

# TUBERCULOSIS

# TB Symptom Screening for Adults and Children

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## Adults:

- Do you have a cough? (>2 weeks or any duration if HIV+)
- Have you had a fever for more than 2 weeks?
- Do you have drenching night sweats?
- Have you lost weight? (>1.5kg unexplained weight loss)

## Children:

- Does the child have a cough > 2 weeks that is not improving on treatment?
- Has the child had a fever for more than 2 weeks?
- Has the child lost weight or failing to thrive? (check *Road to Health Card*)
- Is the child always tired or less playful than usual?

## Other questions for adults and children:

- Have you had close contact with someone with TB?
- Has anyone in your family been diagnosed with TB recently?
- Adults only: Is blood present in your sputum?
- Do you have shortness of breath? For how long?
- Have you lost your appetite?
- How long have you been feeling weak and tired?
- Have you worked in a mine?
- Have you previously been treated for TB?
- Do you know your HIV status?
- Do you have diabetes?
- (Questions in bold are most essential)
- Not all those with TB will have a cough; therefore, a high index of suspicion is required, particularly in people who are HIV positive who may only have one of the above symptoms.

## Baseline Screening of TB

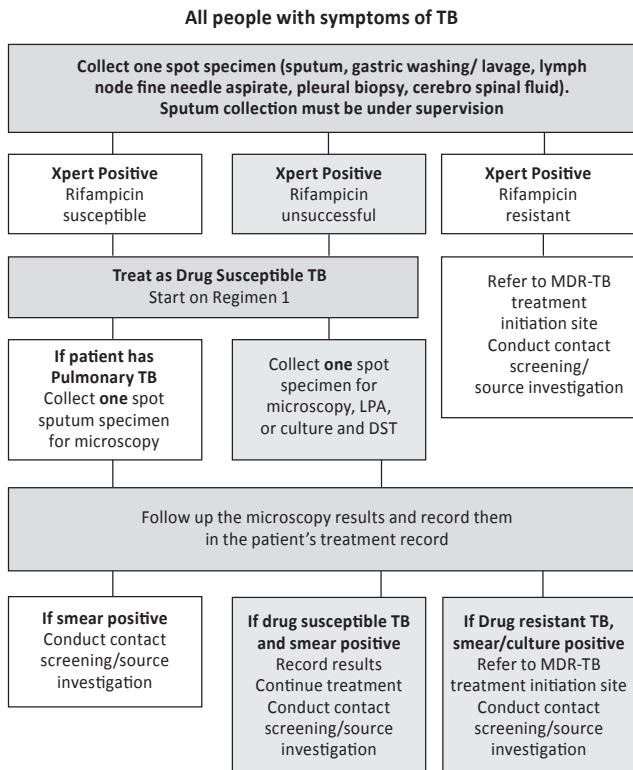
Investigations		Recommended Frequency
<b>Microscopy</b>	All patients	Baseline, 7 weeks and 23 weeks
<b>Height</b>	All patients	Baseline
<b>Weight</b>	All patients	Baseline and monthly
<b>Body mass index</b>	All patients	Baseline
<b>HIV test</b>	Patients with unknown HIV status or have not tested in the past year	Baseline
<b>Blood glucose</b>	Urine glucose and ketones (All patients)	Baseline
	Blood glucose (symptomatic patients)	Baseline and monthly for diabetic patients
<b>Pregnancy test</b>	Women of child bearing age, presenting with history of amenorrhoea and not on contraception	Baseline
<b>Alcohol use screening</b>	Patients with a history of alcohol use	Baseline
<b>Liver function tests</b>	In patients with a history of liver disease, excessive alcohol use	Baseline
<b>Serum creatinine</b>	In patients with a history of kidney disease	Baseline, monthly
<b>Chest x-ray</b>	Patients with concomitant lung disease and those with a history of working in the mines	Baseline, end of treatment

# Smear Reporting

ZN Staining		Auramine Staining	
Number of Bacilli Seen on a Smear	Results Reported	Number of Bacilli Seen on a Smear	Results Reported
No AFB per 100 oil immersion field	0	No AFB on slide	0
1-9 AFB per 100 oil immersion field	Scanty	<1 AFB per field	+
10-99 AFB per 100 oil immersion field	+	1-9 AFB per field	++
1-10 AFB per 1 oil immersion field (min 50 fields)	++	10-99 AFB per field	+++
>10 AFB per 1 oil immersion field (min 20 fields)	+++	>100 AFB per field	++++

