Guidelines for Diagnosis and Management of TB in children

2012

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Definitions

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

TB infection: occurs when a person carries the Mycobacterium tuberculosis bacteria inside the body. Many people have TB infection and are well. A positive tuberculin skin test (TST) suggests infection but a negative TST does not exclude the possibility of infection.

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

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

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

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

New case: is a patient who has never taken treatment for tuberculosis or has taken anti- tuberculosis drug for less than 4weeks in the past.

Relapse: is a patient declared cured or treatment completed in the past and now has a positive sputum smear.

Transferred in: is a patient who has been transferred from another TB register to continue treatment.

Transferred out: is a patient who is transferred to another district whilst still on treatment.

Treatment Failure: A patient who whilst on treatment is sputum smear positive 5 months or later during the course of treatment. Or smear negative patient found smear positive at completion of 2mths treatment.

Return after default: A patient who returns to treatment after an interruption of 4 wks or more and who had previously received treatment for 4wks or more.

Others: patients who do not fit in the above mentioned types such as patients known to have taken TB drugs for more than 4wks from outside the programme

Treatment completed: Patient who was registered as pulmonary smear positive, completed and has no sputum smear or had only one negative smear at or after 5mths. Or was registered as smear negative or extra pulmonary and received full course of treatment.

Defaulted: A patient who at any time after registration had not collected drugs for 4 or more consecutive weeks (1month)

Died: A patient who is reported to have died of any reason during the course of treatment (based on information gathered and recorded by a responsible health worker)

Abbreviations

ART	anti-retroviral therapy
CPT	cotrimoxazole preventive therapy
CXR	chest radiograph
DOT	directly observed therapy
EPTB	extra-pulmonary tuberculosis
E	ethambutol
H	isoniazid
HIV	human immunodeficiency virus
IGRA	interferon gamma release assay
IPT	isoniazid preventive therapy
LIP	lymphoid interstitial pneumonitis
MDR	multi-drug resistant
NTP	National Tuberculosis control Programme
PcP	Pneumocystis jirovecii pneumonia (PjP)
PTB	pulmonary tuberculosis
R	rifampicin
TB	tuberculosis
TBM	tuberculosis meningitis
TST	tuberculin skin test
Z	pyrazinamide

Acknowledgements

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Foreword

The need for a standardized guideline to direct comprehensive quality TB care for children in Ghana is long overdue. The document has been a unique collaboration between Clinicians from Academia, National TB programme and pediatricians, with support from WHO and TB childhood international working group.

The guidelines therefore, is informed by current updates on TB care in children, programmatic issues and need to have child TB care integrated into general services for a wider coverage for TB child care services.

I am expecting the document to be used widely by all health care practitioners making use of relevant chapters as reference points.

Health care training institutions would find this manual very useful.

Professor J.O.O. Commey
Consultant, Pediatrician
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Executive Summary

- All children with TB should have ethambutol included in their intensive phase of anti TB treatment

- All children with TBM and osteoarticular TB require at least 12 months of anti TB treatment with ethambutol in the intensive phase

- Steroids are indicated in cases of endobronchial TB, large pleural effusion, pericardial effusion and TBM. The duration of steroid use should not exceed a period of one month

- Where the benefit outweighs the risk the referral clinician or paediatrician may consider the use of streptomycin in the intensive phase under strict monitoring

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

- For TB exposed neonates, breastfeeding should be continued whilst mother is on anti TB treatment.

- Diagnosis of childhood TB will be made easier by introduction of improved diagnostic techniques such as GeneXpert and TST

Chapter One

Introduction

Tuberculosis (TB) is an important cause of illness and death in children, especially in sub-Saharan Africa with Ghana being no exception
Childhood TB is generally difficult to diagnose and usually under reported

The diagnosis of TB can be made in most children in an outpatient setting based on careful clinical assessment together with appropriate use of National Tuberculosis Management Guidelines

Contact history is a very important part of assessment for childhood TB diagnosis and prevention as well as BCG vaccination history from the parent or guardian. In the cases of children under five, the Child Health Record should be carefully examined for evidence of poor growth.

Any child with suspected or confirmed TB **SHOULD** be tested for HIV infection after counseling of parent/guardian and the HIV test results should be discussed.

Children with TB respond well to treatment and tolerate anti-TB treatment
Children (0-14 years) should be routinely registered and reported to the National Tuberculosis Control Programme (NTP) as per national guidelines.

****

These Paediatric TB guidelines are for:

1. Any Health worker who manages sick children at the primary, secondary and tertiary level health facilities
2. Persons involved in community TB care

They aim to improve:

1. Early and accurate case detection of children with TB
2. Management and outcome of children with TB
3. Management of co-morbidities
4. Child contact screening and management

They will focus on:

1. Diagnosis of common forms of TB in children
2. How to treat
3. When to refer
4. Management of children who are close contacts of TB cases

Epidemiology of TB in children

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

Overall case notification rate of TB (all forms) in Ghana in 2011 was 63/100,000 population.

Of the 15,849 reported cases only 876 were children under 15 years. This represents 5.5% of total notified cases. Reported figures show gross under reporting of TB cases in children.

A history of contact with a TB patient is a risk factor for TB infection. Risk factors for TB disease include young age, HIV-infection, malnutrition, recent measles infection and other immunosuppressive state.

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

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

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

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

BCG vaccination is given to reduce severe clinical forms of all childhood tuberculosis (miliary TB and TB meningitis). To achieve this all newborn babies are vaccinated at birth with BCG vaccine.

BCG is not fully protective against TB disease in children.

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

Clinical Diagnosis: PTB

The most common clinical presentation of pulmonary TB is persistent respiratory symptoms and poor weight gain. Note that in at-risk groups such as infants or HIV-infected, pulmonary TB can also present as acute pneumonia. The diagnosis revolves around clinical features, history of contact with sputum positive adult case, chest x-ray and tuberculin skin test. The approach to diagnosis of TB in HIV-infected children is similar to that for HIV-uninfected children.

Screening Tool

The screening tool (See Appendix 3, page 63) will improve case detection.

Typical symptoms

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

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

History of contact

- Close contact: such as a person with TB living in or outside the same household e.g. neighbor, relative, teacher, care giver with whom the child has had frequent contact
- A source case with sputum smear-positive PTB is more likely to infect contacts than cases with sputum smear-negative PTB
- If no source case is identified, always ask about anyone in household with chronic cough. If there is such a person, request assessment for possible TB
- Children usually develop TB within 2 years after exposure and most (90%) within the first year

Check weight, record weight and compare to previous weights

Clinical Examination

Weigh Child accurately

- Compare to previous weights using the Child Health Records
- Look for weight loss or poor weight gain
- Check for evidence of growth faltering

Nutritional Assessment

- Measure child's mid upper arm circumference (MUAC)
- Check for bilateral pitting oedema
- Assess appetite
- Assess breast feeding status
- Classify according to the table 1 below

Table 1: *Classification of nutritional status of children*

Group	Severe acute malnutrition (SAM)	Moderate acute malnutrition (MAM)	Normal
Children (6–59 months old)	-MUAC < 11.5 cm -Any grade of bilateral pitting Oedema	MUAC ≥ 11.5 to < 12.5 cm	MUAC ≥ 12.5 cm
Children (5–9 years old)	-MUAC < 13.5 cm -Any grade of bilateral pitting Oedema	MUAC ≥ 13.5 to < 14.5 cm	MUAC ≥ 14.5 cm
Children (10–14 years old)	-< 16.0 cm -Any grade of bilateral pitting Oedema	MUAC ≥ 16.0 to < 18.5 cm	MUAC ≥ 18.5 cm

- Check vital signs

- Look for fever and increased respiratory rate

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

- Look for other clinical features that might suggest other causes of chronic lung disease
  - Generalised lymphadenopathy, oral thrush, parotid enlargement which suggest HIV infection
  - Finger clubbing suggests Lymphocytic Interstitial Pneumonitis (LIP) or bronchiectasis. (Table 5; Page 39)
  - Recurrent cough and/or wheeze responsive to bronchodilators suggests asthma

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. Pneumocystis Pneumonia (PcP/ PjP)

