



Ministry of Public Health and Sanitation

GUIDELINES FOR THE MANAGEMENT

OF

DRUG RESISTANT TUBERCULOSIS IN KENYA

DIVISION OF LEPROSY, TUBERCULOSIS AND LUNG DISEASE

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Foreword

Tuberculosis (TB) remains a major cause of morbidity and mortality in Kenya. It affects all age groups but has its greatest toll in the most productive age group of 15 to 45 years. The major factor responsible for the large TB disease burden is the current HIV epidemic. Other factors that have contributed to this large TB disease burden include poverty and social deprivation that has led to mushrooming of peri-urban slums and congestion. Although TB cases notified in the country has stagnated recently, a new challenge of resistant strains of TB is gradually but surely increasing and in particular MDR TB. This new challenge threatens to reverse gains made in the fight against TB in Kenya. Drug Resistant TB (DRTB) is occasioned by development of resistance by the TB bacilli to first line drugs, a result of use of inadequate TB treatment regimes, inadequate adherence on the part of the patients or poor monitoring of TB treatment.

In order to address this challenge, the ministry is working with development partners and has specifically initiated a DRTB treatment project through DLTLD. Treatment centres have been established at Kenyatta National Hospital, Moi Teaching and Referral Hospital and Homa Bay Sub District Hospital where patients will be admitted during the intensive phase of treatment. An aggressive health care workers training program has been launched to transfer necessary skills to capacitate health care workers to cope with the new demands. Other regional DR TB centers are being set up with focus on areas with high volume drug resistant patients especially at Coast, Nyanza, Rift Valley and North Eastern.

These guidelines provide a new milestone for the ministry and DLTLD towards achieving internationally agreed TB control targets, relevant Millennium Development Goals (MDGs) and provision of universally acceptable standards of TB care.

These guidelines are to be used as technical reference material by health care workers involved in TB care and for training of health care workers in addition to other TB training materials to enable comprehensive care to TB patients.

It is therefore my sincere hope that all health care workers involved in TB care will find these guidelines useful tool for successful implementation of TB control activities in Kenya.

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This material hopefully will be used to eliminate DRTB as a threat to public health and also contribute to the achievement of the millennium development goals in Kenya

List of abbreviations

AFB	-	Acid Fast Bacilli
AIDS	-	Acquired Immunodeficiency Syndrome.
ART	-	Antiretroviral Therapy.
CBOs	-	Community Based Organizations.
CDC	-	Centres for Disease Control and Prevention.
CDR	-	Case Detection Rate.
CHEW	-	Community Health Extension Worker
CNR	-	Case Notification Rate.
CRL	-	Central Reference Laboratory
DLTLD	-	Division of Leprosy, Tuberculosis and Lung Disease
DMOH	-	District Medical Officer of Health
DOTS	-	Directly Observed Therapy Short course.
DST	-	Drug Susceptibility Testing
DTC	-	Diagnostic Testing and Counseling
DTLC	-	District Tuberculosis and Leprosy Coordinator.
EPTB	-	Extra-Pulmonary Tuberculosis.
FBOs	-	Faith Based Organizations.
HIV	-	Human Immunodeficiency Virus.
INH	-	Isoniazid
IOM	-	International Organization for Migration
IPC	-	Infection Prevention and Control
IUATLD	-	International Union Against Tuberculosis and Lung Disease.
KAPTLD	-	Kenya Association for Prevention of Tuberculosis and Lung Disease.

KEMRI	–	Kenya Medical Research Institute.
KNH	–	Kenyatta National Hospital.
MDGs	–	Millennium Development Goals.
MDRTB	–	Multi-Drug Resistant Tuberculosis
MOH	–	Ministry of Health
NASCOP	–	National Aids and Sexually transmitted infections Coordinating Program
NGOs	–	Non Governmental Organizations.
NLTP	–	National Leprosy and Tuberculosis Program
NSN	–	New Smear Negative
NSP	–	New Smear Positive
OPD	–	Out Patient Department
PPM	–	Private Public Mix.
PTB	–	Pulmonary Tuberculosis
PTLC	–	Provincial Tuberculosis and Leprosy Coordinator.
R	–	Rifampicin
SCC	–	Short Course Chemotherapy
TB	-	Tuberculosis.
UV	–	Ultraviolet light
WHO	–	World Health Organization.
XDRTB	–	Extensively Drug Resistant Tuberculosis
ZN	-	Ziehl-Neelsen

Introduction

TB caused by MDRTB bacilli is a growing concern worldwide with an estimated burden of 424,203 worldwide of which 10,449 are to be found in Africa (Zigol, 2006). Kenya is one of the 22 high burden TB countries that collectively contribute about 80% of the world's TB burden. TB in Kenya is primarily driven by HIV and poverty with the urban-slum population making the greatest contribution. The TB case notification has risen from 57/100,000 in 1985 to 329/100,000 in 2008.

Treatment period for TB has reduced from 18 months to 12, then 8, and now in Kenya a 6 month regimen is being phased in. The TB Short Course Chemotherapy (SCC) was initiated in the country in 1993 and covered the whole country in 1997.

In the global anti-TB drug resistance survey of 1993-94, Kenya was the only country that reported no multi-drug resistant TB. However, Isoniazid mono-resistance was 5% and 10% respectively for primary and combined resistance while streptomycin had a combined resistance of 2%. It was notable that drug resistance was significantly higher in patients from the refugee population (18.3%) compared to non-refugee population (5.7%). About 2.9% cases of drug resistant TB among the refugee population were MDRTB while the non-refugee population had no MDRTB.

The program has over the years progressively improved to achieve satisfactory treatment outcomes for both category one and category two patients with success rates of 85% (among NSP) and 82% (among smear positive relapses) in 2008. The failure rate then among smear positive relapses (n=3,794) was about 0.6%. Re treatment TB cases (relapses, return after default, failures and out of control cases) form the pool where suspected MDRTB cases may be found.

Since 2002 surveillance of MDRTB has been strengthened and conducted for all retreatment cases of TB. Over the years, the proportion of retreatment patients submitting sputum specimens to the CRL has improved and in 2008, up to 51% of all re treatment cases submitted sputum for culture and DST. From 2003 to 2008, the CRL has documented a total of 353 MDR TB cases. It is important to note that most of these patients improved on category 2 treatment.

Chapter 1 Political commitment and coordination

1.1 General considerations

Sustained political commitment and leadership are the foundation for any sound programme to control TB. The legal and regulatory context defines the potential as well as the structure and policies of the national TB and DR-TB control programmes. Political commitment is expressed through adequate financial support and appropriate infrastructure, including facilities and trained human resources. Coordination among the different components of public and private health programmes and organizations is essential for successful programme implementation. Sufficient training and retention of medical, public health personnel depend on long-term government planning and support.

1.2 Political commitment

Political commitment must be expressed at all stages of the health intervention process, from planning and implementation to monitoring and evaluation. Political support needs to be garnered from sources including government ministries and regional departments responsible for TB control, nongovernmental organizations and the private sector, the pharmaceutical industry, academic and research institutions, professional medical societies and the donor community. This commitment takes the form of financial and human resources, training, legal and regulatory documents, infrastructure and coordination of all stakeholders involved in all aspects of the framework for control of drug-resistant TB.

1.3 Sufficient economic support

The national TB control programme budget must be sufficient to develop and retain an adequate workforce with interest and expertise in drug-resistant TB without weakening the workforce of the national programme as a whole. The financial resources needed to support the framework should be provided. Efforts should be made to limit barriers including financial barriers to patients' accessing appropriate care for drug resistance TB.

1.4 Regulatory and operational documents

MDRTB control programme in Kenya is integrated into the national TB control Programme. To improve access, scale-up will follow a decentralized model. Follow up shall be either community based through clinics or home based. Patients shall only be hospitalized only when medically necessary. To appropriately care for MDRTB patients, isolation wards will be required in all PGHs and other facilities guided by need. Treatment will be delivered through well-supported and -trained health workers during the intensive phase and

CHEWS and/or community health workers in the continuation phases to support adherence through DOT.

The following are examples of the use of regulatory and operational measures:

- Legislation can be drafted to ensure proper registration, availability, quality, safety and distribution of second-line drugs.
- There are TB/HIV committees at all levels. These committees should be mandated to also address the MDRTB issues arising
- Roles and responsibilities of different partners shall be articulated clearly to avoid duplication, ambiguity in implementation plans, targets and area of operations to maximize benefit. Stewardship of this process will be given by the Ministry of Public Health and Sanitation/DLTLD.

1.5 Coordination

Coordination will include the contributions of all the key stakeholders, organizations and external partners.

- National TB control programme. The national TB control programme is the central coordinating body for the activities described in the strategic framework. Commitment of the necessary resources, particularly for a strong central management team, ensures that all elements are in place, from the procurement of second-line drugs to the appropriate implementation and monitoring of the DR-TB control programme. As needed, the national programme may build partnerships with all relevant health-care providers and development partners.
- The program recognizes the involvement and communication with community leaders can greatly facilitate implementation of treatment and respond to needs that cannot be met by medical services alone. Community education, involvement and organization around TB issues can encourage a feeling of community ownership of control programmes and reduce stigma. In some circumstances, communities have helped to address the interim needs of patients, including the provision of DOT, food and/or housing.
- Coordination with prisons.

Transmission in prisons is an important source of spread of drug-resistant TB in some countries, and infection control measures can reduce incidence substantially. In many cases, inmates are released from prison before they finish treatment. Close coordination and communication with the civilian TB control programme, advance planning, targeted social

support and specific procedures for transferring care will help ensure that patients complete treatment after release from prison.

- All health-care providers (both public and private).

In some countries, private practitioners manage most cases of drug-resistant TB. In these settings, it is important to involve the private sector in the design and technical aspects of the programme.

- Many PPM programmes have demonstrated effective and mutually beneficial cooperation.

In PPM systems, patients and information move in both directions. For example, private providers can be compensated fairly through negotiated systems of reimbursement, and the public health system may provide clinic- or community- based DOT as well as registering patients and their treatment outcomes. Similar PPM mixes can be established for treatment of drug-resistant TB, but they require exceptional coordination.

Chapter 2 Case finding strategies for MDR TB

2.1 Operational definitions

2.1.1 Types of drug resistance

1. **Mono-resistance:** This is mycobacterium which is resistant to only one first-line anti-tuberculosis drug;
2. **Poly-resistance:** This is mycobacterium which is resistant to more than one first-line anti-tuberculosis drug other than both Isoniazid and Rifampicin;
3. **MDR-TB:** This is mycobacterium which is resistant to at least Isoniazid and Rifampicin;
4. **XDR-TB:** This is extensively drug resistant TB. It is caused by multidrug resistant (MDR) mycobacterium that is also resistant to any Fluoro-quinolone, and at least one injectable agent (Amikacin, Kanamycin or Capreomycin) .

2.1.2 Type of drug resistant TB disease

1. **Pulmonary tuberculosis:** TB involving the lung parenchyma
2. **Extra pulmonary tuberculosis:** TB involving organs other than the lungs. Note that if the patient has both pulmonary TB and extra pulmonary, s/he should be classified as *pulmonary* TB and the site of the extra pulmonary disease documented. Miliary TB and pleural TB are extra pulmonary.

2.1.3 Classification of patients

Before enrolling a patient, determine whether s/he has previously received anti-tuberculosis treatment and if so, record the dates of treatment and the treatment outcome. Also record whether the patient ever previously received second-line drugs.

Category IV patient: This is any form of TB requiring 2nd line drugs which includes XDR, PDR, MDR etc)

1. New Category IV patient (primary resistance)

This is an MDRTB patient who has never received anti-tuberculosis treatment, who has received anti-tuberculosis treatment for less than one month, or who had DST at the start of a WHO category I regimen and then switched to a Category IV regimen because of evidence of MDRTB.

2. Category IV patients previously treated with first-line drugs (acquired or secondary)

This is a MDRTB patient who has been treated for one month or more with first-line drugs only.

3. Category IV previously treated with second-line drugs

This is a MDRTB patient who has been treated for one month or more with second-line drugs, with or without first-line drugs. They could be:

- Return after default – a MDRTB patient who was on second line treatment, who interrupted treatment but has been found and returned to treatment.
- Relapse – a patient who was successfully treated for MDRTB and now comes back with MDRTB.

4. Transfer in.

This is an MDRTB patient who has been transferred from one district register of drug resistant TB patients to another.

5. Others

These are MDRTB patients who do not fit any of the above definitions.

2.2 Case finding strategies

The program will enroll patients from the high risk groups for MDRTB. The diagnostic tool for MDRTB is DST and this will be used selectively for the patients highly suspected to be having MDRTB.

Categories of patients whose specimens should be cultured

- All retreatment cases (relapses, failures of category 1 or 2, return after default)
- Contacts of MDR TB patients
- All new smear positive
- New PTB Sm- HIV positive patients

All health care workers should send sputum specimen from all the retreatment cases and also retreatment failures to the CRL for DST. This is made possible through a contract between a courier firm—Securicor—and the NLTP. The courier firm transports the packaged specimens to the CRL and takes results from the CRL to the health care workers. The packaging of this sputum is explained in detail later in this manual. The CRL has the capacity to carry out DST for Rifampicin (R) Isoniazid (H), streptomycin (S), and Ethambutol (E). Representative samples of the isolates from CRL undergo quality assurance in two supranational reference laboratories (SNRLs). There are plans to start doing DST for

second-line drugs. The laboratory DST results are compared to the treatment outcomes in order to validate the DST results to ascertain whether these are MDRTB patients. This process will yield the MDRTB patients who fail treatment. EQA is also done in a supra national laboratory and regular feedback provided to the central reference laboratory. The results of DST take on average six to nine weeks to reach the clinicians treating the patients. However molecular testing has reduced this period to 24 to 48 hours. The identified patients will be recruited for treatment, which will only commence after evaluation at an approved DR-TB treatment facility. Those who qualify for treatment will receive the intensive phase either as inpatients in the MDRTB treatment centre with discharge when the isolation period is over following sputum conversion or as outpatients in an approved facility-based DOT program.

