Contact Tracing and Active Case Finding: Underused Tools to Reduce the Burden of TB in Children

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Dr Clara van Gulik
Paediatric TB and HIV advisor
Medecins Sans Frontieres
TB Case Finding Strategies

- **Passive case finding**
  - Patient initiated, self presentation because of symptoms

- **Enhanced case finding**
  - Patient initiated but following a provider/program initiated information campaign

- **Active/Intensified case finding**
  - Program/provider initiated
  - Attempt to identify most cases of a disease in a specific time period, geographic location or at risk group
ACF: What Strategy for Children?

Where?
- Schools/Nurseries
- Paediatric TB services
- Maternal and Child Health services
  - OPD/ANC
  - Paediatric hospital wards
  - Nutrition programs
- Households

How?
- Symptom screening
- Mobile X-ray
- Microscopy
- Culture
- Molecular diagnostics
- Role of TST/IGRA
- TB Paediatricians

Whom?
All children < 5 yrs with contact with (P)TB
All HIV infected children > 1yr
MSF Paediatric clinic
ACF: To Screen or To Diagnose?

**Screening**
- Should be simple
  - Can be complex
- High sensitivity
- Detect those without active TB and start preventive treatment

**Diagnosis**
- Can be complex
  - Should be simple
- High specificity
- Early diagnosis means earlier treatment
  - Better outcomes
  - Reduces transmission

Source: WHO
Screening is simple, Politics is not
ACF: Is it cost-effective?

WHO PRO/STOP TB: Modelling analyses of 6 strategies suggests:

- Only cost-effective if TB prevalence among the target population is high
- Extensive diagnostic methods only for very high-risk groups, such as TB contacts, prisoners or PLHIV
- TB symptom screening always applicable but diagnostic yield is very limited

Target prioritization and strategy selection for active case-finding of pulmonary tuberculosis: a tool to support country-level project planning
N Nishikiori, C Van Weezenbeek, BMC Public Health Feb 2013

IPT can reduce development of TB by up to 90% in patients with primary infection
Reinforcing Contact Tracing

Purpose:
- Identify contacts of all ages with undiagnosed TB
- Provide preventive therapy

Symptom based clinical screening is sufficient
- Cough, fever, weight loss/failure to thrive
- Allows implementation at PHC/MCH/community level
- Home visits allow additional family IEC

WHO prioritised high risk groups:
- Children < 5yrs of age
- People living with HIV infection
- Index case is M/XDR TB, Sm+ PTB, HIV + or child < 5yrs
Evidence of higher TB/LTBI risk in Contacts

- Meta-analysis of 203 studies; > 1m contacts

*Contact investigation for tuberculosis: systematic review and meta-analysis*, Fox et al, European Respiratory Journal, 41, 2013

<table>
<thead>
<tr>
<th>Age group</th>
<th>Low &amp; Middle Income (95) % prevalence</th>
<th>High Income (108) % prevalence</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>TB</td>
<td>LTBI</td>
</tr>
<tr>
<td>&lt; 5</td>
<td>10</td>
<td>35.5</td>
</tr>
<tr>
<td>5 - 14</td>
<td>8.4</td>
<td>53.1</td>
</tr>
<tr>
<td>All contacts</td>
<td>3.1</td>
<td>45</td>
</tr>
<tr>
<td>HIV+</td>
<td>22</td>
<td>54</td>
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</table>

Incidence greatest in 1st year of exposure
### Do MDR TB close contacts get MDR?

<table>
<thead>
<tr>
<th>Study</th>
<th>Country</th>
<th># of contacts</th>
<th># of MDR case/# with TB, with DST</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kritski et al, 1996</td>
<td>Brazil</td>
<td>218</td>
<td>62% (8/13)</td>
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<td>Peru</td>
<td>4503</td>
<td>90% (129/142)</td>
</tr>
<tr>
<td>Johnston et al., 2012</td>
<td>Canada</td>
<td>89</td>
<td>0% (0/5)</td>
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### Do MDR TB close contacts get MDR?

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<tr>
<th>Исследование</th>
<th>Страна</th>
<th>Число контактов</th>
<th># случаев МЛУ/# больны ТВ, с ЛЧТ</th>
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**Child contacts of MDR TB, Peru (1996 – 2003)**

**Method:** Retrospective cohort
- HH contacts to MDR TB index cases
- TB prevalence at start of index case treatment
- TB incidence over 4 yrs

**Results:** 1299 child contacts
- 67 treated for TB, **7 of 8 had MDR**
- Disease rate **30x > children gen population**
- Incidence rate in **1st year 5 – 10x > later yrs**

**Conclusion:** Similar to 2 SA cohorts
- Contact investigation, prompt referral and Tx of paediatric HH contacts of MDR TB patients essential regardless of age

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<th>Age</th>
<th>Prevalence (per 100.000)</th>
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<tr>
<td>&lt; 1 yr</td>
<td>0</td>
</tr>
<tr>
<td>1 – 2 yr</td>
<td>2513</td>
</tr>
<tr>
<td>3 – 4 yr</td>
<td>565</td>
</tr>
<tr>
<td>5 – 10 yr</td>
<td>2000</td>
</tr>
<tr>
<td>11 – 14 yr</td>
<td>1994</td>
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<tr>
<td>All children</td>
<td>1771</td>
</tr>
<tr>
<td>Adults &gt; 15</td>
<td>2257</td>
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_Tuberculosis in Children Exposed at Home to Multidrug Resistant Tuberculosis, M Becerra et al, The Paediatric Infectious Disease Journal, Feb 2013_
Child contacts of MDR TB, Armenia (June 2012 – ongoing)

**Method:** Prospective cohort study

- Prevalence of TB infection/disease at start of index case treatment
- Incidence of TB infection/disease in subsequent 2 yrs
- Sample size: 150 contacts
- **Screening:**
  - Clinical history and examination
  - TST and QFT-IT
  - Chest X-ray
  - (Sputum/GA if Sx/signs on CXR)
  - (HIV)
- 3- monthly follow up
Child contacts of MDR TB, Armenia (June 2012 – ongoing)

Preliminary Results

- 55 child contacts
- Infected: 35 (64%)
- Non infected: 19 (35%)
  - Eight re-assessed at 3M: 2 became infected
- Disease suspected (based on CXR): 1

Differing Risk Factors?

- Slow/reluctance to recruitment
- BCG and EPI coverage
- Nutritional status
- Climate/environment
- HH conditions
- Context
Role Model: Kazakhstan

- **Strong govt commitment**
  - Prevent TB in children
  - Treat and care for TB in children
- **Majority of children diagnosed through ACF in PHC setting**
- Contact investigations in HH conducted routinely
- Extensive and developed infrastructure of paediatric TB services focusing on ACF and screening of contacts

- 74% reduction in TB case notification in children (1999 – 2011)
- 3x increase in MDR TB in children, 5x increase in adolescents

Source: WHO Child TB Roadmap 2013
Concluding Points

- Contact screening is an important but under used ACF strategy that is effective for children of all ages
- Contact tracing needs to be accompanied with a well implemented and functioning preventive activity
- To scale up case finding in children:
  - Strengthen and expand paediatric TB care to all HC settings
  - Integrate or collaborate with existing maternal, neonatal and child health (MNCH) services
- Still many research gaps