



DESK-GUIDE

FOR MANAGEMENT OF
TB IN CHILDREN FOR HEALTH CARE WORKERS



For Management of TB in Children for Health Care Workers

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FOREWORD

Childhood Tuberculosis disease for a number of years has long been neglected among other paediatric illnesses of public health interest. The World Health Organisation estimates that half a million children are diagnosed with TB every year .The true burden of the disease is not known globally. It is however known that there is under diagnosis and under reporting of cases of childhood TB.

TB disease in children is often seen with other childhood illnesses like pneumonia, malnutrition and HIV/ AIDS, childhood TB is thus usually missed or is simply not thought of even in areas of high TB burden. It is important to note that globally, 75% of reported childhood TB cases are from the 22 high burden TB countries. It is these same countries that also carry the burden of the top 5 child killer diseases some of which are known risk factors of TB. From this knowledge it is likely that many cases of malnutrition, pneumonia are undiagnosed TB cases-making TB an unrecognised but significant cause of child mortality.

As a country, we are aware of the gaps that exist in the prevention, diagnosis, treatment, follow up of childhood cases of TB. As part of the country’s efforts to bridge these gaps the National TB Programme has taken steps to strengthen childhood TB diagnosis, care and treatment through use of this simple tool that will guide the health worker in managing a presumptive case of childhood TB.

This guide is mainly for the health workers managing sick children at primary care level and any health worker working at outpatients’ settings. It was revised and adapted from the International Union Against Tuberculosis and Lung Disease Desk-Guide for the diagnosis and management of TB in children in consultation with key stakeholders in child health activities including specialist paediatricians, policy makers and partners in child health.

We call upon all stakeholders to make use of this guide in delivering child health services in order to improve early TB case detection, quality TB case management and contact screening so as to improve and contribute to child survival in Zimbabwe.



Brigadier General (Dr) Gerald Gwinji
Permanent Secretary, Ministry of Health and Child Care

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This desk is based on the following documents:

1. Desk-Guide for diagnosis and management of TB in children -2015, publication by The International Union Against Tuberculosis and Lung Disease.
2. Guidance for national tuberculosis programmes on the management of TB in children, Second Edition -2014, publication by the World Health Organisation.

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



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ABBREVIATIONS

ART	Anti-Retroviral Therapy
CPT	Cotrimoxazole Preventive Therapy
CXR	Chest Radiograph
DOT	Directly Observed Therapy
DR	Drug Resistant
DST	Drug Sensitivity Testing
EHT	Environmental Health Technician
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 jiroveci pneumonia
PPD	Purified Protein Derivative
PTB	Pulmonary Tuberculosis
TB	Tuberculosis
TST	Tuberculin Skin Test



DEFINITIONS

Child: 0 to 14 year-age group.

Close contact: a person who is not in the household but who shared an enclosed space, such as a social gathering place, workplace, or facility with the index case for extended daytime periods during the 3 months before the start of the current treatment episode.

Contact: any person who has been exposed to an index case.

Contact screening: an interview with the index case to obtain the names and ages of contacts and an assessment of contacts' risk for having or developing TB.

Household contact: a person who shared the same enclosed living space as the index case for one or more nights or for frequent or extended day time periods during the 3 months before the start of the current treatment episode.

Index/source case: the initially identified case of new or recurrent TB in a person of any age in which others may have been identified.

Infant: a child under 1 year of age.

Infection: Infection with *Mycobacterium tuberculosis* usually results from inhalation of infected droplets produced by someone who has pulmonary TB 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. Many people have TB infection and are well.

Preventive therapy: treatment offered to contacts who are considered to be at risk of developing TB disease following exposure to a possible source in order to reduce that risk.

Source/index case investigation: Contact investigation undertaken among household members of TB infected children with the goal of identifying and if necessary treating the source case and identifying any others that may have been infected.

Standard case definitions of TB in children: the case definition is determined by the anatomical site, history of previous treatment, drug resistance and HIV status.

Treatment outcomes: categories of treatment outcomes used for children for recording and reporting purposes that are similar for all age groups.

Tuberculosis disease (active TB): illness that occurs in someone with *Mycobacterium tuberculosis* and is characterized by clinical signs and symptoms, with or without laboratory or X-ray evidence.



1. INTRODUCTION

Under 5 mortality rates remain high in Zimbabwe with the leading causes of death listed as neonatal (44%), pneumonia (12%) and HIV/AIDS (9%) and under nutrition given as a major underlying cause (WHO 2014). Childhood TB is not listed as a cause of mortality in data both from Sub-Saharan Africa and Zimbabwe but may go unrecognized in children with pneumonia, respiratory illness, HIV/AIDS or undernutrition. Programs have generally focused on sputum smear positive TB cases and not put in place effective strategies to actively screen all child contacts.

A recent situational analysis on childhood TB conducted in Harare city and another province revealed that most cases of TB were diagnosed at central/tertiary level and there was reduced capacity to conduct basic TB screening and clinical diagnosis at the lower levels of the health care system where the majority of sick children present. There was also a low index of suspicion for childhood TB and underutilization of diagnostic resources.

This adapted Desk Guide seeks to equip health care workers (HCW) with the skills to suspect, screen, diagnose and treat childhood TB in Zimbabwe. The specific aims are 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.
4. use of Isoniazid Preventive Therapy (IPT) in HIV positive children.
5. the use of newer diagnostic technologies.

Specific focus will be given to providing HCW with job aids targeted at:

- Managing child TB contacts at community level.
- Screening child TB contacts in health facilities.
- Approach to TB diagnosis.
- Collection of gastric aspirates.
- Performing a Tuberculin skin test (Mantoux).

The Desk guide is for:

1. The health worker who manages sick children in first/second level health facilities or outpatient setting at any level of care.

The Desk guide will focus on:

1. Diagnosis of common forms of TB in children.
2. Treatment of TB in children.
3. Referral criteria of children with TB.
4. Management of children who are close contacts of TB cases.



2. EPIDEMIOLOGY OF TB IN CHILDREN

An estimated 550 000 (6%) of the total incident cases of TB were reported in children in 2013 (1). Childhood TB has been included in the “other diseases” category among the under-five causes of mortality but contributes to significant morbidity and mortality especially in high TB burden settings. Many cases of pneumonia, malnutrition and HIV may be undiagnosed TB.

Zimbabwe is ranked 17 among the 22 high TB burden countries that account for 80% of the TB cases. Local estimates of childhood TB range between 8-10%. (National TB Control Programme Strategic Plan 2015-2017).

Most TB cases occur in children less than 5 years of age. Pulmonary TB accounts for the majority of cases and the presentation of extra-pulmonary TB varies with age.

Neonatal BCG vaccination protects against the more severe forms of TB such as military TB and tuberculous meningitis to which infants and young children are particularly susceptible.

The younger the child, the more likely to identify a close contact with TB disease
Progression from TB infection to TB disease can be more severe and of rapid onset in infants (<12months) and young children (1-5 years).

Children with TB disease usually have poor weight gain, may lose weight or be malnourished. TB/HIV co-infection is common in children in Zimbabwe. HIV-infected children are at a greater risk for TB infection and TB disease.

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

The key risk factors for TB in children are shown in Box 1:

Box 1. Key risk factors for TB in children

- Household or other close contact with a case of pulmonary TB (especially smear-positive or culture-positive pulmonary TB)
- Age less than 5 years
- HIV infection
- Severe malnutrition
- Recent measles



3. DIAGNOSIS OF TUBERCULOSIS

The diagnosis of TB in children relies on thorough assessment of all evidence derived from a careful history of exposure, clinical examination and relevant investigations. The proposed approach to diagnosing TB in children is summarized in Box 2.

Box 2. Guidance on approach to diagnosis of TB in children

- Careful history (including history of TB contact and symptoms consistent with TB)
- Clinical examination (including growth assessment)
- Bacteriological confirmation whenever possible
- HIV testing (if status is unknown)
- Tuberculin skin testing
- Chest X-ray (if available)
- Investigations relevant for suspected extra-pulmonary TB

3.1 PULMONARY TUBERCULOSIS

The most common clinical presentation of pulmonary TB is persistent respiratory symptoms and poor weight gain or weight loss. Note that in at-risk groups such as infants or HIV-infected children, 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.

Box 3. 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 for more than 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).