Chapter 3 Diagnosis of DR TB

The mainstay for the diagnosis of drug resistance Tuberculosis in Kenya is by culture and DST.

3.1. Sputum sample collection and processing

Collection of sputum specimens should be done in the early morning in an open space away from people or in sputum collection booths. The specimen should be put into a sterile universal bottle, which should be tightly screwed and protected from sun light (UV light) by placing it in a dark thick envelop or appropriate transportation containers as shown below in Figure 1.. The recommended packaging is to put the specimen container (primary container) in secondary and tertiary containers.

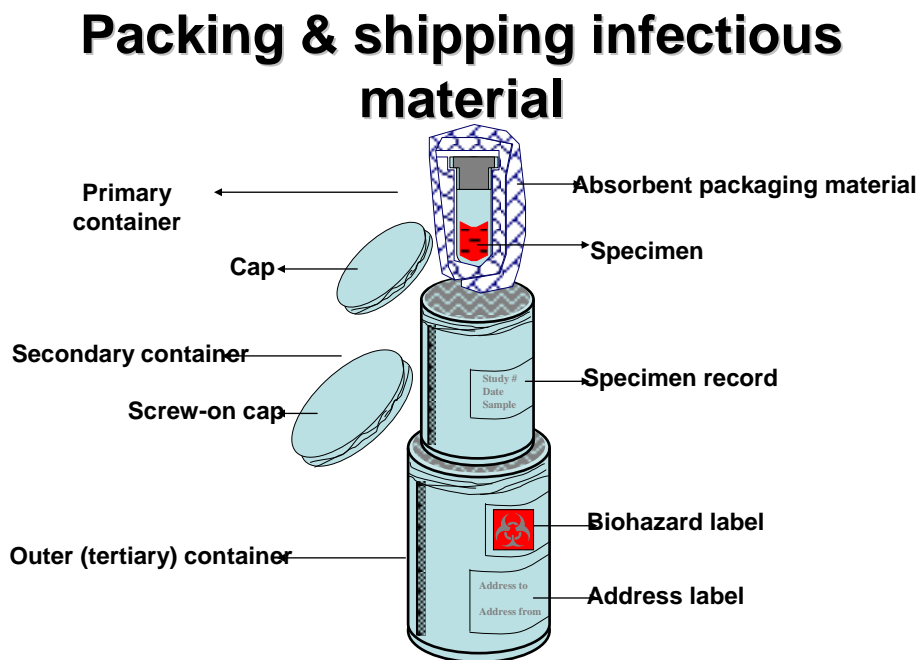
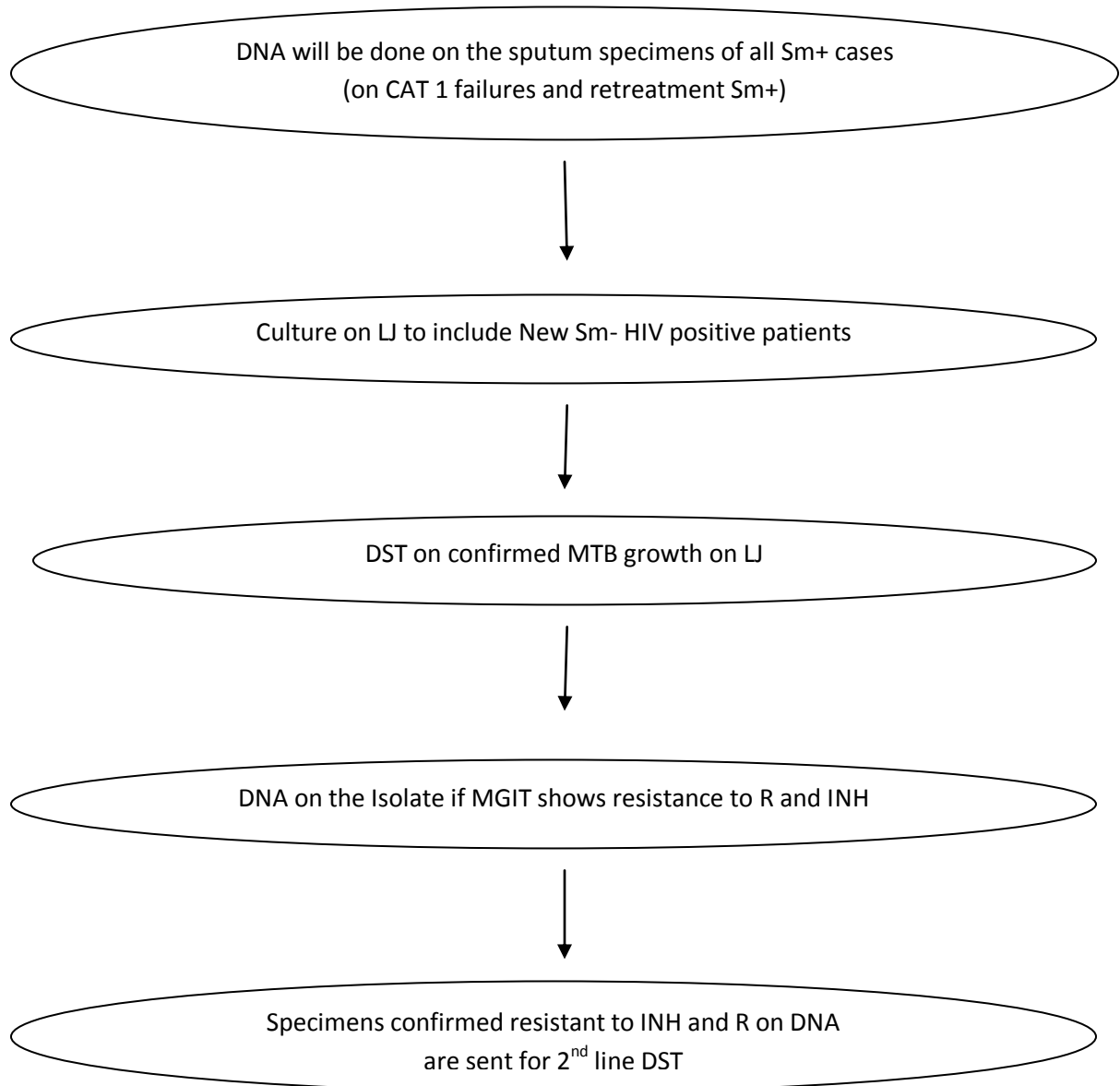


Figure 1

Sputum culture and DST is currently being done in the Central Reference Laboratory in the public sector. Plans are underway to decentralize to regional laboratories. In the mean time, facilities managing suspected DRTB patients will send sputum specimens collected from these patients to the CRL.

3.2. Screening Algorithm for DRTB



3.3. Organization and development of the laboratory network

The laboratory network has a pyramidal structure based on a large number of Level I laboratories accessible to all TB suspects and patients, a moderate number of Level II laboratories located in mid-sized population centers and health facilities and a few (or even a single) apex Level III laboratories at the provincial, state or national level.

In the public sector CRL and KEMRI carry out both culture and DST while in the private sector Nairobi and Aga Khan Hospitals have the capacity to do DST. Culture only facilities are available in Moi Teaching and Referral Hospital, Homa Bay and Kisumu. All these laboratories are supervised by the CRL which also supervises the provincial hospitals.

3.3.1. Regional Labs

All regional labs (level 5 hospital labs) should be upgraded to perform cultures, DNA and eventually DST.

3.3.2. Quality Assurance

Diagnostic TB microscopy labs will be strengthened to provide quality work by participating in both internal quality control and external quality assurance (IQC & EQA)

All lab performing cultures will do internal quality control by including H37RV in their routine cultures. CRL will oversee External Quality Assurance (EQA) activities of the regional labs performing cultures. Strengthen the links between CRL and SRNL to ensure quality of culture and DST laboratory services and validation of DST for both first line and second line drugs.

Chapter 4 Patient isolation and infection control

4.1. Prevention

MDR-TB development can be prevented by implementing a high quality DOTS program but if MDR-TB cases occur despite this, there is need to contain such cases through proper and adequate treatment. Detailed infection control measures should be put in place wherever MDR-TB patients are treated. The MDR-TB patients should not be mixed with HIV infected patient population

4.2. Components of TB infection control in the health facility

4.2.1. Administrative Controls

These are the most effective and least expensive measures and thus are highest priority in resource limited settings. They comprise policies and procedures intended to promptly identify infectious TB patients (smear positive) by same day sputum examination and initiation of treatment of infectious cases to reduce exposure to close contacts.

TB infection control policies and procedures include:

- The establishment of an infection control committee
- Appointment of an **infection control officer**
- Formulation of an **infection control plan** which should be made known to all health care providers in the facility
- **Physical separation of patients** suspected or known to have TB including those with MDR-TB from other patients especially those patients who are immunocompromised. (Isolation wards / rooms / one section of the ward) and
- The **triaging of patients** with chronic cough (two or more weeks) in the outpatient department to hasten TB screening while all in patients with cough should be screened for TB
- Diagnostic tools for TB (request forms, sputum mugs) should be freely available in all departments.

Five steps for Patient Management to Prevent transmission of TB in HIV Care Settings	
Step	Action
1	Screen for suspected or confirmed TB
2	Educate on cough hygiene
3	Separate patients suspected of having TB
4	Investigate for TB or Refer
5	Provide HIV services

Key interventions for the prevention against hospital transmission of tuberculosis

1. Cough for 2 weeks or more may indicate PTB
2. Smear positive PTB must be diagnosed immediately
3. It is safer to diagnose PTB in OPD than in the wards
4. Sputum specimen must be collected as rapidly as possible.
5. Sputum smear results must be communicated to the responsible clinician as quickly as possible.
6. Windows of wards where PTB suspects or patients are managed wards should be left open at most times.
7. PTB suspects must be taught simple cough hygiene.
8. PTB patients should wear masks when going to theatre
9. X-rays examinations for PTB suspects and patients should be scheduled for those times when the X-ray department is not busy.

4.2.2. Environmental /Engineering controls

These measures reduce transmission of TB in the hospital by reducing the concentration of infectious droplet nuclei in the air. They include natural and or mechanical ventilation, use of and high efficiency particulate air filtration but **should not replace administrative controls**.

1. Ventilation

Natural ventilation is the least expensive environmental measure. Transmission is unlikely outdoors and therefore TB suspects and patients should be encouraged to spend most of the day time outdoors. Special comfortable sheds which maximize on natural ventilation and sunlight should be promoted for outpatient departments with a high burden of TB suspects and patients.

Adequate ventilation inside health facilities should a priority. The use of extraction fans, which work properly, to improve ventilation, may be used in facilities where a large number of MDRTB patients will are cared for.

Ventilation may be supplemented by upper room Ultraviolet Germicidal Irradiation (UVGI) and UVGI may also be used in ventilation ducts or in fan driven air sterilizing devices mounted on ceilings, walls or portable units that can be moved from room to room. **These measures are however are expensive and will not be routinely available in Kenya.**

4.2.3 Personal respiratory protection

The usual surgical masks are relatively loose fitting and are made of paper or cloth. They are not adequate for prevention of TB infection but can be used by the MDRTB patients. Particulate respirators (e.g. the N-95 mask) on the other hand are designed to protect the wearer from tiny (1-5 μm) airborne infectious droplets. These respirators should fit well individual wearers. Men with beards cannot be properly fitted with personal respirators.

4.2.4. Care of the health worker

- HCWs need to be educated on MDR and TB IPC.
- All health care workers exposed to smear positive TB patients should be provided with respirators i.e. N95 masks.
- Staff should be encouraged to go for periodic TB screening and HIV to know their status
- HIV infection predisposes individuals to getting tuberculosis. It is advised that health care workers who are HIV positive or who suspect they may be HIV positive should not work in wards which take care of PTB suspects or patients. All health care workers should be encouraged to know their HIV status.

4.2.5. Laboratory Considerations

The laboratory should process sputum samples as quickly as possible. It is preferable that a same day sputum smear microscopy service is established in every hospital to allow for a rapid turnaround of sputum smear results. Results of smear positive cases must be communicated as quickly as possible to the clinicians managing the patient. In particular, staff must ensure that smear positive results from “**in patients**” are forwarded to the wards as soon as the results are known.

4.2.6. Other High Risk areas

1. The x-ray department

It is preferable to schedule radiological procedures for suspected or confirmed infectious TB at a time when the x-ray department is not busy with other patients. Radiology departments should be encouraged to provide separate waiting areas for infectious TB suspects and patients where possible.

2. Minor Theatre

All TB patients who come for chest drains, biopsies and other TB related procedures should wear surgical masks while in the minor theatre.

4.3. Role of the TB / Infection Control Officer

Hospitals are encouraged to appoint one or more health care workers as the TB coordinating officer. This officer should coordinate infection control measures (including those for TB control) in the hospital including triage, diagnosis, treatment, separation / isolation, case recording and reporting, recommending and installation of environmental measures and to ensure that the logistics, required for infection control in the hospital are working optimally.

4.4. Prevention and control of TB transmission within the community

Awareness on reduction of TB transmission in the community should be enhanced through early identification of TB suspects and referral for follow-up in the health care setting.

Health education should be given to the patients, family and community on the signs and symptoms of TB disease and the need to support patients on treatment so that they complete their regimens effectively to avoid various drug resistances.

