DESK-GUIDE FOR DIAGNOSIS AND MANAGEMENT OF TB IN CHILDREN

Second edition, 2015
The Union welcomes requests for permission to reproduce or translate this publication, in part or in full. Applications and enquiries should be addressed to the Department of Communications at communications@theunion.org


This product is made possible by the generous support of the American people through the United States Agency for International Development (USAID). The Global Health Bureau, Office of Health, Infectious Disease and Nutrition, USAID, provided financial support for this document through TB CAP under the terms of Agreement No. GHS-A-00-0500019-00

Disclaimer:
The contents are the responsibility of TB CAP and do not necessarily reflect the views of USAID or the United States Government.
List of contents

Acknowledgements........................................................................................................4
Introduction.......................................................................................................................5
Epidemiology of TB in children.......................................................................................6
Clinical diagnosis: PTB.....................................................................................................7
Growth charts..................................................................................................................9
Approach to TB diagnosis in HIV-uninfected and HIV-infected child..........................10
Investigate: who, when and if (available).......................................................................12
Clinical diagnosis: EPTB...............................................................................................13
TB treatment..................................................................................................................16
Additional management decisions and follow-up..........................................................18
Treatment failure...........................................................................................................20
Child contact screening and management....................................................................21
TB infection control.......................................................................................................22
The child with TB and HIV...........................................................................................22
NTP management issues...............................................................................................24
Definitions and abbreviations.......................................................................................25
Appendix 1. Wall charts
  1. Guidance for the screening of children in close contact with an adolescent or adult with newly diagnosed pulmonary TB...........................................26
  2. Guidance for the diagnosis of children who present with symptoms suggestive of TB.................................................................27
  3. Strict symptom criteria............................................................................................28
  4. Indications requiring hospitalization/referral..........................................................28

Tables
  1. Recommended treatment regimens for new patients.............................................17
  2. Recommended dosages according to weight.........................................................17
  3. Numbers of tablets by weight band for FDC.........................................................18
This guide is based on NTP and WHO childhood TB and HIV case management guidelines. This guide is a decision-aid and does not cover all possible situations and/or solutions related to the management of childhood TB. The clinical judgment of the health worker remains the basis for final decision-making, and this aid is not a substitute for clinical expertise and individual assessment. It aims to provide guidance for the more common and straightforward cases presenting for care in the resource-limited setting.

Acknowledgements
This document represents a consensus document developed by members of a workshop convened by the International Union Against Tuberculosis and Lung Disease (The Union) and comments received from a wider audience including National Tuberculosis control Programme (NTP) managers and child TB experts from the IUATLD’s Child TB Training Working Group (especially Prof BJ Marais and Prof HS Schaaf), and Dr Anna Nakanwagi of TB CAP program, IUATLD, Uganda.

Participants of workshop:
Dr C Chabala (Zambia), Ms P Enarson (The Union), A/Prof SM Graham (Australia), Dr YK Haile (TB CAP), Dr L Muhe (WHO, Geneva), Dr E Obimbo (Kenya) and Dr C Puta (Uganda).

Lead author
Stephen M Graham
Child Lung Health, International Union Against Tuberculosis and Lung Disease, France; and
Centre for International Child Health, University of Melbourne Department of Paediatrics, Australia.
Introduction

Tuberculosis (TB) is an important cause of illness and death in children, especially in sub-Saharan Africa.

The diagnosis of TB can be made in most children in an outpatient setting based on careful clinical assessment.

Contact history is a very important part of assessment for child TB diagnosis and prevention.

Any child with suspected or confirmed TB should be tested for HIV infection.

Children with TB respond well to treatment and tolerate anti-TB treatment.

Children (0-14 years) should be routinely registered with and reported by the NTP.

