Expanding Laboratory Capacity in India for the Diagnosis of Drug-Resistant TB

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Foundation for Innovative New diagnostics
A non-profit Swiss Foundation
(Geneva, New Delhi, Kampala)

- **Founded in 2003** (WHO World Health Assembly): Partnering for better diagnosis for all
- **Vision**: A world where patients will have equitable access to high quality diagnosis
- **Mission**: FIND drives the development and implementation of accurate and affordable diagnostic tests, that are appropriate to patient care in low-resource settings
Background

Indian TB scenario

• Highest number of Incident TB cases- 2 Million
  – One fifth of global TB burden
• Estimated number of prevalent TB cases: 3 Million
  – Est. Global burden: 14 Million
• Estimated number of TB deaths in 2009: 0.28 Million
  – Globally est. number of deaths: 1.3 Million
• Stands second in the number of MDR-TB burden
  – 22 % of global MDR TB patients are in India
Background

• FIND India office established in 2007

• Initial projects in India
  – Post- STAG approval, **India projects**
    • Line Probe assay (LPA) demonstration project
    • Liquid C&DST and Rapid speciation lab preparedness study
  – Sites for FIND (Global) Demonstration projects
    • LED based Fluorescent microscopy project
    • Cartridge Based NAAT project

• Data from India projects presented regularly to the RNTCP lab & DOTS plus committees
  – RNTCP Lab scale-up plan
  – Endorsement for use of LPA, Liquid C&DST and rapid speciation in programme settings, under EXPANDx TB and TGF RD 9 project
RNTCP National Lab scale-up plan (1)

- Introduction of rapid diagnostics in program settings
  - Introduction of LPA testing in **43 labs**
  - Introduction of LC & DST in **33 labs**.
- LPA to work as primary diagnostic tool
  - Follow-up Culture on LJ or LC
- Leading to.......
  - Rapid Turn around time for DST, **at each of 43 sites**
    - 3 days (LPA) vs 4.5 months (LJ C&DST)
  - Enhanced laboratory capacity, **at each of 43 sites**
    - 12000 (LPA) vs 5000 (LJ C&DST) per annum
RNTCP National Lab scale-up plan (3)

- Phased introduction of LPA: 43 labs
  - 12 Labs (NRL:4 & IRL 8): 2010-11
  - 14 Labs (All IRL): 2011-2012
  - 17 labs (All IRL): 2012-13
RNTCP National Lab scale-up plan (4)

Implementation

• **EXPAND-TBx Project**
  – India is one of the 27 countries covered
  – Project initiated in India: March, 2010
  – Implementing partners: FIND, WHO-GLI, & GDF

• **GF RD 9 TB project**
  – FIND – Sub-recipient under CTD
  – To be initiated by April, 2011

• **Other sources of funding:**
  – RNTCP funds;
  – NRHM & State Health funds.
  – Other partners
EXPANDx- TB Project

The specific operational objectives are to:

• Expand and accelerate access to QA new diagnostics (LC, LPA and rapid speciation)
  – necessary technology transfer &
  – Ensuring tools are integrated within TB programs

• Impact market dynamics to leverage price reductions for diagnostic tools, instruments, reagents, and supplies and stimulate a greater number of suppliers of new TB diagnostics

• Improve case detection and management of TB and MDR-TB
EXPANDx- TB Project

• Assistance available under the project
  – Pre-identified list of equipment and consumables approved by EXPAND-TB
    • Includes LC and LPA equipment and consumables

• India activities and support
  – 40 labs for LPA equipment and consumables
  – 31 labs for LC equipment and consumables
GFATM RD 9 project: India

- **Objective:** Establish and enhance capacity for quality assured rapid diagnosis of DR-TB suspects in 43 C&DST labs

- Supports implementation of National Lab scale-up plan, complementing EXPANDx-TB
  - Additional **HR for IRLs**, in a phased manner
  - Additional specimen processing equipment and consumables, to improve lab throughput
  - Up gradation of **20 IRLs** for LC readiness
  - Onsite technical support and long term mentoring (travel, HR, etc)
  - Funds for rapid specimen transportation and reporting
Steps in introducing LPA testing

