

DOCTOR'S DESK GUIDE

MANAGEMENT OF

CHILDHOOD TUBERCULOSIS

REVISED
2017



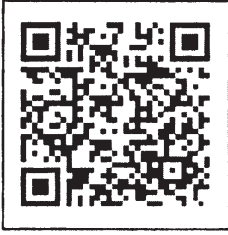
National TB Control Program

National Tuberculosis Control Program
Ministry Of National Health Services, Regulations & Coordination
Government of Pakistan
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Pakistan**

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National TB Control Program

National Tuberculosis Control Programme

Block E & F, EPI Building, Near National Institute of Health (NIH)
(Prime Minister's National Health Complex), Park Road, Islamabad, Pakistan

Telephone: + (92-51) 843-8082-3

Email: ntpmanagerpak@ntp.gov.pk

Website: www.ntp.gov.pk

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IDENTIFYING PRESUMPTIVE TB IN CHILDREN

Every child less than 14 years should be assessed for presumptive TB if he/she presents with: “Prolonged or Unexplained illness of more than 2 weeks”

With one or more of the following:

<ul style="list-style-type: none"> • Cough more than 2 weeks (or uncertain duration) • Fever (usually low grade at evening), or • Enlarged cervical lymph nodes, or • Failure to thrive • Known contact of pulmonary TB patient (Bacteriologically positive) • HIV infected child • Meningitis (see signs below) 	<p style="text-align: center;">So important to ask if ; >she/he is taking any drugs</p>
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HISTORY AND EXAMINATION

TB usually presents with a slow onset illness. Adolescents and some older children present in a similar way to adults, while younger children often have non-specific symptoms and signs.

- The presumptive TB child needs to be properly evaluated based on history (including history of bacteriologically positive TB close contact and HIV infection) and physical examination.

NOTE: A child should be referred to a PMDT* site if he/she has active TB with close contact of Drug Resistant TB case

Ask and look for the following TB signs and symptoms and decide accordingly:

Chest

- Cough > 2 weeks (unremitting and not improving)
- Sputum
- Shortness of breath
- Unilateral wheeze, dullness

Systemic

- Fever > 2 weeks, low grade (99 ° F)
- Sweating at night
- Malnutrition or failure to gain weight (Protein Caloric Malnutrition — Grade 3), has not responded to 1 month dietary plan
- Low immune status: H/O pertussis or measles (in last 6 months)
- Lymph nodes: Cervical lymph nodes (enlarged, painless, matted, or there is an abscess with or without discharge)
- BCG scar absent

Meningitis

- Headache, vomiting, irritability, lethargic
- Neck stiffness, bulging anterior fontanella, coma

Abdomen

- Chronic diarrhea, distended abdomen, any mass, or ascities

Bones and joints

- Backache, stiffness, lump, deformity, limp
- Unilateral swelling of joint, any tenderness(slow onset)