Desk guide is for:
1. Health worker who manages sick children in first level health facilities or outpatient setting at any level of care
2. NTP worker who manages children as part of NTP work

Desk guide aims to improve:
1. early and accurate case detection of children with TB
2. management and outcome of children with TB
3. child contact screening and management

Desk guide will focus on:
1. diagnosis of common forms of TB in children
2. how to treat
3. when to refer
4. management of children who are close contacts of TB cases
Epidemiology of TB in children

Children (0-14 years) account for up to one-third of all TB cases
Most cases are pulmonary TB (PTB) cases
Extrapulmonary TB (EPTB) is also common and presentation varies with age

Important to always consider
Age and nutritional status
Risk factors for TB infection: history of contact with a TB patient
Risk factors for TB disease: young age, HIV-infected, malnourished, recent measles

Most TB cases occur in children less than 5 years of age
The younger the child, the more likely to identify a close contact with TB disease
TB disease can be more severe and of rapid onset in infants and young children

Children with TB disease usually have poor weight gain, may lose weight or be malnourished

The presentation and approach to diagnosis of pulmonary TB in older children (>10 years) and adolescents is similar to that for adults

Any child with suspected or confirmed TB should be tested for HIV
TB/HIV co-infection is common in children in sub-Saharan Africa
HIV-infected children are at greater risk for TB infection and for TB disease
Diagnosis and management can be more challenging in HIV-infected

BCG is not fully protective against TB disease in children

The diagnosis of TB can be made with confidence in the majority of children using careful clinical assessment
Clinical Diagnosis: PTB

The most common clinical presentation of pulmonary TB is persistent respiratory symptoms and poor weight gain. Note that in at-risk groups such as infants or HIV-infected, pulmonary TB can also present as acute pneumonia. The approach to diagnosis of TB in HIV-infected children is similar to that for HIV-uninfected children.

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 (>2-3 weeks) without improvement following other appropriate therapies (e.g. broad-spectrum antibiotics for cough; anti-malarial treatment for fever; or nutritional rehabilitation for malnutrition)

History of contact
- Close contact: such as with a source case of TB living in the same household
- Contact may be with a source case of TB from outside the household (e.g. neighbour, relative) with whom the child has had frequent contact
- A source case with sputum smear-positive PTB is more likely to infect contacts than cases with sputum smear-negative PTB
- If no source case is identified, always ask about anyone in household with chronic cough – if so, request assessment of that person for possible TB
- In older children the contact with a TB source case may be outside the household e.g. school
- Timing of contact: children usually develop TB within 2 years after exposure and most (90%) within the first year

Check weight, record weight and compare to previous weights
Clinical examination

- Weigh child accurately and compare to previous weights:
  - Look for weight loss or poor weight gain
  - Check for evidence of growth faltering

- Vital signs
  - Look for fever and increased respiratory rate

- Respiratory system
  - May have signs of respiratory distress
  - Auscultation and percussion: usually normal but may reveal lung disease (e.g. crackles, bronchial breathing) or pleural effusion (dullness and reduced breath sounds)

- Clinical features that might suggest other causes of chronic lung disease
  - Generalised lymphadenopathy, oral thrush, parotid enlargement suggest HIV infection
  - Finger clubbing (LIP or bronchiectasis, pages 11 and 22)
  - Recurrent cough and/or wheeze responsive to bronchodilators suggests asthma

Atypical clinical presentations of PTB

- Acute severe pneumonia
  - Presents with fast breathing and chest indrawing
  - Occurs especially in infants and HIV-infected children
  - Suspect PTB if poor response to antibiotic therapy – if HIV-infected also suspect other HIV-related lung disease e.g. PcP

- Wheeze
  - Asymmetrical and persistent wheeze can be caused by airway compression due to enlarged tuberculous hilar lymph nodes
  - Suspect PTB when wheeze is asymmetrical, persistent, not responsive to bronchodilator therapy and associated with other typical features of TB*

*Note that wheeze due to asthma is usually recurrent and variable rather than persistent, responsive to inhaled bronchodilator and is not associated with other typical features of TB such as poor weight gain and persistent fever.
Examples of abnormal growth charts

Growth faltering or "failure to thrive"

Weight loss

Examples of abnormal growth charts
**Approach to TB diagnosis in HIV-uninfected child**

TB suspected on basis of typical and persistent symptoms

- Sputum: Negative or not done
  - Smear-positive

**Clinical diagnosis:**
- Positive contact history
- Physical signs suggestive of PTB*
- CXR suggestive of PTB

If only one or none of the features are present
- If child sick, admit to hospital for further investigation
- If child well, review after 2-4 weeks

Make a diagnosis of TB if two or more of these features are present

*The clinical and CXR signs suggestive of TB are listed above

If child does not fit definite criteria to start anti-TB treatment, decision for further review as outpatient or for inpatient management or for referral for further opinion/investigation will depend upon clinical state of the child and available levels of care.