TB should be considered in a child who loses or fails to gain weight following nutritional rehabilitation.

Signs and symptoms of PTB in children may be atypical (Box 5)

Box 5. Atypical clinical presentations of PTB

- Acute severe pneumonia
- Presents with fast breathing and chest in-drawing
- 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 tuberculohilar 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. It is responsive to inhaled bronchodilators and is not associated with other typical features of TB such as poor weight gain and persistent fever.*

EXAMPLES OF ABNORMAL GROWTH CHARTS

Chart 1: Growth faltering or “poor or no weight gain”

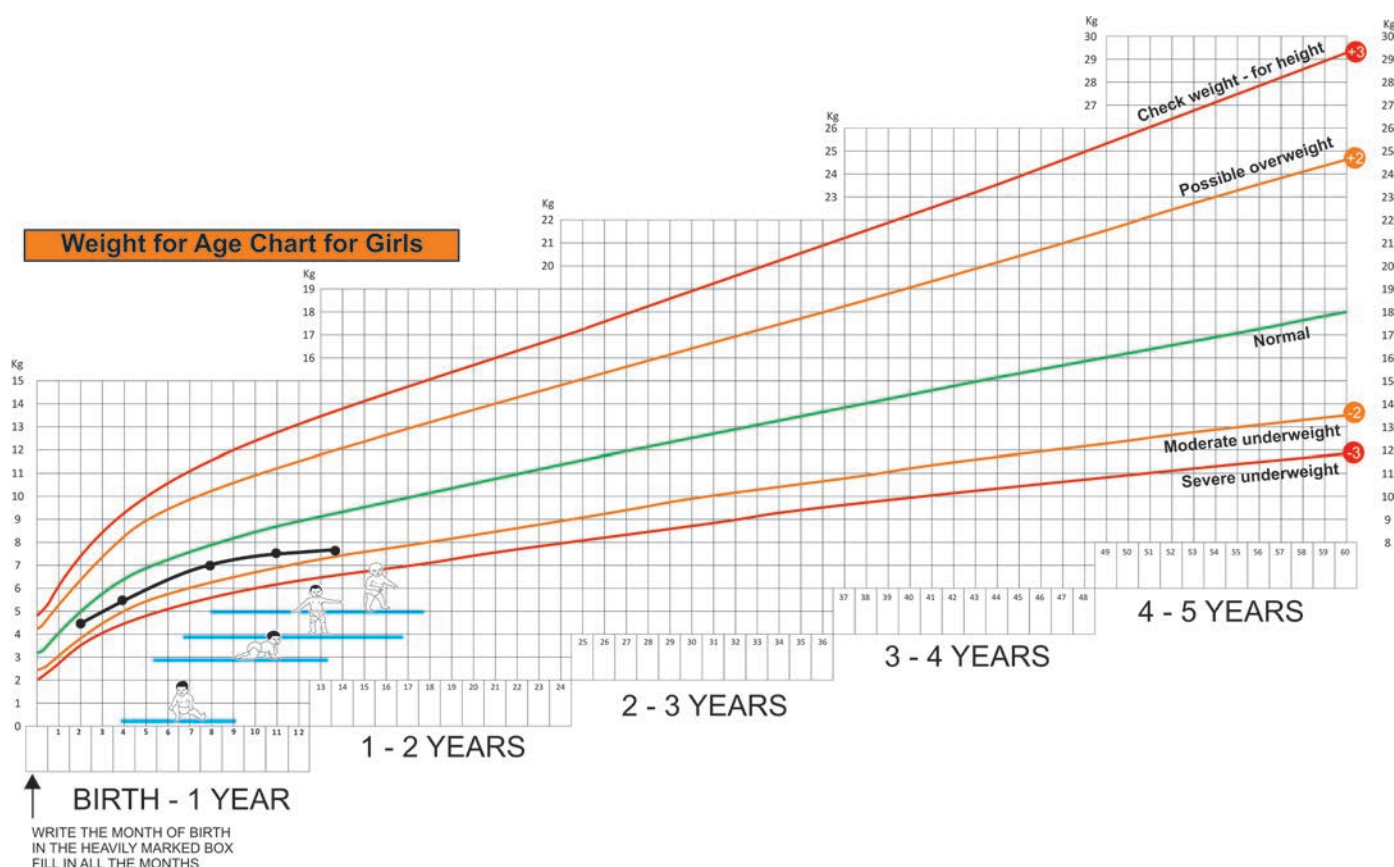
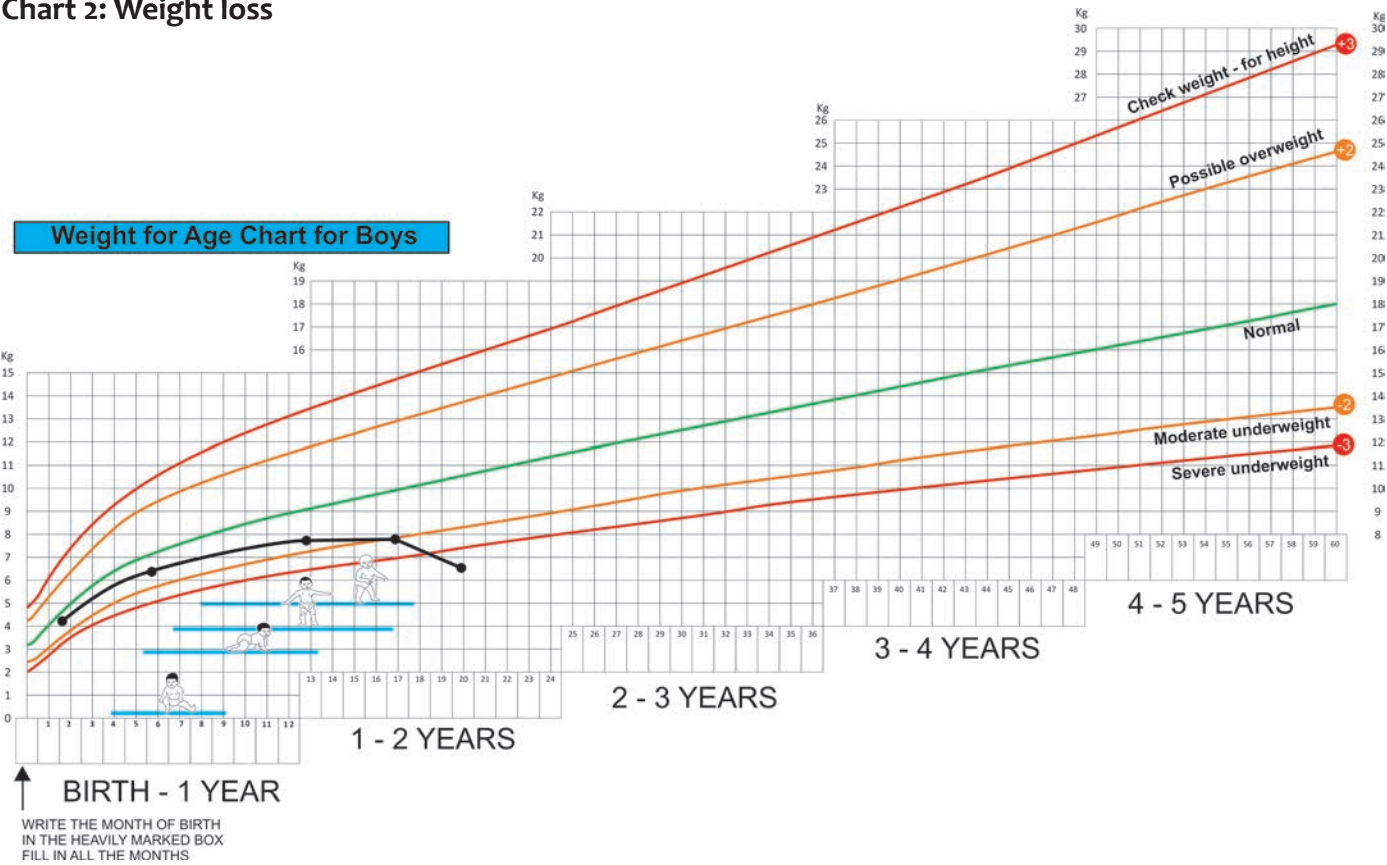


