NATIONAL NLTP GUIDELINE

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FOREWORD

Tuberculosis 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 44 years. The major factor responsible for the large TB disease burden in Kenya is the concurrent HIV epidemic. Other factors that have contributed to this large TB disease burden include poverty and social deprivation that has led to a mushrooming of peri-urban slums, congestion in prisons and limited access to general health care services. In the last decade TB case notification has been increasing at an average of 16% annually. Within the same time period the NLTP has been confronted with the challenge of providing integrated TB and HIV services in addition to other interventions without a commensurate increase in the human resource available for TB control. Additionally there have been increasing concerns about the emergence of drug resistant TB, a threat that would pose major challenges in the fight against TB in this resource limited country.

In order to address the new challenges posed by the tuberculosis epidemic in the face of the HIV epidemic and the socio-economic environment, the ministry of health through NLTP has identified the following areas for increased support: Strengthening of the human resource capacity at all levels of the NLTP for effective coordination of TB control activities, decentralisation of TB control services down to the community level to increase access to these services, a stronger collaboration between TB and HIV control programmes in order to promote delivery of integrated TB/HIV services, private –public partnerships to increase the number of private providers integrated into the TB service provider network and a sustained public education campaign coupled with health care worker training and support to promote early care seeking and adherence to treatment at community level and better TB case management by health care providers. In the last few years great strides have been made in all these areas thanks to the many stakeholders dedicated to making a difference.

Leprosy is no longer a major public health problem in Kenya. However, sporadic cases are being reported in Western, Eastern, Coast and Nyanza provinces. In 2004 only 175 new cases

of leprosy were reported in Kenya. As a result of the declining incidence of leprosy the majority of health workers in Kenya have lost skills in the diagnosis and management of Leprosy. Therefore the leprosy section of these guidelines has been purposefully included to assist health care workers to diagnose and manage leprosy as Kenya intensifies its effort to eradicate leprosy.

Medical science and practice is a dynamic field that demands a continuous process of revision and update of all practice manuals and guidelines. The present guidelines are a revision of the earlier ones produced in 1994, 2000 and 2003. The revision of the tuberculosis and leprosy management guidelines marks yet another step forward for the National Leprosy and Tuberculosis Programme (NLTP) towards achieving internationally agreed TB control targets including the TB relevant Millennium Development Goals (MDGs). The immediate short term goal is to achieve the 70/85 targets – that is to detect 70 % of infectious TB and cure 85% of the detected cases and then sustain this effort over a long time to achieve the MDGs. The TB MDGs are, to have halted and begin to reverse the incidence and mortality due to TB by 2015. These Guidelines should be used as technical reference material by all health care workers involved in TB care and can also be used for training of health care workers in conjunction with other training materials including the TB/HIV training guide.

It is therefore my sincere hope that all health care workers involved in TB care will find the revised guidelines a useful tool for the successful implementation of both Leprosy and tuberculosis control activities.

Dr. James Nyikal. MBS

Director of Medical services

Ministry of Health
August 2005

LIST OF ABBREVIATIONS

AFB	Acid fast bacilli
ARC	AIDS related complex
BCG	Bacille Calmette Guerin
BCP	Blister cell pack
CIDA	Canadian International Development Agency
COLS	Clinical Officer Lung and Skin diseases
DST	Drug Sensitivity Testing
DTLC	District TB & Leprosy Coordinator
ENL	Erythema nodosum leprosum
F	Failure
FDC	Fixed Dose Combination
GoK	Government of Kenya
KEMRI	Kenya Medical Research Institute
KEPI	Kenya Expanded Programme on Immunization
KNCV	Koninklijke Nederlandse Centrale Vereniging voor Tuberculose bestrijding (Royal Netherlands Tuberculosis Association)
MB	Multi-bacillary Leprosy
MDT	Multiple drug therapy
MOH	Medical Officer of Health
N	New (patient)
NGO	Non-governmental organization
NLTP	National Leprosy Tuberculosis Programme
NLR	Netherlands Leprosy Relief Association
PB	Pauci-bacillary
PTB	Pulmonary Tuberculosis
PHC	Primary health care
PTLC	Provincial TB and Leprosy Coordinator
OOC	Out of control
R	Relapse
RFT	Released from treatment
RR	Reversal reaction
SCC	Short-Course Chemotherapy
TC	Treatment completed
TI	Transfer in
TO	Transfer out
TR	Treatment resumed
TST	Tuberculin Skin Test
PLWA	People living with AIDS
CDC	Centre for Disease Control and Prevention, Atlanta Georgia
WHO	World Health Organisation
WB	World Bank

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The NLTP would like to thank all the people who contributed to the refining of these guidelines and the organizations that contributed funds to enable the printing of these guidelines. The NLTP is committed to distributing these guidelines widely to assist health care workers all over Kenya to better manage TB and Leprosy.

Dr. Chakaya J. Muhwa
Head, NLTP
August 10, 2005

Preface

Kenya has a large and rising TB disease burden and is ranked among the twenty-two countries that collectively contribute about 80% of the world's TB cases. The TB case notification rate (CNR) rose from 51 to 320 per 100,000 population between 1987 and 2004. As in the rest of Sub-Saharan Africa this large increase in TB is attributed primarily to the Human Immunodeficiency Virus (HIV). Other factors that may be contributing to the spiralling TB disease burden in Kenya include the high poverty levels with consequent socio-economic deprivation. This is most evident in urban areas where there has been a phenomenal growth of slums and a slum population. The large urban slum population has been followed closely by an increase in the proportion of TB cases notified to the NLTP from urban areas. For example in 2004 over 35% of all notified TB cases in Kenya were from the five largest urban areas of Nairobi, Mombasa, Kisumu, Nakuru and Eldoret, reinforcing the known fact that poverty and TB are closely interrelated. The implication of this observation is that a general improvement in socioeconomic conditions may be the answer to TB control in the long term. However case finding and specific chemotherapy are the only methods that are known to have an important and immediate impact on the transmission of TB. The finding of TB cases and the provision of efficacious chemotherapy is the major preoccupation of the NLTP.

The National Leprosy and Tuberculosis Programme (NLTP), a programme of the Ministry of Health (MoH), was launched by the Government of Kenya (GoK) in 1980, combining the hitherto Kenya Tuberculosis Programme which existed since 1956 and several leprosy control projects which were in existence in Western, Coast and Eastern provinces since the early seventies. The NLTP is mandated to develop policies and guidelines, mobilize political support and resources and carry out activities aimed at controlling both TB and Leprosy so as to eventually remove the threat to public health that these diseases currently pose.

The NLTP adopted the Directly Observed Therapy Short Course (DOTS) strategy for the control of TB in 1993 and achieved countrywide geographic DOTS coverage in 1997. In 1993 the World Health Assembly set up global TB control targets which were to detect (find) 70% of infectious cases and successfully treat 85% of the detected cases by 2005. The TB control targets for the Millennium Development Goals are to have halved the mortality due to TB by 2010 and to have halted and begin to reverse the incidence of TB by 2015. Despite nearly a decade of countrywide implementation of DOTS, Kenya is yet to achieve the internationally agreed 70/85 TB control targets. The WHO estimates that the Case Detection Rate (CDR) for 2004 was around 47% while the treatment success rate has been a steady 80 % since the adoption of DOTS. It is for this reason that the NLTP, in line with international trends, has launched several new approaches to increase access to DOTS and truly expand population DOTS coverage. These approaches include community based DOTS (CB-DOTS), Public -Private Mix for DOTS (PPMDOTS), collaboration between TB and HIV control programs and the development of an elaborate advocacy, communication and social mobilization strategy aimed at influencing communities to seek care early when TB symptoms occur and to remain on treatment until this is completed when treatment is initiated.

Currently the NLTP is receiving financial support from the Government of Kenya, through the Ministry of Health and multilateral donors such the Presidential Emergency Plan for AIDS Relief through, Centre for Disease Control & Prevention (CDC) and USAID, the WHO, the Global Fund to fight AIDS, Tuberculosis and Malaria (GFATM) and the Canadian International Development Agency (CIDA) through Royal Netherlands Tuberculosis Association (KNCV).

PART I: TUBERCULOSIS

Chapter 1: Epidemiology of Tuberculosis

Definition

Tuberculosis is an infectious disease caused by a bacillus called *Mycobacterium tuberculosis*, an acid-fast rod shaped bacillus. Occasionally *Mycobacterium bovis*, transmitted through contaminated milk and *Mycobacterium africanum* also cause the disease. In rare situations Mycobacteria other than TB (MOTT) may cause a disease similar to typical TB.

The bacillus is transmitted from person through aerosolized droplet nuclei and therefore coughing, which generates infected droplets, is the most important mode of transmission of TB. The bacillus may also be transmitted by other aerosol generating processes including laughing, talking, sneezing, singing and spitting. The infectious patient is that person with a positive sputum smear.

In the majority of persons infected with the tubercle bacilli the immune system is able to contain the infection and the bacilli remain dormant for the rest of a person's life and do not lead to disease. Persons who are infected with the tubercle bacillus can be identified by the tuberculin skin test, the most used technique in Kenya for this test being the mantoux technique.

NOTE: The Mantoux test SHOULD NOT be used to diagnose TB disease. A positive tuberculin skin test (mantoux) only indicates infection with the tubercle bacillus.

Risk factors for TB exposure, infection and disease

To be infected with the tubercle bacillus a person must be exposed to the bacillus. A person's risk of exposure to the bacillus is related to incidence of infectious TB in the community that person belongs to, the number of cases or contacts that person interacts with over time and the duration of infectiousness of the cases that that person comes into contact. Therefore exposure is likely when there is a high incidence of TB in the community and the population density is high as is the situation in urban slums.

Following exposure to the bacillus, the risk of infection with the bacillus is related to extent of contact which is determined primarily by the proximity to and length of contact with the infectious person, the degree of air clearance and exposure to sunlight which determine the degree of dispersion and survival of the bacilli and the sputum bacillary load of the infectious person. A person is more likely to be infected with the tubercle bacillus if they spend long hours with an infectious person who is not on treatment especially if this contact occurs in a poorly lighted and poorly ventilated environment. This highlights the importance of poverty in the transmission of TB and also influencing disease occurrence in the event of infection with the tubercles bacillus.

Poverty and Tuberculosis are closely interrelated. Poverty reduction will have an important impact on Tuberculosis incidence while TB control should be an important component of poverty reduction strategies.

In the event of infection with the tubercle bacillus the majority of infected persons will not develop TB disease. Those at risk of developing the disease following infection with the tubercle bacillus include very young children especially those under one year of age, individuals who are poorly nourished, and those with poor immune defenses. Among the category of persons with poor defenses are people infected with HIV, diabetics, alcoholics, patients with leukemia, patients with silicosis and patients receiving long term oral steroids or immunosuppressive therapies. Smokers too have an increased risk of disease.

In Kenya the most common risk factor for TB is infection with the Human Immunodeficiency Virus (HIV).

A significant proportion of cases of TB however do not have any obvious risk factor for disease and in these cases unknown biological factors may play a role.

Text Box 1: Risk factors for exposure, infection and disease

Exposure to the TB bacillus

- Incidence of infectious TB
- Average duration of infectiousness of cases
- Number of cases/contacts interactions over time
- Population density
- Family size

Infection with the TB bacillus following exposure

- Bacillary load of infectiousness case
- Extent of contact with infectious cases
    1. Proximity to infectious case
    2. Length of contact with infectious case
- Contact environment
    1. Air clearance (ventilation) – dispersion of bacilli
    2. Lighting – survival of bacilli.

Disease following infection

- Extremes of age
- Gender (less in females?)
- HIV infection
- Diabètes
- Silicosis
- Leukemia
- Alcoholism
- Tobacco smoking
- Long term treatment with oral corticosteroids
- Treatment with immunosuppressive agents.
- Unknown factors

The most frequent form of tuberculosis is disease involving the lung (Pulmonary TB or PTB). This is also the most important form from the public health viewpoint because it is only PTB patients who can transmit the infection. The disease can, however, attack any organ of the body such as the lymph nodes, urinary tract (kidney, ureters, bladder), the genital system (ovary, fallopian tubes, uterus, testes, epididymis, skeletal system (bone, joints), the nervous system (brain, meninges, spinal cord), the skin, the eye, the gastro-intestinal system and serosal membranes (peritoneum, pleura, pericardium). When TB occurs outside the lung it is said to Extra-Pulmonary (EPTB).

When untreated, tuberculosis is a disease with a high mortality rate. The current treatment regimens achieve a very high cure rate (almost 100 %) provided the patient is started on a correct drug regimen at the correct disease and the treatment is adhered to.

Classification of clinical TB

Tuberculosis patients are classified as follows:

1. ***New Pulmonary Tuberculosis (PTB) –***patients who have never been treated before.

    a. Smear positive PTB or category 1 patients.
    b. Smear negative PTB or category 3 patients

2. ***Extra-Pulmonary Tuberculosis*** also placed in category 3

3. ***Previously treated smear positive PTB relapses or failures or return after default*** (also called smear positive re-treatment cases) – these are placed in category 2. These patients may have drug resistant TB.

All smear positive re-treatment cases should have sputum TB culture and drug susceptibility testing to exclude drug resistance and especially multi-drug resistant TB.

4. ***Other re-treatment cases*** – smear negative PTB cases that have previously been treated or EPTB in a patient previously treated for TB.

Chapter 2: The burden and control of Tuberculosis disease in Kenya.

Tuberculosis disease has re-emerged as a major public health problem in the world. It is estimated that a third of the world population is infected with tubercle bacillus, with eight (8) million people progressing to active tuberculosis disease each year 2 million of whom die of the disease. The WHO reported that incidence of TB grew by 1% globally in the year 2003 even though the incidence fell or was stable in five out of six WHO regions. In 2003 the African region witnessed a sharp rise in the incidence of TB which was attributed to the high HIV prevalence in this region.

Kenya is one of the 22 high TB burdened countries in the world which collectively contribute 80% of the global TB disease burden. Kenya is experiencing a generalized TB epidemic affecting the young economically productive age groups (15-44 year old). Males are 1.4 time more likely to have TB than females. In 2004 a total of 106, 000 cases of TB were notified to the National Leprosy and Tuberculosis Programme (NLTP) which represents a TB case notification rate of 320 per 100,000 population. Since the early nineties, TB cases have increased almost ten-fold, mainly due to the HIV/AIDS epidemic. People Living with HIV/AIDS (PLWHA) are the major subgroup with increased incidence of tuberculosis. In 1994 a national survey to determine the prevalence of HIV among TB patients found that 40% of TB patients were HIV sero-positive. It is currently estimated that over 60% of TB patients are co-infected.

Apart from the HIV epidemic, poor socio-economic status leading to over crowded slums in the peri-urban areas coupled with poor nutrition and limited access to health services have been identified as contributing factors to the increasing TB burden. Current data indicates that TB cases occur mostly among slum dwellers in large cities.