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

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

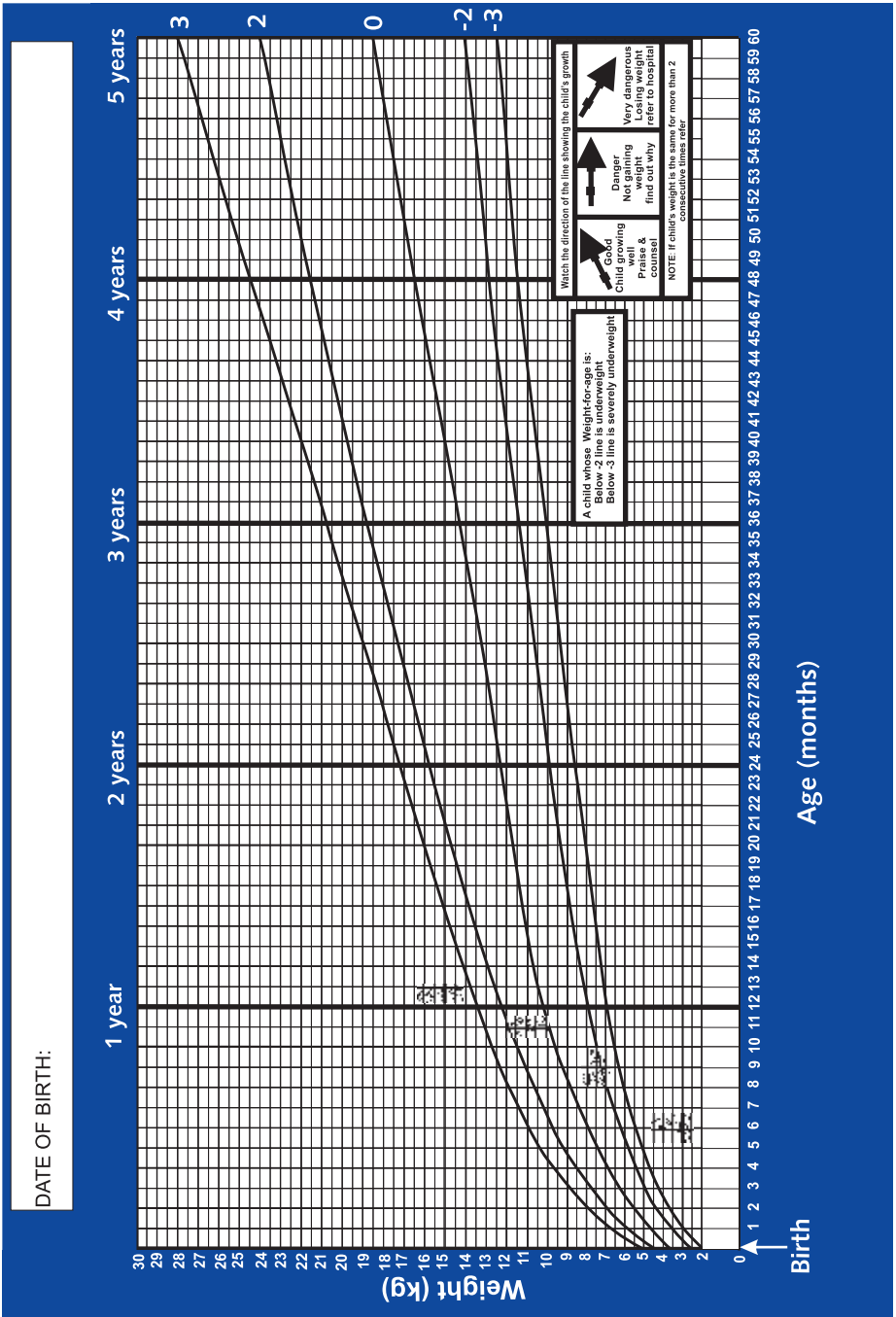
Examples of Chest X rays suggestive of TB in an HIV uninfected Child

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

Weight-for-age BOYS

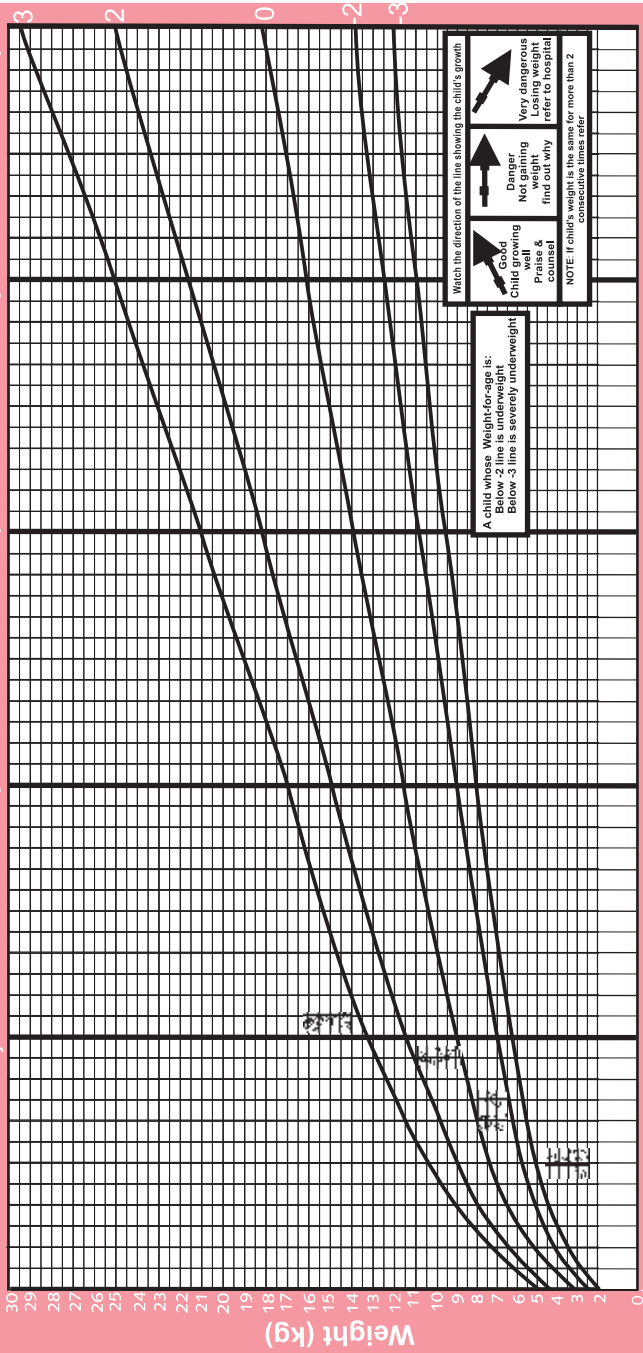
Birth to 5 years (z-scores)



Weight-for-age GIRLS

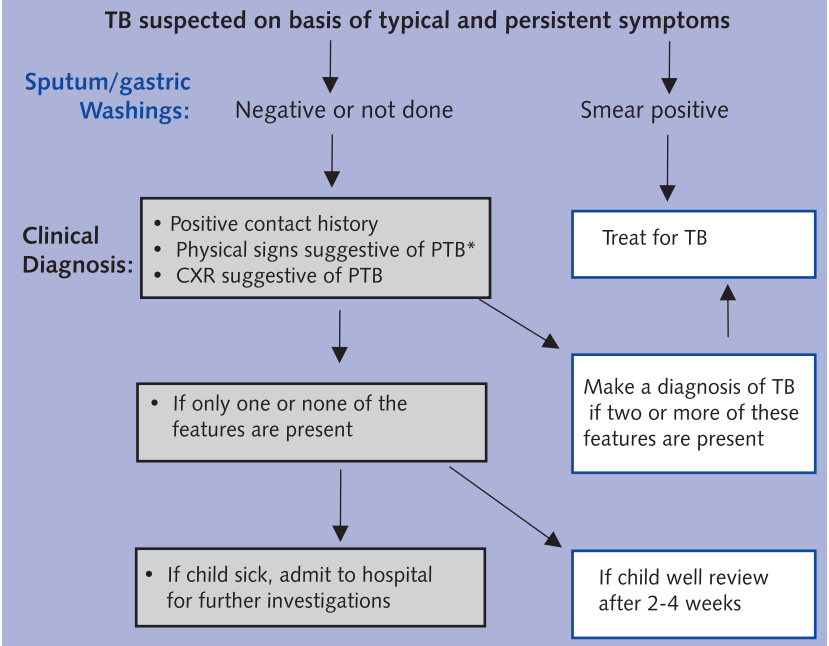
Birth to 5 years (z-scores)

DATE OF BIRTH:



Flow chart 1

Approach to TB diagnosis in HIV-uninfected Child



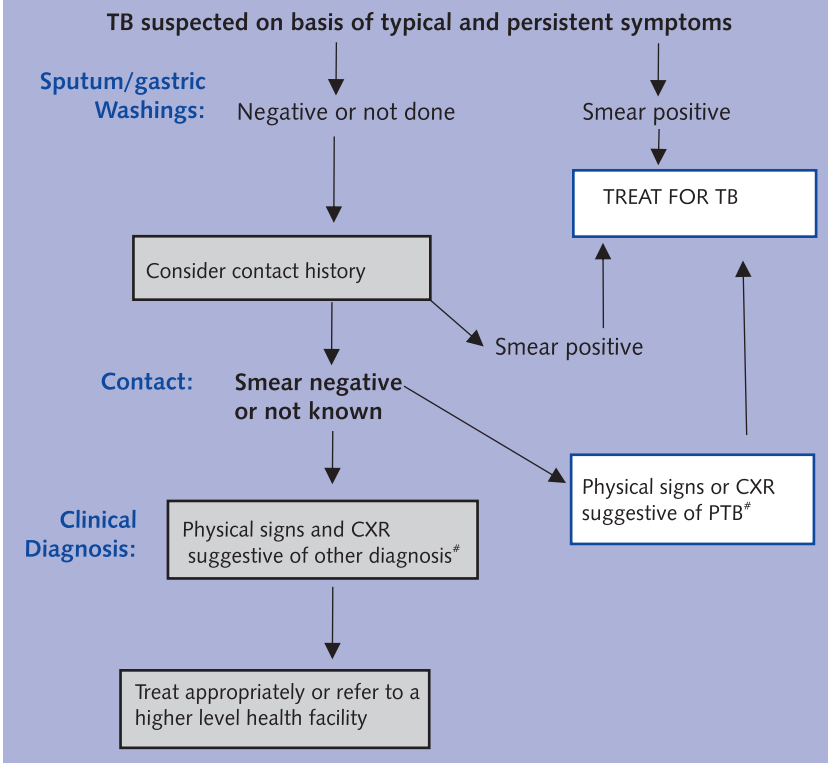
* The clinical signs suggestive of TB are listed on pages 13 -14

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

If the child is asymptomatic but has a positive contact history, refer to Appendix 1 (page 57)

Flow chart 2

Approach to TB diagnosis in HIV-infected Child



It can be difficult to clearly define what is "suggestive of PTB" on clinical or radiological findings in HIV-infected children because of clinical overlap between PTB and other forms of HIV-related lung disease:

CXR abnormalities of PTB in HIV-infected child are similar to those in HIV-uninfected child (See page 21)

Other Diseases Miliary TB

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

Bronchiectasis: focal opacification in right lower zone with thickening of bronchial walls and honeycomb appearance

Investigations

HIV test

- **Any child with suspected TB should have an HIV test**
- For children below 18 months early diagnosis using PCR is recommended
- A positive HIV test also directs the need for other HIV-related care for the child and possibly other family members

Sputum when available

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

Gastric aspirate or induced sputum

- Usually performed in children unable to provide sputum by coughing
- Perform acid fast bacilli (AFB) microscopy and mycobacterium culture if available (culture increases likelihood of identifying TB bacteria)
- Especially useful in child with diagnostic uncertainty or suspicion of multi drug resistant TB (MDR TB)

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 (see page 18)
  - Miliary mottling in lung tissue
  - Cavitation (tends to occur in older children)
  - Pleural or pericardial effusion – though seen on CXR – are forms of extra pulmonary TB that tend to occur in older children

- The finding of marked abnormality on CXR in a child with no signs of respiratory distress (no fast breathing or chest in-drawing) is supportive of TB

Tuberculin skin test (TST)

- 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
- A positive test can occur after recent BCG immunisation
- A negative test may occur in the presence of TB if there is HIV infection, malnutrition and severe disseminated TB
- Use is recommended in secondary or tertiary facilities

Caution

- A positive TST does not distinguish between TB infection and active disease
- A negative TST does not exclude TB disease

Interferon Gamma Release Assay (IGRA)

- These are expensive yet non-specific tests to identify antibodies to TB among exposed persons.
- IGRAs should not replace the TST in low-and middle-income countries for the diagnosis of latent TB infection in children, nor for the diagnostic work-up of children (irrespective of HIV status) suspected of active TB in these settings.

- IGRAs should nor replace the TST in low- and middle-income countries for the screening of latent TB infection in adult and pediatric contacts, or in outbreak investigations.
- IGRAs not TST should be used in low- and middle-income countries for the identification of individuals at risk of developing active TB.

For more information on WHO's latest policy statement concerning IGRAs please review the following statement:

http://www.who.int/tb/features_archive/policy_statement_igra_oc2011.pdfd

GeneXpert

- Is useful for diagnosing *Mycobacterium Tuberculosis* and Rifampicin resistant bacilli
- Recommended for use in tertiary institutions or reference laboratories

Clinical Diagnosis: EPTB

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

Clinical assessment in all cases should consider:

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

Table 2. *Clinical presentation and diagnosis of EPTB*

Site of EPTB	Typical clinical presentation	Investigation	Comments
TB Adenitis	Asymmetrical, painless non-tender lymph node enlargement for more than one month +/- discharging sinus Most commonly in neck area	Fine needle aspiration when possible for culture and histology TST usually positive- not necessary for diagnosis	Treat If axillary node enlargement on same side as BCG, consider BCG disease and refer
Pleural TB	Dullness on percussion and reduced breath sounds +/- chest pain	CXR Pleural tap#	Treat If pus in pleural tap, consider empyema and refer
Usually young (<5years) with disseminated disease and severely ill			
TB meningitis	Headache, irritability/ abnormal behavior, vomiting (without diarrhoea),lethargic/ reduced level of consciousness, convulsions, neck stiffness, bulging fontanelle, cranial nerve palsies	Lumbar puncture obtain CSF# CXR	Hospitalize for TB treatment*
Miliary TB	Non-specific, lethargic, fever,	CXR	Treat and refer*

Site of EPTB	Typical clinical presentation	Investigation	Comments
Usually 5 years and older			
Abdominal TB	Abdominal swelling with ascites or abdominal masses	Ascitic tap#	Refer *
Spinal TB	Deformity of spine May have lower limb weakness/paralysis/ unable to walk	Xray spine	Refer*
Pericardial TB	Cardiac failure Distant heart sounds Apex beat difficult to palpate	CXR Cardiac ultrasound Pericardial tap#	Refer*
TB bone and joint	Swelling end of long bone with limitation of movement Unilateral effusion of usually knee or hip	Xray bone/joint Joint tap#	Refer*

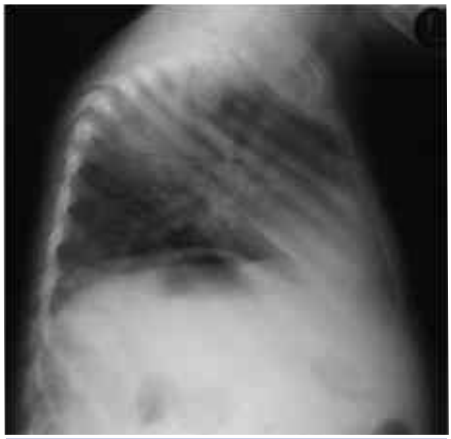
typical findings- straw coloured fluid, exudate with high protein, white blood cells predominantly lymphocytes on microscopy. Sample can be analyzed for AFB and/ or cultured.

* Referral to a higher level for further 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.