Chart 2: Weight loss



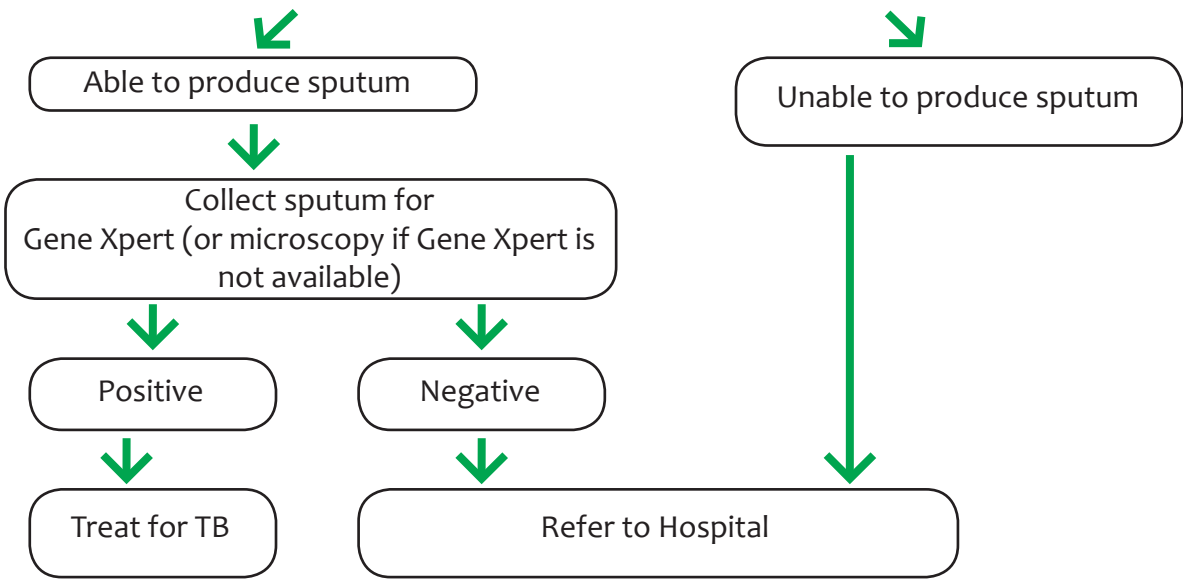
3.2 APPROACH TO PULMONARY TB DIAGNOSIS IN A CHILD AT CLINIC LEVEL

Presumptive Childhood Pulmonary TB case

If a child presents with any two of the following:

- Persistent fever and or night sweats
- Weight loss or failure to gain weight
- Persistent cough >2 weeks
- Fatigue and reduced playfulness
- History of TB contact

Especially if symptoms persist for more than 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).

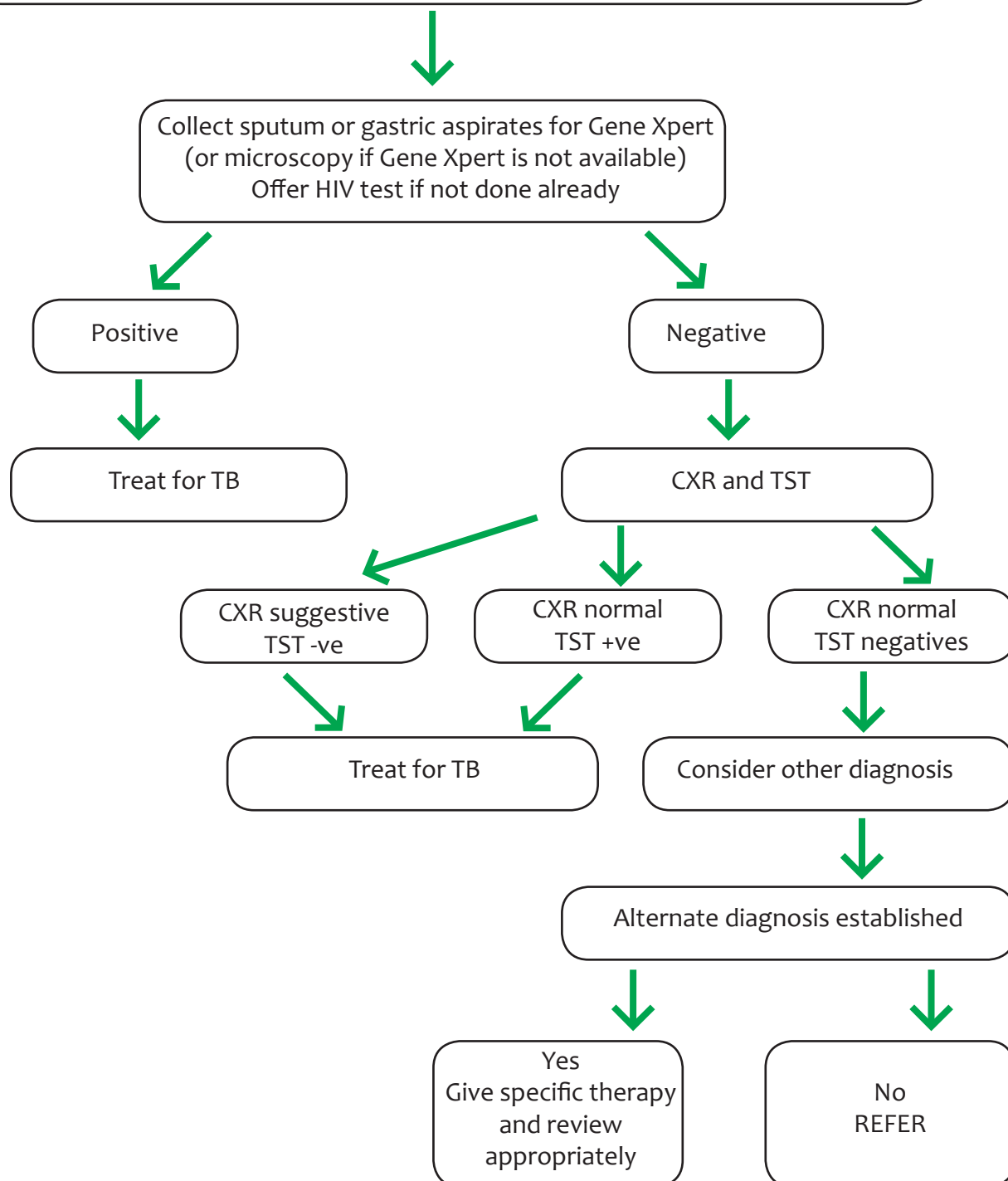


3.3 APPROACH TO TB DIAGNOSIS IN A CHILD AT DISTRICT LEVEL

Presumptive Childhood TB case referred from Clinic with an two of the following:

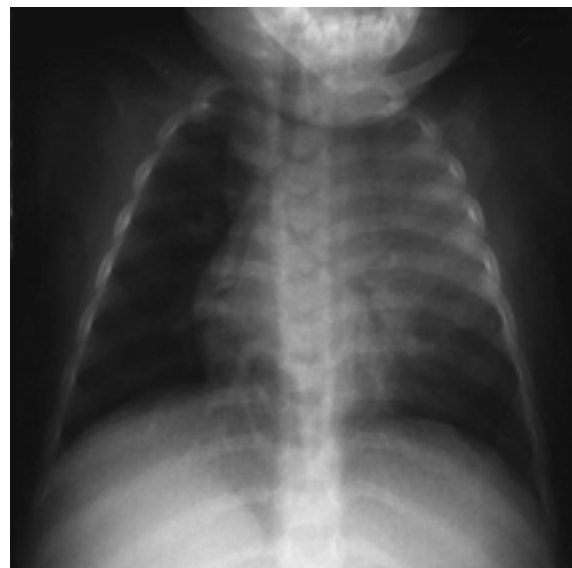
- Persistent fever and or night sweats
- Weight loss or failure to gain weight
- Persistent cough>2 weeks
- Fatigue and reduced playfulness
- History of TB contact

Especially if symptoms persist for more than 2 weeks without improvement following other appropriate therapies.