Although Kenya's TB disease burden is large the cases notified may represent less than half of the incident cases that occur each year. The WHO estimated that Kenya's TB case detection rate (proportion of incident cases that are diagnosed and treated) was about 47% in 2004.

Tuberculosis control strategies in Kenya.

Tuberculosis control in the country is based on the elements of the WHO strategy of Directly Observed Treatment Short Course (DOTS) (see text box 2), which has been found to be the most cost effective intervention for the control of TB.

Text Box 2: The DOTS strategy

- *Political commitment to provide adequate human, financial and other resources for sustained TB control*
- *Case finding with a with a focus on detection of the most infectious cases through a network of quality assured sputum smear microscopy services.*
- *Standardized short-course regimens with Direct observation of drug intake at least in the initial phase of treatment are used for treatment of TB*
- *Regular and uninterrupted supply of quality anti-TB drugs*
- *A standardized recording and reporting system that ensures that all detected cases are reported and treatment outcomes of every reported determined.*

The National Leprosy and Tuberculosis Programme (NLTP).

The responsibility for implementing the DOTS strategy and control of TB within the MoH is vested in the NLTP. Structurally the NLTP consists of the Central Unit (CU) at the headquarters which consists of Head of Programme who reports to the Head of Division of National AIDS Sexual Transmitted Disease Control Programme (NASCOP)/NLTP and who is currently assisted by two Medical Officers designated as The National TB/Leprosy Coordinators (NTLCs). There are currently ten paramedical officers designated as NLTP programme officers at the CU. The main function of the CU is formulation of TB control policy and strategies, resource identification and mobilization, coordination of the procurement and distribution of anti-TB drugs and other commodities, collection and collation of TB related data and, coordination of training and supervision. Tuberculosis control activities are coordinated by Provincial TB and Leprosy Coordinators (PTLCs) and District TB and Leprosy Coordinators (DTLCs) at the provincial and district levels respectively. The TB and Leprosy coordinators are integral members of the Provincial and District Health Management Teams. The delivery of DOTS services is integrated into the general health services provided at health care delivery points.

At the time of writing (2005) the NLTP had a direct staff establishment of 150 including staff at the central, provincial and district levels. The general health staff consisting of clinicians, nurses, laboratory and public health staff augments the direct NLTP staff. As at June 2005 TB services were available in 1,652 public, NGO and private health care facilities the majority of which are treatment centres. Six hundred and twenty centers were offering smear microscopy services.

The aims of NLTP are:

- *For individual patients*: To cure their disease, quickly restore their daily normal activities and preserve their position in the family and society
- *For the community*: To reduce the number of infectious cases in the community and hence reduce the disease burden.
- *For the nation*: That TB is no longer a public health problem and Leprosy is eradicated.

The objectives of TB and Leprosy control are:

- To interrupt transmission of infection
- To reduce morbidity, mortality and disability
- To prevent drug resistance

Strategies to achieve the above objectives are

- Early case-detection
- Treatment of the detected cases

Activities

- Early Case detection of both TB and Leprosy.
- Treatment of detected cases
- Health education to the community, health workers and the patients.
- Invite contacts of patients for screening and offer the necessary assistance.
- Recording and reporting for monitoring and evaluation
- Training of all Health workers and the community.
- Tracing of patients who have defaulted from treatment.
- Supervision of health workers.
- Operational research

HIV influences TB in several ways. The virus is the most potent known risk factor for reactivation of dormant infection. HIV infected individuals infected with the tubercle bacilli have an annual risk of disease of 5-10% as opposed to non-HIV infected individuals who have a similar risk but over a life time. About one in two to three persons infected with both TB and HIV will have TB in their lifetime. HIV increases the rate of progression of new TB infections to disease and also increases the risk of recurrence of previously successfully treated disease. Currently (2005) it is estimated that more than 60% of TB patients in Kenya are HIV infected.

HIV infected TB patients are more likely to develop other acute infections and be hospitalized while receiving TB treatment. Some of these infections include bacteremic *Streptococcal pneumonia* and *Non-typhi Salmonella septicemia*. Additionally, HIV infected TB patients are more likely to die while receiving TB treatment than TB patients who are not HIV infected. Early deaths in HIV infected TB patients may be due to TB itself and related to late diagnosis of the TB while late deaths are usually due to non-TB HIV related infections

Text Box 3: HIV and TB interactions.

HIV

- Reactivation of dormant infection
- Rapid progression of new infection to disease
- Recurrence of disease after successful treatment
- Increased risk of other acute infectious illnesses
- Increased risk of death
- Increased risk of adverse reactions to anti0-TB drugs

TB

- Rapid progression of HIV disease.

The close association between TB and HIV makes it imperative to develop strategies for the delivery of combined TB and HIV services in what is commonly referred to as TB/HIV collaborative activities. These activities are aimed at reducing the burden of TB in people living with HIV/AIDS and on the flip side to reduce the burden of HIV in TB patients.

The key TB/HIV collaborative activities include:

A: Screening of persons found to be HIV positive at HIV testing sites for TB

All persons found to be HIV positive at HIV testing sites, including VCT centres, STI clinics, PMTCT sites etc should be referred to the nearest TB screening centre.

This is more critical in clients who have a cough, fever, weight loss, chronic diarrhea or the presence of lymph node enlargement.

B: TB Preventive Therapy

There is good evidence that TB preventive therapy, using a six to nine months course of daily isoniazid, prevents the development of active TB in HIV infected persons. This beneficial effect may last up to two or so years after the course of treatment. It is critical however to ensure that active TB is confidently ruled out to avoid inadvertent monotherapy with isoniazid which would only serve to generate resistance to this drug. Suitable persons for Isoniazid TB preventive therapy include HIV infected individuals who:

- are well
- have had no fever in the past month
- have not lost weight
- do not have persistent diarrhea
- do not have palpable lymph glands
- do no have a palpable liver or spleen
- do not have clinical or biochemical evidence of liver disease
- have a normal chest x-ray

Because the screening of HIV infected persons for active TB may be clinically challenging the NLTP recommends that Isoniazid TB Preventive Therapy in Kenya be limited to situations where feasibility studies are being conducted and thorough screening and follow up of patients can be ensured. Isoniazid TB Preventive Therapy may therefore be offered in congregate settings, for example prisons, among health care workers and in industrial medical clinics where client follow up and monitoring may be relatively easy.

C: Prevention of TB transmission at health care settings

Simple infection prevention procedures should be introduced and maintained at all health care facilities to reduce the risk of nosocomial transmission of TB especially to People Living with HIV/AIDS (PLWAs). These include hand capping, triaging of patients to allow for physical separation of TB suspects (the coughers) from other patients, rapid screening of coughers for TB and maximizing natural ventilation and lighting in wards and outpatient areas.

D: Screening of TB patients for HIV

Because of the relationship between TB and HIV
All TB patients should be offered HIV testing and counseling through the process of Diagnostic Testing and Counseling (DTC).

Diagnostic Testing and Counseling

This is the process of preparing patients for a HIV test within health care settings. The underlying principle is that clinicians have a duty to provide patients who come with signs and symptoms of HIV related illnesses with an accurate and a complete diagnosis, and with appropriate advice about management of this condition.
It is considered substandard care not to offer HIV diagnostic testing and counseling to patients presenting with an illness that may be HIV related including TB.

The emphasis is on the patient knowing his/her HIV status as a way of improving treatment

outcomes. Benefits of knowing ones HIV status include prevention of HIV infection, treatment and prevention of HIV related opportunistic infections, accessing life- prolonging ARV drugs and access to emotional and social support.

When carrying out DTC, the health care worker should ensure that the patient fully understands the purpose and benefits of testing during the pre-test (discussion) counseling. The patient should also be informed of the disadvantages of declining the test including the missed opportunities for treatment and prevention of opportunistic infections. The health care worker should be able to respond to the patient's questions and concerns and very importantly the patient should know that he or she has a right to decline the test. For those who decline the test the health care worker should try and identify the barriers to testing and try and solve them All patients who decline the test should be encouraged to think about returning for the test during the course of TB treatment.

On receiving the results, the health care worker should provide post testing counseling with emphasis on interventions that can be provided. Post test counseling should include the following:

Those who test negative:

- Should be informed about couple discordance and be encouraged to refer their partners for testing.
- Should be motivated to maintain non -risky behavior so as to avoid acquisition of the HIV infection.

Those who are positive:

This group of patients may require more intense counseling and support to cope with the positive result and may benefit from referral to a formal counselor. The basic post counseling session should include:

An empathic disclosure of the positive result and

- A discussion with the patient about the care available and referral to a Comprehensive Care Clinic as soon as feasible.
- A discussion on disclosure of result to the partner and partner referral for a HIV test.
- Nutritional advise
- A discussion on positive living
- Referral to post test clubs or any other support groups for psychosocial support

NB: Always be on the look out for other Opportunistic Infections (OIs) and treat or refer the patient accordingly.

E: Provision of Cotrimoxazole preventive therapy.

Cotrimoxazole Preventive Therapy (CPT) should be provided to all TB patients found to be infected with HIV. The dose is 960 mg once daily which is two tablets for the usual tablets or one tablet for the double strength tablets. Patients given cotrimoxazole should be monitored for side effects which include skin rashes and gastrointestinal disturbances. Minor skin reactions may be managed with an antihistamine e.g. chlopheniramine (piriton) while minor gastrointestinal reactions can be managed with metoclopramide (plasil). The drug should be withdrawn whenever moderate to severe reactions occur. HIV infected patients should be made to understand that treatment with cotrimoxazole is life long unless treatment with ARVs is given and the CD4 cell count has risen above 200.

F: Provision of Anti-Retroviral Therapy (ART)

Tuberculosis patients with HIV should be offered or referred to ART centres at the earliest opportunity. Simple referral forms for this purpose have been made available. The majority of HIV infected TB patients will initiate ART after the intensive phase of TB treatment and this may be the optimal time for these patients to be referred to ART centres. However, very sick patients may need to initiate ART earlier. The recommended national first line regimen for TB patients initiating treatment while on rifampicin is d4t (stavudine) + 3TC (lamivudine) + EFV (efavirenz) but for patients who are no longer on rifampicin the standard national first line regimen of d4t (stavudine) + 3TC (lamivudine) + NVP (Nevirapine)

G: Recording and Reporting of TB/HIV

The TB registers have been modified to capture TB/HIV data.

All patients diagnosed and treated for TB should be registered and treatment outcomes recorded in the TB facility registers that every clinician treating TB should have.

This is essential for monitoring and evaluation of TB control activities including TB/HIV collaborative activities.

Chapter 4: Pulmonary TB in adults

Pulmonary TB is the most common clinical form of TB. Over 80% of all TB occurs in the lung. Pulmonary TB should be suspected in any person presenting with a cough of longer than two weeks in duration. The cough may be associated with production of sputum that may be blood stained. Other symptoms that often accompany the cough include fevers, night sweats, loss of weight, chest pain and shortness of breath.

None of the symptoms of TB are specific to this disease and therefore ***all persons presenting with a cough for longer than two weeks should be evaluated for TB with sputum smears unless there is another obvious cause of the cough.***

Physical signs are also not specific but every patient with suspected TB should be carefully examined especially for the presence of obvious signs of HIV disease. The only way to confirm PTB is by examining sputum.
Therefore all patients suspected to have PTB should have three sputum samples collected for microscopic examination for Acid Fast Bacilli (AFB). The recommended sputum collection procedure is the spot, morning plus spot in which a first sputum sample is collected at the time the patient presents, a second sample is collected in the early morning the following day and a second spot specimen is collected when the patient brings the morning specimen. This strategy enables three sputum samples to be collected within a twenty-four hour period. The results should also be available within the same time frame allowing infectious cases of TB to be rapidly identified and placed on treatment and further transmission of TB interrupted.

Technique for collecting sputum:

A specimen collected under the supervision of a member of the health team is likely to be better than a specimen collected without supervision. One needs to explain to the patient that saliva is not the same as sputum. Patients usually co-operate better if they are out of sight of other patients at the time of sputum collection. Patients who have had some food shortly before sputum collection should rinse their mouths with water first.

It is important to observe a few basic principles before sputum collection. ***These basic principles improve the quality of care of TB patients and should be observed by all care givers irrespective of seniority or status.***

- All patients requested to submit a sputum sample should have brief explanation of the reason for sputum collection.
- A laboratory request form should be filled properly.
- The patient's name and number should be clearly written on the side of the sputum container.

Process of sputum collection

- Ask the patient to cough deeply (demonstration is usually more effective than words).
- Ensure that no one is standing in front of a patient producing sputum.
- Avoid contaminating the outside of the sputum container. If the outside is contaminated, discard the container and repeat the collection with a fresh one.
- If the specimen is not suitable (e.g. if the quantity is insufficient or if it contains saliva), ask the patient to repeat the coughing until a sufficient amount of sputum has been obtained (3 to 5 ml).

After collecting the sputum specimen

- Place the lid on the container and close it firmly.
- Wash your hands with soap and water.
- Preferably store the sputum specimens in a cool and dark place, such as a cupboard or refrigerator, that can be locked and which is used solely for this purpose.
- Send the specimens to the laboratory as soon as possible (in any case, the specimen should arrive at the laboratory as soon as possible within 1 day of collection).
- Accompany each specimen with a properly completed laboratory request form.

Outside the public sector and where culture facilities are available and can be affordable, the initial evaluation of PTB suspects may include sputum TB culture and drug susceptibility testing (DST). ***In general however sputum TB culture and DST should be reserved for the evaluation of all smear positive and negative PTB patients, who have failed initial treatment, relapsed or are returning to treatment after a period of default because these patients may have drug resistant TB bacilli.***

When sputum is unavailable or negative AFB microscopy results have been obtained it may be useful to obtain lower respiratory tract specimens using other methods. These include sputum induction through the inhalation of hypertonic saline (greater 0.9%) preferably by ultrasonic nebulization or a bronchial wash or bronchoalveolar lavage sample obtained through fiberoptic bronchoscopy. In general these procedures are available only in tertiary institutions in Kenya and because they may lead to a substantial generation of infectious aerosols these procedures should only be carried out in clinical environments with appropriate infection prevention measures in place.

Rarely, TB is diagnosed through the examination of lung biopsy specimens obtained through fiberoptic bronchoscopy, open lung biopsy or the transthoracic route. Obtaining lung biopsy specimens demands the availability of a technically qualified person and the requisite equipment.

The chest x-ray may aid the diagnosis of PTB but it should never be used as the sole means of establishing a TB diagnosis. ***All patients with chest x-ray features suggestive of PTB should have sputum specimens submitted for microbiological examination***. It is a major error to diagnose TB on the basis of a chest x-ray and fail to examine sputum.