Examples of TB Radiological Images

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

Miliary TB: typical bilateral diffuse micronodular pattern. Note differences to LIP X-ray on page 18



Spinal TB: collapse of thoracic vertebra causing angulation

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

TB Treatment

Some important rules

- Treatment regimens for new patients are listed in Table 3 (Page 29)
- Drug dosages are calculated according to weight and are listed in Table 4 (page 30)
- All HIV-infected children require four drugs in the intensive phase of treatment
- HIV-infected children should not be treated with intermittent (three times or twice weekly) regimens including during the continuation phase
- Register all children receiving anti-TB treatment in the institutional TB Register
- Record patient grouping, treatment regimen and date of commencement in Child Health Records, TB treatment card and health unit TB register
- Record weight at each visit in Child Health Records and TB treatment card
- Children gain weight while receiving anti-TB treatment and dosages should be adjusted accordingly
- Children with poor weight gain will need nutritional rehabilitation
- Weight is important for monitoring of treatment response
- Once treatment starts it must be completed; "trial of TB treatment" should not be used as a diagnostic tool
- A caregiver should be identified as the DOT provider for all ages including older children
- Adherence to the full course of treatment should be emphasized and reinforced
- TB drugs are very well tolerated in almost all children. Adverse events (side effects) are unusual and the most important is hepatotoxicity
- Ethambutol can be safely used in all ages of children at recommended dosages

Table 3 *Recommended treatment for all children with TB regardless of immune status*

TB disease category	Recommended regimen	
	Intensive phase	Continuation phase
PTB	2HRZE	4HR***
EPTB (except TB meningitis and osteoarticular TB)**	2HRZE	4HR***
#TBM** and osteoarticular TB	2HRZE	10HR***
Retreatment	3HRZE + 2S	10HRE***

Figure 1: *Child with TB of the spine*

\# Where the benefit outweighs the risk the referral clinician or paediatrician in a tertiary facility may consider the use of streptomycin in the intensive phase under strict monitoring in the dose of (20-40mg/ kg).

** Indications for steroid use in childhood TB include endobronchial TB, large pleural effusion, pericardial effusion and TBM. The duration of steroid use should not exceed a period of one month.

*** The physician may extend the duration of treatment in HIV infected children depending on the clinical response.

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

Table 4. Recommended dosages according to weight (WHO, 2010)

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

Table 5. Treatment of new cases who interrupted treatment

Treatment phase	Length of interruption	Clinical features	Treatment
Intensive < 1 month	< 2 weeks	-	- Intensify adherence and monitoring
		-	- Continue on same regimen
	>2 weeks		- Intensify adherence and monitoring - Restart same regimen
Intensive >1month	4-8 weeks	Asymptomatic	- Address adherence issues - Continue on same regimen
		Symptomatic	- Address adherence issues - Restart treatment under strict DOTS
Continuation	>8weeks	Asymptomatic	- Address adherence issues - Continue on same regimen
		Symptomatic	- Address adherence issues - Re-exam and investigate to rule out co-morbid conditions - If likely to be TB refer TB referral clinician/Tertiary facility

MDR-TB

MDR- TB management must be initiated in a tertiary facility and managed by appropriate specialists.

MDR- TB in children is usually a primary disease from an adult contact. Efforts must be made to trace the primary source and other exposed contacts. Choice of second line drugs must be based on Drug sensitivity testing (DST) using the recommended national MDR guidelines (Refer- Guidelines for the management for MDR- TB in Ghana).

Additional management decisions

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

- For all HIV-infected and exposed children
  - Start co-trimoxazole preventive therapy (CPT) from age 6 weeks
  - Start antiretroviral therapy (ART) in the HIV-infected child as per current national guidelines
  - Conduct family-based care/screening

- Referral should be considered if
  - Diagnosis is uncertain
  - HIV-related care is necessary e.g. to commence ART
  - There is failure to respond to treatment despite good adherence to anti-TB treatment

- Nutritional support should be provided for malnourished children
  - Using hospital /community based nutritional programmes
  - Where available, the Enablers' package should be accessed to support caregivers to provide appropriate nutrition

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

- Pyridoxine is recommended for all children on TB treatment, especially in severely malnourished, HIV-infected and children with peripheral neuropathy (Dose:25mg daily)

Follow up by the Clinician

- HIV-uninfected: monthly during intensive phase and 2-monthly on continuation phase
- HIV-infected: review at 2 weeks and 4 weeks following commencement of anti-TB treatment and then monthly thereafter
- This is a critical part of effective TB treatment requiring a clear management plan. There is an example of a TB treatment card (Appendix 2, Page 60) that could be copied and provided.

Important practice points

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

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

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

Treatment failure

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

On assessment after 1-2 months on treatment, consider treatment failure if child is taking anti-TB treatment and there is:

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

Poor adherence is a common cause of "treatment failure".
If a child stops anti-TB treatment for less than 2 weeks in the intensive phase and less than 2 months in the continuation phase and becomes symptomatic, then restart first-line anti-TB therapy (refer Table 5, page 30)

Treatment failure is more common in HIV-infected children.

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

Refer children with treatment failure for further assessment

Child contact screening and management

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

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

Important questions for any person commenced on anti-TB treatment

i. Is the case smear positive?

ii. How many children in the household?

iii. What are the ages of the children?

iv. Is the child contact sick or well?

v. What is the relationship of the source case to the children?

vi. Is there anyone else in the household who is coughing?

Refer to Appendix 1 (page 57) for a recommended approach to assessment of the child contact.

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

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

For neonates with mothers who are sputum positive, BCG should not be given till mother has sputum converted negative and child has tested negative for TST. If TST is positive child should continue prophylaxis for 6 months otherwise give full course of treatment. Breastfeeding should be continued whilst mother is on treatment.

IPT must be given for a full 6 months to be effective. Dosage: 10mg/kg

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

If source case is MDR TB, refer the children for contact management advice promptly and adhere to treatment until it is completed (Refer-Guidelines for the management for MDR- TB in Ghana)

TB Infection Control in Health Facilities

Ventilation (Refer SOPs for TB infection control)

- Good ventilation in waiting areas and consulting rooms of a health facility can reduce the spread of TB and other airborne infections.
- Good ventilation uses open doors, windows, skylights and exhaust fans to dilute and exchange room air with fresh air, thereby reducing the concentration of particles remaining in room air, such as those containing tubercle bacilli
- The minimum acceptable ventilation involves openings on opposite ends of a room (window – window, window – door)

To increase ventilation and decrease the risk of TB transmission in your facility:

- Check that all windows and doors can be opened and are easy to keep open
- Check that doors allow some airflow, even when closed
- Check that all exhaust fans and air-conditioners are in good working order and clean
- Place fans in windows to blow room air to the outdoors
- Keep doors, windows and skylights open as much as possible (while still respecting privacy)

TB clients

- The most infectious TB cases are people with smear-positive pulmonary TB who have not yet been detected or who have been on anti-TB treatment for less than 2 weeks. Since any TB suspect may be infectious, attend to every TB suspect quickly.
- Identify coughers quickly and ask them to wait near an open window or in a comfortable area separate from the general waiting room (outdoors when possible).
- Send the TB suspect outdoors to collect a sputum sample in the open air if possible, away from other people.

- Do not stand in front of the TB suspect when he or she is coughing to produce sputum (or anytime).
- Educate TB suspects, TB patients and their families about the need to cover their mouths and noses when coughing or sneezing, to prevent transmission of TB as well as colds, influenza and other respiratory infections (cough etiquette)

Care of needles

- Take precautions to reduce the spread of HIV or other blood-borne pathogens in needles.
- Follow recommended procedures for sterile injections and to prevent needle-stick injuries.
- Use a safetybox (or sharps container) for safe disposal of all medical sharps waste.

To reduce your own risk:

- Always follow recommended infection control procedures in your work at the health facility.
- If you have risk factors for TB disease such as smoking, malnutrition, diabetes or alcohol dependency, decrease your risk factors for TB disease to the extent possible such as stopping smoking or following treatment for diabetes to increase your immune function
- Know your HIV status; get retested periodically. If you are HIV-infected, you may decrease your risk of developing TB by taking CPT, ART and IPT if appropriate
- Get a BCG immunization if you have not had one.
- Stay alert for possible signs and symptoms of TB in yourself. If one or more of these develop, report promptly for assessment and care.
- If you are diagnosed with TB, start treatment

Chapter Six

The child with TB and HIV

- A comprehensive approach to management of both TB and HIV is critical.
- HIV test is indicated in all children with suspected and confirmed TB
- Approach to diagnosis of TB is similar to that of HIV-uninfected children
- All children with TB/HIV should receive CPT and ART
- Nutritional support is often needed for children with TB/HIV
- All HIV-infected children need to be screened for TB disease.
- The management of children with TB/HIV should be integrated and all family members are counseled and tested for HIV and screened for TB
- The specific needs of each family need to be determined and a plan of action developed to ensure that the family receives comprehensive care using all available services

The diagnosis of PTB can be particularly challenging in HIV-infected patients because of clinical overlap with other HIV related lung disease