CXR suggestive of PTB: right perihilar lymph node enlargement with opacity in the right mid zone



CXR suggestive of PTB: left upper lobe opacification with narrowing and shift of left main bronchus

3.4 TUBERCULOSIS IN AN HIV INFECTED CHILD

HIV infected children are at greater risk of TB disease because of immunosuppression and the likelihood of being a contact. The approach to diagnosing TB in children living with HIV is essentially the same as for diagnosis in HIV-uninfected children. This approach can however become challenging for the following reasons.

Box 6. TB in the HIV infected child

- Clinical features consistent with TB are common in children living with HIV but may be due to other diseases.
- TST is less sensitive and induration of $>5\text{mm}$ is considered positive in a child living with HIV.
- Children living with HIV have a high incidence of other HIV related acute and chronic lung diseases.
- Children living with HIV may have lung disease of more than one cause, which can mask response to therapy.
- There is an overlap of CXR findings in TB and other HIV-related lung diseases.

All HIV infected children with presumptive TB should be referred to the district level.

The diagnosis of PTB needs careful consideration in an HIV-infected child because of clinical overlap with other HIV-related lung disease.

Box 7 Cause	Other conditions to consider in the HIV-infected child Clinical features
Recurrent pneumonia	Recurrent episodes of cough, fever and fast breathing that usually respond to antibiotics.
LIP	Unusual before 1 year of age. Associated with generalized symmetrical lymphadenopathy, clubbing, parotid enlargement. Nutritional status variable. CXR: diffuse reticulonodular pattern and bilateral perihilaradenopathy. No compression of airways.
Tuberculosis	Persistent respiratory symptoms not responding to antibiotics. Often poor nutritional status; positive TB contact especially in younger children CXR: focal abnormalities and perihilaradenopathy.
Bronchiectasis	Cough productive or purulent sputum; clubbing CXR: honeycombing usually of lower lobes.
PCP	Complicates recurrent bacterial pneumonia, LIP or TB. Common cause of severe, fatal pneumonia especially in infants. Persistent hypoxia is common. Unusual after 1 year of age. CXR: diffuse interstitial infiltration or hyperinflation.
Mixed infection	Common problem: LIP, bacterial pneumonia, TB. Consider when poor response to first-line empiric management.
Kaposi sarcoma	Uncommon. Characteristic lesions on skin or palate.

3.5 INVESTIGATIONS

1. Sputum

- Usually children older than 5 years can be encouraged to cough and produce sputum.
- Collect two samples.
- Send one sample for Gene Xpert and one for smear microscopy or both for smear microscopy where Gene Xpert is not available. Send samples for *TB culture to the National TB Reference laboratory.



2. Gastric aspirate

- Usually performed in children unable to provide sputum by coughing.
- Collect two samples.
- Send one for Gene Xpert and one for smear microscopy or both for smear microscopy where Gene Xpert is not available. Send samples for *TB culture to the National TB Reference laboratory.

3. 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 a marked abnormality on CXR in a child with no signs of respiratory distress (no fast breathing or chest indrawing) is supportive of TB.

4. 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.*

5. 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.

**TB culture increases the likelihood of identifying TB bacteria. Treatment should however not be delayed if there is supportive evidence for TB disease.*



3.6 EXTRA PULMONARY TUBERCULOSIS

Extra pulmonary tuberculosis (EPTB) 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 are characteristically persistent, progressive and may be associated with weight loss or poor weight gain.

Assessment in all cases should consider:

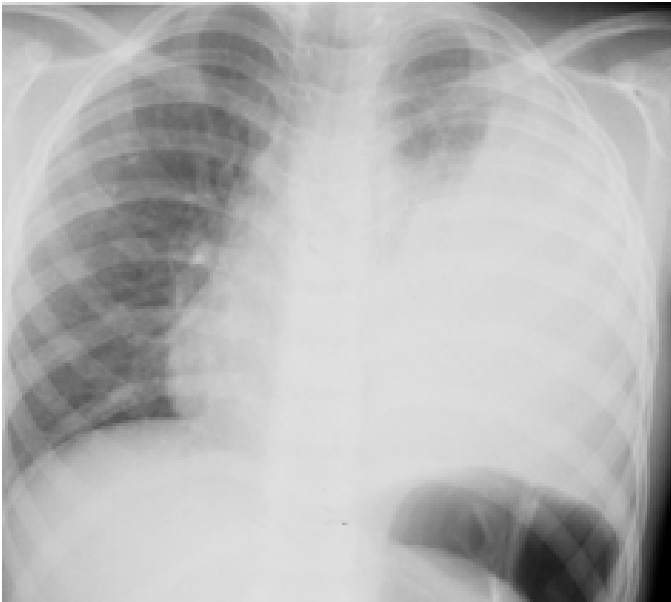
- History of contact (see above). Time lapse from exposure to disease presentation can be quite variable – shorter for young children with disseminated disease, longer for other forms that present in school-aged children.
- Sputum for Gene Xpert or smear microscopy where Gene Xpert is not available.
- Gastric aspirates in young children for Gene Xpert or smear microscopy where Gene Xpert is not available.
- HIV test.

Box 8: Approach to management of EPTB (merge cells please)		
Site of EPTB	Typical clinical presentation	Investigation
TB adenitis	Asymmetrical, painless, non-tender lymph node enlargement for more than one month. +/- discharging sinus most commonly in neck area.	Fine needle aspiration or lymph node biopsy when possible for TB microscopy, culture and histology. Xpert MTB/RIF can also be used. TST usually positive - not necessary for diagnosis.
Pleural TB	Dullness on percussion and reduced breath sounds +/- chest pain.	CXR Pleural tap#
TB meningitis	Headache, irritability/abnormal behaviour, vomiting (without diarrhoea), lethargic/reduced level of consciousness, convulsions, neck stiffness, bulging fontanelle, cranial nerve palsies.	LP
Military TB	Non-specific, lethargic, fever, wasted.	CXR and LP (25% of children with military TB will also have TB (meningitis))
Abdominal TB	Abdominal swelling with ascites or abdominal masses.	Abdominal USS and ascitic tap for biochemistry and microscopy
Spiral TB	Deformity of spine May have lower limb weakness/paralysis/unable to walk.	X-ray Spine
Pericardial TB	Heart Failure. Distant heart sounds. Apex beat difficult to palpate.	CXR, Cardiac USS
TB bone and joint	Swelling end of long bones with limitation of movement. Unilateral effusion of usually knee or hip.	Xrays bone/joint Joint tap#

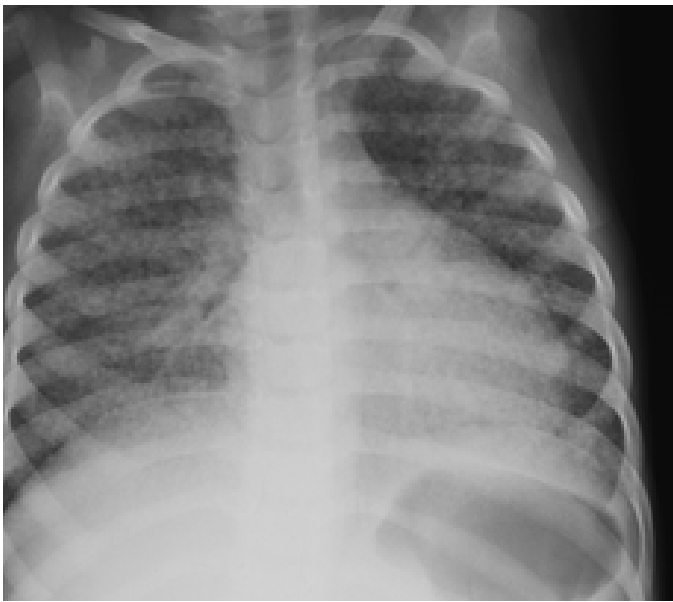


typical findings: straw colored fluid, exudate with high protein, white blood cells predominantly lymphocytes on microscopy.

- 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 pleural effusion: Large left-sided effusion. Pleural tap to differentiate from empyema.