Source: National Tuberculosis Management Guidelines, 2014

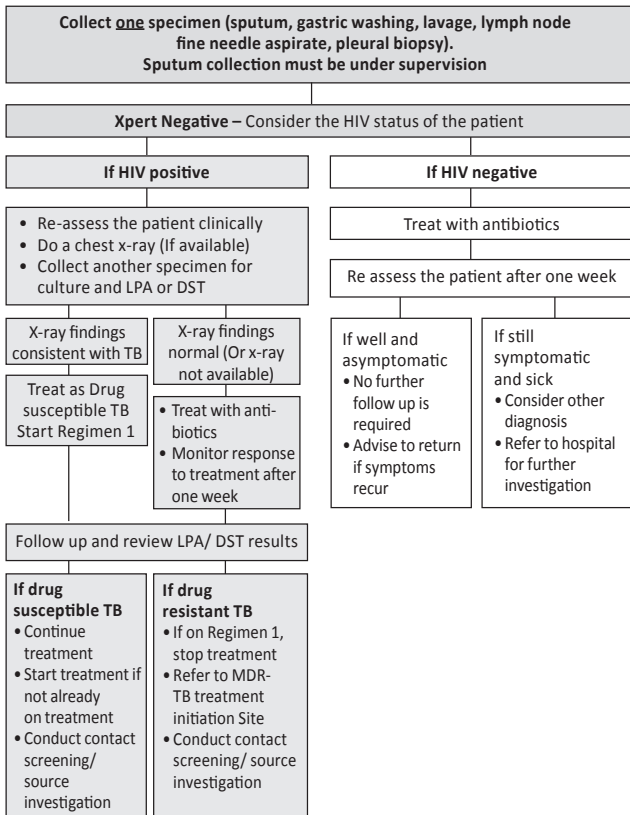
# Xpert Diagnostic Algorithm



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# Xpert Diagnostic Algorithm

## All people with symptoms of TB



## TB Diagnosis Using the Line Probe Assay (LPA)

The LPA test may be used on high risk patients where rapid diagnosis of MDR-TB or Isoniazid resistance is required. One spot sputum specimen should be collected for smear microscopy, if AFB positive then another specimen must be collected for LPA. If smear microscopy is AFB negative, another smear for culture and LPA must be collected.

### Interpretation of the LPA Results

Result	Action
Smear microscopy results are AFB positive	The LPA test will be conducted on the second specimen and the results should be back within 5 – 7 days, therefore the patient should be given a return date within 7 days. If the results confirm drug resistant TB the patient should be counselled and arrangements for referral to the local MDR-TB Unit made to ensure treatment initiation as soon as possible. If the results confirm drug sensitive TB, the patient should be counselled and started on TB treatment immediately.
Smear microscopy results are negative	If DR-TB is strongly suspected then a second specimen for culture must be collected for culture and LPA. Whilst waiting for results, chest x-rays may be conducted to support the diagnosis. If clinical and x-ray findings are suggestive of TB, the patient may be started on Regimen 1 and the results reviewed as soon as available and patient managed appropriately.

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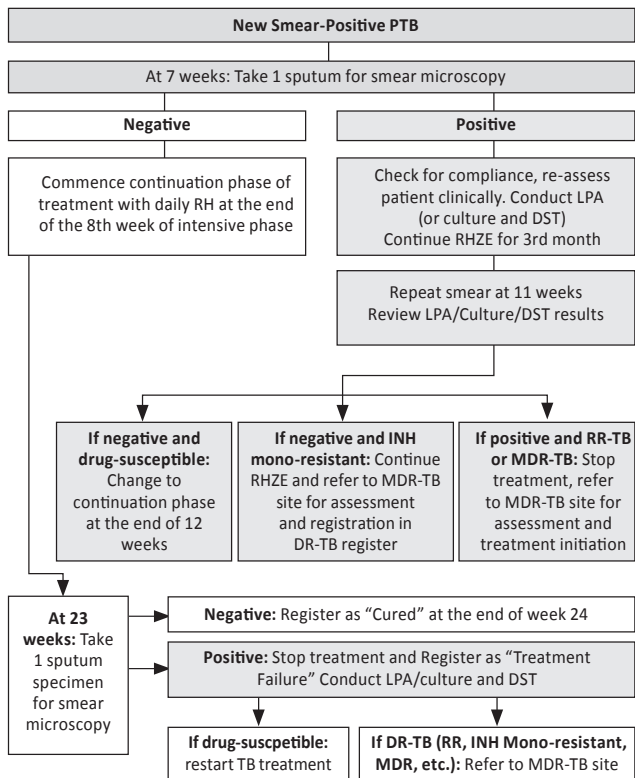
## TB Diagnosis Using the Line Probe Assay (LPA)

