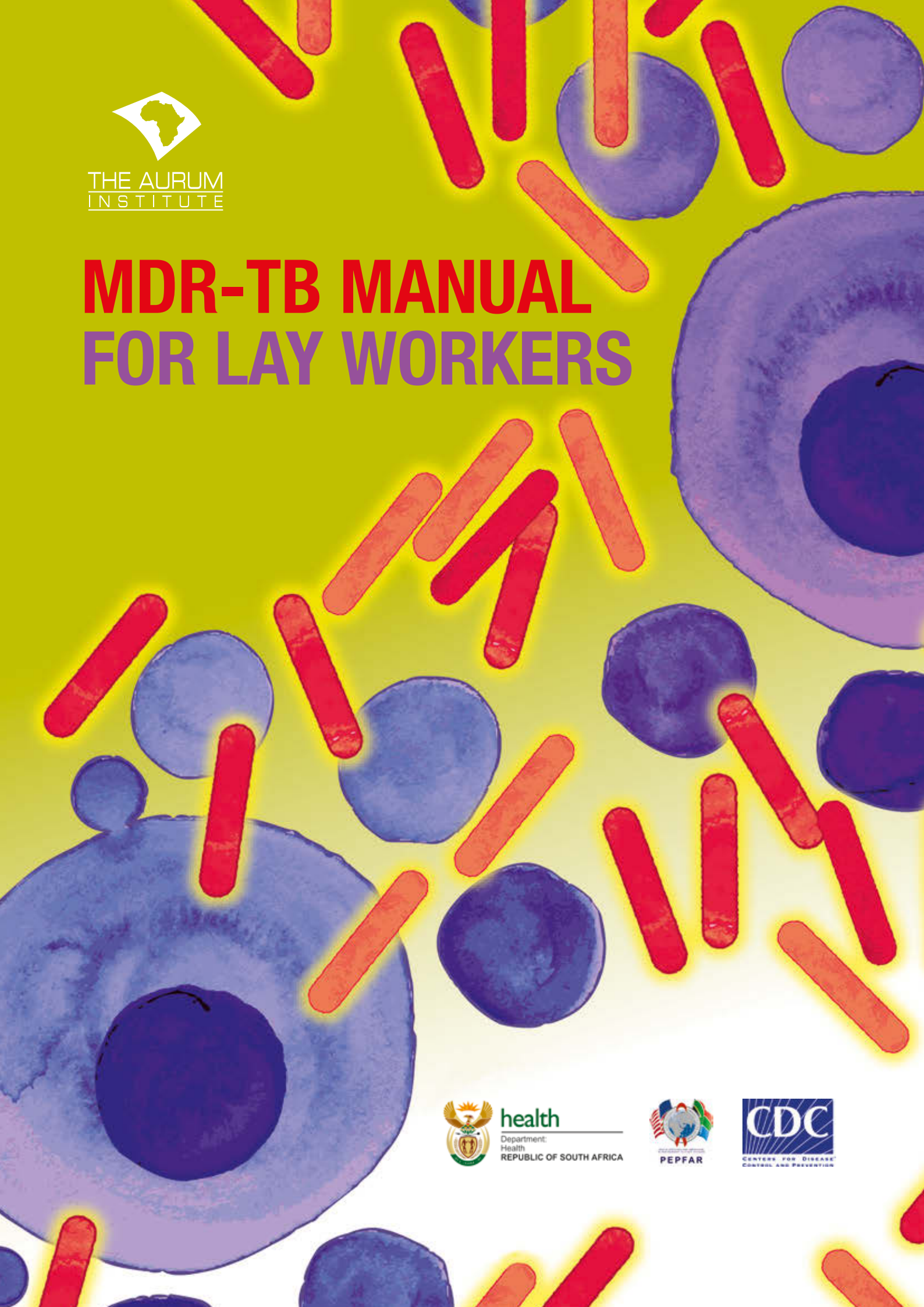
THE AURUM INSTITUTE

MDR-TB MANUAL FOR LAY WORKERS



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Comments and recommendations for changes, corrections or improvements may be sent to tools@auruminstitute.org

The information in this Manual has been based on the following guidelines:

NATIONAL DEPARTMENT OF HEALTH, South Africa

- Management of Drug-Resistant Tuberculosis Policy Guidelines (Updated January 2013)
- Guidelines for the Management of Tuberculosis in Children; 2013
- National Tuberculosis Management Guidelines; 2014
- Guidelines For The Management Of Tuberculosis, Human Immunodeficiency Virus And Sexually Transmitted Infections In Correctional Facilities; 2013

WORLD HEALTH ORGANIZATION

- Companion handbook to the WHO Guidelines for the programmatic management of Drug-Resistant Tuberculosis; 2014

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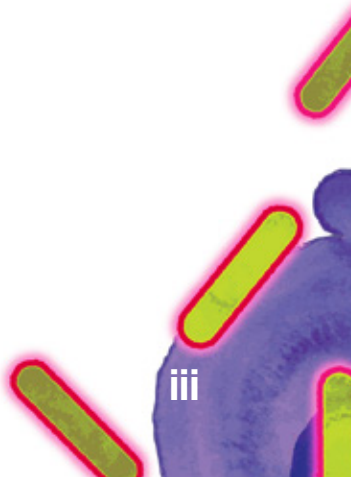


LIST OF ABBREVIATIONS

Abbreviation	Definition
ART	Antiretroviral Therapy
BMI	Body Mass Index
CHW	Community Health Worker
CT scan	Computed Tomography Scan
DOT	Directly Observed Treatment
DR-TB	Drug-Resistant Tuberculosis
DS-TB	Drug-Susceptible Tuberculosis
DST	Drug Susceptibility Testing
HCW	Health Care Worker
IPT	Isoniazid Preventive Therapy
LPA	Line Probe Assay
MDR-TB	Multidrug Resistant-Tuberculosis
NHLS	National Health Laboratory Services
PHC	Primary Health Care
SASSA	South African Social Security Agency
TB	Tuberculosis
TST	Tuberculin Skin Test
UVGI	Ultraviolet germicidal irradiation
XDR-TB	Extensively Drug Resistant-Tuberculosis

ANTI-TUBERCULOSIS DRUG ABBREVIATIONS

Abbreviation	Definition
Am	Amikacin
E	Ethambutol
Eto	Ethionamide
H, INH	Isoniazid
Km	Kanamycin
Lfx	Levofloxacin
Mfx	Moxifloxacin
PAS	Para-aminosalicylic Acid
R	Rifampicin
Trd	Terizidone
Z	Pyrazinamide

TABLE OF CONTENTS

PRE-TEST

Please choose the correct answer.

1. **What are the main reasons why MDR-TB develops?**
   a) Patients do not complete their full course of treatment
   b) Health Care Workers prescribe the wrong treatment, the wrong dose, or length of time for taking the drugs
   c) The supply of drugs is not always available
   d) All of the above

2. **What is the basic principle of Directly Observed Treatment?**
   a) Providing TB treatment to patients
   b) Making sure the patient comes to the clinic
   c) Making sure that the patient has a social grant
   d) Ensuring that the patient takes the TB treatment

3. **According to the National Guidelines, which investigation is needed to initially diagnose DR-TB?**
   a) Gene Xpert
   b) LPA
   c) Culture
   d) DST

4. **A patient has developed MDR-TB when there is resistance to...?**
   a) Rifampicin and Isoniazid
   b) All second-line TB drugs
   c) Only Isoniazid
   d) Only Rifampicin

5. **What are the 4 most common symptoms of MDR-TB?**
   a) Coughing up blood, rash, cough, loss of weight
   b) Jaundice, cough, upper abdominal pain, night sweats
   c) Cough, fever, night sweats, loss of weight
   d) Cough, coughing up blood, fever, loss of weight

6. **How often is smear microscopy and culture done when monitoring MDR-TB patients?**

   a) At baseline and then monthly

   b) Yearly

   c) Quarterly

   d) Only at baseline

7. **Answer True/False: Chest X-Rays may be normal in patients with MDR-TB**

T	F

8. **Which of the following drugs is a first-line TB drug?**

   a) Rifampicin

   b) Moxifloxacin

   c) Kanamycin

   d) Pyridoxine

9. **Answer True/False: The same treatment strategy can be used for all MDR-TB patients**

T	F

10. **Which of the following is a major side effect of MDR-TB treatment that requires urgent care?**

    a) Tingling and numbness of feet

    b) Diarrhoea

    c) Strange visions and thoughts

    d) Nausea and vomiting

11. **Answer True/False: All children diagnosed with MDR-TB receive the same MDR-TB treatment**

T	F

12. **Answer True/False: HIV positive patients diagnosed with MDR-TB can also receive Antiretroviral therapy**

T	F

13. The 2 phases of MDR-TB treatment are...?

a) Early and Late

b) Intensive and Continuation

c) Cure and Remission

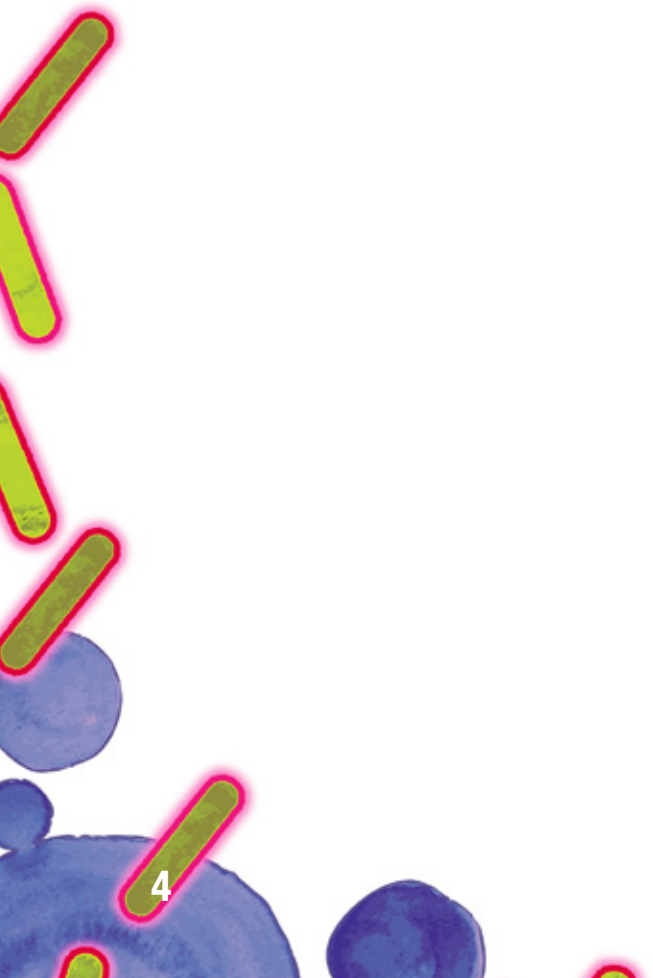
d) Primary and Secondary

14. Answer True/False: MDR-TB is transmitted in the same way as Drug-Susceptible TB

T	F

15. Answer True/False: A consent form must be signed by the patient before initiating MDR-TB treatment

T	F



CHAPTER 1 - OVERVIEW OF DRUG-RESISTANT TB

INTRODUCTION

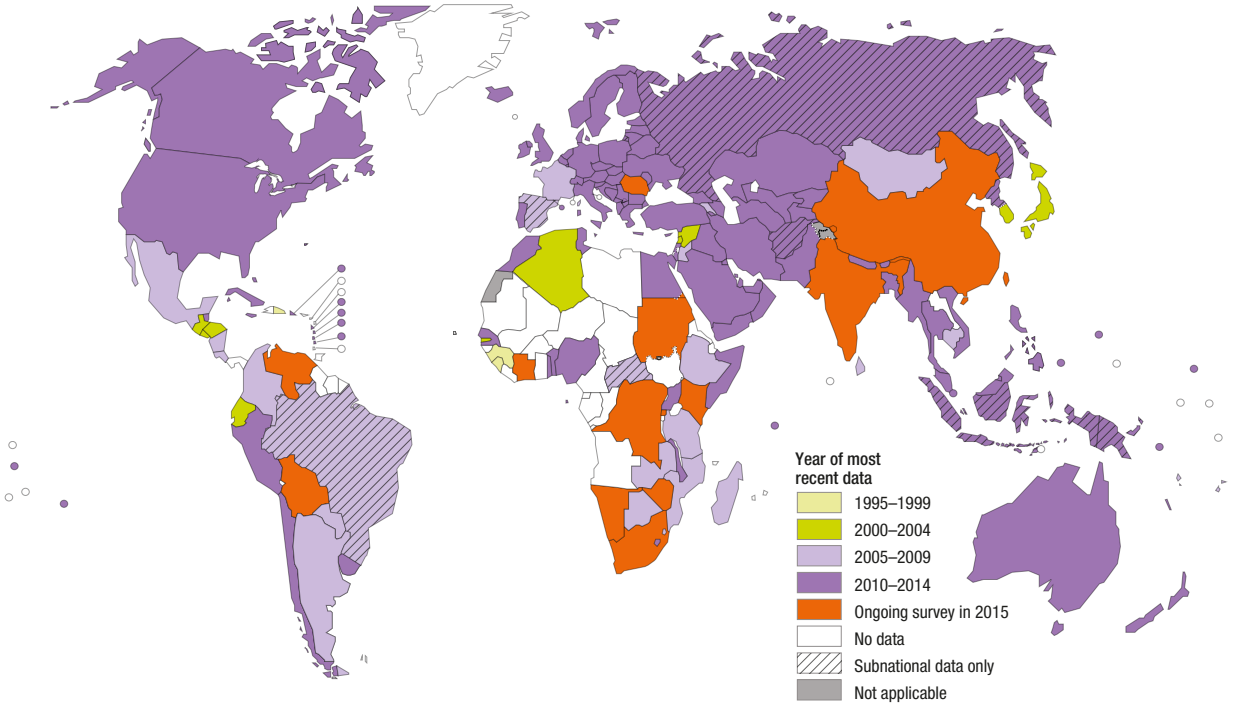
Globally, the control of Tuberculosis (TB) remains a challenge. Despite efforts to improve accessible quality care, problems still delay progress. Control of TB is further delayed by the development of Drug-Resistant Tuberculosis (**DR-TB**). DR-TB has been noted to be a 'man-made' problem due to the improper use of anti-tuberculosis drugs.

The statistics reveal that globally, an estimated 3.3% of new TB cases and 20% of previously treated TB cases have Multidrug-Resistant Tuberculosis (**MDR-TB**).

Data collected on **MDR-TB** shows that an estimated 480 000 people developed **MDR-TB** in 2014 and 190 000 people died due to **MDR-TB** in 2014.

More people are being tested for drug resistance since 2014; worldwide 58% of previously treated patients and 12% of new cases have been tested.

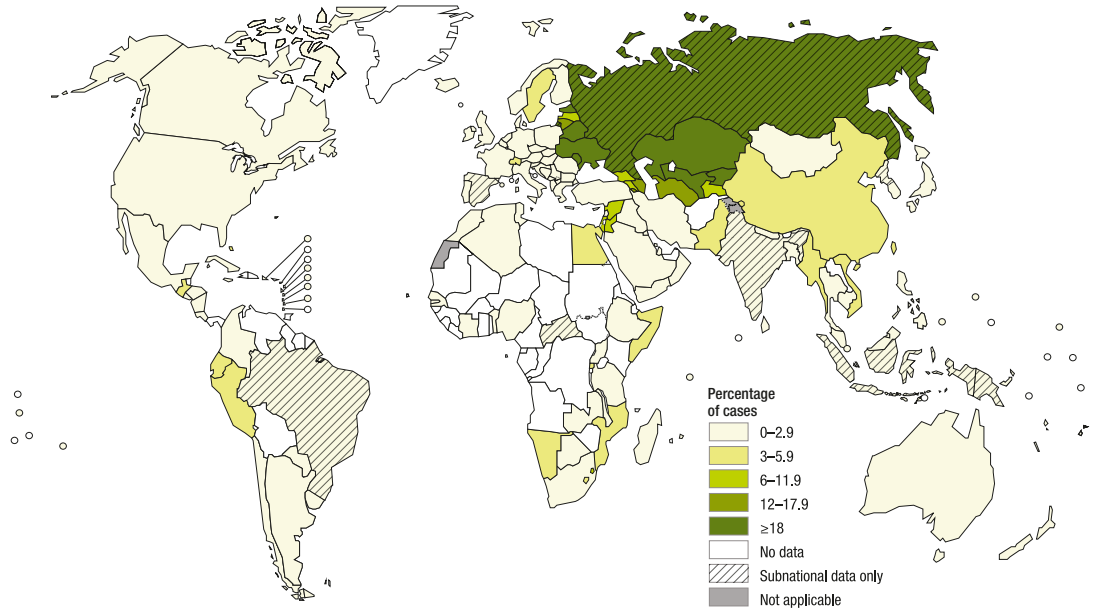
Global coverage of data collection on drug resistance; 1994-2015[1]



The global coverage of **DR-TB** has grown, more countries are reporting and recording data on **DR-TB**. This information helps in monitoring of the **DR-TB** problem and also ensures that resources such as medication and funding can be allocated to regions that are most affected. South Africa is one of the countries in which the **DR-TB** surveys were shown to be on-going in 2015.