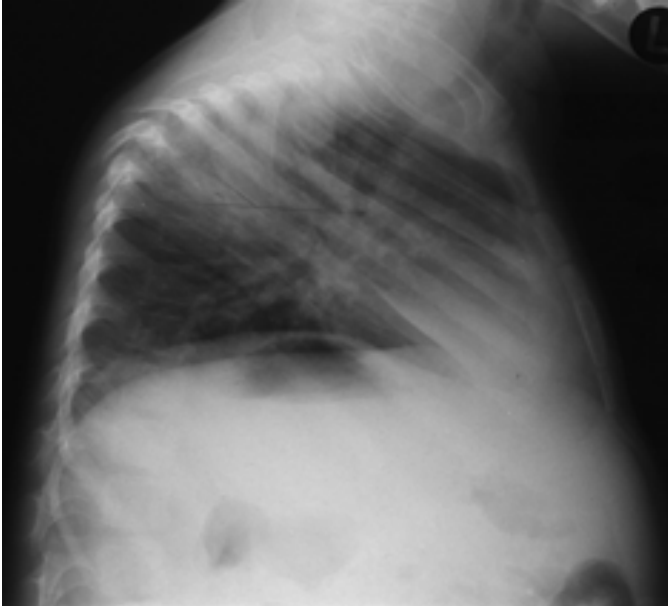
Military TB: Typical bilateral diffuse micronodular pattern. Note differences to LIP X-ray above.



TB Lymphadenitis.



Spinal TB: Deformity of Spine.



Spinal TB: Collapse of thoracic vertebra causing angulation.



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

The diagnosis of TB can be made with confidence in the majority of children using careful clinical assessment and available diagnostic tools.

4. MANAGEMENT OF A CHILD WITH TB DISEASE

The decision to treat a child should be made using the TB diagnosis algorithm for children and once such a decision is made, the child should be treated with a full course of therapy.

Box 9: Important points to note

- The principles of treatment of TB in children are the same as for adults.
- A caregiver should be identified as the DOT provider for all ages including older children.
- Once treatment starts it must be completed.
- Treatment regimens by diagnostic category for new patients are listed in Table 1 below.
- Drug dosages are calculated according to weight (see appendix 7).
- Streptomycin should not be used as part of first-line treatment regimens for children with any form of TB.
- Pyridoxine is recommended for the following categories of children: severely malnourished, HIV-infected, pregnant adolescents, children with diabetes mellitus and those with renal failure.
- Breastfeeding infants and children should continue to breastfeed while receiving TB treatment.
- Nutritional support should be provided for malnourished children.
- The date of commencement of TB treatment should be indicated on the child health card for under five-year olds.
- All children treated for TB should be recorded in the health facility TB register and TB treatment card by diagnostic category, treatment regime and date of starting TB treatment.

4.1 TUBERCULOSIS TREATMENT

4.1.1 Recommended treatment regimens

Table 1.

TB Diagnostic Category	Recommended Regimen	
	Intensive phase	Continuation phase
<ul style="list-style-type: none">• Bacteriologically confirmed• Clinically diagnosedPTB with or without extensive parenchymal disease• All forms of EPTB except tuberculous meningitis and osteoarticular TB	2 HRZE	4HR
<ul style="list-style-type: none">• TB meningitis and• Osteo-articular TB	2 HRZE	10 HR

*(H= isoniazid. R= rifampicin. Z= pyrazinamide. E= ethambutol)

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

Drug	Daily dosage in mg/kg Range (maximum)
Isoniazid (H)	10-15 (300 mg)
Rifampicin (R)	10-20 (600 mg)
Pyrazinamide (Z)	30-40 (2000 mg)
Ethambutol (E)	15-25 (1200 mg)

**Refer to appendix 7 for weight based dosing tables of TB drugs.*

4.2 MONITORING RESPONSE TO TREATMENT

Children should be reviewed 2 weeks after starting TB treatment and monthly thereafter.

Box 10: The following should be assessed

- Presence of TB symptoms.
- Weight - measure and record the patient's weight.
- Review medication dosages – adjust according to weight gain.
- Treatment adherence: note risk factors for poor adherence eg distance to facility, orphan, primary care-giver unwell, adolescents.
- Ask about adverse/side effects eg yellow eyes, abdominal pain, skin rash.

Chest X-ray is a poor indicator of response to treatment as mediastinal and hilar lymph glands can enlarge as a result of the improvement in the child's immunity and can also persist for more than a year after successful treatment. CXR should be considered for children who are deteriorating on treatment.

Weight is important for monitoring of treatment response.

TB drugs are very well tolerated in almost all children. Adverse events (side-effects) are uncommon and the most important is hepatotoxicity.

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 TB drugs immediately and refer to hospital.

Complete an Adverse Drug Reaction form (appendix 7) also found on the following URL:

<http://www.mcaz.co.zw/index.php/downloads/category/13-forms?download=120:revised-adr-report-rev-5-march-2015>



4.3 INDICATIONS FOR HOSPITALIZATION

The main indications for hospitalization include the following:

Box 11: Who should be considered for hospitalization?

- Patients who are too ill
- 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 drug reactions such as skin reactions or hepatotoxicity

4.4 HIV-INFECTED CHILDREN

TB treatment in the HIV-infected child is the same as in the HIV uninfected child.

Box 12: Remember the following:

- Commence cotrimoxazole preventive therapy
- Commence antiretroviral therapy (ART) at least 2 weeks after starting TB treatment.
- Conduct family-based care/screening for both TB and HIV
- Consider the overlapping toxicities of cotrimoxazole, TB drugs and ARVs

4.5 TREATMENT FAILURE

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

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

Treatment failure is more common in HIV-infected children mainly because of pill burden resulting in poor adherence.
Treatment failure may suggest the possibility of DR TB and needs careful assessment.

Box 13: Consider the possibility of TB treatment failure for a child who is receiving TB treatment and has any of the following at 2 months assessment:

- No symptom resolution or worsening of symptoms
- Continued weight loss
- Is sputum/gastric aspirate smear-positive

If a child stops 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 TB therapy. If a child stops TB treatment for less than 2 weeks in the intensive phase or less than 2 months in the continuation phase continue current regimen.

Refer children with suspected treatment failure for further assessment

4.6 DRUG RESISTANT TB

Approach to drug-resistant TB in children

Most children are infected via primary transmission from close household contacts. When diagnosed and treated, children with DR-TB have excellent treatment outcomes and usually do better than adults with DR-TB.

DR-TB should be considered in any child who has the following: persistent non-remitting cough or fever, weight loss, or focal findings that are suggestive of TB (lymphadenitis, spinal deformities, ascites, and joint effusions) AND has a history of the following:

Box 15: When to suspect DR-TB in children

- History of previous treatment within the past 6-12 months;
- Close contact with a person known to have DR-TB, including household and school contacts;
- Close contact with a person who has died from TB, failed TB treatment or is non-adherent to TB treatment
- Failure to improve clinically after 2-3 months of first-line TB treatment, including persistence of positive smears or cultures, persistence of symptoms, and failure to gain weight (radiological improvement is frequently delayed)
- Children who have lived in high-burden settings or who have contacts who have lived or worked in high DR-TB burden settings

All efforts should be made to obtain specimens for bacteriological examination in children with suspected DR-TB. If the bacteriological confirmation is impossible, DR-TB regimens can however be prescribed in children with TB, who were close contacts of DR-TB cases and are incapable of producing sputum specimens or are smear and/or culture-negative.

All children with suspected or confirmed DR-TB should be referred to the nearest DR-treatment site for assessment and treatment.



5. TB PREVENTION

TB prevention in children is an important aspect of childhood TB activities in any setting.

5.1 BCG VACCINATION

A single dose of BCG vaccine should be given to all newborns at birth or at first contact within the first year of life. A child with symptomatic HIV infection should not receive BCG vaccination.

5.2 CONTACT SCREENING AND MANAGEMENT

Children usually get TB infection from infected adults, older children and adolescents whom they are in close contact with. Contact tracing should therefore be done for any index case diagnosed with TB.

The main purpose of contact screening and management are two-fold:

- to identify contacts of all ages with undiagnosed TB disease among the contacts of an index case.
- to provide preventive therapy for contacts without TB disease who are susceptible to developing disease following recent infection.

Any patient started on TB treatment should be asked the following questions:

Box 16: Important questions for any person diagnosed with TB:

- Is the case sputum smear positive?
- How many children are in the household?
- What are the ages of the children?
- Is the child sick or well?
- What is the relationship of the person to the children?
- Is there anyone else in the household who is coughing?

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

5.2.3 Community level management of child contacts.

A community based approach to TB prevention, case finding and supportive care is needed to ensure that all children exposed to TB, at risk for TB and those with TB receive high quality care.

