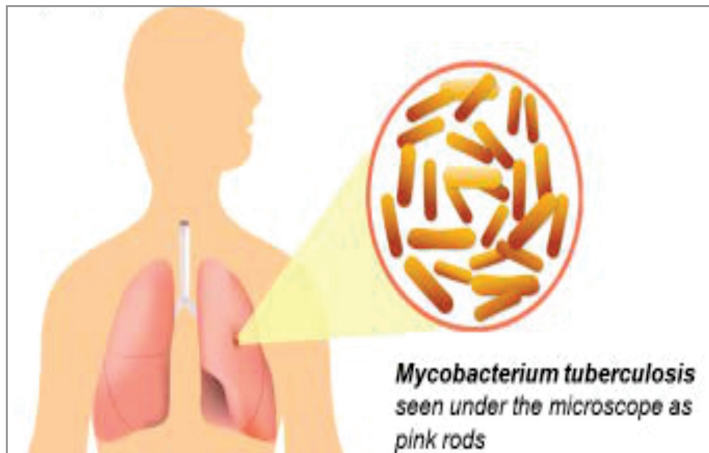


BASICS OF TB

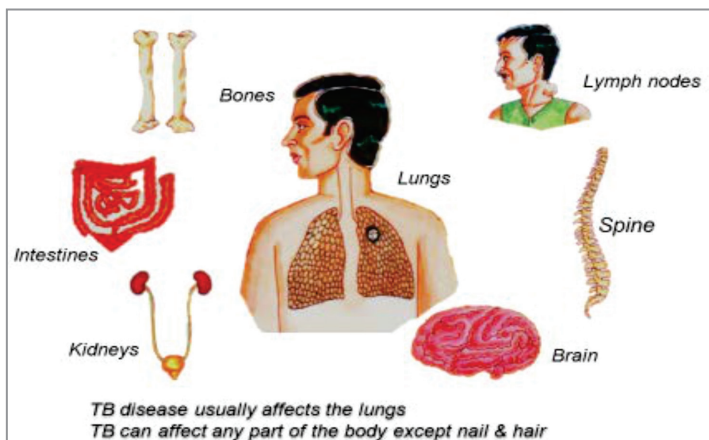
A Handout for Community Health Workers (CHWs) of TB Programs

What is Tuberculosis?

- ▶ Tuberculosis (TB) is an infectious disease caused by a bacteria, *Mycobacterium tuberculosis* (M.tb).



- ▶ Bacteria are germs which are invisible to the eye. They can be seen under the microscope.
- ▶ *Mycobacterium tuberculosis* is usually seen as pink rods or fluorescent rods under the microscope.
- ▶ TB can cause cough, fever, loss of weight and appetite, and if left untreated, can spread to others and can even result in death.



- ▶ TB usually affects the lungs (Pulmonary TB).
- ▶ It can affect any part of the body except the hair and nails.
- ▶ When it affects other parts of body, it is called Extrapulmonary TB (EPTB).

- ▶ TB infection spreads through droplets of bacteria-containing sputum or saliva.
- ▶ A person having TB of the lung can infect 10 others in one year if left untreated.
- ▶ TB can be **completely cured** with the correct drugs of the correct dosage taken for the correct duration.
- ▶ Treating TB correctly helps to prevent the spread of disease to others. It also helps prevent drug resistance.
- ▶ If TB is not treated correctly and completely, it can result in increased severity, spread of infection to others, drug resistance and death.

Who can get TB?

Anyone can get TB. Men, women and children, rich and poor people can get TB. Persons with lower immunity are at higher risk of developing TB.

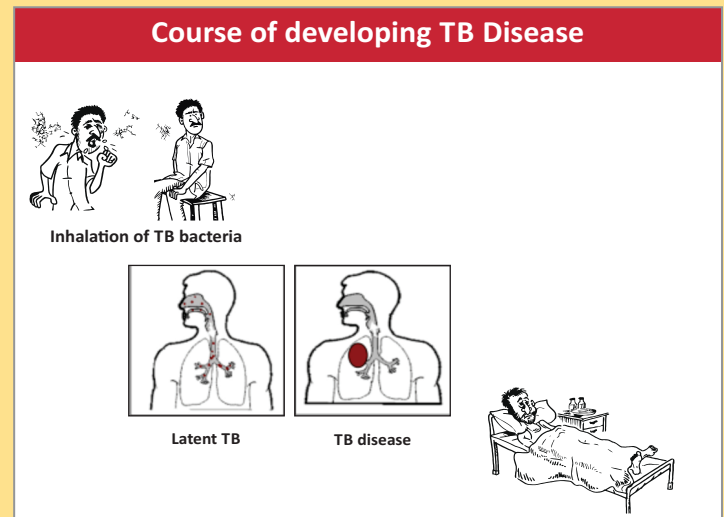
- ▶ Young children and elderly persons are more prone to TB as their immune systems are under-developed or weak.
- ▶ TB disease is associated with conditions which lower immunity (at risk/vulnerable population), including:
 - HIV/AIDS – Persons with HIV are 6 times more likely to develop TB in their lifetime than those who do not have HIV infection
 - Diabetes
 - Undernutrition
 - Steroid use (Steroids are medicines which control or decrease immunity)
 - Chronic kidney disease
 - Organ transplant and chemotherapy
- ▶ Certain occupations like mining are at increased risk of developing TB