If the child is asymptomatic but has a positive contact history, refer to Appendix 1 (p 25).

---

**CXR suggestive of PTB:**
- Right perihilar lymph node enlargement with opacity in the right mid zone
- Left upper lobe opacification with narrowing and shift of left main bronchus
Approach to TB diagnosis in HIV-infected child

TB suspected on basis of typical and persistent symptoms

Sputum: Negative or not done
- Smear-positive
  - Consider contact history

Contact: Smear-negative or not known
- Smear-positive → TREAT FOR TB

Clinical diagnosis:
- Physical signs and CXR suggest other diagnosis#
- Physical signs or CXR suggestive of PTB#

# It can be difficult to clearly define what is “suggestive of PTB” on clinical or radiological findings in HIV-infected children because of clinical overlap between PTB and other forms of HIV-related lung disease: see Table on page 22 and CXRs below.
# CXR abnormalities of PTB in HIV-infected child are similar to those in HIV-uninfected child.

Lymphoid interstitial pneumonitis: typical features are bilateral, diffuse reticulonodular infiltration with bilateral perihilar lymph node enlargement

Bronchiectasis: focal opacification in right lower zone with thickening of bronchial walls and honeycomb appearance
Investigate: who, when and if (available)

HIV test
- **Any child with suspected TB should have an HIV test**
- A positive HIV test also directs the need for other HIV-related care for the child and possibly other family members

Sputum
- Do two sputum smears for acid fast bacilli (AFB) microscopy, and culture if available
- Usually children older than 10 years (sometimes as young as 5 years) can produce sputum

Chest X-Ray
- CXR remains an important tool for diagnosis of PTB in children who are sputum smear negative or who cannot produce sputum
- The following abnormalities on CXR are suggestive of TB
  - Enlarged hilar lymph nodes and opacification in the lung tissue
  - Miliary mottling in lung tissue
  - Cavitation (tends to occur in older children)
  - Pleural or pericardial effusion – though seen on CXR – are forms of extra pulmonary TB that tend to occur in older children
- The finding of marked abnormality on CXR in a child with no signs of respiratory distress (no fast breathing or chest indrawing) is supportive of TB

Tuberculin skin test
- TST is useful to support a diagnosis of TB in children with suggestive clinical features who are sputum smear negative or who cannot produce sputum
- A positive TST indicates infection:
  - positive in any child if ≥ 10 mm irrespective of BCG immunisation
  - also positive if ≥ 5 mm in HIV-infected or severely malnourished child
- A positive TST is particularly useful to indicate TB infection when there is no known TB exposure on clinical assessment i.e. no positive contact history
- Caution
  - A positive TST does not distinguish between TB infection and active disease
  - A negative TST does not exclude TB disease

Gastric aspirate or induced sputum
- Usually performed in children unable to provide sputum by coughing
- Perform AFB microscopy and TB culture if available (culture increases likelihood of identifying TB bacteria)
- Especially useful in child with diagnostic uncertainty or suspicion of MDR TB

Investigations such as TST and sputum culture are often not available.
Clinical Diagnosis: EPTB

Extrapulmonary TB is common in children and presentation varies with age. The table below lists typical clinical features of forms of EPTB and suggested investigations for each category. Symptoms vary depending on site of disease and characteristically are persistent, progressive and may be associated with weight loss or poor weight gain.

**Clinical assessment in all cases should consider:**
- **History of contact** (see above). Time lapse from exposure to disease presentation can be quite variable – shorter for young children with disseminated disease, longer for other forms that present in school-aged children.
- **Sputum for smear microscopy** if cough and sputum is available.
- **HIV test**

