GUIDELINES FOR THE MANAGEMENT OF TUBERCULOSIS IN CHILDREN

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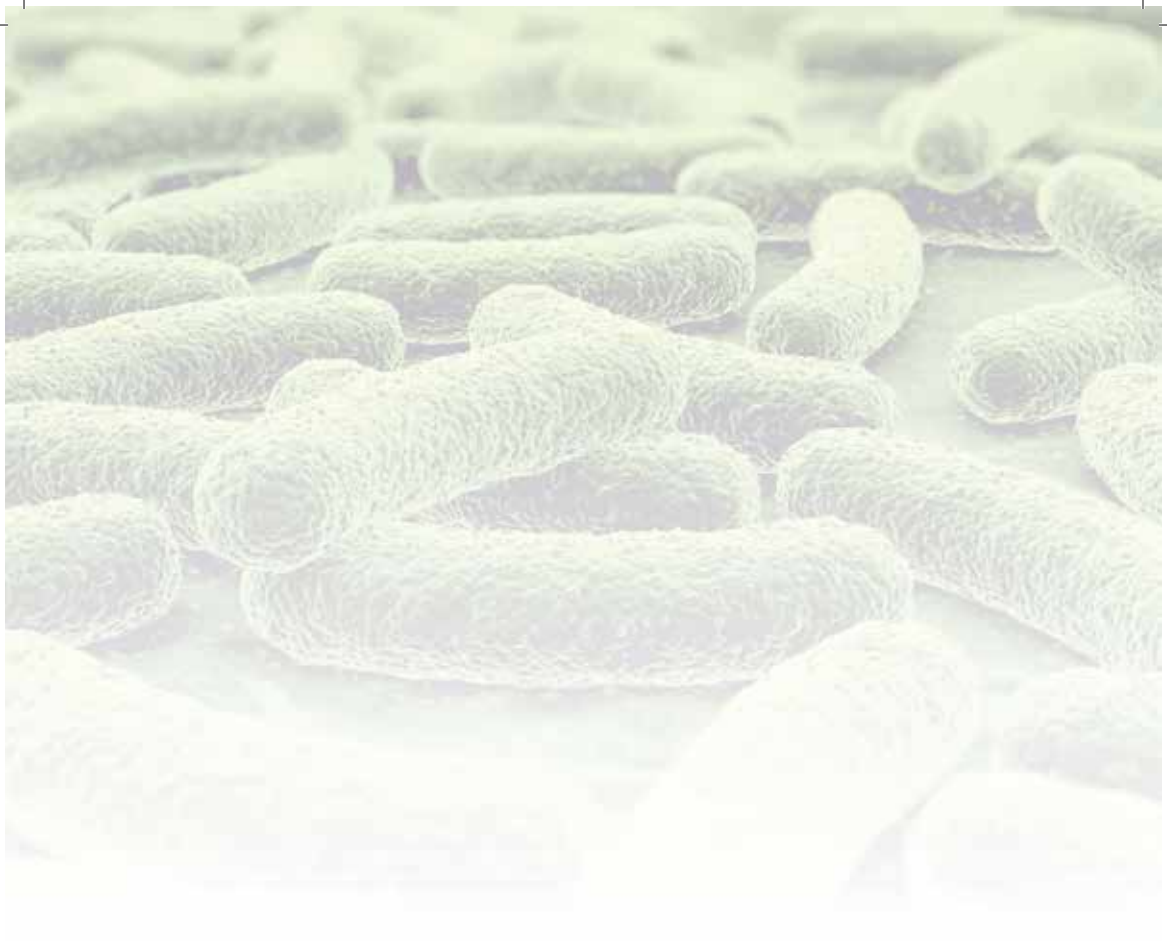

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FOREWORD

Childhood TB has been neglected for years despite the fact that children are at high risk of acquiring TB infection and die of TB disease because of difficulties in diagnosing TB in this age group. These guidelines therefore are meant to raise awareness about this silent childhood epidemic in the country. All services that provide maternal and child health care at primary and secondary level must screen children at high risk of TB and mothers for TB, initiate TB treatment early in those diagnosed with TB, offer TB preventive therapy to those who are eligible and antiretroviral treatment to TB/HIV co-infected children and mothers. In addition families and communities must be educated on general infection control and cough hygiene to prevent further transmission in households and places of congregation.

Implementing all these strategies in combination will not only reduce the burden of disease in children but help us attain the goal of zero TB deaths in children. Partnerships with communities and more research into new diagnostic tests, better vaccines and child friendly medicine formulations will provide immense opportunities for attaining this goal.

Minister of Health
Dr Aaron Motsoaledi

ACKNOWLEDGEMENTS

These guidelines are meant to provide guidance to professional health care workers on the management of children with Tuberculosis. The main changes include;

- Case finding strategies for TB in children
- The use of Xpert MTB RIF in diagnosing pulmonary and extra pulmonary TB in children
- The TB medicine dosing chart for children based on the available medicine formulations
- Provision of Isoniazid Preventive Therapy to HIV infected children and uninfected children less than 5 years
- ART initiation in children with TB

The development of these guidelines has been collaboration between the National and Provincial Department of Health and technical partners. NDOH acknowledges the technical support provided by the WHO in the development of these guidelines.

Director General for Health
Ms M P Matsoso

ABBREVIATIONS

AFB	Acid fast bacilli
ART	Anti-retroviral therapy
BCG	Bacille-Calmette-Guerin
CPT	Cotrimoxazole preventive therapy
CXR	Chest X-ray
DST	Drug susceptibility testing
EPTB	Extrapulmonary Tuberculosis
FDC	Fixed-dose combination
HCT	HIV counselling and testing (includes VCT and PITC)
HCW	Health care worker
HIV	Human immunodeficiency virus
IPT	Isoniazid preventive therapy
IRIS	Immune reconstitution inflammatory syndrome
MDR-TB	Multidrug-resistant Tuberculosis
PMTCT	Prevention of mother to child transmission
PTB	Pulmonary Tuberculosis
TB	Tuberculosis
TB/HIV	Tuberculosis and HIV infection
TBLN	Tuberculosis of the lymph nodes
TBM	Tuberculous meningitis
TST	Tuberculin skin test
WHO	World Health Organization
XDR-TB	Extensively drug resistant tuberculosis

DEFINITIONS

- **Active tuberculosis:** disease that occurs in someone infected with Mycobacterium tuberculosis. It is characterized by signs or symptoms of active disease, or both.
- **Passive tuberculosis case-finding:** A patient-initiated pathway to TB diagnosis
- **Close contact:** a person living in the same household as, or in frequent contact with (e.g. child minder, school staff), a source case with PTB.
- **Children:** 0 to 14 year age group.
- **Infant:** a child of less than 1 year of age (0-12 month age group)

1. TUBERCULOSIS INFECTION

TB in children is a reflection of the extent of transmission of TB infection in the communities as the source of infection for children is usually an adult/ adolescent with infectious pulmonary TB (smear/ culture positive PTB).

Tuberculosis infection should be differentiated from disease:

- **TB infection** - A child becomes infected when the child inhales the TB organism. TB infection is diagnosed when the child is asymptomatic and the Tuberculin Skin Test (TST) is positive. Not all children exposed to an infectious adult case of TB will become infected.
- **TB disease** - About 10% of children who have been infected with TB develop active disease. TB disease may manifest in many different ways but is indicated by the presence of well-defined symptoms.

1.1 How children get infected

When a person with the infectious TB coughs, bacilli are expelled in droplets into the air. These infectious droplets can remain in the air and can be inhaled by the child, causing infection. The proportion of children infected will depend on the duration of exposure (time), the closeness of the contact and the number of organisms in the sputum of the source case. The risk of infection is increased with:

- Long duration of exposure to an infectious case.
- High intensity of exposure: smear positive cases are the most infectious, smear negative and culture positive cases are less infectious while extra pulmonary TB cases are normally not infectious.
- Close exposure: where the mother or caregiver has active TB.
- Age and HIV status: young children (< 5 years) and HIV positive children are at high risk of getting infected.
- Children who are malnutritioned

Infection can also occur before or during birth if the mother has disseminated tuberculosis. In this case the bacilli will pass through the placenta from the mother's circulation into the fetal circulation. Babies can also be infected through inhalation of infected material during birth or immediately after birth through exposure to an adult with infectious TB. Drug resistant TB is as infectious as drug susceptible TB. Children exposed to drug resistant TB therefore have the same risk of being infected as children exposed to drug susceptible TB.

TB infection in children ca can be effectively prevented by;

- Diagnosing and treating all adult/ adolescent patients with infectious TB early
- Strengthening TB infection control practises if congregate settings and households

TB disease can be prevented in high risk groups by;

- Providing TB preventive therapy (Isoniazid Preventive Therapy - IPT)
- Universal coverage with BCG vaccination

1.2 Diagnosis of tuberculosis infection

A child that has been infected by MTB develops a positive tuberculin skin test (TST). It takes between 6 -12 weeks after exposure for a positive TST to develop. Children with tuberculosis infection are asymptomatic. Most children have an immune system that is strong enough to prevent the infection from progressing to disease.

The TST measures the hypersensitivity to tuberculin purified protein derivative (PPD). A positive tuberculin test does not indicate the presence or extent of tuberculosis disease; it only indicates TB infection. There are different types of TSTs but the Mantoux is the recommended test. The test is read after 48-72 hours. The Mantoux skin test is positive when the transverse diameter of skin induration is 10mm or greater. In HIV infected children the TST is less likely to be positive and an induration of 5 mm or greater is regarded as positive.

A negative TST does not exclude TB infection. The TST can be negative in a TB infected child due to:

- Severe malnutrition
- HIV infection
- Disseminated TB such as miliary TB or TB meningitis
- Immunosuppressive drugs e.g. high dose steroids

The tuberculin skin test (TST) has limited value in clinical work, especially where TB is common. The test shows hypersensitivity to proteins of the TB bacillus, as a result either of infection with M. tuberculosis or induced by Bacille Calmette-Guérin (BCG) vaccination. It indicates infection and not TB disease. In children, infection is one of the criteria used in the diagnosis of TB. In adults, it is used to diagnose latent infection in immunosuppressed patients who would benefit from INH prophylactic therapy.

The test involves injecting tuberculin purified protein derivative (PPD) into the skin. Previous exposure results in a local delayed type hypersensitivity reaction within 24-72 hours. The reaction is identified as palpable induration (hardness) at the site of injection. The response only indicates hypersensitivity. It shows that the person has at some time been infected with M. tuberculosis or been vaccinated. By itself, it does not indicate the presence or extent of tuberculosis disease. The reaction after previous BCG is usually weaker than the reaction to natural infection and remains positive for several years thereafter. It should also be noted that a negative result does not rule out the diagnosis of TB disease. Various conditions, including HV may suppress the reaction.

1.3 Performing a Mantoux Tuberculin Skin Test

1) The Mantoux TST is the most reliable test available. The test requires:
   - 2 units of tuberculin purified protein derivative PPD-RT23 2TU or
   - 5 units of PPD-S 5TU.
2) Use a single-dose tuberculin syringe and a short 27-gauge needle with a short bevel to do the test.
3) Draw up 0.1ml of PPD of the correct strength into the syringe.
4) Clean an area of skin in the mid anterior section of the forearm. The PPD is injected between layers of skin (intradermally). Keep the needle almost parallel to the skin, with the bevel pointing upwards during insertion. It is important to ensure that the injection goes into and not under the skin. A small papule should form at the injection site; if it does not, the PPD has been injected too deeply and the test should be repeated at a different site.
5) The reaction to the test at the site of the injection is measured 48-72 hours later by noting the widest **transverse** point across the edges of the raised, thickened area. This area of induration and not redness is measured.
6) To help measure accurately, mark the edges of the induration at the widest point with a pen and measure the exact distance between the two points in millimetres.

