Module 9b
COMMUNITY-BASED CHILD TB MANAGEMENT
A few points to keep in mind……..

• Tuberculosis (TB) in children is common wherever TB is common in adults

• TB is an important cause of illness and death in children

• An understanding of the risks for infection and disease due to TB in children is critical for improved diagnosis and preventive management
National TB control data

- This slide could include recent data of TB control indicators from the National TB control programme
Risk factors for TB infection and disease in children

For TB infection
- Contact with source case
  - Closeness of contact
  - Duration of contact
- Source case characteristics
  - Smear positivity
  - Cavities on CXR
- Increased exposure
  - Living in high TB endemic communities
  - Children of families living with HIV

For TB disease
- Young age
  - < 5 years of age
- Immunosuppression
  - HIV
  - Malnutrition
  - Post-measles
- Not BCG vaccinated
  - Risk of disseminated disease
Common scenarios for community health worker in management of child TB

1. Child with symptoms and the diagnosis of TB is suspected

2. Child who is a household or close contact of an infectious case of TB i.e. usually a case with sputum-smear positive disease
Suspect diagnosis of TB in a child

- Common forms of TB in children are pulmonary TB and lymph node TB
- History of contact is important
- At initial assessment, decision needs to be made about need for referral for further investigation and/or immediate management – or whether the need is for further follow-up assessment
- Children with suspected pulmonary TB that can provide sputum (usually > 5 years) should have sputum taken for microscopy
Diagnosis of PTB

Typical symptoms

- Cough especially if persistent and not improving
- Weight loss or failure to gain weight
- Fever and/or night sweats
- Fatigue, reduced playfulness, less active

Especially if symptoms persist (>2 weeks) without improvement following other appropriate therapies (e.g. broad-spectrum antibiotics for cough; anti-malarial treatment for fever; or nutritional rehabilitation for malnutrition)
Diagnosis of TB adenitis

- TB adenitis is most common in cervical region. Lymph node enlargement is painless and asymmetrical, often multiple, discreet or matted.
- Nodes are typically large (>2 x 2 cm) i.e. visibly enlarged not just palpable.
- Lymph node enlargement is persistent (>1 month) and not responsive to other treatment such as antibiotics.
- Sinus and discharge may develop.
- Usual age is 2-10 years.
- May or may not be associated with other symptoms of TB.
History of contact

note the following..........

- Closeness of contact
- Sputum smear result of index case (if known)
- Timing of contact
  children usually develop TB within 2 years after exposure and most (90%) within the first year
- If no source case is identified, always ask about anyone in household with cough – if so, request assessment of that person for possible TB
Check weight, record weight and compare to previous weights

Growth faltering or failure to thrive

Weight loss
Clinical approach to TB diagnosis

**Note** that clinical assessment should include decision for hospitalisation or referral to health facility depending on severity of clinical signs or need for other appropriate management.

### INDICATIONS REQUIRING REFERRAL

- Need for further investigation and initial management that cannot be done at primary level facility
- Severe malnutrition for nutritional rehabilitation
- Signs of severe pneumonia (i.e. chest in-drawing) or respiratory distress
- Other co-morbidities e.g. severe anaemia

Referral should also be considered if

- Diagnostic uncertainty requiring further investigation at referral level
- Necessary for HIV-related care e.g. to commence ART

Children with symptoms that might suggest TB such as cough who appear otherwise well (do not have any of the above indications for referral) could be reviewed in 1-2 weeks to see whether symptoms are **persistent**.
Guidance for the management of children at community level who present with symptoms suggestive of TB

Symptoms suggestive of TB?
- Cough, fever, poor weight, less active, enlarged lymph nodes

Sputum smear-negative or not done/available

Typical and persistent symptoms?

NO

Follow-up in 1-2 weeks
Persistent non-remitting symptoms?

YES

Documented TB contact in the preceding year?

NO

REFER to DISTRICT HOSPITAL LEVEL
  e.g. may need CXR

YES

REFER FOR TREATMENT of TB AND REGISTRATION

1. Is sputum available?
2. Is hospitalisation/referral indicated?
3. Is HIV test indicated?

1. Yes – send to submit sputum for microscopy
2. Yes - refer
3. Yes – send for HIV test
Drug dosages should be consistent with national guidelines. Children tolerate TB drugs well with lower risk of toxicity compared to adults.