*PMDT-Programmatic Management of Drug Resistant TB

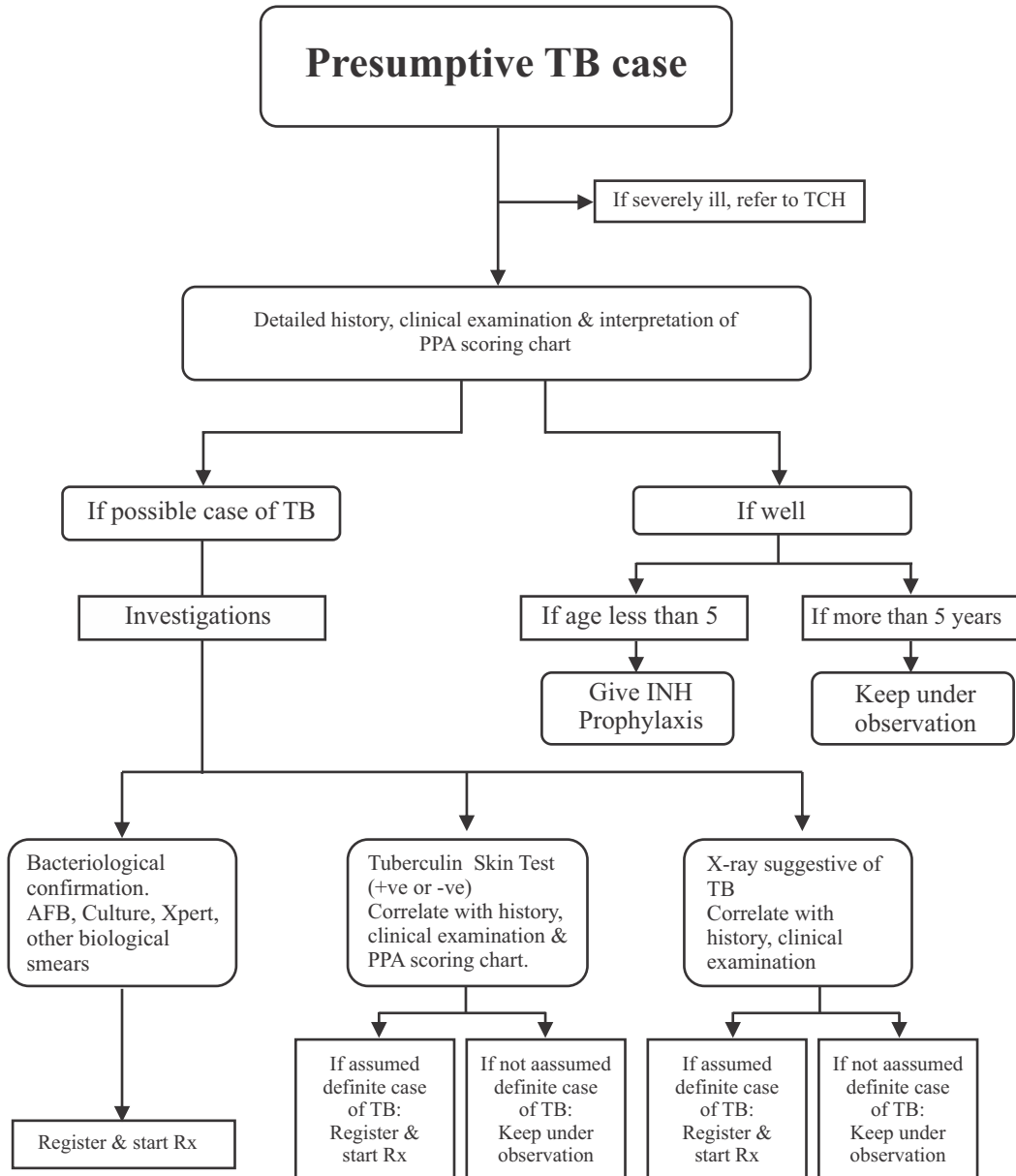
INVESTIGATE AND INTERPRET

A presumptive childhood TB case should be properly investigated before reaching a possible decision.

NOTE: Most of the children can be diagnosed based on clinical signs, symptoms and close contact history, supportive investigations and using PPA Scoring Chart.

The algorithm below provides a step by step guide to help evaluate a child for TB disease.

Figure: Evaluation of a Presumptive TB Child





NATIONAL TB CONTROL PROGRAM

ALGORITHM FOR PULMONARY TB DIAGNOSIS IN CHILDREN



History of presenting illness

For all children presenting to a health facility ask for the following suggestive symptoms:
(Cough, fever, poor weight gain, lethargy or reduced playfulness)
Suspect TB if child has two or more of these suggestive symptoms
Ask for history of contact with adult/adolescent with chronic cough or TB within the last 2 years

Physical Examination

Examine the child and check for:

- Temperature >37.5 (fever)
- Weight (to confirm poor weight gain, weight loss) - check growth monitoring curve
- Respiratory rate (fast breathing)
- Respiratory system examination - any abnormal findings

Examine other systems for abnormal signs suggestive of extra-pulmonary TB[#]

Investigations

Obtain specimen* for Xpert MTB/RIF (and culture when indicated**) Do a chest X-ray (where available)
Do a Mantoux test*** (where available) Do a HIV test
Do other tests to diagnose extra-pulmonary TB where suspected[#]

Diagnosis

Bacteriologically confirmed TB:
Diagnose if specimen is positive for MTB

Clinically diagnosed TB:

Child has **two or more** of the following suggestive symptoms:

- Persistent cough, fever, poor weight gain, lethargy

PLUS **two or more** of the following:

- Positive contact, abnormal respiratory signs, abnormal CXR, positive Mantoux

Note: If the child has clinical signs suggestive of EPTB, refer to EPTB diagnostic table

Treatment

Treat for TB as follows:

- All children with **bacteriologically confirmed TB**
- All children with a **clinical diagnosis of TB**

NB: In children who do not have an Xpert result, or their Xpert result is negative, **but** they have clinical signs and symptoms suggestive of TB they should be treated for TB

All forms of TB (Except TB meningitis, bone and joint TB): **Treat for 6 months (2 HRZE / 4 HR)**

TB meningitis, bone and joint TB: **Treat for 12 months (2 HRZE/ 10 HR)**

*Specimen may include: Expecterated sputum (child > 5 years), induced sputum, nasopharyngeal aspirate and gastric aspirate. **Attempt to obtain specimen in every child**

**Do a culture and DST for the following children:

1. Rifampicin resistance detected by the Xpert test
2. Refugees and children in contact with anyone who has Drug Resistant TB
3. Those not responding to TB treatment
4. Those with Indeterminate Xpert results

INVESTIGATIONS:

Tuberculin Skin Test (TST):

All presumptive child TB cases should be administered PPD to help diagnosis (procedure of administering PPD is given in the annexure 1)

Reading of TST result: the induration in mm is measured after 48—72 hour.