Reading the Tuberculin Skin Test		
Immune Status	HIV positive, malnourished, severe illness	Others (including previous BCG)
Diameter of induration in positive test	>5 mm	>10 mm

Interpreting a positive TST

A positive test indicates infection with TB, but not necessarily TB disease. In a child under 5 years or an HIV-infected child of any age, a positive skin test indicates recent infection and is a risk factor for progression to disease. In the presence of other features such as a history of a TB contact, signs and symptoms of TB and chest x-ray changes, a positive tuberculin skin test is suggestive of TB disease in children

Children under the age of 5 years, HIV-infected children of any age and HIV-infected adults, who have a positive skin test and no symptoms or signs of TB, should be put on TB prophylaxis for six months.

Interpreting a negative TST

A negative tuberculin skin test does not exclude TB; various conditions may cause a false negative reaction including:

- HIV infection
- Malnutrition
- Severe viral infections (e.g. measles, chicken pox)
- Cancer
- Immuno-suppressive drugs (e.g. steroids)
- Severe disseminated TB.

1.4 TB preventive therapy in children

After exclusion of TB disease, Isoniazid preventive therapy (IPT) should be given to the following child contacts:

- All children less than 5 years of age (including neonates)
- All HIV-infected children irrespective of age

Children older than 5 years who are well do not require chemoprophylaxis but must be followed up clinically because they have the lowest risk of serious or disseminated disease. If the index patient is co-infected with HIV, it is important to also check the HIV status of the child therefore HIV testing should be offered.

On the basis of the evidence that is currently available, WHO does not recommend second-line drugs for chemoprophylaxis in contacts of patients with MDR-TB. However, for child contacts of patients with Isoniazid mono resistant TB, Rifampicin 15mg/kg daily for 4 months may be given. Where the index patient has Rifampicin mono resistant TB, the child contact may be given Isoniazid 10mg/kg daily for 6 months

Recommended regimen for TB prophylaxis: Isoniazid (INH) 10 (10-15) mg/kg/day for 6 months.

Caregivers should be advised to crush the appropriate fraction of the 100mg Isoniazid tablet and to dissolve it in water or multi-vitamin syrup before giving it to the child.

Table 1: Dosage recommendations for INH preventive therapy in children

Weight band (kg)	Daily Isoniazid (INH) 100mg tablet
2 – 3.4	1/4 tab
3.5 – 4.9	½ tab
5 – 7.4	¾ tab
7.5 – 9.9	1 tab
10 – 14.9	1 ½ tabs
15 – 19.9	2 tabs
20 – 29.9	3 tabs
30 – 40	4 tabs

At initiation of Isoniazid Preventive Therapy (IPT)

- Counsel the parent or guardian about the importance of treatment compliance, the possible side effects of Isoniazid particularly hepatitis and the symptoms of active TB.
- Emphasize the importance of seeking care if they develop side effects to the medicines or symptoms of TB. Clarify that TB preventive therapy decreases the risk of developing TB disease and not infection, but that TB disease may still occur.

During monthly follow up visits

- The child must be screened for TB symptoms at every visit and if symptomatic appropriate investigations must be conducted. If active TB disease is confirmed, stop the Isoniazid treatment and start the full TB treatment regimen
- Ask about side effects to Isoniazid - peripheral neuropathy, jaundice and vomiting due to hepatitis
    - If peripheral neuropathy develops prescribe 100 mg pyridoxine (vitamin B6) daily until symptoms disappear
    - If the client develops signs and symptoms suggestive of hepatitis, stop INH preventive therapy immediately and refer for further investigations and assessment.
- Monitor adherence to treatment - conduct pill counts
    - If adherence to treatment is poor or there is interruption of treatment, enquire about the possible reasons and counsel the parent/ guardian

The protective effect of Isoniazid falls away as soon as therapy is stopped. Therefore children who are re-exposed to a person with infectious TB disease after completing the IPT or TB treatment must be restarted on IPT again provided TB disease has been excluded.

Children who have successfully completed TB treatment should not be routinely started on IPT. Pre exposure IPT is not recommended in children irrespective of their HIV status.

1.5 Immunisation

The BCG vaccine is a live attenuated vaccine derived from M Bovis. It stimulates the same immunological response as primary infection in the body without leading to disease. It is injected intradermally and is given to all neonates at birth except symptomatic HIV exposed neonates. BCG provides children with a degree of protection against disseminated and severe forms of TB (TB meningitis and miliary TB).

Due to the high TB burden in the country, it is recommended that routine BCG vaccination be given at birth to asymptomatic HIV exposed babies. However, these babies must be monitored closely for the development of BCG related adverse events disease.

2. SYSTEMATIC TUBERCULOSIS SCREENING

Systematic screening for active TB is defined as the "systematic identification of active TB disease in children using tests, examinations or other procedures that can be applied rapidly". The primary objective of TB screening is to ensure early detection of TB disease and initiation of treatment.

Screening should be offered routinely to all children presenting to the health facility. High risk groups who should be routinely screened include;

- children who live in the same household with a person diagnosed with smear and/or culture positive PTB (infectious TB),
- HIV positive children
- children less than five years
- children with severe malnutrition

The systematic screening should include a symptom screen followed by thorough history taking, clinical examination, chest x-ray and bacteriological testing for all those with a positive symptom screen. A chest x-ray, where available may be used to screen for PTB in children. If the child is the index case with TB, active case finding should be undertaken to determine the source case. Information about any person in the household diagnosed with or has symptoms of TB and other possible places of exposure should be obtained from the parent or guardian.

2.1 TB Symptomatic screening

The most common symptoms in children are:

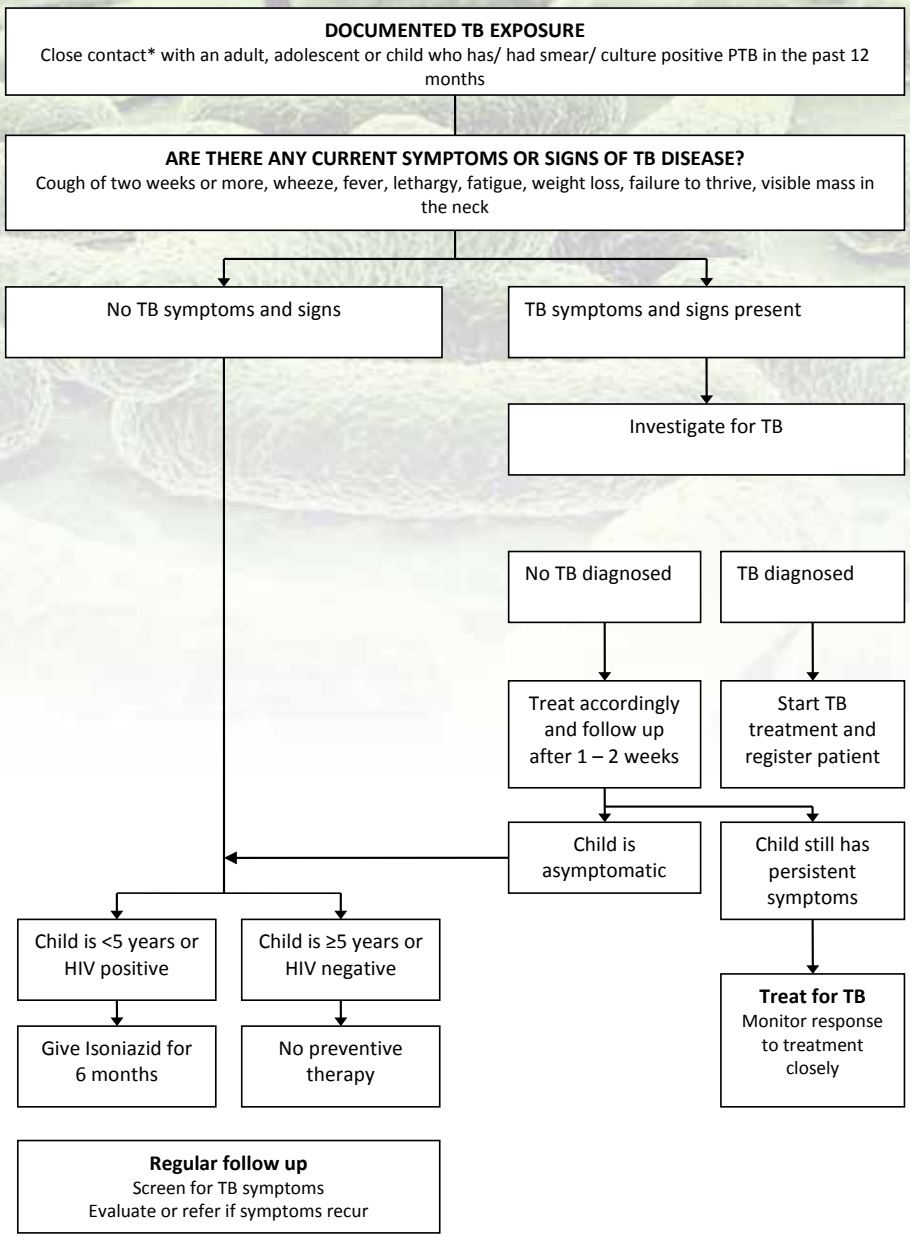
- Cough of two weeks or more
- Persistent fever of more than two weeks
- Documented weight loss/ failure to thrive
- Fatigue (less playful/ always tired)

The TB screening tool (annexure 2) to be available in all health facilities and pediatric wards and to screen patients for tuberculosis when they enter for inpatient, outpatient or emergency treatment. The purpose of this tool is to;

- Assess and document the patients TB symptoms and risk factors.
- Determine the need for further medical testing or evaluation.
- Serve as documentation that screening and testing was provided to all high risk groups

The tool is organised into four sections – Demographics/ patient details, Medical history, Signs and symptoms of TB and the action plan. It is very important that the patient is asked all the questions and the tool completed fully. All children with one or more of the TB symptoms must be investigated accordingly for TB.

Figure 1: TB screening Algorithm



**Close contact is defined as any household contact or contact outside the household that is of sufficient duration and proximity to pose a high risk of infection.*

3. DIAGNOSIS OF TUBERCULOSIS

Risk factors for the progression from infection to TB disease include:

- Age of the child: Young children especially those under 2 years of age have the highest risk of developing disease. Another high-risk age group is adolescents who get infected for the first time during adolescence. Children going to primary school have the lowest risk.
- Immune suppression: HIV infected children, severely malnourished children, especially those with kwashiorkor, and following a bout of measles.
- Recent infection: most children who progress to disease do so within 12 months of being infected.

Children who are infected with drug resistant TB are at the same risk of developing disease as children infected with drug susceptible TB. Young children (under 5 years of age), HIV-infected children and malnourished children have both an increased risk of infection as well as an increased risk of developing serious forms of TB like TB meningitis and disseminated or miliary TB. Unlike tuberculosis infection, which is asymptomatic, TB disease manifests with symptoms or physical signs of disease. The most common type of disease is pulmonary TB, characterised by hilar and/or mediastinal lymph gland enlargement.

3.1 Clinical presentation of TB

Children can present with TB at any age but it is commonest in the under-5 age group and during adolescence. The symptoms are those of a chronic disease, most of which are non-specific and overlap with other chronic diseases, especially HIV.

a) History of contact

A history of contact with a smear and/or culture positive pulmonary TB case, especially if there is close contact (family member, care giver or person living in the same household and in congregate settings such as crèches and pre-schools) should always prompt detailed examination for presence of the disease. The following should be considered when obtaining information on contacts;

- Contact may be a person from outside the household (e.g. neighbor, relative) with whom the child has had frequent contact. For school going children consider the school or crèche
- The people most likely to infect their contacts are those with smear positive PTB rather than those with sputum smear-negative, culture positive PTB
- If no possible source of infection for the child is identified, always ask about anyone in the household with a chronic cough. If there is a person who is coughing they should be investigated for TB.
- The timing of contact with a person who has infectious PTB: children usually develop TB within 2 years after exposure and most (90%) within the first year

The other information about the source case that is important is their response to treatment, as failure to respond might indicate exposure to a drug resistant source case.

b) Symptoms of TB disease

The commonest symptoms are chronic unremitting cough, fever, weight loss and unusual fatigue.

