumental in initiating innovative approaches for greater effectiveness of processes involved: identification, counseling of parents and student, admission, training, imparting life skills, life in the hostel, job placement, post placement services.
Persons affected by Leprosy especially those with visible deformity have started earning and hence are able to live a dignified life leading to reduction in stigma.

Conclusion: The approach of VTCs with reservation for individuals affected by leprosy is distinctive to TLMTI and is instrumental in reaching out creatively to the young adolescents making them better equipped to earn sustained and decent incomes. This raises their own and of their families’ quality of life, responsibly manage the incomes earned, and live authentic value based lives. The VTCs can also contribute to the eradication of leprosy and to addressing stigma, thus promoting mainstreaming of its graduates.

Keywords: leprosy, vocational training, specially designed, stigma reduction, mainstreaming
ILC5.3-022
P-Scale and SALSA Scale to Determine Baseline Values of Restriction In Participation And Activity Among Patients With Foot Drop Due To Leprosy
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Objective: To determine the social participation (P-scale), activity limitation and safety awareness level (SALSA scale) of patients with foot drop due to leprosy.

Methodology: The study was conducted at The Leprosy Mission (TLM) Hospital, Naini a unit of The Leprosy Mission Trust India. This hospital is a 150 bedded specialized Leprosy Referral Centre in North India with over 2500 new Leprosy registrations, 425 Tendon Transfer surgeries, 543 ulcer admissions and 489 medical complications admission each year. Patients with foot drop deformity and those reviewed at follow-up were included in the study. All the patients who were admitted or reviewed in out-patient department were included in the study. The review assessment included a Hindi version of the Participation scale (P-scale), Hindi version of Screening of Activity Limitation and Safety Awareness scale (SALSA), nerve function assessment and joint angles to determine the correction of foot drop. All the assessments were done by an experienced physiotherapist or occupational therapists and the counsellor. All the clinical details were entered into the patient’s electronic medical record. Data was analysed using SPSS.

Results: The P-scale and SALSA score shows Mild to moderate restriction and limited activity limitation, respectively. This shows an improvement after foot drop correction.

Conclusion: Foot drop correction surgery helps to improve the Participation and activity level. Good safety awareness score indicates the motivation level of patient to look after the anesthetic hand.

Keywords: Foot Drop, P-Scale, SALSA, Base Line Value, Leprosy
Non-optimal utilization of the assistive devices (wheel chair) by person affected by leprosy living in various leprosy colonies of Delhi

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Objective:
To determine the reasons due to which person affected by leprosy not able to utilize assistive devices (wheel chair) optimally given to them under government schemes.

Methodology:
Data was collected through the interview and direct assessment of the patient living in leprosy colonies of Delhi. Person affected by leprosy were interviewed from following leprosy colonies
1. Loknata kusht ashram patel nagar Delhi
2. Jagat mata khust ashram tilak nagar Delhi
3. Home for leprosy and T.B patients under the ministry of social welfare
government of Delhi Tahirpur
4. MCD leprosy colony Tahirpur, in total 75 person affected by leprosy were interviewed regarding reasons for non-optimal utilization of the assistive devices (Wheel chair)

Result:
Out of the total 75 person who were not optimally using the wheel chair 67 said that they were not able to move with wheel chair because the surrounding are not barrier free and they feel mobility more restricted. 60 person were of the opinion that they need assistance from other person to use the wheel chair. 40 person were of the opinion that wheel chair are very heavy and they cannot use them. 52 patients said that wheel chairs are not suitable for long time use as seats are not comfortable. 20 patients were of the opinion that repair of wheel chair is not possible locally so they are not using them.

Conclusion:
From the study it can be concluded that wheel chairs which were distributed in leprosy colonies were not being utilized optimally because of various reasons. One of the important reasons for non-utilization is that wheel chair were distributed for utilization but the environment is not barrier free further some people required assistance to propel the wheel chair.
So it is recommended that some modification in wheel chair should be done for optimal utilization.

Keywords: assistive devices, wheel chair, leprosy colonies
ILC5.3-025
The Outcome of Lasso Surgery for Claw Hand Correction in Female Leprosy Patients
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Objectives: To determine the outcome of claw hand correction among female leprosy patients in terms of cosmetic appearance and functional improvement.

Methodology: The study was carried out at The Leprosy Mission Hospital Naini, Allahabad, Uttar Pradesh, India a unit of The leprosy Mission Trust India. This is a referral hospital for leprosy situated in a high endemic area of leprosy with over 350 reconstructive surgeries performed each year. The hospital medical record system was computerized in 2007 and each patient was given an unique identification number to store and retrieve patient data.

All female patients who had been operated for claw hand deformity, using lasso procedure (direct and indirect), during the period January 2012 to December 2014, were included in this study. The computerized surgical audit form was used to record patient and assessment details for each patient separately. The outcome assessments were done at pre physiotherapy, pre operative, post-operative and follow-up periods (3 months and 1 year) for all patients. The assessment includes demographic details, nerve function assessment, joint angles and functional evaluation of the hand. The joint angles were measured using a standard finger goniometer. The functional improvement of the hand was measured in terms of quality of fist, grasp contact, grasp power, buttoning and counting paper sheets. In the analysis of the functional outcome those with median paralysis were excluded. The intrinsic position and MCP joint position was graded as Excellent, Good, Fair and Poor based on the joint angles for analysis and reporting.