Poverty impacts the presence TB in a community, particularly for people living in urban slums, due to overcrowding, poor ventilation, Indoor air pollution, malnutrition, smoking, stress and social deprivation.

How is TB transmitted?

- ▶ TB is transmitted through the air.
- ▶ Transmission occurs through coughing, sneezing, laughing and even talking.
- ▶ When a person with untreated lung TB coughs, sneezes, laughs, shouts, talks or sings, he/she releases droplets containing the TB bacteria. The droplets are not visible to the eye.
- ▶ When the droplets containing TB bacteria are inhaled by another person, that person is likely to get TB.
- ▶ TB can be transmitted by those with lung TB or Pulmonary TB. Those with TB in other parts of the body (Extrapulmonary TB) do not transmit TB.

After a person is infected, he / she develops disease symptoms when the immunity is lowered.



What are the Common Symptoms of TB?.....

Cough is the most common symptom of TB.

The symptoms of lung TB (Pulmonary TB- PTB) are

- ▶ Cough, which is persistent, usually with sputum (typically cough of more than two weeks)
- ▶ Chest Pain
- ▶ Shortness of Breath
- ▶ Coughing of blood

The other symptoms listed below may occur with TB of any part of the body including the lungs

- ▶ Fever
- ▶ Night Sweats
- ▶ Weight loss (or lack of adequate weight gain in children)
- ▶ Tiredness
- ▶ Loss of appetite

Every person with persistent cough of two weeks, or more, with or without other symptoms, should be identified and investigated for TB

Presumptive TB			
Pulmonary TB	Extrapulmonary TB	Pediatric TB	Drug Resistant TB
Persons with any of the symptoms and signs, suggestive of TB including: - cough for > 2 weeks - fever > 2 weeks - significant weight loss - haemoptysis - any abnormality in chest radiograph.	Persons with organ-specific symptoms and signs including: - swelling of lymph node - pain and swelling in joints - neck stiffness - disorientation - constitutional symptoms like significant weight loss - fever for ≥ 2 weeks - night sweats	Children with symptoms including: - persistent fever and/or - cough for more than 2 weeks - weight loss/ no weight gain and/or - history of contact with infectious TB	-TB patients who failed treatment with first line drugs (FLD) - Paediatric non responders - Contacts of DR-TB - Smear positive on any follow-up during treatment with FLD - Previously-treated TB - TB HIV co-infection
Significant weight loss in adults - >10% weight loss in 6 months Children - History of unexplained weight loss or no weight gain in past 3 months. Loss of weight is defined as loss of >5% body weight as compared to highest weight recorded in last 3 months.			

The following persons need to be identified and tested for TB, irrespective of the duration of cough:

1. **People living with HIV** may not develop typical symptoms
2. **Household Contacts** who live with/ take care of TB patients
3. **Health care workers** who take care of TB patients

How is TB Diagnosed? What are the tests done to check if a person has TB?.....

TB can be diagnosed by **seeing or growing** the TB bacteria from any specimen in the body

Microbiological Confirmatory tools are tests that confirm for sure that a person has TB by checking for the presence of the TB bacteria or parts of the TB Bacteria (**see or grow** TB bacteria). The tests are:

1. **Microscopy**
2. **Rapid Molecular Diagnostic Test** - CBNAAT like GeneXpert, LPA)
3. **Culture** - Solid or Liquid culture, including Drug Sensitivity Testing

Two samples are collected for sputum smear microscopy/ CBNAAT/ LPA/ Culture

- ▶ One should be an early morning sample.
- ▶ Other can be a spot sample, collected under supervision.

Clinical diagnosis: Sometimes TB is diagnosed with other tests which are non confirmatory, especially in a person who has symptoms and signs of TB. These are

1. **Radiography** - Chest X-Ray
2. **Tuberculin Skin Test** - e.g. Mantoux test
3. **Histopathology** - Biopsy
4. **Cytopathology** - FNAC

Microscopy

This is a simple test which checks under the microscope for the presence of the TB bacteria

This test can detect bacteria if they are present in sufficiently large numbers (10,000 bacteria per ml of sputum).