Result	Meaning	Action
MTB complex detected	MTB was isolated from the specimen therefore the patient has bacteriologically confirmed TB	Review susceptibility results and treat accordingly
MTB complex not detected	MTB was not isolated from the specimen	This result does not completely exclude TB
Rifampicin and Isoniazid susceptible	Patient has drug susceptible TB	Treat with Regimen 1
Rifampicin and Isoniazid resistant	Patient has multi drug resistant TB (MDR-TB)	Treat with Category IV
Rifampicin resistant and Isoniazid susceptible*	Patient has Rifampicin mono resistance (RR-TB)	Treat with Category IV
Rifampicin susceptible and Isoniazid resistant	Patient has Isoniazid mono resistance	Treat with first line drugs RHZE for 6 months

\* Isoniazid resistance is more complex genetically than rifampicin resistance. The LPA can “miss” isoniazid resistance (i.e. report a false isoniazid susceptible result). In most laboratories, if the LPA shows rifampicin mono resistance, the isoniazid susceptibility will be tested on phenotypic drug susceptibility testing for confirmation.



# Monitoring Algorithm for Bacteriologically Confirmed PTB Patients



Source: National Tuberculosis Management Guidelines. Department of Health, 2014.

# Management of Treatment Interruption

## If The Patient Interrupted Treatment For Less Than 1 Month

1. Trace the patient
2. Establish the cause for interruption of treatment
3. Address the problem or concerns/ counsel patient
4. Continue treatment and add the missed doses at the end of the treatment phase
  - If the interruption occurred during the intensive phase, the duration of this phase must be extended by the number of days that the patient did not take treatment.
  - If the interruption occurred during the continuation phase, the duration of this phase must be extended by the number of days that the patient did not take treatment.

## If Patient Interrupts Treatment 1 – 2 Months

Action 1		Action 2	
1. Trace the patient 2. Establish the cause for interruption of treatment 3. Address the problem or concerns/ Counsel patient 4. Collect sputum specimen for Xpert 5. Continue treatment and review results of the tests	If Xpert positive and Rif sensitive	<ul style="list-style-type: none"> <li>• Continue treatment and add the missed doses at the end of the treatment phase</li> </ul>	Monitor as usual until treatment is completed
	If Xpert positive and Rif resistant	<ul style="list-style-type: none"> <li>• Stop treatment</li> <li>• Register patient as “RR-TB”</li> <li>• Refer to the MDR-TB treatment initiating site for further management</li> </ul>	Follow up to ensure the patient has been successfully referred

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# Management of Treatment Interruption

If Patient Interrupted Treatment For Two Months Or More (Lost To Follow Up)			
Action 1		Action 2	
<ol style="list-style-type: none"> <li>Trace the patient</li> <li>Establish the cause for interruption of treatment</li> <li>Address the problem or concerns/ Counsel patient</li> <li>Collect sputum specimen for Xpert</li> <li>Do not start treatment, wait for the results</li> </ol>	If Xpert positive and Rif sensitive	<ul style="list-style-type: none"> <li>Register as "Treatment after loss to follow up"</li> <li>Restart Regimen 1</li> </ul>	Monitor as usual until treatment is completed
	If Xpert positive and Rif resistant	<ul style="list-style-type: none"> <li>Register patient as "RR-TB"</li> <li>Refer to the MDR-TB treatment initiation site for further management</li> </ul>	Follow up to ensure the patient has been successfully referred

## Regimen 1: Treatment for New and Previously Treated Patients

Regimen 1: For Adults and Children Older Than 8 Years or Weighing More Than 30kg		
Pre-treatment body weight	Intensive Phase 7 days a week for 2 months	Continuation phase 7 days a week for 4 months
	RHZE (150,75,400,275)	RH (150,75)  RH (300,150)
30-37 kg	2 tabs	2 tabs
38-54 kg	3 tabs	3 tabs
55-70 kg	4 tabs	2 tabs
> 70kg	5 tabs	2 tabs