Table 6. *Clinical features of HIV related lung diseases*

Cause	Clinical features
Recurrent pneumonia	Recurrent episodes of cough, fever and fast breathing that usually respond to antibiotics
LIP	Unusual before one year of age Associated with generalized symmetrical lymphadenopathy, clubbing and parotid enlargement Nutritional status variable CXR: diffuse reticulonodular and bilateral perihilar adenopathy. No compression of airways
Tuberculosis	Persistent respiratory symptoms not responding. Often poor nutritional status; positive TB contact especially in younger children CXR: focal abnormalities and perihilar adenopathy
Bronchiectasis	Cough productive of purulent sputum, clubbing CXR: honeycombing usually of lower lobes Complicates recurrent bacterial pneumonia, LIP or TB
PcP/ PjP	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

***Table** 7. Clinical and radiological features that differentiate causes of chronic lung diseasein HIV-infected children*

Feature	PTB	Bronchiectasis	LIP	Miliary TB
Clinical				
Respiratory symptoms	Common	Common	Common	Uncommon
Persistent fever	Common	Common	Common	Common
Wasting	Common	Common	Variable	Common
Generalized lymphadenopathy	Uncommon	Uncommon	Common	Uncommon
Parotid enlargement	Rare	Rare	Common	Rare
Clubbing	Uncommon	Common	Common	Rare
Chest X-ray				
Focal parenchymal	Common	Common	Uncommon	Uncommon
Diffuse micronodular	Negative	Negative	Uncommon	Common
Diffuse reticular	Negative	Negative	Common	Negative
Lymphadenopathy	Common	Variable	Common	Uncommon

Note that co-morbidities are common in HIV-infected children

Integrated care

An important step to improving the prevention and management of TB in children is the provision of integrated care. Children with TB do not present and are not managed within the context of specific TB care services but rather in the general child health services, or in HIV care services. Therefore, for implementation of childhood TB activities and training, appropriate target audiences would include:

- NTP staff that are not necessarily clinically trained in child health but need to manage or address childhood TB activities as part of their NTP duties, for example registration of cases, training, data management, drug procurement and distribution, monitoring and evaluation.

- Health workers at secondary and primary level facilities that provide care for sick children

- Health workers involved in the management of adult TB cases in the community

- Health workers that are involved in the management of mothers and children with HIV

Issues peculiar to childhood TB, should be integrated into ongoing NTP training and updates, as a means to ensure efficient integration of childhood TB services rather than being addressed in a separate training forum as overlaps exist in TB and TB/HIV management among children, adolescents or adults. Very few differences exist in diagnostic approach, treatment dosages and treatment availability, or with child contact screening and management.

Management of TB in pregnancy

TB is often undiagnosed in the mother prior to TB being suspected or confirmed in the neonate. The presenting symptoms of TB are similar in pregnancy as compared to non-pregnant women with the commonest form of TB being pulmonary TB. Disseminated TB occurs in 5-10% of pregnant woman suffering from TB, and this is a particular risk for congenital TB.

All pregnant women with HIV should be screened for symptoms of TB and in the same way pregnant woman with suspected TB should be tested for HIV. If TB is diagnosed, therapy must be commenced promptly to prevent transmission and improve outcome. The treatment of TB in pregnant women is similar to that for non-pregnant women. HIV-infected pregnant women with TB are treated with ART according to WHO guidelines. TB/HIV co-infection is an indication for commencing ART. The optimal time to give ART will depend on the CD4 cell count, tolerance of TB treatment and other clinical factors. Interventions to prevent mother-to-child transmission of HIV should be commenced as per national guidelines.

Management of the newborn of a mother with TB

Pregnancy is associated with an increased risk of developing TB disease in previously infected women, particularly in the last trimester or in the early post-natal period. The burden of maternal TB and TB in pregnant women has increased substantially since the onset of the HIV epidemic. Around 2% of HIV-infected pregnant mothers are diagnosed with TB, and TB is a major cause of maternal mortality in TB/HIV endemic settings. The increased risks for the newborn of mothers with TB and TB/HIV include:

- Infection and disease with TB
- Mother-to-child transmission of HIV
- Preterm delivery and low birth weight
- Peri-natal and infant mortality
- Being orphaned

Neonatal TB

Congenital TB is when the neonate acquires TB in-utero through haematogenous spread via the umbilical vessels, or at the time of delivery through aspiration or ingestion of infected amniotic fluid or cervico-vaginal secretions. Congenital TB usually presents in the first week of life and mortality for congenital TB is high.

Neonatal TB is when the newborn is infected after birth by being exposed to an infectious case of TB, which is usually the mother or may be another close contact. It is often difficult to distinguish between congenital and neonatal TB and management is the same for both. Both forms will be referred to as neonatal TB. The TB-exposed neonate may be asymptomatic or symptomatic. Breast-feeding does not transmit TB.

Symptoms of TB in the neonate are usually non-specific and include lethargy, poor feeding, low birth weight and poor weight gain. The clinical signs are also non-specific and can include respiratory distress, non-resolving pneumonia, hepatosplenomegaly, lymphadenopathy, abdominal distension with ascites, or a clinical picture of "neonatal sepsis" with disseminated tuberculosis. The diagnosis of TB should be included in the differential diagnosis of chronic neonatal infection with a poor response to antimicrobial therapy, congenital infections and atypical pneumonia. The most important clue to the diagnosis of TB in the newborn is a maternal history of TB or HIV infection. Critical points in the maternal history include non-resolving pneumonia, contact with an index case of TB and recent commencement of treatment for TB.

Management of the asymptomatic neonate exposed to maternal TB

TB disease should be excluded in a neonate born to a mother with suspected or confirmed TB. Maternal infectiousness and drug susceptibility should be determined.

- The neonate should not be separated from mother if she does not have MDR-TB
- Mother should not stop breast-feeding
- BCG should not be given to neonates exposed to TB while screening for TB disease or latent TB infection as it interferes with interpretation of TST reducing its effectiveness for diagnosis
- BCG should not be given if the newborn or infant is confirmed to be HIV-infected

Asymptomatic neonates born of mothers with infectious drug-susceptible (confirmed or suspected) TB should receive isoniazid (10mg/kg) for 6 months once TB disease has been excluded. The infant should be regularly followed up to ensure TB disease does not develop.

At the end of 6 months, if the infant remains asymptomatic, treatment with INH is stopped and a TST performed. BCG is given after 2 weeks if the TST remains negative and the baby is HIV-uninfected.

If the mother is non-infectious, the infant should be screened for TB. If there is no evidence of TB infection, then the infant should be regularly followed up to ensure that TB disease does not develop.

If the diagnosis of TB is confirmed or the infant develops clinical signs suggestive of TB, treatment should be started under specialist care. BCG is given 2 weeks after completing therapy if the infant is HIV-uninfected.

BCG is not given if HIV-infected.

Neonates born to mothers with MDR or XDR-TB should be referred to a local expert in the management of this complicated problem. Infection control measures are required to reduce likelihood of transmission from mother to child such as wearing mask.

Management of the neonate with TB disease

The treatment of congenital or neonatal TB is the same, and should be done by a clinician experienced in the management of paediatric TB. A complete investigation of mother and neonate should be undertaken. CXR and specimens from appropriate sites should be collected to confirm the diagnosis of TB in the neonate. TB treatment should be commenced on suspicion while awaiting bacteriological confirmation as TB progresses rapidly in the neonate. Treatment dosage will need to take account of weight and weight gain, which can be rapid in infants.

A favourable response to therapy is indicated by increased appetite, weight gain and radiological resolution. Breast-feeding is recommended irrespective of the TB status of the mother. The risk of transmission of TB through breast milk is negligible and although anti-TB drugs are excreted into breast milk in small amounts, there is no evidence that they induce drug resistance. Separation from the mother is not an option especially in the resource-limited setting where establishment of breast-feeding can be critical for child survival.

Integration of maternal, neonatal and child health services

Integration of maternal, neonatal and child health services for TB and TB/HIV should be prioritized through the following activities:

- Include tuberculosis prevention, diagnosis and treatment as core component of the integrated management of pregnancy and child health
- Tuberculosis prevention, diagnosis and treatment should be included in all stages of pregnancy, neonatal, postpartum and postnatal care

- Include a symptom-based screening algorithm to identify eligible pregnant women living with HIV for IPT
- Pregnant women living with HIV should be screened regularly using the algorithm at each of their encounters with health workers and based on the outcome of the screening should either be provided IPT or further investigated for TB
- Facilitate the implementation of the integrated patient monitoring system of HIV (pre-ART and ART), PMTCT and TB care recommended by national guidelines.
- Integrated management of childhood illnesses services strengthen the inclusion of TB prevention, diagnosis and treatment in integrated management of childhood illnesses for children less than 5 years old.