The MDRTB patients should be advised to spend as much time as possible outdoors, sleep in a separate bedroom at home, to wear the ordinary masks when receiving visitors, to practice cough etiquette (to cover their mouth when they cough), use sputum mug and dispose of the mugs in pit latrines. Where sputum mugs are not available, locally available containers with fitting lids should be used.

Due to HIV TB co infection the community should be encouraged to go for Voluntary Counseling Testing. Contacts of MDR patients should be screened for TB and for HIV.

4.5. Infection control measures in special settings

There are special settings in the community that are of high risk and call for special attention as far as TB infection, prevention and control is concerned. Structures and buildings in congregate settings should comply with national norms and regulations for public buildings, and should meet the design criteria for sufficient ventilation.

- Prisons and remand cells

- Informal settlements (slums)
- Refugee and internally displaced persons (IDP) camps
- Learning institutions (schools, colleges)
- Security forces training camps (military, GSU, police national youth service etc)
- Public transportation
 - Matatus, buses and trains
 - Air transport

TB is spread more readily in congregate settings such as prisons, remands, informal settlement and public transport. This is because of the long duration of potential exposure, crowded environment, poor ventilation, and limited access to health care services.

4.5.1. Prisons and remand cells

All inmates on admission should be screened for TB. The prison and remand cell should follow and implement TB infection control guidelines. There is need for active advocacy and sensitization of the relevant ministry and departments for the implementation of TB infection control guidelines in the prisons.

4.5.2. Informal settlements (slums and refugee camps)

To reduce TB transmission in the informal settlement, there is need to have adequate sensitization and advocacy on proper ventilation on the existing structures/ housing and practice of cough etiquette. The implementation of community TB infection control guidelines should be emphasized. Screening, contact tracing and defaulter tracking should be highly emphasized in such settings.

4.5.3. Learning institutions and security forces training camps

Learning institutions and training camps should embrace TB infection control guidelines. TB infection control should be incorporated in the school health program. Learning institutions and training camps should adopt and own TB environmental measure and UVGI.

4.5.4. Public transportation

TB infection control guidelines should be implemented in public transport sectors. There should be adequate ventilation by opening windows on both sides of the vehicles or applying mechanized ventilation. Advocacy and sensitization with different ministries and the community is required for this to succeed. Airline services should implement TB Infection

control guidelines. Transportation of suspected MDR-TB Patients from one facility to another should be by well ventilated means of transport with personal respiratory protective devices.

Chapter 5 MDR Treatment

5.1 Classes of anti TB drugs used in management of DR-TB

5.1.1. Drugs used for treatment of drug-resistant tuberculosis

The drugs used are classified into 5 groups based on their efficacy, experience of use and drug class. These groups are shown in Table 2. Table 2. Drugs for treatment of tuberculosis

Group	Description	Drugs
1	First-line oral anti-tuberculosis agents	1. Pyrazinamide (Z) 2. Ethambutol (E) 3. Rifampicin (R) 4. Isoniazid (H)
2	Injectable anti-tuberculosis agents	1. Streptomycin (S) 2. Kanamycin (Km) 3. Amikacin (Am) 4. Capreomycin (Cm) 5. Viomycin (Vi)
3	Second-line fluoro-quinolones	1. Ciprofloxacin (Cfx) 2. Ofloxacin (Ofx) 3. Levofloxacin (Lfx) 4. Moxifloxacin (Mfx) 5. Gatifloxacin (Gfx) 6. Sparfloxacin
4	Oral bacteriostatic second-line anti-tuberculosis agents	1. Ethionamide (Eto) 2. Protionamide (Pto) 3. Cycloserine (Cs) 4. Terizidone (Trd) 5. P-amino salicylic acid (PAS) 6. Thioacetazone (Th)
5	Third line anti-tuberculosis agents with unclear efficacy	1. Clofazimine (Cfz) 2. Amoxicillin/Clavulanate (Amx/Clv) 3. Clarithromycin (Clr) 4. Linezolid (Lzd)

5.2. Treatment strategies For MDR-TB

5.2.1. Considerations When Designing a Treatment Strategy

MDR treatment requires a combination of drugs from various groups as listed in the table above. The decision on which drugs are to be used to treat the MDRTB is based on the

available national anti-tuberculosis drug resistance survey data, availability and extent of use of anti-tuberculosis drugs in the country, prevalence of drug resistance in the different categories of tuberculosis patients, the availability of the 2nd line of anti-tuberculosis drugs and the frequency of their use in the country

5.2.1. Medico-legal issues:

A patient with MDR-TB has the right to refuse treatment.

5.3. Kenya MDR Regimen

5.3.1. Treatment of MDR-TB in Kenya

In Kenya the treatment for MDR-TB is based on a **standard regimen** using the following drugs:

6 Km-Pto-Lfx-Cs-(E/Z) / 18 Pto-Lfx-Cs-(E/Z)

- The number shown before each phase stands for the duration of time in months and is the minimum recommended time the phase should last.
- One of the alternative drugs appearing in parentheses should be selected, based on sensitivity findings.
- The drugs in the higher groups are written first followed in descending order of potency.

PAS can be substituted for Pto or Cs in case there is intolerance, contra-indication (including pregnancy) or resistance to any of them is detected.

5.3.2. Surgical management

In specific cases surgery can be used as additional management of MDR-TB especially in case of extensive lung fibrosis or in some cases of EP MDR-TB, e.g., TB of the spine.

5.3.3. Duration of Treatment

The duration of treatment is guided by smear and culture conversion. The minimum recommended duration of treatment is 18 months after culture conversion. The treatment consists of two phases as follows;

5.3.4. Intensive Phase – 6Km-Pto-Lfx-Cs-(E/Z)

This lasts for a minimum of 6 months, and should continue 4 months after sputum conversion or at least 3 consecutive negative culture results. The following drugs are recommended:

- a) Inj. Kanamycin [Km]
- b) Tabs Protionamide [Pto]
- c) Tabs Levofloxacin [Lfx]
- d) Tabs Cycloserine [Cs]
- e) Either Tabs Ethambutol [E] or Tabs Pyrazinamide [Z]

5.3.5. Continuation Phase – 18Pto-Lfx-Cs-(E/Z)

This lasts for 18 months and uses the following drugs:

- a) Tabs Protionamide [Pto]
- b) Tabs Levofloxacin [Lfx]
- c) Tabs Cycloserine [Cs]
- d) Either Tabs Ethambutol [E] or Tabs Pyrazinamide [Z]

5.3.6. Extra-pulmonary MDR-TB Treatment

The treatment strategy is the same as in patients with pulmonary MDR-TB. Clinical monitoring by team of physicians on at least 6 monthly bases is of utmost importance to follow up on extra-pulmonary MDR-TB patients. If patient is able to give sputum, it is recommended to perform sputum follow-up as well.

5.4. Treatment of Extensively Drug-Resistant Tuberculosis (XDR-TB)

XDR-TB is a public health emergency that requires prompt diagnosis and treatment, appropriate isolation, and aggressive contact tracing. While cure rates for XDR-TB are lower than for MDR-TB, XDR-TB is a curable disease.

All XDR-TB patients should receive an individualized treatment regimen. The regimen should include an injectable agent, a higher generation Flouro-quinolone, and drugs from Groups 1, 4 and 5 to which the isolate is known or suspected to be susceptible. An effective regimen should contain at least five effective drugs.

While treatment should be individualized, the following empiric regimen is recommended in cases where first and second line DST is not yet available:

- Intensive phase: 12 months of CM-Mfx-PAS-Cfz-Amx/Clv
- Continuation phase: 18 months of Mfx-PAS-Cfz-Amx/Clv

Include Group 1 and Group 4 drugs thought to be effective (strain still susceptible). Clofazimine can be used for the duration of the regimen if extensive disease is present and if the drug is tolerated. Levofloxacin may be used in place of Moxifloxacin.

5.5. Treatment for contacts of MDR-TB patients

Active contact tracing is a cornerstone of DR-TB control. All household and other close contacts of an MDR or XDR patient should receive prompt and thorough screening including clinical evaluation for signs of TB disease and tuberculin skin testing. If cough or other symptoms are present, a chest X-ray should be performed and sputum sample collected. Young children and HIV-positive contacts should receive a chest X-ray even if they are asymptomatic.

Close monitoring of all household contacts of MDR patients is needed. If active TB develops in a household contact of a known DR-TB patient, culture and DST should be done as soon as possible. While awaiting DST results, the contact patient should receive empiric second-line treatment based on the standardized regimen outlined above. The regimen may be adjusted when DST results are available.

The DLTLD will make every effort to ensure that access to prompt treatment for MDR-TB is available. While awaiting treatment, thorough IPC measures should be taken. Patients with malnutrition should receive nutritional support, when possible, to retard disease progression. Patients already on a retreatment regimen may continue until MDR-TB treatment is initiated. Active contact tracing should be initiated as soon as the DR-TB diagnosis is made.

5.6 Patients diagnosed with poly-drug resistant TB

Pattern of drug resistance	Regimen	Duration of treatment
H (± S)	R/Z/E/LFX	9 months
H and Z	R/E/LFX	9months
H and E	R/Z/LFX	9 months
R	3KN/H/E/Z/LFX/ 15H/E/LFX	18 months
R and E (± S)	3KN/H/Z/LFX 15H/Z/LFX	18months
R and Z (± S)	3KN/H/E/LFX 15/H/E/LFX	18 months
H, E, Z (± S)	3KN/R/PTO/LFX 15/R/PTO/LFX	18months

5.7. Special situations

5.7.1. Management of MDR-TB patients in prison

The same guidelines have to be used in terms of treatment regimens. Treatment centers on site are needed. Special nutritional support has to be added. Infection control in prisons should include policies that an MDR-TB patient cannot share a cell with other prisoners. A separate isolation ward is needed.

Contact tracing in prison includes theoretically all other prisoners. All prisoners who are symptomatic should undergo sputum smears, cultures, DST and CXR.

5.7.2. Management of MDR-TB patients in refugee camps

The same guidelines have to be used in terms of treatment regimens. On site treatment has to be made available (MDR-tents). A mobile team goes around to give treatment.

Entire treatment should be coordinated by the DLTLTD. This includes supply of drugs, laboratory support, quality control, and training of staff.

Should the camp close, IOM/UNHCR have to come in to ensure continuation of the MDR-treatment.

5.8. Management of MDR-TB patients who are HIV co-infected

When a patient is newly diagnosed with both HIV and MDR-TB, the MDR-TB regimen should be started first. Cotrimoxazole prophylaxis and fluconazole prophylaxis, if needed, should be started together with the start of the MDR regimen. If antiretroviral therapy is indicated (ie, $CD4 < 250$), ARVs should be initiated 2-8 weeks after starting DR-TB treatment. In patients who are stable without evidence of other opportunistic infections, ARV initiation may be deferred longer to minimize the risk of drug toxicity.

For patients receiving Rifampicin (ie, polydrug resistance), Nevirapine should be avoided. An ARV regimen that contains Efavirenz is preferred in such situations, unless there are contraindications to Efavirenz

5.9 Treatment delivery and adherence

5.9.1. Patient care

All centers managing MDRTB should have in place an MDRTB management committee which will be charged with ensuring adequately trained staff capacity staff at the health facility to ensure health worker DOT and patient support to ensure case holding. The DR-TB management committee should discuss new patients prior to treatment initiation, and meet regularly to discuss challenges during treatment. Such challenges may include side effects, pregnancy, poor adherence, psychosocial barriers and other issues. A health care worker should visit the home (both rural and urban) before treatment can be started for second line anti-TB treatment

All the doses for second line should be observed by the health care worker and confirmed as swallowed by asking the patient a question. Adequate staffing is recommended to ensure success of the program.

MDRTB patients should be monitored closely for adverse drug effects and appropriate actions taken at once.

Patient support should include accommodation, food, transport, non-TB drugs, non TB laboratory tests, extra investigations if required. The social support should be provided directly to the patients in order to ensure the money reaches the ones who need it.

As far as possible, all necessary patient and family support should be put in place to increase adherence to treatment. These may include patient support groups, psychological counseling, transportation, subsidy, food baskets etc. All MDRTB patients, their families and communities require health education, including stigma reduction.

5.9.2. Treatment delivery and adherence

Treatment of MDRTB should aim to ensure maximum adherence. The prevention of non – adherence and default from treatment should be emphasized, as it's more important than default retrieval measures. It is important to understand that many patients with MDRTB may have been non-adherent to previous treatment and could become non-adherent to current treatment if not strongly supported. To prevent non adherence and default from treatment the following measures are essential:

1. Education/ counseling of patients

All patients with MDRTB and their families should receive education and counseling about MDRTB, its treatment, potential adverse drug effects and the need for adherence to treatment from start of treatment and reinforced throughout the period of treatment. This can be done by health care workers (clinicians, nurses), lay health care workers, community health care workers and current or former TB patients. Interpersonal Communication (IPC), the most effective way of communication, should be used to educate patients and their families complimented with use of IEC including pamphlets and brochures in various languages.

2. Assessment for risk factors for non-adherence

All patient must be assessed for risk factors for non-adherence to treatment, including poor social circumstances (e.g. severe poverty or homelessness) , drug and alcohol abuse, nutritional barriers (lack of food) , non-facilitatory work schedules , drug adverse effects, denial of disease state and other adherence barriers including distances from health delivery points. Any identified factor(s) that may impact on adherence should be addressed. This may include the provision of incentives and enablers including food, shelter, clothing, transport, and psychological support (counseling and peer support.)