- If TST is >10mm; further investigation for TB
- If TST is <10mm:
 - TB strongly suspected, further investigate for TB
 - TB not strongly suspected because of clinical symptoms, give broad spectrum antibiotics (except fluoroquinolones) and evaluate after 7-10 days as clinical response to broad spectrum antibiotics does not rule out TB and signs and symptoms can reappear

Gene Xpert test:

(Recommended by NTP*, where possible as the preferred choice of investigating children with presumptive TB)

The GeneXpert machine is highly sensitive and results are delivered within hours including Rifampicin Resistance pattern. The samples of sputum, gastric lavage, specimen from some extra pulmonary sites can be used in GeneXpert machine.

- The samples need to be transported to the facilities where the Gene Xpert machine is installed.
- The TB control programme has recommended using Gene Xpert to help diagnosis of children where ever possible.

NOTE: Culture is a confirmatory test but takes 4-6 weeks for the result and is not routinely used in the programme for diagnosing TB disease.

Sputum Smear Microscopy / Gastric Lavage for AFB:

- Older children above 8 yrs of age will be encouraged to cough out sputum for microscopy.
- Younger children who cannot produce sputum will be admitted and gastric aspirate is collected through lavage and will be sent for microscopy.
- "TB05" form is used to submit the AFB request in the laboratory and to get the report.
- Results:
 - If sputum smear or gastric aspirate found positive, no further investigation is required. Start treatment.
 - If none is positive, further investigations are suggested (see below)

Chest X-rays (AP view):

The X-ray chest is widely used to diagnose TB among children. Finding of CXR should be used in conjunction with other investigations and patients signs and symptoms.

Suggestive of TB	Non-specific
<ul style="list-style-type: none">▪ Miliary mottling▪ Lymphadenopathy: para-tracheal, tracheal or mediastinal▪ Consolidation: No response to antibiotics	<ul style="list-style-type: none">▪ Ill-defined opacity/ infiltrate▪ Marked broncho-vascular markings

Examples of typical CXR in children with TB is given in the annexure 2 on page 13

Histology (Cervical Lymph Node or Granuloma)

- If biopsy is found positive for AFB, no further investigation for TB, Start treatment.
- A Caseating granulomatous lesion found on histopathology, no further investigations

Other investigations

- CSF for AFB if signs/symptoms of meningitis
- Abdominal aspirate for AFB if there is ascites or pleural tap in case of effusion.

* *National TB Control Programme.*

DECIDE — THE DIAGNOSIS

Decide on findings of clinical examination and investigation results

- If smear found bacteriologically positive, declare & manage TB.

In cases where the child is not found bacteriological positive, the PPA Scoring Chart helps in evaluating probable TB on the basis of multiple features i.e. clinical, histological, and radiological, etc

Revise PPA Scoring Chart 2016

	1	2	3	4	5
Age	< 5 years				
Close Contact*	TB suggestive	B-ve (Clinically diagnosed TB)	B+ve (Bacteriological positive)		
PEM/SAM**	Yes	Not responding to Nutritional rehabilitation for 02 months			
H/O Measles, Whooping Cough	3-6 months	< 3 months			
HIV		Yes			
Immuno-compromised***	Yes				
Clinical Manifestation****		Suggestive		Strongly suggestive	
Radio Diagnostic imaging*****	Non-specific	Suggestive of TB	Strongly suggestive		
Tuberculin Skin /PPD testing	5-10 mm		> 10mm		
Xpert test					Positive
Granuloma	Non specific				Positive for TB

INTERPRETATION:

Score	Interpretation	Suggested Actions
0 - 2	Unlikely TB	<ul style="list-style-type: none"> • Investigate other reasons of illness
3 - 4	Possible TB	<ul style="list-style-type: none"> • Do not treat for TB • Manage the presenting symptom (s) • Monitor monthly the condition (s) for 3 months using scoring chart
5 - 6	Possible TB	<ul style="list-style-type: none"> • Investigate and exclude other causes of illness • Investigation may justify therapy
7 or more	Probable TB	<ul style="list-style-type: none"> • confirm (if possible)

Description of Condition to be assessed for diagnosing Childhood TB **(Revised PPA Scoring chart 2016)**

*** Close contact:**

History of cough for more than 2 weeks among the house hold of child (score 1), contact tracing is required

B-ve TB patients among the house holds (score 2), may or may not be receiving/completed anti tuberculous treatment

B+ve TB patient among the house holds (score 3). May or may not be receiving/completed anti tuberculous treatment

****PEM/SAM (Protein Energy Malnutrition/Severe acute malnutrition):**

Use WHO Recommended Z. scoring chart (1)

Not responding to Nutritional rehabilitation for 02 months (2)

***** Immunocompromised status:**

Malignancies like leukemia or lymphomas etc

Immunodeficiency diseases like agammaglobunemia etc

Chemotherapy /Immuno- suppressive therapy such as steroids for more than 2 weeks.

****** Clinical Manifestation:**

Suggestive of TB; Pulmonary Findings (unilateral wheeze, dullness, weight loss, Hepato-splenomegaly, Lymphadenopathy, ascites etc.

Strongly suggestive of TB:

Matted lymph nodes, abdominal mass or doughy abdomen, sinus formation, gibbus formation, chronic mono arthritis, meningeal findings (bulging fontanel, irritability, choroid tubercle, papilloedema)

*******Radio-Diagnostic/ imaging studies includes Chest X-ray, CT Chest/MRI etc:**

Non-specific:

Ill-defined opacity or patchy infiltrates on chest X-Ray,

Marked broncho-vacular marking.

