WHO Task Force Framework on assessment of TB surveillance data - Revisiting the "Onion model"

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Task Force on TB Impact Measurement

**Mandate**

- To produce a robust, rigorous and widely-endorsed assessment of whether the 2015 targets for reductions in TB incidence, prevalence and mortality are achieved at global level, for each WHO Region and in individual countries.
- To regularly report on progress towards these targets in the years leading up to 2015.
- To strengthen national capacity in monitoring and evaluation of TB control.

Responding to country concerns and demands.
Task Force on TB Impact Measurement

3 strategic areas of work

- Use of routine surveillance data to measure incidence, prevalence and mortality (all countries)

- Prevalence of TB disease surveys in at least 21 global focus countries

- Periodic review and revision of methods used to translate data from surveillance systems and surveys into estimates of disease burden
Task Force framework for the assessment of TB surveillance data

**DATA QUALITY**
- Completeness
- No duplications, no misclassifications
- Internal and external consistency

**TRENDS**
- Analyse time-changes in notifications and recorded deaths alongside changes in case-finding, case definitions, HIV prevalence and other determinants of changes in TB incidence and TB mortality

**ARE ALL TB CASES AND DEATHS CAPTURED IN SURVEILLANCE DATA?**
- "Onion" model
- Inventory studies
- Capture re-capture studies
- Prevalence surveys
- Innovative operational research

**IMPROVE surveillance system**

**EVALUATE trends and impact of TB control**

**UPDATE estimates of TB incidence and mortality**
If appropriate, **CERTIFY** TB surveillance data as direct measure of TB incidence and mortality

**TB notifications ≈ TB incidence**
**TB deaths in VR system ≈ TB mortality**
Progress in applying framework

5 regional workshops with > 60 countries,
3 country missions: Tanzania, Vietnam, Philippines
The Onion Model

- **All TB cases**
  - **Recorded in notification data**
    - **Notified cases**
      - Diagnosed by NTP or collaborating providers
      - Diagnosed by public or private providers, but not notified
    - Presenting to health facilities, but undiagnosed
  - Access to health facilities, but don’t go
  - No access to health care

Undiagnosed cases

All TB cases
What is needed to increase the fraction of notified TB cases

1. Recorded in notification data
2. Diagnosed by NTP or collaborating providers but not notified
3. Diagnosed by public or private providers, but not notified
4. Presenting to health facilities, but undiagnosed
5. Access to health facilities, but don’t go
6. No access to health care

PPM

Communication, social mobilization

HSS strengthening

PAL, Laboratory strengthening

Programmatic or health system interventions

Supervision, investment in recording and reporting
What is needed to quantify the fraction of TB cases missing from the notification data

- Inventory studies
- Vital registration data
- Capture-recapture studies
- Prevalence of TB disease surveys (health care seeking behaviour)
- Innovative operational research
Substantiating expert opinion

- **Access to health** from demographic and health surveys data (Layer 6)
- **Overall performance of health systems** as measured by: (Layer 5, 6)
  - Infant mortality ratio
  - Number of primary health care units or doctors per population
  - % of assisted births
- **Performance of TB diagnostic systems** (Layer 4, 5)
  - % people who died from TB (Vital registration data) and never accessed TB diagnosis and treatment
  - EQA of labs
  - KAP studies (health seeking behaviour), delay studies
- **Contribution of different TB care providers** (Layer 3)
  - Health expenditure in the private or nongovernmental sector, out-of-pocket expenditure
- **TB drug distribution** (Layer 2)
Trends in TB notification rates by case type in Tanzania

- Smooth curve in line with HIV epidemic
- Consistency in the distribution of case types over time
- Reporting of retreatment case initiated 2001
Factors affecting TB notifications in Tanzania

↑ notification mirrors ↑ case finding and HIV, but difficult to disentangle given lack of data disaggregated by HIV and case type, for ≠ years
Tanzania

Most districts have high cure rates and low death rates... but there are still districts with low cure rates and high death rates.
TB diagnostic centers have increased … but there is still an uneven distribution across regions.
Tanzania

93% pop within 10 km basic health care unit

... but infant mortality still high
Tanzania

Increase in diagnosis of TB following introduction recent interventions
# Estimates in Tanzania before and after discussions

<table>
<thead>
<tr>
<th>Onion layers (% total new cases missed in each layer)</th>
<th>Before discussions</th>
<th>After discussions</th>
<th>Source of evidence</th>
</tr>
</thead>
<tbody>
<tr>
<td>6. No access to health care</td>
<td>6.3</td>
<td>6.3</td>
<td>-93% pop within 10 km basic health care unit</td>
</tr>
<tr>
<td>5. Access but do not go</td>
<td>2.7</td>
<td>5</td>
<td>↑ diagnosis TB following introduction recent interventions</td>
</tr>
<tr>
<td>4. Presenting but not diagnosed</td>
<td>2.4</td>
<td>9</td>
<td>↑ diagnostic delay</td>
</tr>
<tr>
<td>3. Diagnosed by public non-NTP</td>
<td>0.9</td>
<td>0.9</td>
<td>- Exclusive distribution of TB drugs by NTP</td>
</tr>
<tr>
<td>2. Diagnosed by NTP but not notified</td>
<td>1.5</td>
<td>1.5</td>
<td></td>
</tr>
<tr>
<td>Sum of % of missing cases: layers 2 to 6</td>
<td>13.8</td>
<td>24</td>
<td></td>
</tr>
<tr>
<td>Country's CDR (2007)</td>
<td>86.2</td>
<td>75</td>
<td>-</td>
</tr>
</tbody>
</table>
Framework for Tanzania

DATA QUALITY

Completeness – appears to be verified, BUT analysis not available at national level. Cannot assess duplications/misclassifications since data are aggregated (not case-based); Data mostly consistent, within ranges expected, but extreme values in a few regions.

TRENDS

Do surveillance data reflect trends in TB incidence and mortality?

HIV and case-finding have affected trends in notification BUT difficult to disentangle effects - notifications disaggregated by HIV status not available and data on case-finding only available at national level.

ARE ALL TB CASES AND TB DEATHS CAPTURED IN SURVEILLANCE DATA?

Relied on "Onion" model based on (mostly) expert opinion combined with some evidence about health system coverage/access and some TB-specific KAP study data.

notifications ≈ TB incidence VR TB mortality ≈ TB deaths

UPDATE estimates of TB incidence and mortality

Data do not yet provide direct measurement. Incidence estimates revised downwards (CDR up). Prevalence survey will provide important new data.

IMPROVE surveillance

1. Roll-out case-based ERR
2. Routinely assess data quality esp. in "outliers"

EVALUATE trends and impact of TB control

3. Strengthen M&E supervision
4. Implement updated R&R recommendations

Need data disaggregated by HIV status at district level to be compiled at national level.
The onion model exercise

1. Complete the table by providing your best estimate and the lowest and highest possible estimate for each layer of the onion model
3. Use your expert opinion, BUT try to substantiate it!
4. Right down your sources of information
Thank you