Epidemiology of childhood TB
Global and European perspectives

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Outline

• Overview of epidemiology of TB

• Availability of childhood TB data at WHO

• Age-sex distribution of notified TB cases

• Challenges to the estimation of childhood TB burden
Impact and outcome targets

1. Outcome targets, DOTS (WHA*, Stop TB Partnership)
   - Detect $\geq 70\%$ of new sputum smear-positive (SS+) cases
   - Successfully treat 85% of detected new SS+ cases

2. Impact targets (MDGs, Stop TB Partnership)
   - Halt and reverse incidence by 2015 (MDG 6)
   - Halve cases and deaths by 2015 vs. 1990 baseline

* World Health Assembly
Progress in case detection is stagnating

- Case detection rate (%) DOTS sm+
- All sm+
- 62% in 2007


- W Pacific 76 69 61 56 53 47
- SE Asia 69
- Americas 61
- EMR
- Europe
- Africa

- 76 69 61 56 53 47
- 0 10 20 30 40 50 60 70 80 90 100
- case detection rate (%)

- DOTS sm+
- All sm+
71% of "missing" cases in Africa and SE Asia in 2007
Treatment success target reached globally

Europe: 70%, Africa: 77%, Americas: 78%

Europe: 244,662, Africa: 2.43 million
Incidence rates falling slowly

- Africa
- South-East Asia
- WORLD
- Western Pacific
- Eastern Mediterranean
- Europe
- Americas

Cases in millions:
- 1990: 8
- 1995: 9.2
- 2007: 9.2

Cases per 100,000 population:
- 1990: 100
- 2007: 50

Increase in estimated TB incidence in Eastern Europe (1990-2007)
Estimated TB incidence rates, by country, 2007
TB prevalence and mortality

Falling… but need to fall faster to reach targets

Target for 2015 = 14

Total deaths from TB in 2007 = 1.6 million
Reductions in mortality: 3 regions on track, 3 are not

Similar pattern for prevalence
Treatment outcome for HIV+ and HIV-, 2006 cohort.

- **New smear-positive (data from 55 countries):**
  - HIV+: 12,931
  - HIV-: 722,667

- **New smear-negative and extrapulmonary (data from 48 countries):**
  - HIV+: 18,298
  - HIV-: 601,518

- **Re-treatment (data from 31 countries):**
  - HIV+: 4,765
  - HIV-: 80,293

Legend:
- Cured
- Completed
- Died
- Failed
- Defaulted
- Transferred
- Not evaluated
TB/HIV summary

- 1.4m incident TB infected with HIV (15% of 9.3m)
- 63% of total TB/HIV estimated indirectly (104 countries) through the IRR method: need to scale up TB/HIV surveillance
- Impact of ART on IRR
MDR in new, 27 priority countries
MDR in re-tx, 27 priority countries
Increasing % of migrants among new TB cases in Western Europe

* 24 countries (excluding Andorra, Bulgaria, Cyprus, Greece, Luxembourg, Monaco, Poland, Romania, San Marino, Spain)

Childhood TB
TB cases and deaths, by clinical form and age group, Brazil, 2004
TB CFR for each of the 27 Brazilian states, by sex and age group
Availability of childhood TB data at WHO

• Smear+ cases: 0-14
  – 1995: 55% countries, 74% of global burden
  – 2007: 69% countries, 98% of global burden

• Smear- and extrapulmonary: 0-14
  – 2006: 51% countries, 30% of global burden
  – 2007: 52% countries, 38% of global burden

• Cases: 0-4, 5-14
  – 2006: 36% countries, 22% of global burden
  – 2007: 41% countries, 25% of global burden
Smear + notification - % 0-14/all
9 epidemiological regions

AFRhigh
AFRlow
CEUR
EEUR
EME
EMR
LAC
SEAR
WPR
World

% 0-14/all

1995 2000 2005 2010
1995 2000 2005 2010
Smear + notification - % 0-14/all

Big differences among countries
Methodological issues
Smear + notification - % 0-14/all

Netherlands - ss+

Greece - ss+
Smear + notification - % 0-14/all
Smear-neg and extra-pulmonary - % 0-14/all

Eastern Europe
Smear-neg and extra-pulmonary - % 0-14/all
Established market economies
Smear-neg and extra-pulmonary - % 0-14/all
Central Europe