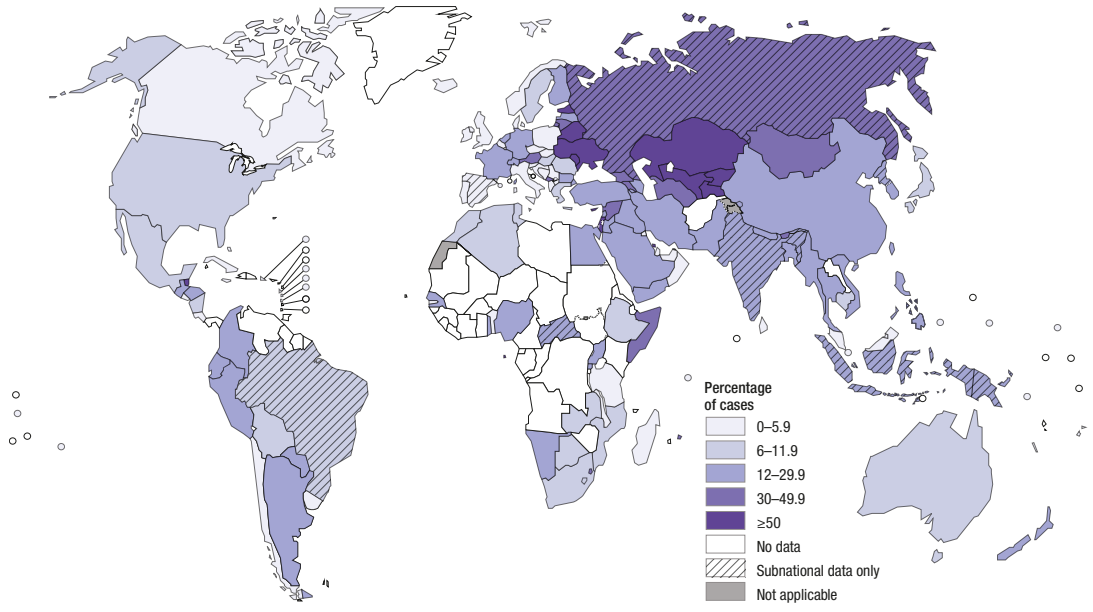
NEW MDR-TB CASES

Percentage of new TB cases with MDR-TB;[a] 2014



[a]Figures are based on the most recent year for which data have been reported, which varies among countries. Data reported before the year 2000 are not shown.

Percentage of previously treated TB cases with MDR-TB;[b] 2014

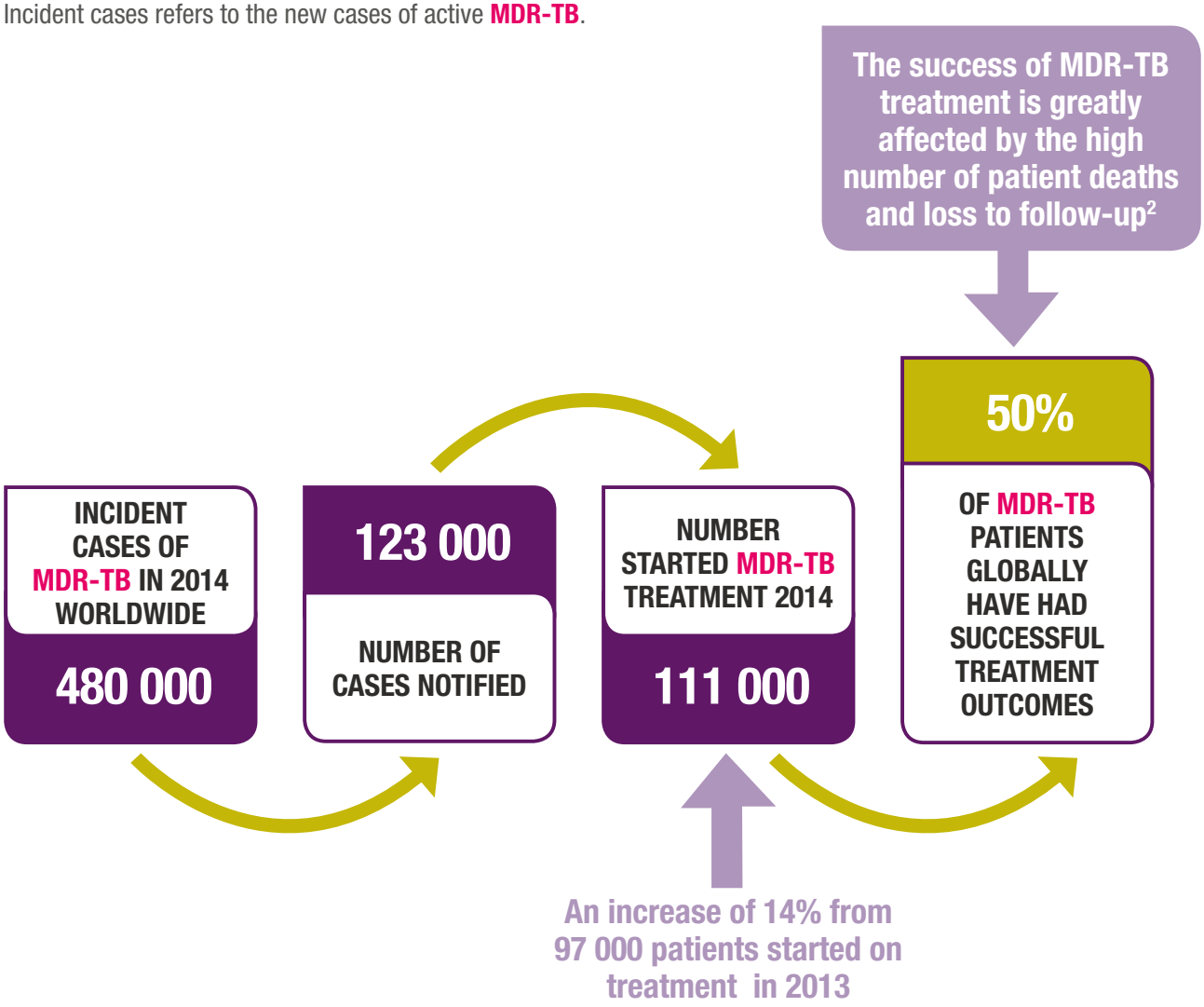


[b]Figures are based on the most recent year for which data have been reported, which varies among countries. Data reported before the year 2000 are not shown. In six countries or territories, the high percentage of previously treated cases with MDR-TB refer to only a small number (1-8) of notified TB cases. These are: Bahrain, Bonaire, Saint Eustatius and Saba, Cyprus, Israel, and Sao Tome and Principle.

As shown in the above figures, previously treated TB patients are at greater risk of getting MDR-TB as compared to those who had no previous TB infection.

What is an Incident Case?

Incident cases refers to the new cases of active **MDR-TB**.



SIZE OF THE PROBLEM IN SOUTH AFRICA[1]

South Africa is the world's 6th highest burden TB country, lagging behind countries with significantly larger populations, such as China and India. South Africa is also ranked the 10th highest **DR-TB** 'high burden' country.

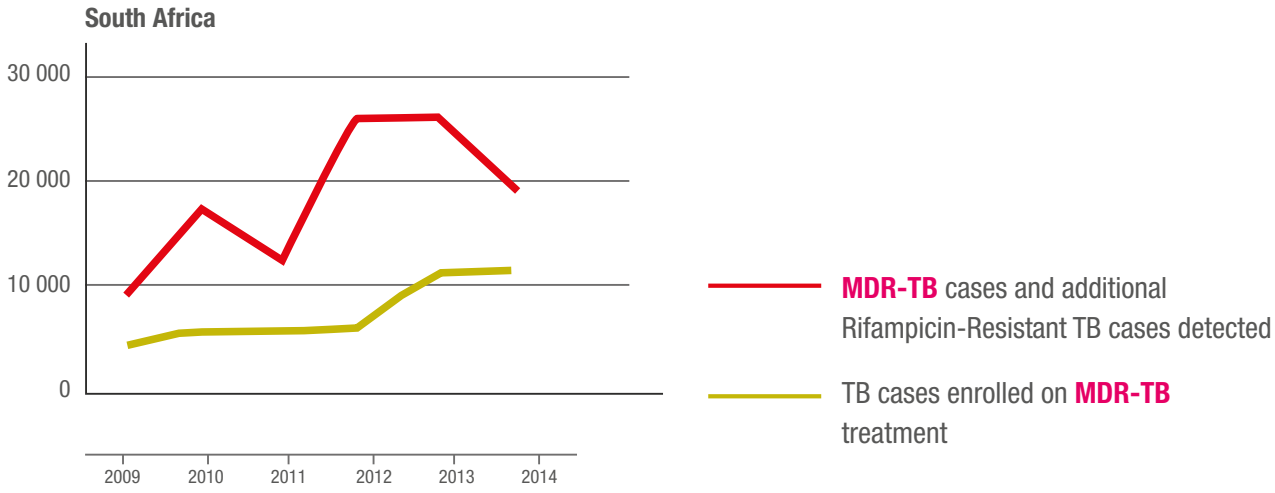
What is a 'high burden' DR-TB country?[3]

These are countries where there are at least 4000 cases of **MDR-TB** each year and/or at least 10% of newly registered TB cases are **MDR-TB**

The number of **MDR-TB** and **XDR-TB** patients have increased due to the coexisting HIV epidemic and poor management of TB.

There has been a steady increase in the number of **DR-TB** patients identified since 2006, due to the introduction of new diagnostic tests by the NHLS.

DR-TB cases detected vs the number of patients actually placed on treatment



From the figure above it can be seen that there is a big gap between the number of **DR-TB** cases detected and the number of patients actually placed on **MDR-TB** treatment.

A number of factors have contributed to this gap in treatment of **MDR-TB** patients:

- Insufficient trained staff
- Insufficient MDR-TB drugs due to the high cost
- Infrastructure problems which results in facilities unable to manage MDR-TB patients

NOTES

TEST YOUR KNOWLEDGE

Fill in the blanks:

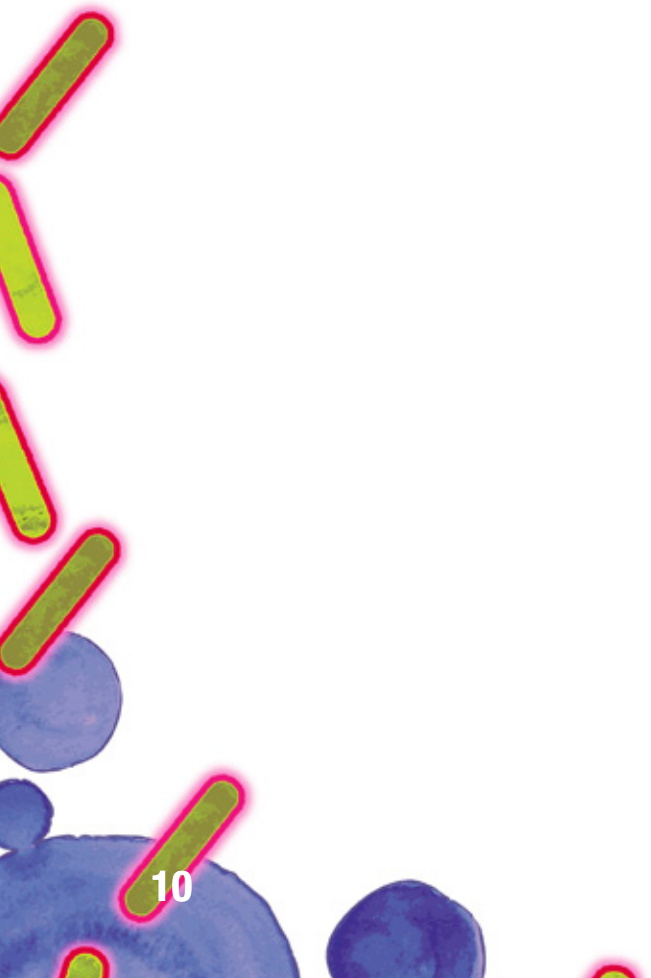
1. Control of TB is delayed by the emergence of .....

2. ..... is considered to be a man-made problem due to the improper use of ..... drugs.

3. Drug resistance surveillance data shows that an estimated ..... people developed ..... in 2014 and ..... people died due to ..... in 2014.

4. The successful treatment outcome for MDR-TB patients globally has been noted to be ..... %.

5. South Africa is globally ranked the ..... highest DR-TB high burden country.



Score .....

CHAPTER 2 - DECENTRALISED MANAGEMENT OF MDR-TB

THE DECENTRALISATION OF MDR-TB SERVICES[4]

In order to provide immediate access to treatment, the decentralisation of **MDR-TB** services has been implemented nationally. The decentralisation of **MDR-TB** services means the reorganisation or the transfer of health services to non-specialist sites i.e. primary health care clinics (PHC), to ensure that **MDR-TB** patients have greater access to care and are managed at different levels of care.

What are the different levels of health care for MDR-TB patients?

Level of Care	Role
Centralised DR-TB unit	There is one Centralised TB Unit per province This unit is responsible for starting and monitoring treatment for **XDR-TB**, Children with MDR-TB, Patients with diabetes, kidney problems and **MDR-TB** co-infection, Pregnant women with **MDR-TB**
Decentralised DR-TB Units	This unit can be just one Ward in a Hospital This unit is responsible for starting and monitoring treatment for **MDR-TB** This unit can also monitor treatment for **XDR-TB**
Satellite MDR-TB units	This unit is responsible for providing medication and monitoring **MDR-TB** patients This unit can start treatment for **MDR-TB** patients
PHC Clinics	Nurses at PHC clinics that are trained to manage **MDR-TB** can initiate treatment for patients with uncomplicated **MDR-TB** They are responsible for providing injectable treatment and monitoring the patient
Mobile Team	These teams consist of a nurse and a driver and are based at the PHC Clinic or the Satellite **MDR-TB** Unit They are responsible for tracing and monitoring all the contacts of **MDR-TB** patients They are able to provide injections to patients in their homes if the patient is unable to attend the clinic They can also supervise the intake of the oral tablets They educate the family about infection control
Community DOT Supporter/Caregiver	Depending on the local situation the DOT supporter may be community caregivers, community DOT supporters, family members

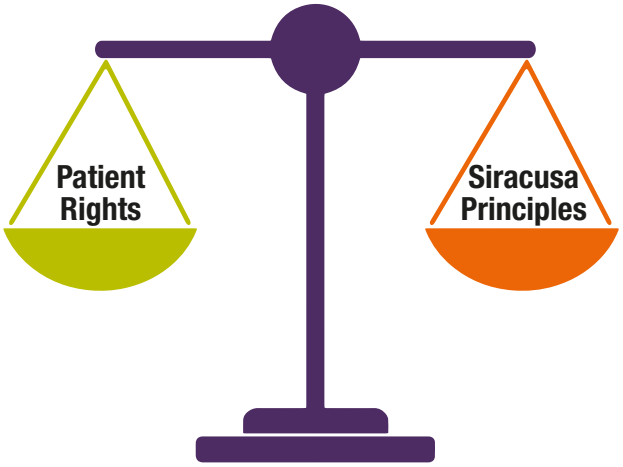
The benefits of decentralised management of **MDR-TB** patients:

- Increase patient's access to care thus will influence whether patient's take their treatment
- Accommodate patient's own needs as they will be closer to their homes
- Reduce the time in starting **MDR-TB** treatment, patients will no longer wait for hospital beds to become available in order to start treatment
- Reduce community transmission of **MDR-TB** because patients will be on treatment sooner

LAWS THAT APPLY TO THE MANAGEMENT OF MDR-TB

Bill of Rights, Enshrined in the Constitution of the Republic of South Africa, 1996[5]

Affords individual rights to every person and also balances competing rights and communal interests



Siracusa Principles[6]

"Public health may be invoked as grounds for limiting certain rights in order to allow a state to take measures dealing with a serious threat to the health of the population or individual members of the population. These measures must be specifically aimed at preventing disease or injury or providing care for the sick and injured and that due regard shall be had to the international health regulations of the World Health Organization."

- The legal frame work for managing **DR-TB** speaks to the needs of the public and the healthcare workers.
- If a patient infected with **DR-TB** intentionally refuses treatment and is a danger to the public, isolation or interference with freedom of movement may be necessary for the good of the public. This is considered legal under international human rights laws.
- The management and prevention of **DR-TB** requires teamwork between all affected which includes consideration of the community and the individual involved.
- Patients who refuse admission but who are willing to receive treatment, can receive treatment at a community health centre close to their homes. They must adhere to **strict infection control measures** both at home and in the community.[4]

NOTES

TEST YOUR KNOWLEDGE

1. Fill in the table by selecting the correct answer from the list provided below:

a) Providing treatment, monitoring adherence and side effects

b) Starting and monitoring treatment of XDR-TB and Paediatric and complicated MDR-TB patients

c) Providing treatment and support to MDR-TB patients receiving treatment at home

d) Starting and monitoring treatment in MDR-TB, mono-and poly- resistant patients

e) Providing injectable drugs at clinics and DOT

Level of Care	Role/Function
Centralised DR-TB unit	
Decentralised DR-TB unit	
Satellite MDR-TB unit	
Mobile Team/PHC	
Community: DOT supporters and Caregivers	

2. Answer True/False:

Patients who refuse admission but who are willing to receive treatment, can receive treatment at a community health centre close to their home if they adhere to **strict infection control measures** both at home and in the community.