The community should be mobilized and equipped to focus on the following:

Box 17: Community activities in TB prevention

- Contact tracing of all TB cases.
- Referral of individuals with the greatest likelihood of developing active TB disease following infection (under 5-year olds, HIV infected of any age)
- Provide treatment support
- Facilitate linkages with other services eg nutrition, maternal and child health services.

A contact with one or more of the main symptoms in Box 18 should be referred for investigation of TB disease at the facility.

Box 18: Checklist of main symptoms

- Persistent cough for >2 weeks.
- Weight loss or failure to gain weight.
- Persistent fever for >1 week and /or night sweats.
- Fatigue or reduced playfulness.
- EHT to collect sputum for microscopy/Gene Xpert from older children with two or more symptoms.

5.3 ISONIAZID PREVENTIVE THERAPY

Isoniazid preventive therapy (IPT) greatly reduces the risk of an infant or young child with TB infection from developing disease. Isoniazid preventive therapy also reduces the risk of TB disease in HIV infected individuals with latent TB.

Box 19: IPT in children

- All children below 5 years of age that are contacts of a bacteriologically confirmed TB case and have no evidence of TB disease.
- 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.
- Duration of IPT should be 6 months.
- Follow up every 2 months and investigate for TB if symptoms eg. Persistent cough, poor weight gain or weight loss, fever or fatigue develop.

5.4 TUBERCULOSIS INFECTION CONTROL

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

The following simple procedures are effective in TB infection control in health care facilities, congregate settings and households.



Box 19: TB infection control measures

- Include patients and community in advocacy campaigns.
- Develop, implement and regularly review an infection control plan.
- Monitor infection control practices.
- Promote cough etiquette and cough hygiene.
- Ensure safe sputum collection.
- Triage people with presumptive and known infectious TB, separate and treat them with minimal delay.
- Ensure rapid diagnosis and initiation of treatment.
- Protect health care workers encourage use of personal protective equipment.
- Provide health education about TB transmission without stigmatizing TB patients.
- Natural ventilation and sunlight.
- Keep doors and windows open on opposite sides of the TB clinic and other clinics.
- Open windows.
- Advise TB patients to do the same at home.
- Apply the same in the health facilities.



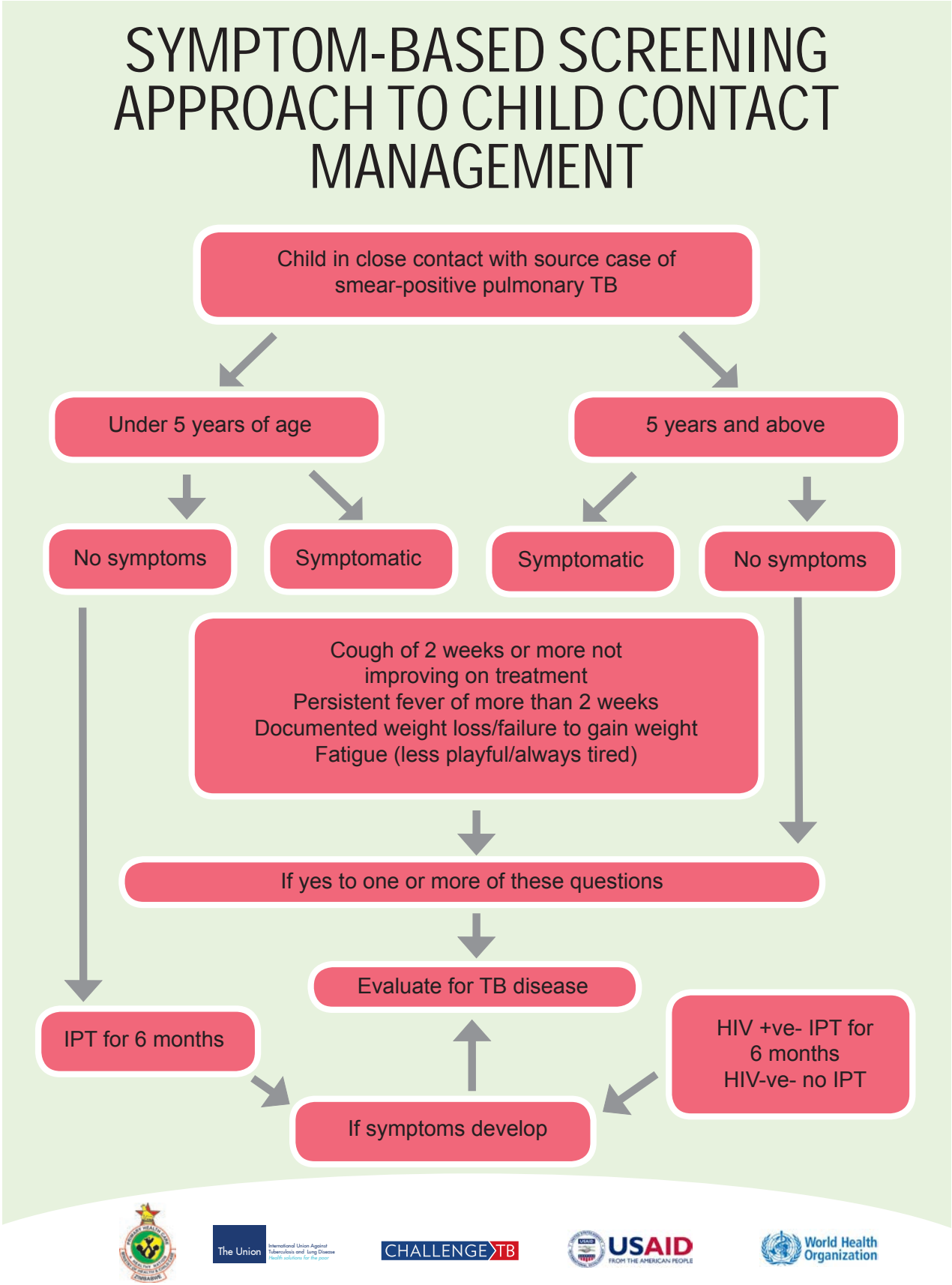
6. RECORDING AND REPORTING

Accurate recording and reporting of TB (and HIV) in children at different levels of care is important for improved epidemiologic surveillance, planning and organization of paediatric services, drug procurement and budgeting. Children are reported in same way as adults: includes: age, site of TB, gender, disease category, HIV status, outcome.

Box 20: Points specific to children

- All children treated for TB should be recorded and reported in one of two age bands (0-4 years and 5-14 years).
- Information on TB screening, results and treatment should be documented in the child health cards for under 5s and in the hand held clinic record for each child. This will improve continuity of care and communication between health services.
- All children with a TB diagnosis must be registered in the district TB register and should be part of the quarterly and yearly cohort analysis and reporting, including when there is no bacteriological confirmation.