Results: There were a total of 121 female patients that had claw correction using lasso procedure. 90% of patients had excellent to good intrinsic position and MCP joint position at the time of discharge from post operative physiotherapy. The unassisted angle decreased after surgery indicating a correction of claw hand. The results were similar for the follow-up periods. The grasp contact and power improved. Those with long duration of deformity (3 years or more) had poorer outcome as compared to those with shorter duration before surgery.

Conclusions: Lasso procedure for Claw hand correction improves physical appearance and functional outcome. Patients should be motivated to undergo surgery as early as possible to achieve the maximum outcome after tendon transfer surgery for claw hand.

Keywords: Female, Leprosy, Rehabilitation, Claw hand, Reconstructive surgery
ILC5.3-026
P-Scale and SALSA Scale to Determine Baseline Values of Restriction And Activity Among Patients With Claw Hand Due To Leprosy
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Objective: To determine the social participation (P-scale), activity limitation and safety awareness level (SALSA scale) of patients with claw hand due to leprosy.

Methodology: The study was conducted at The Leprosy Mission (TLM) Hospital, Naini a unit of The Leprosy Mission Trust India. This hospital is a 150 bedded specialized Leprosy Referral Centre in North India with over 2500 new Leprosy registrations, 425 Tendon Transfer surgeries, 543 ulcer admissions and 489 medical complications admission each year. Patients with claw hand deformity and those reviewed at follow-up were included in the study. All the patients who were admitted or reviewed in out-patient department were included in the study. The review assessment included a Hindi version of the Participation scale (P-scale), Hindi version of Screening of Activity Limitation and Safety Awareness scale (SALSA), nerve function assessment, joint angles and functional assessment to determine the correction of claw hand. All the assessments were done by an experienced physiotherapist or occupational therapists and the counsellor. All the clinical details were entered into the patient’s electronic medical record. Data was analysed using SPSS.

Results: The P-scale and SALSA score shows Mild to moderate restriction and limited activity limitation, respectively. This shows an improvement after claw hand correction.

Conclusion: Claw hand correction surgery helps to improve the Participation and activity level. Good safety awareness score indicates the motivation level of patient to look after the anesthetic hand.

Keywords: P-scale, SALSA, Claw hand, Baseline, Leprosy
ILC5.3–027
Promoting RCS at Government Secondary Centres by LEPRAG Society: Experience from Odisha (India)
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Objective:
Reconstructive surgery (RCS) is an important component of leprosy services. In the past this service was confined to a limited number of Government (tertiary) and NGO institutions. LEPRAG Society was providing RCS services in Odisha since 1994 and it provided services to 2705 persons till 2006. LEPRAG Society is the ILEP Coordinator for the state of Odisha and has much expertise in providing RCS services. After the integration of vertical leprosy programme (NLEP) in the GHC system in 2004, LEPRAG Society tried to strengthen the referral system of the state through a project. The project built the capacity of Govt. surgeons, provided instruments and equipments and physio-technicians and started initiating RCS at Leprosy Home & Hospital Cuttack and then extended to 11 other secondary centres.

Methods:
Twenty Govt. surgeons are trained in RCS by reputed RCS surgeons like Dr. Mannam (Karigiri), Dr. Vijay Kumar (TLM), Dr. Raju Dash (Professor Plastic Surgery) on drop-foot, claw fingers, thumb correction, lagophthalmos, claw toes and wrist drop since 2006, first at tertiary centres and then at secondary centres. Leprosy Home & Hospital, Cuttack, Mission Hospital, Bargarah and District Hospital Jharsuguda were the pioneer secondary centres, where RCS was regularly performed and sustained. Further such services were extended to nine other secondary centres at district hospitals and are receiving equally good results. The assessment including functional and client satisfaction was conducted by the trained surgeons, physiotherapists and sociologists to all the persons undergone RCS at these secondary centres. And the assessment was conducted periodically for 314 persons in 2011–12, 155 persons in 2013–14 and 113 for 2014–15.
Results:
The results are analysed on the Palande scale and corrective actions are taken for better results and sustainability of the RCS activity in the State GHC system. These results and the process of mainstreaming of RCS in government will be presented.

Conclusion:
Secondary care centres (district hospitals) can undertake RCS activity without any hurdles provided proper training for staff and operation theatre equipments are given. Such centres are more accessible to beneficiaries and GHC staff. ‘Good’ results in hand surgeries are assured by i) proper selection of beneficiary, ii) pre-operative preparations, iii) meticulous post-operative management and iv) ensuring regular follow-up.

Keywords: Leprosy, Reconstructive Surgery, Government, Sustainability, Palande scale
ILC5.3-029
Attributable Impact of CBR Self-Help Groups to Enhance the Socio Economic Status of People Affected by Leprosy and Other Disabilities
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Objectives:
To assess the attributable impact of Community Based Rehabilitation (CBR) Initiatives in North West Bangladesh.

Methods:
A CBR intervention comprising a group based approach with emphasis on livelihoods and empowerment was implemented in NW Bangladesh. Impact was assessed through a quasi-scientific design with pre and post measures.