Results can be got within a few hours.

It is available for free in Designated Microscopy Centers (DMCs) of the Revised National Tuberculosis Control Programme (RNTCP).

CBNAAT (Cartridge Based Nucleic Acid Amplification Test) GeneXpert

This tests detects a part of the TB bacteria.

Test results can be got within two hours hence it is called a rapid cartridge based molecular diagnostic test for TB

The test will detect the following:

1. Mycobacterium tuberculosis (MTB) even if present in very small quantities
2. Determine if the MTB is sensitive or resistant to Rifampicin

The following persons are prioritized for CBNAAT:

- ▶ Persons at risk for Multidrug-Resistant TB (MDR TB) - contacts of MDR TB patients, history of previous TB treatment
- ▶ HIV Positive individuals
- ▶ Children
- ▶ Abnormal chest X-Ray, Sputum smear negative but still suspected to have TB
- ▶ Extrapulmonary TB samples

Sputum collection:

Follow these steps to produce sputum for test:

- ▶ Get a sputum container with your home on it sputum collection centre or DMC.
- ▶ Collect sputum in the open air or in a vacant room with open windows.
- ▶ No one should be standing in front during sputum collection.
- ▶ Inhale deeply 2 to 3 times with the mouth open.
- ▶ Cough out deeply from the chest.
- ▶ Split out the sputum into the open container.
- ▶ Close the lid tightly.
- ▶ Submit this at the sputum collection centre or any sputum testing centre like DMC or CBNAAT lab.

If only saliva is produced, the patient can try again after inhaling some steam.

What are the types of TB.....

Based on method of diagnosis

- ▶ **Microbiologically confirmed TB** - presumptive TB with biological specimen positive for acid fast bacilli or for MTB on culture, or positive for TB on quality assured rapid molecular diagnostic tests.
- ▶ **Clinically diagnosed TB** - presumptive TB patient who is not microbiologically confirmed but diagnosed as TB by a clinician based on X-ray abnormalities, histopathology or clinical signs.

Based on site of disease

- ▶ **Pulmonary TB** - within the lungs
- ▶ **Extra Pulmonary TB** - TB in any organ other than inside the lung can occur in any part of the body excluding hair and nails

Based on Drug Sensitivity

- ▶ **Drug Sensitive TB (DSTB)** - sensitive to all the FLDs - Isoniazid, Rifampicin, Pyrazinamide, Ethambutol
- ▶ **Drug Resistant TB (DRTB)** - resistant to one or more anti-TB drugs

Treatment History

- ▶ **New case** - patient with TB who has never been treated with anti TB medication or has been treated with anti-TB medication for less than one month.
- ▶ **Previously treated** - patient with TB who has been previously treated with anti TB-medication for more than one month.

What does treatment for TB consist of?.....

Management of TB consists of:

1. Anti-TB medicines
2. Management of associated conditions

Anti-TB medicines

Anti-TB drug treatments are a combination of several drugs that have different functions. The use of multiple drugs help prevent the bacteria from developing drug resistance.

TB treatment for DSTB consist of

- The initial Intensive Phase (IP) with at least 4 drugs given together.
- This is followed by a Continuation Phase (CP) with 3 drugs given together.
- The minimum duration of treatment is 6 months for a new patient and 8 months for a previously treated patient.

DRTB and some types of EPTB need a longer duration of treatment.

Commonly used drugs are

- Tablets: H - Isoniazid
 R - Rifampicin
 Z - Pyrazinamide
 E - Ethambutol

Injection: S-Streptomycin (given to previously treated patients)

Others used for second line regimes include fluoroquinolones, kanamycin, cycloserin, PAS etc.

Drug formulations - Fixed drug combinations (FDC) i.e all medicines are combined in one tablet

Dose - According to the patient's weight; patient may need 2, 3, 4 or 5 tablets per day

Dosage frequency - Daily treatment is currently followed in RNTCP

Drug Dosage for Adult TB

Weight category	Number of Tablets (FDCs)		Streptomycin
	Intensive phase	Continuation phase	
	HRZE	HRE	gm
25-39 kg	75/150/400/275	75/150/275	0.5
40-45 kg	2	2	0.75
55-69 kg	3	3	1
>=70	4	4	1

Injectable Streptomycin to be added in IP phase for 2 months as part of the regimen of previously-treated drug sensitive patients.