1. Establish 2-3 Clean rooms for LPA
   - Hybridization room
   - Amplification room
   - Master Mix room

2. Equipment and consumables for LPA

3. Staff Training

4. Establishing LPA Proficiency
   - LPA PT mechanism approved by National Lab Committee

5. Establishing mechanisms for rapid transportation of patient specimen & results reporting
Establishing clean rooms for LPA testing

Example 1. Converting vacant space into clean rooms.
Establishing clean rooms for LPA testing

Example 2. Adapting existing rooms for efficient space utilization
Training of Lab staff

• International Centre for Excellence in Laboratory Training (ICELT) established by UNITAID, FIND & GOI in 2010
  – 4 trainings on LPA conducted
  – Vision to develop HR pool of in-country as master trainers
• Training at ICELT, complemented and followed-up by on-site hands-on training at the lab sites
• Standardized training curriculum developed for use in all 27 countries covered under EXPANDx-TB
Hands-on training on LPA testing at ICELT by international panel of trainers
On-site training on LPA testing

STDC Trivandrum

STDC Hyderabad

LRS Institute, Delhi
50 smear positive sputum specimen

Sputum processing by NALC-NAOH method

50 sputum deposits

Each deposit split into two parts- ‘a’ and ‘b’

50 sputum deposits, numbered ‘a’

DNA extraction, Amplification, Hybridization and interpretation;

‘a’ and ‘b’ specimen processed in different batches/ different days

50 sputum deposits, numbered ‘b’

Analysis of LPA results based on proficiency bench marks

- Negative control: **Clean in all runs**
- % of invalid results: < 10%
- Internal concordance in results of “a” and “b” parts of specimens: ≥ 95%
- Concordance in results of 20 randomly selected DNA extracts tested at second lab: ≥ 95%
Lab software for rapid analysis and reporting of results
Please find attached results from our Reference lab for your TB patient.

RNTCP Culture, DST, and LPA Results Form

DISTRICT: Bhilwara  TB UNIT (TU): The TB Unit for this patient
DOTSPLUS SITE NAME: SMS Medical College, Japur

NAME: Jaipur Abdur
AGE/SEX: 39/Male
COMPLETE ADDRESS: 1234 Bhilwara Way
Bhilwara District
Bhilwara, India 12345-6789

TB NO.: 1111-0002

[IRL LAB SPECIMEN NO.: 2345-6789
SPUTUM FOR: Follow-Up]

[If Follow-up, Month of follow-up:]

LPA DST RESULT (RIF / INH):
RIF: 
INH:
Steps followed in establishing LC & DST labs

1. Establishing BSL-3 area
   - Air Handling and cooling units
2. MGIT 960 system and Manual MGIT
3. Training
4. Liquid C&DST Proficiency
5. Ensuring electricity power handling and back up capacity
Current status

• LPA results being used for diagnosis at 4 RNTCP Labs
• LPA proficiency testing underway in 7 labs
• Additional 10 labs supplied with LPA equipment
  – LPA proficiency testing to be commenced
• Liquid introduced in 5 State labs
  – 2 of these have completed PT and applied for accreditation
Data from 3 LPA lab doing service delivery

Snapshot: Tuesday, 5 April, 11
Districts covered: 28; Population: 46.4 Million

- Patients screened 2658
- LPA 2442 (92%) results available
  - 192 (8%) LPA invalid
  - 967 (40%) with RIF-Resistance
- LJ DST (Back-up) 1370 (52%) results currently available;
Strengths

• Coordination at all levels to ensure implementation of DR-TB response plan
• National level meeting by CTD with NRLs and implementing partners on Qtrly basis
• Coordinated efforts in HR development
• Proactive program leadership at Central and State level
• Fast track budget mobilization at State level from NRHM/ other sources for un-budgeted activities
• Contribution of WHO-RNTCP TAP consultants in addressing field problems
Challenges

• Delays in development of an “on-line MIS”
• Ensuring uninterrupted supply of SLDs
• Maintaining labs proficiency at the time of drug shortage
• As volumes increase & TAT goes down, delivery of treatment becomes biggest challenge
First patient diagnosed by Rapid tests in programme settings in India
Thank You