The radiographic features that usually suggest PTB include upper zone patchy shadows especially when these show evidence of cavitation and scarring (fibrosis). In HIV infected persons the radiological picture is more often atypical with the lower or mid-zone shadows and the presence of hilar or mediastinal lymph node enlargement being relatively common. Miliary mottling and pleural and or pericardial effusion, which strictly speaking is not PTB, are also commoner radiographic features in HIV infected persons.

The tuberculin skin test (Mantoux) should not be used to diagnose PTB in adults. This test only indicates that the person has previously been infected with the TB bacillus.

Similarly most serological tests are not able to distinguish previous infection from current active disease and therefore should not be used to diagnose PTB.

The erythrocyte sedimentation rate (ESR) is usually elevated in active TB but this test is not sensitive or specific enough to be of value in the diagnosis of PTB.

Nucleic acid detection tests including Polymerase Chain Reaction (PCR) may have a reasonable sensitivity and specificity for TB but are usually expensive and have not been adequately studied in resource limited settings like Kenya.

Smear negative PTB

About 50% of PTB patients will have negative sputum smears for AFBs. ***Smear negative PTB should be diagnosed in patients with a cough of longer than two weeks, chest radiographic findings that are consistent with TB, at least three sputum smears negative for AFBs and a lack of response to a trial of broad spectrum antimicrobials excluding fluoroquionolnes.***
This definition of smear negative PTB therefore implies that the diagnosis can not be made if sputum smears and a chest x-ray are not done.

Differential diagnosis of PTB

In a person presenting with a chronic cough and negative sputum smears other diagnoses must always be considered. These include pneumonia especially pneumonia caused by unusual pathogens (fungi including ***Pneumocytis jirovecii***), lung abscess, lung cancer, sarcoidosis and bronchiectasis. The diagnosis of these alternative diagnoses require a careful history, physical examination and various tests including chest computed tomographic scan which may not be easily accessible to the majority of PTB suspects. When the diagnosis of TB is in doubt the patient should be referred to the next level for appropriate evaluation.

Chapter 5: Extra-pulmonary TB in adults

The presentation and diagnostic approach to extra-pulmonary TB will depend on site of disease. A detailed description of all forms of TB is beyond the scope of this guide. However the most common forms of TB and the diagnostic approaches are briefly described below. When patients present with symptoms of disease and the health care worker is not able to quickly make a diagnosis or there are signs of severe disease, a rapid referral to the next appropriate level is highly recommended.

Tuberculous Pleural effusion and empyema

Involvement of the pleura in TB may occur soon after infection (primary disease in children and young adults), or may be the result of reactivated disease in older persons. A tuberculous cavity in the lung that is close to the pleura may rupture into the pleura allowing the pleura to be involved in the disease process. In these circumstances, there is usually formation of pus in the pleural space (empyema) and if air has also leaked into the pleural space the resulting condition is called pyopneumothorax. When the pyopneumothorax is communicating with a bonchus a bronchopleural fistula is created.

Tuberculous pleural effusion usually presents with local chest symptoms including chest pain and breathlessness. Many patients also have a cough and systemic symptoms including fever and night sweats. When examined the trachea and the point of maximum cardiac impulse (apex beat) may be found to have shifted away from the side of the effusion. Percussion of the chest reveals "stony" dullness and breath sounds are reduced on the side of the effusion. It is advisable to obtain a chest x-ray to confirm the presence of the effusion. It is also advisable, if the expertise exists, to perform a diagnostic pleural aspiration which at the minimum will distinguish pus (empyema) from "usual" effusion.

Where facilities exist aspirated pleural fluid should be sent to the laboratory for biochemical tests (sugar, protein, and lactic dehydrogenase), cell count, cytology and microbiological tests including smears and cultures for tubercle bacilli. Although a pleural biopsy may improve the confidence with which the diagnosis of TB by demonstrating granulomatous inflammation on histology or a positive Ziehl Nielsen (ZN) stain or a positive TB culture it is rarely required in young patients below the age of 40 years. Older patients and especially those with a significant smoking history may have other diagnoses and in these patients it is advisable to perform a pleural biopsy using an Abrahm's needle.

Tuberculous pericardial effusion

Tuberculous pericardial effusion may present with a variety of symptoms including chest pain, shortness of breath, a cough, leg swelling and fever. The patient with a pericardial effusion will usually have a high pulse rate (tachycardia) and may have a low blood pressure, impalpable apex beat, quiet heart sounds and signs of heart failure including a large liver, ascites and leg edema. A chest x-ray is always required and usually shows a large globular heart. Where feasible patients suspected to have a pericardial effusion should be referred to a heart specialist for confirmation of the diagnosis using echocardiography. A pericardial tap (pericardiocentesis) for diagnostic purposes is rarely carried out but this procedure may be life saving if there are signs of cardiac compression (tamponade). This procedure must be done by technically qualified and experienced health care workers only.

Tuberculous lymphadenopathy

Tuberculous lymphadenopathy most commonly involves the cervical (neck) nodes but any other lymph node group may be involved. The lymph nodes enlarge and are usually painless and initially firm and discrete. As the disease progresses the nodes become fluctuant and matted together and then they break down with sinus formation and pus discharge. The presence of unilateral fluctuant nodes or draining nodes often without much pain or fever is usually due to TB and in these situations a formal node biopsy may not be necessary. However when an alternative diagnosis is being considered, for example Kaposi's sarcoma, lymphoma and cancer then a node biopsy should be obtained.

Intracranial TB

a) Tuberculous meningitis

This disease is often difficult to diagnose and requires a very high index of clinical suspicion. The onset of the disease is usually gradual with a progressive headache and vomiting with progression to neck stiffness. The presence of a thick exudate at the base of the brain leads to cranial nerve palsies while involvement of the arteries of the brain can lead to convulsions, loss of speech or loss of power in one or more limbs. If untreated TB meningitis leads to a gradual change in level of consciousness eventually ending in coma and death if the disease is not diagnosed quickly and treated. The diagnosis of tuberculous meningitis rests on clinical suspicion and examination of cerebrospinal fluid obtained following a lumbar puncture. In some situations it may be advisable to obtain a brain CT scan, if available, to exclude space occupying lesions and raised intracranial pressure before performing a lumbar puncture. In TBM the brain CT scan may show basal enhancement. In the presence of raised intracranial pressure a lumbar puncture may cause fatal brain herniation through the foramen magnum. By the time the diagnosis of TBM is made the CSF is usually clear or may be opalescent or xanthochromic. The CSF should be left to stand to see if spider webs formation occurs. Usually the CSF has a high cell count (mainly lymphocytes), low sugar and high protein. The ZN stain is rarely positive (less than 10%) while TB culture improves the yield only slightly.

b) TB encephalitis including tuberculoma

The clinical presentation is similar to that of other space occupying brain lesions include headaches, vomiting, convulsions, limb weakness, and cranial nerve palsies. Brain CT scans are useful in demonstrating lesions. A variety of radiological appearances may be seen to some extent reflecting the stage of the evolving granulomatous inflammation. Thus there may be low attenuation areas (edema formation), high attenuation areas, contrast enhancement and calcification (organization). Often it is difficult to confirm the diagnosis of brain TB and the most patients are treated on an empiric basis.

Intestinal TB including ascites

Tuberculous ascites presents with progressive vague abdominal pain, abdominal distension, vague abdominal mass with doughy feeling, fever, wasting and diarrhea that may alternate with constipation. A health care worker with reasonable clinical skills should be able to diagnose ascites. However the diagnosis of TB as the cause of the ascites is often presumptive after exclusion of other causes of ascites which include heart disease, liver disease and kidney disease.

Miliary TB

Miliary TB usually presents with gradual onset of fever, malaise, night sweats, wasting and other so called constitutional symptoms with very little respiratory symptoms. There may be a large liver and or spleen. Whenever miliary TB is suspected the eyes should be examined, where feasible, for choroidal tubercles. The chest x-ray shows multiple small millet-sized nodular shadows. The diagnosis is rarely confirmed but where facilities are available culture of blood, CSF, liver biopsies and blood may be positive for the tubercle bacilli.

Table 1: Other forms of TB
(table of site, key clinical features and mode of diagnosis)
WHERE IS THE TABLE???

Complications of PTB

Haemoptysis

Coughing up of blood (haemoptysis) may be a symptom of TB and in most cases the amount of blood coughed out is small. After the treatment of TB haemoptysis is usually a symptom of post TB bronchiectasis and in most cases it is precipitated by an infection in the bronchiectatic cavities. Recurrent haemoptysis in a patient who was previously treated for TB may also be a symptom of aspergilloma (fungal ball) in a bronchiectatic lesion or post TB cavitary lesion. Haemoptysis is a frightening symptom to most patients and when it occurs, patients should be reassured and sedated with a low dose of largactil at 25 mg twice daily. A course of broad spectrum antibiotics is indicated in those patients with post TB bronchiectasis. If the bleeding is severe and life threatening patients should be admitted to hospital for more specialized treatment which may include surgery (to remove a bronchiectatic lung segment or lobe or to remove an aspergilloma)

Spontaneous pneumothorax

This is usually a result of rupture of a pleural based TB cavity. It is often associated with formation of pus in the pleural space (empyema) leading to a pyopneumothrax. The patient will present with shortness of breath and usually some chest pain. This complication usually requires the insertion of a chest tube with underwater drainage of the air and pus. Therefore patients with a pneumothorax with or without pus should be admitted to hospital for appropriate management.

Bronchiectasis

Patients with this complication may cough out copious amounts of sputum which periodically is coloured, blood stained or foul smelling. This classical presentation of bronchiectasis is becoming less common with the widespread use of antibiotics. In those patients with upper lobe bronchiectatic lesions there may be no sputum production as a result of gravitation facilitated spontaneous drainage (dry bronchiectasis). The optimal management of post bronchiectasis will depend on disease extent and severity. Infective exacerbations will require antibiotic therapy which may be given when needed, cyclically or continuously depending on the frequency of exacerbations. Several antibiotics may be used including ampicillin, amoxicillin and amoxycillin-clavulanate. Metronidazole or clindamycin should be used when anaerobic infection is suspected and an anti-pseudomonal antibiotic like ciprofloxacin should be used when colonization with *Pseudomonas* is suspected or proved. The hallmark of management of productive bronchiectasis is chest physiotherapy, typically postural drainage and other manoeuvres aimed at improving respiratory secretion drainage.

Fibrosis of the lungs

This is sequelae of extensive tuberculous disease and only symptomatic therapy is possible. In severe terminal cases, long term oxygen therapy may be required. These patients should be referred to a hospital for review.

Lung abscess

This may occur in a patient with extensive damage to the lungs after tuberculosis. Antibiotic treatment is given in light of the results of a culture-sensitivity test. Surgical intervention may also be necessary and patients should be referred.

Aspergilloma

This complication arises from the colonization of tuberculous cavities or bronchiectatic lesions with the fungus *Aspergilus fumigatus*. Characteristically aspergillomas present with recurrent or persistent haemoptysis which may or may not be accompanied by systemic symptoms like malaise and fever. The diagnosis should be suspected when a patient previously treated for TB presents with recurrent haemoptysis and is found to have a shadow with an air crescent (halo) around it. The diagnosis is supported by the finding of high levels of specific immunoglobulin G against Aspergillus in blood. The only effective treatment is surgical removal of the aspergilloma.

Chapter 6: Tuberculosis in Children

The burden of childhood TB

Of the 8 million new cases of TB that occur in the world every year, it is estimated that nearly one million cases (11%) occur in children less than 15 years of age. Seventy-five percent of these childhood cases occur in the 22 high-burden countries, of which Kenya is one, that together account for 80% of the world's estimated incident TB cases. In Kenya, TB in children below the age of 15 accounts for about 10% all cases notified to the NLTP every year.

Pathogenesis of childhood TB

Infection with *M. tuberculosis* usually results from inhalation into the lungs of infected droplets produced by someone who is coughing and who has TB disease. The source of infection of most children is an infectious adult in their close environment (usually the household). This exposure leads to the development of a primary parenchymal lesion (Ghon focus) in the lung with spread to the regional lymph node(s). In the majority of cases, the resultant cell-mediated immunity will contain the disease process at this stage. Disease progression does occur, especially in the very young (less than 3 years old), when primary infection occurs in adolescence (more than 10 years of age), and in immune compromised children. Progression of disease occurs by extension of the primary focus with or without cavitation and or the effects of pathological processes in the draining lymph nodes or lymphatic and or haematogenous spread of the disease.

Diagnosis of Tuberculosis in Children

Pulmonary TB in Children

The diagnosis of PTB in children remains a major challenge primarily because the majority of children with TB are not able to expectorate and provide lower respiratory tract specimens for microbiological investigations.

The key elements to a successful diagnosis of PTB in children include:

- A careful history (including history of TB contact and symptoms consistent with TB)
- Smear microscopy
- Tuberculin skin testing (TST)
- Chest radiography
- HIV testing

In the majority of cases, the clinical diagnosis of PTB in children should be straightforward if the clinician pays attention to clinical details aided by the chest x-ray, tuberculin skin test, sputum microscopy where feasible and HIV testing. However it is much more difficult to confirm the disease bacteriologically, since the majority of children mostly develop smear-negative disease and adequate sputum specimens are not easy to obtain. In most immune competent children, TB presents with symptoms of a chronic disease after they have been in contact with an infectious source case. Infection with *Mycobacterium tuberculosis* can be demonstrated by a tuberculin skin test and chest radiograph changes typical of TB are present in the greatest majority.

The Symptoms and Signs of TB in Children

The commonest symptoms of TB in children are chronic unremitting cough for more than two weeks, fever of greater than 38^0C for two or more weeks after other common causes like malaria infection have been excluded and weight loss or failure to gain weight, especially after being treated in a nutritional rehabilitation program.
There are no signs in the lung that are specific for TB. Pulmonary TB should be considered in any child presenting with a chronic pneumonia unresponsive to anti-biotic treatment.

A history of contact with an adult with open TB aids the diagnosis of PTB in children and this history should be elicited in all children suspected to have TB. A close contact is defined as a person living in the same household or is in frequent contact with the child and has or has had smear-positive PTB. Source cases that are sputum smear-negative but culture positive are also infectious, but to a much lesser degree. Therefore ***all children (especially those under 5 years of age) who have been in close contact with a source case must be screened for TB. After TB is diagnosed in a child or adolescent, an effort should be made to detect the adult source cases, especially undiagnosed household case. If a child presents with infectious TB, then childhood contacts must be sought and screened as one would for any smear-positive source case. Children should be regarded as infectious if they are sputum smear-positive or have a cavity visible on the chest radiograph.***

The Chest Radiograph in Children with PTB
The majority of children with PTB will have radiographic changes suggestive of the disease. The commonest picture is that of persistent opacification in the lung together with enlarged mediastinal lymph glands. A miliary pattern of opacification in HIV non-infected children is highly suggestive of TB. Patients with persistent opacification which does not improve after an adequate course of antibiotics should be considered TB suspects and appropriately investigated or treated for the disease. Adolescent patients with PTB have chest radiographic changes which are similar to adult patients with large pleural effusions and apical infiltrates with cavity formation being the most common forms of presentation.

