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

IMPROVE surveillance system

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

EVALUATE trends and impact of TB control

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

UPDATE estimates of TB incidence and mortality

TB notifications ≈ TB incidence
TB deaths in VR system ≈ TB mortality

If appropriate, CERTIFY TB surveillance data as direct measure of TB incidence and mortality
Progress in applying framework

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

No access to health care

Access to health facilities, but don't go

Presenting to health facilities, but undiagnosed

Diagnosed by public or private providers, but not notified

Diagnosed by NTP or collaborating providers

Recorded in notification data

Undiagnosed cases

Diagnosed but not notified cases

Notified 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 reported
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

Communication, social mobilization
Supervision, investment in recording and reporting
PPM
HSS strengthening
PAL, Laboratory strengthening
Programmatic or health system interventions
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.
Tanzania

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></td>
<td></td>
<td></td>
<td>↑ diagnostic delay</td>
</tr>
<tr>
<td>4. Presenting but not diagnosed</td>
<td>2.4</td>
<td>9</td>
<td></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
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.

Do surveillance data reflect trends in TB incidence and mortality?

DATA QUALITY
IMPROVE surveillance

TRENDS
EVALUATE trends and impact of TB control

ARE ALL TB CASES AND TB DEATHS CAPTURED IN SURVEILLANCE DATA?
UPDATE estimates of TB incidence and mortality

1. Roll-out case-based ERR
2. Routinely assess data quality esp. in "outliers"
3. Strengthen M&E supervision
4. Implement updated R&R recommendations

notifications ≈ TB incidence
VR TB mortality ≈ TB deaths

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