Suggestive of TB:

Consolidation not responding to antibiotic therapy,

Para-tracheal, or mediastinal Lymphadenopathy,

Miliary Mottling, cavitation,

CATEGORIZATION OF TB PATIENT — NEW OR PREVIOUSLY TREATED CASE

Ask and check if child has ever taken:

- TB treatment and for how long? Verify through record and proper history
- Streptomycin (powder/dry) injections, for any treatment and for how long.
- Any tablets/syrups which made urine color red/orange. If yes then for how long.

A child diagnosed with TB can be categorized into one of the following categories on the basis of previous intake of anti-TB drugs:

New case (Category-I): This includes a) new cases of pulmonary TB b) new extra-pulmonary TB.

Previously treated case (Category-II): This includes; relapses, treatment after failure, and treatment after loss to follow-up, others previously treated (positive & negative) & patients with unknown previous TB treatment history.

All TB presumptive cases are diagnosed and prescribed at the TB care facility.

Classify the disease as Pulmonary or Extra-pulmonary TB

Decide the "patient type" on basis of history* of TB drug intake in past as:

- **New patients** have never been treated for TB or have taken anti-TB drugs for <1 month
- **Previously treated patients** have received 1 month or more of anti-TB drugs in past. They are further classified by the outcome of their most recent course of treatment as:
 - **Relapse patients** have previously been treated for TB, were declared *cured* or *treatment completed* at the end of their most recent course of treatment, and are now diagnosed with a recurrent episode of TB (either a true relapse or a new episode of TB caused by re-infection).
 - **Treatment after failure patients** are those who have previously been treated for TB and whose *treatment failed* at the end of their most recent course of treatment.
 - **Treatment after lost to follow-up patients** has previously been treated for TB and was declared *lost to follow-up* at the end of their most recent course of treatment. (These were previously known as *treatment after default* patients.)
 - **Other previously treated patients** are those who have previously been treated for TB but whose outcome after their most recent course of treatment is unknown or undocumented.
 - **Patients with unknown previous TB treatment history**, do not fit into any of the categories listed above.

PRESCRIBING DRUGS TO CHILD TB PATIENT

Patients will be prescribed anti-TB drugs based on the category.

- The tubercle bacilli are killed only when anti TB drugs are given in correct dosage and duration
- Irregular treatment leads to resistance and for the proper absorption of anti-TB drugs taking them empty stomach should be preferred
- Complete clinical and prescription details on patient TB Treatment Card (TB01)

Recommended daily dose for 1st line anti-TB drugs for children		
Anti TB drugs	Dose an range (mg/kg body weight)	Maximum dose (mg)
Isoniazid	10 (7-15)*	300
Rifampicin	15 (10-20)	600
Pyrazinamide	35 (30-40)	-
Ethambutol	20 (15-25)	-
*The higher end of the range of isoniazid dose applies to young children; as the children grow older the lower end of the dosing range becomes more appropriate		

TB TREATMENT REGIMEN

RECOMMENDED TREATMENT REGIMENS FOR TB IN CHILDREN		
TB diagnostic category	Anti-TB drug regimens ^a	
	Intensive phase	Continuation phase
<i>Low HIV prevalence (and HIV-negative children) and low isoniazid resistance settings^b</i>		
<ul style="list-style-type: none"> - Smear negative pulmonary TB - Intrathoracic lymph node TB - Tuberculosis peripheral lymphadenitis 	2HRZ	4HR
<ul style="list-style-type: none"> - Extensive pulmonary disease - Smear-positive pulmonary TB - Severe forms of extra-pulmonary TB (other than tuberculous meningitis/ osteoarticular TB) 	2HRZE	4HR
<ul style="list-style-type: none"> - Tuberculous meningitis and osteoarticular TB 	2HRZE ^c	10HR
<p>a. The standard code for anti-TB treatment regimens uses an abbreviation for each anti -TB drug: isoniazid (H), rifampicin (R), pyrazinamide (Z) and ethamabutol (E). A regimen consists of two phases – the initial and continuation phases. The number at the front of each phase represents the duration of that phase in months. Example, 2HRZ: Duration of this phase is 2 months and drug treatment is daily (no subscript numbers after the abbreviations) with isoniazid, rifampicin and pyrazinamide.</p> <p>b. See “Definitions and distinctions” section for discussion of WHO definitions of high and low prevalence of HIV and isoniazid resistance.</p> <p>c. The decision on the regimen for a child with tuberculous meningitis should be made by an experienced clinician. It is suggested that the patient be treated in a hospital.</p>		



NATIONAL TB CONTROL PROGRAM NEW REGIMEN FOR TREATMENT OF TB IN CHILDREN (2017)



TB Disease Category	Recommended Regimen	
	Intensive Phase	Continuation Phase
All forms of TB (Except TB meningitis and TB of the bones and joints)	2 months HRZ (50, 75, 150)+E (100)	4 months HR (50, 75)
Re- Treatment Cases	3 HRZ + E (50, 75, 150) + (100) + S= 20-40 mg / kg (if recommended by Pediatrician)	5 HR +E (50, 75) + (100)
TB meningitis, TB of the bones and joints	2 months HRZ+E	10 months HR
Drug Resistant TB	Refer to a Drug Resistant TB Specialist/PMDT Treatment site	

H= Isoniazid R= Rifampicin Z= Pyrazinamide E= Ethambutol

For previously treated children who present with symptoms of TB within two years of completing anti-TB treatment, evaluate for drug resistant TB, progressive HIV disease or other chronic lung disease. Make every effort to diagnose the child and manage as per the algorithm for TB diagnosis.