<table>
<thead>
<tr>
<th>Site of EPTB</th>
<th>Typical clinical presentation</th>
<th>Investigation</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>TB adenitis</td>
<td>Asymmetrical, painless, non-tender lymph node enlargement for more than one month +/- discharging sinus Most commonly in neck area</td>
<td>Fine needle aspiration when possible for culture and histology TST usually positive - not necessary for diagnosis</td>
<td>Treat If axillary node enlargement on same side as BCG, consider BCG disease and refer</td>
</tr>
<tr>
<td>Pleural TB</td>
<td>Dullness on percussion and reduced breath sounds +/- chest pain</td>
<td>CXR Pleural tap#</td>
<td>Treat If pus in pleural tap, consider empyema and refer</td>
</tr>
</tbody>
</table>

**Usually young (< 5 years) with disseminated disease and severely ill**

<table>
<thead>
<tr>
<th>EPTB</th>
<th>Typical clinical presentation</th>
<th>Investigation</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>TB meningitis</td>
<td>Headache, irritability/abnormal behaviour, vomiting (without diarrhoea), lethargic/reduced level of consciousness, convulsions, neck stiffness, bulging fontanelle, cranial nerve palsies</td>
<td>Lumbar puncture obtain CSF# CXR</td>
<td>Hospitalise for TB treatment §</td>
</tr>
<tr>
<td>Miliary TB</td>
<td>Non-specific, lethargic, fever, wasted</td>
<td>CXR</td>
<td>Treat and refer §</td>
</tr>
</tbody>
</table>

**Usually 5 years and older**

<table>
<thead>
<tr>
<th>EPTB</th>
<th>Typical clinical presentation</th>
<th>Investigation</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Abdominal TB</td>
<td>Abdominal swelling with ascites or abdominal masses</td>
<td>Ascitic tap#</td>
<td>Refer §</td>
</tr>
<tr>
<td>Spinal TB</td>
<td>Deformity of spine May have lower limb weakness/paralysis/unable to walk</td>
<td>X-ray spine</td>
<td>Refer §</td>
</tr>
<tr>
<td>Pericardial TB</td>
<td>Cardiac failure Distant heart sounds Apex beat difficult to palpate</td>
<td>CXR Cardiac ultrasound Pericardial tap#</td>
<td>Refer §</td>
</tr>
<tr>
<td><strong>TB bone and joint</strong></td>
<td>Swelling end of long bones with limitation of movement Unilateral effusion of usually knee or hip</td>
<td>X-ray bone/joint Joint tap#</td>
<td>Refer §</td>
</tr>
</tbody>
</table>

# typical findings: straw colored fluid, exudate with high protein, white blood cells predominantly lymphocytes on microscopy
§ Referral may be necessary for investigation procedure and laboratory support as well as clinical care. If all options for referral have been explored and referral is not possible, start anti-TB treatment. Start anti-TB treatment immediately if TBM suspected.
TB adenitis

Tuberculous lymphadenitis is the commonest form of EPTB in children, usually representing around 10% of total child TB caseload. Enlargement of regional lymph nodes occurs after infection via lymphatic drainage from the site of infection. TB adenitis may or may not be associated with other symptoms of TB. Sinus and discharge may develop.

The cervical lymph nodes are the commonest site of clinical presentation. The usual age of presentation is 2-10 years.

Lymph node enlargement due to TB is typically:
- large (>2 x 2 cm) i.e. visibly enlarged not just palpable.
- painless and asymmetrical - often multiple, discreet or matted
- persistent (>1 month) and not responsive to other treatment such as antibiotics

TST (if available) usually strongly reactive but not necessary for diagnosis. Fine needle aspiration for culture and histology should be done whenever possible.
TB pleural effusion: large left-sided effusion. Pleural tap to differentiate from empyema

Miliary TB: typical bilateral diffuse micronodular pattern. Note differences to LIP X-ray above

Spinal TB: collapse of thoracic vertebra causing angulation

Pericardial TB: enlarged cardiac shadow. Ultrasound to differentiate from other causes of cardiac failure
TB Treatment