Treatment response is usually noted within 1-2 months of treatment – symptom resolution and weight gain.*

Weight should be monitored during treatment and dosages adjusted accordingly. Adherence to the full course is a challenge especially continuation phase.

Importance of supervision by parent/guardian and so they need to understand the importance of adherence and completing the full course.

All children should be registered with NTP: include age, TB type and outcome.

* Note that lymph node enlargement often persists for months even with effective treatment.
Community-based management of a child who is a household or close contact of an infectious case of TB
Available approaches to prevent TB in children

<table>
<thead>
<tr>
<th>Improved case-finding and management</th>
<th>Early identification and effective treatment of infectious TB cases will reduce the burden of child TB</th>
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<tbody>
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<td>Neonatal BCG immunisation is used widely but efficacy is variable</td>
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<td>The main proven benefit of neonatal BCG is protection against severe disseminated forms of TB in children</td>
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<td>Available approaches to prevent TB in children</td>
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<tr>
<td><strong>Contact screening and management</strong></td>
<td>This has huge potential to reduce the burden of TB in children Focus is on individuals infected with TB that have greatest likelihood of developing active TB disease following infection – this includes infants, young children and HIV-infected children of any age Focus is on contacts of the most infectious cases, usually those with sputum smear-positive disease Widely recommended but uptake by families and implementation by NTP are poor</td>
</tr>
</tbody>
</table>
Risk of TB disease following infection by age

![Risk of TB disease following infection by age](image_url)

- **Age in Years**: <1, 1to2, 2to5, 5to10, 10to15
- **PTB**: Bar graph showing the percentage of PTB cases across different age groups.
- **Disseminated**: Bar graph showing the percentage of disseminated cases across different age groups.

- **%**
  - Age <1: Highest percentage of PTB cases.
  - Age 1to2: Moderate percentage of PTB cases.
  - Age 2to5: Lowest percentage of PTB cases.
  - Age 5to10: Slightly increased percentage of PTB cases.
  - Age 10to15: Moderate percentage of PTB cases.

- **Towards Zero Deaths** logo
Proportion of children with TB infection (positive TST) by degree of smear positivity of the source case

Kenyon TA et al, Int J Tuberc Lung Dis 2002
Management of childhood contacts

• Recommended but rarely happens

  – Lack of knowledge of rationale by health workers
  – Symptom-based screening
    • TST and CXR not necessary, rather barriers
  – Community-based – integrated family-based approach
  – Focus on high-risk source cases

• Management issues
  – Isoniazid alone availability
  – Poor adherence
Why is child contact screening important?
Prevent child morbidity and mortality

- The prevalence of TB infection is high among child contacts

- Children living in households with TB cases reported significant increase risk of all-cause mortality (66% higher) in Guinea-Bissau compared to children living in non-TB households in same community, especially if the mother had TB (8-fold increase risk of death)  
  AF Gomes et al, Thorax 2011

- Missed opportunities for IPT are very common in children that later present with confirmed TB disease
  K Du Preez et al, Ann Trop Paediatr 2011
## Studies of child contacts in Asian countries

<table>
<thead>
<tr>
<th>Study</th>
<th>Location</th>
<th>No. of child contacts</th>
<th>Proportion with TB infection</th>
<th>Proportion with TB disease</th>
</tr>
</thead>
<tbody>
<tr>
<td>Andrew et al</td>
<td>India</td>
<td>398</td>
<td>39 %</td>
<td>5.5 %</td>
</tr>
<tr>
<td>Narain et al</td>
<td>India</td>
<td>790</td>
<td>24 %</td>
<td>NR</td>
</tr>
<tr>
<td>Kumar et al</td>
<td>India</td>
<td>142</td>
<td>NR</td>
<td>3 %*</td>
</tr>
<tr>
<td>Singh et al</td>
<td>India</td>
<td>281</td>
<td>34 %*</td>
<td>3 %*</td>
</tr>
<tr>
<td>Rathi et al</td>
<td>Pakistan</td>
<td>151</td>
<td>27 %</td>
<td>NR</td>
</tr>
<tr>
<td>Salazar et al</td>
<td>Philippines</td>
<td>153</td>
<td>69 %</td>
<td>3 %</td>
</tr>
<tr>
<td>Tornee et al</td>
<td>Thailand</td>
<td>500</td>
<td>47 %</td>
<td>NR</td>
</tr>
<tr>
<td>Nguyen et al</td>
<td>Lao PDR</td>
<td>148</td>
<td>31 %</td>
<td>NR</td>
</tr>
<tr>
<td>Okada et al</td>
<td>Cambodia</td>
<td>217</td>
<td>24 %*</td>
<td>9 %*</td>
</tr>
</tbody>
</table>

