Brazil TB/DR-TB Context

- Size: 8,547,403 square km
- Number of states: 27 (including federal district); 5,565 districts with 40,081 health units
- Life expectancy: 70 years
- GDP per capita: 8,230 U.S. dollars
- 82% population living in urban area
- 72,000 cases/year—incidence: 47/100,000 population
- TB/HIV co-infection: 10–14%
- National guidelines: 100% adopted
- 400 to 600 MDRTB cases notified/year
- Primary Resistance to R= 1.5% and H=6% and combined (R+H)= 1.4% (DRS 2008)
- All drugs free of charge to patient, quality assured, not available in private sector, TB treatment in public sector only
- MDRTB Treatment Success Rate around 67% (2008)
Brazil is using 2 R&R systems: one for TB (SINAN) and one for DR-TB (e-TB Manager).

**Overview of systems interfaces**

### SINAN System
- **Epidemiologic surveillance**
- **TB cases**
  - SINAN System for regular TB (not web-based for the first level of data consolidation)
  - Notification of TB cases
  - Reporting provides consolidated data for cohort analysis

### e-TB Manager
- **Notification of DR-TB cases on line**
- **Real-time availability of clinical and lab results**
- **Data inserted by both HU and Lab**
- **Easy, real-time access** to patient info and intelligent report generation tool

### DR-TB is managed by a specific version of e-TB Manager
- **DR-TB cases**
- **SLDs**
- **2nd line drug mngt.**
- **DR-TB + specific treatment situations**

### Note: In São Paulo State, a specific system for TB cases was created (TB WEB) by the State Secretarary of Health – Interoperability is limited but existing between SINAN and TB WEB for data transfert
SINAN - TB

- First use countrywide: 1998
- Denomination: SINAN NET – version 4.0
- Nº of TB Units reporting to SINAN: 23,338 (2010)
- Provide standard reports, list of data/variables and dynamic tables created by TABWIN Program
- Variables from the Notification form and Follow-up form can be crossed for data analysis
SINAN – Common system for all diseases of compulsory notification – Manages only regular TB

<table>
<thead>
<tr>
<th>Entries</th>
<th>Exit</th>
</tr>
</thead>
<tbody>
<tr>
<td>• New case</td>
<td>• Cure</td>
</tr>
<tr>
<td>• Relapse</td>
<td>• Default</td>
</tr>
<tr>
<td>• After Default</td>
<td>• Death</td>
</tr>
<tr>
<td>• Transfers in/out</td>
<td>• Transfers in/out</td>
</tr>
<tr>
<td>• Data non available</td>
<td>• Change of Diagnostic</td>
</tr>
<tr>
<td></td>
<td>• MDR-TB/DR-TB (in this case the patient exits SINAN and will be monitored on the e-TB Manager platform)</td>
</tr>
</tbody>
</table>
Main Strengths:
• Full development / maintenance @ MoH Brazil (Datasus)
• Used in all Brazilian States (100% coverage)
• Accurate data on incidence
• Data entry is case based (personal / demographic / social profile, diagnostic and treatment)
Main Weaknesses:

• Not a TB specific system
• The online version is still under development
• Data collection is done through a standardized paper form from TB Units to municipalities – then SINAN WEB allows consolidation from municipalities => states => central level
• Presents limitations for chronic diseases, which require a larger follow-up data set and information
• The consolidation process is slow, and with loss of data/information from TB Units to Municipalities, and then States till MoH is slow => not an efficient tool for rapid decision making, but produces reliable info for trends analysis
Information Flow via SINAN

SMS: Secretaria Municipal de Saúde / Municipal Secretary of Health
SES: Secretaria Estadual de Saúde / State Secretary of Health
Sisnet: Sistema de transferência de lotes via internet (data transfer via internet)
MS: Ministério da Saúde / MoH
The Discussion on SINAN Main Challenges...