5.9.3. Treatment delivery settings

During the initial phase of MDRTB treatment, therapy will mostly be delivered in a hospital/clinic setting (the MDRTB treatment centre) because of the need for daily injections. However it is possible to deliver the same treatment at home through community nurses, a treatment delivery mechanism that may reduce the risk of hospital transmission of MDRTB and which may be inexpensive for the health care system and the patients.

In ideal setting patients who are smear or culture positive MDR-TB should be treated in isolation facility. An isolation facility should meet all infection control measures as per WHO recommendations. Patients who have converted can be treated on an ambulatory basis or through home based care.

In case there are not enough isolation beds, the isolation facility should prioritize patients who need admission due to side effects to the MDR drugs.

PDR patients should be hospitalized separate from the MDR-patients. XDR patients SHOULD NOT be mixed with MDR, PDR, or other TB patients.

5.9.4. Direct Observation of Therapy (DOT):

All doses of MDRTB medicines will be directly observed. *The choice of DOT provider should be agreed with the patient and or his/her family. The DOT provider may be a health care worker, a workmate, a family member or a community volunteer who should make every effort to accord the patient respect and dignity and maintain confidentiality. DOT providers should receive appropriate training on DR-TB treatment and side effects, TB infection prevention control, and the importance of adherence.*

5.9.5. Default Retrieval

A clinic attendance register should be maintained in every centre treating MDRTB. This will facilitate the identification of treatment defaulters. Every effort should be made to retrieve patients who default from treatment. The skills of social workers and community health care workers and volunteers should be used to assist with default retrieval.

5.10 Patient Monitoring

5.10.1 Initial evaluation and monitoring of treatment

Pretreatment screening and evaluation is done to ensure a baseline for this treatment and to identify patients who are at risk of increased incidence of side effects

Monitoring evaluation	Recommended frequency
Evaluation by clinician	At baseline, monthly until conversion, then every 2-3 months
Screening by DOT worker	At every DOT encounter
Weight	At baseline and monthly
Sputum smear and cultures	Baseline, monthly till conversion, then monthly smears and quarterly cultures every 3 months
DST 1st and 2nd line	Ideally at Baseline and anytime there is a positive culture DST should be done at 3 months if sputum remains positive 2nd line DST should be done for all MDR TB patients
CXR	At baseline then 6 monthly
Heamogram	At baseline then 3 and 6 months, then 6 monthly (or when necessary)
Serum Creatinine	At baseline then monthly while on injectable drug
Serum potassium	At baseline then monthly while on the injectable agent
Serum calcium and magnesium	At baseline then monthly while on the injectable agent
TSH	At baseline then 3 and 6 months, then 6 monthly if on ethionamide/ prothionamide / PAS Monitor clinically monthly for hypothyroidism
Liver function tests	At baseline then 1-3 monthly if on pyrazinamide
HIV screening	At baseline and if clinically indicated
Pregnancy test	At baseline for women of child bearing age; repeat if indicated. Family planning methods should be offered to all woman of reproductive age undergoing DR-TB treatment.

5.10.2. Sputum conversion while on second line treatment

Sputum conversion is when sputum for a patient who was smear / culture positive is found to be negative by the same procedure/s. It is a guideline on when to stop intensive phase and stop isolation. Intensive phase in MDRTB treatment will last up at least 6 months or until three consecutive negative cultures taken 30 days apart are obtained. Isolation will

continue until results of three consecutive negative smears and cultures taken 30 days apart are obtained. This is equivalent to 4 months after culture conversion. Also both smear and culture results are used to monitor patients' progress throughout treatment and as indicators of program performance

5.11. Management of patients failing MDR-TB treatment

While treating MDRTB some unfavorable outcomes are anticipated, including treatment failures and the presence of extremely drug resistant TB (XDRTB). When this happens, the following steps are recommended:

1. Review the treatment card and assess adherence to determine if the patient is receiving all the right drugs and doses.
2. Review the treatment regimen in relation to medical history to determine if the patient may have been re-infected during the course of treatment.
3. Review all DST reports to determine the adequacy of the regimen and consider an alternative regimen where possible.

5.11.1. Signs indicating Treatment failure:

- Persistent cultures and positive smears past 6 months of treatment
- Progressive extensive and bilateral lung damage confirmed on X-Ray with no option for surgery.
- Worsening patient's condition usually including weight loss and respiratory insufficiency

Caution:

Please note that occasionally patients have a positive smear with negative cultures. It is important to appreciate that it may be caused by the presence of dead bacilli and hence does not necessarily indicate treatment failure. Such cases should be discussed with the DR-TB management committee.

In patients with repeated negative culture and smear results and no corresponding clinical and radiological improvement, then consider other diseases rather than MDR-TB.

5.11.2. Suspending Therapy:

Treatment should be suspended when it is confirmed that all the drugs have been administered and there is no possibility of adding other drugs or carrying out any surgical intervention. At this point, supportive care regimen is considered. The 2 most important considerations to suspend therapy and consider supportive care are:

- Patient's quality of life: continued use of the failing regimen can cause additional suffering without any benefits
- Public health concern: Continuing with the failing regimen can amplify resistance in the patient's strain and hence subsequent infection in the public.

This decision to suspend treatment should be made by the MDRTB management team.

Prepare the supportive care plan for the patient after consensus with the patient and the family members. This may include pain relief, management of respiratory insufficiency, nutritional support, and regular medical visits-particularly psychosocial support, home nursing care, prevention and infection control measures as these patients normally remain infectious for a long time.

Chapter 6 Treatment under special conditions

6.1. Treatment of Drug Resistant TB in Special Conditions and Situations

Drug resistant TB may coexist with any number of medical problems and thereby present clinical challenges in the management of both diseases. These challenges include increased risk of drug toxicity, alterations in drug metabolism or pharmacokinetics that requires dose adjustment, multiple drug therapies leading to drug-drug interactions etc. These co-morbid conditions often require high level of clinical expertise and therefore early cross referrals with relevant clinicians with this expertise where feasible is highly recommended. Some common clinical conditions that may co-exist with TB include pregnancy, breastfeeding, contraceptives, drug resistant TB in Children, diabetes mellitus, renal insufficiency, liver disorders, seizure disorders, psychiatric disorders, drug and other substance abuse and HIV infection and use of anti-retroviral drugs.

6.1.1. *Pregnancy*

All female patients with MDRTB and of child bearing age should be screened for pregnancy prior to initiating treatment. An appropriate birth control method for all non-pregnant female patients should be provided during treatment. If possible treatment should be delayed in expectant mothers until the second trimester of pregnancy to avoid teratogenic effects. Aminoglycosides may be avoided in pregnancy due to risk of damaging the hearing of the developing fetus. Capreomycin may cause similar side effects as aminoglycosides but it remains the drug of choice for the injectable in pregnancy. Ethionamide/Prothionamide should be avoided in pregnancy because it may aggravate the pregnancy related vomiting and has been found to be teratogenic in animals. PAS should be substituted for Prothionamide.

Caution: Medications that induce hepatic enzymes, e.g., Rifampicin, protease inhibitors, some second-line MDRTB drugs, reduce the effectiveness of intradermal implanted contraceptives. Patients should be counseled to use alternative methods, e.g., condoms, Depo-Provera, while taking these medications to avoid accidental pregnancy.

6.1.2. *Breastfeeding*

Breastfeeding mothers should receive full treatment. Small quantities of the drugs will be passed into the milk. Because the impact of this to the fetus is unknown it is recommended that where feasible infant formula feeds should be substituted for breast milk. For sputum smear positive mothers the care of the infant should, where feasible, be left to the family. Infant-mother contact should take place in sunny (ideally outdoors) and well-ventilated

areas. If resources permit the mother should be provided with an N-95 respirator if close infant – mother contact cannot be avoided.

6.1.3. Children

Children present particular challenges for DR-TB management. At least 50% of children with active TB may be smear and culture negative, making confirmation of MDR or XDR diagnosis difficult. Every effort should be made to confirm drug resistant TB by culture and DST in children. In children too young to produce sputum, early morning gastric aspirate samples may be obtained for smear and culture.

Children with active TB who are household contacts of a confirmed MDR-TB or XDR-TB patient should be considered to have DR-TB, even if smear and culture are negative. In children for whom DST results are not available, the DST pattern may be assumed to be similar to that of the adult contact. Empiric treatment for DR-TB should be initiated promptly, using a regimen based on the resistance pattern of the source case. In culture-negative children with DR-TB, clinical criteria can be used to determine response to therapy and the duration of the intensive and continuation phases. The DR-TB management committee should be actively involved in such cases.

The regimen used to treat childhood drug resistant TB is similar to that used in adults. The benefit of fluoroquinolones far outweighs the risk, and should be part of every DR-TB regimen. Drug dosages should be based on body weight and based on the higher end of recommended range. Weight should be measured monthly, and dose adjustments need to be made as the child's weight changes.

6.1.4. Diabetes mellitus

Diabetes must be managed closely during treatment for drug resistant TB. Renal function should be monitored closely during treatment for drug resistant TB. The creatinine and potassium levels should be monitored weekly in the first month and monthly thereafter.

6.1.5. Renal insufficiency

Dose adjustment should be made for patients with a renal clearance of < 30 ml/ min or on haemodialysis

6.1.6. Liver disorders

Avoid Pyrazinamide, the most hepatotoxic drug, in patients with chronic liver disease. Closely monitor patients with chronic liver disease clinically and with liver function tests for

deterioration in liver function. Use clinical judgment with patients who develop acute hepatitis, unrelated to anti-TB drugs, while on treatment for drug resistant TB

6.1.7. Seizure disorders

Cycloserine may be given as long as seizure disorder is controlled. Alternative to cycloserine will be PAS in Kenya. Ensure preexisting seizure disorder is under control before initiating treatment for drug resistant TB. This may require dose adjustment of the current treatment for the seizure disorder. Examine the drug regimen and modify treatment where feasible for patients who develop seizures during treatment. Such seizures are often due to drug adverse effects.

6.1.8. Psychiatric disorders

Provide psychiatric assessment prior to initiating treatment in patients with existing psychiatric disorders. Provide appropriate psychiatric treatment for patients who develop psychiatric problems while on treatment for drug resistant TB. Consider substituting PAS for Cycloserine in such patients.

6.1.9. Substance dependence

Usually substance abuse is not a contraindication to treatment with anti-TB drugs but appropriate treatment should be offered for the addiction.

Ensure strict DOT for such patients who are at high risk of abandoning treatment

Health care workers should be aware that cycloserine side effects may be more common in patients dependent on alcohol and other substances.

6.1.10. HIV infection and MDRTB

The overlap between HIV and MDRTB in Kenya is unknown. However as a result of the high prevalence of HIV infection in TB patients in Kenya, it is anticipated that a significant proportion of patients with drug resistant TB, including MDRTB, in Kenya will also be HIV infected. The drug management of HIV infected MDRTB patients would be expected to be challenging especially as regards to pill burden, drug – drug interactions and adverse effects.

The pursuance of recommended TB/HIV interventions as outlined in the NLTP's policy document on TB/HIV collaborative activities is paramount when developing strategies for care and prevention of drug resistant TB in HIV infected persons.

Health care workers need to be aware of the pharmacokinetic interactions between Rifamycins and protease inhibitors in cases of treatment of mono and poly resistant TB but not MDRTB.

Also health care workers need to be aware that the Fluoro-quinolones absorption may be decreased by non-enteric coated didanosine which contains aluminum / magnesium antacid, therefore the administration of didanosine should be given six hours before or two hours after the fluoro-quinolones

When treating HIV infected patients for MDRTB health care workers should look out for increased drug adverse effects e.g. increased risk of peripheral neuropathy when stavudine is co-administered with aminoglycosides, increased risk of cutaneous hypersensitivity reactions by all the drugs; increased risk of neuro-psychiatric syndromes with co-administration of efavirenz and cycloserine; increased risk of renal impairment by aminoglycosides and adverse gastrointestinal effects by all the drugs

6.2 Management of contacts of MDR-TB patients

Close contacts should be identified through active contact tracing and evaluated for active tuberculosis. If the contact appears to have active TB, the health care worker should organize for his/her evaluation including sputum smears; culture, DST and CXR and HIV counseling and testing. While waiting for the results, contacts of patients with MDRTB confirmed to have TB should be started on the same regimen as the index case. This recommendation will be reviewed as evidence of the drug susceptibility patterns of TB in contacts of MDRTB is received. Contacts of MDRTB found not to have active TB should be put on long term follow up and advised to contact health care workers should they develop signs and symptoms of TB.

6.2.1 Pediatric contacts of patients with MDR-TB

MDR-TB should be suspected in children with active TB and having a close contact of an MDR-TB adult or an adult suspected to have died of MDR-TB or if they have bacteriological proven tuberculosis that is not responding to 1st line TB treatment.

Symptomatic pediatric household contacts should be offered screening tests for TB as described in the guidelines for pediatric TB treatment (a Mantoux test, sputum smear, culture and CXR). If smear/culture is positive, start on treatment as per the second line treatment regimen with adjusted drug doses for weight.

6.2.2 *Chemoprophylaxis of Contacts of MDR-TB index cases.*

Currently, **WHO does not recommend** any use of 2nd line drugs for chemoprophylaxis in MDR-TB contacts.

Chapter 7 NUTRITION IN MDR TB

Tuberculosis affects the metabolism of important nutrients such as protein and some micronutrients. Malnutrition on the other hand limits cell mediated immunity and increases susceptibility to infection. This leads to nutritional stress and weight loss, thereby lowering the body's ability to fight infections (weakening immune functions) and nutritional status.