T	F

Score	

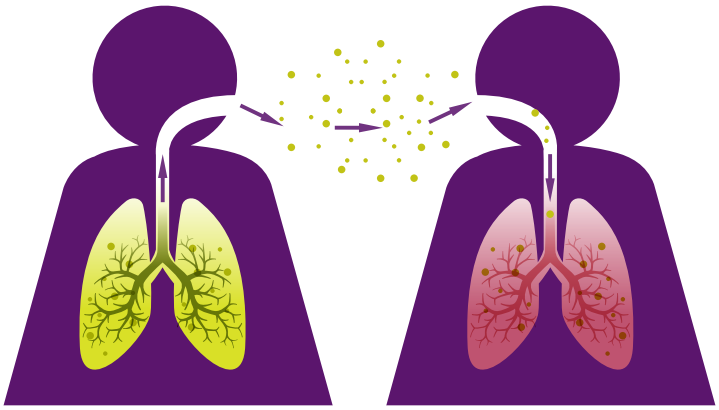
CHAPTER 3 - DEVELOPMENT OF TB

HOW DOES TB DEVELOP?[7]

TB is an air-borne disease. This means that it is spread through the air.

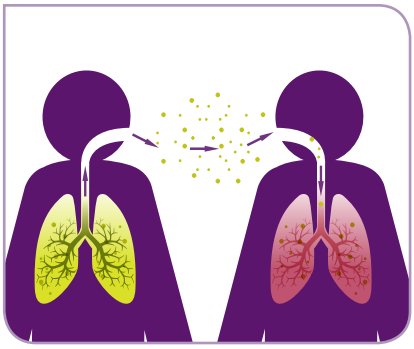
TB spreads through the air from person to person.

- If people who are sick with TB of the lungs cough, sneeze or spit, **invisible, infectious droplets are spread into the air**
- These droplets contain TB bacteria
- They stay in the air for many hours and anyone who breathes in the droplets can become infected



- Although TB is not usually spread by brief contact, anyone who shares air with a person with TB disease of the lungs in an infectious stage is at risk of getting TB
- It is easy for bacteria to pass from person to person when people live closely together
- **Long exposure to infectious TB bacteria in enclosed spaces with poor ventilation increases risk of transmission**
- TB is not spread by handling objects that the patient has come into contact with e.g. dishes, drinking glasses, sheets or clothing

STAGES IN TB DISEASE



STAGE 1: Exposure

- When people are exposed to people infected with TB, they breathe in droplets that contain TB bacteria
- The bacteria are inhaled into the lungs and begin to multiply
- However, not every person that is exposed to TB becomes sick - In some cases the immune system overcomes the TB

STAGE 2: Infection

- Within 2 to 8 weeks, the immune system may gain control of the bacteria-this phase of the illness is called **Latent TB**. The patient has **TB infection but not feeling sick**
- Because the immune system is keeping the TB bacteria under control, people with latent TB infection **do not feel sick**-the bacteria are alive but are sleeping in the body. They can remain this way for a very long period of time, even for life

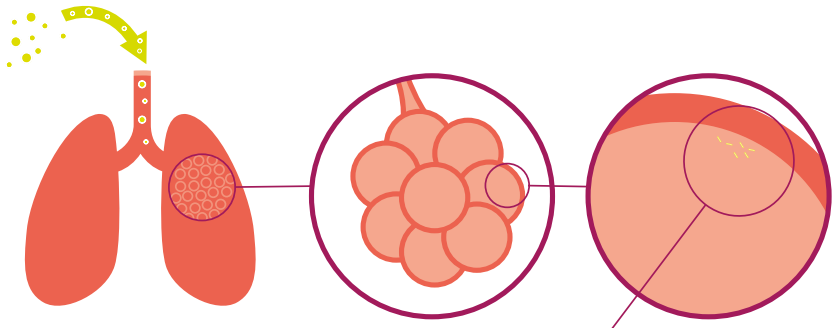
STAGE 3: Disease

- If the **immune system cannot keep the TB bacteria under control,** the bacteria grow and begin to attack the lungs
- The patient then becomes sick-this is called Active TB
- This can occur if the immune system weakens or if there is exposures to a large dose of TB bacteria
- Factors that can weaken your immune system and cause TB to become active include:
  - HIV infection
  - Alcoholism or drug abuse
  - Malnutrition
  - Old age
  - Medication including steroids and chemotherapy
  - Chronic illnesses such as diabetes (high sugar levels), kidney failure, cancer
  - Children under 5 years of age are also at risk
  - Living and working in poorly ventilated places (mines, prisons)
- When TB is active, people become sick and develop signs and symptoms-this is called **TB disease**
- People with TB disease may spread TB to others if the active TB is in their lungs

SUMMARY

STAGE 1: Exposure

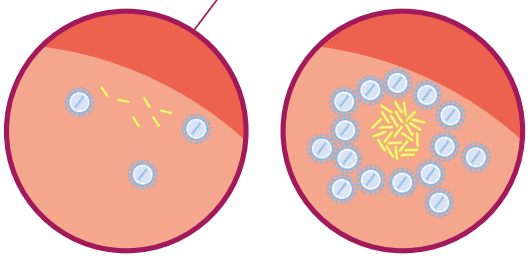
TB BACTERIA are inhaled into the lungs of an uninfected person via droplets sneezed, coughed or spat by another **PERSON WHO IS ILL WITH TB**.



STAGE 2: Infection

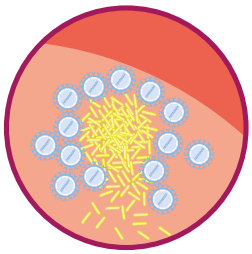
TB BACTERIA are recognised as invaders and are contained by the healthy immune system (white blood cells-including the **CD4 CELLS**).

This is known as **LATENT TB.**



STAGE 3: Disease

Immune system unable to contain the **TB BACTERIA** which escape into the rest of the lung-and possibly other parts of the body causing disease. This is known as **ACTIVE TB.**



INFECTION VS DISEASE IN LUNGS

TB INFECTION	TB DISEASE
TB present	TB present or absent
Tuberculin skin test positive	Tuberculin skin test positive
Chest X-ray normal	Chest X-ray usually reveals lesion
Sputum smear microscopy and cultures negative	Sputum smear microscopy positive or negative and cultures positive
No symptoms	Symptoms such as cough, fever, weight loss, night sweats
Not infectious	Often infectious before treatment
Not defined as a case of TB	Defined as a case of TB

NOTES

TEST YOUR KNOWLEDGE

1. **What does air-borne disease mean?**

.....

.....

.....

2. **TB can be spread from person to person by…?**

   a. coughing

   b. sneezing

   c. spitting

   d. all of the above

3. **Fill in the blanks**

STAGE 1: Exposure STAGE 2: ..... STAGE 3: .....

4. **When does active TB occur?**

.....

.....

.....

Score

CHAPTER 4 - TREATMENT FOR TB

TB treatment is effective if the correct drugs are given for the correct period of time.

The aim of TB treatment is to:

- Cure the patient of TB
- Decrease the spread of TB
- Prevent the development of drug resistance
- Prevent recurring TB
- Prevent deaths due to TB or its complications

How do the TB drugs work?

TB drugs can either be bactericidal or bacteriostatic in activity

Bactericidal antibiotics kill bacteria directly

Bacteriostatic antibiotics stop bacteria from growing

FIRST-LINE TB DRUGS[7]

Drug-Susceptible TB **(DS-TB)** is infection with TB bacteria that can be treated with all first-line TB drugs. First-line TB drugs are medications that are able to successfully treat TB. The medication is usually available in fixed dose combination tablets e.g. **Rifafour** (Isoniazid, Rifampicin, Pyrazinamide, Ethambutol), **Rifinah** (Isoniazid, Rifampicin). This fixed dose combination tablets are included in the standard treatment regimens for treating TB.

Drug Group	Example
Group 1: First-Line TB Drugs	Isoniazid, Rifampicin, Pyrazinamide, Ethambutol

The standard treatment regimen consists of an **INTENSIVE PHASE LASTING 2 MONTHS** and a **CONTINUATION PHASE LASTING 4 MONTHS.**

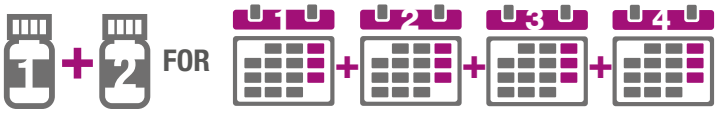
PHASES OF TB TREATMENT: 4 for 2 + 2 for 4

INTENSIVE PHASE

4 (drugs) **for 2** (months)
Isoniazid (H/INH), Rifampicin (R), Pyrazinamide (Z), Ethambutol (E)

CONTINUATION PHASE

2 (drugs) **for 4** (months)
Isoniazid (H/INH), Rifampicin (R)



Drugs used in the **intensive phase** such as Isoniazid, Rifampicin and Pyrazinamide **kill the TB bacteria** and Ethambutol stops the TB bacteria from growing.

Drugs in the **continuation phase** kill the remaining bacteria and **prevent TB from recurring**. Rifampicin and Isoniazid are the drugs used in this phase.

SECOND-LINE TB DRUGS[8]

The second-line TB drugs are grouped according to their usefulness in treating strains of TB that are resistant to first-line TB drugs. A few examples of drugs for each drug group are noted below.

Drug Group	Examples	Activity
Group 2 Injectable drugs	Kanamycin, Amikacin,Capreomycin	Kills the **DR-TB** bacteria
Group 3 Fluoroquinolones	Moxifloxacin, Levofloxacin	Kills the **DR-TB** bacteria
Group 4 Oral second-line drugs	Ethionamide, Terizidone, Para aminosalicyclic acid (PAS)	Stops the **DR-TB** bacteria from growing
Group 5 Drugs of unclear efficacy	Amoxicillin/Clavulanate(Augmentin), Azithromycin, Thioacetazone, Imipenem, High dose INH, Linezolid,Clofazimine, Bedaquiline, Delaminid	Some activity against TB bacteria but this is unclear

Bedaquiline and Delaminid are the first new DR-TB drugs that have been developed in almost 50 years. They are useful when Injectables cannot be used due to side effects or when the patient has XDR-TB.

SUPPLEMENTARY TREATMENT:

Pyridoxine (Vitamin B6): 150mg

- Is used to prevent peripheral neuropathy (tingling and numbness)
- Side Effects are more common when using second-line TB drugs so high doses of pyridoxine may be needed, up to 200mg daily

SUMMARY:

First-Line TB Drugs

- These drugs have the greatest activity against TB bacteria and they are essential to the TB drug treatment program
- These drugs are usually in Group 1
- Examples: Rifampicin, Isoniazid, Ethambutol, Pyrazinamide

Second-Line TB Drugs

- Current TB drugs are grouped according to their usefulness in treatment of **DR-TB**
- All the drugs in Group 2 to 5 are referred to as second-line TB drugs
- The second-line TB drugs are able to kill and stop the **DR-TB** bacteria from growing
- The important second-line drugs are the Injectables and Fluoroquinolones

NOTES

TEST YOUR KNOWLEDGE

1. **Name 2 aims of TB treatment**

   a. .....

   b. .....

2. **TB drugs work in the following 2 ways; explain what is meant by:**

   a) Bactericidal: .....

   b) Bacteriostatic: .....

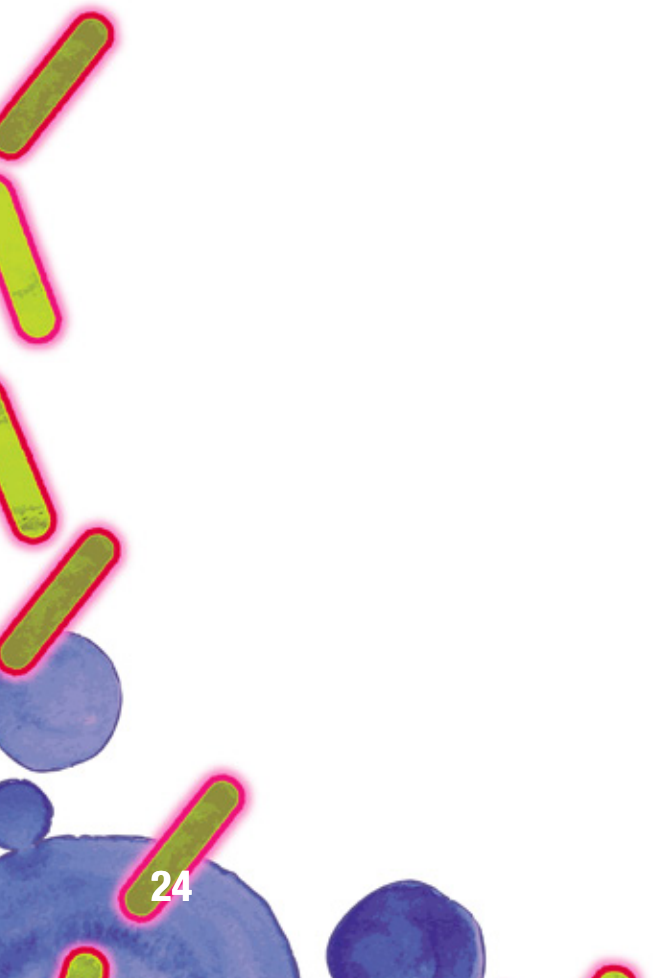
3. **Name 2 examples of:**

   First-line TB drugs: a. .....

   b. .....

   Second-line TB drugs: a. .....

   b. .....



Score

CHAPTER 5 - DRUG-RESISTANT TB

DRUG-RESISTANT TB[5]

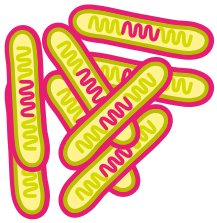
DR-TB are strains of TB that are **not treatable** or are **unaffected** by most first-line TB drugs.

Other Categories of Resistance

Mono-Resistance: TB bacteria that are resistant (do not respond) to one of the first-line TB drugs except for Rifampicin

Poly-Resistance: TB bacteria that are resistant to two or more first-line TB drugs **except** Isoniazid and Rifampicin

Rifampicin-Resistance: TB bacteria that is resistance to Rifampicin with/without resistance to other drugs



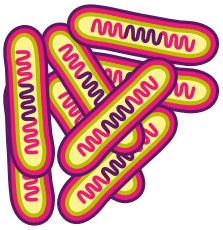
WHAT IS MDR-TB?

M-Multi

D-Drug

R-Resistant

MDR-TB is a form of TB caused by bacteria that do not respond to Isoniazid and Rifampicin, which are the two most powerful first-line TB drugs.



WHAT IS XDR-TB?

X- Extensively

D- Drug

R- Resistant

XDR-TB is a form of **MDR-TB** that responds to even fewer available medicines, including the most effective second-line TB drugs.

XDR-TB is spread in the same way as other forms of TB.

XDR-TB can develop in 2 ways:

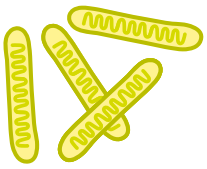
1. When a person is receiving treatment for TB and the TB drugs are misused or mismanaged:

- Wrong treatment given
- Wrong dose
- Treatment given for too short a period of time
- Poor drug supply to the clinic

2. When a person becomes infected from a patient who already has **XDR-TB**

XDR-TB takes a long time to be treated.