- Chronic cough is a cough that has been present for 2 weeks or more and that is not improving, especially if the child fails to respond to a course of antibiotics. In HIV positive children a cough of any duration must be investigated.
- Fever of greater than 38°C for 14 days after excluding common causes such as malaria or pneumonia
- Weight loss, defined as a loss of more than 5% of the highest weight recorded in the past three months (especially when documented on the "Road to Health" card).
- Failure to thrive - a child in a nutrition programme who fails to gain weight should also be investigated for TB.
- Unusual fatigue: The child becomes less playful or complains of feeling tired.

c) Clinical examination

There are no specific features on clinical examination that are specific for TB. Physical signs that are suggestive of TB disease are:

- Painless enlarged lymph glands, most commonly in the neck, that do not respond to a course of antibiotics.
- Gibbus, especially if it is of recent onset

Signs that would require further investigations to exclude TB are;

- Pleural effusions
- Pericardial effusions
- Abdominal ascites
- Non painful joint swelling
- Meningitis not resolving on antibiotic treatment

Other non-specific signs include night sweats, breathlessness (due to pleural effusion), peripheral oedema (due to pericardial effusion) or painful limbs and joints (due to erythema nodosum or dactylitis/inflammation of digits).

Danger signs that require immediate referral to hospital as they indicate serious, life-threatening forms of TB:

- Headache (especially if accompanied by vomiting), irritability, drowsiness, neck stiffness and convulsions (signs of TB meningitis)
- Meningitis not responding to treatment, with a sub-acute onset or raised intracranial pressure
- Big liver and spleen (signs of disseminated TB)
- Distended abdomen with ascites
- Breathlessness and peripheral oedema (signs of pericardial effusion)
- Severe wheezing not responding to bronchodilators (signs of severe bronchial compression)
- Acute onset of angulation (bending) of the spine.

The diagnosis of TB is based on a combination of history of exposure, clinical presentation, Mantoux test and chest x-ray. The approach to the diagnosis of TB in children depends on the resources that are available. In areas where Mantoux skin test and chest x-ray are limited, the diagnosis can still be made through taking a good history and doing a thorough clinical examination.

Indications for the evaluation of children for TB include:

- Exposure to a smear or culture positive case of PTB.
- Indication of TB infection (Mantoux 10mm or more in HIV-negative or 5mm or more in HIV positive children).
- Symptoms suggestive of TB.

HIV positive children on treatment and care must be screened for TB exposure and symptoms at each clinical visit.

The Tuberculin Skin Test (TST) is used as in combination with other tests in diagnosing TB in children

3.2 HIV testing in children with TB symptoms

An HIV test is important in the diagnosis of childhood TB. As with adults, the standard of care is to provide HIV counselling and testing to all children who are investigated for TB and their parents/caregivers. Families should be given the necessary information about HIV to help make an informed choice about an HIV test. The HIV test should be strongly recommended and consent for testing sought from parents or the legal guardian of children if younger than 12 years of age.

In children less than 18 months:

- An HIV ELISA or HIV rapid test is used for screening. A positive test could be due to maternal antibodies and an HIV DNA PCR test is used to confirm the diagnosis.

In children over 18 months of age:

- HIV ELISA or HIV rapid tests are used both for screening and confirmation of the diagnosis.

3.3 TB diagnosis in HIV infected children

The diagnosis of TB disease in HIV-infected children is exactly the same as for HIV-uninfected children except that the diagnosis of tuberculosis is more complex because:

- The symptoms and signs of tuberculosis and those of other HIV related lung diseases could be indistinguishable. Symptoms such as chronic cough, weight loss and persistent fever are common to both HIV related lung disease and TB.
- The Mantoux skin test is frequently negative even though the child may be infected with TB or has TB disease.

- Although the radiological features are usually similar to that found in HIV-negative children, the picture could also be atypical. Radiological changes of HIV related lung diseases are confused with those caused by tuberculosis e.g. LIP may look very similar to miliary TB.
- The differential diagnosis of pulmonary TB in HIV-infected children is much broader and includes: bacterial pneumonia, viral pneumonia, fungal lung disease, pneumocystis jiroveci pneumonia, pulmonary lymphoma and Kaposi's sarcoma.

It is for these reasons that an HIV test is included as the standard of care in all child TB suspects. If there is uncertainty of the TB diagnosis, the child should be treated with antibiotics for 5-7 days and the chest x-ray repeated after two weeks depending on the clinical picture of the child.

There is both the risk that TB will be over-diagnosed in children and they will be treated unnecessarily or that TB may be missed, and therefore an opportunity to treat an HIV-infected child for a curable disease will also be missed. LIP is the most difficult condition to distinguish from TB due to radiological similarities, although LIP normally has typical clinical signs that include clubbing, parotid enlargement and generalised lymph gland enlargement. Bacteriologically confirmed TB can occur in children with an underlying diagnosis of LIP, bronchiectasis or any other lung infection.

In spite of the difficulties TB can be diagnosed with a fair degree of accuracy in the great majority of HIV infected children.

Any child presenting with a history of exposure to a person diagnosed with infectious pulmonary TB, presenting with TB symptoms, physical signs suggestive of TB, abnormal chest x-ray suggestive of TB, with or without a positive tuberculin skin test is regarded as having TB disease.

In areas where x-ray facilities are not available, any child presenting with a history of exposure to a person diagnosed with infectious pulmonary TB, TB symptoms, with or without a positive tuberculin skin test is regarded as having TB disease.

The presence of any three or more of the following features is suggestive of TB
- TB symptoms
- Physical signs suggestive of TB
- Positive tuberculin skin test
- Chest x-ray findings suggestive of TB

3.4 Chest x-rays

The most common radiological signs of TB in children are:

- An enlarged hilar region of the lung or a widened mediastinum due to enlarged hilar or mediastinal glands. Compression of the airways due to the enlarged lymph glands may be observed. These enlarged lymph glands can occlude the airway resulting in collapse of a lobe.
- A parenchymal lesion can enlarge causing widespread opacification in a segment or lobe of the lung.
- Acute dissemination causes widespread fine millet-sized (1-2 mm) lesions (miliary TB).
- Pleural effusions may occur in children older than six years.

The changes on chest x-ray are often non-specific and TB should not be diagnosed from the chest x-ray alone. The usefulness of the chest x-ray in HIV-infected children is reduced due to the overlap with other HIV related lung diseases e.g. lymphoid interstitial pneumonitis (LIP). They are useful in the diagnosis of PTB or miliary TB in children, in differentiating TB from other lung diseases and in diagnosing other concomitant lung disease. However, good quality x-rays are essential for proper evaluation. Adolescents may present with x-ray changes similar to those of adults such as;

- Apical infiltrates
- Cavities
- Pleural effusions

Miliary TB presents with a diffuse, bilateral, micronodular pattern which can be confused with LIP

3.5 Bacteriological testing

Sputum should always be obtained in children presenting with a chronic cough however, pulmonary TB in young children is usually paucibacillary (few organisms) and the collection of adequate samples is difficult. Recommended methods for sputum collection in children:

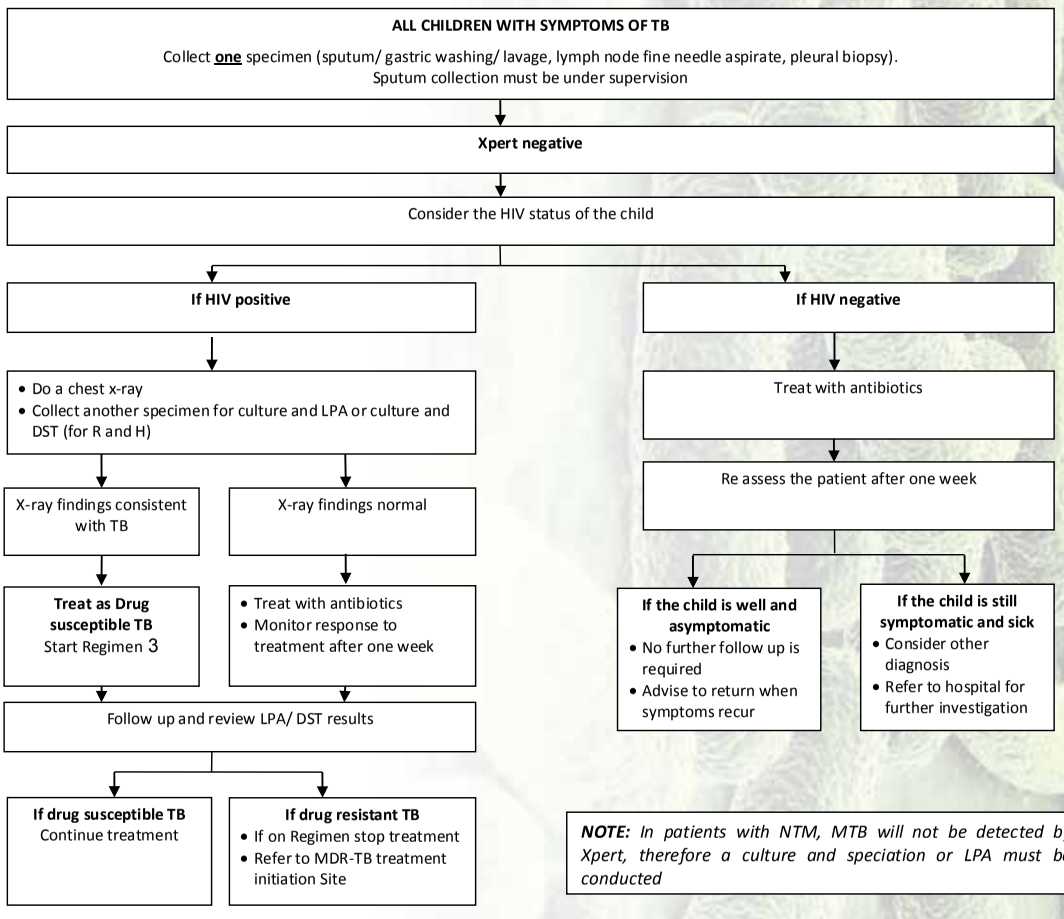
1. Gastric aspiration	• Can be performed in young children who are unable to expectorate sputum. The child must fast for about 6 hours (at night) • The child must be in a sitting or semi-sitting position • Insert a nasogastric tube and check that it is correctly positioned • Suction to collect the gastric fluid, place this in the specimen bottle • Further washings with 15- 30 ml of sterile water maybe collected and added to the first sample. • On completing the laboratory request form indicate that the sample is a “gastric aspirate”.

2. Expectoration	• Sputum collection is possible in older children with extensive and cavitatory disease, particularly if the patient has a chronic cough. • The patient must first rinse their mouth • Then take a deep breath, hold for a second and exhale – repeating this two or three times before coughing into the specimen bottle • Check the quantity and quality of the specimen and request the patient to cough up more if inadequate or collect another sample if not satisfactory. • On completing the laboratory request form indicate that the sample is “sputum” or “expectorated sputum”.
3. Sputum induction	• is encouraged in patients with difficulties in producing sputum • On completing the laboratory request form indicate that the sample is “induced sputum”. • The child should fast for at least 3 hours prior to induction • The child must be in a sitting position • The patient is pretreated with bronchodilators like salbutamol prior to induction, to reduce the risk of bronchospasm • Nebulise with 5ml of 3% hypertonic saline solution for 15 minutes or until the solution is finished. • Chest physiotherapy may be done to loosen up the secretion • Samples are collected from the throat or nasopharynx using a nasopharyngeal suction. • For children who can cough up sputum, they can expectorate spontaneously
4. Bronchial washings / Broncho-alveolar lavage (BAL)	• This can only be conducted at higher levels of care. • On completing the laboratory request form indicate that the sample is BAL ”or“ Bronchial washings.

Sputum specimen obtained through gastric aspiration, bronchial washings, sputum induction and expectoration must be tested using the GeneXpert.

Serological tests are not recommended for routine diagnosis of TB in children.