Patient and family support for children with TB

When a child is diagnosed with TB, the child should also be tested for HIV if not yet known. In many settings, the diagnosis of TB and/or of HIV can cause stigma and discrimination. The family unit bears the impact of the attendant stigma and discrimination, as well as the burden of caring for children with TB or TB/HIV during physical illness and death. The model of family-centred care, an approach that focuses on the continuum of care for the whole family rather than the individual, requires a multidisciplinary approach to address all the needs of the family.

Basic principles in continuum of care include:

- Integration of care with prevention for the provision of a comprehensive, holistic system of TB and TB/HIV management
- Provision of non-discriminatory/judgmental care and prevention
- Maintaining confidentiality and respect for basic rights
- Provision of clinical and nursing care to alleviate symptoms of TB and HIV and prevention of opportunistic infections

- Provision of counseling and psychosocial support services.
- Provision of support for home care
- Community mobilization of resources for cost-effective comprehensive and holistic care.
- Provision of education, supervision and support for staff

The child as the "index" case of TB or HIV

When a child is diagnosed with TB, it is common to find others in the family with TB that may also need further assessment. When a child is diagnosed as HIV-infected, it is almost certain that the mother is also HIV-infected, probably the father and possibly other siblings as well. Assessment for TB (and HIV) should be recommended to parents and siblings of children with TB (and TB/HIV).

Support for the family

The health care worker needs to determine what care can be expected from family members and what care must be obtained from other sources. To determine this they need to ascertain the following information:

- What the family knows about TB
- Has the family acknowledged that the child has TB (and HIV)
- What is the parents' state of health and their psychological condition
- Are they capable of providing physical care for the child
- All individuals who can offer support to this family and their age and health status.
- Are identified individuals willing and able to help care for the child.
- Social services available to the family in their community.

In practical terms, support for a family with a child with TB should include:

- Psychological support to family members receiving the test results that their child has TB disease. This must allow time for the family to ask any questions they may have regarding the diagnosis and management

- Support in assisting the family in understanding about their child's TB through appropriate information and educational materials about the treatment, including:
  - the actual treatment for TB that the child will receive
  - the frequency and duration of treatment
  - what health services are available for TB (and HIV) treatment
  - what is required from the family in relation to on-going care
  - planning a schedule of clinical monitoring
  - simple infection control measures at home
  - plans to return to school

- Support to help address issues for older children and adolescents with TB and TB/HIV

- Referral for screening for TB of other family members, especially siblings, and other close contacts

- Provision of IPT as indicated

- Referral for CPT and ART as indicated

- Counselling on nutritional needs of infant or young child and other affected family members

- Make referrals and appointments to the identified services before the family leaves the facility

Community support

TB care in Ghana is delivered through community-based care with support from community-based actors and partners. Hospital based care is only indicated for very ill patients to manage TB and other co-morbidities. Community-based TB care allows the following:

- All family members requiring care for TB can receive them at the same time and place

- Saving of both time and money when care is provided closer to home
- Continuity of care between the patient's home, community, and local CHPS compound
- It increases support from the community which may lead to better adherence to treatment and can be instrumental in overcoming barriers to long-term care

It is also important to involve local schools to assist them through education of teachers and other staff at school to the needs of children with TB/HIV and why they need frequent visits to the clinics and the importance of taking drugs regularly. This may aid in reducing stigma in schools.

Infection control

TB infection control is important because of the association of TB with HIV and the emergence of MDR-TB and XDR-TB. Infection control measures should therefore be delivered as part of a patient-centred approach. The community has a right to safe health care and to be able to attend a clinic or hospital without fear of contracting TB. Also, health workers have a right to a safe working environment.

Awareness-raising activities in the community garner social support for decreasing TB transmission in the community. Such activities also help to increase sustainable behaviour and social change, and to minimize the stigma inherently associated with identifying potentially infectious individuals and placing them in safe, separate environments. Communities also have an important role and responsibility in preventing TB transmission in congregate settings and households. All these measures create a supportive environment for detection of new cases and provision of care.

Table 8: Actions for effective TB infection control safety without stigma

1.	Include Patients and Community in Advocacy Campaigns
2.	Develop an Infection Control Plan
3.	Ensure Safe Sputum Collection
4.	Promote Cough Etiquette and Cough Hygiene
5.	Triage TB suspects for "fast-track" or separation
6.	Assure Rapid Diagnosis and Initiation of Treatment
7.	Improve Room Air Ventilation
8.	Protect Health Care Workers
9.	Capacity Building
10	Monitor infection control practices

TB infection control guidelines

Guidelines for prevention of TB transmission in a variety of settings exists in Ghana as well as guidance on how to prioritize TB infection control measures at all levels – healthcare facilities, congregate settings and households.

Many risk factors are responsible for the nosocomial spread of TB: poverty; stigmatisation; poor adherence to TB treatment; weak healthcare systems; high patient loads resulting in long waiting times, crowded wards and outpatient clinics; slow scale up of ART and IPT services; poor ventilation due to inappropriate design of facilities; shortage of human resources; and inadequate education of staff by NTPs and inadequate understanding by patients.

In TB endemic settings, in addition to the risk of living in a household with an infectious case of TB, there is a risk of TB transmission to children that attend health facilities. The risk of developing TB following infection is particularly high for infants and young children or HIV-infected children of

any age that accompany their parents or guardians attending health facilities. The risk of exposure is particularly high in facilities that care for adults with TB and/or HIV. TB is the commonest opportunistic infection in HIV-infected adults of the child-bearing/parenting age-group.

Children with TB are often not considered to be infectious and therefore not likely to transmit TB. However, some children do transmit TB and infection control is therefore important even in health facilities or areas dedicated only to the management of sick children. The clinical presentation of TB in children is variable and often overlaps with the presentation of pneumonia, HIV and malnutrition so that infection control measures are relevant to all outpatient and inpatient areas where sick children are seen.

Particular areas of concern are:

- Newborn care settings. There are many documented outbreaks of TB among neonates with the source usually being a mother or a member of staff infecting many babies in the neonatal care unit. Neonates are a particularly vulnerable group for development of acute onset or disseminated severe disease.

- Health facilities that provide care for older children and adolescents with TB as they are often infectious.

- HIV clinics.

- Facilities that care for children with severe malnutrition.

School-aged children with TB should be kept from attending school until it is considered that there is a very low risk of transmission.

Chapter Eight

NTP Management Issues

Most of the issues that relate to an effective NTP providing a high quality service for TB control relate to children as well as adults.

Early case detection and effective management of TB cases in the community will reduce the burden of TB in children. It is important that NTP include childhood TB in funding and resource allocation, in policy guidelines/protocols and training opportunities in NTP.

NTP should have a focal person for childhood TB and a childhood TB working group for monitoring and evaluation of childhood TB-related issues.

Registration and reporting

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

Childhood TB should be reported on in the same way as adults with respect to age, site of TB, gender, patient grouping, HIV status, outcome

Major differences to management of adults

- Most childhood TB cases not confirmed bacteriologically and are usually smear-negative
- TST is an important tool for child TB diagnosis and should be made widely available in diagnostic facilities
- Drug dosages need to be in mg/kg (Table 4, page 30) Drug dosages may need to be adjusted with weight gain
- Children tolerate TB drugs very well

Treatment outcome

It is very important that treatment outcomes are reported by NTP for all children that receive TB treatment as per standard guidelines

i. Cure (for smear positive)
ii. Treatment completion
iii. Transfer out
iv. Default
v. Death

Engage all care providers

As part of the overall TB control activities, the NTP needs to coordinate and engage all relevant care providers to ensure adequate service provision through dissemination and implementation of International Standards of TB Care. Regular in-service training on childhood TB should be organized for all health workers especially those at the DOTS centres. Public-Private Partnership, including community and faith-based organizations, is critical to intensify case finding and support adherence.

Capacity Building

Management of childhood TB should be improved by training paediatricians and medical officers in the districts. Medical staff should be trained in administration and interpretation of TST. Laboratory technicians must have regular in-service training in sputum examination. Additional training for radiologists and radiographers in paediatric diagnostic imaging should be emphasized.