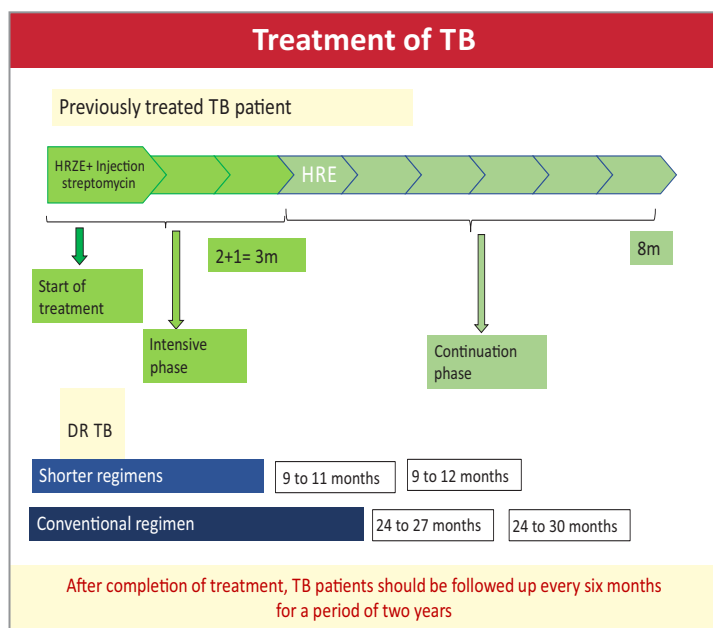
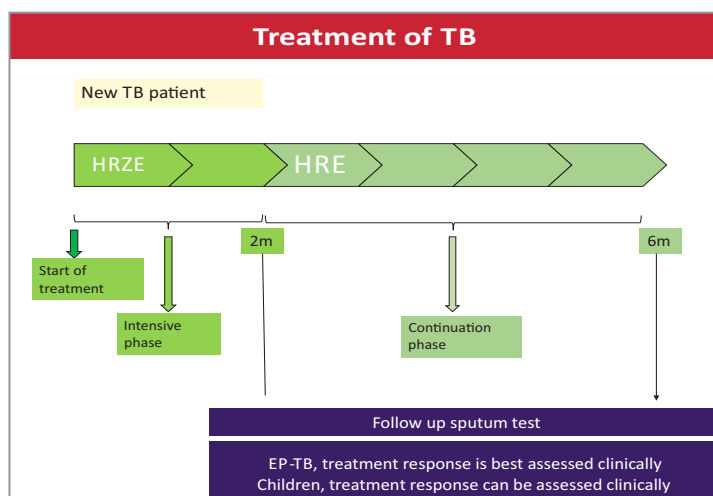
In patients above 50 years of age, the maximum dose of streptomycin should be 0.75 gm.

Adults weighing less than 25 kg will be given loose drugs as per body weight.

Weight category	Number of Tablets (dispersible FDCs)			Injectable Streptomycin
	Intensive phase		Continuation phase	
	HRZ	E	HRE	
	50/75/150	100	50/75/100	mg
4-7 kg	1	1	1	100
8-11 kg	2	2	2	150
12-15 kg	3	3	3	200
16-24 kg	4	4	4	300
25-29 kg	3 + 1A	3	3 + 1A	400
30-39 kg	2 + 2A	2	2 + 2A	500

Management of associated conditions

- ▶ Counselling of the patient and family about disease, treatment and to help them accept the diagnosis
- ▶ Testing and treatment for comorbidities like HIV, diabetes, silicosis, other respiratory illness etc.
- ▶ Management of conditions like pregnancy and breast feeding
- ▶ Monitoring and managing side effects and other symptoms like persistent cough, breathlessness, gastritis etc.
- ▶ Follow up of patients to ensure adherence to medicines
- ▶ Evaluation of patient during course of treatment to assess improvement (follow-up sputum testing, weight gain, symptoms improved etc.)
- ▶ Nutritional support in addition to anti-TB drugs
- ▶ Psychological and social support when required
- ▶ Ensuring that the patient completes the full course of treatment
- ▶ Ensuring that all contacts of the patient are screened for TB



Notable adverse reactions to first line drugs

Treatment outcomes for DSTB

- Cured** - Microbiologically confirmed TB, smear negative at the end of complete treatment.
- Treatment completed** - Treatment complete without evidence of failure, but no records to show smear or culture results.
- Treatment success** - Either cured or treatment completed.
- Failure** - Biological specimen is positive by smear or culture at the end of treatment.
- Failure to respond** - Case of Pediatric TB failed to have microbiological conversion to negative or deteriorates after 12 weeks of IP.
- Loss to follow up** - Treatment interrupted for one consecutive month or more.
- Not evaluated** - No treatment outcome is assigned (transferred out).
- Treatment regimen changed** - Patient on FLD, switched over to DRTB regimen after diagnosis as DRTB
- Death** - Died during the course of TB treatment

Disclaimer: This brief is made possible by the generous support of the American people through the United States Agency for International Development (USAID). The contents are the responsibility of KHPT and do not necessarily reflect the views of USAID or the United States Government.