Some important rules

- Treatment regimens by disease category for new patients are listed in Table 1 on page 17
- Drug dosages are calculated according to weight and are listed in Table 2 on page 17
- All HIV-infected children require four drugs in the intensive phase of treatment
- HIV-infected children should not be treated with intermittent (three times or twice weekly) regimens including during the continuation phase
- Register all children receiving anti-TB treatment in the health unit TB register
- Record diagnostic category, treatment regimen and date of commencement in road-to-health book, TB treatment card and health unit TB register
- Record weight at each visit in road-to-health book and TB treatment card
- Children gain weight while receiving anti-TB treatment and dosages should be adjusted accordingly.
- Weight is important for monitoring of treatment response
- Once treatment starts it must be completed; “trial of TB treatment” should not be used as a diagnostic tool
- A caregiver should be identified as the DOT provider for all ages including older children
- Adherence to the full course of treatment should be emphasized and reinforced
- TB drugs are very well tolerated in almost all children. Adverse events (side-effects) are unusual and the most important is hepatotoxicity.
- Ethambutol can be safely used in all ages of children at recommended dosages
Table 1. Recommended treatment regimens for new patients (WHO, 2014)

<table>
<thead>
<tr>
<th>TB disease category</th>
<th>Recommended regimen</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Intensive phase</td>
</tr>
<tr>
<td>Non-severe forms of TB (smear negative PTB, intrathoracic lymph node TB, peripheral lymph node TB) in low HIV prevalence and low isoniazid resistance settings</td>
<td>2HRZ</td>
</tr>
<tr>
<td>Non-severe forms of TB (smear negative PTB, intrathoracic lymph node TB, peripheral lymph node TB) in HIV endemic# or high isoniazid resistance settings</td>
<td>2 HRZE</td>
</tr>
<tr>
<td>More severe forms of PTB and EPTB except TBM and osteoarticular TB</td>
<td>2 HRZE</td>
</tr>
<tr>
<td>TB meningitis</td>
<td>2 HRZE</td>
</tr>
<tr>
<td>Osteoarticular TB</td>
<td></td>
</tr>
</tbody>
</table>

H=isoniazid. R=rifampicin. Z=pyrazinamide. E=ethambutol
Numeral refers to number of months of the regimen e.g. 2 HRZE refers to two months of daily isoniazid, rifampicin, pyrazinamide and ethambutol

# HIV endemic setting i.e. countries where the HIV prevalence among adult pregnant women is ≥1% or among TB patients is ≥5%
Note: Streptomycin no longer recommended for children with TB

Table 2. Recommended dosages according to weight (WHO, 2014)

<table>
<thead>
<tr>
<th>Drug</th>
<th>Daily dosage in mg/kg</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Range (maximum)</td>
</tr>
<tr>
<td>Isoniazid (H)</td>
<td>7-15 (300 mg)</td>
</tr>
<tr>
<td>Rifampicin (R)</td>
<td>10-20 (600 mg)</td>
</tr>
<tr>
<td>Pyrazinamide (Z)</td>
<td>30-40 (2000 mg)</td>
</tr>
<tr>
<td>Ethambutol (E)</td>
<td>15-25 (1200 mg)</td>
</tr>
</tbody>
</table>
Table 3. Numbers of tablets by weight band for FDC (RHZ: 60/30/150)

<table>
<thead>
<tr>
<th>Weight bands</th>
<th>Intensive Phase</th>
<th>Continuation Phase</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>RHZ 60/30/150</td>
<td>E 100</td>
</tr>
<tr>
<td>4-6kg</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>7-10kg</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>11-14kg</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>15-19 kg</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td>20-24kg</td>
<td>5</td>
<td>4</td>
</tr>
</tbody>
</table>

It should be noted that at 25 kg, children can adopt adult dosage recommendations and use adult preparations.

Additional management decisions

- Hospitalization
  - Severe forms of PTB and EPTB for further investigation and initial management
  - Severe malnutrition for nutritional rehabilitation
  - Signs of severe pneumonia (i.e. chest in-drawing)
  - Other co-morbidities e.g. severe anaemia
  - Social or logistic reasons to ensure adherence
  - Severe adverse reactions such as hepatotoxicity

- For all HIV-infected children
  - Commence cotrimoxazole preventive therapy (CPT)
  - Commence antiretroviral therapy (ART)
  - Conduct family-based care/screening

- Referral should be considered if
  - Diagnostic uncertainty
  - Necessary for HIV-related care e.g. to commence ART
  - Failure to respond to treatment despite good adherence to anti-TB treatment

- Nutritional support should be provided for malnourished children if available

- Breastfeeding infants and children should continue to breastfeed while receiving anti-TB treatment

- Pyridoxine is not routinely given but is recommended for severely malnourished and HIV-infected children
Follow-up

HIV-uninfected: monthly during intensive phase and 2-monthly on continuation phase
HIV-infected: review at 2 weeks and 4 weeks following commencement of anti-TB treatment and then monthly thereafter

This is a critical part of effective TB treatment requiring a clear management plan. There is an example of a TB treatment card (Appendix 2) that could be copied and provided.