* Data only for < 5 years; NR: not recorded

From Triasih R et al (in press)
Why is contact screening important? Increased case-finding

- The prevalence of TB infection and disease is high among contacts
  
  
  – All TB cases 4.5% (95% CI 4.3-4.8)
  – Confirmed cases 2.3% (95% CI 2.1-2.5)
  – Latent TB infection 51.4% (95% CI 50.6-52.2)

- Malawi
  
  
  – 189 TB cases (HIV prevalence 69%) and 985 household contacts
  – TB prevalence with active case finding among contacts (1.74%, 1735/100,000) was significantly higher than passive case finding 0.19% (191/100,000) - p=0.01

- The Gambia
  
  PC Hill et al, PLoS ONE 2008
  
  – Incidence of TB disease among contacts was 603 per 100,000 (95% CI 370-830)
  
The prevalence of active TB cases among contacts – meta-analysis

<table>
<thead>
<tr>
<th></th>
<th>Included studies</th>
<th>Contacts investigated</th>
<th>Cases found</th>
<th>Prevalence (%) [95% CI]</th>
</tr>
</thead>
<tbody>
<tr>
<td>All*</td>
<td>77</td>
<td>883,213</td>
<td>22,803</td>
<td>3.1% (2.3-4.2)</td>
</tr>
<tr>
<td>Close contacts</td>
<td>62</td>
<td>847,646</td>
<td>22,032</td>
<td>3.6% (2.6-5.1)</td>
</tr>
<tr>
<td>Household contacts</td>
<td>60</td>
<td>843,606</td>
<td>21,930</td>
<td>3.6% (2.5-5.1)</td>
</tr>
</tbody>
</table>

.......in other words, the rate of active TB identified by screening of close or household contacts is around 3,600 per 100,000 population!
The prevalence of sputum smear-positive cases among contacts – meta-analysis

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</thead>
<tbody>
<tr>
<td><strong>All</strong></td>
<td>30</td>
<td>818,171</td>
<td>1,083</td>
<td>0.9% (0.6-1.3)</td>
</tr>
<tr>
<td><strong>Close contacts</strong></td>
<td>26</td>
<td>805,462</td>
<td>1,068</td>
<td>1.0% (0.6-1.6)</td>
</tr>
<tr>
<td><strong>Household contacts</strong></td>
<td>25</td>
<td>805,110</td>
<td>1,022</td>
<td>0.9% (0.6-1.4)</td>
</tr>
</tbody>
</table>

...and the rate of sputum smear-positive TB identified by screening of close or household contacts is around 1,000 per 100,000 population!
The prevalence of active TB is significantly higher if the contact is a young child (<5 years) or HIV-infected

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<td>All contacts</td>
<td>78</td>
<td>898,619</td>
<td>38,209</td>
<td>3.5% (2.3-5.4)</td>
</tr>
<tr>
<td>Child contacts &lt;5y</td>
<td>21</td>
<td>6,617</td>
<td>856</td>
<td>9.6% (5.5-16.0)</td>
</tr>
<tr>
<td>Contacts 5-14y</td>
<td>11</td>
<td>5,366</td>
<td>300</td>
<td>4.5% (1.6-12.3)</td>
</tr>
<tr>
<td>HIV+ contacts</td>
<td>5</td>
<td>282</td>
<td>79</td>
<td>28.4% (9.8-59.2)</td>
</tr>
</tbody>
</table>
Recommendations for the Investigation of Contacts of Persons with Infectious Tuberculosis