Intervention groups consisted of 668 people involved in two CBR self-help projects in separate regions. Control cohorts consisted of 878 individuals recruited from within or adjacent to the intervention region. Controls were selected as potential future participants in the interventions. Individuals were not assigned to their groups randomly. Baseline data were collected shortly after formation of the groups and again two years later. Outcome measures included standardized assessments as well as a range of secondary measures.

Standardized measures assessed activity limitations (SALSA), participation restrictions (P-Scale), and quality of life (WHOQOL-bref). Other outcome measures included per capita income and change in involvement in government safety net programs.

Results:
Standardized assessments were adjusted for confounders using stepwise regression. Following this, significant changes were found for the intervention groups on the following: SALSA (p<0.01), P-SCALE (p<0.01), WHOQOL social domain (p<0.01) and WHOQOL Psychological domain (p<0.01). Per capita income also changed significantly compared to the control groups for one cohort, but no statistically significant change was measured in the other cohort.
Results of various secondary outcome measures, including access to social safety nets programs, will also be discussed as they may inform future study designs.

Conclusions: The findings provide strong evidence that the interventions being studied are able to positively impact the lives of group members regarding a number of key dimensions, including socio-economic status. Not all assessments demonstrated change in both intervention groups. Several secondary measures failed to demonstrate significant change. The details and implications will be discussed in the presentation.

**Keywords:** Community Based Rehabilitation, Attributable impact, leprosy, Participation scale, SALSA
ILC5.3–030
Use of a simple Qualitative Participatory Tool to assess the Impact of Reconstructive Surgery in Leprosy
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Objective: To develop a simple participatory tool to assess the impact of reconstructive surgery in Leprosy with regard to function, participation and inclusion.

Methods: An evaluation research study on various aspects of The Leprosy Mission Trust India’s (TLMTI) Reconstructive surgery programme was carried out in 2014–2015 across 8 states of India. A simple qualitative participatory pictorial tool that combined Scoring and Ranking and taking about 15–20 minutes to administer was developed and field tested. The tool allowed for scoring based on perceptions of what was important to individuals under the areas of Function, Participation and Inclusion. Scoring was done out of 10 for level of difficulty experienced in these areas before and after the surgery. After the scoring, the person was asked to rank which result was the most important to him/her - improvement in Function, Participation or Inclusion. Teams comprising medical doctors and physio/occupational therapists were trained in the methodology and collected data through field visits. The tool was also administered separately to a close family member to understand if perceptions within the family were similar to the affected individual’s.

Results: The tool was administered to 22 men and 12 women in 11 TLMTI locations in 7 states. It was found to be simple and easy to administer. The majority of respondents experienced significant improvement in Function, Participation and Inclusion. A detailed analysis is underway and will be reported.

Conclusions: Reconstructive surgery is intended to have significant positive impact on an individual’s personal, family and social life. A simple tool that trained community workers can administer in the field is a cost effective way of assessing impact of a reconstructive surgical programme and identifying areas for improving client satisfaction and impact through counseling, advocacy, rehabilitation and other appropriate interventions.

Keywords: Leprosy, Reconstructive Surgery, Impact, Participatory Tool, India
ILC5.3-031
PREVENTION OF POST-OPERATIVE SUBLIMIS MINUS DEFORMITY BY MODIFIED SURGICAL PROCEDURE AT DONOR FINGER - A LONG TERM FOLLOW UP
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Introduction:
Many surgical techniques have been developed to replace the functions of Ulnar Median Palsy of hand.
Among the corrective surgical procedures, the flexor digitorum sublimis transfer (FDS) (stiles - Bunnels) are the most commonly used procedure in tendon transfer surgery.
The advantage of this operation is simplicity of performance and ease of Rehabilitation. However, sublimis minus deformity occurs quite often as a post-operative complication at the donor finger in hyper mobile joints i.e. flexor of terminal interphalangeal joint resulting in ugly, crippling and very difficult to correct.
Dr.E.P.Fritchi (1984), considered Hyper mobile Joints in Claw fingers is an absolute contraindication for the removal of sublimis tendon as that leads to sublimis minus deformity.
In order to prevent the above, Dr.August Beine used a modified technical procedure which consists of joining the digital stumps of the sublimis tendon to the flexor profundus (FP) tendon of the donor finger which prevents sublimis minus deformity post-operatively.

Methods
The present study reports the retrospective analysis of 369 leprosy patients with irreversible ulnar–low–median palsy have undergone RCS at Sivananda Rehabilitation Home, Hyderabad, Telangana, India with the modified technique using flexor digitorum superficialis tendon during the year 2000 to 2010 and followed up to 2016 for occurrence of sublimis minus deformity at donor finger including occurrence of check rein deformity.
Results:
Details to be checked by Physiotherapist long term follow-up -
(i) During open hand no hyper extension of proximal Inter Phalangial joint and no flexion terminal inter Phalangial Joint with the help of routine angle measurements including donor finger.
(ii) Ableness to close the fist full.
(iii) Ableness to do the pulp to pulp pinching.

The presentation of the results of the procedure and correlated view are given with specific patient’s factors based on the leprosy patients who underwent this procedure. The whole presentation will be illustrated with pre, post, intra-operation figures and long term data.