Although chest radiography is useful in the diagnosis of TB in children, chest radiographs from this age group, and especially those under the age of five years, may be difficult to read and these x-rays should preferably be read by a radiologist or other health care worker specially trained in their reading.

Bacteriologic Tests in PTB in Children
This is the most difficult aspect for the diagnosis of PTB in children and the younger the child the more difficult the process. The main challenge relates to obtaining representative lower respiratory tract specimens for bacteriologic evaluation. The more common ways of obtaining these specimens include:
Spontaneous Sputum Expectoration
Sputum is difficult to obtain from children under the age of ten and even when obtained the majority of these children end up with smear-negative disease. However, in children who are able to produce a specimen, it is worth collecting specimens and sending these for smear microscopy and culture. ***All specimens obtained from children for Mycobacterial tests should also be sent to a laboratory able to carry Mycobacterial cultures.*** Yields are higher in older children over the age of five years and adolescents and in children with severe disease.

Gastric aspirates

Gastric aspiration using a nasogastric feeding tube can be performed in young children who are unable or unwilling to expectorate sputum. If performed, gastric aspirates should be sent for smear microscopy and mycobacterial culture.

Sputum induction
Sputum induction can safely and effectively be performed in children of all ages and bacteriologic yields are better than for gastric aspirates. However this procedure can not be performed in the absence of a nebulizer and preferably an ultrasonic nebulizer. Because it is an aerosol generating procedure there is a potential danger of transmission of TB to health care workers and therefore this procedure may be optimally done only in health care environments where adequate measures for prevention of transmission of infectious aerosols are in place.

The tuberculin skin test (mantoux) in childhood TB
A positive tuberculin skin test (TST) indicates infection with *M. tuberculosis*. In children, TST can also be used as an adjunct in diagnosing TB disease in children. In this country, the TST is standardized and 5TU of tuberculin PPD-S is usually used. Although the test appears to be simple and easy to administer there is need for health care worker training in the performance and reading of this test.

There is some debate as to the limits that should be regarded as positive for the tuberculin skin test in this country. A previous tuberculin survey suggested that the cut-off point for a positive test should be 17mm. In HIV infected children and in those with malnutrition the cut off point should be brought down to 5 mm.

A positive TST (mantoux) indicates that the child has been infected with TB but does not necessarily indicate disease.

Tuberculin skin tests are useful in HIV infected children to identify those with dual HIV TB infection and as an aid in the diagnosis of TB, although the percentage positive will be lower than in non-infected children.
A negative TST (Mantoux) never rules out a diagnosis of TB in a child.

Other specialized tests
Tests including computerized chest tomography, bronchoscopy, serological and nucleic acid amplification (e.g. PCR) tests are generally not recommended for the routine diagnosis of TB in children.

When a decision is made to treat a child for TB, full treatment instead of "Trial of treatment" should be offered.

HIV in Childhood TB
Children who are HIV infected may be at increased risk of developing TB just like HIV infected adults. The diagnosis of TB in HIV-infected children is more complex, as HIV-related lung diseases are commonly confused with TB. It is possible that a significant proportion of HIV infected children with pulmonary disease treated as TB do not in fact have TB.

As in adults all children with TB should be offered proportion HIV testing and counselling in accordance with published guidelines for HIV testing in children.

Case definitions for PTB in children

The following definitions are used:

- **Sputum smear-positive (PTB+)**
  a. two or more initial sputum smear examinations positive for AFB, **or**
  b. one sputum smear examination positive for AFB plus radiographic abnormalities consistent with active pulmonary tuberculosis as determined by a clinician, **or**
  c. one sputum smear positive for AFB plus sputum culture positive for *M. tuberculosis*.

- **Sputum smear-negative (PTB-)**
  Any case of pulmonary tuberculosis that does not meet the above definition for smear-positive TB is considered to be sputum smear negative. This group includes cases without smear result, which should be exceptional in adults but are relatively more frequent in children.

Use of scoring systems for diagnosing PTB in children

It is important to recognize that most scoring systems have not been systematically evaluated and most perform poorly when evaluated especially in HIV infected children. These scoring systems should only be used as screening tests for TB and not as a means for the making a firm diagnosis of TB.

Extra pulmonary TB in Children

As in adults TB can affect any organ of the body in children. Of the extra-pulmonary forms of TB that occur in children, miliary and tuberculous meningitis carry the most risk of death.
The most common forms of extra-pulmonary TB and the practical approach to the diagnosis are shown in the table below.

Table 2:Category of extra-pulmonary TB and approach to diagnosis

Category	**Practical approach to diagnosis**
Lymph nodes (cervical most commonly)	Node biopsy/Fine needle aspiration
Miliary	Chest radiograph
Meningitis	Lumbar puncture and CSF examination
Pleural effusion	Chest radiograph + pleural tap
Peritoneal TB	Abdominal ultrasound
Osteoarticular	Radiography, join tap

The following signs and conditions are highly suggestive of TB in children:

- The presence of a gibbus, especially of recent onset, is highly suggestive of spinal TB
- Non-painful enlarged cervical lymphadenopathy with fistula formation
- Meningitis not responding to treatment, with a sub-acute onset or raised intracranial pressure
- Pleural effusion
- Pericardial effusion
- Distended abdomen with ascites
- Non-painful enlarged joints
- Signs of tuberculin hypersensitivity: phlyctenular conjunctivitis, erythema nodosum

Chapter 7: Treatment of TB in adults and children

The aims of treatment are:

- To cure patients and therefore prevent suffering and death from TB
- To prevent long term complications or squeal of TB
- To prevent relapse of the disease
- To prevent transmission of the infection
- To prevent the development of resistant tubercle bacilli
- To do the above without inflicting adverse events.

It is important to remember that "the treatment of tuberculosis benefits both the community as a whole and the individual patient; thus, any public health program or private provider undertaking to treat a patient with tuberculosis is assuming a public health function that includes not only prescribing an appropriate regimen but also ensuring adherence to the regimen until treatment is completed."

Tuberculosis treatment involves the use of multiple drugs taken in combination. This is done to prevent the emergence of drug resistance to any of the drugs. When single drugs are used (monotherapy) the tubercle bacilli quickly develop resistance to the drug used. Therefore anti-TB drugs should always be used in combination and currently most anti-TB drugs are available as tablets containing multiple drugs in Fixed Dose Combinations (FDC). There are five primary drugs used to treat TB: isoniazid (H), Rifampicin (R), Pyrazinamide (Z), Ethambutol (E) and Streptomycin (S).

In the first two months of treatment four drugs are used to rapidly reduce the number of tubercle bacilli (bacillary load) in the body. This phase is called the Intensive Phase of anti-TB treatment. After two months two drugs are used for 4-6 months and this phase is called the Continuation Phase of anti-TB treatment.

Anti-TB drugs should be taken in the right combinations, with the right doses and the correct schedules for the appropriate duration. To promote total adherence to treatment an individualized patient centered approach should be developed. *Therefore Direct Observation of Treatment (DOT) should be promoted using a treatment supporter who is acceptable and accountable to the patient and to the health system.* This treatment supporter could be health care worker, a family member or a community volunteer and the DOT may take place at home, workplace, health facility or other convenient place agreeable to the patient, the treatment supporter and the health care system.

All patients who have not been treated previously should have a two month initial phase of treatment consisting of isoniazid, rifampicin, pyrazinamide and ethambutol followed by a continuation phase of ethambutol and isoniazid for six months or isoniazid and rifampicin for four months.

Treatment regimen for new adult TB patients : 2ERHZ/6EH or 2ERHZ/4RH

Table 3: TB treatment regimen

Abbreviation of the regimen	2ERHZ / 6EH or 2ERHZ/4RH	
Phase	Intensive phase	Continuation phase
Duration	Daily supervised for two months	Daily self-administered for six months
Drugs used	Two months of daily Ethambutol (E) + Rifampicin (R)+Isoniazid (H)+ Pyrazinamide (Z)	Six months of daily Ethambutol (E) and Isoniazid (H) or 4 months of Rifampicin and Isoniazid

Note: For dosages see Table 4 below.

For patients who have previously been treated for TB including those who have relapsed after successful previous treatment, those who defaulted from previous treatment or those who failed previous treatment (Category II patients) the regimen used is two months of SERHZ followed by one month of ERHZ and then five months of RHE. This regimen is abbreviated 2SERHZ/1ERHZ/5RHE.

Table 4: Table showing TB drug dosages

Drug Dosages		Pre-treatment weight		
Drug	Formulation	Over 55 kg	38-55 kg	30-37 kg
Streptomycin	i.m. Injection	1 gr	0.75 gr	0.50 gr
FDC of Rifampicin 150 mg +Isoniazid 75 mg+ Pyrazinamide 400 mg+ Ethambutol 275 mg	Combination tablet RHZE	4	3	2
FDC of Rifampicin 150 mg +Isoniazid 75 mg+ Pyrazinamide 400 mg	Combination tablet RHZ	4	3	2
FDC of Rifampicin 150 mg +Isoniazid 75mg	Combination tablet RH	4	3	2-1
FDC of Rifampicin 150 mg + Isoniazid 100mg	Combined tablet RH	4	3	2-1
Ethambutol 400 mg Intensive phase	Tablet	2	1	1/2
Ethambutol 400 mg Continuation phase	Tablet	21/2	2	1 1/2
FDC of Ethambutol 400 mg +Isoniazid 150 mg	Combination tablet EH	2 1	2	11/2

In the public health care sector, TB treatment is now provided in individualized patient packs. Before allocating a pack to a patient, determine where the patient will receive DOT. Patients being

transferred out to another health facility should not be given their packs to move with. The patient packs should remain in the health facility and appropriate doses taken out of the pack for the recommended duration of treatment. Adjustment in doses should be made at the beginning of treatment according to the instructions in the patient packs.

All patients started on treatment in the health facility should be entered in the treatment register with all entries filled in. The same information, together with the clinical notes, should be entered in the patient's TB treatment card (and the patient appointment card).

Patients on TB treatment should be monitored for clinical and bacteriologic response. ***For smear positive PTB patients a follow up sputum smear should be carried out at the completion of the intensive phase of treatment (two months) and four (RH) or five (EH) months and at the end of treatment.*** Patients who have a positive smear at the end of the intensive phase should have the intensive phase extended for not more than one month and weekly sputum smears until these become negative at which point they should be switched to the continuation phase. Patients who still have a positive smear at month 4 (RH) or month 5 (EH) should be considered to have failed initial treatment and switched to the re-treatment regimen (2SRHZE/1HRZE/5RHE). The medications given and the bacteriologic and clinical response should be recorded in the patient record card and the TB treatment register.

TB treatment in nomadic populations

In Kenya, about 10% of all registered tuberculosis patients live in nomadic areas. In the arid and semi – arid areas, supervision and follow-up of treatment is difficult due to the scarcity of health facilities and their life style. However the NLTP has now standardized treatment all over the country and the same regimens are used in patients treated in TB manyattas.

The re-treatment regimen for nomadic patients with relapse (R), treatment failure (F), or treatment resumed (TR), with active tuberculosis disease and who have a positive sputum smear or culture result however remains the same and is: 2SRHZE/4RHZE

Treatment of TB in pregnancy

In general pregnancy should be avoided during anti-TB treatment. ***However when it occurs the termination of pregnancy should not be recommended.*** Like most drugs anti-TB drugs have not been specifically studied in pregnancy. There is always some risk of teratogencity with any drugs especially when the drug is given in the first trimester. There have been no significant reports that anti-TB drugs pose a greater than usual risk of teratogencity and therefore all pregnant women with active TB should be treated with a full complement of anti-TB drugs. It is useful give pyridoxine with isoniazid to avoid any small risk of damaging the infant's nervous system. In addition streptomycin should not used in pregnancy because it may cause deafness in the infant. When treating drug resistant TB the aminoglycosides (kanamycin, amikacin and capreomycin) the thioamides (ethionamide and prothionamide) should not be used in pregnancy**.**

Treatment of Tuberculosis in children

The objectives of treatment of TB in children are similar to those in adults.

Children usually have pauci-bacillary disease (low organism numbers), as cavitating disease is relatively rare (about 6% or less) at less than 13 years of age and the majority of the organisms in adult-type disease are found in the cavities. On the other hand, children more often than adults develop extra-pulmonary TB (EPTB), and severe and disseminated TB (e.g. miliary TB and TB meningitis) is especially found in the young less than 3 years old. Both the bacillary load and the type of disease may influence treatment regimens.

Treatment outcomes in children are generally good, even in young and immune compromised children who are at higher risk of disease progression and disseminated disease, provided that treatment starts promptly to decrease morbidity and mortality.

The management of all children with TB should be in line with the DOTS strategy, including directly-observed treatment wherever possible.

The principles of treatment are similar to those in adults. As in adults anti-tuberculosis treatment is divided into two phases: - an intensive phase and a continuation phase. The intensive phase uses at least three drugs (RHZ) while the continuation phase utilizes usually two drugs (RH). In Kenya daily treatment is recommended. The suggested drug regimen and doses for children are summarized in the Tables below.

Treatment regimen for new smear-negative and extra-pulmonary tuberculosis patients younger than 15 years is: 2RHZ/4RH

Table 5: TB treatment regimen in children

Abbreviation of the regimen	2RHZ / 4RH	
Phase	Intensive phase	Continuation phase
Duration	Daily for two months	Daily self-administration for four months
Drugs used	Rifampicin (R) + Isoniazid (H)+ Pyrazinamide (Z)	Rifampicin (R) + Isoniazid (H)

Table 6: Recommended anti-TB FDC for use in Children.

Drug Dosage							
Drug	Formulation	<7years	8-9yrs	10-14yrs	15-19yrs	20-24yrs	25-29yrs
Rifampicin 60 mg Isoniazid 30 mg Pyrazinamide 150 mg	Combination tablet RHZ	1	1.5	2	3	4	5
Rifampicin 60 mg Isoniazid 30 mg	Combination tablet RH	1	1.5	2	3	4	5
Rifampicin 60 mg Isoniazid 60mg	Combination tablet RH	1	1.5	2	3	4	5

Table 7: Anti-tuberculosis drug dosages for children

Drug	**Daily dosage in mg/kg (maximum)**
Isoniazid	5-10 (300mg)
Rifampicin	10-20 (600mg)
Pyrazinamide	25-40 (2000mg)
Ethambutol*	15-25 (1200mg)
Streptomycin	15-20 mg (1000mg)

Although there is evidence that ethambutol may be safe in children it is reasonable to limit the use of this drug to children who are able to indicate when visual problems occur (over the age of 6)

The recommended regimen for all forms of TB in Kenya in children is 2RHZ/4RH.