Important practice points

- Weigh the child at each follow-up, document and adjust dosage if necessary
- Adherence for the full course of treatment may be a challenge.
  - Explain and emphasize to care-giver and child why they must take the full course of treatment even if they are feeling better
  - Note risk factors for poor adherence such as distance/transport; orphan (especially if mother has died) or primary care-giver unwell; adolescents
  - Education and adherence support especially TB/HIV
- Explain that anti-TB drugs in children are well tolerated and safe.
- CXR is not required in follow-up if the child is responding well to anti-TB treatment

The most important adverse effect is hepatitis which usually presents with jaundice, nausea and vomiting. There may be abdominal pain, jaundice and tender, enlarged liver.

If considered a possibility, stop the anti-TB drugs immediately and refer to hospital
**Treatment failure**

Most children with TB will start to show signs of improvement after 2 to 4 weeks of anti-TB treatment.

Assessment at 1-2 months after treatment, consider treatment failure if child is receiving anti-TB treatment and:

- No symptom resolution or symptoms getting worse
- Continued weight loss
- Smear-positive at 2 month follow-up sputum

Poor adherence is a common cause of “treatment failure.”

If a child stops anti-TB treatment for more than 2 weeks in the intensive phase or more than 2 months in the continuation phase and becomes symptomatic, then restart first-line anti-TB therapy. If a child stops anti-TB treatment for less than 2 weeks in the intensive phase or less than 2 months in the continuation phase and becomes symptomatic, then continue current regimen.

Treatment failure is more common in HIV-infected children.

Treatment failure suggests the possibility of MDR TB and needs careful assessment.

---

*Refer children with treatment failure for further assessment*
Child contact screening and management

Isoniazid preventive therapy (IPT) greatly reduces the risk of an infant or young child with TB infection from developing disease.

**Important questions for any person commenced on anti-TB treatment**

1. Is the case smear positive?
2. How many children in the household?
3. What are the ages of the children?
4. Is the child contact sick or well?
5. What is the relationship of the source case to the children?
6. Is there anyone else in the household who is coughing?

- All children who are close contacts with cases with smear-positive TB should be screened for TB
- If the TB source case is the child’s parent and is HIV-infected, test all the children for HIV
- Screening can be done at the primary health care level
- Symptoms alone are used to screen child contacts for possible TB disease

Refer to Appendix 1 (page 25) for a recommended approach to assessment of the child contact.

**Any child contact with symptoms should be carefully assessed for TB disease**

IPT is indicated for all young children (< 5 years) and HIV-infected children of any age that are household contacts of a case with sputum smear-positive TB AND do not have any evidence of TB disease

IPT must be given for a full 6 months to be effective. Dosage of 10 (7-15) mg/kg is same as for treatment.

Follow up is critical:
- review every 2 months and continuously re-enforce message of adherence
- investigate for TB if typical symptoms develop i.e. persistence of cough, fever, fatigue, poor weight gain

**If source case is MDR TB, refer the children for contact management advice**
TB infection control

Prevention of TB transmission and infection in the household and health facilities are important components of control and management of TB in children.

The following simple procedures are effective in TB infection control at home and clinics

- Early diagnosis and treatment of adult TB cases in the household
- At the clinic promptly identify potential and known infectious cases of TB; separate and treat them with minimal delay by conducting triage and screening
- Provide health education about TB transmission without stigmatizing TB patients
- Encourage proper cough hygiene both at home and at health facilities
- Natural ventilation and sunlight:
  - Keep doors and windows open on opposite sides of the TB clinic and other clinics (effective ventilation- changing air)
  - Where children and adults stay together open windows.
  - Advise TB patients to do the same at home
  - Apply the same in the clinics

The child with TB and HIV

A comprehensive approach to management of both TB and HIV is critical.