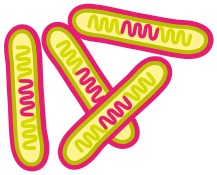
SUMMARY:



DRUG-SUSCEPTIBLE TB

CURABLE WITH FIRST-LINE TB DRUGS IF THE MEDICATION IS TAKEN CORRECTLY

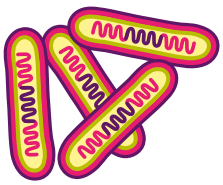
IF TREATMENT IS STOPPED OR INTERRUPTED, **RESISTANT TB** DEVELOPS



MDR-TB

RESISTANT TO ISONIAZID AND RIFAMPICIN

DURATION OF TREATMENT FOR **MDR-TB** IS LONGER AND THE SIDE EFFECTS ARE SEVERE



XDR-TB

RESISTANT TO MOST OF THE TB DRUGS INCLUDING THE INJECTABLES AND FLOUROQUINOLONES

XDR-TB TAKES A LONG TIME TO BE TREATED AND SIDE EFFECTS CAN BE SEVERE

NOTES

TEST YOUR KNOWLEDGE

1. What is **MDR-TB**?

2. What is **XDR-TB**?

3. What is Rifampicin-Resistance?

Score

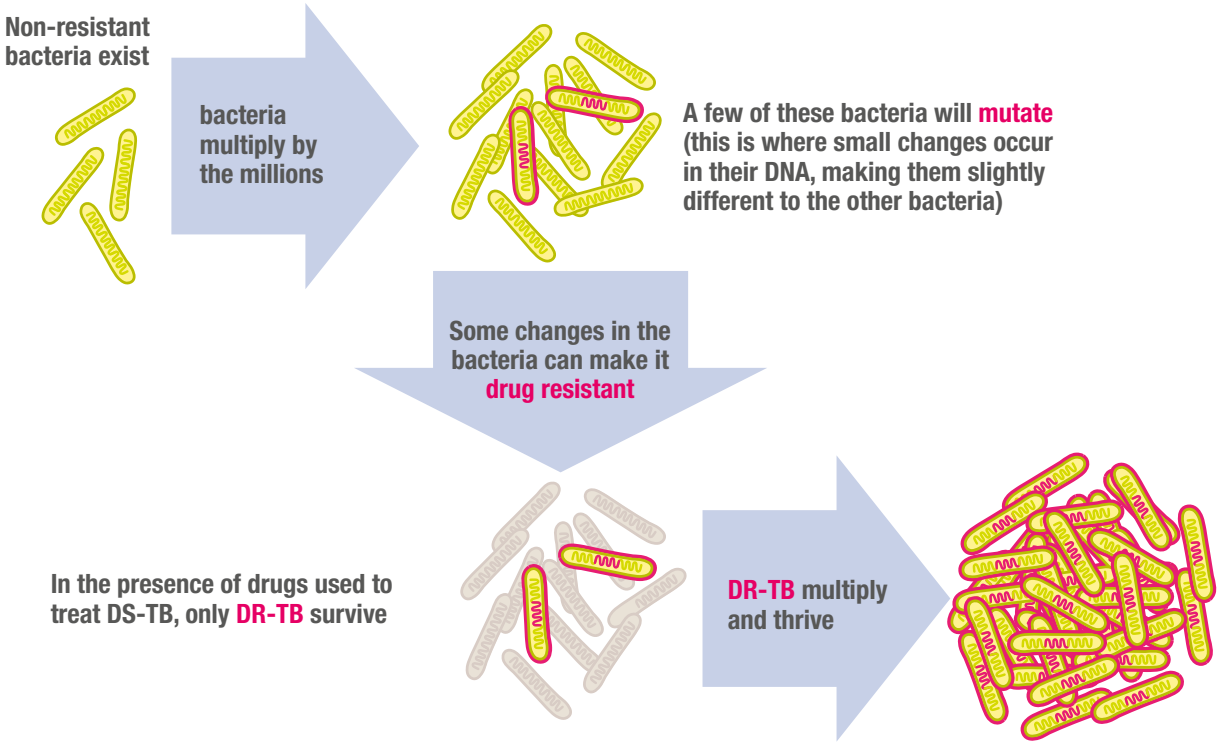
CHAPTER 6 - DEVELOPMENT OF MDR-TB

Resistance to TB drugs is regarded as a man-made problem because it is largely due to human error. Drug resistance can occur when:

- Patients do not complete their full course of treatment
- Health Care Workers prescribe the wrong treatment, the wrong dose, or length of time for taking the drugs
- The supply of drugs is not always available
- Patients do not take their TB medication as prescribed

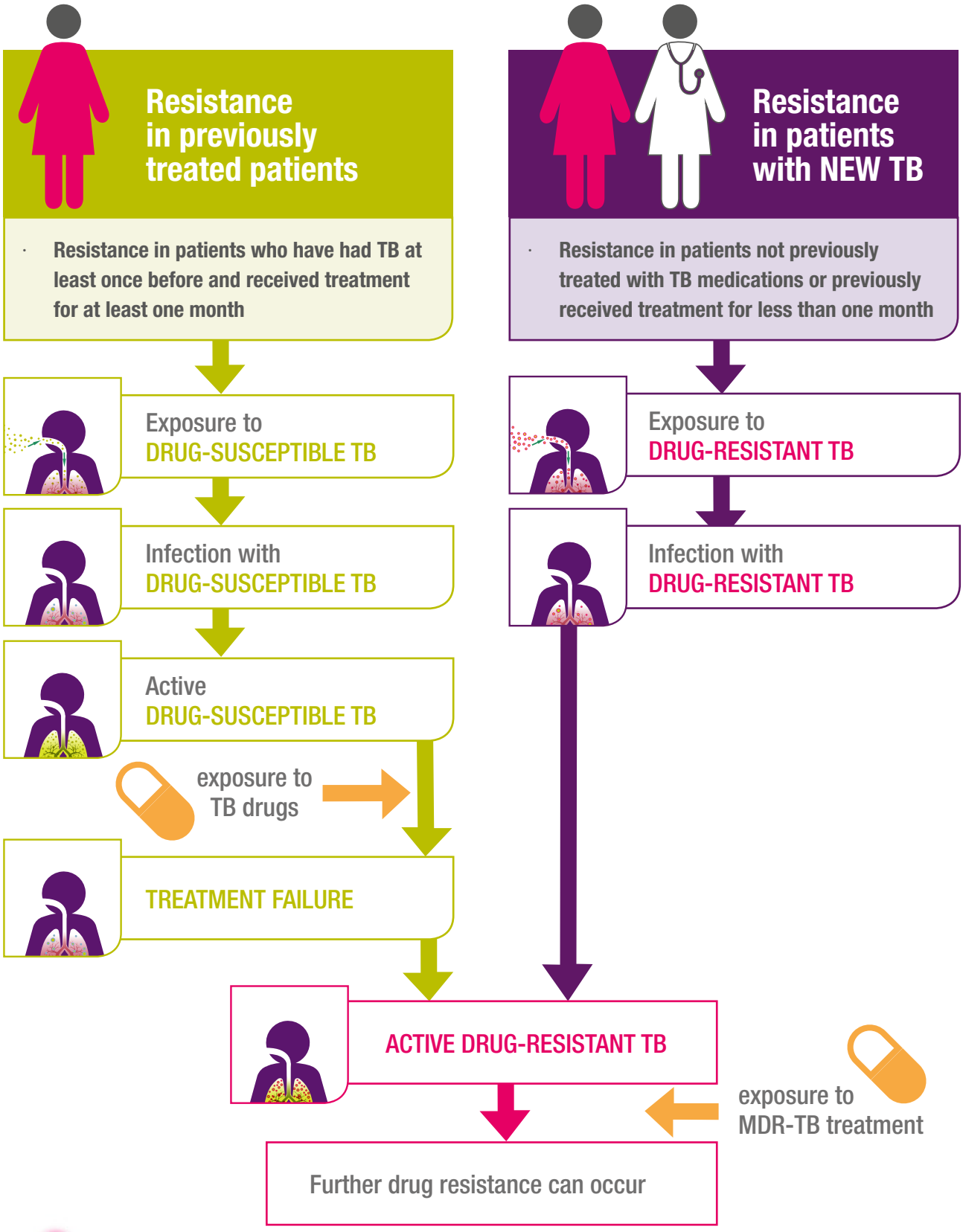
The TB bacteria change/mutate and the TB drugs are not able to work on the new bacteria. The changed/mutant TB bacteria are then able to multiply and increase in number.

HOW DOES MDR-TB DEVELOP?



MDR-TB GROUPS:[4]

MDR-TB is grouped according to the history of previous TB infection as follows:



Example

MDR-, XDR-TB epidemic in Tugela Ferry, Umzinyathi District, Kwa-Zulu Natal[9]

- Identification of **MDR-** and **XDR-TB** cases, 2005
- Most of patients were HIV positive (76%) and did not have previous TB; all patients were shown to have the same strain of TB
- The drug resistant outbreak in this area was due to the transmission of already resistant strains–NEW CASES
- This outbreak highlighted that a few inadequately treated TB patients–PREVIOUSLY TREATED CASES can transmit the same strain of resistant TB to others in the community
- With poor infection control measures within facilities, resistant strains of TB can be transmitted to other patients and staff

WHO IS AT RISK OF DEVELOPING MDR-TB?[10]

Drug resistance is more common in people who:

1 Do not take their TB medicine regularly

2 Do not take all of their TB medicine as told by their doctor or nurse

3 Develop TB disease again, after having taken TB medicine in the past

4 Come from areas of the world where drug-resistant TB is common

5 Have spent time with someone known to have DR-TB disease

WHEN DO WE SUSPECT THAT MDR-TB HAS DEVELOPED?

MDR-TB is often suspected clinically when:

- A patient has repeat positive smear microscopy or culture results
- When a patient does not respond to TB treatment despite documented good adherence/taking the medication
- When a person has had exposure to a confirmed or suspected MDR-TB patient

NOTES

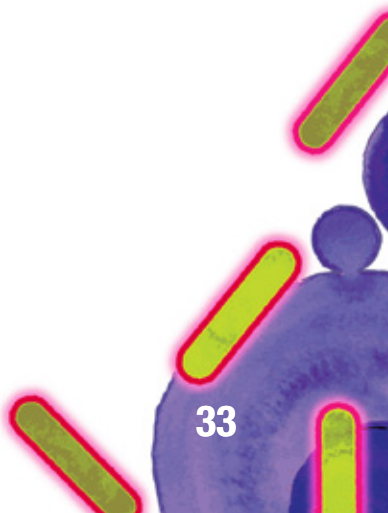
TEST YOUR KNOWLEDGE

1. **Name 2 ways in which MDR-TB develops**

2. **How is MDR-TB grouped?**

3. **Discuss 2 situations when people are at risk for developing MDR-TB**

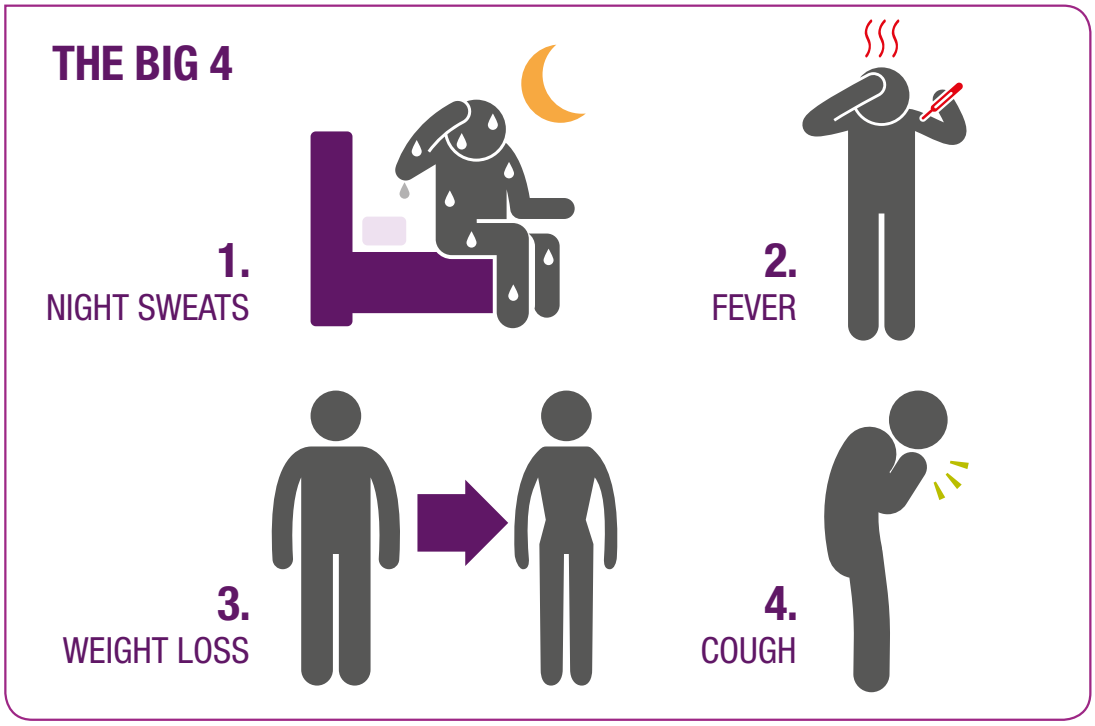
Score



CHAPTER 7 - DIAGNOSIS OF MDR-TB

WHAT ARE THE SYMPTOMS OF MDR-TB?[4]

The symptoms of **MDR-TB** are the same as for **DS-TB**:



Other symptoms may include:

- Chest pain
- Shortness of breathe
- Coughing up of blood or mucus containing blood
- In addition chills and tiredness may also be present

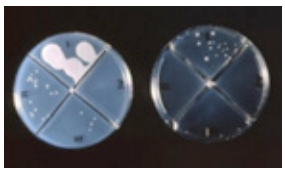
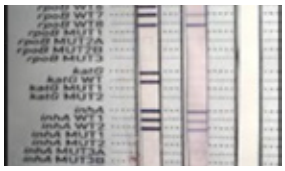
HOW DO WE ASSESS A PATIENT FOR MDR-TB?[4]

- Always start with a **complete medical history:** This should include any previous TB, previous treatment regimen (as we want information on whether any second-line drugs were used) as well as if the if the patient has any other medical conditions such as diabetes or is taking steroids
- Ask about **work history**-especially if the patient has worked in a mine, been incarcerated, health care workers including people that have worked or works at a laboratory
- **Family history** is important, and contacts should be screened
- **Physical examination:** the clinical presentation of patients with **DS-TB** and **DR-TB** will be the same
- **Bacteriological investigations** (discussed below) are often used to confirm the diagnosis

All patients who do not know their HIV status should be offered counselling and voluntary testing.

TESTS USED TO DIAGNOSE MDR-TB

Examination of the sputum samples are done in a laboratory after they have been collected at the clinic or hospital.

TEST	DESCRIPTION
Gene Xpert 	· Relatively new diagnostic tool in South Africa · This test has an advantage over the existing TB smear microscopy (N.B. terminology explained later in the chapter) because it is able to identify a greater number of patients truly affected by the disease and identifies many patients that would not have been diagnosed using TB microscopy, the test is able to detect the genetic material of the TB bacteria · The Xpert MTB/RIF test reports on whether TB bacteria was detected or not detected and is also able to identify resistance to rifampicin (see table on right) accurately within a short time frame, thus a diagnosis of TB can be made quickly and the patient can be placed on appropriate treatment
Culture 	· Provides a definitive diagnosis of TB · It increases the number of cases found because it allows even few TB bacteria time to grow and thus TB is then identified · Culture results for TB may take 4-6 weeks because the TB bacteria grow slowly
Drug Susceptibility Testing (DST) 	· Provides a definitive diagnosis of TB · It increases the number of cases found because it allows even few TB bacteria time to grow and thus TB is then identified · Culture results for TB may take 4-6 weeks because the TB bacteria grow slowly
Line Probe Assay (LPA) 	· Focuses on rapid detection of rifampicin-resistance, alone or in combination with isoniazid · A Culture and DST are still required to confirm resistance

Gene Xpert reports two results:

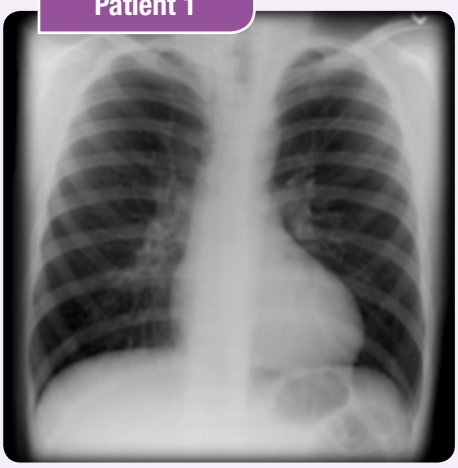
Result	Comment
1. Confirm presence of MTB	
MTB complex detected	The patient has TB disease
MTB complex not detected	TB disease cannot be excluded; the sensitivity of the Gene Xpert is low if the sputum sample contained just a few bacteria. Further tests are required to confirm TB disease e.g. Culture
2. Screen for Rifampicin-Resistance	
Rifampicin-susceptible	TB disease can be treated with Rifampicin, but there may be resistance to other first-line drugs
Rifampicin-resistant	TB disease cannot be treated with Rifampicin, the patient needs to be investigated for Isoniazid resistance and this will be done using LPA

All patients with Gene Xpert MTB positive results with resistance to rifampicin will start MDR-TB treatment, but these patients also require laboratory confirmation of MDR-TB by Culture & DST. In addition, the sputum sample should be sent for baseline smear microscopy and LPA.

Can a Chest X-Ray or Smear Microscopy or a Montoux Test (Tuberculin Skin Test) be used to diagnose MDR-TB?

Chest X-Ray

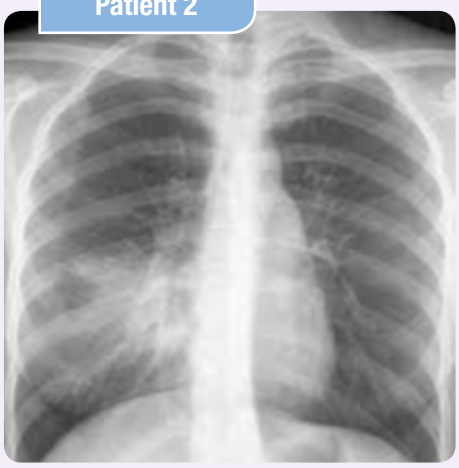
Patient 1



Radiopaedia.org

Which patient has MDR-TB?

Patient 2



www.sharinginthehealth.ca

The Chest X-Ray is able detect abnormalities in the lung, which may suggest Pulmonary (Lung) Tuberculosis, but Chest X-Rays cannot be used to make a definite diagnosis. It is thus not possible to use a Chest X-Ray to differentiate between **DS-TB** and **MDR-TB**. A patient with **MDR-TB** may have a normal Chest X-Ray.

Smear Microscopy

Smear Microscopy cannot distinguish between **DS-TB** and **DR-TB**, or between different types of bacteria.

It is used to **monitor** patients on TB treatment and to assess the level of infectiousness of the patient based on the presence of Acid Fast Bacilli.

Acid Fast Bacilli are bacteria that retain the dye which is used to stain them and are then visible under a microscope.