Corticosteroids in childhood TB

Corticosteroids should be used for the management of certain types of TB where scar formation may lead to serious consequences. These include TBM, lymphobronchial TB, TB pericarditis and genitourinary TB. The drug most frequently used is prednisone, in a dosage of 2mg/kg/day for 4 weeks. The dose should then be slowly reduced (tapered) over 1-2 weeks before stopping.

Administering Treatment and Ensuring Adherence

Children, their parents, and other family members should be educated about TB and the importance of completing treatment. Where possible, someone other than the child's parent or immediate family should observe or administer treatment. All children should receive treatment free of charge, whether the child is smear-positive at diagnosis or not. Fixed dose combinations (FDCs) should be used at all times to improve simplicity and adherence. Child-friendly formulations, such as soluble tablets or powder, or suspensions, should be used where they are available and of proven quality. Treatment adherence should be recorded in the patient appointment and facility record card and register.

Follow Up of Children on TB treatment

Ideally, each child should be clinically assessed at 2 weeks after treatment initiation, at the end of intensive phase, and every two months until treatment completion. The assessment should include, at a minimum, a symptom assessment, an assessment of adherence, inquiry about any adverse events, and weight measurement. Medication dosages should be adjusted to account for any weight gain. Adherence should be assessed by reviewing the treatment card. A follow-up sputum smear for microscopy at 2 months should be obtained for any child who was smear-positive at diagnosis. Follow-up chest radiographs are not routinely required in children, particularly as many children will have a slow radiologic response to treatment. A child who is not responding to TB treatment should be referred for further assessment and management.

Case Recording and Reporting for Childhood TB

All children diagnosed and treated for TB should be recorded in the TB facility register and standard treatment outcomes reported.

Paradoxical Reactions in Childhood TB

A temporary exacerbation of symptoms, signs or radiographic manifestations sometimes occur after beginning anti-tuberculosis therapy. This can simulate worsening disease, with fever, increased size of lymph nodes or tuberculomas, but is usually the result of immune reconstitution brought about by improved nutritional status, anti-tuberculosis treatment itself. Anti-tuberculosis treatment should be continued and in the majority of cases oral corticosteroids should be added.

Anti-TB Drug Adverse Events in Children

Adverse events are much less common in children than in adults. The most important adverse event is the development of hepatotoxicity, which can be caused by any of the anti-TB drugs. The management of anti-TB drug adverse is similar to that in adults.

Re-treatment Cases

In childhood TB cases where anti-tuberculosis treatment failed or a relapse occurs, every effort should be made to find the most likely cause for the failure of treatment or relapse. Failure of treatment in confirmed TB is more likely to be due to drug resistant TB. Therefore all children who fail first line anti-TB treatment should as far as feasible have specimens submitted to a laboratory for Mycobacterial culture and DST. While results are awaited the child should be placed on the regimen 2SRHZ(E)/1RHZ(E)/5RH(E) with the use of ethambutol in children over age 6 years as previously described.

Prevention of TB in Children

BCG vaccination

Despite the fact that that Bacille –Calmette Guerin (BCG) has been in use in children since the 1920s, controversies about its effectiveness in preventing TB remain. The efficacy of this vaccine ranges from 0 to 80% in published studies from several areas of the world. The reasons for this may be multiple, including different types of BCG used in different areas, differences in the strains of

M. tuberculosis in different regions, different levels of exposure and immunity to environmental mycobacteria and differences in immunization practices. However, it is generally accepted that after effective BCG vaccination there is protection against the more severe types of TB such as miliary and tuberculous meningitis, which are most common in young children and therefore in Kenya it is recommended that this vaccine should be given to all children at birth or first contact with the health care system.

In general BCG vaccination is safe. However a small number of children develop reactions which include local abscesses, secondary bacterial infections, suppurative adenitis and very rarely disseminated BCG disease. Those who develop BCG disease should be treated using a first line regimen.

Preventing TB in Children in Contact with Smear Positive PTB

When a patient is diagnosed with smear-positive pulmonary tuberculosis, the clinician should collect information regarding young children living with the patient in the same household. This is important because infants and young children are at a higher risk of acquiring infection and severe forms of tuberculosis than adults. When there are children with symptoms suggestive of tuberculosis, they should be referred for further investigations.

Any under five year child without symptoms and who has not received BCG vaccination, should be given Isoniazid prophylaxis as described below: -

<u>At diagnosis</u>
The mother is started on anti-TB treatment; the child is started on isoniazid chemoprophylaxis for three months.

<u>At 2 months</u>
The sputum of the mother is checked. If still smear positive, sputum for AFB microscopy is tested at 3 months. In most of the cases it should be negative by this time. A tuberculin test should be carried out on the child and if there is a reaction of more than 5 mm diameter isoniazid chemoprophylaxis should be continued for another three months.

<u>At 3 months</u>
If a tuberculin test is negative, isoniazid should be stopped. In case the child is not vaccinated with BCG, BCG vaccination is given after isoniazid has been stopped for three days. After three days without isoniazid, the child is given BCG vaccination.

NB: Isoniazid is given at a dose of 10 mg per Kg body weight once daily.

Adjuncts to anti-TB drug treatment

Health education

It is the task of health staff to educate tuberculosis patients and their relatives about their disease. It is essential for obtaining the patient's co-operation over the required treatment. An understanding, sympathetic and concerned attitude on the part of the health staff is essential for getting the message across. Health education is essential to attain a high cure rate and to prevent default. Health education should be provided every time the patient receives care from the health care provider.

What the Patient Should Know

At diagnosis the patient needs to know that:

- Tuberculosis is an infectious disease, which is transmitted from one person to another through coughing, sneezing, etc.
- The patient may have infected other people who may also develop tuberculosis. The patient should, therefore, encourage other people with whom he or she has been in close contact with to undergo screening for TB.
- Tuberculosis drugs are available, free of charge, at any Government health facility and in most mission hospitals and at a subsidized fee at some private health care facilities where the KAPTLD private sector treatment project is active.
- Once treatment with these drugs is initiated, the symptoms of tuberculosis disease will disappear quickly, but the drugs still need to be continued daily until the end of the prescribed treatment period. Failure to comply with this treatment requirement may cause the disease to start again, with the possibility that drug resistance may have developed which would make treatment with the same drugs inadequate. This could occasion a greater risk for the health of the patient and that of his or her close contacts.
- The type of regimen and the exact number and type of tablets that the patients will take.
- How long the intensive phase and the continuation phase will take and where and when the drugs will be administered.
- A sputum-smear examination is required at certain intervals to monitor the progress towards cure. Explain to the patient when the examination will be required.

After the start of treatment

- Patients are requested to inform the staff at the clinic when they intend to travel. An adequate supply of drugs can then be given to cater for the period of travelling.
- Patients are requested to inform the staff at the clinic when they intend to move to another area. The clinic staff will then write a transfer letter and give advice as to where they can continue treatment.

At the End of Treatment

- Tuberculosis disease may occur again. The patient should therefore report immediately to the health care provider when similar symptoms recur.

Nutritional Support for TB Patients

Patients on anti-TB treatment usually experience an increase in appetite. This is a good sign and indicates a good clinical response. However in some situations the increased appetite may pose challenges for the patients when access to adequate amounts of food is a problem. Food may be used as an incentive to keep patients on treatment. Patients on anti-TB treatment should be encouraged to eat a well balanced diet but should not be made to incur more than the usual cost for food in the name of finding nutritious foods.

Use of Alcohol and Tobacco During Treatment for TB

Alcohol is injurious to the liver. Anti-TB drugs also may be toxic to the liver. Therefore the combination of alcohol and anti-TB drugs may lead a greater risk of hepatic reactions. It is advisable therefore to encourage patients on anti-TB treatment to reduce the amount of alcohol taken if alcohol cannot entirely be avoided. Tobacco smoking is injurious to body organs and should be strongly discouraged in patients receiving TB treatment. In Kenya it is common for patients to receive advice to avoid sexual contact with their spouses and partners while on treatment for TB. While this advice may be reasonable thing to do in the early part of treatment (first two weeks for infectious patients) there is no known contraindication to sexual intercourse during treatment with anti-TB drugs.

Chapter 8: Anti-TB Drug Adverse Effects

While most patients treated for TB experience no problems with the treatment, a few patients may have significant side effects which can threaten life or interfere with the quality of life. All health care workers managing cases of TB should be familiar with the common side effects of anti-TB drugs and how to manage these side effects.

Table 8: TB drugs and associated side effects

Drug	Common side effects
Isoniazid	Peripheral neuropathy and hepatitis.
Rifampicin	Gastrointestinal side effects including anorexia, and vomiting, hepatitis and will reduce effectiveness of oral nausea the contraceptive pill.
Pyrazinamide	Joint pains and hepatitis.
Streptomycin	Auditory and vestibular damage and may also damage the kidney.
Ethambutol	Eye damage (optic neuropathy).

Any of these drugs may cause a skin rash. Tuberculosis patients who are HIV infected patients may experience more severe side effects.

Management of skin rash: The initial symptom of a cutaneous hypersensitivity reaction is often a skin an itch (pruritis). If there is no obvious rash the skin itch should be treated with an antihistamine without withdrawing the drugs while watching the patient closely. If a severe reaction develops with a maculopapular erythematous blistering rash with ulceration of mucous membrane (Stevens-Johnson syndrome) with or without a generalized systemic disturbance, the anti-TB drugs should be stopped and the patient referred to a more senior clinician where appropriate. Treatment for TB should be withheld until the rash resolves. Thereafter anti-TB drugs should be reintroduced one at a time, beginning with the least likely drug to have caused the rash and starting with low doses. This is best done by a clinician familiar with the challenge protocols. If on challenge the patient is found to react to an essential anti-TB drug (H or R) attempts at desensitization should be made and this must be done by a clinician familiar with the desensitization protocols.

Management of peripheral neuropathy: The most common cause of this side effect is isoniazid. Peripheral neuropathy is more common in HIV infected patients, diabetics, alcoholics and sufficiently malnourished patients. To prevent peripheral neuropathy in these patients low dose pyridoxine at 10 mg per day should be co-prescribed with anti-TB drugs. Peripheral neuropathy is usually sensory and is recognized by the presence of pain, numbness and parasthesias (pins and needles) in the hands and feet in a stock and glove distribution. When these symptoms occur the dose of pyridoxine should be increased to 100 mg per day.

Management of hepatitis: The key suspect drugs are isoniazid, pyrazinamide and rifampicin. Hepatitis is recognized by the presence malaise, nausea, vomiting, anorexia, fever, abdominal pain, hepatomegally and jaundice. When hepatitis occurs the anti-TB drugs should be stopped until the jaundice resolves. Strangely most patients can restart treatment after the jaundice resolves without a

recurrence. It is advisable to refer patients with hepatitis to a more senior or specialized clinician especially when the hepatitis is severe.

Management of gastrointestinal side effects: Anorexia, nausea and vomiting are very common in patients who commence anti-TB treatment. These side effects are usually not life threatening but interfere with food and drug intake and compromise the quality of life. The appearance of these side effects may lead to non-adherence to treatment. The symptoms may be mitigated by taking the anti-TB drug with meals. Often anti-emetic drugs may be required. It is rare that anti-TB drugs need to withdrawn. In the presence of intractable vomiting the patient should be referred to a more senior or specialized clinician.

Management of impaired vision: This is a rare adverse effect of ethambutol. If suspected, the drug should be withdrawn and the patient immediately referred to an eye specialist for assessment. If this adverse event is confirmed to be due to ethambutol the drug should never be given again.

Management of vestibule-cochlear toxicity: This adverse effect is usually due to streptomycin. It is often, though not always, dose dependent. When the symptoms of vestibule-cochlear toxicity occur, the dose of streptomycin should be checked and reduced if possible. If the dose cannot be reduced or dose reduction does not improve the symptoms, streptomycin should be stopped and not be given again.

Chapter 9: Drug resistant TB in Kenya

Development of drug resistance

The major reason for the development of drug resistance in TB is non-adherence: by governments through failure to provide political support and stewardship in the fight against TB; by health care providers through failure to prescribe efficacious regimens for the treatment of TB and by patients through failure to adhere to the prescribed treatment until it is completed.

Classification of resistance

Anti-TB drug resistance is

- Primary if there is definitely no previous treatment
- Initial when previous treatment cannot definitely be excluded
- Acquired if there is a definite history of previous treatment

The TB bacillus are said to be

- Mono-resistant when there is resistance to any one single drug
- Poly resistant when there is resistance to two or more drugs but excluding resistance to both rifampicin and isoniazid
- Multi-Drug resistant when there is resistance to both rifampicin and isoniazid

Magnitude of drug resistant TB in Kenya

Tuberculosis controllers and clinicians in Kenya are concerned about the potential for emergence of a drug resistant TB, including MDRTB, disease burden for several reasons. Firstly with the liberalization of the pharmaceutical sector in Kenya in the eighties a variety of anti-TB drugs of unknown quality became available especially in the private sector. The private for profit health care sector has largely not been participating in DOTS and therefore TB management practices including drug treatment have not been fully standardized. As has been documented elsewhere, TB management practices of private health care providers are often suboptimal and pose a great risk for the emergence of drug resistant TB. When this is coupled with the availability of anti-TB drugs of unknown quality, including loose rifampicin, the risk becomes even greater. In general, post marketing surveillance for pharmaceuticals is not available in Kenya and therefore the risk for poor quality drugs finding their way even into the public health care system is real. This became critical following the introduction of fixed dose combinations (FDCs) where the potential for poor rifampicin bioavailability is a real threat in poor quality rifampicin containing FDCs. The second major reason for worry is the presence in Kenya of large numbers of displaced populations (refugees) from countries surrounding Kenya where there has been or there is on going civil strife. In these countries or regions within the affected countries, organized TB control activities are non-existent and a significant proportion of TB patients carry drug resistant TB bacilli.

In 1993-94, Kenya participated in the global anti-TB drug resistance survey coordinated by the WHO. Among the participating countries Kenya was the only one that reported no multi-drug resistant TB. The isoniazid mono-resistance was however reported to be 5% and 10% for primary and combined resistance respectively. For streptomycin, a combined resistance of 2% was reported. No resistance to rifampicin was reported. A study performed at the same time in North Eastern Kenya to estimate and compare patterns of drug resistance in refugees from Somalia and non-refugee populations showed that drug resistance was significantly higher in patients from the refugee population (18.3%) compared to patients from the non-refugee population (5.7%). In addition, 2.9% of the cases of drug resistant TB among the refugee population were MDRTB while the non-refugee population had no MDRTB.