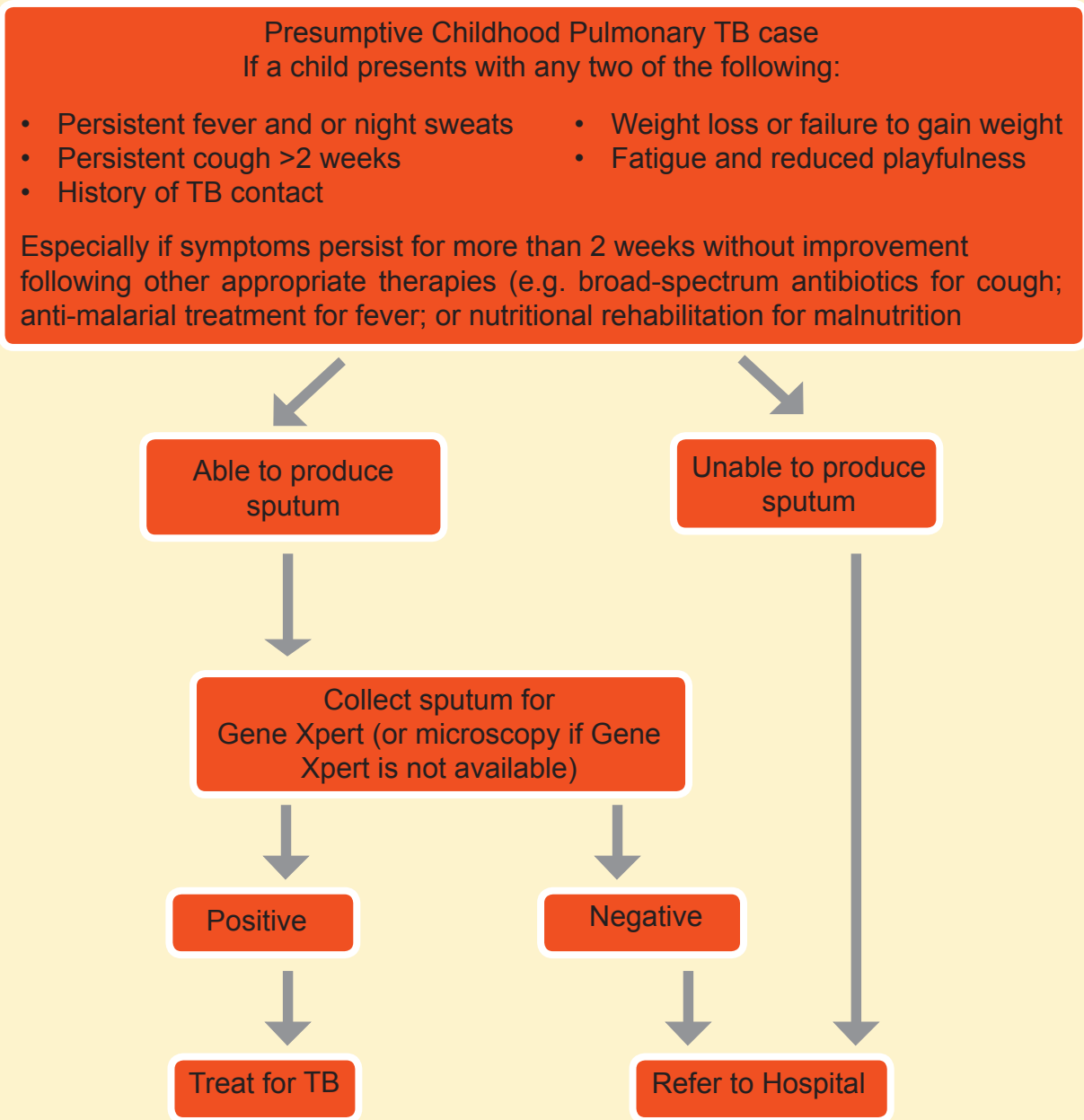




Close contact is defined as living or having lived with in the same household as, or in frequent contact with (e.g. child minder, school staff), a source/index case with PTB in the past 2 years.



APPROACH TO PULMONARY TB DIAGNOSIS IN A CHILD AT CLINIC LEVEL



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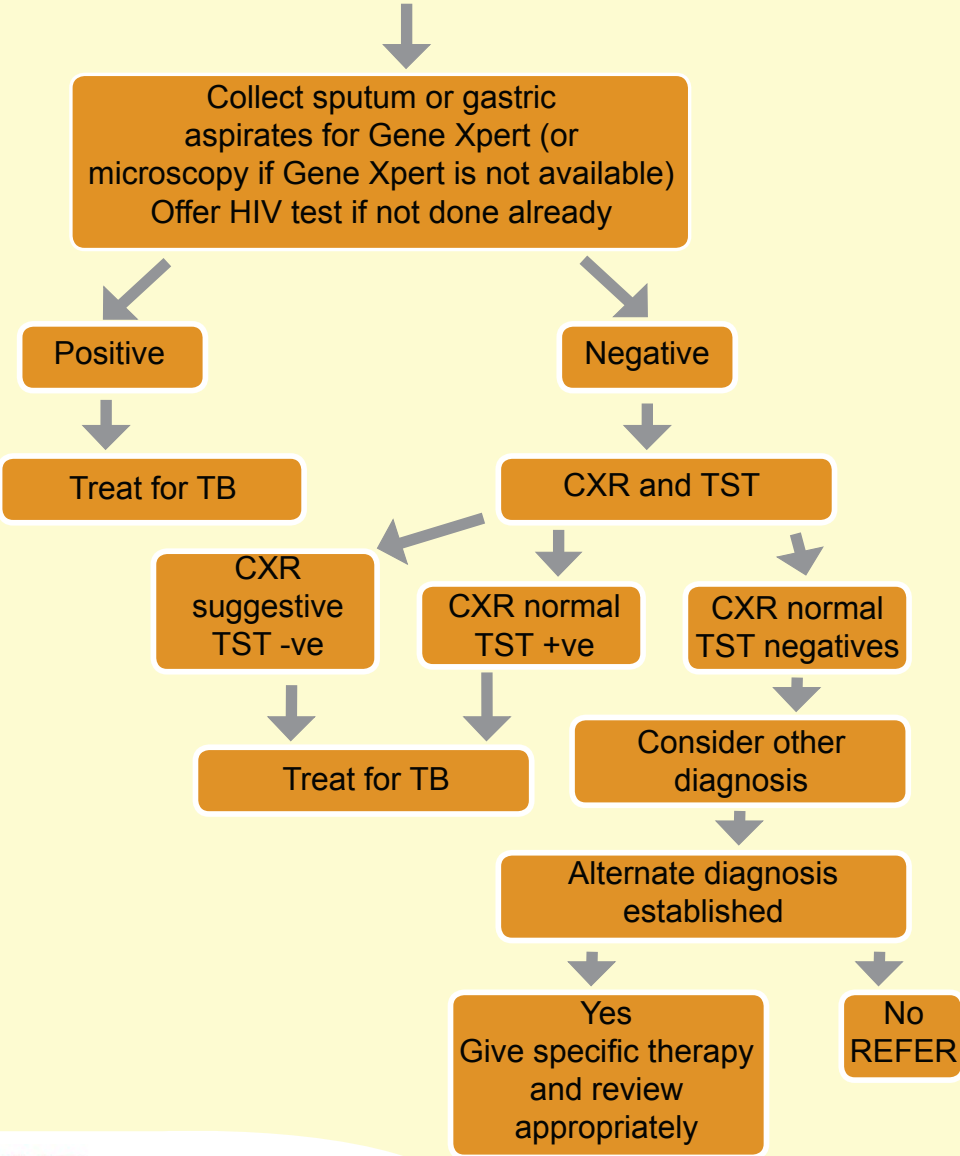


APPROACH TO TB DIAGNOSIS IN A CHILD AT DISTRICT LEVEL

Presumptive Childhood TB case referred with any two of the following:

- Persistent fever and or night sweats
- Persistent cough>2 weeks
- History of TB contact
- Weight loss or failure to gain weight
- Fatigue and reduced playfulness

Especially if symptoms persist for more than 2 weeks without improvement following other appropriate therapies.



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APPENDIX 4 (a)

Guidance for Community Health Workers on management of TB contacts.

ASK:

1. Is there anyone in your community who was recently started on TB treatment?
2. Is there any household with a teenager, child or adult with a combination of
 - A cough for >2 weeks
 - Loss of weight

IF YES, then there is need to visit the household for health education and referral.

WHAT TO DO IF:

The household has a confirmed case of TB on treatment.

- List all household members and their ages.
- Refer to the nearest health centre any of the following:

- 1) Children under the age of 5 years in the household.
- 2) All HIV positive individuals in the household despite their ages.
- 3) All with any of the symptoms listed below despite their age.

- Persistent cough > 2 weeks
- Weight loss or failure to gain weight
- Persistent fever for more than 1 week OR night sweats
- Fatigue OR reduced playfulness

REMEMBER:

- TB can be prevented.
- Remind the patients and family members that TB can be cured.
- Remind family members that young children and anyone living with HIV is at a higher risk of developing TB disease.
- Encourage every patient on TB treatment to take their pills daily until treatment is complete.
- Encourage those started on Isoniazid prophylaxis to continue their treatment for 6 months.
- Follow up on contacts and refer any who may develop TB symptoms and encourage them to visit the nearest health facility.
- Educate members of the household on the simple measures they can take to reduce TB transmission.

TB Infection Control Guidance for Village Health Worker.

Prevention of TB transmission and infection in the household can be done by encouraging the following simple but effective measures.