Conclusion:
We feel this new procedure will prove useful to prevent sublimis minus deformity of the donor finger in cases where a sublimis transfer is done with good result cosmetically and functionally.
ILC5.3-032
Long-term effect of treatment using modified temporalsis muscle transfer for correcting lagophthalmos in leprosy
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Objective: To observe the long-term effect of a modified temporalsis muscle transfer operation (modified Johnson’s operation) in paralytic eyelids resulted from leprosy and to compare it with traditional Johnson’s operation.

Methods: Some modifications were made based on the traditional Johnson’s operation: (1) Through the subcutaneous tunnel, the bundle of temporalsis fascia strip will be connected with the nose side, middle and lateral part at any location of the lower edge of the upper eyelid according to the severity of the lagophthalmos; (2) Omitting the fascial strip in lower eyelid so as to avoid ectropion and worsening; (3) Ectropion was corrected with lid shortening operation.

Results: The modified Johnson’s operation during 1996—2009 was performed on 407 eyes of 319 cases. We followed these patients during 2013–2015. with following-up time from 5 years to 15 years after operation. The mean eyelid gap in the group of light closure decreased from 7.5 mm before operation to 3.5 mm after operation. The mean eyelid gap in the group of tight closure decreased from 6 mm before operation to 0.6 mm after operation. These results were very similar to those of patients treated with the traditional Johnson’s method previously done by us, but no one developed postoperative complications after the modified operation, such as ectropion and blepharoptosis.

Conclusions: The modified temporalsis muscle transfer is a simpler and safer operation for correcting paralytic eyelid resulted from leprosy, and it is especially suitable for those with lower eyelid ectropion before operation.

Keywords: lagophthalmos, temporalsis muscle transfer, long-term effect
Are Persons Affected by Leprosy resident in Leprosy settlements willing to be reintegrated into their local communities?

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Objective: To ascertain the willingness of persons affected by leprosy to leave the leprosy settlements and be reintegrated into their local communities.

Methods: The study was a retrospective desk analysis of documented interviews conducted routinely by social workers among persons affected by leprosy. The study reviewed five-year (from 2011 to 2015) interview reports of persons affected by leprosy residing across five purposively selected leprosy settlements (Iberekodo, Ijebu Igbo, Agb Ireti, Oyi River and Uzuakoli) in Southern Nigeria. Semi-structured interviewer-administered questionnaire was used to obtain data. The household heads were asked about their willingness to be reintegrated into their local communities. Some factors affecting their willingness/unwillingness were also obtained and analysed.

Results: A total of 131 (57.4%) out of 228 persons affected by leprosy were willing to be reintegrated back to their communities. Median age of those willing to be resettled was 55.4 years; while for those unwilling was 65.4 years. Those living with disabilities were 66.2%. Males were 57.4%. Eighty-one (66%) of those with any form of occupation (trading or farming) were willing to be resettled; 44 (41.1%) of unemployed persons were also willing to be resettled. Among those who expressed need for housing, 81 (95.3%) of them were willing to return to their communities if their housing needs were met. Fifty-six (82.2%) of those who expressed need for welfare allowance for daily sustenance were unwilling to be re-integrated into their communities.

Conclusion: The study highlights that over half of the persons affected by leprosy residing in leprosy settlements in Southern Nigeria were willing to be reintegrated into their communities. Efforts to support them return to their communities should be accelerated by policy makers and other stakeholders.

Keywords: willingness, reintegration, community, leprosy, Nigeria
ILC5.3-034

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Objective: To identify the single most important social needs of persons affected by leprosy (PALs) residing in leprosy settlements in southern Nigeria. Scarce resources are often channelled towards socio-economic rehabilitation without sufficient knowledge about the expressed needs of PALs; hence the need for this study which may be very useful to guide policy and efficient use of resources in low and middle income countries.

Method: A descriptive cross sectional study of PALs in five purposively selected leprosy settlements in southern Nigeria. It was conducted using semi-structured interviewer administered questionnaires administered to household heads (HH). The questionnaires were administered by social workers. They were asked about their social rehabilitative needs that would facilitate reintegration into their communities of origin.

Result: They were 228 household heads interviewed. Median age was 60.4 years. Females were 97 (42.5%). Among those interviewed, 85 (37.3%) expressed their single most important need as housing (house construction in their communities); 56 (24.5%) support for small scale business (trading); 10 (4.3%) support for small scale business (farming), 9 (3.9%) educational support for their children or dependants and 12 (5.2%) other forms of employment. Fifty six (24.5%) expressed their single most important need as welfare allowance (hand-outs) for daily sustenance.

Conclusion: This study suggests that housing (construction of new houses in their local communities) was the single most important need expressed by persons affected by leprosy. It is therefore recommended that policy makers and stakeholders should take these needs into account for efficient deployment of resources for rehabilitation of persons affected by leprosy.

Keywords: Needs, Persons Affected by Leprosy, Nigeria, Social
ILC5.3–035
Community Intervention Program for Leprosy affected Beneficiaries in Post Integration Era
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Objectives:
Involving and motivating the leprosy affected patients with impairments to identify an appropriate livelihood option suitable for them has always been a challenge. In a post integration era the role of leprosy organizations are shifting from being an exclusive “service provider” to also a “service facilitator” organization. In the context of the institutions taking up a role of as a service facilitator, it is vital for it to understand the beneficiaries’ priorities. Providing appropriate knowledge about the disability benefits, rights and the anti-discriminatory laws are some of the key priorities for successful inclusion of the leprosy affected patients in the mainstream society.