Albania ss-/ep

Bosnia_and_Herzegovina ss-/ep

Croatia ss-/ep

Cyprus ss-/ep

Hungary ss-/ep

Montenegro ss-/ep

Poland ss-/ep

Serbia ss-/ep

Slovakia ss-/ep

Slovenia ss-/ep

TFYR_Macedonia ss-/ep

Turkey ss-/ep
Paediatric cases - % of total notifications (2006 and 2007)
Uneven ratio smear neg and extra-pulmonary / smear pos
Challenges to the estimation of childhood TB burden

• Lack of historical data for smear-neg and extra-pulmonary childhood TB cases

• ≠ policies or practices for collecting smear from children with pulmonary TB for sputum and culture examination

• ≠ case definitions for childhood TB: infection may be notified as disease

• ≠ case definitions for childhood TB clinical forms: smear-neg X extra-pulmonary cases

• Incomplete vital registration data
Table 1  Estimated numbers of new cases, case rates in children, overall case rates (all ages), and the percentage of all TB estimated to occur among children in the 22 high-burden countries

<table>
<thead>
<tr>
<th>Country</th>
<th>Children aged 0–14 years</th>
<th>% of TB occurring in children</th>
<th>Estimated TB case rates &lt;15 years of age*</th>
<th>Estimated case rate†</th>
</tr>
</thead>
<tbody>
<tr>
<td>Afghanistan</td>
<td>17 540</td>
<td>25.3</td>
<td>189</td>
<td>324</td>
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<tr>
<td>Bangladesh</td>
<td>33 166</td>
<td>10.2</td>
<td>61</td>
<td>236</td>
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<tr>
<td>Brazil</td>
<td>23 520</td>
<td>20.7</td>
<td>47</td>
<td>66</td>
</tr>
<tr>
<td>Cambodia</td>
<td>3 966</td>
<td>5.3</td>
<td>70</td>
<td>571</td>
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<tr>
<td>China</td>
<td>86 978</td>
<td>5.3</td>
<td>27</td>
<td>129</td>
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<tr>
<td>Democratic Republic of Congo</td>
<td>24 052</td>
<td>16.1</td>
<td>106</td>
<td>306</td>
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<tr>
<td>Ethiopia</td>
<td>28 675</td>
<td>16.1</td>
<td>95</td>
<td>272</td>
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<tr>
<td>India</td>
<td>185 233</td>
<td>10.2</td>
<td>53</td>
<td>179</td>
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<tr>
<td>Indonesia</td>
<td>15 691</td>
<td>2.7</td>
<td>23</td>
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<td>Kenya</td>
<td>22 124</td>
<td>16.1</td>
<td>167</td>
<td>450</td>
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<tr>
<td>Mozambique</td>
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<td>16.1</td>
<td>98</td>
<td>268</td>
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<tr>
<td>Myanmar</td>
<td>8 007</td>
<td>10.2</td>
<td>51</td>
<td>165</td>
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<td>Nigeria</td>
<td>32 310</td>
<td>12.4</td>
<td>63</td>
<td>228</td>
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<td>Pakistan</td>
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<td>25.3</td>
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<td>Philippines</td>
<td>12 167</td>
<td>5.3</td>
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<td>304</td>
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<td>Russian Federation</td>
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<td>4.2</td>
<td>30</td>
<td>126</td>
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<td>South Africa</td>
<td>35 449</td>
<td>16.1</td>
<td>237</td>
<td>501</td>
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<tr>
<td>Thailand</td>
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<td>2.7</td>
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<td>141</td>
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<td>Uganda</td>
<td>12 099</td>
<td>16.1</td>
<td>103</td>
<td>320</td>
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<tr>
<td>United Republic of Tanzania</td>
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<td>16.1</td>
<td>118</td>
<td>337</td>
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<tr>
<td>Vietnam</td>
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<td>5.3</td>
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<td>183</td>
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<td>Zimbabwe</td>
<td>12 267</td>
<td>16.1</td>
<td>221</td>
<td>603</td>
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<tr>
<td>Total for the 22 high-burden countries</td>
<td>659 397</td>
<td>9.6</td>
<td></td>
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</tr>
</tbody>
</table>

* Case rates per 100 000 children. United Nations population estimates used for denominator.
† Case rates per 100 000 population.
TB = tuberculosis.