Table 6.0 Clinical presentation of TB and nutritional implications

Sign/symptom	Nutritional impact
Cough lasting 2 weeks or more	An increased energy demand.
Fever and night sweats	Increased Calorie requirement (10% extra calorie per every 1°C rise in body temperature) and dehydration
Loss of appetite	Inadequate nutrient intake hence poor nutritional status.
Weight loss	Poor health and nutritional status predisposing the clients to frequent, prolonged and severe infections due to impaired immunity
Blood in the sputum	Increased energy demand and loss of blood/iron predisposing the clients to anaemia and other infections.
Oozing matted lymph nodes or enlarged lymph nodes	Increased protein and micronutrients requirement for tissue repair.
Breathlessness and fatigue – pleural effusion, pericarditis	Increased energy need.

7.1 To maintain good nutrition status

A patient needs to eat a well balanced meal 3 times a day with 2 nutritious snacks in between. The day's meal must provide;

7.2 Macronutrients

1. Protein to help in repair of damaged/torn tissues in the nitrogen breakdown, growth and development and continue maintaining metabolisms (hormones and enzymes), drug absorption, at least 3-4gms protein for children and 1.2- 1.5gms for adults must be available either from consumption of animal and plant foods with emphasis on eggs, milk and milk products, fish, soybean and other legumes available in the local markets or through medical nutrition recommended products for enteral or parental feeding depending on the condition.
2. Carbohydrates; Many a times the patients will have lost a lot of energy due to the prolonged coughs and needs 36-40gms /kg body weight/day. The carbohydrates will come from many staple foods available locally e.g. grains, roots and tubers, bananas and sugar. If a patient cannot be able to feed normally then it should be given in form of enteral or parental feeding depending on the condition.
3. Lipids; These provide the body with energy, cushion organs and aid in digestions.

Fats and Oils provide all that is needed. Oils are better. The diets should contain only 25 – 30% of the daily energy requirement.

4. Vitamins and minerals - the bodies needs them in small amounts and are very essential. Of importance is Vitamin A, C, D. Zinc, iron, calcium and selenium because of the part they play in immune restoration. These micronutrients are destroyed in TB and need to be replenished through diet and also supplementation. E.g. give Vitamin A on contact to a patient who is not pregnant as per policy (Disease target).

Patients can get the micronutrients from fruits with emphasis on those dark red and yellow colours. Dark green leafy vegetables available in the local markets will in most cases provide enough. A good multivitamin and mineral supplement, providing 50%-150% of the recommended daily intake, is advisable since it will be most unlikely that a person with TB will be able to meet the increased requirements for vitamins and minerals with diet alone (due to a poor appetite). Supplements however should preferably be given after consulting an expert health professional.

Multiple micronutrients providing 1 RNI and containing at least 300mg pyridoxine/day is recommended.

7.3 NUTRITIONAL CARE AND MANAGEMENT

Nutrition status is a principal determinant of morbidity and mortality from tuberculosis.

The general objectives in Nutritional Care and management of TB patients are to;

- Maintain good nutrition status
- Prevent and control body wasting and weakness
- Correct nutritional deficiencies which may have occurred during the disease.
- Modify diets to improve the body's ability to metabolize nutrients during TB disease
- Accelerate healing process.

7.3.1 Steps to nutrition care on patients

- **Step 1**

Carry out nutritional **assessment** (Anthropometry, Biochemical, Clinical, Dietary, and Socioeconomic assessments) Anthropometric indicators in the Main TB register.

- **Step 2**

A nutrition care plan (assessment, diagnosis, intervention, and follow up plan). Basically to identify patients with nutritional problems early and provide adequate support.

- **Step 3**

Conduct nutrition counseling/**education**. Prepare a **food drug-plan** with the client (or Care givers).

- **Step 4**

Carry out a **follow-up plan** (set target timelines, return date, referrals)-**Refer TB patients living with HIV/AIDS** and other chronic conditions like diabetes for nutrition care. Linking the patient to the existing CSO's offering food and other forms of support

7.4 MDR TB drugs and nutrition recommendations

The absorption of many TB drugs are adversely affected by food and some medications.

Table 7.2. Tuberculosis drugs and food recommendations.

DRUG NAME	FOOD GUIDE	FOODS TO AVOID	POSSIBLE SIDE EFFECTS	POTENTIAL DRUG NUTRIENT INTERACTION
Ethambutol	May be taken with food	Alcohol		
Streptomycin	Increase fluid intake		Taste changes of food, nausea	
Pyrazinamide	May be taken with food			
Ethionamide	Take with or after meals (Supplement with vitamin B6)	Alcohol	Abdominal discomforts, nausea	
Ofloxacin	Take 2 hrs before or after supplements	Antacids, milk products	review	
Kanamycin	Can be taken without regard to food			
Capreomycin	Increase fluid intake			Take with foods high in potassium (bananas, avocados)
Para-amino salicylic acid(PAS)	Take with or immediately after food.	Alcohol		Increase fluid intake
Cycloserine	Supplement B6	Alcohol		Affects absorption of pyridoxine
Prothionamide				

Chapter 8 Management of drugs side effects

8.1. Basics of drug side effects

Recent experience in MDRTB treatment programs suggests that chances of cure are significantly improved when maximal doses of multiple second-line drugs are used while rapidly and aggressively treating side effects to improve tolerance.

Permanent dose reduction or definitive elimination of a drug from the regimen is a serious step and should be considered only after all other possibilities have been exhausted, used as a last resort, i.e., in cases of significant organ dysfunction or intractable symptom intolerance. Ideally, any drug eliminated should be replaced with an equally effective drug so as not to compromise the overall effectiveness of the regimen.

Often, if side effects cannot be completely eliminated, patients may be asked to tolerate symptoms until they subside.

It is often difficult to ascertain whether a given side effect is due to a single medication or the result of several drugs given simultaneously. If after following the various treatment schemes given below the patient remains intolerably symptomatic, a dose reduction or elimination of one of the drugs may be necessary. This can be done in a systematic manner by reducing the dose of the most likely offending drug for one week to see whether the symptoms diminish or disappear; if symptoms persist, the drug is returned to its original dose and the same process repeated for the other drugs in the regimen, until all potentially responsible drugs have been tested. Systematic dose reduction of multiple drugs simultaneously would be the next option.

The nurse should record side effects (annex 1) and report the event to the managing physician at the earliest appropriate time. A proper form can help the nurse to check out side effects.

The best time is usually the first DOT in the morning.

Only the managing physician should do dose changes or eliminate a specific drug.

Discussion with the MDRTB committee is recommended whenever taking important decisions such as this.

8.2. Management of specific adverse reactions

8.2.1. Nausea and vomiting

Suspected agents: PAS, Eto/Pto, Clofazimine, H, E, Z.

Nausea and vomiting are frequent during the first few weeks of therapy and usually cease with supportive therapy. Nausea and vomiting are reversible upon discontinuation of the suspected agent.

1st Phase:

- Check signs of dehydration (thirst, dry mouth, sunken eyes, low blood pressure, orthostasis, weakness) and serum concentration of electrolytes
- Check out other causes such as hepatitis (jaundice or icterus, pruritis, right-sided abdominal pain)
- Adjust administration of medications:
 - administer Eto or Clofazimine in three separate doses
 - administer medication associated with nausea at night with short-acting benzodiazepine;
 - administer PAS one hour after taking other anti-TB medications.

2nd Phase:

- Administer anti-emetics: start with metoclopramide 10 mg by mouth given 30 minutes before morning and/or afternoon dose of anti-TB drugs, to a maximum of 15 mg twice daily.

Notes: Avoid metoclopramide and prochlorperazine if neurological problems develop.

Anti-emetics include: prochlorperazine (available in drops and very effective before dose of DR TB drugs), diphenhydramine, lorazepam, dimenhydrinate, metoclopramide, promethazine, chlorpromazine (very effective if given at night)

3rd Phase:

- If ineffective, start promethazine 25 mg with diphenhydramine 25 mg (or other antihistamine) by mouth 30 minutes prior to anti-TB drugs or prior to meals, up to 3 times daily. If necessary, the dose may be increased to promethazine 50 mg (with diphenhydramine 25 mg) 3 times daily to control symptoms. Promethazine is very useful at night for nausea and for sleeping

NB: Side effects of promethazine include sedation, dry mouth, urinary retention, and, rarely, tardive dyskinesia or confusion in the elderly. Diphenhydramine is used to minimize these side effects.

- Chlorpromazine drops (10-25 mg, available in 25mg/5ml) can be given 4-6 hourly.

Ideally given 30 minutes before DR TB drugs are given (liquid form is best absorbed and works in 30 –60 minutes)

- If the patient cannot take drugs orally, give promethazine 25-50 mg intramuscularly according the schedule given above or promethazine 25mg per rectum.

4th Phase:

- If persistent vomiting results in dehydration, give 500-1,000 ml of 0.9% NaCl or Ringer's solution intravenously as needed.

- Consider ondansetron 8mg BD for 3 days, then 8 mg OD when necessary.

5th Phase:

- If taking Eto, reduce to 750 mg QD

- If taking Clofazimine, reduce to 200 mg QD Note: Cfz can cause the clinical picture of acute abdomen

- If absolutely necessary, stop all anti-TB drugs until symptoms resolve.

8.2.2. *Gastritis.*

Suspected agents: PAS, Lfx, Ofx, Mfx, Eto, H, E, and Z.

For dyspepsia, belching, hyperacidity, and epigastric pain, start with aluminium hydroxide 2-4 tablets given by mouth up to 4 times daily, at least 2 hours before or after anti-TB medications.

If symptoms persist: refractory symptoms may in some cases be treated with omeprazole 20 mg once a day by mouth.

If this treatment is not successful, medically re-evaluate while considering other aetiologies

Note: dosing of antacids should be timed so as not to interfere with the absorption of anti-TB drugs, i.e., at least 2 hours apart from anti-TB drugs.

8.2.3. *Dermatitis*

Suspected agents: all are possible - most likely agent is thioacetazone, especially in HIV infected patients.

Rule out other likely causes (i.e., scabies, allergic reaction to non-TB medications).

Treatment of localized rash or mild generalized rash, give diphenhydramine 25 mg (or other antihistamine) by mouth as needed up to 3-4 times daily. If itching is severe, 1% topical hydrocortisone may be applied directly to lesions.

If rash is severe or if bullous or exfoliative lesions appear, all anti-TB medications must be stopped immediately. A parenteral corticosteroid (i.e., dexamethasone 2-4 mg 4 times daily intravenously or intramuscularly) may be necessary in severe cases. After rash has resolved, anti-TB drugs should be added back one at a time in gradually increasing doses, in the following order: H - R - Z - Pto / Eto -Fluoroquinolones- Cs - E - PAS - Cm or aminoglycosides.

If the rash recurs after resumption of one of these agents, then discontinuation of that agent may be required and another agent should be substituted. If the rash was particularly severe, reintroduce the anti-TB medications starting with one-tenth of the original dose and increase the dose more slowly.

Note: if a rash appears while the patient is on T, this drug should be stopped immediately and prednisone administered at a dose of 1 mg/kg. T should never be given again in such cases.

8.2.4. *Seizures.*

Suspected agents: Cs, H, and Ofx, Lfx and Mfx

Prior history of seizures is not a contraindication to the use of the above agents if the seizures are well controlled on anti-convulsive therapy. Seizures are not a permanent sequel of treatment with any of the above agents.

Seizures should be controlled in patients with active uncontrolled seizures before starting treatment. Risks and benefits should be discussed with patients. Seizures that appear for the

first time during TB treatment are likely to be caused by a TB drug. Pyridoxine should be given to all patients on cycloserine to reduce neurological side effects (50 mg for every 250 mg of cycloserine to a maximum of 200 mg/day) If patient experiences a seizure for the first time during therapy suspend the Cs for a short period and initiate therapy for seizures and then reintroduce the cycloserine if it is essential to the regime (usually it is). It can be restarted at a lesser dose but the usual dose should be achieved as soon as possible.

If actively fitting:

Place the patient in the lateral decubitus position, remove objects nearby that can cause danger for the patient, protect the tongue with a soft object too large to be swallowed, observe until patient stops seizing,

Ensure airway is protected.

Give diazepam 5 mg intravenously or intramuscularly immediately, followed by a loading dose of phenytoin (typically 20 mg/kg intravenously, or orally). Diazepam may be repeated once in 10 minutes if seizures do not cease.

Monitor the patient carefully for signs of respiratory depression.

If the seizure has already stopped at the time of initial evaluation and the patient is postictal, do not give diazepam but give phenytoin loading dose as described above.

In both instances, begin phenytoin maintenance dose of 300 mg/day (3-5 mg/kg/day) once the loading dose has been administered.

If seizures recur, phenytoin may be increased to a maximum of 500 mg/day or a second agent (valproic acid, phenobarbital) may be added.

Increase pyridoxine to 300 mg/day in all cases.

Note: caution with diazepam which may depress respiratory function.

Initiate antiepileptic treatment for the remainder of MDR-TB therapy:

o Phenytoin (3-5 mg/kg/day), 300 mg/day –100mg 3 times a day

Note: Potential adverse effects: ataxia, incoordination, confusion, skin rash, cerebellar dysfunction, hepatotoxicity, gingival hyperplasia, lymphadenopathy, hirsutism. Increased level by H.

If seizures recur, phenytoin may be increased to a maximum of 500 mg/day or a second agent (valproic acid, phenobarbital) may be added.

o Valproic acid (750-1250 mg/day). Start with 500mg and increase by 250mg.