DOSAGES FOR PAEDIATRIC TB TREATMENT (IMPROVED FORMULATION) (منظور شدہ فارمولا) بچوں میں ٹی بی کے علاج کے لیے ادویات کا چارٹ DOSAGES FOR A CHILD UP TO 3.9KGS 3.9 کلو گرام وزن تک کے بچوں کے لیے ادویات

Weight Band (Kgs)	Number of Tablets		
	Intensive Phase		Continuation Phase
	HRZ (50/75/150mg)	E(100mg)	HR (50/75mg)
Less than 2kgs	1/4 Tablet	1/4 Tablet	1/4 Tablet
2-2.9 kgs	1/2 Tablet	1/2 Tablet	1/2 Tablet
2-3.9 Kgs	3/4 Tablet	3/4 Tablet	3/4 Tablet

Ethambutol is not dispersible.

Treatment of neonates may require dose adjustment to reconcile the effect of age and possible toxicity and should therefore be under taken by a clinician experienced in managing paediatrics TB

DOSAGES FOR A CHILD BETWEEN 4 - 25KGS 4 سے 25 کلو گرام وزن تک کے بچوں کے لیے ادویات

Weight Band (Kgs)	Number of Tablets		
	Intensive Phase		Continuation Phase
	HRZ (50/75/150mg)	E(100mg)	HR (50/75 mg)
4 - 7.9 Kgs	1 Tablet	1 Tablet	1 Tablet
8 - 11.9 Kgs	2 Tablets	2 Tablets	2 Tablets
12 - 15.9 Kgs	3 Tablets	3 Tablets	3 Tablets
16 - 24.9 Kgs	4 Tablets	4 Tablets	4 Tablets
25kgs and above	Use adult dosages and preparations		

DOSAGES & duration of Isoniazid (INH) therapy in Isoniazid Prevention Therapy (IPT) = 10 mg/ kg/ day of body weight for 6 Months (Maximum of 6 Months)

Weight band (Kgs)	Number of Tablets	
	Daily Dose in mgs	INH (100mg)
< 5 kg	50	1/2
5.1- 9.9 Kg	100	1
10 - 13.9 Kg	150	1 1/2
14-19.9 Kg	200	2
20 - 24.9 Kg	250	2 1/2
>25 Kg	300	3
25kg and above	Use adult dosages and preparations	

DOSAGES FOR A CHILD ABOVE 25KGS: ADULT FORMULATION DOSAGE TABLE 25 کلو گرام وزن سے زائد بچوں کے لیے ادویات

Weight Band (Kgs)	Number of Tablets	
	Intensive Phase	Continuation Phase
	HRZE (75/150/400/275mg)	HR (75/150mg)
25 - 39.9 Kgs	2 Tablets	2 Tablets
40 - 54.9 Kgs	3 Tablets	3 Tablets
55Kg and above	4 Tablets	4 Tablets

PYRIDOXINE (VITAMIN B6) : DOSAGE FOR CHILDREN ON TB TREATMENT (TABLET 50MG)

Weight Band (Kgs)	Dose in mg	Number of 25mg Tablets	Number of 50mg Tablets
Less than 5 Kgs	1/2 Tablet	Half a tablet 3 TIMES PER WEEK	Not suitable for young infants
5.0 - 14.9 Kgs	1 Tablet	Half a tablet daily	Half of 50mg tablet 3 TIMES PER WEEK
15kg and above	50mg	Two tablets daily	One 50 mg tablet daily

Adverse Events*The most important adverse events is the development of hepatotoxicity, which can be caused by isoniazid, rifampicin or pyrazinamide. However, the occurrence of liver tenderness, hepatomegaly or jaundice should prompt investigation of serum liver enzyme levels and the immediate stopping of all potentially hepatotoxic drugs. No attempt should be made to reintroduce these drugs until liver functions have normalized.

EDUCATE ATTENDANT (PARENT)

Explain the key points on TB and its treatment:

- TB is curable
- Its diagnosis and treatment is free
- Symptoms should improve, if not improving come back
- Stress importance of DOT, daily treatment and supervision by parent
- Send to the DOTS Facilitator for further education and registration
- Ask to bring the other under five children with similar signs to the TB Care Facility
- Direct observation and support by parent and selected Treatment supporter
- Identify household contacts for further management.
- Good nutrition is essential for the child including breast feeding (if child is breast fed)

REGISTER A CHILD TB CASE

- Ask and record full address of patient and contact person details in TB01.
- Record the treatment center in TB01.
- Fill in patient treatment card (TB02), by transferring data from TB01 , and also record the date for next follow- up visit.
- Fill in the first part of TB Register (TB03), by transferring data from TB01.