- HIV test is indicated in all children with suspected and confirmed TB
- Approach to diagnosis of TB is similar as for HIV-uninfected children
- Treatment for TB is same as for HIV-uninfected children
- All children with TB/HIV should receive CPT and ART
- Nutritional support is often needed for children with TB/HIV
- All HIV-infected children need to be screened for TB disease.
- If TB disease is excluded, IPT is given irrespective of age
- The management of children with TB/HIV should be integrated and all family members are counseled and tested for HIV and screened for TB
- The specific needs of each family need to be determined and a plan of action developed to ensure that the family receives comprehensive care using all available services
The diagnosis of PTB can be particularly challenging in HIV-infected child because of clinical overlap with other HIV-related lung disease.

<table>
<thead>
<tr>
<th>Cause</th>
<th>Clinical features</th>
</tr>
</thead>
<tbody>
<tr>
<td>Recurrent pneumonia</td>
<td>Recurrent episodes of cough, fever and fast breathing that usually respond to antibiotics</td>
</tr>
<tr>
<td>LIP</td>
<td>Unusual before 1 year of age</td>
</tr>
<tr>
<td></td>
<td>Associated with generalised symmetrical lymphadenopathy, clubbing, parotid enlargement.</td>
</tr>
<tr>
<td></td>
<td>Nutritional status variable.</td>
</tr>
<tr>
<td></td>
<td>CXR: diffuse reticulonodular pattern and bilateral perihilar adenopathy. No compression of airways</td>
</tr>
<tr>
<td>Tuberculosis</td>
<td>Persistent respiratory symptoms not responding to antibiotics. Often poor nutritional status; positive TB contact especially in younger children</td>
</tr>
<tr>
<td></td>
<td>CXR: focal abnormalities and perihilar adenopathy</td>
</tr>
<tr>
<td>Bronchiectasis</td>
<td>Cough productive or purulent sputum; clubbing</td>
</tr>
<tr>
<td></td>
<td>CXR: honeycombing usually of lower lobes</td>
</tr>
<tr>
<td></td>
<td>Complicates recurrent bacterial pneumonia, LIP or TB</td>
</tr>
<tr>
<td>PcP</td>
<td>Common cause of severe, fatal pneumonia especially in infants.</td>
</tr>
<tr>
<td></td>
<td>Persistent hypoxia is common</td>
</tr>
<tr>
<td></td>
<td>Unusual after 1 year of age</td>
</tr>
<tr>
<td></td>
<td>CXR: diffuse interstitial infiltration or hyperinflation</td>
</tr>
<tr>
<td>Mixed infection</td>
<td>Common problem: LIP, bacterial pneumonia, TB</td>
</tr>
<tr>
<td></td>
<td>Consider when poor response to first-line empiric management</td>
</tr>
<tr>
<td>Kaposi sarcoma</td>
<td>Uncommon</td>
</tr>
<tr>
<td></td>
<td>Characteristic lesions on skin or palate</td>
</tr>
</tbody>
</table>
NTP Management Issues

Most of the issues that relate to an effective NTP providing a high quality service for TB control relate to children as well as adults. Early case detection and effective management of TB cases in the community will reduce the burden of TB in children. It is important that NTP include child TB in funding and resource allocation, in policy guidelines/protocols and training opportunities in NTP. NTP should have a focal person for child TB and a child TB working group for monitoring and evaluation of child TB-related issues.

Registration and reporting
All children receiving TB treatment need to be registered in the district TB register and should be part of the quarterly and yearly cohort analysis and reporting, including when sputum is smear-negative or not obtained.

Children are reported in same way as adults: includes: age, site of TB, gender, disease category, HIV status, outcome

Major differences to management of adults
Most cases not confirmed i.e. “smear-negative”
TST is an important tool for child TB diagnosis
Drug dosages need to be higher in mg/kg (Table 2, page 13)
Drug dosages may need to be adjusted with weight gain
Children tolerate TB drugs very well

Treatment outcome
It is very important that treatment outcomes are reported by NTP for all children that receive TB treatment as per standard category
   i. Treatment completion
   ii. Default
   iii. Death
   iv. Transfer out
   v. Cure (for smear positive)

Engage all care providers
As part of the overall TB control activities, NTP need to coordinate and engage all relevant care providers to ensure adequate service provision through dissemination and implementation of International Standards of TB Care. Public-Private Partnership, including community and faith-based organizations, is critical to intensify case finding and support adherence.
**Definitions and distinctions**

Infection with *Mycobacterium tuberculosis* usually results from inhalation of infected droplets produced by someone who has PTB and who is coughing. The most infectious source cases are those with sputum smear-positive disease. The closer the contact with this source case, the greater the exposure and the greater the risk of getting infected with tuberculosis.