XPERT DIAGNOSTIC ALGORITHM


ALL CHILDREN WITH SYMPTOMS OF TB
Collect one specimen (sputum/ gastric washing/ lavage, lymph node fine needle aspirate, pleural biopsy).
Sputum collection must be under supervision
Xpert negative
Consider the HIV status of the child
If HIV positive
• Do a chest x-ray
• Collect another specimen for culture and LPA or culture and DST (for R and H)
X-ray findings consistent with TB
X-ray findings normal
Treat as Drug susceptible TB
Start Regimen 3
• Treat with antibiotics
• Monitor response to treatment after one week
Follow up and review LPA/ DST results
If drug susceptible TB
Continue treatment
If drug resistant TB
• If on Regimen stop treatment
• Refer to MDR-TB treatment initiation Site
If HIV negative
Treat with antibiotics
Re assess the patient after one week
If the child is well and asymptomatic
• No further follow up is required
• Advise to return when symptoms recur
If the child is still symptomatic and sick
• Consider other diagnosis
• Refer to hospital for further investigation
NOTE: In patients with NTM, MTB will not be detected by Xpert, therefore a culture and speciation or LPA must be conducted

3.6 Case definitions

The case definitions for children are determined by;

- Site of disease
- Results of any bacteriological test
- Severity of TB disease
- History of previous TB disease

a) Site of TB disease

	Definition	Comment
Pulmonary TB	Disease involving the lung parenchyma.	A patient with both a parenchymal lesion in the lungs (pulmonary TB) and extra-pulmonary TB is classified as pulmonary TB.
Extra-pulmonary TB	Disease involving organs other than the lungs: e.g. pleura, lymph nodes, abdomen, genito-urinary tract, skin, joints and bones and meninges	Intrathoracic TB such as mediastinal or hilar lymphadenopathy or pleural effusion without a parenchymal lesion in the lungs, is classified as extra-pulmonary TB. Where several sites are affected, the site representing the most severe form of disease determines the case definition of extra-pulmonary TB.

b) Bacteriologically confirmed TB

Children who have a positive Xpert, LPA, culture and smear microscopy result are considered to have bacteriologically confirmed TB disease. All children diagnosed with pulmonary TB using Xpert should have a sputum smear microscopy done. This baseline smear microscopy is used to identify those with infectious TB disease for contact investigation and for bacteriological monitoring of response to treatment. Patients are classified as “Xpert positive-smear positive” or “Xpert positive-smear negative” pulmonary TB.

- **Xpert positive - Smear positive pulmonary tuberculosis:**
  A child with a positive Xpert result and at least 1+ AFB in at least 1 sputum smear examination.
- **Xpert positive - Smear-negative pulmonary tuberculosis:**
  A child with a positive Xpert result and at least one sputum smear microscopy negative for AFBs or
- **Xpert positive - Smear not done TB:**
  A child with a positive Xpert result and a baseline smear was not conducted. This applies to children with pulmonary TB who are unable to expectorate spontaneously and those who had extra pulmonary TB specimen tested.

c) Clinically diagnosed TB

Children who are started on TB treatment without bacteriological confirmation of disease. This includes;

- A child with a negative Xpert result and at least one sputum smear microscopy negative for AFB, with chest x-ray abnormalities that are consistent with active TB or a decision to treat based on the clinical picture or
- A child who had no bacteriological test done, with chest x-ray abnormalities that are consistent with active TB or a decision to treat based on the clinical picture or
- A child who is started on treatment based on clinical picture only (empiric treatment)
- A child who is started on treatment based on histological and biochemical tests suggestive of TB

d) Severity of disease

The extent of the disease and the anatomical site determine the severity of disease and the appropriate treatment regimen.

Complicated TB disease	Uncomplicated TB disease
Meningitis	Cervical lymphadenitis
Miliary	Low bacillary load PTB disease
Pericarditis	PTB with minimal lung parenchyma involvement
Abdominal	Mediastinal/ hilar lymph node involvement
Spinal	Pleural effusion
Osteo-articular	
Cavitary PTB	
PTB with extensive parenchymal involvement	
Smear positive PTB	

e) History of previous treatment

The purpose of classifying patients according to previous TB treatment is to identify those patients at increased risk of acquired drug resistance and to manage them appropriately. The different categories are as follows:

Category	Definition
New:	A patient who has never had treatment for TB or who has taken anti-tuberculosis drugs for less than 4 weeks. They may have; • Positive or negative Xpert and positive or negative smear PTB or • Positive or negative Xpert and positive or negative culture PTB or • Extra pulmonary TB disease.
Previously treated	A patient who has taken TB treatment for 4 weeks or more in the past and either relapsed, defaulted or had treatment failure. They may have; • Positive or negative Xpert and positive or negative smear PTB or • Positive or negative Xpert and positive or negative culture PTB or • Extra pulmonary TB disease.
	Relapse: A patient who received treatment and was declared cured or treatment completed at the end of the treatment period and has now developed *Xpert and smear or culture positive pulmonary TB again*.
	Re-treatment after failure: A patient who received treatment and remained or became and smear or culture positive TB at the end of the treatment period, and *Xpert and smear or culture positive*.
	Re-treatment after default: A patient who completed at least one month of treatment and returns after interrupting treatment for two months or more, and is *Xpert and smear or culture positive*.
Other	All cases that do not fit the above definitions such as: - patients who do not have a clear history of previous TB treatment - patients who were previously treated but the outcomes of previous TB treatment are not known - patients who have been previously treated (relapse, default, failure) and are Xpert and smear or culture negative - patients who have been previously treated (relapse, default, failure) and have EPTB
Transfer in	A patient who has been registered for treatment in a facility in one district and is transferred to a facility in another district to continue treatment. The smear conversion and treatment outcome for this patient must be reported back to the facility that transferred the patient.

4. DIAGNOSIS OF EXTRA-PULMONARY TB

The commonest forms of extra-pulmonary TB are:

- TB lymphadenitis
- Pleural effusion
- TB meningitis
- Disseminated TB (Miliary TB).

Lymph node TB can be diagnosed and treated in the primary health care facility, but the other types of extra-pulmonary TB require referral to a hospital for diagnosis and initiation of treatment.

Table 1: Level of Care for Diagnosis and Evaluation of Extra pulmonary TB

Site of TB Disease	Practical approach to diagnosis	Level of diagnosis and initiation of treatment
Peripheral lymph nodes (especially cervical)	Fine needle aspiration (FNA) for Xpert Lymph node biopsy	Primary health facility Hospital
Miliary TB (Disseminated TB)	Chest x-ray Lumbar puncture	Hospital
TB meningitis	Lumbar puncture, CSF for chemistry and Xpert CT scan (where available) Chest x-ray	Hospital
Pleural effusion (older children and adolescents)	Chest x-ray, pleural tap for chemistry and culture	Hospital
Abdominal TB (e.g. peritoneal)	Abdominal ultrasound and ascitic tap for chemistry and culture	Hospital
Osteo-articular TB	X-ray, joint tap, or synovial biopsy	Hospital
Pericardial TB	Ultrasound and pericardial tap	Hospital

Criteria for hospitalization

- Complicated 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

4.1 TB lymphadenitis

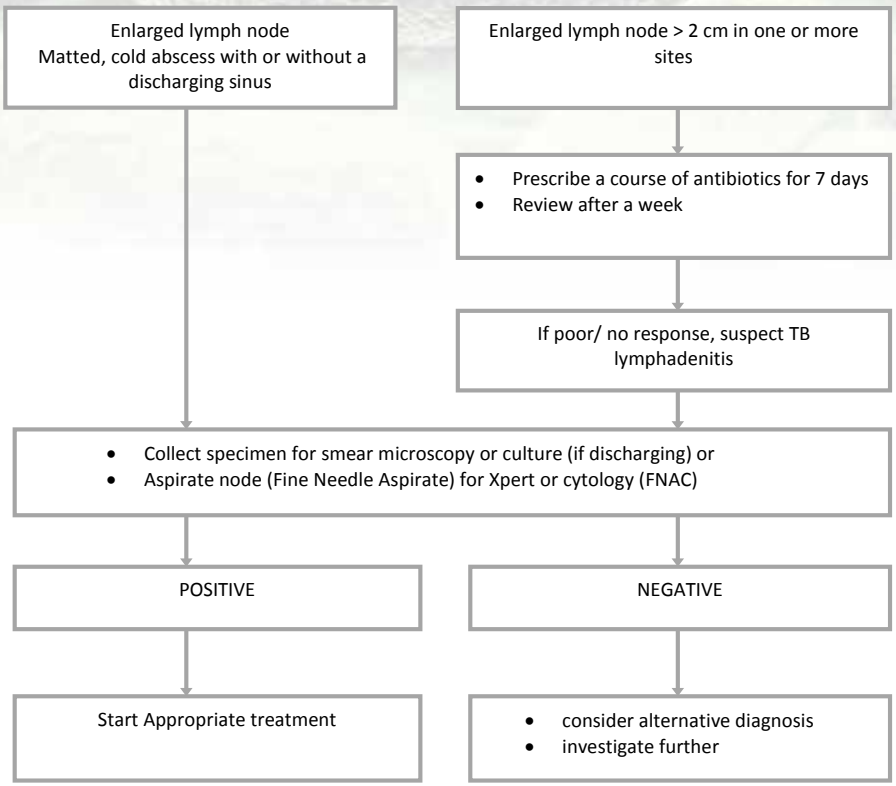
Tuberculous lymphadenitis usually occurs in the neck (cervical neck glands) but may involve axillary and inguinal lymph nodes. The enlarged nodes are usually painless and have developed over time (two weeks or more). They may be firm and discreet nodes at the beginning and become fluctuant and matted together. Later an abscess may form which may break through the overlying skin to form a chronic sinus.

Consider TB lymphadenitis in a child who has;

- Painless enlargement of cervical nodes
- No lesion on the head that could cause the lymph gland enlargement
- No response to antibiotics.

The certainty of the diagnosis can be improved by a positive Mantoux skin test, chest x-ray and fine needle aspirate or biospy.

Diagnostic algorithm for TB lymphadenitis



Other causes of enlarged nodes include;

- Persistent generalised lymphadenopathy (PGL)
- Lymphoma
- Kaposi sarcoma
- Sarcoidosis
- Carcinomatous metastases

4.2 TB meningitis

TB meningitis is a very serious form of TB in children and characterised by gradual onset of symptoms. Complications include obstruction of cerebrospinal fluid (CSF) flow, hydrocephalus, inappropriate anti-diuretic hormone secretion, hemi- or quadriplegia, convulsions, deafness, blindness and mental retardation.

Typical history and symptoms include:

- Contact with a person who has infectious TB.
- Lack of interest in playing or change in behaviour
- Headache, especially if accompanied by early morning vomiting.
- Irritability,
- Drowsiness, convulsions.
- Weight loss.

Physical signs include:

- Neck pain and resistance to neck flexion due to meningeal irritation (Kernig's sign).
- Cranial nerve palsies.
- Altered level of consciousness.

Investigations:

- *Lumbar puncture* - CSF has raised protein, low glucose, low chloride, predominantly lymphocytes; the gram stain is negative and acid fast bacilli are seldom found.
- Xpert can be performed on cerebro spinal fluid for MTB detection and Rifampicin susceptibility testing
- *Mantoux skin test* – The Mantoux can however be negative
- *Chest x-ray* - may be normal in children with TBM

Always consider TB meningitis in children diagnosed with meningitis and not responding to treatment. These children should be urgently referred to a hospital for management.

4.3 Miliary TB

This is a complication of primary TB in young children. It results from widespread blood borne dissemination of TB bacilli. Patients may present with systemic features such as low-grade fever, weight loss, fatigue and malaise. The patient may have a history of cough and respiratory distress.

Physical signs include:
- Lymphadenopathy,
- Hepatosplenomegaly,
- Fever.
- Tachypnea, cyanosis, and respiratory distress.
- Other signs - papular, lesions on the skin or choroidal tubercles in the retina.

Investigations
- *Chest x-rays* – diffuse, uniformly distributed, small military shadows, "millet seed" appearance
- *Full blood count* – pancytopaenia
- *Liver Function Test* – abnormal
- *Biopsy* – tubercles on histology
- *Culture* – Isolation of MTB in CSF, bone marrow, sputum

4.4 Pleural effusion

Inflammatory tuberculous effusions may occur in any serous cavity of the body i.e. pleural, pericardial, peritoneal. They are common in older children and adolescents. Patients with pleural effusions may present with chest pains, breathlessness

Physical signs include;
- Decreased chest movement
- Stony dullness

Investigations
- *Chest x-rays* - Tracheal/ mediastinal shift away from side of effusion
  - Unilateral or bilateral uniform, white opacity with a concave upper border
- *Pleural aspirate* – exudate, straw colored, high protein, high WCC, raised Adenosine Deaminase (ADA)
- *Pleural biopsy* – for Xpert

5. MANAGEMENT OF A CHILD WITH TB DISEASE

Children with TB usually have paucibacillary disease and are not a risk to other children or adults. However, some children, mainly school-aged children and adolescents, have smear-positive TB with cavities on chest x-ray. These children are as infectious as smear-positive adults and their contacts must be investigated as well.