Methods:
Door to door survey for screening and identification of leprosy impairments along with other general disabilities were carried out through the community intervention program by the institute. Members from local disability organizations and federation were involved in facilitating the identified leprosy affected in knowing the rights and the facilities available for the differently abled through the local government. Focus group discussions with the community, village leaders and village administrative officers by the rehabilitation team from the institute helped the community taking a leading role in monitoring the intervention programs for rehabilitating the leprosy affected patients.
Results:
The experiences of the differently abled members from the general disability organizations motivated the leprosy affected patients in knowing their rights and facilities available through the Government. The leprosy affected patients were empowered to access the welfare schemes and the facilities available through the Government nodal agencies by partnering them. Through this model of community intervention “for and through the leprosy affected” helped the patients acquire various disability benefits, sustainable livelihood options directly from the Government.

Conclusion:
The knowledge about the local customs, sentiments and practices are essential to customize the intervention program for the leprosy affected patients. Involvement of the differently abled beneficiaries to facilitate the village level meetings helps in motivating the community members and leaders. The ownership of any community intervening program by the patients would help in the success of the program.

Keywords: Disability, Impairments, Inclusion, Rights, Community
ILC5.3-036
ASSISTIVE TECHNOLOGY FOR THE RESCUE OF AUTONOMY IN LEPROSY PATIENTS WITH DISABILITIES
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Objective: the present study aims to describe the repercussion of assistive technology in promoting autonomy of the subject, and to analyze the relation between subject and technologies in the process of care.

Methods: a qualitative, descriptive exploratory study with a semistructured interview and a field observation as a research method were conducted between November 2014 and February 2015 at Hospital Universitário Clementino Fraga Filho from the Universidade Federal do Rio de Janeiro. Eight patients from the service of Occupational Therapy were interviewed. After a detailed sensory motor assessment, which aimed to analyze physical conditions and prevent risks related to the lack of sensibility, our patients started to use adapted devices specially built. Analysis was conducted by the hermeneutic approach.

Results: one patient did not report a positive contribution of the Assistive Technology in the routine. All the other patients claimed the adapted devices helped them in the process of self-care. The following categories were studied: contribution of the adapted devices for the self-care and feelings and sensations provoked by the use of self-help devices and the perception of the care from the health-care professionals.

Conclusions: it is important to provide the tools for the patient’s self-care, which interferes in one’s autonomy and social inclusion. Patients’ perception of care provided by the hospital considered it as warm, sensitive and competent. The use of assistive technology does not represent a high cost for one’s treatment, but has an impact in the rescue of the abilities lost with the evolution of the leprosy disabilities. This should receive more research funds. The assistive technology has a transforming power in the rescue of these patients’ identity, leading to believe in new possibilities of care.

Keywords: assistive technology, autonomy, leprosy, disability, Occupational Therapy
Evaluation of the effect of Leprosy patients “Self Care Group” (SCG)
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Object: Through mutual communication and encouragement, disability rehabilitation and mental health for leprosy patients will be improved effectively. By the study, I can explore an effective nursing mode that can improve the Leprosy patients’ self-care ability, so as to improve the quality of their life, and reduce the harm of Leprosy. At the same time, we can also provide scientific evidence for developing strategies and reducing the harm of Leprosy.

Method: 84 leprosy patients from four Leprosy sanatoriums were selected by cluster random sampling in Nov 2012, they were with eye, hand or foot disability. They were randomly divided into control group and experimental group (Self Care Group) following the principle of informed consent. Control group used the conventional method of self care by themselves, while the Self Care Group carried out self care and functional training regularly by the organization of the medical staffs and the team leader, and carried out the centralized self care twice a week. All the leprosy patients were investigated before and after the study by using the same questionnaire (Follow-up handbook of Leprosy patients self care). All analyses were done in Statistic Package for Social Science (SPSS) 19.0 by using the methods of descriptive statistics, t-test and chi-square test.

Result: The ages of self care group and control group had no significant difference(p>0.05).Most of them were farmers (accounted for 98.8%), and their cultural level was low, most people were still unmarried. 42 of them were with eye disability (50%), 78 of them were with hand disability (92.86%), and 77 of them were with foot disability (91.67%). Through one year study, there was no statistical difference of the change of eyes, hands and feet disability in control group (p > 0.05). While the member of disability cases of self care group with red eyes, dryness of hands and feet, rhagadia of hands and feet, ulcers of hands decreased obviously, and achieved better effect than the control group (p < 0.05).

Conclusion: Self care group of Leprosy patients achieved a remarkable effect of improving the patients’ eye, hand and foot disability. And it was also an effective and economic means to eliminate the leprosy harm in the low-epidemic state of Leprosy.

Keywords: Leprosy, self care group, effect
ILC5.3–038
Effect of clinical and nursing pathway in leprosy plantar ulcer treatment
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The authors designed the clinical and nursing pathway of leprosy plantar ulcer and applied in 16 plantar ulcer cases for 6 months. And good effect was gotten. The patients were very satisfied with the pathway and their knowledge–attitude–practice related to plantar ulcers improved. The ulcer cure rate reached 75% (12/16). The role of nurses were fully played. We suggested that the pathway should be spread in the leprosariums in China and more experiences should be gotten to promote the progress of the unified clinical and nursing pathway criteria of leprosy plantar ulcers in China.

