Epidemiological estimates of global childhood TB burden

5th meeting of the WHO Global Task Force on TB Impact Measurement
Geneva, 9-10 May

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Overview

- Background to childhood (0-14 years) TB estimates
- Epidemiological indicators
- Next steps to improving estimates
Why are childhood TB estimates important?

- How big of a problem is it?
- Competing health priorities
- Neglect
- Allocation of funding
- Advocacy
Background to childhood TB estimates

- What makes childhood TB estimates "mission impossible"?
  - Diagnosis
  - Lack of data (under-reporting, misdiagnosis)

- No WHO-endorsed estimates published in the Global TB Report

- Current WHO-led effort with the Childhood TB Sub-group

- Recent evidence from TB endemic countries
  - Rural Bangladesh: prevalence of 100/100,000
  - Urban Pakistan: 40% under-reporting in Karachi
Age groups

- For the purposes of this presentation: 0-14
- Further disaggregation is recommended since 2006: 0-4, 5-14

2.16 New pulmonary smear-negative/smear-unknown/smear-not done TB cases by age and sex, 2009 calendar year (number of patients)

*Time-changes in the distribution of cases by age and sex are analyzed by WHO to understand trends in disease burden and gaps in the performance of TB surveillance*

If you have data by age and sex that do not fit this framework (e.g., different age groups), please provide the data that you do have in the "Remarks" section.

<table>
<thead>
<tr>
<th></th>
<th>0-4</th>
<th>5-14</th>
<th>0-14</th>
<th>15-24</th>
<th>25-34</th>
<th>35-44</th>
<th>45-54</th>
<th>55-64</th>
<th>65+</th>
<th>Unknown</th>
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<tbody>
<tr>
<td>Male</td>
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### Incidence (1/5)

**Data source**

<table>
<thead>
<tr>
<th>New TB case notifications 2010</th>
<th>Smear Positive</th>
<th>Smear negative(^1)</th>
<th>Extra-pulmonary</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Total notifications</strong></td>
<td></td>
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<tr>
<td>Among countries disaggregating by age</td>
<td>2,655,389</td>
<td>1,830,300</td>
<td>806,352</td>
</tr>
<tr>
<td>Among countries not disaggregating by age</td>
<td>2,595,210</td>
<td>1,036,943</td>
<td>323,292</td>
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<tr>
<td>(% notifications not disaggregated over total)</td>
<td>60,179</td>
<td>793,357</td>
<td>483,060</td>
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<tr>
<td><strong>Number of countries disaggregating notifications by age</strong></td>
<td>197</td>
<td>156</td>
<td>155</td>
</tr>
<tr>
<td><strong>Notified childhood TB</strong></td>
<td>49,062</td>
<td>110,133</td>
<td>37,475</td>
</tr>
<tr>
<td>(% over total notifications among countries disaggregating)</td>
<td>(2)</td>
<td>(11)</td>
<td>(11)</td>
</tr>
<tr>
<td><strong>Number of countries not disaggregating notifications by age</strong></td>
<td>19</td>
<td>60</td>
<td>61</td>
</tr>
</tbody>
</table>

\(^1\) This category includes smear unknown and not done
Incidence (2/5) 
Rationale

- Age disaggregation not done by all countries
- For countries disaggregating data, use notified childhood TB cases
- For countries not disaggregating data:
  - Method 1: assume proportion of children same to those who do
  - Method 2: use proportion of SP from countries disaggregating all case types
- Apply global case detection rate 65% (62%-69%) on notifications
Incidence (3/5)
Estimation and limitations

- **Estimation of incidence**
  - Total estimated notifications: 340,000 (both methods)
  - Total estimated incidence: 520,000 (490,000-550,000)
    - 6% of the total 8.8 million incident cases in 2010

- **Limitations**
  - Assume CDR for children is the same as for adults
  - Uncertainty for lack of representativeness not accounted for
  - Assume 0 cases among case type unknown and re-treatments
Incidence (4/5)
Next steps (short-term)

- Collect existing disaggregated data from countries that do not report
- Systematic literature reviews
- Questionnaire to characterize childhood activities
- Global consultation
  - Which epidemiological indicator?
  - How to compile existing data?
  - What new data to produce?
  - Ensure buy-in
Incidence (5/5)
Next steps (mid/long-term)

- Revise the WHO-recommended quarterly data collection forms
- Inventory studies, including paediatric diagnostic providers
- Adaptation of existing statistical methodologies for the indirect disaggregation

1 Disclaimer: Personal view and not that of the organization
Mortality (1/3)
Data source and rationale

- **Data source**
  - Age-specific, vital registration data reported to WHO

- **Rationale**
  - For countries with VR data: ratio of childhood to adult TB-specific mortality
  - For countries without VR data: use a statistical model to predict this ratio
  - Apply ratios onto total estimated TB mortality
Mortality (2/3)
Estimation and limitations

- **Estimation of mortality**
  - 64,000 (58,000-71,000)
    - Childhood TB case fatality rate of 12%
      (global 16%=1,400,000/8,800,000)

- **Limitations**
  - There are 68 (out of 215) countries and territories with VR data used for this calculation; they are all middle to high income
  - Uncertainty for lack of representativeness not accounted for
  - Possible under-estimation due to miscoding of TB deaths

- IHME exercise produced very similar estimate (66,825)
Mortality (3/3)
Next steps

**Short-term**
- Collect existing, as well as generate new, data from:
  - sample vital registration systems and/or
  - mortality surveys (e.g. China, India, Indonesia, South Africa)
- Further develop the statistical model

**Long-term**
- Advocate for development and investment in VR systems
Prevalence

- **Data source**
  - Does not exist at global level
  - Some nationwide prevalence surveys up to 2000

- **Next steps**
  - Develop a diagnostic algorithm to be used in prevalence surveys (?)
  - Focus on surveys in households of TB cases
Global momentum

- Advocacy brochure World TB Day
- Road-map
- Integration of childhood TB activities in other child health sectors
- Closing the gap between policy and practice

Policy Forum

Closing the Policy-Practice Gap in the Management of Child Contacts of Tuberculosis Cases in Developing Countries

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Acknowledgements

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Question to the Task Force

- What are your comments on the proposed next steps to improve epidemiological estimates of the burden of TB in children?