MANAGE THE HOUSEHOLD CONTACTS

The protocol for screening the household contacts and close contact of a child-TB case are as follows:

- All 0-5 year old children, regardless of any symptom/sign suggestive of TB, are brought to the hospital for TB screening.
- All children above 5 years old with symptoms suggestive of TB (i.e. history of cough, fever or weight loss) are brought to the hospital for TB screening
- All adults with chest symptoms suggestive of TB (i.e. cough more than two weeks) are brought to the diagnostic center for TB screening.

Screen the household members of a child-TB case, as per above protocol, by:

- Interviewing the attendant, enlist the household contacts and decide those who need further screening at the TB care Facility (hospital).
- Arranging the screening of identified eligible contacts by
 - Instructing the attendant where, when and how to go for the screening of contacts.

CANDIDATES FOR IPT (INH PROPHYLAXIS) TREATMENT

- The children below 5 year of age and are close contact of Bacteriologically Positive (B+ive) TB patient, are put on INH prophylaxis therapy (IPT). The INH is prescribed in a dosage of 10 mg/kg and is given for a period of 6 months.

Child breast- fed by B+ive mother would continue to breast feed. The child should be protected by prescribing INH in same dosage for six months and is given BCG at end of six months, if not already given. Children on INH prophylaxis should be followed.

Note: The rationale for assigning high priority to contacts of index cases < 5 years of age is to find the source of the infection. Children 5 years and below are at higher risk for acquiring TB infection and of progressing from infection to TB disease.

- HIV-positive with no active TB household or close contacts
- Use IPT register to record the information

MONTHLY FOLLOW-UP VISIT

- **Check** for symptoms if improving; weight gain and also check visual acuity.
- **Ask** about new symptoms, and any change in vision — if change, check visual acuity
- **Ask** about the regularity of drugs taken and check the Treatment Supporter Card
- If good compliance? if not ask why and help solving the problem
- If new symptoms appear consider side-effect as follows:

Side Effect	Management
Minor	Continue anti-TB drugs and: Give TB drugs last thing at night
✓ Anorexia, nausea, abdominal pain	
✓ Joint pains	Paracetamol
✓ Burning sensation in feet	Pyridoxine 10-50 mg/day
✓ Itching of skin	Anti histamine
	If no response, exclude other possible reasons.
Major	Stop anti-TB drugs. Refer to Pediatric or other Specialist
✓ Skin rash	(e.g. Ophthalmologist for visual impairment, potentially related to Ethambutol).
✓ Deafness	
✓ Dizziness (vertigo & nystagmus)	
✓ Jaundice	
✓ Visual impairment (other causes excluded)	
✓ Shock, purpura, acute renal failure	

- Deliver and record the drugs for the next month.
- Enter the current and next date of appointment on TB02 & inform the attendant

FOLLOW-UP VISIT (2 & 5/ 6 Month)

- If bacteriologically positive at diagnosis, decisions are based on doing a smear by the completion of 2nd and 5th month (confirm for failure) and at the end of 6th month (after completing 180 dosages):

- If negative at 2 months, start continuation phase treatment
- If positive at 2 months, send for Xpert test for possible drug-resistant TB and treat accordingly

- If smear negative, extra pulmonary or diagnosis was made on clinical findings then reassess for TB symptoms:

- Clinical assessment
- Fever and sweating-now absent
- Lethargy- now normal activity
- Weight-gain
- Other TB associated findings at diagnosis-improved

Unless re-occurred
due to an acute illness

Decide if these finding have improved or not:

1. Symptoms improved: start continuation phase TB treatment
2. Symptoms not improved or deteriorated:
 - Reassess for another cause of these symptoms, if found treat accordingly, and also start continuation phase TB treatment
 - If no other cause found to explain the non-improvement, continue intensive phase treatment for one more month, then
 - Again reassess and whether or not another diagnosis found, start continuation phase TB treatment.

NB. Once started, even if the initial TB diagnosis is changed, or is uncertain, always complete TB treatment.

IDENTIFY AND RETRIEVE PATIENTS WITH DELAYED VISIT

The DOTS Facilitator will identify the delay of 10 or more days, in collection of medicine, and arrange for retrieval

To retrieve delayed patient, the following procedure should be followed:

- Writing letter where usually effective, feasible and/or
- Calling/SMS by (telephone), where deemed suitable and found feasible
- Other feasible ways, as deemed suitable under local circumstances, such as contacting a LHW (Lady Health Worker) or a health worker doing a home visit, etc.