Keywords: Clinical and nursing pathway, Leprosy plantar ulcer, Health education
ILC5.3-039
Analysis of the social support condition and its influence factors among people affected by leprosy in WenZhou district of Zhejiang Province
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Objective To study the current status of support condition and its influence factors among people affected by leprosy so as to explore a scientific basis for establishment social support model of leprosy. Methods 60 leprosy patients were completed the Social Support Rating Scale(SSRS) in WenZhou. Related factors were collected by self-designed questionnaire and analyzed by multivariate logistic regression.

Results 60 cases were selected as the subjects, whose average overall scores of support were 32.30 ± 6.02, and were lower than those of the normal. The scores of subjective support, objective support and the utilization of support were 19.40 ± 3.50, 7.10 ± 1.73, 5.80 ± 1.63 respectively. The levels of support were correlated with mode of living (OR=27.96), economic income(OR=23.13), education level(OR=13.68), disability(OR=0.19), age(OR=0.16) by logistic regression.

Conclusion The social support condition of those people affected by leprosy called for special attention and the government should provide fundamental living and social support to them.

Keywords: Leprosy, social support, associated factors
Evaluation and analysis of anxiety and depression and their related factors in people affected by leprosy

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Objective To study anxiety and depression and their related factors in people who affected by leprosy and lived at home. Methods 60 leprosy patients were completed a self-made questionnaire for general status and completed two mental scales including the Self-Rating Anxiety Scale (SAS) and Self-Rating Depression Scale (SDS).

Results The rate of anxiety and depression was 41.67% (25/60) and 21.67%(13/60) respectively and has no statistical differences in gender. Anxiety and depression were correlated with treatment status and disability. By Logistic regression analysis, treatment status(OR=23.78, 95%CI: 2.13~265.26), disability(OR=7.68, 95%CI:2.01~29.40) and economic income(OR=4.54, 95%CI:1.05~19.68) were risk factors for anxiety, while disability (OR=34.77, 95%CI:2.84~425.07) and treatment status(OR=19.28, 95%CI:1.86~199.62) were risk factors for depression.

Conclusion People who affected by leprosy and lived at home have visible anxiety and depression manifestation. They call for special mental health care and social support.

Keywords: Anxiety, Depression, Leprosy
Factors analysis on self-care behavior habituation of disability lepers
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Objective To understand the impact of various factors of disability lepers’ self-care habituation. Method 275 disability lepers in Jiangsu were surveyed by interview and questionnaire.

Result Self-care awareness, monitoring, and economic conditions affect the self-care habituation of disability lepers (P<0.05).

Conclusion Enhanced the disability lepers health beliefs and the support of family, government and community are the effective way to improve self-care habituation of disability lepers.

Keywords: leprosy disability, self-care, factors
ILC5.3–042
Lepromatous leprosy quality of life investigate in Shaanxi Province
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Aim: To clear the quality of life of patients with lepromatous leprosy in Shaanxi Province. Way: Between August to December in 2008, using internationally accepted Dermatology Life Quality Questionnaire (DLQI). Respectively, Shaanxi Province Shangluo and Hanzhong sanatorium sanatorium now 64 cases of lepromatous leprosy patients quality of life survey conducted dermatological, randomly selected 64 cases of other skin diseases, matched for age and gender to be used as a control group. Result: Quality of life in patients with lepromatous leprosy total score was significantly higher (18.78 ± 5.70), DLQI10 entries rates, found that in addition to Question 4 (impact on clothing of patients), the other nine are DLQI score and statistical significance. Patient quality of life scores and sex, age, duration and education level had no correlation with disabilities. DLQI score was significantly higher than in patients without blemish patients. The content validity and reliability of the analysis DLQI scale, indicating that the table is applicable to the particular quality of the survey population to survive. Conclusion: Low quality of life in patients with lepromatous leprosy in Shaanxi Province, and needs to be strengthened for the attention of the population.

Keywords: leprosy, Lepromatous, quality of life of patients
The NTD Morbidity and Disability (NMD) Toolkit Project: selection of tools and preliminary validation in Fortaleza, Brazil

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Neglected tropical diseases (NTDs) are a group of often chronic, disabling and poverty-related infectious conditions. Worldwide, more than a billion people are affected by NTDs. However, accurate and internationally comparable data about NTD-related morbidity and disability are lacking. This is one reason why very little attention is paid to NTD-related disabilities.

Objective

To develop and pilot a toolkit to assess and monitor morbidity and disability across NTDs.

Methods

The study comprised a preparatory phase and an initial validation study. The former included a systematic literature review on existing tools to assess and monitor different aspects of NTD-related morbidity and disability and a Delphi study consisting of three e-surveys with 21 NTD-experts representing 9 NTDs. The panel was asked to nominate and select existing instruments that covered all domains of the WHO International Classification of Functioning, Disability and Health (ICF). Once the initial set of instruments was selected, a validation was done in Fortaleza, Ceará State, north-eastern Brazil. We used a cross-sectional, non-random survey design with a mixed methods approach among people with leprosy, Chagas disease, leishmaniasis and schistosomiasis.
We tested the cultural validity of 5 of the instruments in the toolkit focusing on the understanding of the wording and meaning of the questions in the scales, the relevance of each instrument for the problems experienced by the respondents, the endorsement on each instrument, their overall opinion of the assessment interview and the duration of the interview.