ALWAYS:

1. Encourage the household members to open windows and doors, especially those of the room where patient spends most of his/her time.
2. Encourage the patient to spend time outdoors as much as possible.
3. Encourage the family to avoid sleeping in the same room with the patient.



4. Encourage the patient to practice cough hygiene i.e.
- to cover their mouth and nose with a tissue/cloth when coughing or sneezing.
 - To cough or sneeze into upper sleeve, not your hands if there is no tissue/cloth.
 - To place used tissue/cloth in a waste basket or burn it.
 - to have a habit of washing hands with soap/ash regularly after coughing or sneezing.



APPENDIX 4 (b)

Management of child contacts at community level.

Box 18

- List close contacts
 - Age of contact
 - Is contact HIV infected
 - Does contact have symptoms suggestive of TB
- Checklist of main symptoms
 - Persistent cough for >2 weeks
 - Weight loss or failure to gain weight
 - Persistent fever for >1 week and /or night sweats
 - Fatigue or reduced playfulness

A contact with one or more of the main symptoms should be referred for evaluation of TB disease at the facility.



APPENDIX 5

How to perform a Pediatric Gastric aspiration.

Materials required:

- | | |
|----|--------------------------------|
| 1. | Gloves |
| 2. | Nasogastric tubes 8-10FG |
| 3. | Sputum container |
| 4. | 5,10 or 20 ml syringes |
| 5. | Sodium Bicarbonate (8.4%) |
| 6. | Normal saline or sterile water |
| 7. | Lab request forms |
| 8. | Alcohol/Methylated spirit |

PROCEDURE

1. Instruct the parent/guardian regarding overnight fasting of at least 4 hours before early morning gastric aspirate (GA). The procedure is preferably performed early in the morning when the child comes to the outpatient clinic or in the ward if child is an in-patient. The procedure may also be performed during the daytime, as long as the child has been kept nil per os (NPO) for minimum 4 hours.
2. Use an assistant to help as this procedure requires 2-3 people.
3. Prepare all the materials for the procedure.
4. Position the child lying on the back.
5. Measure the distance of the nasogastric tube to the stomach (from tragus of the ear, to nose, to xiphisternum) : this estimates the distance that will be required to insert the tube.
6. Place the child's face in the "sniffing air" position, and pass the nasogastric tube from the nose into the stomach.
7. Withdraw gastric contents using the syringe attached to the nasogastric tube and place in the sputum container.
8. If < 1ml is aspirated, insert 5-10ml of sterile water or normal saline down the tube, leave for three minutes, and then aspirate until a minimum of 5-10ml aspirate is obtained. Do not repeat more than 3 times.
9. Add an equal volume of sodium bicarbonate solution to the specimen jar (in order to neutralize the acidic gastric contents and so prevent destruction of tubercle bacilli).
10. Tightly secure the lid and wipe the container with 70% alcohol to prevent cross-infection.
11. Fill out the laboratory request forms.
12. Transport the specimen (in a cooler box) to the laboratory for processing as soon as possible (within 4 hours).



13. Place the specimens in a refrigerator (4-8°C) if it is likely to take more than 4 hours for the specimens to be taken to the laboratory.

Ref: Guidance for national programs on the management of tuberculosis in children. Geneva, World Health Organization, WHO/HTM/2014.03.



APPENDIX 6

Performing a Tuberculin Skin Test (Mantoux).

The Mantoux TST measures the delayed type hypersensitivity response to purified protein derivative (PPD)- a protein precipitate of inactivated tubercle bacilli. A positive mantoux only indicates exposure to tubercle bacilli and latent TB infection not active disease. A negative test does not exclude TB infection or disease.

Materials required:

1	Tuberculin/1ml syringe
2	A 27-G needle
3	5 TU of tuberculin PPD-S

PROCEDURE

1. Locate and clean injection site free of scars, sores and veins, 5-10 cm below the elbow joint using an alcohol swab.
2. Draw up 0.1ml of tuberculin into the syringe.
3. Inject the solution between the layers of the skin keeping the needle almost parallel (5-15°) to the skin with the bevel pointing upwards.
4. After injection, a small wheal of 8-10mm should form at the infection site. If not, the PPD was injected too deeply and the test should be repeated at a site at least 5cm away from the original site.
5. Record the date, site location in the child’s notebook or hospital notes.
6. The results should be read between 48 and 72 hours after administration.
7. Inspect the injection site and use the fingertips as a guide for marking the widest edges of induration (swelling) across the forearm. Note that the inflammatory reaction to the PPD may show as redness of the skin, swelling and or blistering. The reaction may be difficult to see in dark skinned individuals - make sure to inspect injection site thoroughly for inflammatory changes.
8. Mark the edges of the swelling with a pen and measure the exact distance between the two points in millimeters.
9. Only record measurement in millimeters not as “positive” or “negative”.

Interpreting the results

Positive TST	Normal immunity	Defective immunity (HIV infected, severely malnourished, severe illness such as TBM/miliary TB)
	≥10mm	≥5mm

The following can cause a false-positive or false-negative TST.

Causes of a false-negative TSTCauses of a false-positive TST	
<ul style="list-style-type: none">• HIV infection• Malnutrition• Severe viral infections (eg measles, chicken pox)• Cancer• Immunosuppressive drugs (eg steroids)• Severe disseminated TB	<ul style="list-style-type: none">• BCG vaccination• Infection with non-tuberculous mycobacteria



The left picture is the correct way to measure Tubeculin Skin Test

APPENDIX 7

DOSING TABLES

Current Recommended dosing guidelines for TB medicines for children.

	Intensive Phase			Continuation Phase	
Weight Bands (kgs)	RHZ 60mg/30mg/150mg dispersible tab	Ethambutol 100mg dispersible tabs	Isoniazid 100mg	RH 60mg/30mg dispersible tab	Isoniazid 100mg
4 - 6.9 kg	1	1	1	1	1
7 - 10.9 kg	2	2	1	2	1
11 - 14.9 kg	3	2	2	3	2
15 - 19.9 kg	4	3	3	4	3
20 - 24.9 kg	5	4	3	5	3
25kg and above	Use adult dosage and formulation				

Recommended dose of TB medicines by weight band using Expected new FDCs

Weight Bands	Intensive Phase		Continuation Phase
	RHZ 70/ 50/150	E 100	RH 75/ 50
4 - 7.9kg	1	1	1
8 - 11.9kg	2	2	2
12 - 15.9kg	3	3	3
16 - 24.9 kg	4	4	4
25kg and above	Use adult dosages and formulations		



Spontaneous Adverse Drug Reaction Report (ADR) Form						
Identities of Reporter, Patient and Institute will remain confidential						
MCAZ Reference Number (MCAZ use only)						
Patient Details (to allow linkage with other reports)						
Clinic/Hospital Name:		Clinic/Hospital Number				
Patient Initials:		VCT/OI/TB Number				
Date of Birth:		Weight (Kg)	Sex:			
Age:		Height (Meters)				
Adverse Reaction						
Date of Onset:						
Duration:	Less than One Hour	Hour	Days	Weeks	Months	
Description of ADR and or Therapeutic failure or of lack of effectiveness						
Serious: Yes <input type="checkbox"/> No <input type="checkbox"/>	Reason for Seriousness	<input type="checkbox"/> Death		<input type="checkbox"/> Life-threatening		
		<input type="checkbox"/> Hospitalization/prolonged		<input type="checkbox"/> Disabling		
		<input type="checkbox"/> Congenital-anomaly		<input type="checkbox"/> Other medically important condition		
Relavant Medical History						
Relavant Past Drug Therapy						
Outcome of ADR	Recovered	Not yet recovered	Fatal	Unknown		
Current Medication						
Generic Name	Brand Name	Batch Number	Dose	Indication	Date Started	Date Stopped
Concomitant (other) drugs taken & Dates/period taken:	Name of Drug:				Date Started	Date Stopped
Suspected drug (s), if known:						
Laboratory Tests Results:						
Report By						
Forename (s) & Siurname:						
Designation:						
Address:						
Signature:			Date:			
Send to: The Director-General, Medicines Control Authority of Zimbabwe 106 Baines Avenue, P O Box 10559, Harare Tel: +263-4-708255 or 792165, Email: mcaz@mcaz.co.zw, website: www.mcaz.co.zw						

NB: This form may be completed for any ADR related to medicines or medical devices.



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