Positive Smear Microscopy: Presence of Acid Fast Bacilli
Negative Smear Microscopy: Absence of Acid Fast Bacilli

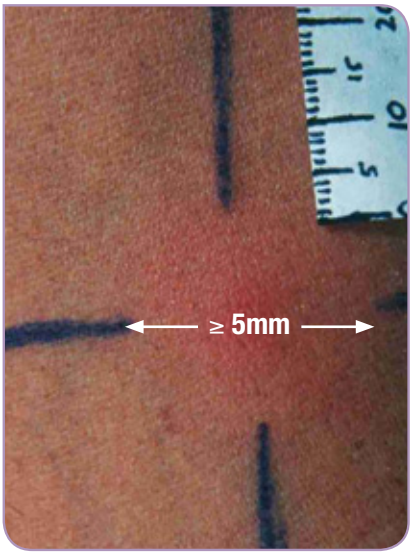
Reason why Smear Microscopy cannot distinguish between DS- and DR-TB

The laboratory looks for bacteria using a microsocope after the specimen has been stained with a dye and washed with an acid solution. Because other bacteria can also be stained with the dye, a positive smear result cannot be used to confirm diagnosis of TB

Montoux Test (Tuberculin Skin Test)

The **tuberculin skin test (TST)** is the standard method of determining whether a person is infected with TB but the test **does not diagnose TB disease.**

When TB infection has occurred the body becomes sensitive to certain parts of the bacteria. The tuberculin test is performed by injecting a small quantity of purified protein product of the bacteria into the inner surface of the skin. If a reaction occurs, some swelling at the injection site occurs. A swelling of ≥ 5mm is considered to be a positive result i.e. this tells us that TB infection is present. The skin test is read between 48 to 72 hours after administration of the injection.



Proving *drug resistance* to *Tuberculosis* from a sputum sample from the patient **is the only definitive diagnosis of MDR-TB.**

NOTES

TEST YOUR KNOWLEDGE

1. **List the symptoms of MDR-TB?**

2. **Answer True/False:**

   Chest X-Rays can be used to diagnose MDR-TB

T	F

3. **Interpret the following Gene Xpert result:**

   "MTB complex detected, RIF resistant"

Score

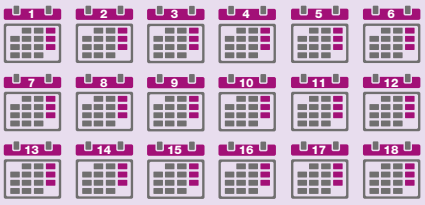
CHAPTER 8 - MANAGEMENT OF MDR-TB

Treatment of patients with **MDR-TB** involves using second-line TB drugs.
The second-line drugs are:

- Much more expensive
- Less effective
- Have more side effects than first-line TB drugs

PHASES OF MDR-TB TREATMENT

MDR-TB treatment consists of two phases:[4]

PHASE	DURATION	CHARACTERISTICS
INTENSIVE	 At least six months and until sputum smear microscopy and cultures are continuously negative	· Close monitoring for side effects, especially if using an injectable · Combination of injectable and oral drugs are used
CONTINUATION	 18 months from the time that the first culture becomes negative	· Fewer side effects · Usually only oral drugs prescribed

The duration of treatment for **MDR-TB** can be up to ±24 months.

Remember that the Intensive Phase will not be shorter than 6 months.

WHAT IS THE DURATION OF MDR-TB TREATMENT?

The recommended duration of treatment is guided by:

- Culture conversion
- Determined by adding 18 months to the culture conversion date (see next page)

Extension for up to 24 months may be needed in chronic cases of **MDR-TB** with wide spread damage to the lungs.

What is Culture Conversion?

- When a positive culture progresses to no growth of M. Tuberculosis on sputum culture
- Achieved when patient gets a second negative TB culture (specimen taken 30 days apart)
- **Conversion date** is the date of collection of the first negative Culture Specimen

MDR-TB TREATMENT REGIMENS[4]

The Standard treatment regimen is used for patients who have not been previously exposed to second-line TB drugs. For patients who have been previously treated with second-line TB drugs an individual treatment regimen is formulated.

Standard MDR-TB Regimen

The standard MDR-TB regimen consists of an intensive phase of at least six months with five drugs followed by a continuation phase of 18 months with four drugs.

Treatment should be given at **least six days per week.** This regimen is recommended for all newly diagnosed **MDR-TB** patients.

5 for 6 + 4 for 18

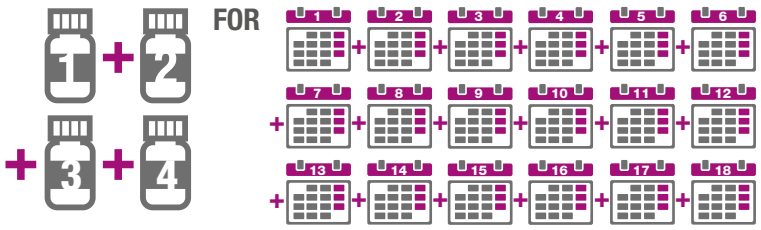
INTENSIVE PHASE

5 drugs for a minimum of **6** months

The drugs used are Kanamycin (Km) or Amikacin (Am), Moxifloxacin (Mfx) or Levofloxacin (Lfx), Ethionamide (Eto), Terizidone (Trd) and Pyrazinamide (Z)

CONTINUATION PHASE

4 drugs for **18** months



The drugs used are Moxifloxacin (Mfx) or Levofloxacin (Lfx), Ethionamide (Eto), Terizidone (Trd) and Pyrazinamide (Z)

Individual MDR-TB Regimen

The following needs to be taken into account when considering an individual MDR-TB Regimen:

1. History of TB drugs received

will alert us to TB drugs that should not be used as there may be resistance to them

2. Drug susceptibility test (DST)

will tell us which TB drugs that can be used to treat the infection

A treatment regimen for XDR-TB is also based on the patient's previous TB drug history and the results of the DST.

NOTES

TEST YOUR KNOWLEDGE

1. **Name the 2 phases of MDR-TB treatment**

2. **What is the minimum duration for each treatment phase?**

3. **When is the individual treatment regimen for MDR-TB considered?**

4. **What is the total duration of MDR-TB treatment?**

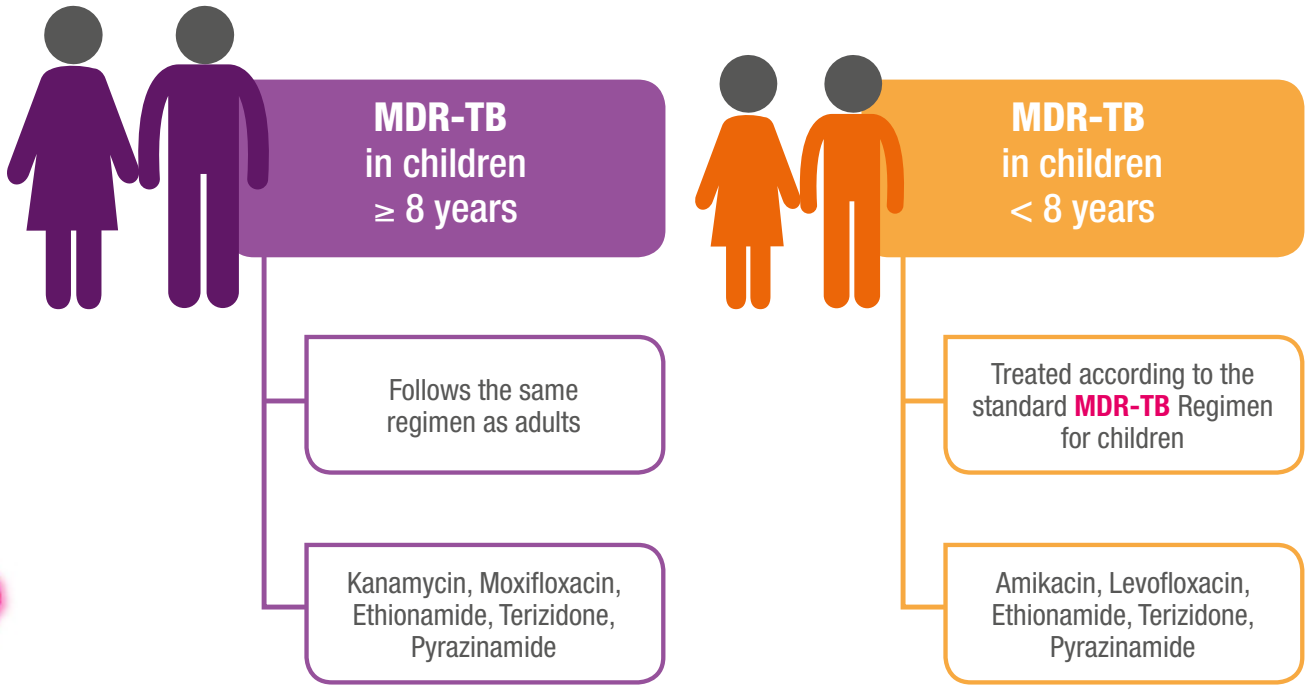
Score

CHAPTER 9 - MANAGEMENT OF CHILDREN WITH MDR-TB

Children with **MDR-TB** generally are infected from an adult who has MDR-TB. It is challenging to diagnose **MDR-TB** in young children as they are not able to produce sputum on request. Careful collection of sputum has to be done.

If a child with symptoms of TB has been in close contact with a **MDR-TB** patient, treatment for **MDR-TB** can be started based on the contact history. This also means that the child's treatment regimen may be based on the treatment that the 'MDR-TB patient' was receiving i.e. standard regimen or an individual regimen.

Even though some of the **MDR-TB** drugs can have severe side effects for children, the benefits of starting treatment outweigh the risks. The selection of second-line TB drugs used to treat children with **MDR-TB** is dependent on their age. Duration of treatment for **MDR-TB** can be 12 to 18 months in a New case with no extensive lung damage.



In general, drug dosages should be based on the weight of the child. Children generally tolerate medication well and few side effects are seen.

NOTES

TEST YOUR KNOWLEDGE

1. **Why is it challenging to diagnose MDR-TB in children?**

2. **Answer: True/False**

   All Children with **MDR-TB** receive the same treatment regimen

T	F

3. **Answer: True/False**

   The drug dosage for the **MDR-TB** treatment is adjusted according to the weight of the child

T	F

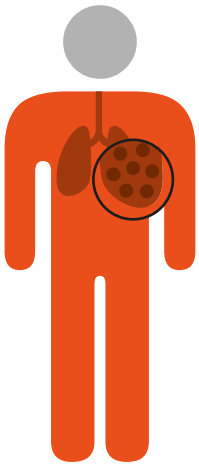
Score

CHAPTER 10 - MDR-TB IN CORRECTIONAL CENTRES

TB is a major health concern in Correctional Centres, with the prevalence rate being higher than in the general population.[12] There are no clear statistics on the total number of offenders with TB or **MDR-TB** at Correctional Centres.

Offenders will return back into society and the health problems faced in Correctional Centres will extend to the outside community.

Correctional Centres receive patients with TB; offenders are often from socio-economically deprived societies and are therefore at higher risk of health problems. These problems enter Correctional Centres with the offenders.



Symptom-based TB screening is conducted on all offenders at the following times:[12]

- at entry
- during TB screening campaigns
- on request by the offender
- when referred by a peer
- had contact with an offender with TB
- as part of integrated primary health care services
- at least bi-annually as a routine service provided
- and on release

The screening is aimed to **detect TB early.**

Once an offender is diagnosed with Rifampicin-Resistant TB, they are referred to the **MDR-TB** treatment initiation site for:

- Examination
- LPA, Sputum collection for Smear microscopy, Culture and DST for first- and second-line drugs
- Starting of **MDR-TB** treatment

Offenders with **MDR-TB** are isolated/hospitalised for at least 6 months or when smear and culture negative for **MDR-TB**.

DOT is an important aspect of **MDR-TB** care in Correctional Centres, DOT is usually carried out by a nurse based at a Correctional Centre clinic.

Below are a few examples of poor TB management in Correctional Centres. These factors increase the chances of MDR-TB developing:

- Overcrowding
- Compliance to treatment is poor
- Closed environment with poor air circulation
- Interruption of treatment
- Transfers out/loss to follow-up

MDR-TB for offenders is managed in accordance with all relevant existing Department of Health Guidelines.

NOTES

TEST YOUR KNOWLEDGE

1. **Name 2 occasions when offenders are screened for TB at Correctional Centres**

   a. .....

   b. .....

2. **Name 2 factors at Correctional Centres that contributes to development of MDR-TB**

   a. .....

   b. .....

Score .....

CHAPTER 11 - MONITORING OF MDR-TB PATIENTS

HOW ARE MDR-TB PATIENTS MONITORED?[4]

Clinical assessment	Laboratory Tests	Other investigations
· Weight and height-to calculate body mass index (BMI)	· Sputum smear microscopy and Culture-taken at baseline and monthly · DST-at baseline and if the culture result is still positive at six months · Blood tests to check for problems with the kidneys, thyroid and liver · HIV testing and Pregnancy tests-at baseline and when indicated	· Chest X-Ray-at baseline, 6 monthly in adults · For children Chest X-Ray is done every 2-3 months in the intensive phase, and at treatment completion · Audiometry (hearing test)-at baseline, monthly during intensive phase and after 3 months after the injections have been stopped · Eye tests-at baseline and when indicated · Lung Computerized Tomography (CT) scan-if indicated

Monitoring a child's response to treatment is difficult; not gaining weight adequately is often the first sign of treatment failure.

Birth control is strongly recommended for all non-pregnant sexually active women receiving MDR-TB treatment, because the drugs used to treat MDR-TB affect the development of the unborn infant. Use of oral or injectable contraceptives can be considered.

HOW DO WE KNOW IF THE PATIENT IS DOING WELL ON THE MDR-TB TREATMENT?

There will be an improvement in the patient's medical condition:

- Weight gain
- No fever
- No cough

When the patient is responding well, they are discharged to receive **MDR-TB** treatment in the community from either a mobile team or a PHC facility.

What if there is no improvement on treatment?

If the patient shows minimal or no improvement during the four months of treatment, the patients are re-evaluated. Evaluation takes place in the decentralised or centralised **DR-TB** units.

The following will take place at this evaluation:

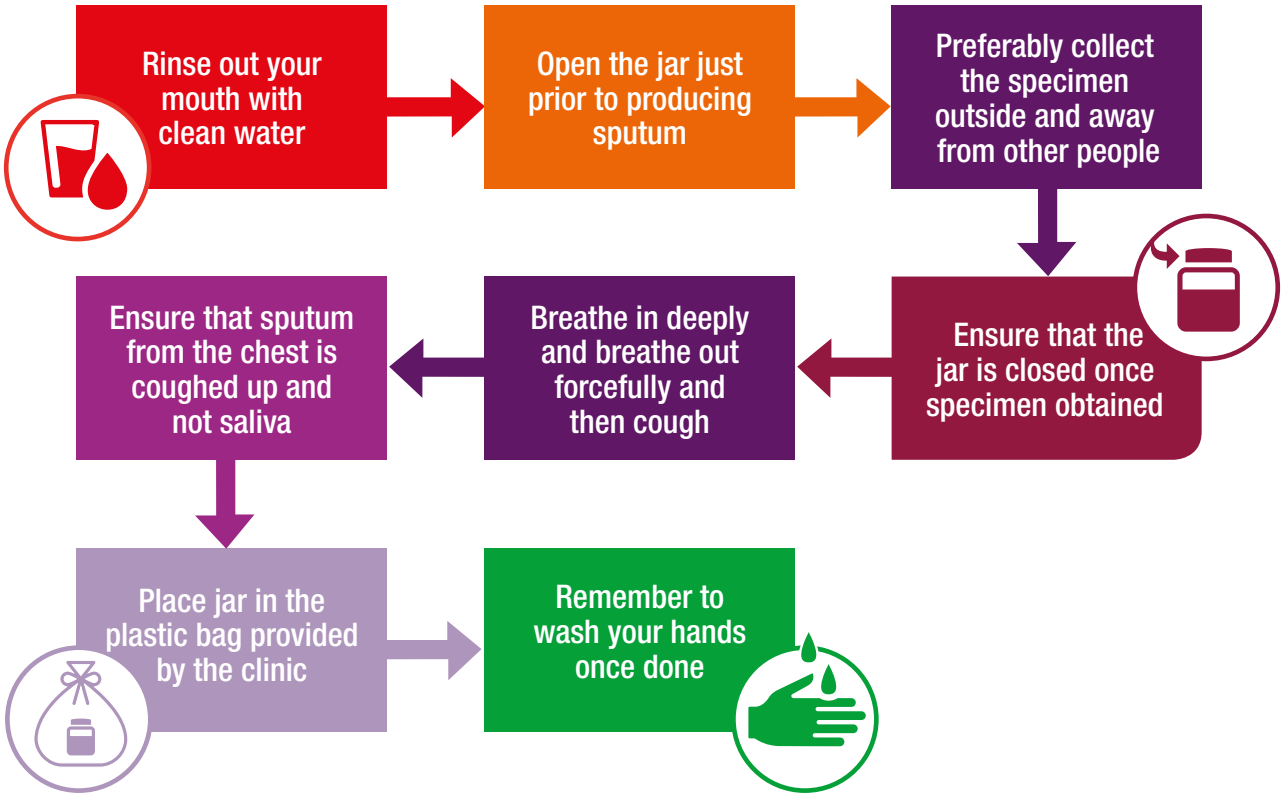
- A Chest X-Ray is usually repeated to check if there are any changes in the lungs
- A repeat sputum smear microscopy and culture test
  - › if the culture is still positive then a repeat DST for both first- and second-line drugs is needed
- The patients adherence to treatment is checked

Reasons for lack of improvement:

- Incorrect Dose-the wrong dose of the **MDR-TB** drugs that was given to patients
- Problems with the smear microscopy or culture specimen-possible contamination of sputum specimen

All smear negative, TB culture positive MDR-TB patients can be discharged from hospital and can continue treatment at facilities that are conveniently located to them.