When a young child is diagnosed with any form of TB, the parents and household contacts (if not already on TB treatment) should be carefully evaluated to find the source of infection for the child. Make. The parents should receive advice on the infection control measures to implement in the house to prevent further transmission of infection. A nutritional assessment of the child must be conducted and parents advised on appropriate diet and where necessary nutritional supplements must be provided.

Appropriate HIV-care is essential to help reduce morbidity and mortality of co-infected children.

All children who have been diagnosed with TB disease must be recorded in the TB treatment register and provided with a full course of the appropriate TB regimen. Trials of TB treatment are not recommended. The TB treatment regimen should be continued until completion, unless an alternative diagnosis has been confirmed.

All children on treatment for TB must be reported to the TB programme as part of the routine quarterly cohort reports. The same case definitions apply to both adults and children.

Important things to do in a child diagnosed with TB:

- Exclude HIV infection
- Assess all co-infected for ART and start ART
- Provide psycho-social support to child and parents/ guardian
- Consider referral for nutritional support
- Complete the TB Register
- Make a note in the Road to Health Card
- Ask about other children or adults in the household and screen them for TB

5.1 TB treatment

TB treatment is the same in both HIV-infected and HIV-uninfected children. Possible causes for failure, such as non-compliance with therapy, poor drug absorption, drug resistance and alternative diagnoses should be investigated in children who are not improving on TB treatment. As HIV infected children have a slower response to treatment, prolonged treatment for 9 months may be considered by a specialist.

The treatment principles are the same as for adults. Treatment is comprises of 2 phases: an intensive phase of 2 months with 3/ 4 drugs and a continuation phase of 4 months with 2 drugs. In severe/ complicated TB disease the treatment may be given for a longer time by prolonging the continuation phase to 7 months (instead of 4 months). The drug dosages depend on the body weight of the child and should be adjusted as weight changes during the course of treatment. Parents and caregivers should be counselled about TB and the importance of adherence to treatment.

Table 1: Recommended Dose ranges in mg/kg

Drug	Daily	Maximum daily dose
Isoniazid (H)	10-15	300mg
Rifampicin (R)	10-20	600mg
Pyrazinamide (P)	30-40	2g
Ethambutol (E)	15-25	1200mg

REGIMEN 3A: 2(RH)Z / 4 (RH)

This regimen is recommended for the treatment of uncomplicated TB disease. This includes with low bacillary load TB disease such as PTB with minimal lung parenchyma involvement, intrathoracic disease (mediastinal/ hilar lymph node involvement), TB lymphadenitis and TB pleural effusion.

REGIMEN 3A: FOR CHILDREN <8 YEARS AND <30 KG WITH UNCOMPLICATED TB DISEASE				
Body Weight kg	Intensive phase (2 months)			Continuation phase (4 months)
	Rifampicin/ Isoniazid 60,60	Pyrazinamide 150mg* or 150mg/3mL	Pyrazinamide 500mg	Rifampicin/ Isoniazid 60,60
2–2.9 kg	½ tablet	1.5 mL	expert advice on dose	½ tablet
3–3.9 kg	¾ tablet	2.5 mL	¼ tablet	¾ tablet
4–5.9 kg	1 tablets	3 mL	¼ tablet	1 tablet
6–7.9 kg	1½ tablets		½ tablet	1½ tablets
8–11.9 kg	2 tablets		½ tablet	2 tablets
12–14.9 kg	3 tablets		1 tablet	3 tablets
15–19.9 kg	3½ tablets		1 tablet	3½ tablets
20–24.9 kg	4½ tablets		1½ tablets	4½ tablets
25–29.9 kg	5 tablets		2 tablets	5 tablets
* For each dose, dissolve 150mg dispersible (1 tablet) in 3mL of water to prepare a concentration of 50mg/mL (150mg/3mL). Only Pyrazinamide 150mg or 500mg tablets may be given at a time depending on availability but NOT both **Children who are malnourished or HIV positive: Pyridoxine 25mg daily may be given for children >5years and 12.5mg for children <5years may be added to the treatment**				

REGIMEN 3A: FOR CHILDREN >8 YEARS AND ADOLESCENTS WITH UNCOMPLICATED TB DISEASE			
Body weight kg	Initial phase (2 months)	Continuation Phase (4 months)	
	Rifampicin, Isoniazid, Pyrazinamide, Ethambutol (150,75,400,275)	Rifampicin, Isoniazid (150,75)	Rifampicin, Isoniazid (300,150)
30 - 37	2 tablets	2 tablets	
38 – 54	3 tablets	3 tablets	
55 – 70	4 tablets		2 tablets
>71	5 tablets		2 tablets

REGIMEN 3B: 2(RH)ZE/ 4(RH)

This regimen for recommended for the treatment of complicated TB disease. This includes severe forms of TB such as TB pericarditis, abdominal TB, osteo-articular TB and high bacillary load PTB (smear positive disease, extensive parenchymal involvement on chest x-ray, cavities on chest x-ray).

REGIMEN 3B: FOR CHILDREN <8 YEARS WITH COMPLICATED TB DISEASE					
Body Weight kg	Intensive phase 2 months				Continuation phase 4 months
	Rifampicin, Isoniazid 60,60	Pyrazinamide 500mg	Pyrazinamide 150mg* or 150mg/3mL	Ethambutol 400 mg tablet OR 400mg/8mL** solution	Rifampicin, Isoniazid 60/60
2–2.9	½ tablet	Expert advice on dose	1.5 mL	1 mL	½ tablet
3–3.9	¾ tablet	¼ tablet	2.5 mL	1.5 mL	¾ tablet
4–5.9	1 tablet	¼ tablet	3 mL	2 mL	1 tablet
6–7.9	1½ tablet	½ tablet		3 mL	1½ tablets
8–11.9	2 tablets	½ tablet		½ tablet	2 tablets
12–14.9	3 tablets	1 tablet		¾ tablet	3 tablets
15–19.9	3½ tablets	1 tablet		1 tablet	3½ tablets
20–24.9	4½ tablets	1½ tablet		1 tablet	4½ tablets
25–29.9	5 tablets	2 tablets		1½ tablets	5 tablets

* For each dose, dissolve 150mg dispersible (1 tablet) in 3mL of water to prepare a concentration of 50mg/mL (150mg/3mL). Only Pyrazinamide 150mg or 500mg tablets may be given at a time depending on availability but NOT both

**For each dose, crush 400mg (1 tablet) to a fine powder and dissolve in 8 ml of water to prepare a concentration of 400mg/8mL. Discard unused solution.

*** The continuation phase may be prolonged to 7 months in slow responders and children who are HIV positive In children who are malnourished or HIV positive Pyridoxine 25mg daily may be given for children >5years and 12.5mg for children <5years may be added to the treatment

REGIMEN 3B: FOR CHILDREN >8 YEARS AND ADOLESCENTS WITH COMPLICATED TB DISEASE			
Body weight kg	Initial phase (2 months)	Continuation Phase (4 months)	
	Rifampicin, Isoniazid, Pyrazinamide, Ethambutol (150,75,400,275)	Rifampicin, Isoniazid (150,75)	Rifampicin, Isoniazid (300,150)
30 - 37	2 tablets	2 tablets	
38 – 54	3 tablets	3 tablets	
55 – 70	4 tablets		2 tablets
>71	5 tablets		2 tablets

All previously treated children must be assessed and investigated for drug resistant TB. If drug susceptible TB, treat with Regimen 3B and monitor closely for clinical response and adverse events.

Treatment for TB Meningitis

	Duration	Dosage	Maximum daily dose
Rifampicin	6 months if there are concerns about ongoing disease, prolong for another 3 months. Consult with a specialist	20 mg/kg as a single daily dose	600 mg
Isoniazid	6 months if there are concerns about ongoing disease, prolong for another 3 months. Consult with a specialist	20 mg/kg as a single daily dose	400 mg
Pyrazinamide	6 months if there are concerns about ongoing disease, prolong for another 3 months. Consult with a specialist	40 mg/kg as a single daily dose.	2 000 mg
Ethionamide	6 months if there are concerns about ongoing disease, prolong for another 3 months. Consult with a specialist	20 mg/kg as a single daily dose	1 000 mg

The recommended treatment duration is 6 months but if there are concerns about clinical progress, the treatment can be prolonged by another 3 months to 9 months in total. Consult a paediatrician.

5.2 Use of steroids in children with TB

Oral steroids should be added to the treatment in children with the following forms of TB:

- TB meningitis
- TB pericarditis
- Mediastinal lymph glands obstructing the airways.
- Severely ill children with disseminated TB (miliary)

The recommended dose is: Prednisone 2 mg/kg orally, daily for 4 weeks (maximum daily dose 60mg). The dose should be tapered to stop over 2 weeks.

5.3 Monitoring response to treatment

a) Clinical monitoring

Children should be monitored at least on a monthly basis for the first 2 months, thereafter every 2 months until completion of treatment. Children responding well to treatment will have resolution of symptoms and gain weight. The patient must be assessed at each visit for;

- Presence of TB symptoms
- Treatment compliance - review the patient treatment card (Green card), conduct pill count
- Adverse events -
- Weight gain – measure and record the patient's weight
- Review medication dosages – adjust according to weight.

The chest x-ray is a poor indicator of response as the hilar and mediastinal lymph glands can enlarge as a result of the improvement in the child's immunity. Therefore follow-up chest x-rays are not routinely recommended in;

- Children with uncomplicated TB,
- Asymptomatic children, during or at the end of therapy.

b) Bacteriological monitoring

Children and adolescents diagnosed with pulmonary TB should be monitored using smear microscopy/ culture. One sputum specimens should be collected for smear examination seven weeks (end of intensive phase) to evaluate smear conversion and at 23 weeks (end of continuation phase) to evaluate treatment outcome.

If the child has a positive smear at the end of the intensive phase, it indicates one of the following:

- Most frequently, that the intensive phase of treatment was poorly supervised
- Sometimes, that there is slow clinical progress due to advanced or complicated disease – e.g. high bacillary load, extensive cavitation
- Rarely, that the client may have drug resistant TB

5.4 Management of a child who deteriorates on TB treatment or treatment failure

Children may sometimes deteriorate (experience a worsening of symptoms) or not respond to treatment (persistent cough, poor weight gain) despite adequate therapy, the most important questions to answer are:

i. Is the drug dosage correct?
ii. Is the child taking the drugs as prescribed (good adherence)?
iii. Is the child HIV-infected?
iv. Was the child severely malnourished?
v. Is there a reason to suspect drug-resistant TB (index case has drug resistant TB, is a re-treatment case or is also not responding to therapy)?
vi. Has the child developed IRIS?
vii. Is there another reason for the child's illness, other than or in addition to TB?

Most children will respond well to TB treatment, however if the patients shows poor response assess the child for treatment compliance, drug absorption problems and drug resistance, as outlined above. Suspect drug resistance in a child who fails to convert at 7 or 11 weeks after excluding non compliance to treatment and first line DST should be conducted. In cases where there was no initial bacteriological confirmation of disease, suspect failure when clinical symptoms are not improving or worsen and x-rays show disease progression. Any child with persistent symptoms or who deteriorates on TB treatment should be referred to the next level of care for further assessment and care.

5.5 Adverse events

Adverse events caused by TB drugs are much less common in children than in adults. The most important adverse event is the development of hepatotoxicity, which can be caused by isoniazid, rifampicin, or pyrazinamide. Serum liver enzyme levels should not be monitored routinely, as asymptomatic mild elevation of serum liver enzymes (<5 times normal values) is not an indication to stop treatment.