Monitoring and Evaluation

Coordination and Information flow between district and region should be strengthened preferably through ICT.

Quarterly report forms (TB 07) should capture information on children who default, relapse or have treatment failure.

All logistics as pertains to management of the child with TB e.g. paediatric patient TB kit must be available at all times in every health facility.

Patient care and support

All malnourished children should have nutritional support

The Child Health Record is an essential tool in the monitoring of children under 5 years old on TB treatment and must be inspected at each visit. It is useful for dietary counseling.

Treatment of childhood TB should be monitored using TB01P.

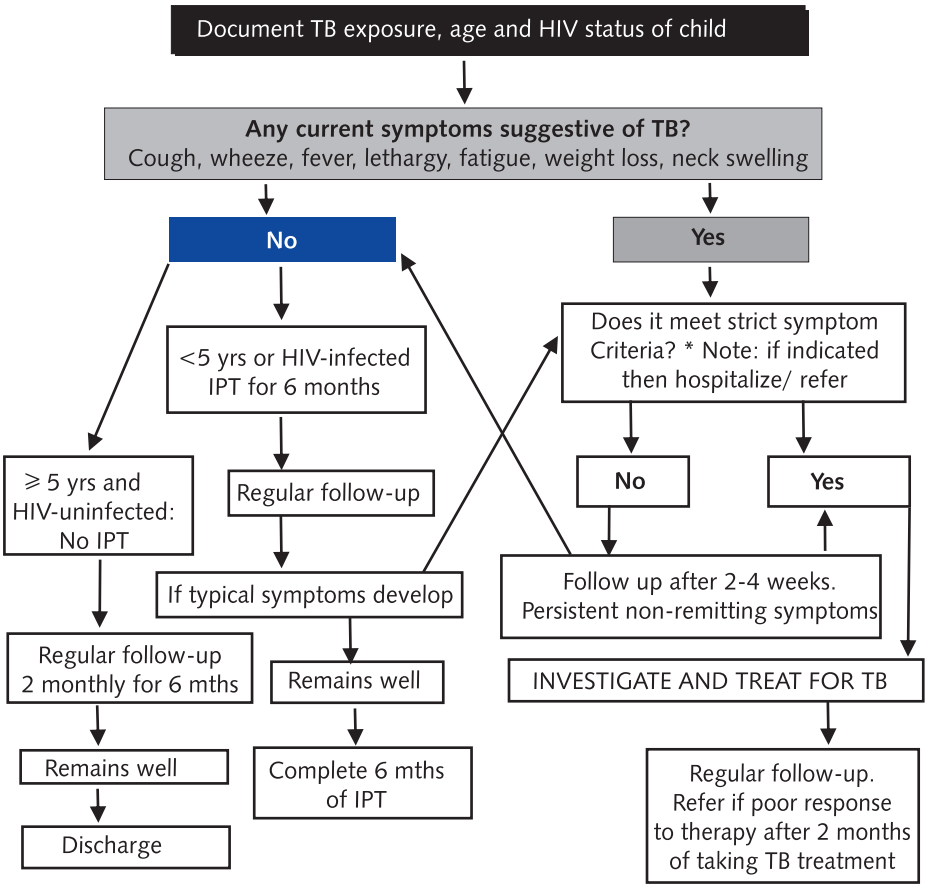
Adolescent peer support groups should be encouraged especially in the setting of HIV co-infection.

All children should be given appropriate support when necessary to ensure adherence for successful completion of treatment.

Appendices

Wall Charts

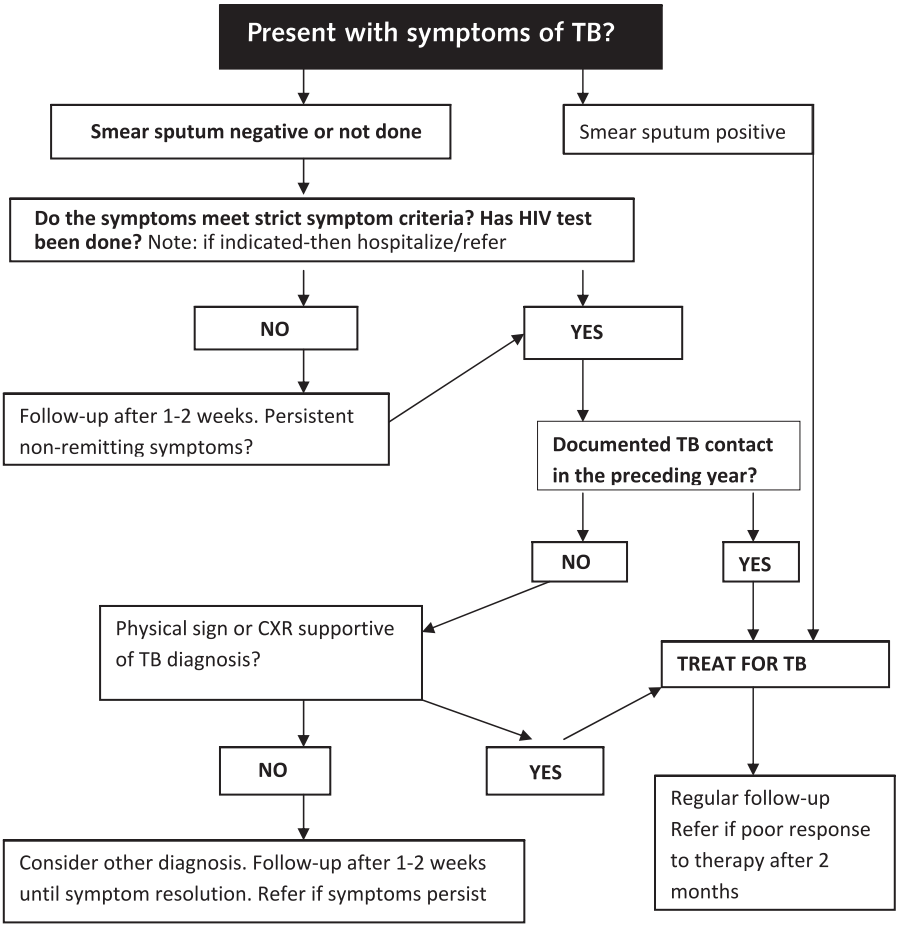
A. GUIDANCE for the screening of children in close contact** with an adolescent or adult with newly diagnosed pulmonary TB



* Strict-Symptom Criteria defined on page 59

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

B. GUIDANCE for the diagnosis of children who present with symptoms suggestive of TB



* Strict -Symptom Criteria defined on page 59

C. Strict Symptom Criteria

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

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

D. Indications Requiring Hospitalization/referral

- Severe forms of PTB and EPTB for further investigation and initial management
- Severe malnutrition for nutritional rehabilitation
- Signs of severe pneumonia (i.e. chest in-drawing) or respiratory distress
- Other co-morbidities e.g. severe anaemia
- Referral should also be considered if:
  - the diagnosis is uncertain requiring further investigation at referral level
  - HIV-related care is necessary e.g. to commence ART

Disease			Diagnosis							HIV Care			
Type of Patient		Disease Classification	Test Date	Sputum Smear	Gastric Lavage	Lymph node Biopsy	Aspirate	Abdominal USG	Other	Counselling & Testing		Treatment	
New	Relapse	Pulmonary								Date		HIV Clinic No.	
Transfer In	Failure	Extra Pulmonary	Date	X-ray Results				BCG Scar		Test Results		Date of Registration	
Return After Default				Suggestive	Not Suggestive	Other Disease	Undefined	Yes	No	Date of post test counselling		ART Start Date	
Other (Specify).			Any Known TB Contacts		Yes		No			CPT start date		ART Regimen	

I. INITIAL PHASE – prescribed regimen and dosages: Tick the appropriate category box below and, using the dose schedule, indicate the daily number of tablets and dose of Streptomycin (mg).

Weight (kg)	Paediatric New			Paediatric Re-treatment			
	RHZ (60/30/150mg)	RH (60/60mg)	E (100mg)	S (1000 mg)	RHZ (60/30/150mg)	RH (60/60mg)	E (100 mg)
5 – 7 kg	1	1	1	100 mg	1	1	1
8 – 14 kg	2	1	2	200 mg	2	1	2
15 – 20 kg	3	2	3	280 mg	3	2	3
21 – 30kg	Paediatric Kit B: 2 tabs HRZE (75/150/400/275) + 2 tabs HR (60/60)			400 mg	Paediatric Kit B: 2 tabs HRZE (75/150/400/275) + 2 tabs HR (60/60)		

Treatment Monitoring				
Month	Weight (kg)	MUAC (cm)	Smear / Test	Lab No.
Month 0				
Month 2				
Month 3				

Tick the appropriate category box below and, using the dose schedule, indicate the daily number of tablets and dose of Streptomycin (mg).