Note: Potential adverse effects: ataxia, sedation, tremor, hepatotoxicity, bone marrow suppression, GI upset, weight gain

o Carbamazepine (600-1200 mg/day)

Note: Potential adverse effects: ataxia, dizziness, diplopia, vertigo, GI upset, hepatotoxicity; skin rash

o Phenobarbital (60-120 mg/day)

Note: Potential adverse effects: sedation, ataxia, confusion, dizziness, decreased libido, depression, skin rash. Enhances metabolism of other drugs, including H.

Always rule out other causes of seizure: previous history of seizure or epilepsy, meningitis, encephalitis, history of substance or alcohol abuse, metabolic disturbances (hypoglycaemia, hyper- or hyponatremia, hyper- or hypocalcaemia), cerebrovascular accident, malignancy or other space-occupying lesion

Check electrolytes.

Neurological consultation.

Note: Even if there is an underlying condition (e.g. history of previous stroke, epilepsy, substance abuse), aggravating triggers should be considered.

Note: sub-therapeutic levels of anti-seizure drugs can be caused by drug-drug interactions between anti-seizure drugs and anti-TB drugs, especially H and R

8.2.5. *Psychosis.*

Psychotic symptoms refer to a constellation of symptoms that indicates a disintegration of personality or a loss of contact with reality. Patients tend to present with hallucinations or delusions. The causes of psychotic symptoms in patients with DR TB may be related to socio-economic circumstances and/or underlying psychiatric disease.

Suspected agents: Cs, fluoroquinolones and H.

Prior history of psychiatric disease is not a contraindication to the use of the above agents, though psychiatric side effects are more likely. Some patients may need anti-psychotic medication throughout the duration of anti-TB therapy, though side effects are generally reversible upon discontinuation of treatment.

For acute psychosis:

If the patient is at risk of harming himself/herself or others: urgent hospitalization in psychiatric hospital

Give haloperidol 1 mg orally or intramuscularly,

If no improvement after 20 minutes give 2mg and if no improvement after 20 minutes give 4 mg.

A benzodiazepine may be given concomitantly provided if there is no evidence of respiratory compromise.

If good response, start haloperidol 2-4 mg orally once daily and increase pyridoxine to 300 mg/day. Haloperidol may be increased by 2 mg per day to control symptoms, to a maximum dose of 10 mg orally per day. Adjunctive agents that may be useful include clonazepam if haloperidol is not fully effective, and diphenhydramine to control the extra pyramidal side effects of haloperidol.

Risperidone can be used instead of haloperidol:

Start with 0.5mg to 5mg twice or three times per day. The usual dose is 2-10 mg per day. Risperidone is as effective and causes less extra-pyramidal effects than haloperidol.

Rule out other causes of psychosis, including illicit drugs, alcohol withdrawal.

It may be necessary to stop anti-TB therapy temporarily (1-4 weeks) while symptoms are brought under control. Consider reducing the dose of the offending agent or replacing it if the strength of the overall regimen is not compromised.

Note: Haloperidol has anticholinergic as well as antidopaminergic effects. If patient develops symptoms of neuroleptic syndrome, must discontinue haloperidol immediately. If patients develop dystonia, Parkinsonism, or EPS, administer with diphenhydramine 25 mg PO QD or biperiden or benztropine.

8.2.6. *Peripheral neuropathy.*

Suspected agents: S, Km, Cm, H, FQ, Cs, and E (rarely Pto / Eto).

Patients with co-morbid disease such as diabetes or alcoholism are more likely to develop neuropathy, but such conditions are not a contraindication to use of the above agents.

Neuropathy is generally not reversible upon discontinuation of anti-TB therapy, but only a small minority of patients requires long-term treatment to control symptoms.

Increase pyridoxine to 200mg/day in patients on second-line drug therapy, 50 mg/day for those on first-line therapy.

If the patient is on Km and is known to be susceptible to Cm, consider changing the parenteral agent to Cm.

Physical therapy focusing on the affected regions may be of benefit.

If the above measures are ineffective, begin nortriptyline or amitriptyline (tricyclic antidepressant) 25 mg orally at bedtime, increasing the dose by 25 mg each week to a maximum of 100-150 mg until symptoms are controlled.

Peripheral neuropathy can have several forms; TCA typically work with chronic constant pain, can be supplemented by NSAIDs; 'shooting' pain responds well to carbamazepine and valproate

If no improvement, start carbamazepine 200mg BID and increase to 600mg BID. Consider use of phenytoin.

If not controlled, ask for a neurological consultation and decrease dose of responsible medication: Cs to 750mg and Km/Am 750mg if Cm not available. Then resume normal dose once pain controlled.

8.2.7. *Drug-induced hepatitis.*

Suspected agents: Z, H, R, Pto / Eto, and PAS.

Consider checking for presence of hepatitis B surface antigen. Liver function tests are checked if patient has symptoms of hepatitis (i.e., anorexia, nausea, vomiting, abdominal pain, jaundice) or as part of regular monthly screening. Any signs of hepatitis (including nausea, severe vomiting, scleral icterus, jaundice, dark urine, pale stool) merit immediate evaluation of liver function tests.

If liver enzymes elevated but less than 5 times normal, continue anti-TB therapy but follow liver function tests each week.

If liver enzymes greater than 5 times normal, stop all anti-TB medications and repeat liver function tests weekly.

If liver enzymes continue to worsen, then progressive drug-induced hepatitis or an unrelated cause must be suspected.

If liver enzymes plateau or revert to normal and symptoms resolve, may restart anti-TB drugs sequentially beginning with the agents least likely to be hepatotoxic: Cm or aminoglycosides – E – Fluoroquinolone - Cs. The following agents can then be resumed one at a time in the sequence indicated, each over a period of one week, while checking liver enzymes at the end of each week: PAS – Pto / Eto – R – Z and H. The offending agent can generally be identified in this manner and discontinued or replaced.

8.2.8. *Arthralgias.*

Suspected agents: Z, fluoroquinolones (rarely Pto / Eto, Cs, Cm and aminoglycosides).

Arthralgias generally diminish over time even without treatment. Serum uric acid levels may be elevated, but this is of little clinical relevance and anti-hyperuricemic therapy is of no proven benefit in these patients. H can rarely induce a systemic lupus erythematosus.

Begin therapy with anti-inflammatory agents (indomethacin 50 mg by mouth twice a day or ibuprofen 400-800 mg by mouth 3 times a day). Paracetamol 500-1,000 mg by mouth 2- 4 times per day may also help bring relief when given together with an anti-inflammatory drug.

Physical therapy is often beneficial. Narcotic analgesics are rarely needed.

If symptoms fail to resolve, consider lowering the dose of the suspected agent provided this does not significantly compromise the effectiveness of the treatment regimen.

8.2.9. *Diarrhoea.*

Suspected agents: PAS, Pto / Eto.

Since many patients use the term diarrhoea to describe bowel movements that are more frequent or loose than normal, it is important to note whether the stool is truly watery and more than three or four times a day.

For mild diarrhoea, treat with loperamide 4 mg by mouth initially followed by 2 mg after each loose stool to a maximum of 10 mg per 24 hours. Encourage fluid intake.

For severe diarrhoea, particularly if accompanied by bloody stools, severe abdominal pain, or fever greater than 38.5 °C, consider other causes such as acute bacterial enteritis, or pseudo-membranous colitis related to fluoroquinolones. Check electrolytes and give rehydration salts

8.2.10. *Hypothyroidism.*

Suspected agents: PAS, Pto / Eto (particularly when given in combination).

Symptoms include fatigue, weakness, cold intolerance, decreased appetite, constipation, loss of energy, depression, and inability to concentrate. Physical signs include enlarged thyroid, dry skin, coarse hair, and weight gain. Check TSH level if suggestive symptoms or signs are present. If TSH level is greater than 10, then symptomatic hypothyroidism is likely and therapy should be given.

Hypothyroidism is reversible upon discontinuation of PAS and/or Eto, i.e., the TSH level normalizes after 2-3 months.

Levothyroxine therapy should be initiated at a dose of 0.050 mg daily (or 0.025 mg daily for patients older than 65 years), increasing the dose by 0.025 mg and checking a TSH level every 4 weeks until a normal level is attained.

Thereafter TSH should be checked every 4 months until the patient's course of anti-TB therapy has been completed. If TSH testing not available, discontinue levothyroxine after two to three months and follow symptoms

If symptoms do not improve, lower Eto dose by 250 mg or decrease PAS to 4 gm twice daily. Discontinue the drug(s) if above measures are ineffective and equally effective agents can be substituted.

Note: do not give levothyroxine at same time as antacids or phenytoin, as these impair GI absorption.

8.2.11. *Renal failure.*

Suspected agents: aminoglycosides, Cm.

Diminished urine production (< 0.5 ml/kg/hour or < 30 ml/hour), oedema or anasarca, malaise, nausea, increased difficulty breathing can be related to acute renal failure.

Co-morbid conditions such as diabetes or chronic renal failure are not a contraindication to treatment with the above agents, though greater caution must be exercised in such circumstances. Renal impairment may be permanent following treatment with the above agents.

Suspend the nephrotoxic agent.

Rule out other causes of renal failure (e.g. diabetes, dehydration, congestive heart failure, urinary obstruction, urinary tract infection, prostatic hypertrophy)

Follow serum creatinine and electrolytes closely.

If renal function stabilizes or improves, resume the parenteral agent, switching to Cm if an aminoglycoside was being used previously. Reduce the overall dose by 250 mg daily or change to 3-times-weekly therapy, following creatinine and electrolytes monthly.

8.2.12. Electrolyte loss.

Suspected agents: Cm, aminoglycosides, PAS, (rarely Pto / Eto)

Other potential causes of electrolyte deficiency (vomiting, diarrhoea, endocrinopathy) should be considered and treated if necessary. Electrolyte abnormalities are typically reversible with discontinuation of therapy. Untreated hypomagnesaemia may lead to a syndrome of "resistance" to correction of hypokalemia.

Serum electrolytes will be routinely measured before treatment and monthly thereafter beginning 7-10 days after the baseline specimen is collected. Clinical signs of electrolyte derangement (i.e., muscle weakness, cardiac arrhythmias) should prompt immediate testing.

Mild-to-moderate hypokalemia (i.e., $2.5 < K < 3.5$ mEq/L, asymptomatic) and mild hypomagnesaemia ($1.4 < Mg < 1.8$ mg/dl, asymptomatic) can be treated with oral supplements (40-80 mEq potassium chloride, 420-840 mg magnesium oxide), with repeat monitoring in 24-48 hours. In areas where it is not possible to measure magnesium, if a patient has hypokalaemia it should be assumed that he also has some degree of hypomagnesaemia.

Severe hypokalemia ($K < 2.5$ mEq/L or symptomatic) and moderate-to-severe hypomagnesaemia ($Mg < 1.4$ mg/dl or symptomatic) should be treated with parenteral or combined parenteral/oral supplementation (40-80 mEq potassium chloride, 420-840 mg magnesium oxalate), with repeat monitoring in 6-24 hours depending on the severity of the symptoms. The above doses assume normal renal function and should be adjusted accordingly for patients with a decreased glomerular filtration rate.

Amiloride or spironolactone is useful in resistant cases.

Note: The rate of administration of potassium chloride given via peripheral intravenous line may not exceed 10 mEq/hour. The rate of administration of magnesium sulfate given via peripheral intravenous line may not exceed 1 gm/hour.

For patients with documented electrolyte loss, the frequency of routine monitoring should be increased to twice-weekly once the acute deficiency has been corrected; after electrolyte levels have stabilized for a period of at least 2 weeks, the frequency of monitoring may be decreased to once-weekly for a further 2 weeks and then once-monthly if levels remain stable.

8.2.13. *Optic neuritis.*

Suspected agent: mainly E (rarely Cs, Pto / Eto provoke visual disturbances)

A rare side effect and usually reversible after discontinuation of E. Loss of red-green colour distinction is usually the first sign.

Stop E (permanently).

8.2.14. *Hearing loss.*

Suspected agents: mainly S, Km, and Cm, (rarely Pto / Eto).

If a patient has had prior treatment with aminoglycosides then he or she may start the new regimen with established hearing loss, which could worsen with further therapy. Hearing loss is generally not reversible upon discontinuation of therapy. Audiometry for baseline and/or follow-up testing is required.

Change parenteral agent to Cm if currently on aminoglycoside. Consider reducing the dose or discontinuing the agent provided this does not compromise the effectiveness of the regimen.

8.2.15. *Depression.*

Suspected agents: Cs, fluoroquinolones, and H.

Patients receiving anti-TB therapy are subject to a variety of factors (prolonged sickness, separation from family, difficult living conditions, etc.), which should not be underestimated as contributors to depression. Depressive symptoms may fluctuate during therapy. Prior history of depression may increase the risk of developing depression during treatment but is not a contraindication to use of any of the above agents.

Address socio-economic conditions if possible. Promote:

- Supportive counseling by medical and paramedical (i.e., health educators, social workers) staff.
- Intensive psychological therapy with counseling to patient and family.
- Emotional support from the family and health promoter.
- Group therapy or informal support groups

Always give pyridoxine 200 mg per day in patients receiving Cs.

If necessary, initiate antidepressant medication (i.e., amitriptyline or fluoxetine) according to usual prescribed doses. Consider lowering the dose or discontinuing a suspected anti-TB agent provided this does not compromise the effectiveness of the regimen.

Note: when the regimen contains H: avoid serotonergics (fluoxetine) and clomipramine; treat by amitriptyline.

Chapter 9 Monitoring & Evaluation

9.1 Case recording and reporting

The national TB control program has traditionally collected information on patients to monitor progress and response to treatment. Efforts have been made to ensure the information collected is of high quality, accurate and timely for planning purposes.

The patients and health care workers should recognize the importance of collecting the patient data and storing this information in confidential standard files. This information should only be released to authorized personnel or when the patient gives consent for the information to be shared.