However, the occurrence of liver tenderness, hepatomegaly, or jaundice should lead to urgent referral for further investigation. Liver function tests should be performed and all drugs stopped. Patients should be screened for other causes of hepatitis, and no attempt should be made to reintroduce hepatotoxic drugs until liver functions have normalized. If the child has severe forms of TB and TB treatment needs to be continued, liver friendly regimen with non-hepatotoxic TB drugs should be introduced (e.g. ethambutol, aminoglycoside and a fluoroquinolone).

Isoniazid may cause symptomatic pyridoxine deficiency, particularly in severely malnourished children and HIV-infected children on antiretroviral therapy. Supplemental pyridoxine at a dosage of 12.5 mg/day (½ tablet) is recommended in:

- Malnourished children
- HIV-infected children
- Pregnant adolescents.

5.6 Nutritional support

Considering that 1) Malnutrition results in the reduction of cell mediated immunity thereby increasing the risk of infections such as TB; 2) the catabolic effect of the TB disease results in weight loss and wasting worsening the malnutrition and 3) children with TB disease present with failure to thrive and weight loss. A systematic evaluation of the child's nutritional status must be part of the physical examination by:

- Measuring the weight, height
- Measuring mid upper arm circumference
- Observing for signs of malnutrition – oedema, severe wasting

The energy needs are increased in co-infected children by 20 – 30%, but this depends on the age and growth status at assessment. The additional needs can be met through proper diet, it is therefore important to advise the caregiver on an appropriate diet using available food at home, where this is not possible, nutritional supplements maybe used until the child has stabilised. Children with severe malnutrition require urgent therapeutic feeding. Breastfeeding should be encouraged for breastfeeding infants.

6. CONGENITAL TB

This is defined as TB acquired during the perinatal period. Infants may acquire tuberculosis (TB) by the following means:

- transplacental spread through the umbilical vein to the fetal liver (in utero)
- aspiration or ingestion of infected amniotic fluid (in utero/ intrapartum)
- inhalation of droplet nuclei from close contacts (mother or other family members) (post partum)

Risk factors for vertical transmission include;

1) a diagnosis of HIV infection or tuberculosis in mothers,
2) a lack of prenatal care
3) non-adherence to anti-tuberculosis treatment,
4) the infectiousness of the mother
5) mother has multi-drug resistant

It is estimated that about 50% of babies born to mother with active TB disease will develop TB disease during the first year of life if IPT or BCG is not provided. Breast milk does not transmit tuberculosis.

6.1 Clinical Presentation

The clinical presentation of congenital TB is nonspecific but is usually marked by multiple organ involvement. Active TB develops between week 2 and end of week 4 of age. The neonate will present with non-specific symptoms such as lethargy, poor feeding, low birth weight and poor weight gain. Other symptoms include respiratory problems, hepato-splenomegaly, lymphadenopathy, abdominal distension, skin lesions, seizures, jaundice, ear discharge, paravertebral abscesses and haematological anomalies. TB should be suspected in neonatal infections that are unresponsive to antimicrobial therapy

6.2 Investigations

A complete investigation of mother and neonate should be undertaken. Chest x-ray, gastric and bronchial aspirates for microscopy and culture and tissue for histological diagnosis

Infection is determined by tuberculin skin (Mantoux test). The following could also assist in making the diagnosis;

- Evidence of tuberculosis infection of the maternal genital tract
- Screening and investigation of contacts, to exclude postnatal transmission
- Placental examination
- In addition the strain of M. tuberculosis isolated from the neonate by restriction length polymorphism must be the same as that from the mother.

6.3 Management

Bacille Calmette-Guérin (BCG) should not be given to neonates exposed to tuberculosis while screening for active disease. Maternal infectiousness and drug susceptibility status should be carried out.

Managing asymptomatic neonates

Scenario	Action 1	Action 2
Asymptomatic neonates born of mother's with infectious drug-susceptible tuberculosis	Treat with daily rifampicin (15 mg/kg), isoniazid (10 mg/kg), PZA (35mg/kg) for 6 months.	At the end of the treatment period, • Screen the infant for TB again • If negative, BCG must be given after 2 weeks[1].
Asymptomatic neonates born of mother's with infectious drug-resistant tuberculosis	Give prophylaxis with high dose INH (15-20 mg/kg) daily for 6 months and followed up monthly to exclude clinical tuberculosis disease (usually drug-resistant) and to monitor side effects. Consider adding pyridoxine when INH is given.	**If child is well and does not develop signs of TB whilst on prophylaxis,** Continue prophylaxis until end of 6 months stop prophylaxis and BCG given 2 weeks later.
		If TB disease develops whilst on prophylaxis refer to the MDR-TB Unit
Asymptomatic neonates born of mother's with non infectious drug-susceptible tuberculosis[2]	Screen the infant for TB clinically, radiologically and bacteriologically (gastric aspirates)	If no tuberculosis is confirmed (negative), give prophylaxis with Isoniazid (10 mg/kg/d) for 6 months If child is well and has no signs of TB at 6 months, prophylaxis can be stopped and BCG given 2 weeks later.
		If TB is confirmed or infant has signs suggestive of TB, A complete course of TB treatment must be given BCG must be given 2 weeks after completing treatment.

[1] BCG is a life vaccine, which is affected by the use of TB drugs (including INH)
[2] Non infectious means the mother has completed at least 2 months of anti-tuberculosis therapy prior to delivery of the baby with confirmed negative smear microscopy/ culture

6.4 Treatment

TB treatment should be commenced while awaiting bacteriological confirmation as the disease progresses rapidly. The treatment is the same as for all children < 8years (Regimen 3A) and the dosing must be as follows;

Intensive Phase (2 months)	**Dosages** Isoniazid (10mg/kg/day) Rifampicin (10mg/kg/day) Pyrazinamide (35mg/kg/day)
Continuation phase (4 months)	Isoniazid (10-15mg/kg/day) Rifampicin (10-15mg/kg/day)

Response to therapy is indicated by increased appetite, weight gain and radiological resolution. Breast feeding is recommended to infants irrespective of the tuberculosis status of the mother. TB infection control practises must be adhered to at all times. The risk of transmission of tuberculosis through breast milk is negligible.

7. MANAGEMENT OF TB IN HIV INFECTED CHILDREN

HIV positive children are at increased risk of TB. Their parents are more likely to be HIV-infected, develop tuberculosis and increase the child's risk of exposure. The progression from infection to TB disease also occurs more frequently and rapidly in HIV-infected children.

These children often have other lung disease related to their HIV infection, including Pneumocystis jiroveci (PCP), lymphoid interstitial pneumonitis (LIP) and viral and bacterial pneumonias. The final common pathway of multiple lung infections is bronchiectasis and chronic lung disease for many HIV-infected children. Most of these diagnoses must be made clinically, often resulting in confusion about which opportunistic infections are causing the child's illness. There may be multiple and concurrent opportunistic infections, so the presence of one diagnosis does not exclude other causes of illness.

7.1 Case definitions

HIV positive TB patient: a child with TB disease who has a documented HIV positive result or enrolled in pre-ART or ART care
HIV negative TB patient: a child with TB disease who tested or has a documented HIV negative result
HIV status unknown TB patient: a child who has never tested for HIV or does not have a documented HIV test result.

7.2 TB treatment

Most children with TB including those who are HIV infected have a good response to the six month treatment regimen. There are however, instances where the continuation phase of treatment may have to be prolonged depending on the disease category and clinical response to treatment. In children who are not responding to treatment, the following must be excluded;

- Treatment failure
- Non compliance to treatment
- Poor drug absorption
- Drug resistance
- Other lung diseases

A trial of TB treatment is not recommended, once a decision to treat has been made, the child should receive the full course of treatment, unless an alternative diagnosis is confirmed.

7.3 General HIV care

Once a child with TB has been diagnosed HIV positive, it is the responsibility of the health care worker treating the child to ensure that the child and family receive appropriate HIV-related care, including:

- Counseling and social services support (e.g. access to child support grants).
- Clinical and immunological (CD4%) staging of disease.
- Treatment of other concurrent opportunistic infections.
- Provision of chemoprophylaxis against other opportunistic infections (cotrimoxazole).
- Regular monitoring of growth and development.
- Nutritional supplements (including micronutrients).
- Appropriate completion of the immunisation schedule.
- Initiation of antiretroviral therapy.
- Referral for palliative care if required.

7.4 Cotrimoxazole prophylaxis

Cotrimoxazole prophylaxis prolongs survival in HIV-infected children and reduces the incidence of respiratory infections and hospitalization. All HIV-infected children should be started on cotrimoxazole.

The recommended dosage for children is trimethoprim 6-8 mg/kg, sulphamethoxazole 20 mg/kg.

Cotrimoxazole syrup contains trimethoprim/ sulphamethoxazole 40/200mg per 5mL and the recommended dosage is therefore 0.625 ml/kg.

Table 1: Cotrimoxazole dosing for children

Recommended daily by weight band	Sulfamethoxazole/ Trimethoprim	Suspension 200/40 mg per 5 mL	Single strength tablet 400/80 mg	Double strength tablet 800/160 mg
3 to 4.9 kg	100/20 mg	2.5 mL	¼ tablet	–
5 to 13.9 kg	200/40 mg	5 mL	½ tablet	–
14 to 29.9kg	400/80 mg	10 mL	1 tablet	½ tablet
> 30 kg	800/160 mg	–	2 tablets	1 tablet

Dapsone should be used as an alternative in children who cannot take Cotrimoxazole. The recommended dose is 2mg/kg/day with maximum daily dose of 100mg.

Cotrimoxazole should be started soon after TB treatment initiation, if the child is not on Cotrimoxazole already.

7.5 Antiretroviral therapy

All HIV positive children who are < 5 years must be initiated on ART irrespective of CD4 count and WHO clinical staging. The criteria for ART initiation in children 5 - 15 years is WHO clinical stage 3 or 4 or CD4 ≤350 cells/ mm^3. Stage 3 includes intra-thoracic TB and cervical adenitis and Stage 4 includes extra-thoracic TB without cervical TB adenitis, therefore all HIV-infected children with TB meet the criteria for ART. Appropriate arrangements for access to antiretroviral drugs should be made for children who meet the clinical indications for treatment. Criteria for fast tracking (starting ART within seven days, if safe to do so) include:

- Children less than 1 year of age
- WHO clinical Stage 4
- MDR or XDR-TB
- CD4 Count < 200 cells/µL Or < 15%

Initiation of ART in children on TB treatment

In HIV-infected children with confirmed or unconfirmed TB disease, initiation of TB treatment is the priority. The decision on when to start ART after starting TB treatment involves a balance between the severity of the disease, age of the child, pill burden, potential drug interactions, overlapping toxicities and possible immune reconstitution syndrome versus the risk of further progression of immune suppression and the associated increase in mortality and morbidity. ART should be introduced 2 - 8 weeks after starting TB treatment and within 2 weeks in severely immune compromised children.

- Start ART after 2 weeks if CD4 count < 50
- Start ART after 8 weeks if CD4 count > 50 or TB meningitis
- Check ALT levels before initiating ART and refer to paediatrician if high.
- Monitor patient closely for IRIS

Baseline tests for ART initiation include;

- Haemoglobin or Full Blood Count
- CD4 count (if not done in the past 6 months)
- HIV Viral Load
- Cholesterol and Triglyceride (PI based regimen)
- Creatinine and urine dipstick (TDF regimen)
- ALT (TB treatment/ jaundiced)

FIRST LINE ANTIRETROVIRAL TREATMENT REGIMENS		
Infants and children <3 years or <10 kg	**Children ≥3 years and ≥10kg***	**If currently on d4T based regimen**
Abacavir (ABC) Lamivudine (3TC) Lopinavir/ Ritonavir (LPV/r)	Abacavir (ABC) Lamivudine (3TC) Efivarenz (EFV)	• Change d4T to ABC if viral load is undetectable • If viral load >1000 copies/mL manage as treatment failure • If viral load is between 50 – 1000 copies/mL consult with expert for advise
*Children ≥ 3 years and exposed to Nevirapine for 6 weeks or longer (PMTCT) should be initiated on ABC + 3TC + LPV/r		

Rifampicin causes liver enzyme induction, resulting in significantly reduced serum drug levels of Nevirapine and Lopinavir. Therefore, the doses of these two drugs need to be adjusted during concurrent TB and antiretroviral treatment. The liver enzyme induction caused by Rifampicin persists for 1-2 weeks after Rifampicin is stopped.