Results
Based on the opinions of the Delphi panel, the instruments included were an ICF-based Clinical Profile, WHODAS, Participation Scale Short, Self-Reporting Questionnaire (SRQ), WHOQOL-BREF and WHOQOL-DIS. Most questions in these instruments were readily understood with the exception of the WHOQOL-BREF, where additional explanations and examples were often needed. The respondents found all instruments very relevant to the problems they experienced. They were appreciative of the instruments and found it valuable to have an opportunity to talk about these aspects of their condition. The mean administration time per instrument ranged from 3.8 to 9.1 minutes. Respondents considered this acceptable.

Conclusion
The NTD Morbidity and Disability (NMD) Toolkit currently comprises 8 instruments covering all domains of the ICF. The findings of the initial validation study in Brazil support the acceptability and relevance of five of the six instruments tested. A range of instruments from the NMD Toolkit will be validated with additional NTDs in Colombia, Mozambique, Nepal and Indonesia during 2016.

Keywords: NTDs, measurement, morbidity, disability, inclusion
ILC5.3-044
An alternative method, gastrocnemius recession, for increasing plantar flexion outcomes in Posterior Tibial Tendon Transfer for Foot Drop Correction
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Objective:
Conventionally, posterior tibial tendon transfer for foot drop correction employs percutaneous Z lengthening of Achilles tendon. In this study, an investigation was performed to investigate and compare the clinical outcome of an alternate approach, gastrocnemius recession, to lengthen the Achilles tendon during surgery.

Methods:
From January 2009 to August 2015, operations were performed on 104 feet at Anandaban Hospital: 56 through the circumtibial (CT) route and 48 through the interosseous (IO) route. Gastrocnemius recession was performed in 15 of the IO cases while percutaneous Z lengthening was performed in the other 89 cases. All patients underwent pre-operative isolation and muscle strengthening exercises for the transferring muscle. All post-operative feet were kept in a cast for 3 weeks, followed by isolation exercises. Six months post-operative, outcomes were measured in terms of ankle range of motion (ROM), dorsiflexion strength, and plantar flexion strength.

Results:
By the end of 6 months, both groups demonstrated satisfactory functional foot drop correction. None of the patients needed a foot drop spring or ankle foot orthosis for walking and working after correction. Six of the CT patients (11%) developed complications. Of these, two (4%) experienced rupture of the tendon graft which required reoperation, while four (7%) required ratightening of transferred tendon slip. The mean ankle ROM in the IO group was 85 degree dorsiflexion (range 75–95) and 108 degree plantar flexion (range 105–115); while in the CT group,
the mean ankle ROM was 86 degree dorsiflexion (range 76–95) and 110 degree plantar flexion (range 104–115). Ankle dorsiflexion and plantar flexion strength in both groups were 4/5 and 5/5, respectively. In the 15 patients of the IO group who received gastrocnemius recession, the mean ankle ROM was 93 degree dorsiflexion (range 75–88) with 115 degree plantar flexion (range 108–120). None of these, or any of the IO cases, developed post-operative complications.

Conclusion:
Gastrocnemius recession is a simple and reliable technique to lengthen the Achilles tendon with improved plantar flexion in foot drop correction. We found satisfactory functional improvement when incorporated with both CT and IO transfer techniques. However, transferring through the interosseous membrane provides better alignment of the transferred tendon with fewer long term complications and is more cosmetically appreciable.

**Keywords:** Gastrocnemius Recession, Foot Drop, Tendon Transfer
ILC5.3-045
Effect of Mobile Therapy team for People Affected by Leprosy in flood affected areas in Sothern India
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Background: People affected with leprosy have difficulties in accessing the health services. A natural calamity like flood has made their life worse. This made the environment inaccessible for health care services and the ulcers became complicated due to exposure to mud and unclean water. This called for a formation of mobile therapy team as a response to manage disability during disaster.

Objective: To assess the effectiveness of mobile therapy team in preventing worsening of leprosy related deformities and disabilities of persons affected in flood hit areas.

Methods: The Leprosy Mission Trust India is working in Cuddalore district through the community based disability projects. As part of the flood relief program, three mobile therapy teams were formed. Each team comprised a nurse, occupational therapist and community development organizers. The therapy team carried the materials for ulcer dressing, Plaster of Paris casting, Splint fabrication and adaptive devices. The mobile teams visited the places of people affected by leprosy. Individual rehabilitation assessments, footwear assessments were done and the intervention was given in the community, at their doorsteps.

Results: 183 people affected by leprosy were visited at their homes. Out of these 68 (37%) people have received ulcer treatment in the community, 87 (48%) needed adaptive devices for, 7 (4%) needed crutches, 8 (4%) toilet modifications, 19 (10%) Plaster of Paris splints, 12 (7%) special footwear measurements, 141 (77%) MCR footwear, 21 (11%) pre-operative therapies have given.