Discuss problems in completing treatment and help to solve them

- Explain the importance of continued treatment and give an appointment

TREATMENT OUTCOME

- The TB care facility will declare treatment outcome for registered TB patients on quarterly basis, based on the data recorded in TB01 card & TB03 register.
- The NTP has given definitions for various treatment outcomes of the TB patients. The definitions used are compatible with international suggestions.
- The treatment outcomes are explained in some detail in table below:

Treatment outcomes

Cured	A patient registered as smear-positive, has completed the duration of treatment, and becomes sputum smear negative at the end of treatment and on at least one previous occasion.
Treatment completed	A smear positive patient who has completed the duration of treatment and have at least one follow up smear negative results but none at the end of treatment due to any reason
	Smear negative and extra pulmonary cases complete six months of treatment successfully
Treatment failure	A sputum smear positive patient who remains or becomes sputum smear positive at month five or later.
Died	A patient who dies for any reason during the course of treatment.
Lost to follow up	A patient whose treatment was interrupted for two consecutive months or more after registration
Not evaluated	A TB patient for whom, no treatment outcome is assigned (includes “Transfer out” to another treatment unit and whose treatment outcome is unknown).

Annexure-1

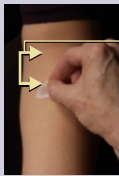
Administration of PPD for TST

Mantoux tuberculin skin test

1 Administration

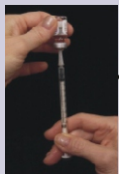
For each patient, conduct a risk assessment that takes into consideration recent exposure, clinical conditions that increase risk for TB disease if infected, and the program's capacity to deliver treatment for latent TB infection to determine if the skin test should be administered.

1 Locate and clean injection site



- 2 to 4 inches below elbow joint
- Place forearm palm side up on a firm, well-lit surface
- Select an area free of barriers (e.g., scars, sores) to placing and reading
- Clean the area with an alcohol swab

2 Prepare syringe

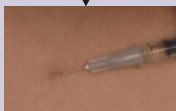


- Check expiration date on vial and ensure vial contains tuberculin (5 TU per 0.1 ml)
- Use a single-dose tuberculin syringe with a 1/4- to 1/2-inch, 27-gauge needle with a short bevel
- Fill the syringe with 0.1 ml of tuberculin

3 Inject tuberculin



- Insert slowly, bevel up, at a 5- to 15-degree angle



- Needle bevel can be seen just below skin surface
- After injection, a tense, pale wheal should appear over the needle

4 Check skin test



- Wheal should be 6 to 10 mm in diameter. If not, repeat test at a site at least 2 inches away from original site

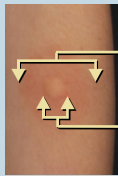
5 Record information

- Record all the information required for documentation by your institution (e.g., date and time of test administration, injection site location, lot number of tuberculin)

2 Reading

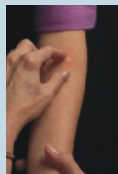
The skin test should be read between 48 and 72 hours after administration. A patient who does not return within 72 hours will probably need to be rescheduled for another skin test.

1 Inspect site



- Visually inspect site under good light
- Erythema (reddening of the skin) – do not measure
- Induration (hard, dense, raised formation)

2 Palpate induration



- Use fingertips to find margins of induration

3 Mark induration



- Use fingertip as a guide for marking widest edges of induration across forearm

4 Measure induration (not erythema)



- Place "0" ruler line inside left dot edge
- Read ruler line inside right dot edge (use lower measurement if between two gradations on mm scale)

5 Record measurement of induration in mm

- If no induration, record as 0 mm
- Do not record as "positive" or "negative"
- Only record measurement in mm

3 Interpretation

Skin test interpretation depends on two factors:

- Measurement in millimeters (mm) of the induration
- Person's risk of being infected with TB and progression to disease if infected

The three cut points below should be used to determine whether the skin test reaction is positive. A person with a positive reaction should be referred for a medical evaluation for latent TB infection and appropriate follow-up and treatment if necessary. A measurement of 0 mm or a measurement below the defined cut point for each category is considered negative.

Induration of ≥ 5 mm is considered positive in

- Human immunodeficiency virus (HIV)-infected persons
- Recent contacts of TB case patients
- Persons with fibrotic changes on chest radiograph consistent with prior TB
- Patients with organ transplants and other immunosuppressed patients (e.g., receiving the equivalent of ≥ 15 mg/d of prednisone for 1 month or more)

Induration of ≥ 10 mm is considered positive in

- Recent immigrants (i.e., within the last 5 years) from countries with a high prevalence of TB
- Injection drug users
- Residents and employees* of the following high-risk congregate settings:
 - prisons and jails
 - nursing homes and other long-term facilities for the elderly
 - hospitals and other health care facilities
 - residential facilities for patients with acquired immunodeficiency syndrome (AIDS)
 - homeless shelters
- Mycobacteriology laboratory personnel
- Persons with the following clinical conditions that place them at high risk:
 - silicosis
 - diabetes mellitus
 - chronic renal failure
 - some hematologic disorders (e.g., leukemias and lymphomas)
 - other specific malignancies (e.g., carcinoma of the head, neck, or lung)
 - weight loss of $\geq 10\%$ of ideal body weight
 - gastrectomy
 - jejunoleal bypass
- Children <5 years of age
- Infants, children, and adolescents exposed to adults at high risk for developing active TB

Induration of ≥ 15 mm is considered positive in

- Persons with no known risk factors for TB

* For employees who are otherwise at low risk for TB and who are tested as part of an infection control screening program at the start of employment, a reaction of ≥ 15 mm is considered positive. Some health care workers participating in an infection control screening program may have had an induration >0 mm that was considered negative at baseline. If these health care workers have an increase in induration size upon subsequent testing, they should be referred for further evaluation.

