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**

- **SINAN – MoH System**
  - 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
  - Easy, real-time access to patient info and intelligent report generation tool

**Epidemiologic surveillance**

- Notification of TB cases
- Reporting provides consolidated data for cohort analysis

**Note:** In São Paulo State, a specific system for TB cases was created (TB WEB) by the State Secretary 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
SINAN – TB versus e-TB Manager for DR-TB

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:

- **Module 1:** Allows online and real-time information sharing and consolidation among different levels within one user-friendly platform.
- **Module 2:** Allows notification, management, and monitoring of TB suspects, TB cases, Drug resistant TB suspect, Mono/Poly/Multi/Extensively-drug resistant TB cases.
- **Module 3:** Allows comprehensive medicine management and control, including demand forecasts.
- **Module 4:** Ensures database confidentiality and reliability through a central level validation process.

- **e-TB Manager** is developed in Java for Web with open-source solutions (no license required) that can be fully customized to address specific country needs.

- **The e-TB Manager** is aligned with WHO recommendations for DOTS and DR-TB programs, including WHO standard forms for reporting and recording.
**Timeline + Main results**

**Planning Phase**
- 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
- Select variables, design reports and tools + information flows
- * Started development and system programming

**Development/Adaptation**
- * Tested initial e-TBM version
- * Adjusted system as needed Developed training strategy, methods and materials
- Pilot 1st version in 3 States

**Roll-out**
- * Introduced 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

**End of Pilot**
- * Potential bugs/barriers eliminated
- * Initial version adjustments finalized + Trainings materials developed
- * Effectiveness of workflow evaluated
- * User acceptance of pilot

**In Production**
- * 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

**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

**Since 2005 to date**
- Personnel trained, cases entered, rate of entry captured, reports generated, case detection + cure rate + geographic coverage increased

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Divided into 4 modules, each one providing essential functionalities for effective TB 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:**
  - All -
- **Treatment Regimen:**
  - All -
- **Site of Disease:**
  - All -
- **Age range:**
  - All -
- **Gender:**
  - All -
- **Medicine Source:**
  - All -
- **Sputum smear microscopy:**
  - All -
- **Type of drug resistance:**
  - All -

**Output selection:**
- Notification TB unit
- Type of patient

### Notification TB Unit

<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>
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<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>
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<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
“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
DR-TB Surveillance Model: Lessons learned (3)

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