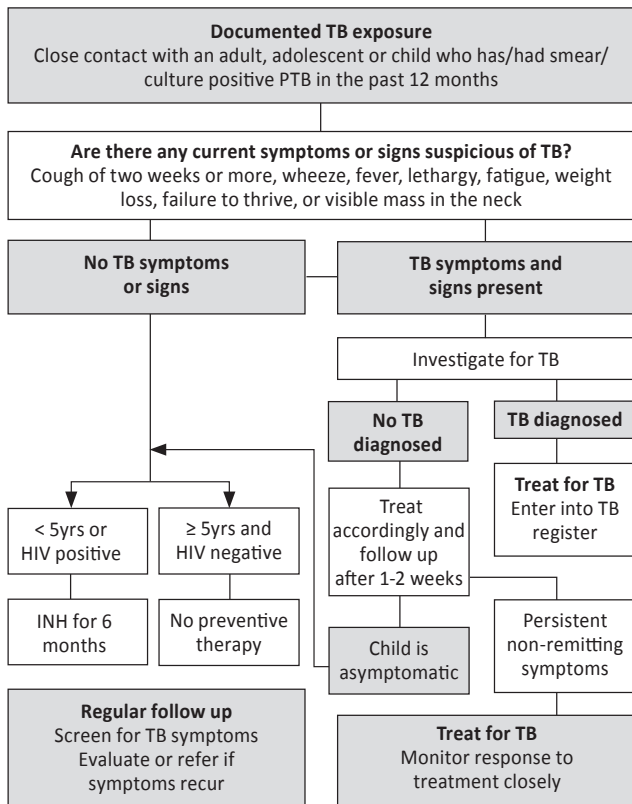
*R-Rifampicin, H-Isoniazid, Z-Pyrazinamide, E-Ethambutol*

## Standard Treatment Doses for TB

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Adults and Children > 8 years / > 30kg TB Drug Dosages		
Essential TB drug (abbreviation)	Dose mg/kg	Dose range mg/kg
Rifampicin (R)	10	8-12
Isoniazid (H)	5	4-6
Pyrazinamide (Z)	25	20-30
Ethambutol (E)	15	15-20
Streptomycin (S)	15	12-18

# TB Diagnosis in Children



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## TB Diagnosis in Children

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Scenario	Regard as TB Case if the Following Exist
History of exposure to infectious TB case <b>OR</b> Confirmed infection (positive Mantoux)	Symptoms of TB <b>AND</b> An abnormal chest x-ray suggestive of TB
Symptoms of TB	History of exposure to infectious TB case <b>OR</b> Confirmed infection (positive Mantoux) <b>AND</b> An abnormal chest x-ray suggestive of TB or positive smear or culture by gastric aspirate/sputum
No Chest X-ray available	Symptoms of TB <b>AND</b> History of exposure to infectious TB case <b>OR</b> Confirmed infection (positive Mantoux)

*Note: The diagnosis can be confirmed by collecting a gastric aspirate or sputum for smear and culture.*

*Source: SA National TB Guidelines, 2009; Guidelines for the Management of TB in Children, 2013*

## TB Treatment Regimens for Children < 8 Years of Age or < 30 kg

Regimen	Definition	Initial Phase Daily Treatment	Continuation Phase Daily Treatment
Regimen 3A	Uncomplicated TB with low bacillary load (Eg. minimal lung parenchyma involvement, intrathoracic disease, TB lymphadenitis, TB pleural effusion)	RHZ for 2 months	RH for 4 months
Regimen 3B	Complicated TB, high bacillary load (Smear-positive or extensive pulmonary TB, all other forms of extrapulmonary TB such as spinal or osteoarticular TB or abdominal TB)	RHZE for 2 months	RH for 4 months
TB Meningitis	For treatment of TB meningitis - consult a paediatrician	HRZ + Ethionamide for 6 to 9 months	
MDR-TB	Confirmed R resistance or R+ H resistance or contact with known MDR-TB case	See MDR-TB standardised regimen. Substitute moxifloxacin for levofloxacin if < 8 years. Consult with expert	
XDR-TB	Confirmed XDR-TB or contact with known XDR-TB case	See XDR-TB standardised regimen Consult with expert	

Source: Adapted from SA NDOH National Tuberculosis Management Guidelines, Guidelines for the Management of Tuberculosis in Children, 2014, and Drug-Resistant Management Guidelines, 2014/2011.