Note: Reliable administration and reading of the tuberculin skin test involves standardization of procedures, training, supervision, and practice. Always follow your institution's policies and procedures regarding infection control, evaluation, and referral. Also remember to provide culturally appropriate patient education before and after administration, reading, and interpretation of the skin test.

For more information on tuberculosis, visit www.cdc.gov/tb



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Annexure-2

CXR in Children with TB



Uncomplicated hilar lymph gland enlargement on the right-hand side



Mediastinal lymph gland enlargement with lung infiltration is seen on the left



Hilar lymph gland enlargement with infiltration into the surrounding lung tissue

Courtesy I UATLD

Chest X-ray



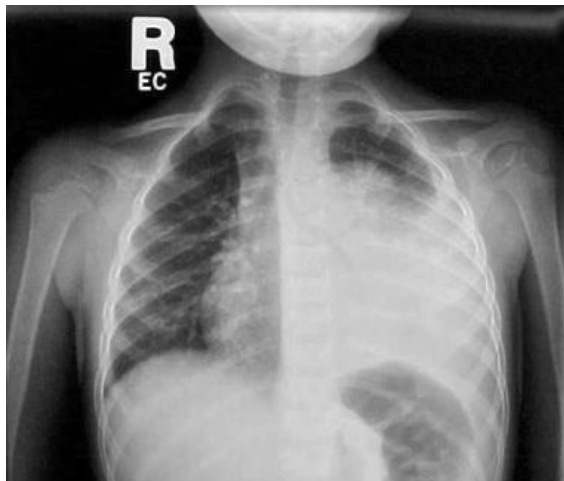
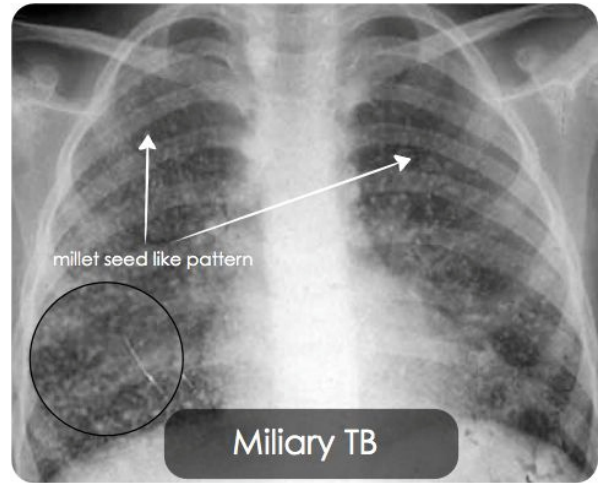
Unequivocal hilar lymph gland enlargement with or without parenchyma opacification

Miliary mottling (especially in HIV non-infected host)

Large pleural effusion ($\geq 1/3$ of pleural cavity) in children >5 years

Apical opacification with cavitation (common in adolescents)

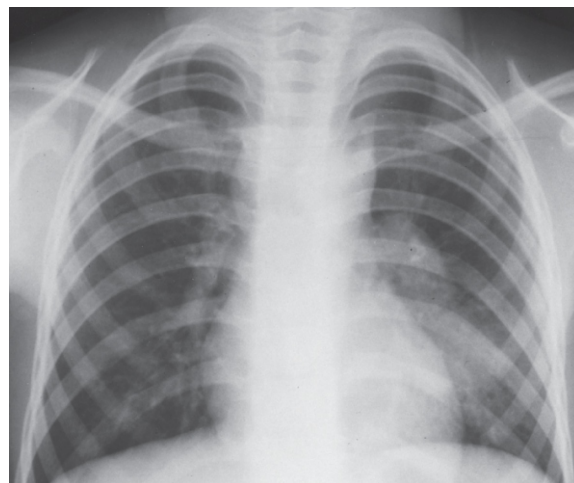
Adapted from *Pediatrics for undergraduates*, 2nd edn. Myanmar Pediatric Society 41



- In a minority of cases, the diagnosis is simplified by the presence of a previous Ghon focus, which is calcified (see arrow).
- Mediastinal lymph gland enlargement with lung infiltration is seen on the left



Gie R. *Diagnostic atlas of intrathoracic tuberculosis in children: a guide for low-income countries*. Paris, International Union Against Tuberculosis and Lung Disease, 2003. 26





National Tuberculosis Control Program

Block E & F, EPI Building, Near National Institute of Health (NIH)
(Prime Minister's National Health Complex), Park Road, Islamabad, Pakistan
Telephone: + (92-51) 843-8082-3 | Email: ntpmanagerpak
Website: www.ntp.gov.pk