Tuberculosis clinicians in Kenya have had to deal with cases of drug resistant TB on a sporadic basis for a long time. Before the introduction of short course chemotherapy most of this was isoniazid or streptomycin mono or combined resistance since rifampicin was not in general use for the treatment of TB in Kenya. After the introduction of short course chemotherapy sporadic cases of MDRTB begun to appear. There has been no extensive evaluation or study of these cases but in general the cases fall into three categories: refugees or immigrants from neighboring countries facing continued civil strife and where TB control programmes are non-existent, patients initiating treatment from the private health care sector where treatment has not been standardized and a few cases starting treatment from the public sector but who have previously been non-adherent to treatment. The Mycobacteriology laboratory at the Kenya Medical Research Institute (KEMRI) recently looked at the drug susceptibility profiles of Mycobacterium tuberculosis isolated from 149 patients referred by private health care providers or the public sector and found 11.4% of them had MDRTB. The clinical information about these patients was not recorded. The Central Reference Laboratory was rehabilitated and started functioning again in January 2003. Over the prevailing one year a total of 1080 sputum specimens were processed and drug susceptibility profiles to first line drugs of *M.tb* isolates carried out. The results indicate that 85(7.8%) had H mono resistance, 37(3.4%) had R mono resistance, 91 (10.4%) had E mono-resistance, 37 (3.4%) had S mono-resistance and 23 (2.2%) had MDRTB.

In 2001 the NLTP with funding from CDC and CIDA-KNCV commissioned the Centre for Respiratory Diseases Research in KEMRI to carry out a country wide survey of anti-TB drug resistance in order to obtain a clear picture of the magnitude of MDRTB in Kenya. This coincided with the second global anti-TB drug surveillance coordinated by the WHO and was to a large extent prompted by this global effort. The procedures followed, including the sampling for purposes of getting a representative sample and the laboratory processing of specimens, were those outlined by the WHO. The results of this survey are awaited.

The NLTP has in its record about 40 cases of MDRTB. Virtually all these cases have previously been treated for TB and therefore have acquired drug resistance. In general the Drug Susceptibility Results (DST) of *M.tb* isolates from these patients reveal resistance to all four first line drugs (EHRS).

Management of drug resistant TB: DOTS-plus.

The management of drug resistant TB through the principles of DOTS is called DOTS-Plus. In Kenya DOTS-Plus will aim at setting up a continuous anti-TB drug surveillance system and to provide drug treatment to cohorts of patients known to have MDRTB under proper management conditions.

To this end, the NLTP is encouraging the routine collection of sputum specimens from all cases of PTB that require re-treatment and the submission of these specimens to the Central Reference Mycobacterial Laboratory in Nairobi or any other laboratory able to carry out TB cultures and DST. This should be coupled with the establishment of a laboratory quality assurance and quality control system that includes most laboratories offering sputum microscopy services and those offering ***M.tb*** culture and DST. The patients who should have sputum samples collected and submitted to a laboratory able to carry out TB culture and DST are smear-positive and smear-negative PTB patients who:

- Have failed therapy with first line drugs
- Are returning to treatment after a period of default
- Have recurrent TB

Treatment and Follow up of patients with drug resistant:

The treatment of patients with drug resistant TB is a complex affair and even among specially trained TB clinicians in Kenya, experience is limited. ***Therefore the NLTP discourages the treatment of cases of drug resistant TB by clinicians who have had no formal training in TB.*** All clinicians undertaking to treat drug resistant TB and in particular MDRTB should notify the NLTP. Additionally the NLTP discourages the treatment of drug resistant TB and MDRTB in particular in environments without basic infection control measures for droplet nuclei.

The drug regimen for treating MDRTB

The NLTP proposes a standard regimen for treating MDRTB, which will consist of:

1. An intensive phase lasting 6 months in which an injectable will be used under strict DOT and preferably in hospital. This will consist of

- Pyrazinamide: This drug is chosen because routine DST on it is not done and therefore the Kenyan DOTS-Plus project will assume that the *M.tb* bacilli retain some susceptibility to it. However if data becomes available that MDRTB bacilli are resistant to this drug on a wide scale this drug will be removed and replaced with PAS (PASER).
- Ethionamide.
- Capreomycin is chosen because the aminoglycosides (Kanamycin and Amikacin) have been available for a long time in Kenya and have been extensively used for treating non-tuberculous infections.
- Cycloserine.
- Ofloxacin.
- Ethambutol will be used only in those patients where susceptibility to the drug is confirmed by DST. If resistance to this drug is present, PAS will be used instead to provide at least five drugs to which the bacilli may be sensitive.

2. A Continuation phase that will go on for 18 months after culture conversion and should be administered as health care worker DOT on an ambulatory basis consisting of:

1. Ofloxacin.
2. Cycloserine.
3. Ethionamide.
4. Pyrazinamide or PAS (PASER) as explained above.

Table 9: Table showing a weight-based dosing regimen that should be used for treatment of MDRTB

Medication	< 33 kg	33 – 50 kg	51 – 60 kg	> 60 kg
Ethambutol (100, 400 mg)	25 mg/kg/day	800–1200 mg	1200–1600 mg	1600–2000 mg
Pyrazinamide (500 mg)	30–40 mg/kg/day	1000–1750 mg	1750–2000 mg	2000–2500 mg
Capreomycin (1 gram vial)	15–20 mg/kg/day	500–750 mg	1000 mg	1000 mg
Ofloxacin (200, 300, 400 mg)	Usual adult dose for MDR TB is 800 mg	800 mg	800 mg	800 mg
Ethionamide (250 mg)	15–20 mg/kg/day	500 mg	750 mg	1000 mg
Cycloserine (250 mg)	15 mg/kg/day	500 mg	750 mg	1000 mg
Pyridoxine/B_6 (25, 50, 100, 300 mg)	Dose at least 50 mg for each 250 mg of cycloserine used for a maximum of 200 mg	150 mg	150 mg	150 mg
PAS (PASER) 150 mg/Kg/Day	150 mg/Kg/Day	8 grams	8 grams	8 grams

The standard regimen should be used for all patients but some adjustments may be made in individual patients depending on the appearance of intolerable or life threatening adverse events or when DST data suggests resistance to one or more second line drugs. In a resource limited setting like in Kenya it is unlikely that there will be a wide range of other reserve drugs to choose from.

Direct observation of drug ingestion (DOT)

The drug intake should be directly observed throughout the treatment period initially at an MDRTB treatment centre (hospital) and thereafter the patient may referred to a health care facility near his or her where a health care should continue to observe drug intake.

Treatment monitoring

Clinical assessment:

During the intensive phase patients should be seen daily by a nursing team who will inform the treating physician immediately there are signs of adverse drug effects or other clinical events. The nursing should measure anthropometric parameters on a daily basis including temperature, pulse and respiratory rate while weight should be monitored weekly.

Management of adverse drug reactions:

The appearance of adverse events should be recorded and the event categorized as follows:

- Mild: awareness of sign or symptom but easily tolerated

- Moderate: discomfort sufficient to cause interference with normal activity
- Severe: incapacitating or life threatening.

The key adverse effects to look out for in patients receiving second line anti-TB drugs include:

- Anaphylaxis and other allergic reactions
- Depression
- Electrolyte abnormalities especially hypokalaemia and hypomagnesaemia
- Gastrointestinal disturbances
- Headaches
- Hepatitis
- Hypothyroidism with use of PAS or thiamides
- Musculoskeletal effects
- Nephrotoxicity
- Ototoxicity
- Peripheral neuropathy
- Psychsosis
- Seizures

The NLTP is preparing a program manual of protocols for management of drug side effects, drawn from existing manuals from PIH and the WHO- GLC guideline protocols and this manual should be consulted when handling patients who may be experiencing adverse drug effects.

Depending on the severity of the adverse drug effects the following actions may be taken when these events occur:

- Treatment withdrawal
- Counteracting the adverse event with another drug e.g. an anti-emetic for vomiting
- Drug dose reduction.

The outcome of the adverse event should be recorded. These outcomes may include

- Resolution of the adverse event
- Persistent/residual adverse event that is tolerated
- Death.

NB: All adverse events irrespective of the severity must be recorded in the patient record card.

Chapter 10: Monitoring and evaluation of TB control activities.

TB case recording and reporting (monitoring and evaluating case detection and treatment):

Tuberculosis case recording and reporting is an important tool for monitoring and evaluating TB control activities at the health facility, region and nationally. The importance of completing correctly the data collection tools at every TB treatment facility cannot be overemphasized. ***Every health care provider who treats TB has a professional responsibility to record and report all cases he or she treats.***

For programmatic and clinical purposes TB patients are recorded and reported using the following terms:

Programmatic classification of TB patients

- **New (N)**: This is a patient who has never been treated for TB.
- **Relapse (R)**: This is a smear positive PTB patient who has previously been treated and was declare cured.
- **Transferred in (TI)**: This is a patient who was initially registered in another district and has now reported to a facility in another district to continue treatment.
- **Treatment resumed (TR)**: This is a patient who interrupted his treatment, and was declared "out of control", but is now resuming treatment.
- **Treatment failure**: This is a patient with a positive sputum smear at end of four (when RH is used in the continuation phase) five (when EH is used in the continuation phase) months of anti-TB treatment.
    - **Others (O):** Other types of patients e.g. failure cases put on re-treatment, sputum smear negative re-treatment.

The following is the classification of outcome of treatment:

1. **Cured (C):** This is a tuberculosis patient who was initially sputum-smear positive and has a negative sputum smear at the end of treatment.
2. **Treatment completed (TC**): This is a tuberculosis patient who has completed his treatment as required but has not had a sputum smear-examination done at the end of treatment.
3. **Out of control (OOC):** A tuberculosis patient who has not attended two consecutive clinics and all efforts to find him/her and bring him/her back to treatment have failed.
4. **Transferred out (TO):** A patient who is transferred to continue treatment in another district and whose treatment outcome is therefore unknown at the initial treatment facility.
5. **Failure (F):** A tuberculosis patient who is still sputum smear-positive after 4/5 or 6/8 months of treatment.
6. **Died (D):** A tuberculosis patient who died during treatment of any cause whatsoever.

Monitoring: This is the routine tracking of service and programme performance. It is a continuous process intended to provide information on the extent to which a programme is achieving its intended targets and timeframes. Monitoring should ideally contribute to evaluation.

Evaluation: This is a time specific assessment of results that can be attributed to programme activities. Evaluation uses routine monitoring data and often indicators that are not collected through routine

information systems. A well designed evaluation should allow for the causes of failure to achieve intended results to be identified. Evaluation may involve:

I: Process evaluation: This is used to assess progress in programme implementation and coverage e.g. number of sites offering diagnostic testing and counseling, number of counselors trained
II: Outcome and impact evaluation: This measures the effect of programme on the target population e.g. number of TB patients tested for HIV, number of HIV positive TB patients receiving cotrimoxazole(outcome indicators) or number of HIV positive TB patients receiving cotrimoxazole alive at the end of TB treatment (impact indicator).

The monitoring and evaluation framework

This defines the:

Inputs: This is what must be provided for programme activities to take place e.g. money, staff, equipment, policies etc.

Processes: These are the specific activities that must be undertaken using inputs for programme targets to be achieved e.g. training of staff, logistics, IEC etc

Out puts: This is what is immediately achieved following inputs and processes e.g. drug stocks, knowledge of health care staff and patients, attitude of health care staff etc.

Outcomes: These are immediate results of the programme on the target population and include use of health care service e.g. number of TB patients offered HIV testing and counseling, number of HIV positive TB patients referred for ART, number of HIV positive TB patients offered CPT etc.

Impact: This the long term effects of the programme e.g. the incidence of TB, mortality of TB etc.

Indicators: These are variables or measurements used to assess progress towards the stated goals. For each of the elements of the M&E framework a target or goal must be defined and one or more indicators identified to assess progress towards the goal e.g. number of microscopes procured and distributed, number/proportion of facilities receiving money for training in TB/HIV collaborative activities, number/proportion of health care facilities offering HIV testing and counseling of TB patients, proportion of TB patients offered HIV testing.

Using simple tools for monitoring and evaluation it is possible to obtain critical information on the quality and impact of the TB service at the facility, region and the entire country. All good monitoring and evaluation plans should have a data collection and analysis plan. Data flow should be logical from service delivery points all the way to the national level. Well trained health care workers at health facility level should be able to use the data they routinely collect to analyze indicators at that level and use these to improve performance. For TB the tools used to collect data are the:

- TB register (facility/district),
- TB treatment card,
- AFB register at the laboratory and
- cough register.

Others that may be used are the referral forms, transfer forms, the VCT register and the ART register. When well maintained these tools should be able to provide information on:

- Proportion of outpatients aged 15 years and over who were identified as TB suspects at the facility (need a column in the outpatient register identifying patients with cough of more than 3 weeks)
- Proportion of TB suspects whose sputum was tested for TB
- Proportion of TB suspects tested who were sputum smear positive
- Proportion of new smear positive PTB cases that had a negative sputum smear at 2 months(conversion rate)
- Proportion of new smear positive cases that were cured, completed treatment, died, transferred out, failed treatment or died.
- HIV seroprevalence among TB patients.
- Proportion of HIV infected TB patients who are provided with cotrimoxazole preventive therapy
- Proportion of HIV-positive TB patients given ART during TB treatment.

Chapter 11: Leprosy disease.

Leprosy is an infectious disease with a slow onset and a chronic course if not treated properly at an early stage. It is caused by a bacillus, *Mycobacterium Leprae*. The bacillus multiplies very slowly (every 14 – 30 days), which explains why the incubation period is so long - on average 5 to 8 years. The bacillus has a preference for the skin and peripheral nerves, which are relatively the coolest places in the body.

As a result of the inflammatory reactions of the body to the bacilli, nerve tissue is damaged, and this may cause damage of one or more of the three different components of the nerve:

- Sensation fibres: The damage causes loss of sensation in innervated skin.
- Motor fibres: The damage causes weakness or paralysis in innervated muscles.
- Autonomic fibres: The damage causes dryness and hypo-pigmentation of the innervated skin.

In the pauci-bacillary (PB), or tuberculoid, type of leprosy, the bacilli are few, and very difficult to observe in a skin smear or a skin biopsy. They are concentrated in the superficial skin layers and in peripheral nerves.

In the multi-bacillary (MB), or lepromatous, type of leprosy, the bacilli are numerous and can spread to almost all parts of the body except the brain and spinal cord. All other organs may be affected by the leprosy bacilli and may be damaged in the long run if the disease is not treated early.

Body Immunity

Leprosy is an infectious disease. However, most people have sufficient body resistance (immunity) to prevent them getting the disease. Only a minority of infected people will actually develop the disease.

The disease has different manifestations depending on the level of immunity (resistance). Patients with a high degree of immunity will develop pauci-bacillary leprosy. Patients with a low degree of immunity will develop multi-bacillary leprosy. These two spectrums of the disease have varying modes of presentation and require different approaches in management.