**TB infection** is when a person carries the *Mycobacterium tuberculosis* bacteria inside the body. Many people have TB infection and are well. A positive TST indicates infection - but a negative TST does not exclude the possibility of infection.

**TB disease** occurs in someone with TB infection when the bacteria inside the body start to multiply and become numerous enough to damage one or more organs of the body. This damage causes clinical symptoms and signs and is referred to as “tuberculosis” or active disease.

**Close contact** is defined as living in the same household as, or in frequent contact with (e.g. child minder, school staff), a source case with PTB.

**Children** refer to the 0 to 14 year age group.

**Infant** is a child of less than 1 year of age (0-12 month age group)

**Abbreviations**

- ART: anti-retroviral therapy
- CPT: cotrimoxazole preventive therapy
- CXR: chest radiograph
- DOT: directly observed therapy
- EPTB: extra-pulmonary tuberculosis
- HIV: human immunodeficiency virus
- IPT: isoniazid preventive therapy
- LIP: lymphoid interstitial pneumonitis
- MDR: multi-drug resistant
- NTP: National Tuberculosis control Programme
- PCP: *Pneumocystis jirovecii* pneumonia
- PTB: pulmonary tuberculosis
- TB: tuberculosis
- TST: tuberculin skin test

**Resource materials**

1. GUIDANCE for the screening of children in close contact with an adolescent or adult with newly diagnosed pulmonary TB

**Documented TB exposure, age and HIV status of child**

**Any current symptoms suspicious of TB?**
cough, wheeze, fever, lethargy, fatigue, weight loss, neck swelling

- **NO**
  - <5yrs OR HIV-infected
    - IPT for 6 months
  - ≥5yrs AND HIV-uninfected
    - No IPT

- **YES**
  - Does it meet strict symptom criteria?*
    - Note: If indicated – then hospitalize/refer

- **NO**
  - Regular follow-up
    - If typical symptoms develop
      - Remains well
      - Complete 6 months of IPT

- **YES**
  - Follow up after 2-4 weeks
    - Persistent non-remitting symptoms?
      - **NO**
      - Regular follow-up
      - If typical symptoms develop
        - Remains well
        - Complete 6 months of IPT
      - **YES**
      - TREAT FOR TB
        - Regular follow-up
        - Refer if poor response to therapy after 2 months of taking TB treatment

---

*Close contact* is defined as living in the same household as, or in frequent contact with (e.g. child minder, school staff), a source case with PTB.
2. GUIDANCE for the diagnosis of children who present with symptoms suggestive of TB

Present with symptoms suggestive of TB?

Sputum smear-negative or not done

Do the symptoms meet strict symptom criteria?*
Has HIV test been done?
Note: If indicated – then hospitalize/refer#

NO

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

NO

Physical signs or CXR supportive of TB diagnosis?

NO

Consider other diagnoses
Follow up after 1-2 weeks until symptom resolution
Refer if symptoms persist

YES

Sputum smear-positive

YES

Documented TB contact in the preceding year?

NO

TREAT FOR TB

YES

Regular follow-up
Refer if poor response to therapy after 2 months
3. **STRICT SYMPTOM CRITERIA**

- Persistent, non-remitting cough or wheeze for more than 2 weeks not responding to standard therapy
- Documented loss of weight or failure to thrive during the past 3 months especially if not responding to food and/or micronutrient supplementation, OR severe malnutrition
- Fatigue/reduced playfulness
- Persistent fever > 10 days

Two or more of these symptoms are highly suggestive of TB disease

4. **INDICATIONS REQUIRING HOSPITALIZATION/REFERRAL**

- Severe forms of PTB and EPTB for further investigation and initial management
- 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