Conclusion: Expertise and special treatment facilities are not always available in the communities. Mobile therapy teams are a useful and effective way of treating the people in the community during the crisis time and those who cannot avail health services.
Development of Adaptive device kit to improve quality of life for persons affected by leprosy

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Background: Assistive devices are very useful intervention tool to prevent and manage disability among persons affected by leprosy. It is not available in ease to the clients who visit health care system and other development units. This calls for a uniform adaptive device kit that can be used by TLMTI units across India and also can be shared with the other parts of the World. 3 sets of devices are planned to designed and tested before it is distributed to the service delivery system.

Objectives:
1. To design 3 sets of adaptive devices and form a kit from manually designed in Hospitals, community based materials and readily available company made
2. To test the applicability and acceptability of the clients
3. To bring awareness about the usage of these products across all units of TLMTI.

Methodology: The study was conducted in TLM Vadathorasalur hospital and in the communities of vellore district and cuddalore districts. 15 types of adaptive devices were identified to enhance functional independence of the people with deformities. The suitable materials available in the markets also were identified and customised to the people based on their deformity status. The effectiveness of the devices was tested using Functional Independent measure and client’s satisfaction were tested using Client satisfaction scale. The 3 sets of designs were displayed in the hospital and pamphlets were circulated to the TLMTI hospitals and community projects and governments to get awareness about the availability of materials and to bring awareness about the usage.

Results: A kit comprises of 3 sets of adaptive devices from manually designed in Hospitals, community based materials and readily available company made. The functional independent score and client’s satisfaction were significantly improved. TLMTI hospitals, community projects, Vocational training centers and governments were aware of the products and by placing orders they were able to getting uniform products and wider community are benefited.
Selection criteria for splints / Orthosis in leprosy
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Introduction: Leprosy often causes impairment of autonomic, sensory and motor nerve function in the affected individuals. This in turn leads to secondary impairment or deformities of varying severity in the eyes, face, hands and feet. Splint has a major role in leprosy, in order to rest the nerve, to prevent further damage and to aid healing, to prevent stretching of the weak / paralysed muscles and contracture of the opposite muscles and other soft tissues. Splints also been widely used in preoperatively and post operatively to protect the tendon. The appropriate splint given on time is very essential to prevent further problems. This paper aims to provide selection criteria with indications and contra-indications for various splints used in leprosy.

Methods: These guidelines have been developed by the therapist/technician based on their clinical experience. These options and guidelines were practiced over several years in TLM Hospitals in India and in the community based interventions programs.

Results: The selection criteria with indications and contra-indications are presented with a simple and comprehensive format.

Conclusion: These guidelines may help the therapist and other medical professionals when treating the people affected by leprosy.
Map the Gap - Inclusive Medical Rehabilitation for Persons with Disability due to Leprosy, Lymphatic Filariasis (LF) and Diabetes Mellitus (DM) in Indonesia

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Objectives
1. To collect and analyze data from different stakeholders (service deliverers, service users) on the present situation regarding availability, accessibility, affordability, appropriateness and acceptability of relevant sectors in medical rehabilitation for persons with disability due to leprosy, LF and DM.
2. To collect and analyze data on factors influencing inclusion of persons with disability due to leprosy, LF, DM in medical rehabilitation services in Indonesia.
3. To develop models that can be used for advocacy and for implementation of inclusive medical rehabilitation for persons affected by leprosy, LF and DM.

Methods
This research will use different methods including literature review, cross-section survey, interview and semi-structured interview. The following data will be gathered and analyzed in this research:
- Types of impairments that can be improved through medical rehabilitation (special needs of target group)
- Prevalence of impairments due to leprosy, LF and DM
- Geographic distribution, social structure and economic capabilities of persons affected by leprosy, LF and DM
- Currently accepted standards of services, procedures in key sectors, and regulation related to DM, LF, Leprosy and disability (Indonesia + globally)
Services and procedures offered by medical centres on different levels
+ Availability of trained staff and training needs of staff
+ Availability of equipment, materials, other resources
+ Current health services management and health information systems re medical rehab

Options and availability of training
KAP of staff in the selected hospitals/HC in relation to persons affected by leprosy, LF, DM Knowledge of target groups about medical rehabilitation
Insurance coverage:
+ practices in selected hospitals/HC
+ by law
+ Perspective of target groups
Knowledge of health centres about indications for medical rehabilitation and referral procedures
The main study population are persons with disability due to leprosy, lymphatic filariasis (LF) and diabetes (DM) in Indonesia. The second group are stakeholders in medical rehabilitation, particularly service providers and government.

Results
The research is aimed to generate knowledge and to develop models to inform decision makers and service providers how inclusive, comprehensive rehabilitation services can be improved or established.

Conclusion
Medical rehabilitation in Indonesia is still limited in terms of availability and accessibility to the majority of people needing it. For persons with disability living in poverty, lack of funds or information about their rights may cause them to go without any rehabilitative interventions their whole life. [See for example: http://kabar.perpus.web.id/index/citizen6/read/2037718/eneng-mendapat-kaki-palsu-setelah-2-tahun-menunggu] The right to health contains the elements of availability, accessibility, acceptability, and appropriateness (or quality). Collecting and analysing data from different stakeholders on the present situation and factors influencing inclusion of persons with disability due to leprosy, LF, DM in medical rehabilitation services in Indonesia is therefore important to further develop the advocacy and implementation of inclusive medical rehabilitation for persons affected by leprosy, LF and DM.