Identification of suspects

As explained earlier, the leprosy control programme relies on *passive case finding*. General health staff should identify suspected leprosy cases among the patients who visit the health units.

When to suspect leprosy

A patient should be suspected of having leprosy when showing one or more of the following signs or symptoms:

- Burning sensations in the skin
- Pale patches on the skin with loss of feeling
- Numbness and tingling of the feet and/or hands
- Weakness of eyelids, hands or feet
- Tender nerves
- Painless swellings or lumps, especially on the face and ear lobes
- Painless wounds or burns on the hands or feet.

Such a patient requires to be reviewed by the DTLC or a dermatologist at the earliest possible time. They will examine the patient and decide if or not to put him on treatment.

The three cardinal signs of leprosy

A diagnosis of leprosy is made if **one** of the following signs is positive:

Text Box 4: Diagnosis of leprosy

- **Skin patch with loss of sensation**
- **One or more peripheral enlarged nerves**
- **The presence of leprosy bacilli on the slit skin smear.**

Classification of type of leprosy

Pauci-bacillary leprosy

Skin: 1 to 5 skin patches
Skin smear: Negative
Reaction: Type I reaction common
Nerves: Early damage to one or more peripheral nerves
Disabilities and deformities: Both are common as a result of irreversible nerve damage. The deformities in particular create the common and feared image of leprosy disease.

Multi-bacillary leprosy

Skin: 6 or more patches, infiltration and nodules
Skin smear: Bacilli present
Reaction: Type I and II reactions may occur
Nerves: Late damage to peripheral nerves
Disabilities and deformities: Mainly develop at a late stage of the disease process.

Nerve Involvement

Nerves affected by leprosy are usually swollen and often tender on palpation. Nerves should, therefore, be examined in every patient suspected of leprosy.

Classification of patients

Patients are classified into the following groups for epidemiological and treatment reasons. The same categories are used in the leprosy register for reporting.

- **New (N)**: This is a patient who has never been treated before.
- **Relapse (R)**: This is a patient who has received treatment and was declared cured but now has leprosy again.
- **Transferred in (TI)**: This is a patient who was registered in another district and has now reported to another district for continuation of treatment.
- **Treatment resumed (TR)**: This is a patient who interrupted his treatment, and was declared "out of control", but is now resuming treatment.

Multiple drug therapy (MDT)

The regimen that is being used in the NLTP is multiple drug therapy (MDT), as advocated by the WHO. Multiple drug therapy was introduced in 1984 and replaced the Dapsone monotherapy. During the introduction of MDT, many patients who were still on mono-therapy were assessed and released from treatment. Some of these patients however, may present with signs and symptoms suggestive of relapse of leprosy and may require assessment and possible treatment with MDT.

MDT differs from mono-therapy in being a combination of several powerful anti-leprosy drugs. This combination of drugs prevents the development of drug resistant bacilli, and has shortened the duration of treatment to six months in pauci-bacillary leprosy and to one year in multi-bacillary leprosy (Tables 11 and 12).

Table 10: MDT for pauci-bacillary leprosy (PB) patients (*duration six months*)

	0-5 years	6-14 years	>14 years
Dapsone daily	25 mg	50 mg	100 mg
Rifampicin four-weekly supervised	150 mg	300 mg	600 mg

Table 11: MDT for multi-bacillary leprosy (MB) patients (*duration one year*)

	0-5 years	6-14 years	>14 years
Dapsone daily	25 mg	50 mg	100 mg
Clofazimine (Lamprene) four-weekly supervised	100 mg	200 mg	300 mg
Clofazimine (Lamprene) unsupervised	50 mg alternate days	50 mg daily	50 mg daily
Rifampicin four-weekly supervised	150 mg	300 mg	600 mg

Outcome of Treatment

At the end of treatment

- **Released from treatment (RFT):** This is a leprosy patient who has completed his treatment as required.
- **Out of Control (OOC):** This is a leprosy patient who has not attended for three consecutive clinics and all efforts to motivate him/her to attend the clinic have failed.
- **Transferred out (TO):** A patient who is transferred to continue treatment in another district
- **Died (D):** A patient who died during treatment from any cause whatsoever.

***NOTE**: Many leprosy patients may have been declared cured (released from treatment, (RFT) but may still suffer from the sequel (reactions) of the disease e.g. ulcers, paralysis in hands, feet or eyes. These should be managed separately.*

Chapter 13: Commonly encountered side effects of anti-leprosy drugs.

These are classified as minor and major

Minor side effects

Inform the DTLC or dermatologist on his next visit to the clinic. Continue MDT.

Slight itching

This is caused by dapsone and should be treated symptomatically with antihistamines

Gastro-intestinal disturbances

These are mostly caused by clofazimine and include nausea, vomiting, and abdominal pains. Give the drug after a meal.

Red urine

This is caused by rifampicin and is harmless. No action needed but continued reassurance of the patient.

Red skin, eyes

This is caused by clofazimine and is harmless. No action is needed. The patient has no complaints at all apart from the cosmetic effect.

Symptoms as for a severe flu

This is caused by rifampicin. Treat symptomatically and reduce the dosage to half until the symptoms have disappeared.

Major Side Effects

Refer the patient to the medical officer or DTLC as soon as possible and stop all MDT drugs.

Jaundice

This is caused by rifampicin. Stop all drugs immediately and refer patient to DTLC.

Anaemia

This is caused by rifampicin, dapsone. Rule out other causes of anaemia (parasites, malaria). Refer to the medical officer or the DTLC.

Exfoliate dermatitis

This is caused by dapsone. The skin is itchy, and later peels off. The patient is very ill. Stop drugs immediately and refer the patient to the medical officer or DTLC or to the nearest hospital.

Fixed drug eruption

This is caused by dapsone. Stop dapsone immediately. The eruption will slowly clear after stopping.

Chapter 14: Leprosy complications.

It is very important that all health staff, dealing with leprosy patients, are aware of the complications that can occur in these patients during or after chemotherapy, because complications can lead to serious deformity and disability. Health staff should be able to determine which complications can be managed at their level and which need urgent referral to the DTLC or a dermatologist.

Treat or refer complications of leprosy disease according to these guidelines

Reactions

Most deformities and disabilities in leprosy are the result of reactions. The early diagnosis and adequate treatment of reactions is therefore extremely important in the prevention of disabilities.

In the case of a leprosy reaction the body's immune system suddenly reacts to the leprosy bacilli in the body (dead or alive) causing an inflammation at the affected sites with all the classic features of acute inflammation such as swelling, pain, redness, warmth, and loss of function. In severe cases, the patient may be in great pain because of the swelling of nerves, and be very ill with a high fever. A reaction may occur ***before, during* and *after*** chemotherapy. It can be provoked by a disturbance of the body's defence system, for example, by inter-current disease or during and after pregnancy.

There are two types of reaction:

- Reversal reaction (or Type I reaction)
- Erythema nodosum leprosum (or Type II reaction).

Reversal reaction (RR), Type I reaction

This type of reaction occurs both in PB and MB leprosy patients.

Refer a patient with Reversal Reaction immediately!

Suspect reversal reaction when you observe the following:

- Acute or sub-acute redness and swelling of one or more skin patches
- Oedema of hands, feet or face
- Acute or sub-acute pain, swelling and tenderness of peripheral nerves; combined with acute or slowly developing loss of sensation and weakness in the area innervated by the affected peripheral nerve

Silent neuritis

This is a type of reversal reaction which is a-symptomatic. Nerve function deteriorates slowly and goes

unnoticed by the patient. It can only be detected by doing regular - at least quarterly - assessments of sensation and muscle function. It is the responsibility of the DTLC to do this.

Treatment of reversal reaction

All patients with reversal reaction must be examined by a DTLC and referred immediately. Any delay may increase loss of nerve function. The patient should be treated with anti-inflammatory drugs - aspirin or indomethacin in mild cases, or high doses of prednisolone in severe cases.

Depending on the patient's condition and his accessibility to a health unit, the patient is admitted for treatment or will be treated ambulatory from a health centre or dispensary. In cases of ambulatory treatment, the DTLC should refer the patient back to the health unit with a detailed treatment schedule. The total duration of treatment may be six months.

Erythema Nodosum Leprosum (ENL), Type II Reaction

This reaction occurs only in multi-bacillary patients. The severe form may be life threatening.

Suspect ENL reaction with:

- A history of sudden onset
- The appearance of red, tender nodules in the skin. They remain for about three days, disappear and crop up again in other places
- Mild to high fever
- A painful red eye with loss of vision
- Painful swollen testicles
- Tender nerves
- Other organs: swollen tender lymph nodes and joints, swollen liver/spleen.

When to suspect the severe form of ENL

- Temperature higher than 38.5 ^{o}C
- Red painful eye
- Painful swollen testicles
- Ulcerating skin nodules
- Severe arthritis, lymphadenitis
- Severe nerve pains.

Management of ENL reaction

Mild ENL: paracetamol, indomethacin or other anti inflammatory drug. These forms may be treated with paracetamol or indomethacin for a period of one week by the general health staff managing the NLTP clinic. If no improvement has occurred by then, the patient should be referred to the DTLC.

Severe ENL: refer as an emergency. These forms should be referred immediately to the DTLC. The patient should be treated with prednisolone and/or clofazimine for 4 - 6 weeks, on average. This reaction may recur repeatedly. As in reversal reactions, patients may be treated in hospital, or on an ambulatory basis.

Eye complications

Eye problems are most commonly caused by leprosy reactions and subsequent nerve damage. They are mentioned separately because of their serious consequences to patients and their specific management.

Every health worker working with leprosy patients should be on the lookout for each of the following conditions in a leprosy patient.

Lagophthalmus

The patient is unable to close the eyelids, due to weakness of the muscles that close the eyelids. The patient does not blink properly and the cornea is usually insensitive. If these muscles are very weak, the eye may water continuously. The cornea is at risk of drying out and is exposed to foreign bodies, which may adhere to it without the patient noticing them.

This is quite a common condition in leprosy patients. The patient is at risk of becoming blind in the affected eye. However, this can be prevented with proper treatment and simple preventive measures (for detailed information, see the *NLTP Manual*).

Red eye

This is a very serious sign in a leprosy patient, especially if it is combined with lagophthalmos. It needs careful examination and often referral.

The red eye is an emergency

Check for:

Foreign body: a hair, an insect, a piece of grit, etc. causing irritation and redness.

Management: Inspect and remove the foreign body, apply anti-biotic eye ointment and an eye bandage for two days.

Keratitis: This is an inflammation of the cornea as a result of an infection by bacteria or a virus, often enhanced by drying out (particularly in patients with lagophthalmos). The cornea is not clear, and the eye is red and painful. Sometimes you can see an ulcer in the cornea.

Management: Apply antibiotic eye ointment and an eye pad. Refer the patient immediately to an eye doctor, the DTLC or the nearest hospital.

Acute iridocyclitis: In a MB leprosy patient this is a form of Type II reaction. It is characterised by:

- Acute red eye
- Loss of vision
- Pin-point pupils, not reacting to light
- Intolerance to light.

Management: Start the patient on atropine eye ointment t.d.s. and apply an eye pad. The patient should then be referred immediately to an eye doctor, DTLC or PTLC. The patient will then be treated with locally applied corticosteroids and atropine under close supervision.

Wounds

- Determine which factors contribute to causing the wound
- Assist the patient to prevent recurrence of the wound

Wounds are common in leprosy patients and are very often recurrent, because the patients are not able to adopt behaviour that will prevent recurrence. Sometimes patients maintain the wound to generate income.

Usually, wounds are the result of overuse of a hand or limb. People with healthy nerves feel pain when their eyes, hands and feet are injured, and will do something about it. First of all, they will unconsciously adopt pain-evading behaviour, which will rest the injured limb or eye - they have protective sensation. Leprosy patients do not have this protective sensation and can continue to walk on blisters or on an infected foot. Frequently, they report for medical assistance when the wound has become severely infected.

It is important for general health staff managing an NLTP clinic to take a good history including details of the patient's living conditions, in order to give appropriate advice on how to prevent the recurrence of wounds and how to stop this seemingly inevitable process of increasing deformity and disability.

Wound management
Apply the following principles in wound management:
- Engage in a dialogue with the patient, do not give a sermon
- Promote a self-help attitude
- Use appropriate available materials (e.g. clean cloth as a bandage).

Patient co-operation is essential for successful treatment of wounds. A good relationship, and an understanding of the patients living conditions, will create the basis for the mutual co-operation that can lead to successful treatment and prevention of recurrent wounds. The general health worker should promote a self-help attitude in the patient. The patient will only be motivated to take care of himself if he understands the reasons for the occurrence and recurrence of wounds, accepts responsibility for to changing his own behaviour, and is in a position to do so.

Superficial ulcers
The patient at home can treat these, after proper practical instructions have been given and are understood.

Basic treatment
- Soaking of the wound in soapy or salty water for a minimum of 20 minutes
- Trimming of the wound edges by rubbing with a stone (or by the nurse with a scalpel)
- Bandaging of the wound with a clean cloth that can be made from old clothes
- Resting of the affected limb - carry the arm in a sling, or walk as little as possible and with a stick or crutch.

Deep wounds/ pus-discharging wounds/ infection
These wounds should be referred to a hospital or the DTLC/PTLC for possibly X-ray and surgical treatment.

Rehabilitation

Patients with deformities and/or disabilities often lead a miserable life on the edge of human existence, frequently as the result of stigmatisation and abandonment by their relatives. The country has a responsibility to assist in the rehabilitation of such patients within the context of community-based rehabilitation. This is not a prime responsibility of the Ministry of Health.

Health education of leprosy patients

- Is a dialogue, not a lecture
- Is essential to attain a high cure rate
- Is essential to prevent defaulting

It is the task of health staff to educate leprosy patients about their disease. Education is essential for obtaining the patient's co-operation over the required treatment. An understanding, sympathetic and concerned attitude on the part of the health staff is essential for getting the message across.

Like in tuberculosis treatment, leprosy patients have to take drugs on a strict and regular basis in order to obtain a high cure rate. They need much support from medical staff and their families throughout their treatment course in order to maintain treatment compliance.

Leprosy is a complicated disease even for health staff unless they have received some specialised training in the subject. So it is even more difficult for the lay patient to understand the disease and the possible harmful consequences of ignoring medical advice.

The factors that complicate the management of leprosy are:

- People with the disease are still stigmatised.
- The patches in pauci-bacillary patients only disappear several years after MDT has been stopped and the patient is told that he is cured.
- Leprosy reactions with complications such as paresis, paralysis or blindness can occur months or years after a patient is declared cured.
- Leprosy disabilities are often irreversible if patients report very late. They may have expected their disabilities to be "cured"; therefore this leads to disappointment and may influence their compliance with treatment.
- Even with MDT the treatment period is still quite long (6 months to 1 year) and this causes problems with the regular intake of drugs.