7.6 Management of a child who develops TB whilst on ART

The timing of the development of TB after ART initiation should be considered in determining the most likely cause of TB. The development of TB in a child on ART could be indicative of immune reconstitution (if it occurs within the first 6 months of ART initiation), failure of the ART regimen (if it occurs after 6 months) or a new TB Infection depending on exposure.

TB treatment should be started without delay and ART continued in these children. The ART regimen should be reviewed and may need to be changed as follows:

1) Efavirenz: use the maximum dosage according to recommended range as per package insert of either drug for weight or body surface area.

2) Abacavir and lamivudine: no adjustment of dosages.

3) Lopinavir/ritonavir: provide additional ritonavir while on rifampicin-containing treatment. Add sufficient ritonavir to ensure an equal dose in milligrams of lopinavir and ritonavir. For example, for each mL of lopinavir/ritonavir 80/20mg/mL solution add 0.75 mL of ritonavir 80 mg/mL solution. If the child is on a Lopinavir/ Ritonavir containing regimen, Ritonavir should be added at a dose of 0.75 times the volume of the Lopinavir/ Ritonavir dose. TB treatment should be started at standard doses. In older children the dose of Ritonavir should be doubled as in adults.

4) Give pyridoxine (vitamin B6) to all children on TB and ARV treatment, due to shared toxicities of the regimens.

If the child is on second line ART regimen, the choice of ART will depend on the resistance to the first line drugs and possible drug interactions. Consult with expert for advice.

7.7 Monitoring

Clinical progress should be monitored monthly. At each visit the following must be done;

- Measure height, weight, plot in child growth chart
- Assess treatment compliance
- Enquire about other illnesses
- Enquire about side effects
- Perform the necessary laboratory tests
- Review and adjust dosages based on the weight of the child

	Frequency during treatment	Purpose
Height, weight, head circumference (<2yrs) and development	Monthly	To monitor the growth and development of the child
Clinical assessment	Monthly	To monitor the response to ART
CD4	12 months into ART Every 12 months thereafter	To monitor the response to ART To determine when to stop Cotrimoxazole
VL	6 and 12 months into ART Every 6 months thereafter for children <5years Every 12 months thereafter for children 5 – 15 years	To monitor viral suppression Monitor treatment compliance Detect treatment failure
Haemoglobin or Full Blood Count	1, 2 and 3 months into ART Every 12 months if on AZT	To detect AZT related anaemia
Cholesterol and Triglyceride	12 months into ART Every 12 months thereafter if on PI based regimen	To detect PI related metabolic side effects
Drug related adverse events	Monthly	To identify drug related adverse reactions

7.8 Management of adverse reactions due to TB and Antiretroviral treatment

Clinically significant drug interactions occur between the rifampicin, and some of the non-nucleoside reverse transcriptase inhibitors (NNRTIs) and protease inhibitors (PIs). The adverse events of the TB drugs and the antiretroviral drugs are similar and can cause confusion as to which drugs need to be stopped.

Adverse reaction	Onset	Main ARV drug involved	Main TB drug involved	Management
Peripheral neuropathy	Early or late	Stavudine Didanosine	Isoniazid Cycloserine	Pyridoxine (may be given as preventive therapy at the beginning of treatment or as treatment once isoniazid toxicity has occurred)
Hepatitis	Early	Nevirapine Protease Inhibitors	Pyrazinamide Rifampicin Isoniazid Ethionamide	Stop all drugs Do liver function tests Once resolved start TB treatment
Gastrointestinal disturbances (diarrheoa, abdominal pains)	Early or late	All	All	Symptomatic treatment
Skin rash	Early or late	Efivarenz Nevirapine Abacavir	Pyrazinamide Rifampicin Isoniazid Cycloserine	Mild: Symptomatic treatment Severe: Stop all drugs, treat and once resolved restart with TB treatment
Central nervous system dysfunction	Early or late	Efivarenz	Isoniazid Cycloserine	Pyridoxine
Anaemia	Early or late	Zidovudine	Rifampicin	Change from Zidovudine to Stavudine

7.9 Immune reconstitution inflammatory syndrome (IRIS)

Immune reconstitution inflammatory syndrome (IRIS) has been observed in patients on TB treatment who start ART. This syndrome is characterized by a worsening of disease after initial clinical improvement (hence also sometimes known as a paradoxical reaction). The reaction may occur during the first three months of ART, is generally self-limiting and lasts 10-40 days. Patients already on ART may experience temporary exacerbations of symptoms, signs or x-ray manifestations after beginning TB therapy. This can simulate worsening disease, with fever, increased size of lymph nodes or tuberculomas. TB treatment and ART should be continued, though in some cases the addition of corticosteroids might be useful. If in doubt, refer the child for evaluation.

Always refer to the latest Paediatric Antiretroviral Treatment Guidelines

8. MANAGEMENT OF DRUG RESISTANT-TB IN CHILDREN

Children are as susceptible to drug resistant as to drug susceptible TB. Drug resistant TB is a laboratory diagnosis. Drug resistant TB should be suspected if any of the features below are present.

- A child who is a close contact of an MDR TB patient.
- A child who is a contact with a TB patient who died while undergoing treatment especially if the deceased patient most likely had unconfirmed MDR-TB (i.e., was a contact of another person with MDR TB, had poor adherence to treatment, or had received more than two courses of treatment).
- A child with bacteriologically proven TB who is not responding to first-line drugs administered with direct observation.
- A child exposed to a source case that remains smear- or culture-positive after 2 months of directly observed first-line TB treatment.

All children with confirmed or unconfirmed RR-TB, MDR-TB and XDR- TB should be referred to the nearest MDR-TB treatment initiation site for assessment and treatment.

Drug-susceptibility testing should be performed on the initial M. tuberculosis isolate and on subsequent isolates if treatment failure or relapse is suspected. The treatment history of the source case can be used to define the probable drug susceptibility of the child's organism and to design the empiric therapeutic regimen for the child, whilst awaiting DST results or where it is not possible to obtain a specimen.

8.1 Classification of patients based on drug resistant TB

Category	Definition
Mono resistance	Resistance to one first line TB drug (other than rifampicin)
Poly resistance	Resistance to more than one first line TB drugs (other than rifampicin and isoniazid)
Rifampicin esistance (RR-TB)	Resistance to rifampicin with or without resistance to other first or second line TB drugs. This includes mono resistance, multidrug resistance, poly drug resistance and extensive drug resistance.
Multi drug resistance (MDR-TB)	Resistance to at least both isoniazid and rifampicin
Extensive drug resistance (XDR-TB)	Resistance to any fluoroquinolone and at least one of the three second line injectable drugs (capreomycin, kanamycin, amikacin), in addition to multi drug resistance

8.2 Treatment for patients with drug resistant TB

The principles of treatment of drug resistant TB are as follows;

- Do not add a drug to a failing regimen.
- Treat the child according to the drug susceptibility pattern (and using the treatment history) of the source case's *M. tuberculosis strain* if an isolate from the child is not available.
- Use at least four drugs certain to be effective.
- Use daily treatment only; directly observed therapy is essential.
- Counsel the child's caregiver at every visit, to provide support, advice about adverse events and the importance of compliance and completion of treatment.
- Treatment duration depends on the extent of the disease, but in most cases will be 12 months or more (or at least 12 months after the last positive culture).
- Follow-up is essential: clinical, radiological and bacteriological (mycobacterial culture for any child who had bacteriologically confirmed disease at diagnosis).

Second line drugs used in the treatment of RR-TB, MDR-TB, XDR-TB

Drug	Mode of action	Common side effects	Recommended daily dose	
			Range (mg/kg)	Maximum (mg)
Ethionamide/ Prothionamide	Bactericidal	Vomitting, gastrointestinal disturbances	15 - 20	1000
Fluoroquinolones Levofloxacin Moxifloxacin	Bactericidal	Arthropathy, arthritis		
			7.5 - 10	-
			7.5 - 10	-
Aminoglycosides Kanamycin Amikacin Capreomycin	Bactericidal	Ototoxicity Hepatotoxicity		
			15 - 30	1000
			15 – 22.5	1000
			15 - 30	1000
Terizidone/ Cycloserine	Bacteriostatic	Psychiatric Neurological	10 - 20	1000
Para-aminosalicylic acid	Bacteriostatic	Vomiting, gastrointestinal disturbances	150	12 000

Drug adverse events occur less frequently in children than in adults. Caregivers should be made aware of possible adverse events and the need to report any adverse event. Regular monitoring of the child's weight is important as the drug doses need regular adjustment as the child gains weight.

HIV-infected children with drug-resistant TB should receive in addition:

- Pyridoxine (1-2 mg/kg/day) especially if on high-dose isoniazid and/or malnourished
- CPT
- ART should be initiated as early as possible but timing should be individualized. It is however, preferable to wait 2 – 8 eight weeks to prevent the risk of IRIS and minimize confusion with overlapping adverse events of the two drug regimens. Drug doses of antiretroviral agents do not need adjustment if rifampicin is excluded. The use of corticosteroids are as for drug susceptible TB and for IRIS.

9. MONITORING AND EVALUATION

Childhood TB reflects the effectiveness of the TB control programme particularly the prevention, case detection and treatment strategies. Accurate recording, data collation and analysis at different levels is important for improved epidemiological surveillance, planning and organization of services, quantification of medicines drug formulations and budgeting.

9.1 TB Screening data

All children, who have been screened for TB, must be recorded in the TB symptom screening tool. The data must be collated on a daily using the daily summary sheet (Annexure 3). All those who are tested must be recorded in the TB Identification register (GW 20/12), this data must be collated on a monthly basis in the TB detection summary sheet.

Important screening indicators include:

- number of children screened,
- number of children with symptoms suggestive of TB,
- number of children tested/ investigated for TB
- number of children diagnosed with TB
- number of children started on TB treatment
- number of children who died before treatment initiation
- number of children lost to follow up
- number of child contacts <5 years started on IPT

These indicators must be closely monitored at facility level for immediate action. The data can be disaggregated by age and the HIV status of children.

9.2 Treatment initiation data

Children who are started on TB treatment, must be entered into the facility-based TB treatment register (GW 20/11). All fields in the registers must be completed. The data must be disaggregated by HIV status, age groups and type of disease, the recommended age groups for children and adolescents are as follows;

- 0 - 4 years
- 5 - 9 years
- 10 – 14 years
- 15 – 19 years

9.3 Treatment outcome data

At the end of the treatment, the treatment outcome must be recorded in the TB register. Accurate recording at the facility level is important for proper evaluation of the programme. The outcome definitions for children are as follows;

Cured: Child who was sputum smear positive pre treatment and is sputum smear negative in the last month of treatment and on at least one previous occasion, at least 30 days prior.
Completed treatment: Child who has completed treatment but does not meet the criteria to be classified as cured or treatment failure
Lost to follow up: Child whose treatment was interrupted for 2 consecutive months or more
Died: Child who dies for any reason during the course of TB treatment.
Treatment failure: Child who is sputum smear-positive at 5 months or later after starting treatment
Transferred out: Child who has been transferred to another district and for whom the treatment outcome is not known

Treatment response in a child with sputum smear-negative TB or extra pulmonary TB is assessed monthly by monitoring the weight of the child and symptom resolution. In children with smear-positive TB, sputum smears should be repeated at 7 and 23 weeks.

9.4 TB and HIV data

All children diagnosed with TB and are HIV negative or HIV status is unknown must have been tested for HIV on completion of TB treatment. The HIV status, Cotrimoxazole and ART information must be entered in the TB treatment register.

The key indicators for TB and HIV are;
- Number of children with known HIV status
- Number of children who are HIV positive
- Number of children on CPT
- Number of children on ART

These indicators ideally should be measured at treatment outcome. The data may be disaggregated by age group and type of TB disease.