SPUTUM IS COLLECTED AS FOLLOWS:



WHAT ARE THE MOST COMMON SIDE EFFECTS SEEN IN MDR-TB PATIENTS?

MINOR SIDE EFFECTS	MAJOR SIDE EFFECTS-REQUIRES URGENT CARE ⚠
· Nausea, vomiting · Diarrhoea · Tingling and numbness of feet	· Skin rash and itching · Abdominal Pain · Yellow eyes · Strange visions or thoughts · Fatigue and shortness of breath

If patients experience any of the above symptoms, they must report to the nearest clinic.

⚠ **The injectable drugs (Amikacin, Kanamycin) commonly cause damage to the kidneys and can result in hearing loss. If a patient develops hearing loss on MDR-TB treatment, he/she should be referred to the health worker immediately.**

HOW DO WE MONITOR FOR DRUG SIDE EFFECTS?[4]

- Patients on **MDR-TB** treatment need to be **interviewed weekly** (at the hospital when treatment is started or at the clinic on discharge from the hospital) about side effects to drugs
- The major advantage of **daily DOT** is the ability to monitor the patient daily for side effects
- **Laboratory tests** are important to detect certain side effects that may not be noticed by the patient or the DOT provider; although there are recommended intervals for performing laboratory testing for side effects, this can be done more frequently for patients who are of high risk
- If side effects are noted, a record is made of the problems on an **'Adverse Drug Reaction monitoring** form-A' (See Annexure 1)
- **If the side effect is mild and not dangerous, it is best to continue the TB drugs** and use medication to treat the side effects; some side effects may disappear or diminish with time, thus patients will need to be motivated to continue treatment
- The side effects of second-line TB drugs depends on the dose; in some cases, **reducing the dose** of the drug may improve symptoms
- **Psychosocial support** is an important part of managing side effects of the second-line TB drugs
- **Supplementary drugs** are used to stop or lessen the side effects

SERIOUS SIDE EFFECTS

There are serious side effects that are life-threatening and may result in:

- Hospitalisation
- Permanent damage or disability
- Death

The most important rule regarding side effects: IF IN DOUBT – SHOUT!

NOTES

TEST YOUR KNOWLEDGE

1. When monitoring MDR-TB patients on treatment, how often are the following tests done?

Sputum smear microscopy and culture	
Audiometry	
HIV test and pregnancy test	

2. List 2 ways we can know that a patient is responding to MDR-TB treatment

.....

.....

.....

3. Name 2 major side effects of MDR-TB treatment

.....

.....

.....

4. Name the 2 side effects commonly caused by the 'injectable'

.....

.....

.....

Score

CHAPTER 12 - ADHERENCE COUNSELLING AND SUPPORT FOR PATIENTS WITH MDR-TB

WHAT IS THE PATIENT-CENTRED APPROACH?[8]

The patient-centred approach is based on the patient's needs and mutual respect between the patient and the HCW.

This approach may increase the chances of a successful treatment outcome.

The patient-centred approach also means that words such as 'defaulter' will be replaced with the term 'lost to follow-up' as this would be more respectful to the patient.

Checklist of information and education on MDR-TB that needs to be provided to a patient as well as their family members before starting treatment:

- Inform the patient about the **length of treatment**
- **Teach the patient about the drugs**–explain that there are at least five different drugs of which one is an injectable
- Try to teach the patient the **names of the drugs**
- Teach the patient about the **possible side effects** and that this should be **reported to the HCW/DOT provider**
- **Teach the patient about monitoring** that has to be done while treatment is being taken
- **Provide the patient with the TB patient charter** (at the hospital and clinic)–this will provide the patient with information on their rights and responsibilities
- Ensure that the patient **understands how to make an appointment** if they need to be seen before their next routine visit
- Provide patients and their families with **information on social support and care services available** e.g. SASSA grants

WHAT IS ADHERENCE?

Adherence is the degree to which a client follows a treatment regimen that has been designed in a consultative partnership between the client and healthcare professional/counsellor.[14]

Adherence therefore means taking every dose every day as prescribed in consultation.

Full Adherence:
Is essential in preventing the increase of resistance
Is essential in increasing the chances of cure

Remember to use **The Five 'A's of Adherence** to assist with the patient-centred approach.[13] A few examples are provided under each heading.

THE FIVE 'A's OF ADHERENCE:

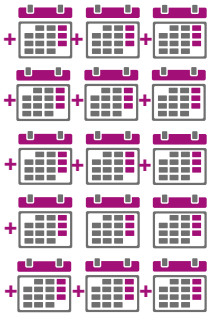
Assess	Advise	Agree	Assist	Arrange
· Adherence to their medication · Presence of side effects · Financial situation · Factors associated with the patient's lifestyle that may impact their adherence	· Use neutral, nonjudgmental language · Correct any inaccurate knowledge and complete gaps in the patient's understanding · On social support · Discuss options that are available for the patient to adhere to treatment	· On treatment options	· Provide a DOT provider/ supporter · Provide treatment/ medication · Provide calendars/ reminder tools · Provide psychological support	· Follow-up care and visit to monitor treatment progress · Referral to social services –social support measures

WHAT ARE THE OBSTACLES TO PATIENT ADHERENCE IN MDR-TB TREATMENT?

THE INDIRECT COSTS TO PATIENTS IN ACCESSING CARE

THE DAILY HIGH PILL BURDEN

THE FREQUENT AND SERIOUS DRUG SIDE EFFECTS



LENGTHY RECOMMENDED TREATMENT REGIMENS

For **MDR-TB** patients, social support is very important. In order to improve the quality of life of **MDR-TB** patients and assist with adherence to treatment, a patient-centred care approach as well as social support is needed.

As there are limited treatment options for **MDR-TB** and because of the serious public health consequences if the treatment fails, all **MDR-TB** patients should be under DOT, to ensure adherence to treatment.

WHAT IS DIRECTLY OBSERVED TREATMENT (DOT)?

- For DOT to be effective, the treatment supporter watches the patient swallow the tablets, but this should be done in a sensitive and supportive manner
- DOT improves the chances of adherence to treatment and can help with the early detection of treatment side effects

WHO QUALIFIES TO BE A TREATMENT SUPPORTER FOR DOT?

- Health care worker
- Trained workplace or community health worker (CHW)
- Family member
- Whoever the patient chooses

DOT services should cover the following:

- Ask about side effects
- Provide treatment for minor side effects
- Refer to hospital if serious side effects occur
- Provide the patient with their daily dose of treatment and observe them swallowing their medicines
- Record doses taken in the patient-held green card and patient treatment record
- In the case of patients been seen by HCW, the TB patient diary should be updated to identify patients who did not present for DOT-these patients should be recalled

FACTORS IMPACTING ADHERENCE TO MDR-TB TREATMENT

Individual	Economic	Health system	Social levels	Cultural
Knowledge about, attitudes to, and beliefs about the disease, treatment and the health care system	Patient's ability to cover the costs associated with DOT	Capacity of the system to make adherence easier and affordable for the patient	Resources available in the community to prevent the stigma and discrimination of patients	Attitudes of traditional healers to ART Perceptions of western medicine versus traditional medicine Religious beliefs

Factors impacting adherence can be addressed by providing the patient with psychosocial support. MDR-TB patients qualify for SASSA grants.

WHAT HAPPENS IF A PATIENT STOPS TAKING TREATMENT OR INTERRUPTS TREATMENT?

- The patient should be **convinced** to continue treatment
- The HCW should explain that by stopping or interrupting treatment, it can result in further **resistance**
- The HCW should try to establish the reasons **why treatment** has been **stopped** and address the problem i.e. side effects
- If there are social or economic problems contributing to the patient not taking treatment, **assistance** can be provided
- If the patient agrees to continue with the treatment, the **treatment regimen** can be **restarted** or in some cases it may need to be re-structured
- If the above mentioned issues have been addressed and the patient still refuses treatment, then a hospital **'Refusal of Treatment form'** has to be signed by the patient

NOTES

TEST YOUR KNOWLEDGE

1. Fill in the blank

Adherence is the degree to which a client follows a treatment regimen that has been designed in a .....between the client and healthcare professional/counsellor.

2. List 2 factors that make it difficult for patients to take their **MDR-TB** treatment

a. .....

b. .....

3. Fill in the blank

The patient-centred approach also means that words such as 'defaulter' will be replaced with the term .....as this would be more respectful to the patient.

4. What is DOT?

.....

.....

.....

Score .....

CHAPTER 13 - PREVENTION OF MDR-TB

HOW CAN WE PREVENT MDR-TB?

According to the National Department of Health, preventing MDR-TB can be done in the following ways:[4]

Other MDR TB prevention measures include:

WHAT IS A CLOSE CONTACT?

Close contacts are defined as people living in the same household as the MDR-TB patient, or spending hours a day together with the patient indoors.

It is important to trace contacts of **MDR-TB** patients so that active TB can be detected and treated early.

Home visits by CHWs are an important way to do contact investigation. All contacts are checked for TB.

If contacts of **MDR-TB** patients do not have any TB symptoms, they can be managed according to their individual risk factors. Usually **Isoniazid Preventive Therapy (IPT)**, a health intervention for the prevention of TB among young children and people living with HIV, is provided to contacts who do not have TB symptoms. IPT benefits the contact as it blocks TB disease from occurring.

IPT is provided to the following group of children who have had contact with a **MDR-TB** patient and **do not have symptoms of TB**:

- Children under five years of age
- HIV infected children of any age

Provision of IPT for HIV negative children older than five years and adults is based on the history and clinical examination findings.

Children under five years and all persons living with HIV infection should be evaluated every 6 months for two years after their last **MDR-TB** contact, irrespective if they have symptoms

- If they do develop symptoms, prompt investigation and treatment is required

NOTES

TEST YOUR KNOWLEDGE

1. **Which 'contacts' in particular should be screened for MDR-TB?**

2. **How often are contacts screened for MDR-TB?**

3. **What 4 measures according to the National Department of Health can help to prevent MDR-TB?**

Score

CHAPTER 14 - MDR-TB AND HIV CO-INFECTION

HIV is a risk factor for developing both **DS-TB** and **MDR-TB**.

WHAT IS HIV?

Human – transmitted only between humans

Immunodeficiency – something which breaks down the immune system

Virus – an infectious agent which causes disease in the body

- HIV is a virus that attacks the host's bodies immune system (the immune system's CD4 cells in particular)
- HIV attaches itself to a CD4 cell, enters it and uses the CD4 cell to make more copies of itself
- The viruses destroy the CD4 cells while doing this
- Once HIV infection is present, it cannot be removed from the body
- HIV is the virus that causes AIDS

TREATMENT FOR HIV INFECTION:

- The standard treatment consists of a combination of at least three drugs, often called "antiretroviral therapy" (ART) that stops HIV from replicating
- ART has the potential to reduce death and illness among HIV positive patients, and to improve their quality of life

MDR-TB AND HIV CO-INFECTION

HIV positive patients are vulnerable to **DR-TB** infection. Due to their compromised immune system, they are unable to fight off infection. **MDR-TB** is difficult to diagnose in HIV positive patients because the number of TB bacteria in the sputum is often low. Their symptoms can be confused with other illnesses and this leads to a delay in starting **DR-TB** treatment. Therefore there is an increase death rate for those co-infected because of mis-diagnosis.

MDR-TB patients can also be co-infected with HIV. Emphasis is placed on combining services and offering care for both conditions during the same visit.

It is important in HIV positive patients to:[4]

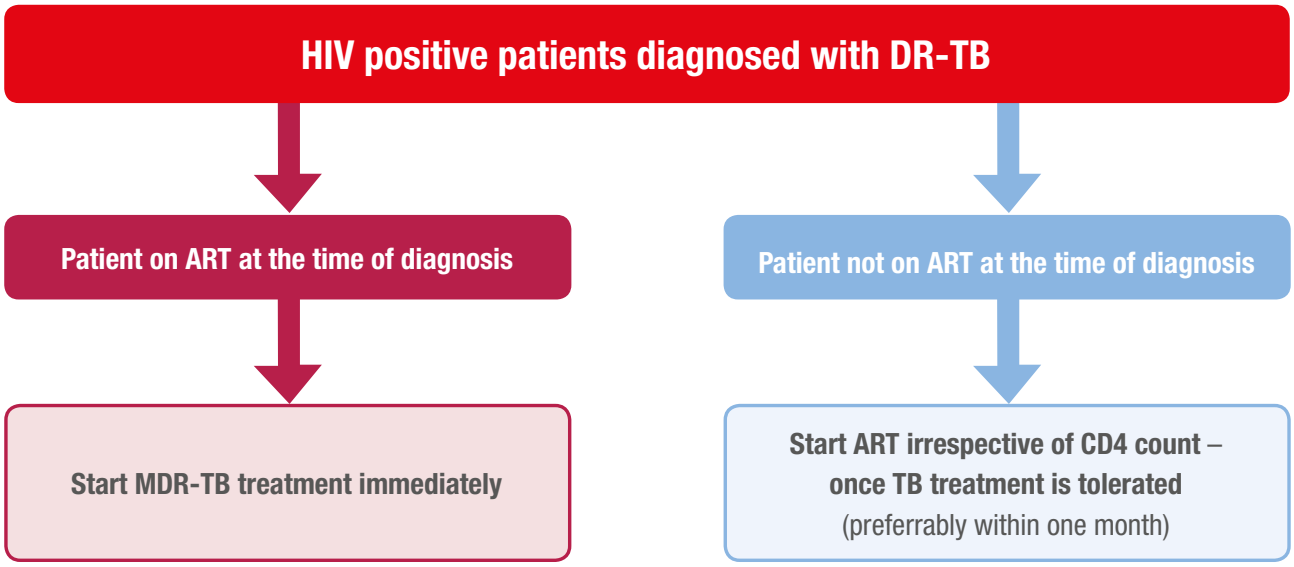
1. Diagnose **DR-TB** early
2. Start on appropriate second-line TB treatment and ART
3. Practice strong infection control measures

Screening for drug resistance should therefore be performed for HIV positive patients with TB.

Side Effects caused by **MDR-TB** drugs are much more common for HIV positive patients. ART and second-line TB drugs often interact and their side effects overlap.

DIAGNOSIS AND TREATMENT OF MDR-TB IN HIV POSITIVE PATIENTS:[4]

- It is more difficult to diagnose **MDR-TB** in HIV positive patients; the patients usually present with sputum negative TB because the number of TB bacteria in the sputum is often very low or they can present with extra pulmonary TB (TB outside of the lung)
- Algorithms are used by clinicians to help speed up the diagnosis of **MDR-TB**



A common first-line ART regimen used in MDR-TB:

Zidovudine (AZT) + Lamivudine (3TC) + Efavirenz (EFV)

Tenofovir (TDF) is generally avoided because of the overlapping kidney problems that it causes when used with the injectables

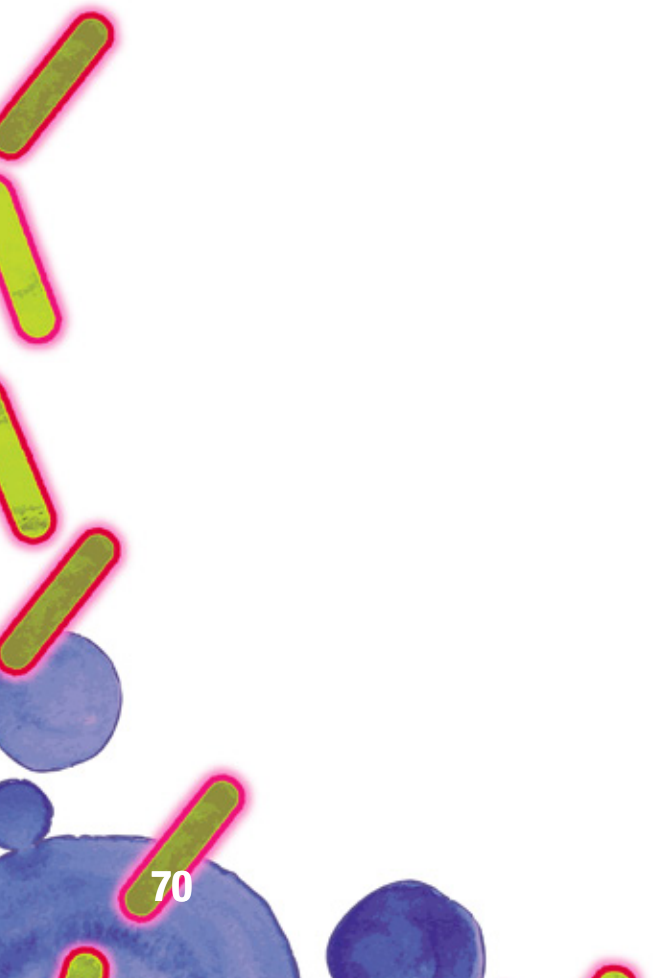
TDF can be started after the intensive phase if the Creatinine Clearance > 50ml/min

HOW DO WE MONITOR PATIENTS WITH MDR-TB AND HIV CO-INFECTION?

Patients with **MDR-TB** and HIV should be managed at facilities that are able to monitor both conditions during the same visit. In particular, patients should be monitored as follows:

- Intensive monitoring for overlapping side effects
- Opportunistic infections have to be prevented, monitored and treated
- Provision of socio-economic support during the treatment

All HIV positive patients diagnosed with MDR-TB should undergo DST for the second-line TB drugs.