A patient appointment card will be in custody of the patient. S/he will be responsible for keeping it safe and producing it at all times when required by the health care worker serving him/her for information retrieval and updating. This card will carry the summary information of the patient and will serve as a primary source of patient information. It will be used to monitor progress and clinic attendance including daily ticking of supervision of treatment. The facility register and the patient record card will be kept in the health facility and forms the core patient records. The data is used by the clinicians to make decisions that will affect the management of the patients. A district MDR TB register might be needed to collate all the information on patients with MDR TB within the district. This register becomes useful if the number of patients on category IV is large enough to warrant the use of a district register. Reporting of treatment outcomes will be based on these tools (cohort analysis).

Definitions based on site of disease and history of previous anti-tuberculosis treatment

Patients with tuberculosis involving the lung parenchyma are considered to have pulmonary TB. Tuberculous intra-thoracic lymphadenopathy (mediastinal and/or hilar) or tuberculous pleural effusion, without radiographic abnormalities in the lungs, therefore constitute a case of extrapulmonary TB. A patient with both pulmonary and extrapulmonary TB should be classified as a pulmonary case. The categories of **New, Relapse, After default, After failure of Category I treatment, After failure of Category II treatment and Transfer in** belong to the group of pulmonary cases.

- **New.** Patients who have never received anti-tuberculosis treatment, or who have received anti-tuberculosis treatment for less than one month. (Note: patients who had DST at the start of a WHO Category I regimen and are then switched to a

Category IV regimen because of resistance are placed in this group, even if they received more than one month of Category I treatment).

- **Relapse.** Patients previously treated for tuberculosis that have been declared cured or treatment completed, and then diagnosed with MDR-TB.
- **After default.** Patients who return to treatment with confirmed MDR-TB after interruption of treatment for two months or more.
- **After failure of Category I treatment.** Patients who return after having failed the first treatment.
- **After failure of Category II treatment.** Patients who return after having failed the re-treatment.
- **Transfer in.** Patients who have been transferred from another register for treatment of drug-resistant TB to continue Category IV treatment. Their outcomes should be reported to the transferring unit so that it can report their outcomes in the cohort in which they originally started MDR-TB treatment.
- **New extrapulmonary.** Patients who have never received anti-tuberculosis treatment, or who have received anti-tuberculosis treatment for less than one month with tuberculosis of organs other than the lungs, e.g. pleura, lymph nodes, abdomen, genitourinary tract, skin, joints and bones, meninges.
- **Other.** Patients who do not fit the above definition. This group includes previously treated pulmonary patients without known outcome status and all previously treated extrapulmonary patients.
- **Total.** The sum of Pulmonary, New extrapulmonary and Other.

9.2. Treatment outcome definitions for Category IV treatment

Cured:

- This is a MDRTB patient who has completed treatment according to the protocol and has at least five consecutive negative cultures from samples collected at least 30 days apart in the final 12 months of treatment, or
- A patient with only one culture positive and no concomitant clinical evidence of deterioration, provided that this positive is followed by a minimum of three consecutive negative cultures taken at least 30 days apart.

Treatment completed:

- This is a MDRTB patient who has completed treatment according to protocol but lacks bacteriological results

Died:

- This is a MDRTB patient who dies from any cause during the course of MDR-TB treatment

Failed:

- This is a MDRTB patient whose two or more of the five cultures recorded in the final 12 months of therapy are positive or
- One of the final three cultures is positive or
- A clinical decision has been made to terminate treatment early because of poor response or adverse events.

Defaulter

- This is a MDRTB patient whose treatment was interrupted for two or more consecutive months for any reason without medical approval.

Transferred out

- This is a MDRTB patient who has been transferred to another district and for whom the treatment outcome is **unknown**.

9.3 Category IV recording and reporting system

This section describes the information system for Category IV patients, with the objective of recording information needed to monitor programme performance and treatment outcomes. It presents the instruments and minimum variables necessary to implement and monitor Category IV treatment. Tools are also introduced to track screening and enrolment efforts.

9.4 Category IV recording and reporting system

- A standardized method of recording and reporting should be implemented in DR-TB control programmes.
- DR-TB treatment cards should have an expanded section for information on patients with HIV.

The information system and performance indicators allow NTP managers at different levels to monitor overall programme performance. This includes:

- patients started on treatment and treatment outcomes
- follow trends in the number of cases notified
- plan drug supply
- Provide the basis for programme and policy developments.

9.4.1 Main forms/registers and flow of information

All patients diagnosed and treated for MDRTB should be registered and treatment outcomes recorded in the MDRTB facility registers that every facility/clinician treating MDRTB should have. This is essential for monitoring and evaluation of TB control activities. Before being registered for initiation of treatment the patient will be screened to ensure suitability for treatment and possibility to treat without introducing the risk of XDRTB. This is because all failures of this treatment will be likely candidates of MDRTB.

The following tools will be used for reporting and recording

9.4.2 Category IV Treatment Card

Once the decision to start a patient on Category IV treatment is made, the health staff in the treatment unit should enter the patient in the Category IV Register. The staff should complete the Category IV Treatment Card when the patient is actually starting treatment. This card is a key instrument for DOT workers who administer drugs to patients on a daily basis. The card should be updated daily by ticking off the supervised administration of drugs. The card represents the primary source of information to complete and update the Category IV Register. The card, or a copy of the card, must always follow the patient (e.g. from a specialized hospital to an ambulatory facility). A copy of the card may be used as a notification form and later also to report the final outcome of treatment.

The Category IV Treatment Card contains the following sections:

- **Basic demographic and clinical information.** Records name, address, sex, age, weight and site of disease
- **Category IV registration number.** This is a new unique identification number assigned when the patient is entered in the Category IV Register.
- **Date of Category IV registration.** Provides registration date in the Category IV Register
- **Previous district TB registration number and date of registration.**
- **Registration group according to result of previous antituberculosis treatment.**
- **Previous TB treatment episodes.** Lists and describes any previous antituberculosis treatment and outcomes. Start with the earliest treatment and label it number 1. Use the drug abbreviations given on the front of the treatment card. Also note here the outcome of any previous treatment.
- **Previous use of second-line antituberculosis drugs.** Documents use of any of the second-line drugs listed at the front of the chart for antituberculosis treatment for more than one month.

- **Meetings of MDR TB team.** This section provides a space to record major decisions by the team.
- **HIV testing information.** DTC should be offered to all patients and the date of testing and results recorded here. If HIV-infected, indicate whether patient is on ART and/or CPT.
- **HIV flow sheet.** This section is only filled in for HIV-infected patients.
- **Monitoring of weight.** Weight should be recorded at least monthly.
- **DST results.** Record the date of sputum collection and results of all DST performed.
- **Monitoring of smear and culture.** Record date of sputum collection, sample number in the laboratory register and result of smear and culture accordingly Month “0” is the time of specimen collection at the start of the Category IV regimen.
- **Regimen.** Record the initial Category IV regimen and later changes. Use one line for each date on which a drug(s) is changed. If drug dosage is progressively increased (e.g. starting 250 mg of ethionamide daily and increasing by 250 mg over 2–3 days until the full dose is reached), record this in the patient’s medical record (not on the treatment card).
- **Record of daily observed administration of drugs.** This is constructed with one line per month to facilitate assessment of adherence. Mark one box for each day the entire treatment is administered. Additionally, if dosing is twice daily, one slash mark could be made for the A.M. dose and a second, intersecting mark could be made for the P.M. dose; if both are received, the box would contain an “x”.
- **Outcome of treatment.** Record the outcome of treatment when the final bacteriology results become available.

9.4.3 The Category IV Register

This is the record of all patients who start Category IV treatment. This register allows quick assessment of the implementation of Category IV, facilitating quarterly reporting and analysis of treatment start and outcomes. Any patient with mono- or poly resistance should stay in the DR-TB programme should not be crossed out of the Category IV Register.

The District Tuberculosis Register is the traditional register used by DOTS programmes in which all TB patients are first registered. Any patient who is switched to a Category IV regimen should have the outcome category “Change to Category IV” entered in the District Tuberculosis Register.

The following information is recorded in the Category IV Register as it is in the patient treatment card

- **Category IV registration number.**

- **Date of Category IV registration.**
- **Name, sex, date of birth, address**
- **District TB registration number.** All patients should have been entered in a District Tuberculosis Register. A patient who for any reason has never been registered in the District Tuberculosis Register should be registered there and the number transferred to the Category IV Register.
- **Site of disease.** Pulmonary, extra pulmonary or both, Patients with both pulmonary and extra pulmonary TB should be classified as a case of pulmonary TB.
- **Registration group**
- **Second-line drugs received for more than one month prior to registration**
- **DST.** Date sample taken, date of DST result and the results. Enter the DST that resulted in the patient being registered as a Category IV patient. Follow-up DSTs are not recorded in the register.
- **Category IV regimen.** Record the initial Category IV regimen using the drug abbreviations.
- **Date of start of Category IV treatment**
- **Smear and culture monitoring result.** Record all smear and culture results
- **Final outcome**
- **HIV status.** Testing results, CPT and ART treatment information

9.4.4 Laboratory Register for culture and DST

Laboratories will have separate registers for sputum smear microscopy and culture (5), while reference laboratories carrying out DST should have additional space in the culture register for DST results. The Laboratory Register for culture and DST should contain samples from all MDR-TB suspects, indicating the registration group, and be filled in from the request form.

The Laboratory Register should be compared regularly with the Category IV Register to ensure that all confirmed MDR-TB cases are entered in the Category IV Register.

TB Sputum-smear Examination Request Form. This form should be used by health care workers who follow up smear exams

Laboratory Register for Sputum-smear Examination: Where the facility registers the patients smeared every day

TB Culture/sensitivity Request Form – for request of follow up cultures as detailed in the guidelines

Drugs and other supplies:

Daily Activity Drug Register (DADR) – to monitor the use of the MDRTB drugs on a

daily basis

Facility CDRR (Consumption Drug Report & Request) Form- to summarize the consumption of drugs in the MDRTB treatment centre

Others: Bin Card and S11.

9.4.5 Quarterly report on MDR-TB detection and Category IV treatment start

This report is used to assess the number of MDR-TB cases detected (distribution and trends) and the number of MDR-TB cases who start treatment. The report should be made quarterly. This report should be accompanied by a copy of the patient register to update the national MDR TB patient line register.

The report should be made by the unit managing MDR-TB. The quarterly report includes:

- The number of confirmed MDR TB patients in that quarter
- Number of MDR Tb patients started on treatment in that quarter split by registration group
- The number of confirmed XDR-TB cases

9.4.6 Six-month interim outcome assessment of confirmed MDR-TB cases

Since treatment takes on average two years before final results are known, the TB control programme needs more updated information on treatment outcome. Bacteriological results are based on the smear and culture data during months 5 and 6 of treatment. Consider the 6-month outcome assessment unknown for a particular patient if a culture or smear result is unknown for either month 5 or 6. All cases from the Category IV Register should be included in this report.

The form should be completed 9 months after the closing day of the cohort. This allows culture information at month 6 of treatment to be included for all patients in the cohort. For instance, TB patients who started treatment during the first quarter of a year (1 January to 31 March), should have the form filled in from 1 January of the following year.

9.4.7 Annual report of treatment result of confirmed MDR-TB patients starting Category IV treatment

This report shows the final result of treatment by year of treatment start. All the patients are classified by previous use of antituberculosis drugs (none, only first-line drugs, also second-line drugs). If relevant, results for patients with XDR-TB could be added. All data can be extracted from treatment cards and Category IV Register. The report is made at 24 months after the last patient in the cohort started treatment. Most of

the patients will have finished treatment by 24 months, allowing preliminary assessment of cure rates. Since a few patients may be on treatment for longer than 24 months, the form will be completed again at 36 months, which will then be considered the final result.

9.4.8 Drug Resistant patients Not on Treatment

When Category IV treatment is being introduced, there may be a large group of patients who are still sputum smear-positive after supervised Category II treatment from previous years. There may also be patients who have received several unsuccessful treatments, are considered incurable by health staff and who have lived with active TB disease with no or inadequate treatment for a period of time. While preparing for Category IV treatment, all District TB coordinators (DTLC) should keep a list of these patients and send this list at the end of the quarter through the Provincial TB coordinators (PTLC) to the Central Unit to facilitate planning of drug and other resource needs.

When Category IV treatment becomes available, such cases with evidence of active disease should follow the national protocol for Category IV treatment start, ideally having a DST done at the start to confirm MDR-TB or any other resistance pattern.

9.4.9 Assuring the quality of the recording and reporting system

In order for the information system for DR-TB to function well:

- Adequate training on DOTS information system and the specifics of the Category IV forms.
- Regular supervisory visits
- Regular meetings between MDR TB teams and other staff at different levels to share information
- Weekly comparisons of the Category IV Register with the DST register in all the laboratories performing DST to ensure that all patients in whom MDR-TB is diagnosed are started on Category IV treatment. The inclusion of MDR-TB patients from the Laboratory Register should take into consideration the quality of the DST performed in the laboratory. Patients diagnosed with MDR-TB in laboratories without proper quality assurance (i.e. in many private laboratories, the quality of DST is completely unknown) should not be included in the Laboratory Register for Culture and DST until their DST has been confirmed in a qualified laboratory.