WHO, 2012

Recommends contact investigation for household and close contacts when the index case;
- has sputum smear positive pulmonary or laryngeal tuberculosis;
- has M/XDR TB (proven or suspected);
- is a person living with HIV;
- is a child < 5 years of age

Recommends that clinical evaluation of household and close contacts for active tuberculosis be prioritized to the following contacts:
- Persons of all ages with symptoms suggestive of TB,
- children < 5 years of age
- persons with known or suspected immunocompromising conditions (especially HIV)
- contacts of index cases with M/XDR TB (proven or suspected)

Recommends that children < 5 years of age or HIV-infected of any age who are household or close contacts and who, after an appropriate clinical evaluation, do not have active TB should be treated for presumed LTBI per existing WHO guidelines
Screening of child contacts

- Widely recommended but rarely happens
- Focus is on contacts of smear-positive source cases
- Uptake by families and implementation by health workers are poor
- TST and CXR were often advised but
  - Resource intensive and limited access
  - Limited role in clinical decision making
- Symptom-based screening now advised
Symptom-based screening is also recommended in the WHO 2006 guidance.
Symptom-based screening

Child in close contact with a case of sputum smear-positive TB

- Less than 5 years
  - Well
    - Preventive Therapy
  - Symptomatic
    - If becomes Symptomatic
- 5 Years and Over
  - Symptomatic
    - Evaluate for TB disease
  - Well
    - If becomes Symptomatic

*Also consider if the mother or primary caregiver has sputum smear-negative pulmonary TB
*Symptomatic: If TB is suspected, refer to local guidelines on diagnosis of childhood TB
# Isoniazid 10/mg/kg daily for 6 months
$ Unless the child is HIV-infected (in which case isoniazid 10/mg/kg daily for 6 months is indicated)
Management of child contacts

• **Decentralise**: symptom-based screening provides opportunity to undertake an integrated family-based approach in the community around the source case receiving DOT rather than requiring referral to health facility for all cases.

• **Adherence**: to IPT for 6 months is a challenge.

• **Enhanced case-finding**: Note that symptom-based screening also aims to identify symptomatic contacts of any age for investigation for possible TB disease.
Management of child contacts

List close contacts

• What is the age of the contact?
• Is the contact HIV-infected?
• Does the contact have any symptoms suggestive of TB?

Checklist of main symptoms

• Persistent cough for more than 2 weeks
• Weight loss or failure to gain weight
• Persistent fever for more than 1 week and/or night sweats
• Fatigue, reduced playfulness, less active
Sample contact screening register

<table>
<thead>
<tr>
<th>Name</th>
<th>Age (years)</th>
<th>TB symptoms (Y/N)</th>
<th>Anti-TB treatment (Y/N)</th>
<th>Isoniazid preventive therapy (Y/N)</th>
<th>TB registration number</th>
<th>Treatment outcome</th>
<th>HIV status a</th>
</tr>
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### Management of child contacts

#### Criteria for contacts to receive IPT

- No active TB disease – no symptoms suggestive of TB  
  AND
- At high risk of disease following TB exposure
  - < 5 years
  - HIV-infected

#### Management of contacts

<table>
<thead>
<tr>
<th>Management of contacts</th>
<th>Response</th>
<th>Action</th>
</tr>
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<tbody>
<tr>
<td>Symptomatic</td>
<td>TB treatment</td>
<td>Register</td>
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<tr>
<td>Sputum smear positive</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Symptomatic</td>
<td>Refer</td>
<td>Refer</td>
</tr>
<tr>
<td>Sputum smear-negative or not available</td>
<td></td>
<td></td>
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<tr>
<td>Asymptomatic and high risk</td>
<td>IPT</td>
<td>IPT register</td>
</tr>
<tr>
<td>Asymptomatic and not high risk</td>
<td>No treatment</td>
<td>Advise to return if symptoms develop</td>
</tr>
</tbody>
</table>
Sample IPT register

<table>
<thead>
<tr>
<th>No.</th>
<th>Name of TB contact treated with IPT</th>
<th>Age</th>
<th>Sex</th>
<th>HIV-infected (Y/N)</th>
<th>IPT started on (date)</th>
<th>IPT completed (Y/N)</th>
</tr>
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