NOTES

TEST YOUR KNOWLEDGE

1. Fill in the blank

MDR-TB patients can also be co-infected with ..... thus emphasis is placed on combining services and offering care for both conditions during the same visit.

2. Answer True/False

It is important to screen for Drug resistance in all HIV positive patients diagnosed with TB

T	F

3. Answer True/False

ART can be started in patients diagnosed with **MDR-TB**

T	F

Score

CHAPTER 15 - OUTCOMES OF MDR-TB TREATMENT

POSSIBLE OUTCOMES OF MDR-TB TREATMENT

Cure

- The patient has remained culture negative for 3 months in the last twelve months of treatment

Treatment Completion

- The patient has received up to 24 months of treatment

Treatment Failure

- If the patient does not respond to treatment after six months and there is no documented culture conversion
- The patient is re-assessed and placed on a new treatment regimen

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

Not Evaluated

- The patient who has 'transferred out' to another facility or whose treatment outcome is not known

Follow-up after documented cure/completion

Patients should be followed up for at least two years after cure/treatment completion. Visits should be arranged every six months to check for symptoms and collect sputum for smear and culture for testing.

WHEN SHOULD MDR-TB TREATMENT BE SUSPENDED?[7]

The option to stop treatment is only considered when drug-resistant treatment has failed and all treatment options have been tried. The patient should be counselled.

Before stopping treatment the following should be considered:

1. The patient's quality of life: The side effects of the **MDR-TB** drugs
2. The interest of the public: Continuing treatment on a failing regimen can result in an increase in the resistance

THE ROLE OF PALLIATIVE/SUPPORTIVE CARE FOR MDR-TB PATIENTS[13]

Once **MDR-TB** treatment has been stopped, the following supportive measures are used:

- **Pain control:** use of paracetamol/stronger analgesics such as morphine can be considered; in addition codeine will help with alleviating the cough
- **Relief of chest symptoms:** Oxygen can be provided to assist in case of shortness of breath
- **Nutritional Support:** providing small regular meals
- **Regular medical visit:** ongoing medical and psychological support should be provided
- Continuation of supplementary medication
- Hospice/nursing home care
- **Measures to prevent bed sores especially in bed-ridden patients**
- Infection control measures should still be continued as patients with **DR-TB** failure still continue to be infectious for long periods of time

NOTES

TEST YOUR KNOWLEDGE

1. List 4 possible outcomes for MDR-TB patients

2. List 2 supportive measures provided to MDR-TB patients once treatment has been stopped

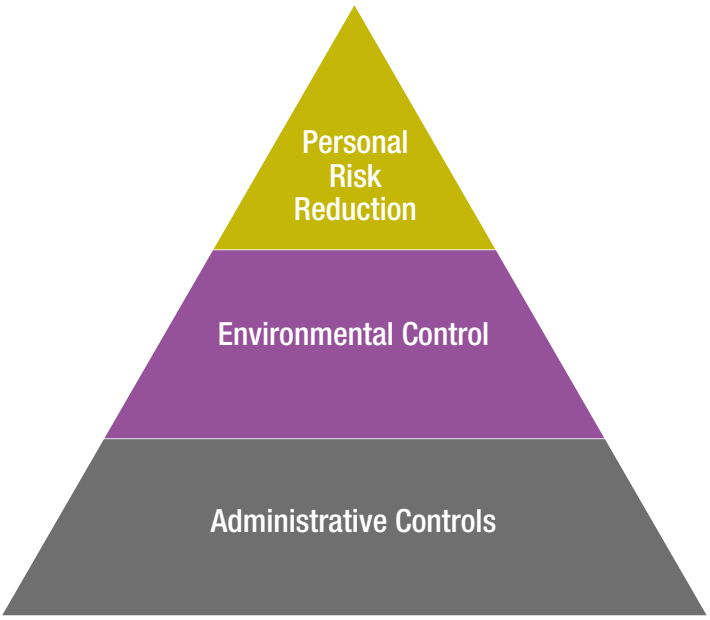
Score

CHAPTER 16 - MDR-TB INFECTION CONTROL

TB Infection control measures are important to protect against **MDR-TB.**

MDR-TB is transmitted through the air. There are three levels of Infection Control to reduce[15] the risk of transmission of TB.

LEVELS OF INFECTION CONTROL



Administrative:

This is the first and most important level of infection control. These are *Management Measures* that are intended to reduce the risk or exposure to persons with infectious TB. They include:

- Developing an Infection Control Plan-Identify and treat TB suspects/patients
- Screening HCWs for TB disease and infection
- Educating, training and counselling HCWs about TB

Environmental:

This is second in the hierarchy and aims to reduce the concentration of infectious TB droplets in the air.

1) Ventilation forms an important part of Environmental Control and may be:
   - Natural Ventilation–relies on open doors and windows
   - Mechanical Ventilation–use of technological equipment to circulate air e.g. fans
2) Ultraviolet germicidal irradiation (UVGI)-is an air-cleaning technology that consists of special lamps that give off ultraviolet light that is used to kill the tubercle bacteria contained in droplet nuclei. UVGI is only effective if used in conjunction with other infection control measures e.g. good air circulation

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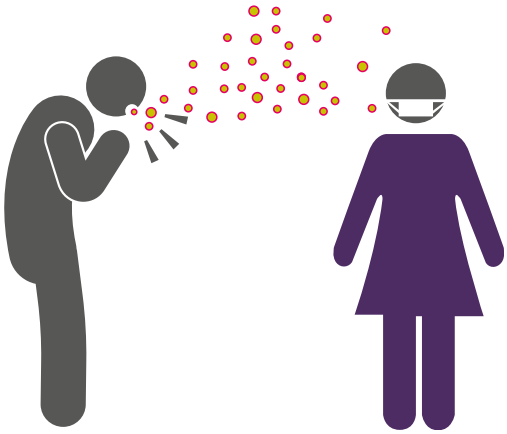
Personal Risk Reduction:

This needs consideration if the Administrative and Environmental Controls are not in place in order to protect against inhalation of infectious droplet nuclei e.g. Drivers that transport patients with suspected/confirmed TB disease, home-based health care to TB patients.



WHAT IS THE DIFFERENCE BETWEEN RESPIRATORS AND SURGICAL MASKS?

Respirators

- Contain a special filter material to filter very small particles
- For the respirator to be effective there must be a tight seal between the mask and the wearer's face
- For use by HCWs

Surgical Masks

- Prevent the spread of droplets from the wearer to others
- Do not provide adequate protection from inhaling particles
- For use by patients

INFECTION CONTROL AND DECENTRALISATION OF MDR-TB SERVICES

With the decentralisation of **MDR-TB** services, infection control measures should extend to the following areas:

HOME INFECTION CONTROL

- Ensure adequate ventilation/open windows
- Patient should have their own bedroom if possible
- Promote cough hygiene
- Ensure that patients use surgical mask during waking hours while at home or when meeting with others
- Patients should refrain from being in close contact with children
- Maximise time in open-air environment (e.g. receiving visitors outside)
- All household members and those who have regular contact with the patient should know their HIV status
- Patients should minimise contact with known HIV positive patients
- Household members should be screened for TB and **DR-TB** every six months

INFECTION CONTROL DURING HOME VISITS

- Wear an N95 Respirator (HCW and DOT supporters)
- Educate the patient on cough hygiene and avoiding close contact
- Provide the patient with a surgical mask when close contact is required
- Keep home or clinic visits short, and if possible the visits should be conducted in a well ventilated area
- Collect sputum outside, observing prescribed infection control precautions

INFECTION CONTROL DURING PATIENT TRANSPORT

- Use vehicles where there is separation of the airspace of the driver from that of the Passengers
- Open vehicle windows
- Provide surgical mask for patient
- Provide N95 masks for medical staff and driver
- Educate patient

HEALTH CARE WORKERS AND DR-TB

HCWs who have contact with **DR-TB** patients should know their HIV status. If they do not, they should be encouraged to be tested for HIV. HCWs who are HIV positive should:

- Commence ART when appropriate
- Be screened every six months for TB
- Have a TB culture done at the time of ART initiation and on an annual basis

According to the Occupational Health and Safety Act:

- HCWs with HIV infection should be provided a safe working environment or alternate employment
- HCWs should be trained in safe working procedures and the use of personal protective equipment

If Infection Control Video is available, the facilitator can play the video.

HOW TO USE A N95 RESPIRATOR PROPERLY

How to Properly Put on and Take off a Disposable Respirator

WASH YOUR HANDS THOROUGHLY BEFORE PUTTING ON AND TAKING OFF THE RESPIRATOR.

If you have used a respirator before that fit you, use the same make, model and size.

Inspect the respirator for damage. If your respirator appears damaged, DO NOT USE IT. Replace it with a new one.

Do not allow facial hair, hair, jewelry, glasses, clothing, or anything else to prevent proper placement or come between your face and the respirator.

Follow the instructions that come with your respirator.[1]

Putting On The Respirator

Position the respirator in your hands with the nose piece at your fingertips.

Cup the respirator in your hand allowing the headbands to hang below your hand. Hold the respirator under your chin with the nosepiece up.

The top strap (on single or double strap respirators) goes over and rests at the top back of your head. The bottom strap is positioned around the neck and below the ears. Do not crisscross straps.

Place your fingertips from both hands at the top of the metal nose clip (if present). Slide fingertips down both sides of the metal strip to mold the nose area to the shape of your nose.

Checking Your Seal[2]

Place both hands over the respirator, take a quick breath in to check whether the respirator seals tightly to the face.

Place both hands completely over the respirator and exhale. If you feel leakage, there is not a proper seal.

If air leaks around the nose, readjust the nosepiece as described. If air leaks at the mask edges, re-adjust the straps along the sides of your head until a proper seal is achieved.

If you cannot achieve a proper seal due to air leakage, ask for help or try a different size or model.

Removing Your Respirator

DO NOT TOUCH the front of the respirator! It may be contaminated!

Remove by pulling the bottom strap over back of head, followed by the top strap, without touching the respirator.

Discard in waste container. WASH YOUR HANDS!

Employers must comply with the OSHA Respiratory Protection Standard, 29 CFR 1910.134 if respirators are used by employees performing work-related duties.

1 Manufacturer instructions for many NIOSH approved disposable respirators can be found at www.cdc.gov/niosh/npptl/topics/respirators/disp_part/

2 According to the manufacturer's recommendations

For more information call 1-800-CDC-INFO or go to http://www.cdc.gov/niosh/npptl/topics/respirators/

CS 207843
DHHS (NIOSH) Publication No. 2010-133

NOTES

TEST YOUR KNOWLEDGE

1. List 3 Infection control measures that should be done 'AT HOME'

.....

.....

.....

2. Indicate which personal protective equipment is appropriate for a) Health care worker and b) Patient. Also provide the name of the equipment.

.....

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.....

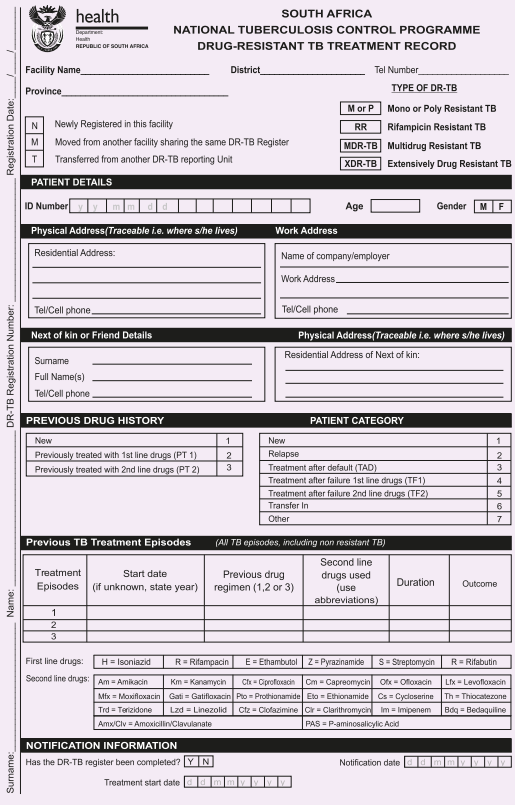
.....

Score

CHAPTER 17 - RECORDING AND REPORTING

The information on **DR-TB** patients must be recorded in the relevant data collection tools.[4]

Record	Completed by	Where it is Kept
DR-TB Treatment Card (**Yellow**)	Nurse/Doctor	**MDR-TB** hospital or Health Facility initiating treatment
DR-TB Patient Consent form (see Annexure 2)	TB nurse and TB Clinician	**MDR-TB** Hospital or Health Facility initiating treatment
Patient Identity Card	Nurse/doctor	Clinic or district hospital where patient is down referred for continuation of treatment
TB Sputum request form	Nurse/doctor	Health Facilities
TB Patient Referral Form	Nurse/doctor	Health Facilities
DR-TB Register (Paper based, Electronic)	Data Capturer, Information officer or person responsible for data	Central **MDR-TB** Unit, Decentralised **MDR-TB** unit, PHC facilities allowed to do so by NDoH and provinces



SOUTH AFRICA
NATIONAL TUBERCULOSIS CONTROL PROGRAMME
DRUG-RESISTANT TB TREATMENT RECORD

Facility Name _____ District _____ Tel Number _____
Province _____

TYPE OF DR-TB
M or P Mono or Poly Resistant TB
RR Rifampicin Resistant TB
MDR-TB Multidrug Resistant TB
XDR-TB Extensively Drug Resistant TB

N Newly Registered in this facility
M Moved from another facility sharing the same DR-TB Register
T Transferred from another DR-TB reporting Unit

Registration Date: / /
DR-TB Registration Number:
Name:
Surname:

PATIENT DETAILS
ID Number | Age | Gender M F

Physical Address(Traceable i.e. where s/he lives) | Work Address
Residential Address:
Tel/Cell phone
Name of company/employer
Work Address
Tel/Cell phone

Next of kin or Friend Details | Physical Address(Traceable i.e. where s/he lives)
Surname
Full Name(s)
Tel/Cell phone
Residential Address of Next of kin:

PREVIOUS DRUG HISTORY

New	1
Previously treated with 1st line drugs (PT 1)	2
Previously treated with 2nd line drugs (PT 2)	3

PATIENT CATEGORY

New	1
Relapse	2
Treatment after default (TAD)	3
Treatment after failure 1st line drugs (TF1)	4
Treatment after failure 2nd line drugs (TF2)	5
Transfer In	6
Other	7

Previous TB Treatment Episodes (All TB episodes, including non resistant TB)

Treatment Episodes	Start date (if unknown, state year)	Previous drug regimen (1,2 or 3)	Second line drugs used (use abbreviations)	Duration	Outcome
1					
2					
3					

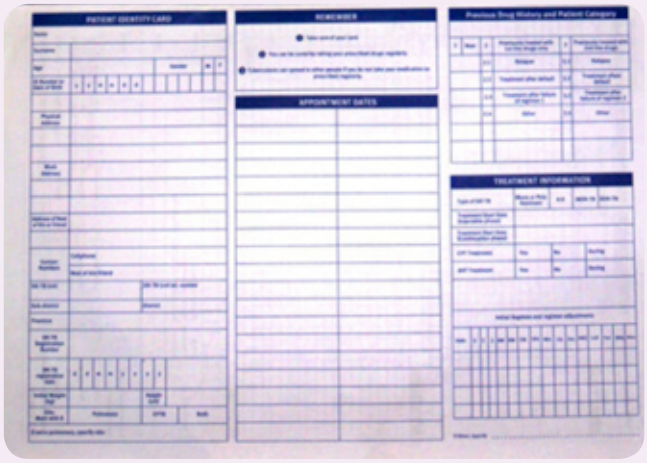
First line drugs: H = Isoniazid | R = Rifampacin | E = Ethambutol | Z = Pyrazinamide | S = Streptomycin | R = Rifabutin

Second line drugs:

Am = Amikacin	Km = Kanamycin	Cfx = Ciprofloxacin	Cm = Capreomycin	Ofx = Ofloxacin	Lfx = Levofloxacin
Mfx = Moxifloxacin	Gati = Gatifloxacin	Pto = Prothionamide	Eto = Ethionamide	Cs = Cycloserine	Th = Thiocatezone
Trd = Terizidone	Lzd = Linezolid	Cfz = Clofazimine	Clr = Clarithromycin	Im = Imipenem	Bdq = Bedaquiline
Amx/Clv = Amoxicillin/Clavulanate			PAS = P-aminosalicylic Acid		

NOTIFICATION INFORMATION
Has the DR-TB register been completed? Y N
Notification date
Treatment start date

DR-TB Treatment Card



Patient Identity Card

PATIENT IDENTITY CARD

- The Patient Identity Card records the same information as the treatment card
- When the patient is discharged from hospital this card is taken to the receiving facility
- The HCW at the receiving facility updates the information on the card daily after administration of treatment
- The Hospital Treatment Card and the Patient Identity Card is updated on a monthly basis at the **MDR-TB** Hospital

DRUG RESISTANT-TB REGISTER

DR-TB Register

- The DR-TB Registers record all patients who receive treatment for DR-TB including mono- and poly-resistant cases
- These registers must be kept in all **MDR-TB** facilities
- The register should be updated daily for new patients and monthly for smear and culture results and treatment outcomes

NOTES

NOTES

TEST YOUR KNOWLEDGE

Fill in the blanks:

Record	Completed by	Where it is Kept
DR-TB treatment Card (**Yellow**)	Nurse/Doctor	
DR-TB Patient Consent form		**MDR-TB** Hospital or Health Facility initiating treatment
Patient Identity Card	Nurse/doctor	
TB Sputum request form		Health Facilities
TB Patient Referral Form		Health Facilities
DR-TB Register (Paper based, Electronic)		Central **MDR-TB** Unit, Decentralised **MDR-TB** unit, PHC facilities allowed to do so by NDoH and provinces

Score	

POST-TEST

Please choose the correct answer.