9.4.10 Referral of DR TB patients

All Category IV patients started on treatment in a regional centre will be decentralized to the nearest facility after conversion or after the intensive phase, (a minimum of six (6)months of injectable treatment. Prior to the transfer of the patient, the resipient facility will be

References

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Weight-based dosing of drugs for adults

Weight-based dosing of antituberculosis drugs in the treatment of drug-resistant TB

NAME OF DRUG	<33KG	33-50KG	51-70 KG	>70 KG
GROUP 1: FIRST-LINE ORAL ANTITUBERCULOSIS DRUGS				
Isoniazid (H) (100,300 MG)	4-6 mg/kg daily or 8-12 mg 3xwk	200 - 300 mg daily or 450 - 600mg 3/ wk	300mg daily or 600 mg 3 x wk	300mg daily or 600 mg 3 x wk
Rifampicin ® (150, 300m mg)	10-20 mg/kg daily	450-600 mg	600 mg	600 mg
Ethambutol (E) (100, 400 mg)	25 mg/kg daily	800-1200 mg	1200-1600 mg	1600-2000 mg
Pyrazinamide (Z) (500 mg)	30-40 mg/kg daily	1000-1750 mg	1750-2000 mg	2000-2500 mg
GROUP 2: INJECTABLE ANTITUBERCULOSIS DRUGS				
NAME OF DRUG	<33KG	33-50KG	51-70 KG	>70 KG
Streptomycin (S) (1 G vial)	15-20mg/kg daily	500-750 mg	1000 mg	1000 mg
Kanamycin Km (1G vial)	15-20mg/kg daily	500-750 mg	1000 mg	1000 mg
Amikacin (AM) (1G vial)	15-20mg/kg daily	500-750 mg	1000 mg	1000 mg
Capreomycin (CM) (1G vial)	15-20mg/kg daily	500-750 mg	1000 mg	1000 mg
GROUP 3:FLUOROQUINOLONES				
NAME OF DRUG	<33KG	33- 50KG	51-70 KG	>70 KG

Ciprofloxacin (Cfx) 250,500,750 mg)	20-30mg/kg daily	1500 mg	1500 mg	1500 mg
Ofloxacin (Ofx) (200,300,400mg)	usual adult dose for MDR-TB is 800 mg	800 mg	800 mg	800-1000 mg
Levofloxacin (LFX) (250,500 mg)	usual adult dose for MDR-TB is 750 mg	750 mg	750 mg	750-1000 mg
Moxifloxacin (Mfx)	usual adult dose for MDR-TB is 400 mg	400 mg	400 mg	400 mg
Gatifloxacin (Gfx) (400 mg)	usual adult dose for MDR-TB is 400 mg	400 mg	400 mg	400 mg

GROUP 4:ORAL BACTERIOSTATIC SECOND-LINE ANTITUBERCULOSIS

NAME OF DRUG	<33KG	33-50KG	51-70 KG	>70 KG
Ethionamide (Eto) (250 MG)	15-20 mg/kg daily	500 mg	750 mg	750-1000 mg
Protionamide (Pto) (250 MG)	15-20 mg/kg daily	500 mg	750 mg	750-1000 mg
Cycloserine (Cs) (250 MG)	15-20 mg/kg daily	500 mg	750 mg	750-1000 mg
Terizidone (Trd) (300 MG)	15-20 mg/kg daily	500 mg	750 mg	750-1000 mg
P-Aminosalicylic acid (PAS)	15-20 mg/kg daily	500	750	750-1000

(4 Gram sachets)		mg	mg	mg
SODIUM PAS: Dosing can vary with manufacture and preparation: check dose recommended by the Manufacturer.				
Thioacetazone (Th) Usual dose is 150 mg for adults				
GROUP 5: AGENTS WITH UNCLEAR EFFICACY (NOT RECOMMENDED BY WHO FOR ROUTINE USE IN MDR-TB PATIENTS)				
Clofazimine (Cfz), Amoxicillin/Clavulanate (Amx/Clv), Clarithromycin (Clr), Linezolid (Lzd).				
Efficacy and dosing in the treatment of drug-resistant TB not fully determined.				

Annex 1: Side-effects follow-up

Document the treatment being used – drug(s) and dosages

Name:	Current treatment regimen – drugs and dosages:					
Week of treatment						
Date						
Sweats						
Cough						
Abdominal pain						
Constipation						
Nausea						
Vomiting						
Anorexia						
Diarrhoea						
Headache						
Periph neuro						
Hypothyroidism						
Low magnesium						
Low potassium						
Skin rash						
Itching						
Joint pain						
Dizziness						
Vision loss						
Hearing loss						
Psychosis						
Convulsions						
Others						

Annex 3: Recording and Reporting tools

		Category IV Treatment Card			
Name _____		Registration group	Select only one	Previous tuberculosis treatment episodes	
Category IV registration number _____		1 New		No. (if unknown, put year)	Outcome
Date of category IV registration _____		2 Relapse			
District TB registration number _____		3 Return after default			
Date of district TB registration ____/____/____		4 After failure of first line			
Address _____		5 After failure of retreatment			
_____ Tel _____		6 Transfer in			
Province : _____		7 Other (previously treated without known outcome status)			
District: _____					
Location: _____					
Chief : _____					
Sex:circle Male _____ Female _____		HIV information		Used second line drugs Yes / No	
Age _____ Date of birth ____/____/____		HIV testing done: Yes / No / Unknown		If yes specify _____	
Initial weight (Kg) _____ Height (cm) _____		Date of test ____/____/____ Results _____		Drug abbreviations	
Site Pulmonary _____ Extrapulmonary _____ Both _____		Started on ARVs: Yes / No Date ____/____/____		H - Isoniazid	Am - Amikacin
	If Extrapulmonary, specific site _____	Started on CPT: Yes / No Date ____/____/____		R - Rifampicin	Km - Kanamycin
		ARV = Antiretroviral therapy		E - Ethambutol	Cm - Capreomycin
		CPT = cotrimoxazole preventive therapy		Z - Pyrizinamide	Cfx - Ciprofloxacin
				S - Streptomycin	Ofx - Ofloxacin
				(Th - Thioacetazone)	Lfx - Levofloxacin
					Mfx - Moxifloxacin
					Gfx - Gatifloxacin
					Pto - Protonamide
					Eto - Ethionamide
					Cs - Cycloserine
					PAS - P-aminosalicylic acid
				Review panel meetings: Dates and decisions	
Date _____	Decision _____	Next date _____			

Patient Identity Card				Appointment dates		Appointment dates	
Name _____							
Address (in full) _____							

Sex	<input type="checkbox"/>	M	<input type="checkbox"/>	F			
Date of birth / / _____							
Health Unit		_____					
Province		District					
_____		_____					

Disease classification		Date treatment started		
Pulmonary		Day	Month	Year
Extrapulmonary				
Site		_____		

Type of patient				
New		Treatment after default		
Transferred in		Relapse		
Treatment after		Other		

Treatment Category				
I	II	III	IV	

Initial treatment _____				
Change in treatment _____				
Allergies _____				
Severe adverse reactions _____				

Remember
Take care of your card
<p>You can be cured if you follow your treatment regimen by taking your prescribed drugs regularly. Tuberculosis can spread to other people if you do not take your medication</p>

MDR-TB Program

Standard Operating Procedures

Introduction

MDR TB is becoming a public Health problem in Kenya.

Rates of MDR-TB cases are expected to continue rising due to several factors, including:

- Poor adherence to treatment
- Poor prescription practices
- Lack of patient follow up
- lack of infection prevention and control policy
- High HIV prevalence
- lack of information in the community
- lack of MDR TB drugs hence patients continue to infect other members of the community
- ETC

Health care workers face serious challenges in handling MDR TB patients. This has therefore necessitated the development of SOPs to guide health care workers in management of these patients.

VISION

To eliminate the MDR TB in Kenya

MISSION

To reduce the transmission and development of MDR TB in Kenya through intensive case finding, treatment of MDR TB, health education to the community.

Identification of a MDR TB patient

All patients who are resistant to both Isoniazid and Rifampicin are classified as MDR TB patients and eligible for MDR TB treatment as per the National MDR TB guidelines

A. Steps to follow after you have identified an MDR TB patient

1. Carry out thorough medical examination

a. Patient History

Take a detailed history of the patient including;

- Demographic data (name, age, sex, marital status)
- Residence (where the patient lives), including village, Assistant chief, location, sub-location and district
- Telephone number of the patient and next of kin
- How the patient could have developed MDR TB
 - New patient
 - Old TB patient
 - Number of times previously treated
 - Regimen previously used
 - History of defaulting
 - Current treatment
- HIV status
- History of drug allergies, smoking, alcohol or any other drug use
- History of any other disease

b. Physical examination

c. Systemic exam

Look out for signs of any other concurrent illness

2. Provide health education to the patient

The patient needs to know:

- Cough etiquette
- How TB is transmitted
- How to protect others from TB
- Treatment options available
- Treatment outcomes (prognosis)
- Infection control measures
- The importance of spending more time outside than in an enclosed area
- The side effects of drugs

3. Prepare the patient for HIV testing if status unknown

- Counsel the patient on the need to know his/her status
- Test the patient in line with the existing protocols
- Provide Cotrimoxazole if HIV positive and refer to CCC for ART

4. Continue current regimen until reviewed

5. Register the patient using available tools

6. Inform the DTLC

7. Refer the patient to a site offering MDR TB treatment

8. Carry out contact tracing

Prepare to visit the patient at home

- Assess the residence, number of rooms, number of people in the house, ventilation in the house
- Assess patient's physical movements e.g. to church, market and other congregate setting
- Screen the household contacts for TB using symptom screen

- Refer any symptomatic contacts to the nearest health facility for further screening
- Provide health education to household members
- Encourage them to spend more time outside than in an enclosed area

B. Infection Control measures

At the facility

- Sputum should be collected in a designated open area
- Patients should be reviewed in well ventilated room
- Triage: Infectious patients in the ward, OPD etc should be quickly identified and managed appropriately. Avoid mixing infectious and non-infectious patients.
- Surgical masks should be available to the infectious patients where possible.
 - NB: Surgical masks are not protective
- Health care workers should use respirators where possible

REMEMBER the best protection is proper ventilation and adequate natural lighting

AT THE MDR TB Treatment Facility

C. Prepare patient for MDR TB treatment

a. Laboratory preparation

The following tests should be done:

- i.* Full hemogram
- ii.* Liver function test
- iii.* Renal function tests
- iv.* Pregnancy test
- v.* HIV test (opt out approach)
- vi.* Sputum test
 - 1.** Microscopy
 - 2.** Culture and sensitivity tests

b. Psycho-social assessment (Assess the patient's knowledge of the disease)

- i.* Patient should identify a treatment supporter
- ii.* Ensure the patient understands the length of treatment
- iii.* Prepare the patient for possibility of adverse effects
- iv.* Ensure the patient understands the need of adherence
- v.* Discourage smoking, alcohol or any other drug abuse
- vi.* Discuss nutritional support
- vii.* If HIV positive, discuss the consequence of co infection and transmission prevention e.g. cough etiquette and use of condoms.

D. Ensure the patient fits the selection criteria described below.

E. Treat according to the Kenya MDR TB treatment protocol.

Selection criteria of MDR TB patient's treatment eligibility.

- Patients must be confirmed resistant to Rifampicin and Isoniazid by results from CRL or any approved DST lab (Attach the results)

- They should also be confirmed re-treatment failures on sputum microscopy
 - Provide the duly filled card from the treatment centre where treatment was delivered

- Must agree to attend at the MDR TB clinic for their daily DOTS treatment
 - Patient and next of Kin to have signed the memorandum of agreement

- A social worker should verify physically the patient home address(urban and rural), next of kin, treatment supporter and the social profile
 - The appropriate section below to be filled

- For congregate settings including prisoners, the team will liaise with the institution's authorities and their health workers to determine whether a the patient can access anti – MDRTB treatment
 - Signed agreement with the officer in-charge of the relevant institution

- At registration for screening patients should come along with their next of kin/ treatment supporter and an introduction letter from their assistant chief.
 - Attach letter from chief or assistant chief with their contact details

- Patient should be screened and recommended for MDRTB treatment by the clinical management team
 - Attach clinical decision by the team

- Treatment will be started once the above conditions are met and subject to availability of drugs to cater for a full course of treatment

Home Address

Patient Name _____ age _____ sex _____

Home address:

Province _____ District _____ Division _____

Location _____ Sub location _____ Village _____

Chief _____ Tel. _____

Sub chief _____ Tel _____

Next of kin: Name _____ Age _____ Relationship to patient _____

Home address:

Province _____ District _____ Division _____

Location _____ Sub location _____ Village _____

Chief _____ Sub chief _____

If patient resides in town, include the following information

Town address: where the patient is residing

Estate _____ Phase _____ House number _____

Confirmation of the above details by: Social worker / DTLC

Name _____ Date confirmed home address: _____

Name _____ Date confirmed town address: _____

Previous TB treatment history

Treatment no.	Regimen	Start date	End date	Treatment outcome	Comments
1					
2					
3					
4					

Patient, next of Kin and health care workers memorandum of understanding for MDRTB treatment

I _____ (patient identified to have MDRTB)

And

_____ Who is the next of Kin

Agree to have _____ started on MDRTB treatment and Hereby undertake to ensure that the patient present him/herself or be presented for treatment to the appointed health care worker on a daily basis for the next 24 months or till the treatment course is completed

And will endeavor to ensure that the patient does not interrupt treatment under any circumstances

Signed: Patient _____

Next of Kin _____

Date _____

Memorandum of Understanding with the officer in-charge of the prison

I _____ Officer In Charge

_____ GK Prison

Hereby undertake to ensure that the patient named below

Who is also an inmate in this prison will be presented for his treatment to the appointed health care worker on a daily basis for the next 24 months or till the treatment course is completed

And will endeavor to ensure that the patient does not interrupt treatment under any circumstances

Official stamp _____

Signature: officer in charge _____

Date _____