In these circumstances, it is clear that education of leprosy patients must be a painstaking task, which requires patience and understanding of the patient's way of thinking and his individual circumstances.

Chapter 15: What every leprosy patient should know.

At diagnosis

- Leprosy is an infectious disease caused by bacteria not by a curse, witchcraft, or anything similar.
- The patient may have infected several other people who may also develop leprosy. They should therefore encourage those people to have themselves checked for leprosy when they develop patches.
- Leprosy bacilli are killed by MDT if the drugs are taken regularly for the recommended period.
- Much of the damage that had been done to nerves and tissues before the patient was started on MDT cannot be reversed.
- During (and after) MDT, patients are no longer infectious and therefore pose no danger at all for the family or the community.
- In PB patient's patches will still be present when the MDT course is already finished. The patches will disappear slowly over a period of 1 - 3 years.
- Tablets need to be taken daily, as prescribed, and preferably at the same time each day.
- Drugs have to be collected from the clinic every four weeks. On the clinic day the patient takes rifampicin and clofazimine under supervision, and collects dapsone and clofazimine to be self-administered at home.
- Keep the drugs out of reach of children.

During MDT

A patient on MDT should report to the clinic in case one of the following happens:

- A soon as patches have started becoming red and swollen again
- As soon as he notices sudden weakness of muscles
- As soon as he notices that one or both of his eyes are red and painful
- As soon as he notices pain in one of his limbs
- A soon as he notices the appearance of red, swollen, tender nodules in the skin

Additionally the patient should be advised about the following:

- To take the drugs after a meal or in the evening just before going to bed if he feels nausea after ingesting them.
- To inform the staff at the clinic when they intend to travel. An adequate supply of drugs can then be given to cater for the period of travelling.
- To inform the staff at the clinic when they intend to move to another area. The clinic staff will then write a transfer letter and give advice on where they should continue treatment.

After MDT

- Leprosy reactions can still develop after MDT. These reactions must not be treated with a new course of MDT but can be effectively treated with other drugs. Early reporting is absolutely necessary to prevent irreversible damage.
- Patients should report as soon as they notice new patches or if old patches become thick and red. This may indicate that the disease has started again, or that a reaction is taking place.
- Patients should report as soon as they notice pain in their hands and feet.

Wound Prevention

The patient should be educated as is appropriate for his individual case, and may be advised as follows:

Care for insensitive feet

- To wear protective footwear throughout the day to avoid injury.
- To avoid too much walking because this is the most common cause of a sole wound in an insensitive foot. So, take a ride on a bicycle when you can; send others in your place; if you must go, stop often, rest your feet, watch where you step.
- To learn from any earlier wounds to his feet so that he does not make similar mistakes again.
- To avoid heat. To sit with his feet protected, when he sits close to a fire.
- To avoid sitting on his lower legs when he sits on the ground because this may cause pressure ulcers.

Daily foot inspection

- To inspect insensitive parts of his feet and legs and also to look for signs of injury, dryness, cracks, and swellings. A small mirror is useful for inspecting the sole of his feet.
- To feel for warm spots: this may warn of injury, and to press for tenderness caused by infection in the deeper layers of the sole of the foot.

Care of dry feet

- To soak for 20 minutes twice daily in salty water, then to rub oil into the skin. This helps to keep the skin of his feet moist and prevents cracks.
- To trim and to rub off any callus.

Care of wounds at home

- To remove the cause, e.g. a nail or small stone in a shoe.
- To soak the wound in soapy or salty water for 20 minutes, at least once a day, or more frequently when the wound is discharging. To remove dirt gently.
- To cover the wound with a bandage. This can be made of old clean cloth.
- To rest the foot.

Care for insensitive hands

Generally apply the same kind of care as for the feet. Hands are most frequently damaged during cooking (burns) and manual labour as a result of too much friction.

Care for eyes with lagophthalmos

Patients with lagophthalmos (inability to close the eye) need special attention. Patients should be advised as follows:

- To wear sunglasses
- To check the eye daily in a mirror for redness and foreign bodies
- To bind a pad of clean cloth over the eyes at night
- To avoid rubbing the insensitive eye.

Chapter 16: Recording and reporting.

The health staff in charge of the tuberculosis or leprosy clinic is responsible for filling in and maintaining the following records and registers used for reporting and cohort analysis:

Leprosy

- Leprosy patient treatment file
- Leprosy appointment card
- Leprosy treatment register

Tuberculosis

- Tuberculosis patient record card
- Tuberculosis appointment card
- Tuberculosis treatment register
- Tuberculosis ambulatory treatment register

General

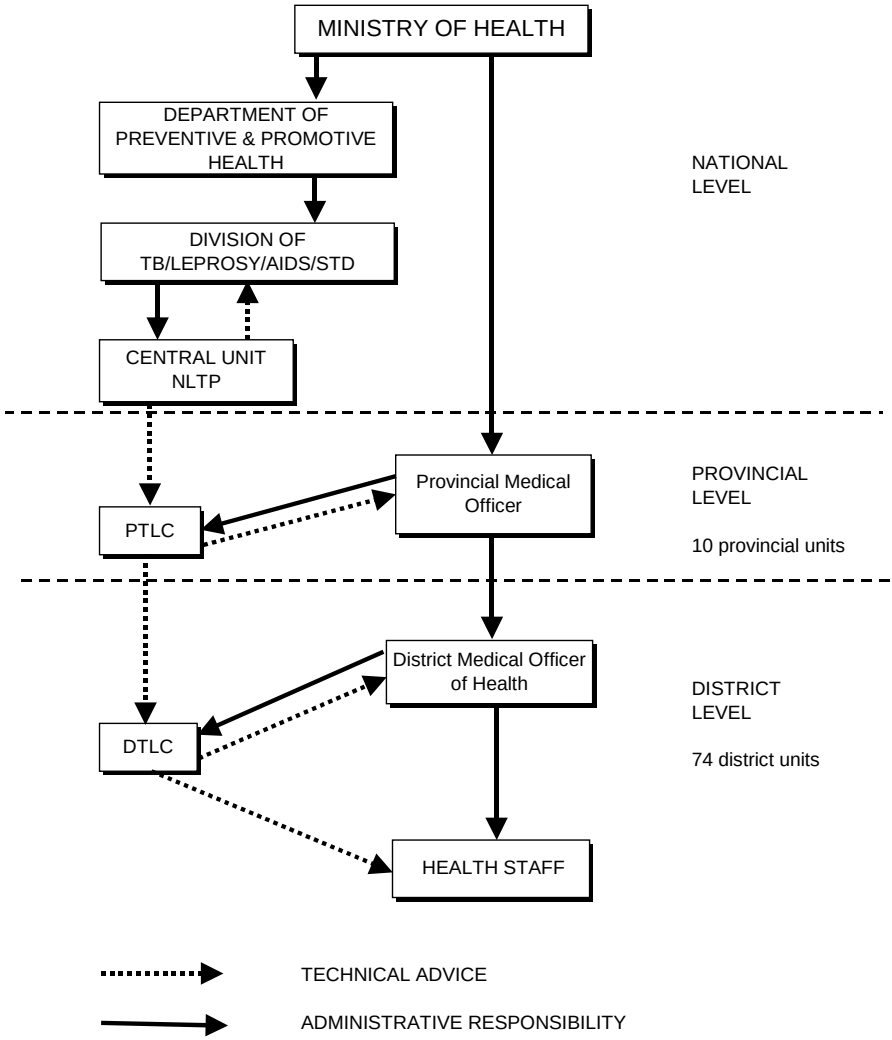
- Defaulter action card
- Laboratory request form for sputum smear examination.

Defaulter tracing

Defaulter tracing is the responsibility of all health staff. During the full course of leprosy treatment and the continuation phase of tuberculosis treatment, patients attend clinics at four-weekly intervals. Failure to attend this clinic may lead to interruption of treatment and treatment failure. Therefore, any tuberculosis patient who has missed one clinic should be traced as soon as possible to establish why he/she defaulted and to persuade him/her to attend again. The same applies to leprosy patients who have missed an appointment.

ANNEX I.

NLTP ORGANIZATIONAL STRUCTURE



ANNEX II. Tuberculosis Register

Date of registration.	*District reg. No.*	*Name*	*Sex* M/F	*Age*	*Address*	*Clinic*	*Date start Rx Regimen*	*Type TB P/EP*	*Type of Patient*				
									N	*R*	*TI*	*TR*	*O*

N=new (never been treated before)
R=Relapse
O= Others (all other categories)

TI=Transferred in(treatment started in another province).
TR=Treatment resumed (resumes treatment after interruption).

ANNEX II. (continued)

Initial diagnosis			*Follow-up exam*			*Date/outcome of treatment*						*Remarks*
Smear	*x-ray*	*Other*	*2/3*	*4/5*	*7/8*	*cure*	*T.c no smear*	*died*	*failure*	*Out control*	*transfer*	

Cured = sputum smear positive patient with negative smear result at end of treatment.
T.C = treatment completed, no smear result
Failure = sputum smear positive with positive smear at 5 months or later during treatment
Out of control = patient did not attend two consecutive clinics despite several attempts to trace the patient and to motivate him/her to attend.
Transfer out = patient continues treatment in another province.

ANNEX III. Tuberculosis Treatment Register

Serial no.	*District reg. No.*	*Name*	*Sex* M/F	*Age*	*Address*	*Neighbour/primary school*	*Type TB P/EP*	*Type of Patient*				
								N	*R*	*TI*	*TR*	*O*

ANNEX III. (continued)

Lab serial number and results of sputum smear examination			*Date treatment was started* / *Regimen*	*Date of clinic*	*Outcome of treatment*	
0	*2/3*	*5/6*	*7/8*			

ANNEX IV.Tuberculosis Quarterly Report on Case Finding of New and Relapse Cases.

QUARTERLY REPORT ON TUBERCULOSIS CASE-FINDING

District name _____ DTLC_____

Patients registered in _____ quarter of _____ Signature_____ Date _____

ALL CASES REGISTERED DURING THE QUARTER

	NEW SMEAR POSITIVES	RETREATMENT				SMEAR-NEGATIVE		EXTRA-PULMONARY		
		Sm+ relapses	Other relapses	Failures	Return after default	< 15 yrs	15 + yrs	< 15 yrs	15 + yrs	TOTAL
Non-nomadic										
Nomadic										
Total										

NEW SMEAR-POSITIVE CASES ONLY

Age group (years)														TOTAL		
0 - 14		15 - 24		25 - 34		35 - 44		45 - 54		55 - 64		65 +				
M	F	M	F	M	F	M	F	M	F	M	F	M	F	Male	Female	Total
Non-nomadic																
Nomadic																
Total																

Ministry of Health

National Leprosy and
Tuberculosis Programme

**COHORT REPORT ON RESULTS OF TREATMENT OF NEW SPUTUM-SMEAR NEGATIVE PULMONARY
AND EXTRA-PULMONARY TUBERCULOSIS PATIENTS OF REGISTERED, 12 - 15 MONTHS EARLIER**

District.....		Patients registered	Date: ...../...../.....
.....		during	Signature:
DTLC Name		..... quarter	
.....			

New Smear-Negative PTB cases,

Results at 2 Months	Total enrolled	Finalised Initial Treatment	Died	Absconded	Transferred out	Total evaluated

Results at 8 Months	Total enrolled	Treatment completed	Died	Out of control	Transferred out	Became Smear Positive	Total evaluated

* of those .....(number) were excluded from evaluation because of the following reason:.....

.....
.....

Extra - Pulmonary TB cases

Results at 2 months	Total enrolled	Finalised Initial Treatment	Died	Absconded	Transferred out	Total evaluated

Results at 8 months	Total enrolled	Treatment completed	Died	Out of control	Transferred out	Total evaluated

* of those .....(number) were excluded from evaluation because of the following reason:.....

.....
.....

Ministry of Health

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COHORT REPORT ON RESULTS OF TREATMENT OF NEW SPUTUM-SMEAR NEGATIVE PULMONARY
AND EXTRA-PULMONARY TUBERCULOSIS PATIENTS OF REGISTERED, 12 - 15 MONTHS EARLIER

District.....		Patients registered	Date: ...../...../....
.....		during	Signature:
DTLC Name		..... quarter	

New Smear-Negative PTB cases,

Results at 2 months	Total enrolled	Finalised Initial Treatment	Died	Absconded	Transferred out	Total evaluated

Results at 8 months	Total enrolled	Treatment completed	Died	Out of control	Transferred out	Became Smear Positive	Total evaluated

* of those .....(number) were excluded from evaluation because of the following reason:.....

.....
.....

Extra - Pulmonary TB cases

Results at 2 months	Total enrolled	Finalised Initial Treatment	Died	Absconded	Transferred out	Total evaluated

Results at 8 months	Total enrolled	Treatment completed	Died	Out of control	Transferred out	Total evaluated

* of those .....(number) were excluded from evaluation because of the following reason:.....

ANNEX VI. Leprosy Report Formats
Ministry of Health
National Leprosy and Tuberculosis Programme

LEPROSY HALF ANNUAL REPORT ON CASEFINDING AND TREATMENT RESULTS

District: …… No: …… DTLC: ……	……. Half Year: ……	Date of completion ……../……/ …….

(block 1) Case finding during half year period

	PB	MB	Total
New			
Relapse			
Transfer in			
Return to control			
Others			
Total			

(block 2) Disability grading of NEW cases

Disability	PB	MB	Total
No Disability			
Grade 1			
Grade 2			
Unknown			
Total			

(block 3) Age and sex distribution of NEW patients

Age	**0 - 14**		**15 - 64**		**65+**		**TOTAL**		
Sex	M	F	M	F	M	F	Males	Females	Total
PB									
MB									

(block 4) Patients still on register, COUNTED at the end of the …… half of the year.

PB	MB	Total

COHORT REPORT ON RESULTS OF TREATMENT OF PAUCIBACILLARY LEPROSY PATIENTS TREATED WITH MDT WHO STARTED 12 – 18 MONTHS EARLIER

(block 5) Period: ……half of year …….

Total started on MDT	Released from treatment (RFT)	Treatment not completed (TNC)	Died (D)	Transferred out (TO)	Out of Control (OOC)	No. of patients who increased disability grade during MDT	
						Number	%

COHORT REPORT ON THE RESULTS OF TREATMENT OF MULTIBACILLARY LEPROSY PATIENTS TREATED WITH MDT WHO STARTED 24 - 30 MONTHS EARLIER

(block 6) Period: ……half of year …….

Total started on MDT	Released from treatment (RFT)	Treatment not completed (TNC)	Died (D)	Transferred out (TO)	Out of Control (OOC)	No. of patients who increased disability grade during MDT	
						Number	%

Annex VII. Tuberculosis Appointment Card

Draw card