H: isoniazid R: rifampicin Z: pyrazinamide E: ethambutol S: streptomycin MUAC: Mid-Upper Arm Circumference

ADMINISTRATION OF DRUGS. Enter: ✓ = directly observed; "O" = drug not taken; "--" = self-administered; "___"= medicine collected for CB-DOTS and draw line to indicate number of days supply given. On review of patient ID Card, update TB01 appropriately

Day / Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	Remarks	TOTAL Doses: Each month	TOTAL Doses: Given	Drugs given to supporter: Date	Drugs given to supporter: Doses

Month 2	Weight _____ kg	Test Result _____	Lab No. _____	Positive smear / test result at end of Month 2 means Take sample for Culture and DST

Please turn over for continuation phase

II. CONTINUATION PHASE - prescribed regimen and dosages:

Tick the appropriate category box below and, using the dose schedule, indicate the daily number of tablets.

Weight (kg)	Paediatric New		Paediatric Re-treatment		
	RH (60/30mg)	RH (60/60mg)	RH (60/30mg)	RH (60/60mg)	E (100mg)
5 – 7 kg	1	1	1	1	1
8 – 14 kg	2	1	2	1	2
15 – 20 kg	3	2	3	2	3
21-30 kg	Paediatric Kit B: 2 tabs HR (75/150) + 2 tabs HR (60/60)		Paediatric Kit B: 2 tabs HR (75/150) + 2 tabs HR (60/60) + 1 tab E (400mg)		

Treatment Monitoring				
Month	Weight (kg)	MUAC (cm)	Smear / Test	Lab No.
Month 5				
Month 6				
Month 8				

ADMINISTRATION OF DRUGS. Enter: ✓ =directly observed; "O" = drug not taken; "-" = "____"= medicine collected for CB-DOTS and draw line to indicate number of days supply given. On review of patient ID Card, update TB01 appropriately

Day / Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	Remarks	TOTAL Doses: Each month	TOTAL Doses: Given	Drugs given to supporter: Date	Drugs given to supporter: Doses
Month 5	**Weight ____ kg**					**Test Result _____**				**Lab. No. _____**					**Positive smear / test result at 5 months means TREATMENT FAI LURE**																		
Months 6/8	**Weight ____ kg**					**Test Result _____**				**Lab. No. _____**					**Negative smear / test result at 6/8 months means CURED**																		

Observations:

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Name and address of Contact Person:

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Source of Referral of Patient			
Provider type	From (Date)	To (Date)	Purpose
Self referred			
HIV clinic/CT centre			
Contact invitation			
District Hospital			
Mission Hospital			
Private Hospital / Clinic			
Pharmacist/Chemist			
Household/family/friend			
Community volunteer			
Other			

Treatment Outcome Record Date: ___/___/20____

		Code
Cure	1	
Treatment Completed	2	
Lost to Follow-Up	3	
Died	4	
Treatment Failed	5	
Not Evaluated	6	

WHO Dosing Regimen for Paediatrics

NEW CASES

Treatment of new TB Case in Children between 5 kg and 20kg					
*Child's Weight	2 Months Intensive Phase (No. of tablets)			4 Months Continuation Phase (No. of tablets)	
	**RHZ (60/30/150mg)	**RH (60/60mg)	E (100mg)	**RH (60/30mg)	**RH (60/60mg)
5 - 7 kg	1	1	1	1	1
8 - 14 kg	2	1	2	2	1
15 - 20 kg	3	2	3	3	2

Treatment of new TB case in Children between 21 kg and 30kg				
*Child's Weight	3 Months Intensive Phase (No. of tablets)		5 Months Continuation Phase (No. of tablets)	
	RHZE (150/75/400/275mg)	**RH (60/60mg)	**RH (150/75mg)	**RH (60/60mg)
21 - 30 kg	2	2	2	2

RE-TREATMENT CASES

Re - Treatment of new TB Case in Children between 5 kg and 20kg							
*Child's Weight	2 Months Intensive Phase (No. of tablets)				4 Months Continuation Phase (No. of tablets)		
	***S (1kg)	**RHZ (60/30/150mg)	**RH (60/60mg)	E (100mg)	**RH (60/30mg)	**RH (60/60mg)	E (100mg)
5 - 7 kg	100mg	1	1	1	1	1	1
8 - 14 kg	200mg	2	1	2	2	1	2
15 - 20 kg	280mg	3	2	3	3	2	3

Re - Treatment of new TB in Children between 21 kg and 30kg						
*Child's Weight	3 Months Intensive Phase (No. of tablets)			5 Months Continuation Phase (No. of tablets)		
	***S (1kg)	RHZE (150/75/400/275mg)	**RH (60/60mg)	RH (150/75mg)	**RH (60/60mg)	E (400mg)
21 - 30 kg	400mg	2	2	2	2	1

* Increase the number of tablets the child takes daily as the child gains weight and moves to a higher weight band

** Dispersible tablets. Tablets should be dissolved in water and given immediately to children

*** Streptomycin injection should be given for the first 2 months of intensive phase treatment only. Discard opened vial after each dosing

Appendix 3

Scoring system for suspected TB in children

Features	0	1	2	3	4	Score
Duration of illness (weeks)	< 2	2 - 4		>4		
Weight for age z score (WAZ)	>-2	-2 to -3	<-3			
Family History of TB	None	Reported by family		Proven sputum positive		
TST test (Mantoux test)				Positive		
Malnutrition				Not improving after 4 weeks		
Unexplained Fever/night sweat			No response to antibiotics/ antimalarial drugs			
Clinical findings				- Lymphadenopathy - Joint/bone swelling - Abdominal mass or ascites - Neurological signs or abnormal CSF	Spinal deformity	

*Adapted from Osborne Scoring system. A score of 7 or more indicates a high risk of tuberculosis.

How to apply/read score system

Example:
A child with weight for age >-3 but< -2 with proven sputum positive contact, skin test not available, bouts of unexplained fever, not responding to antibiotics and antimalarial, with lymph nodes in the neck.

	Feature	Score
	Weight for age	1
	Family history	3
	Tuberculin test	0
	Unexplained fever	2
	Lymph node	3
	Total score	**9**

This is suggestive of TB infection and needs further investigations

Appendix 4

Diagnosis of Extra Pulmonary Tuberculosis

Site of ETB	Typical Clinical Presentation	Investigation	Comment
TB adenitis	Asymmetrical, painless, non-tender node enlargement for more than one month +/- discharging sinus. Most commonly in neck area	Fine needle aspiration when possible for culture and histology TST usually possible - not necessary for diagnosis	Treat If axillary node enlarged on same side as BCG. Consider BCG disease
Pleural TB	Dullness on percussion and reduced breath sounds+/- chest pain	CXR Pleural taps#	Treat If pus in pleural tap consider empyema ,

Usually young (<5 years) with disseminated disease and severally ill			
TB meningitis	Headache, irritability/abnormal behavior, vomiting (without diarrhoea), lethargic reduced level of Consciousness, convulsions, neck stiffness, bulging Fontanels, crania nerve palsies.	Lumbar puncture Obtain CSF# CXR	Hospitalize for TB treatment*
Miliary TB	Non-specific, lethargic, fever, wasted	CXR	Treat and refer *

Typical Findings of straw coloured exudate with high potein and predominately lymphocytes

* Referral may be for investigation as well as additional care. If referral not possible start anti TB treatment

Usually 5 years and older			
Abdominal TB	Abdominal swelling with ascites or abdo masses	Ascitic taps#	Refer*
Spinal TB	Deformity of spine May have lower limb weakness/paralysis	X-ray spine	Refer*
Pericardial TB	Cardiac failure Distant heart sounds Apex beat difficulty to palpate	CXR Cardiac ultrasound pericardial tap#	Refer*
TB bone and joint	Swelling end of long bones with limited movement Unilateral effusion of usually knee or hip	X-ray bone joint joint tap#	Refer*

Typical Findings of straw coloured exudate with high potein and predominately lymphocytes

* Referral may be for investigation as well as additional care. If referral not possible start anti TB treatment

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