- Difficult to introduce changes since SINAN manages other diseases
- No information collected on DST requests and results
- Although regular data consistency routines are performed, some duplication of information remain in the database
- Does not include data on drug-resistant cases
- Needs regular trainings for end-users at municipality and state level
- No version online yet finalized

... Led to the development of the DR-TB System (e-TB Manager) in 2004 to monitor DR-TB

- Developed and implemented in 2004/2005 – web-based
- Focus on MDR-TB Reference Centers where DR-TB cases are treated (higher complexity level – better infrastructure)
- Both systems are complementary, hosted and managed at MoH
- The first version of DR-TB System is now upgraded to the SITE-TB System (recording all resistances (mono-poly-MDR-XDR...) and specific treatment situations like hepatopathy, MOTTS etc
A comprehensive web based tool conceived for strengthening TB programs by integrating case management, medicine control and surveillance information into a single platform.
e-TB Manager is divided into four modules each one providing essential functionalities for effective TB management:

- Allows online and real-time information sharing and consolidation among different levels within one user-friendly platform.
- Allows notification, management and monitoring of TB suspects, TB cases, Drug resistant TB suspect, Mono/Poly/Multi/Extensively-drug resistant TB cases.
- Allows comprehensive medicine management and control, including demand forecasts.
- Ensures database confidentiality and reliability through a central level validation process.

- Is developed in Java for Web with open-source solutions (no license required) that can be fully customized to address specific country needs.
- Is aligned with WHO recommendations for DOTS and DR-TB programs, including WHO standard forms for reporting and recording.
Since 2005 to date
• Personnel trained, cases entered, rate of entry captured, reports generated, case detection + cure rate + geographic coverage increased

• Assessed specific needs of MoH + internet coverage in MDR-TB Centers (75%)

• Defined working group, responsibility matrix, MoU for system development between MSH and Helio Fraga Reference Center

• Started development and system programming

* Implemented system on country’s server (2007)
* Trained IT personnel + potential trainers for permanent capacity building programs
* Created a WG responsible for system management, data extraction, data analysis for publication, data consistency analysis

• Selected variables, designed reports and tools + information flows

2004
• Process Indicators only
• Permanent WG created working with MoH Information commissions

End of 2005:
• Pilot version adjustments finalized for roll-out
• Effectiveness of workflow evaluated
• User acceptance of pilot

Early 2005
• Potential bugs/barriers eliminated
• Initial version adjustments finalized + Trainings materials developed

2005
• Process Indicators only
• Permanent WG created working with MoH Information commissions

Introducing on-site pilot for evaluation in several MDR-TB Centers (Internet coverage reached 95% in the meantime)

• Developed a training methodology / package for diagnostic, clinical care, drug management, and DR-TB surveillance based on multi-disciplinary teams

* Tested initial e-TBM version
* Adjusted system as needed

Developed training strategy, methods and materials

Pilot 1st version in 3 States
Divided into 4 modules, each one providing essential functionalities for effective TB management.
## TB/DR-TB Consolidated Report

### Management

**TB/DR-TB Consolidated Report**

**Classification:**
- All

**Context:**
- Treatment site
- Patient residence site

**Region:**

**Period for case selection: Date of diagnosis**

- Initial month/year:
- Final month/year:

**Other filters**

- Type of patient:
- Treatment Regimen:
- Site of Disease:
- Age range:
- Gender:
- Medicine Source:
- Sputum smear microscopy:
- Type of drug resistance:

**Output selection:**

- Notification TB unit
- Type of patient

### Table: TB Cases by TB Unit and Type of Patient

<table>
<thead>
<tr>
<th>Notification TB Unit</th>
<th>New</th>
<th>Relapse</th>
<th>After default</th>
<th>Failure 1st treatment</th>
<th>Failure re-treatment</th>
<th>Other</th>
<th>Transfer in</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>HEALTH CENTER 1</td>
<td>4,201</td>
<td>482</td>
<td>986</td>
<td>372</td>
<td>295</td>
<td>57</td>
<td>153</td>
<td>6,546</td>
</tr>
<tr>
<td>HEALTH CENTER 10</td>
<td>806</td>
<td>79</td>
<td>208</td>
<td>63</td>
<td>57</td>
<td>6</td>
<td>27</td>
<td>1,246</td>
</tr>
<tr>
<td>HEALTH CENTER 11</td>
<td>845</td>
<td>94</td>
<td>184</td>
<td>64</td>
<td>50</td>
<td>17</td>
<td>19</td>
<td>1,273</td>
</tr>
<tr>
<td>HEALTH CENTER 6</td>
<td>1,700</td>
<td>184</td>
<td>398</td>
<td>149</td>
<td>109</td>
<td>34</td>
<td>61</td>
<td>2,635</td>
</tr>
<tr>
<td>HEALTH CENTER 9</td>
<td>801</td>
<td>98</td>
<td>201</td>
<td>69</td>
<td>58</td>
<td>16</td>
<td>33</td>
<td>1,276</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>8,353</td>
<td>937</td>
<td>1,977</td>
<td>717</td>
<td>569</td>
<td>130</td>
<td>293</td>
<td>12,976</td>
</tr>
</tbody>
</table>
Lessons learned: an MIS implementation is an opportunity to strengthen TB/ DRTB program and motivate core staff, providing:

• Better understanding of guidelines for case detection, clinical care and SLD management
• Constructive forum for exchanging experience and acquiring knowledge in a full DR-TB capacity building package
• Increased awareness for the needs of accurate and updated information at all levels for strategic decision taking
• Mutual understanding of the complementary roles (focus on multi-disciplinary teams – physician, nurse, pharmacist, lab technician, social assistants and health community agents), contributing to better diagnostic, clinical care, work “ambiance” and patient support

• Reduction of delays:
  – diagnosis => treatment
  – adv effect notification => adequate therapeutic conduct / PV
  – TB/DR-TB descriptive epidemiology => action taking

• Reduction of SLDs stock-outs/overstocks/wastage
DR-TB Surveillance Model: Lessons learned (2)

“New tools for data management can mobilize teams for better service delivery”, if:

– End-users and staff at all levels are included in the design and implementation phase + can extract data and have access to any reports:

  • Good data entries lead to useful information and positive trade-off: “I give valuable data to upper level and I receive valuable information at my level”

  • Decentralizing information is also stimulating operational studies

– System is simplifying staff workload and providing more effective responses to concrete staff needs

– All users and staff who contributed to any process of design/implementation + maintain the system alive through data entry are always rewarded/ cited in training materials, or articles published, as part of a process, not as a mean to collect data
A new culture emerged among DR-TB core staff in Brazil:
• More interaction and information sharing among levels
• Decentralization process enhanced: from 63 (in 2004) to 162 DR-TB centers in 2011 => better coverage
• Better identification of suspects, and diagnostic capacity
• Reporting rate increased significantly
• HIV testing rate increased among suspects
• Provided reliable information to support TB regimen changes
• Improved detection, clinical care, drug management and quality of data and information for DR-TB management

• Through an expert committee on TB Information @ MOH:
  • data exchange, consistency checks between databases and further interoperability solutions are studied between the 2 systems + TB WEB of São Paulo
  • SINAN team has been associated to the new definitions of the SITE-TB system for better operations optimization

• SINANWEB, still in dvpt, should bring more flexibility for data extraction at all levels but bring the challenge of using internet at the primary care level with low infrastructure and staff / time constraints for data entries ...
DR-TB Case Reporting (Jan 2000 - Sep 2010)

- Launched new MIS – Apr 2004
- New Guidelines - Capacity Building Activities

MDR-TB Data Base / e-TB Manager– Hélio Fraga National TB Reference Center / Fiocruz/MoH - Brazil
DR TB - Initial Treatment Cohort Outcomes (Jan 2000 - Dec 2008)

MDR-TB Data Base / e-TB Manager– Hélio Fraga National TB Reference Center / Fiocruz/MoH - Brazil
DR-TB Treatment Outcomes
Jan. 2000 – Dec. 2007 (Brazil versus Pará State)

Source: DR-TB Data Base – Hélio Fraga Reference Center / Fiocruz / MoH
Thank you for your attention!

Questions & Answers

Discussion