ANNEXURE 1: WHO STAGING OF CHILDREN WITH CONFIRMED HIV INFECTION

Stage One	
i.	Asymptomatic
ii.	Persistent generalised lymphadenopathy (PGL)
Stage Two	
iii.	Hepatosplenomegaly
iv.	Papular pruritic eruptions
v.	Seborrhoeic dermatitis
vi.	Extensive human papilloma virus infection
vii.	Extensive molluscum contagiosum
viii.	Fungal nail infections
ix.	Recurrent oral ulcerations
x.	Lineal gingival erythema (LGE)
xi.	Angular cheilitis
xii.	Parotid enlargement
xiii.	Herpes zoster
xiv.	Recurrent or chronic RTIs (otitis media, otorrhoea, sinusitis)
Stage Three	
xv.	Moderate unexplained malnutrition not adequately responding to standard therapy
xvi.	Unexplained persistent diarrhoea (14 days or more)
xvii.	Unexplained persistent fever (intermittent or constant, for longer than one month)
xviii.	Oral candidiasis (outside neonatal period)
xix.	Oral hairy leukoplakia
xx.	Acute necrotizing ulcerative gingivitis/periodontitis
xxi.	Pulmonary (intrathoracic) TB and cervical TB adenitis
xxii.	Severe recurrent presumed bacterial pneumonia
xxiii.	Unexplained anaemia (<8g/dl), and or neutropenia (<1000/mm3) and or thrombocytopenia (<50 000/ mm3) for more than one month
xxiv.	Chronic HIV-associated lung disease including brochiectasis
xxv.	Symptomatic lymphoid interstitial pneumonitis (LIP)
Stage Four	
xxvi.	Unexplained severe wasting or severe malnutrition not adequately responding to standard therapy
xxvii.	Pneumocystis pneumonia
xxviii.	Recurrent severe presumed bacterial infections (e.g. empyema, pyomyositis, bone or joint infection, meningitis, but excluding pneumonia)
xxix.	Chronic herpes simplex infection; (orolabial or cutaneous of more than one month's duration)
xxx.	Extrathoracic TB, except cervical TB adenitis
xxxi.	Kaposi's sarcoma
xxxii.	Oesophageal candidiasis
xxxiii.	CNS toxoplasmosis (outside the neonatal period)
xxxiv.	HIV encephalopathy

xxxv.	CMV infection (CMV retinitis or infection of organs other than liver, spleen or lymph nodes; onset after 1 month of age)
xxxvi.	Extrapulmonary cryptococcosis including meningitis
xxxvii.	Crytosporidiosis
xxxviii.	Isosporiasis
xxxix.	Disseminated non-tuberculous mycobacterial infection
xl.	Candidiasis of trachea, bronchi or lungs
xli.	Visceral herpes simplex infection
xlii.	Acquired HIV-associated rectal fistula
xliii.	Cerebral or B-cell non-Hodgkins lymphoma
xliv.	Progressive multifocal leucoencephalopathy (PML)
xlv.	HIV-associated cardiomyopathy or nephropathy

ANNEXURE 2: TB SYMPTOM SCREENING TOOL

TB SYMPTOM SCREENING TOOL FOR ADULTS AND CHILDREN

health
Department:
Health
REPUBLIC OF SOUTH AFRICA

PATIENT DETAILS

Surname: _____ First Name: _____

Physical Address: _____ Age: _____

_____

Telephone Number: _____ Patient folder Number: _____

MEDICAL HISTORY

Close contact of a person with infectious TB:	Yes	No	Unknown	(Tick √)
Type of index patient:	DS-TB	Rif Resistant TB	MDR-TB or XDR-TB	
Diabetic:	Yes	No	Unknown	
HIV Status:	Positive	Negative	Unknown	

Other: (Specify) _____

TB SYMPTOM SCREEN

1. ADULTS

Symptoms (Tick √)	Yes	No
Cough of 2 weeks or more OR of any duration if HIV positive		
Persistent fever of more than two weeks		
Unexplained weight loss >1.5kg in a month		
Drenching night sweats		

2. CHILDREN

Symptoms (Tick √)	Yes	No
Cough of 2 weeks or more which is not improving on treatment		
Persistent fever of more than two weeks		
Documented weight loss/ failure to thrive (check Road to Health Card)		
Fatigue (less playful/ always tired)		

If "Yes" to one or more of these questions, consider TB. If the patient is coughing, collect sputum specimen and send it for Xpert testing. If the patient is not coughing but has the other symptoms, clinically assess the patient or refer for further investigation.

Date of last TB test: _____

Patient referred for assessment and investigation: Yes ☐ No ☐

Date of referral: _____ Facility name: _____

Name: _____ Date: ____/_____/_____

ANNEXURE 3: TB SYMPTOM SCREENING DAILY SUMMARY SHEET

health
Department:
Health
REPUBLIC OF SOUTH AFRICA

TB SYMPTOM SCREENING DAILY SUMMARY SHEET

District: _____ **Sub District:** _____ **Facility:** _____

Month:	Head Count			Number of people screened for TB symptoms					Number of people identified with TB symptoms		Number of people ≥ 5 yrs with TB symptoms whose sputum was collected
	Total	< 5yrs	≥ 5yrs	HIV positive	Diabetic	Contacts	Other	Total	< 5yrs	≥ 5yrs	
Total											

Compiled By:

Name: _____ Signature: _____ Date: _____

ANNEXURE 4: TB DETECTION MONTHLY SUMMARY SHEET

health
Department:
Health
REPUBLIC OF SOUTH AFRICA

SUMMARY FOR TB DETECTION

GW 2.0/13
2013

Page Number:

District: | Sub-District: | Facility:

Year: _____

		Head Count			Number of people screened for TB symptoms					Number of people identified with TB symptoms		Number of people ≥ 5 yrs with TB symptoms whose sputum was tested	Number of people ≥ 5 yrs with a positive test result		Number of people < 5 yrs with a positive test result for Rif susceptible TB			Number of people ≥ 5yrs with a positive test result for Rif resistant TB			Number of people started on TB treatment		Number of child contacts < 5yrs with a negative test result started on IPT	Number of specimens sent to lab for testing (Xpert and microscopy)	Number of results (Xpert and microscopy) received within 48hrs (2 days)
		Total	< 5yrs	≥ 5yrs	HIV positive	Diabetic	Contacts	Other	Total	< 5yrs	≥ 5yrs		Rif Susceptible TB	Rif resistant TB	Started on treatment	Died before starting treatment	Lost to follow-up	Started on treatment	Died before starting treatment	Lost to follow-up	< 5 yrs	≥ 5yrs			
Quarter 1	January																								
	February																								
	March																								
	Total	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o	p	q	r	s	t	u		v	w
	%		b/a x 100	c/a x 100	d/a x 100	e/a x 100	f/a x 100	g/a x 100	h/a x 100	i/a x 100	j/a x 100	k/a x 100	l/k x 100	m/k x 100	n/m x 100	o/m x 100	p/m x 100	q/m x 100	r/m x 100	s/m x 100				v/k x 100	w/k x 100
Quarter 2	April																								
	May																								
	June																								
	Total	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o	p	q	r	s	t	u		v	w
	%		b/a x 100	c/a x 100	d/a x 100	e/a x 100	f/a x 100	g/a x 100	h/a x 100	i/a x 100	j/a x 100	k/a x 100	l/k x 100	m/k x 100	n/m x 100	o/m x 100	p/m x 100	q/m x 100	r/m x 100	s/m x 100				v/k x 100	w/k x 100
Quarter 3	July																								
	August																								
	September																								
	Total	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o	p	q	r	s	t	u		v	w
	%		b/a x 100	c/a x 100	d/a x 100	e/a x 100	f/a x 100	g/a x 100	h/a x 100	i/a x 100	j/a x 100	k/a x 100	l/k x 100	m/k x 100	n/m x 100	o/m x 100	p/m x 100	q/m x 100	r/m x 100	s/m x 100				v/k x 100	w/k x 100
Quarter 4	October																								
	November																								
	December																								
	Total	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o	p	q	r	s	t	u		v	w
	%		b/a x 100	c/a x 100	d/a x 100	e/a x 100	f/a x 100	g/a x 100	h/a x 100	i/a x 100	j/a x 100	k/a x 100	l/k x 100	m/k x 100	n/m x 100	o/m x 100	p/m x 100	q/m x 100	r/m x 100	s/m x 100				v/k x 100	w/k x 100

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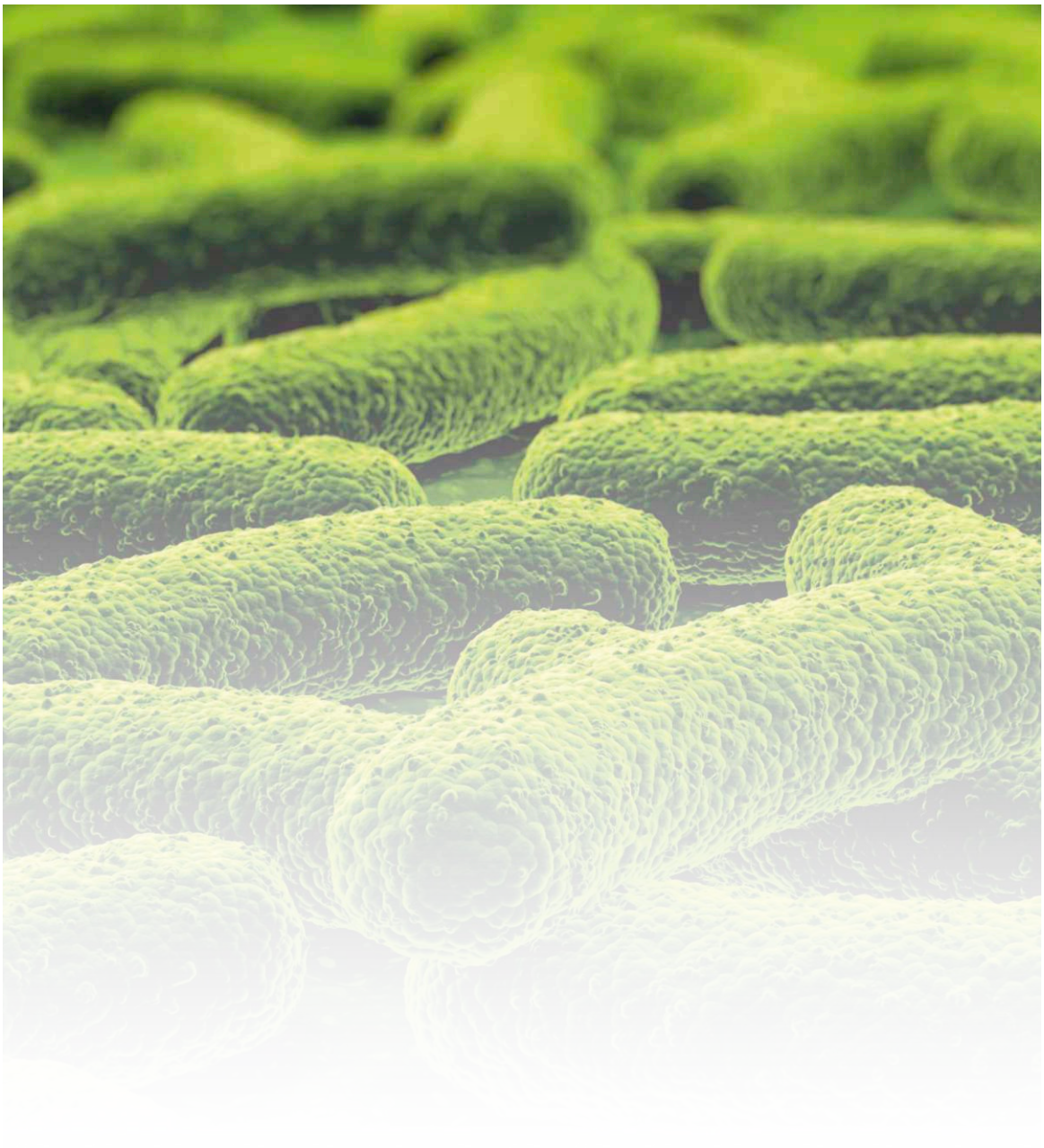

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