## Regimen 3A: For Uncomplicated TB With Low Bacillary Load

### Children up to 8 years or < 30kg

Body Weight (kg)	Intensive Phase (2 months)			Continuation phase (4 months)	
	Rifampicin/ Isoniazid 60,60	Pyrazinamide 150mg* or 150mg/3mL	Pyrazinamide 500mg  expert advise on dose	Rifampicin/ Isoniazid 60,60	Pyrazinamide 150mg* or 150mg/3mL
2-2.9 kg	¼ tablet	1.5 mL	expert advise on dose	¼ tablet	1.5 mL
3-3.9 kg	¼ tablet	2.5 mL	¼ tablet	¼ tablet	2.5 mL
4-5.9 kg	1 tablet	3 mL	¼ tablet	1 tablet	3 mL
6-7.9 kg	1½ tablets		¾ tablet	1½ tablets	
8-11.9 kg	2 tablets		½ tablet	2 tablets	
12-14.9 kg	3 tablets		1 tablet	3 tablets	
15-19.9 kg	3¾ tablets		1 tablet	3¾ tablets	
20-24.9 kg	4½ tablets		1½ tablets	4½ tablets	
25-29.9 kg	5 tablets		2 tablets	5 tablets	

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

**Children who are malnourished or HIV positive: Pyridoxine 25mg daily may be given for children >5 years and 12.5mg for children <5 years may be added to the treatment.**

Source: SA NDOH Updated TB Treatment Protocols for Children, 2014

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## Regimen 3A: For Uncomplicated TB With Low Bacillary Load

Continued

Children > 8 years or > 30 kg and adolescents

Pre-treatment Body Weight kg	Intensive Phase (2 months)	Continuation Phase (4 months)	
		RH (150,75)	RH (300,150)
30 – 37	2 tablets	2 tablets	
38 – 54	3 tablets	3 tablets	
55 – 70	4 tablets		2 tablets
>71	5 tablets		2 tablets

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

**Children who are malnourished or HIV positive: Pyridoxine 25mg daily may be given for children >5years and 12.5mg for children <5years may be added to the treatment.**

Source: SA NDOH Updated TB Treatment Protocols for Children, 2014

## Regimen 3B: For Complicated TB, High Bacillary Load

(All other forms of severe TB: extensive pulmonary TB, spinal or osteo-articular TB or abdominal TB.)  
Children up to 8 years and < 30kg

Body Weight (kg)	Intensive Phase (2 months)			Continuation Phase (4 months)
	Rifampicin, Isoniazid 60,60	Pyrazinamide 500mg expert advice on dose	Pyrazinamide 150mg* or 150mg/3mL	
2-2.9 kg	½ tablet	expert advice on dose	1.5 mL	1 mL ½ tablet
3-3.9 kg	¾ tablet	¾ tablet	2.5 mL	1.5 mL ¾ tablet
4-5.9 kg	1 tablet	¾ tablet	3 mL	2 mL 1 tablet
6-7.9 kg	1½ tablets	¾ tablet		3 mL 1½ tablets
8-11.9 kg	2 tablets	¾ tablet		½ tablet 2 tablets
12-14.9 kg	3 tablets	1 tablet		¾ tablet 3 tablets
15-19.9 kg	3½ tablets	1 tablet		1 tablet 3½ tablets
20-24.9 kg	4½ tablets	1½ tablets		1 tablet 4½ tablets
25-29.9 kg	5 tablets	2 tablets		1½ tablets 5 tablets

Source: SA NDOH Updated TB Treatment Protocols for Children, 2014  
Footnotes continued on next page

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## Regimen 3B: For Complicated TB, High Bacillary Load

### Continued

#### Children > 8 years or > 30kg and Adolescents

Pre-treatment Body Weight (kg)	Initial Phase (2 months)	Continuation Phase (4 months)	
	RHZE (150,75,400,275)	RH (150,75)	RH (300,150)
30 - 37	2 tablets	2 tablets	
38 – 54	3 tablets	3 tablets	
55 – 70	4 tablets		2 tablets
>71	5 tablets		2 tablets

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

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

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

Source: SA NDOH Updated TB Treatment Protocols for Children, 2014

## Treatment for TB Meningitis

	Duration	Dosage	Maximum daily dose
<b>Rifampicin</b>	6 months if there are concerns about ongoing disease, prolong for another 3 months. Consult with a specialist.	20 mg/kg as a single daily dose	600 mg
<b>Isoniazid</b>		20 mg/kg as a single daily dose	400 mg
<b>Pyrazinamide</b>		40 mg/kg as a single daily dose	2000 mg
<b>Ethionamide</b>		20 mg/kg as a single daily dose	1000 mg

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

Source: SA NDOH Updated TB Treatment Protocols for Children, 2014