1. **What are the main reasons why MDR-TB develops?**
   a) Patients do not complete their full course of treatment
   b) Health Care Workers prescribe the wrong treatment, the wrong dose, or length of time for taking the drugs
   c) The supply of drugs is not always available
   d) All of the above

2. **What is the basic principle of Directly Observed Treatment?**
   a) Providing TB treatment to patients
   b) Making sure the patient comes to the clinic
   c) Making sure that the patient has a social grant
   d) Ensuring that the patient takes the TB treatment

3. **According to the National Guidelines, which investigation is needed to initially diagnose DR-TB?**
   a) Gene Xpert
   b) LPA
   c) Culture
   d) DST

4. **A patient has developed MDR-TB when there is resistance to...?**
   a) Rifampicin and Isoniazid
   b) All second-line TB drugs
   c) Only Isoniazid
   d) Only Rifampicin

5. **What are the 4 most common symptoms of MDR-TB?**
   a) Coughing up blood, rash, cough, loss of weight
   b) Jaundice, cough, upper abdominal pain, night sweats
   c) Cough, fever, night sweats, loss of weight
   d) Cough, coughing up blood, fever, loss of weight

6. **How often is smear microscopy and culture done when monitoring MDR-TB patients?**

   a) At baseline and then monthly

   b) Yearly

   c) Quarterly

   d) Only at baseline

7. **Answer True/False: Chest X-Rays may be normal in patients with MDR-TB**

T	F

8. **Which of the following drugs is a first-line TB drug?**

   a) Rifampicin

   b) Moxifloxacin

   c) Kanamycin

   d) Pyridoxine

9. **Answer True/False: The same treatment strategy can be used for all MDR-TB patients**

T	F

10. **Which of the following is a major side effect of MDR-TB treatment that requires urgent care?**

    a) Tingling and numbness of feet

    b) Diarrhoea

    c) Strange visions and thoughts

    d) Nausea and vomiting

11. **Answer True/False: All children diagnosed with MDR-TB receive the same MDR-TB treatment**

T	F

12. **Answer True/False: HIV positive patients diagnosed with MDR-TB can also receive Antiretroviral therapy**

T	F

13. The 2 phases of MDR-TB treatment are...?

a. Early and Late

b. Intensive and Continuation

c. Cure and Remission

d. Primary and Secondary

14. Answer True/False: MDR-TB is transmitted in the same way as Drug-Susceptible TB

T	F

15. Answer True/False: A consent form must be signed by the patient before initiating MDR-TB treatment

T	F

ANNEXURE 1

health
Department:
Health
REPUBLIC OF SOUT

SUSPECTED ADVERSE DRUG REACTION REPORT
HIV/AIDS AND TB TREATMENT PROGRAMME

NATIONAL PHARMACOVIGILANCE CENTRE (NPC)
TEL: 012 395 9506/ 8099
Fax2email: 086 241 2473
Email: npc@health.gov.za

FACILITY NAME			
SUB-DISTRICT			
DISTRICT		TEL	
PROVINCE		FAX	

(Please see instructions on back of page. Please send duplicate to NDoH and complete additional information on a separate sheet)

PATIENT DETAILS:

Patient Initials				Age		Date of Birth (dd/mm/yyyy)	
ID/Reference No				Gender	☐M ☐F	Pregnant	☐Yes ☐No
Allergy		Weight (kg)		Height (cm)		Estimated Gestational Age	

MEDICINES (AND CONCOMITANT MEDICINES, INCLUDING HERBAL PRODUCTS, IF KNOWN)

Medicine	Suspect drug/ Trade Name	Dose	Interval	Route	Date started	Date stopped	Prescriber (Dr/Pharm/Nurse)

Key: **1.** AZT **2.** 3TC **3.** TDF **4.** FTC **5.** D4T **6.** ABC **7.** DDI **8.** NVP **9.** EFV **10.** ETR **11.** ATV **12.** DRV **13.** RTV **14.** LPV/r **15.** ATV/r 15.R **16.** RAL **17.** TDF+FTC **18.** TDF+FTC+EFV **19.**R 20. **20.** H **21.** Z **22.** E **23.** RH **24.** RHZE **25.** Km **26.** Am **27.** Cm **28.** Mfx**29.** Lvx**30.** Gfx**31.** Eto**32.** Trd**33.** Pto**34.** Cs **35.** PAS **36.** Cfx**37.** AZI **38.** Clr**39.** Amx/Clv**40.** MEROPENEM **41.** Lzd**42.** Imipenem**43.** Bedaquiline**44.** Delamanid**45.** PA 824 **46.** High Dose INH

ADVERSE DRUG REACTION

Date of onset of reaction (dd/mm/yyyy) | Date Reported (dd/mm/yyyy)

Description of reaction or problem (tick all that apply) – Attach additional information if required

☐Abdominal pain	☐Dizziness	☐Hyperpigmentation	☐ Persistent muscle pain	☐Vision changes
☐Abnormal behavior	☐Enlarged breast/s	☐Impaired concentration	☐Problems with breathing	☐Vomiting
☐Anxiety	☐Fat gain	☐Impotence	☐Psychosis/hallucinations	☐Weight loss
☐Back pain	☐Fat loss	☐Insomnia/sleep issues	☐Rash	☐Other
☐Chills	☐Fat redistribution	☐Lactic acidosis	☐ Ringing in the ears	
☐Confusion	☐Fever	☐Loss of appetite	☐Unusual bleeding	
☐Constipation	☐Headache	☐Nausea	☐Unusual bruising	
☐Depression	☐ Hearing loss	☐Pain/tingling/numbness in extremeties	☐ Unusual fatigue	
☐Diarrhoea	☐Heartburn	☐Pancreatitis	☐Violent behavior	

LABORATORY RESULTS: SELECT ABNORMAL ONE(S) AND WRITE THE VALUES (BL=BASELINE; CUR=CURRENT)

	K+	*Creat*	*eGFR*	*ALT*	*AST*	*Hb*	*Platelets*	*CD4*	*Viral Load*	*Lact*	*Other:*
BL											
CUR											

ADVERSE REACTION OUTCOME

Intervention:		Action Taken:	Patient Outcome:
☐ Patient Counseled	☐ Additional lab request	☐ Discontinued suspected drug	☐ Recovering
☐ Referred to expert	☐ Hospitalization	Replaced by _____	☐ Died
☐ Additional clinic visit	☐ Other:	☐ Decreased dose	☐ Other: _____
☐ Discontinued Suspected drug _____		☐ Treated with _____	☐ Other: _____
		☐ Other _____	

RELEVANT CLINICAL HISTORY (ATTACH ADDITIONAL INFORMATION IF REQUIRED)

Date patient initiated ARVs (dd/mm/yyyy)			Initial regimen	
How long has patient been diagnosed with HIV		Years		Months
How long has patient been on ARV treatment		Years		Months

CONCOMITANT MEDICAL CONDITION(S) (TICK ALL THAT APPLY):

☐ HTN ☐ DM ☐ KS ☐Hep B ☐ PCP ☐ Esophageal Candidiasis ☐Oropharyngeal Candidiasis
☐Cryp Meningitis ☐Other/s

REPORTED BY:

Name		Highest Qualification	
Designation	☐ Doctor ☐ Nurse ☐ Pharmacist ☐ Other	Email	
Tel	Signature	Date	

THIS REPORT IS NOT AN ADMISSION THAT THE SUSPECTED DRUG(S) CAUSED THE ADR

Version 29.0 dated 12-Mar-2015

ANNEXURE 2

CONSENT FORM FOR DR-TB PATIENTS

UNDERTAKING BY PATIENT

I, ...(name patient) of (residential physical address)
.....
.....
.....

Understand the nature of my disease and treatment as explained by the doctor/ nurse, hereby give an undertaking that.

1. I will follow the prescribed and agreed treatment regimen and to conscientiously comply with the instructions given to improve my health and protect that of others
2. I agree to be hospitalised for the duration to be determined by my doctor if hospitalisation is deemed necessary to facilitate administration of the treatment and clinical monitoring
3. I will inform the doctor/ nurseof any difficulties or problems in following treatment, or if any part of the treatment is not clearly understood
4. I will provide the sputum specimen required for testing to monitor clinical progress
5. I will provide the blood specimen required for monitoring adverse events caused by the drugs
6. I will undergo audiometric tests required to monitor adverse events.
7. I will adhere to cough hygiene practises at all times to prevent spreading the infection to others
8. I will show consideration and respect for the rights of other patients and health-care providers during my stay in the hospital

I understand that if I wilfully interrupt my treatment the following measures could apply:

1. My treatment could be stopped.
2. Any form of social support I may be getting will be stopped

Name ..... Signature Patient: .....

Date: .....

UNDERTAKING BY HEALTH CARE WORKER

I..... (name)

Undertake to:

1. Explain fully to you the nature of your disease and explain the treatment plan to you (including any side effects you might experience)
2. Provide you with regular clinical progress reports whilst on treatment
3. Ensure confidentiality of your medical condition at all times
4. Address your complaints or concerns to the best of my ability
5. Address any socio-economic problems you may encounter whilst in hospital as far as reasonably possible

Name: ..... Signature: .....

Date: .....

Witness: ..... Date: .....

Witness ..... Date: .....

ANSWERS

Chapter 1

1. DR-TB
2. DR-TB; TB drugs
3. 480 000; 190 000
4. 50%
5. 10th

Chapter 2

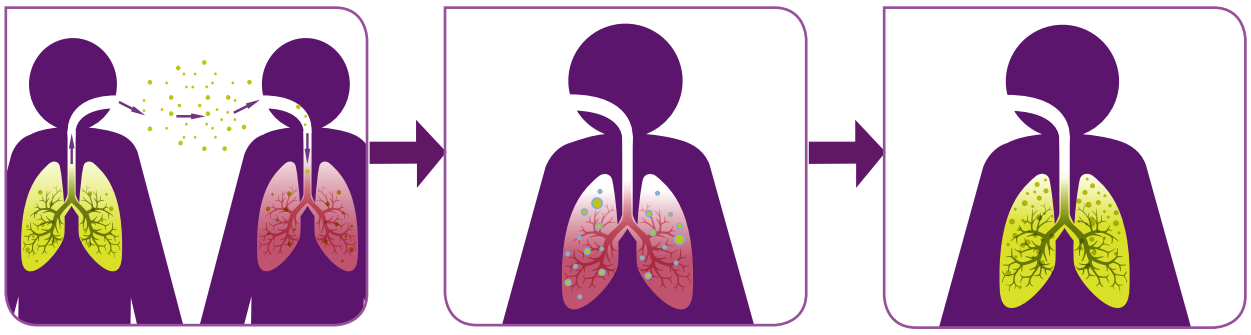
1.

Level of Care	Role/Function
Centralised DR-TB unit	b
Decentralised DR-TB unit	d
Satellite MDR-TB unit	a
Mobile Team/PHC	e
Community: DOT supporters and Caregivers	c

2. True

Chapter 3

1. This means that it is spread through the air.
2. d
3. STAGE 1: Exposure STAGE 2: Infection STAGE 3: Disease



4. When the immune system cannot keep the TB germs under control.

ANSWERS (CONTINUED)

Chapter 4

1. Cure the patient of TB; Decrease the spread of TB; Prevent the development of drug resistance; Prevent recurring TB; Prevent deaths due to TB or its complications
2. a. antibiotics kill bacteria directly

   b. antibiotics stop bacteria from growing
3. a. Rifampicin, Isoniazid, Pyrazinamide, Ethambutol

   b. Kanamycin, Amikacin, Moxifloxacin, Levofloxacin, Ethionamide, Terizadone, PAS

Chapter 5

1. MDR-TB is a form of TB caused by bacteria that do not respond to at least, Isoniazid and Rifampicin, the two most powerful first-line TB drugs.
2. XDR-TB is a form of MDR-TB that responds to even fewer available medicines, including the most effective second-line TB drugs.
3. This is resistance to Rifampicin with/without resistance to other drugs except Isoniazid.

Chapter 6

1. When patients do not complete their full course of treatment; When Health Care Workers prescribe the wrong treatment, the wrong dose, or length of time for taking the drugs; When the supply of drugs is not always available; When patients do not take their TB medication as prescribed
2. Resistance in patients previously treated with TB treatment

   Resistance in patients with New TB
3. - Do not take their TB medicine regularly
   - Do not take all of their TB medicine as told by their doctor or nurse
   - Develop TB disease again, after having taken TB medicine in the past
   - Come from areas of the world where DR-TB is common
   - Have spent time with someone known to have DR-TB disease

Chapter 7

1. • Cough
   • Chest pain
   • Shortness of breathe
   • Coughing up of blood or mucus containing blood
   • Other symptoms may include fever, chills, night sweats, tiredness, persistent loss of appetite, weight loss
2. False
3. The patient has TB disease, TB disease cannot be treated with Rifampicin, the patient needs to be investigated for Isoniazid resistance and this will be done using LPA.

Chapter 8

1. Intensive; Continuation
2. Intensive: minimum 6 months

   Continuation: minimum 18 months
3. Standard: The Standard treatment regimen is used for patients who have not been previously exposed to second-line TB drugs.

   Individual: For patients who have been previously treated with second-line TB drugs an individual treatment regimen is formulated.
4. Up to 24 months

Chapter 9

1. Young children will not be able to produce sputum on request.
2. False; True

Chapter 10

1. At entry; during TB screening campaigns; self-reported or peer referred; TB contacts; as part of integrated primary health care services; at least bi-annually; and on release
2. • Overcrowding
   • Compliance to treatment is poor
   • Closed environment with poor air circulation
   • Interruption of treatment
   • Transfers out/loss to follow-up

ANSWERS (CONTINUED)

Chapter 11

1.

Sputum smear microscopy and culture	Sputum smear microscopy and Culture-taken at baseline and monthly
Audiometry	Audiometry-at baseline, monthly during intensive phase and after 3 months after the injections have been stopped
HIV test and pregnancy test	HIV testing and Pregnancy tests-at baseline and when indicated

2. Weight gain, no fever, no cough
3. Skin rash and itching, abdominal pain, yellow eyes, strange visions or thoughts, fatigue and shortness of breathe
4. Damage to the kidneys; hearing loss

Chapter 12

1. Consultative partnership
2. • Lengthy recommended treatment regimens
   • The daily high pill burden
   • The frequent and serious drug adverse reactions
   • The indirect social and economic costs to patients associated with access to care
3. True
4. Directly Observed Treatment, the treatment supporter watches the patient swallow the tablets, but this should be done in a sensitive and supportive manner.

Chapter 13

1. Children under 5 years, HIV infected patients
2. Every 6 months for 2 years after their last MDR-TB contact.
3. Use Standard first-line regimens; Ensure compliance to management guidelines; Improve adherence and supervision of treatment; Ensure uninterrupted supply of TB drugs

Chapter 14

1. HIV
2. True; True

ANSWERS (CONTINUED)

Chapter 15

1. Cure, Treatment Completion, Treatment Failure, Died, Lost to follow-up, Not Evaluated
2.
   - Pain control-use of paracetamol/stronger analgesics such as morphine can be considered; in addition codeine will help with alleviating the cough
   - Relief of chest symptoms-Oxygen can be provided to assist in case of shortness of breath
   - Nutritional Support-providing small regular meals
   - Regular medical visits-ongoing medical and psychological support should be provided
   - Continuation of adjuvant medication
   - Hospice/nursing home care
   - Measures to prevent bed sores especially in bed-ridden patients

Chapter 16

1. Home infection control includes the following:
   - Ensuring adequate ventilation/open windows
   - Isolating patient (own bedroom where possible)
   - Promoting cough hygiene
   - Ensuring that patients use surgical mask during waking hours while at home or when meeting with others
   - Refraining from close contact with children
   - Maximising time in open-air environment (e.g. receiving visitors outside)
   - Advising all household members and regular contacts to undergo HIV tests

2.

Respirators e.g. N95 Respirator, suitable for Health care worker

Surgical Masks, suitable for patient

ANSWERS (CONTINUED)

Chapter 17

Record	Completed by	Where it is Kept
DR-TB Treatment Card (**Yellow**)	Nurse/Doctor	MDR-TB hospital or Health Facility initiating treatment
DR-TB Patient Consent form	TB nurse and TB Clinician	MDR-TB Hospital or Health Facility initiating treatment
Patient Identity Card	Nurse/doctor	Clinic or district hospital where patient is down referred for continuation of treatment
TB Sputum request form	Nurse/doctor	Health Facilities
TB Patient Referral Form	Nurse/doctor	Health Facilities
DR-TB Register (Paper based, Electronic)	Data Capturer, Information officer or person responsible for data	Central MDR-TB Unit, Decentralised MDR-TB unit, PHC facilities allowed to do so by NDoH and provinces

Answers to Pre/Post Test

1. d
2. d
3. a
4. a
5. c
6. a
7. a
8. a
9. False
10. c
11. False
12. True
13. b
14. True
15. True

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