The WHO Global Project on anti-TB drug resistance surveillance: background, objectives, achievements, challenges, next steps

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TB surveillance and surveys:
A training workshop for consultants
Geneva, 24-27 May 2011
Drug-resistance surveillance: critical component of TB control

- Instrumental to:
  - Develop plans to address MDR-TB
  - Monitor performance of TB and MDR-TB treatment programmes
  - Establish MDR-TB treatment policies

- Major advocacy tool for TB control at global, regional and country levels
Why measuring the burden of drug resistant tuberculosis?

- To estimate the magnitude of drug resistance
- To determine time trends
Why measuring the burden of drug resistant tuberculosis?

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- To determine time trends
Ideally, what would we measure to characterize the magnitude of DR-TB?

1. Incidence of DR-TB
   - Primary resistance
   - Acquired resistance

2. Prevalence of DR-TB

What is actually measured in drug resistance surveys?

1. Fraction of sampled smear positive cases in public sector that is drug resistant at time of diagnosis
   - stratified by previous exposure to TB antibiotics

2. Estimator for proportion of incident cases that is resistant
   - resistance among new cases (transmitted)
   - resistance among retreatment (transmitted & acquired)

History of the Global Project on anti-TB drug resistance surveillance

- Global Project launched
- SRLN launched
- 1st global DRS report
- 2nd global DRS report
- 3rd global DRS report
- 4th global DRS report
- M/XDR-TB report

Timeline:
- 1994: 1st ed. DRS guidelines
- 1997: 2nd ed. DRS guidelines
- 2000: 3rd ed. DRS guidelines
- 2003: 4th ed. DRS guidelines
- 2004: M/XDR-TB report
- 2008: 1st global DRS report
- 2009: 2nd global DRS report
- 2010: 3rd global DRS report
Principles of Anti-Tuberculosis Drug Resistance Surveillance

1. Sample accurately represents population under study
   - Representative group of new TB cases
   - Representative group of previously treated TB cases
   - Examples: surveillance, 100%, cluster, population proportionate cluster, sentinel

2. Quality assured laboratory results
   - Supranational Laboratory Network: 29 laboratories, coordinating center, PT and QA

3. Differentiation between new and previously treated cases
   - treatment history
   - clinical records
Characteristics of available data on drug resistance, 2011

Data available from 120 out of 193 countries (62%)
- 48 countries rely on surveillance systems
- 72 countries rely on periodic surveys

Trends data from 68 countries (637 country-year data points)
Ongoing surveys, 2011

- 24 ongoing surveys
  - 18 nationwide surveys
  - 6 subnational surveys
- 16 planned surveys

Legend:
- Planned surveys
- Ongoing nationwide surveys
- Ongoing subnational surveys
- Nationwide surveillance data
- Subnational surveillance data
- Nationwide recent survey data (since 2000)
- Subnational and/or old survey data (before 2000)
- No data available
Progress on obtaining representative data on drug resistance in the 27 high MDR-TB burden countries

<table>
<thead>
<tr>
<th>Country</th>
<th>Year</th>
<th>Status</th>
<th>Subnational surveys</th>
<th>Nationwide surveys</th>
<th>Routine surveillance</th>
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<td>Russia</td>
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</table>

- **Class B**: 4 oblasts
- **None**: Subnational surveys
- **Routine surveillance**: 12 oblasts
- **Nationwide surveys**: Another conducted
- **Subnational surveys**: Another planned
Distribution of proportion of MDR among new TB cases, 1994-2009

The boundaries and names shown and the designations used on this map do not imply the expression of any opinion whatsoever on the part of the World Health Organization concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries. Dotted lines on maps represent approximate border lines for which there may not yet be full agreement. © WHO 2011. All rights reserved.
Estimated absolute number of MDR-TB cases, 2008

440,000 MDR-TB cases
(95%CI 390,000-510,000)
estimated to have emerged in 2008
or 3.6% (95%CI: 3.0-4.4)
of all incident TB cases globally
Countries that had reported at least one XDR-TB case by end March 2011

69 countries have notified at least one case of XDR-TB
XDR-TB: 9.4% (95% CI: 7.8-11) of MDR-TB globally
Why measuring the burden of drug resistant tuberculosis?

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Trends of MDR-TB cases in selected settings

Orel Oblast, Russian Federation

Tomsk Oblast, Russian Federation
Trends of MDR-TB cases in selected settings

Estonia

- All TB cases (new & relapses)
- New MDR-TB cases
- % MDR among new cases

Latvia

- All TB cases (new & relapses)
- New MDR-TB cases
- % MDR among new cases

Lithuania

- All TB cases (new & relapses)
- New MDR-TB cases
- % MDR among new cases
Trends of MDR-TB cases in selected settings

China, Hong Kong SAR

- **All TB cases (new & relapses)**
  - Cases notified: 10,000, 8,000, 6,000, 4,000, 2,000

- **New MDR-TB cases**
  - % MDR among new cases: 0, 20, 40, 60, 80, 100

United States of America

- **All TB cases (new & relapses)**
  - Cases notified: 25,000, 20,000, 15,000, 10,000, 5,000

- **Combined MDR-TB cases**
  - % MDR among combined cases: 0, 2, 3
Trends of MDR-TB cases in selected settings

Argentina

Peru
Challenges in drug resistance surveys

1. Still numerous countries with no baseline data → lack of laboratory capacity
Ongoing surveys, 2011

- 24 ongoing surveys
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Challenges in drug resistance surveys

1. Still numerous countries with no baseline data → lack of laboratory capacity

2. Surveys in areas with large private health sectors likely not capturing the real proportion of drug resistance → need of small surveys in the private sector to determine the direction of the bias

3. Few repeated surveys in developing countries and scarce information on time trends

4. Association between MDR-TB and HIV not explored → few surveys looking at MDR/HIV
Next steps in drug resistance surveys

1. New diagnostic era $\rightarrow$ use of molecular tests for surveillance purposes (Line Probe Assays, eXpert MTB-RIF)

2. EXPAND TB $\rightarrow$ lab initiative to strengthen lab capacity in 27 priority countries

3. From special surveys to continuous surveillance $\rightarrow$ initially in high risk groups (previously treated cases)

Clin Inf Dis 2011; 52(7):901-6
Drug resistance surveillance in the World Health Assembly

"Surveillance means the **systematic ongoing collection, collation and analysis of data for public health purposes** and the timely dissemination of public health information for assessment and public health response as necessary"

Source: International Health Regulations (2005), adopted by the 58th World Health Assembly

All Member States to "achieve universal access to diagnosis and treatment of multidrug-resistant and extensively drug-resistant tuberculosis", including by means of "**strengthening health information and surveillance systems to ensure detection and monitoring of the epidemiological profile of multidrug-resistant and extensively drug-resistant tuberculosis and monitor achievement in its prevention and control""

Source: 2009 World Health Assembly resolution WHA62.15
Conclusions

- Drug resistance surveillance is an integral part of TB control and MDR-TB management

- Need to accelerate coverage of baseline and time trends drug resistance surveillance data

- Move from periodic surveys to continuous surveillance

THANKS!
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