

THE UNITED REPUBLIC OF TANZANIA
MINISTRY OF HEALTH



MANAGEMENT OF LEPROSY

MANUAL FOR HEALTH WORKERS

FIRST EDITION
2003



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FOREWORD

This manual has been developed to assist health workers in Tanzania to properly manage leprosy. It aims at providing most of the important and practical information regarding the control of leprosy in the country.

With the target of eliminating Leprosy as a public health problem, strengthening community-based leprosy elimination campaigns and integration of leprosy care in all health facilities is the best option to ensure success in eliminating the disease. This simplified manual provides extensive information on leprosy control appropriate for all levels of health care providers. Special emphasis is put on prevention of disabilities, care and rehabilitation of disabled people affected by leprosy in order to reduce stigma and improve their quality of life.

The organization of the contents in ‘Units’ reflects a more practical approach for easy reference and is intended to help the reader thoroughly understand and remember its content. At the end of each ‘Unit’ there are questions for self-evaluation. Emphasis is put on the importance of keeping accurate, reliable, updated and complete records.

This manual is therefore recommended to all health workers in their daily work for the proper diagnosis, treatment and follows-up of leprosy patients.

ACKNOWLEDGEMENTS

The development of this manual has entailed much time-consuming work over the last one year. Its development would not have been possible without the input of the numerous national and international experts who offered advice and help in the preparation of this document. Many of them participated in a number of workshops and their contributions are too many to be listed here. The Ministry of Health through the National Tuberculosis and Leprosy Programme (NTLP) wishes to acknowledge with sincere gratitude all those who contributed to the production of this document.

The Ministry of Health takes this opportunity to thank Dr M. Masatu from CEDHA and other tutors from the Department of Human Resource, the Regional and District TB/Leprosy Coordinators for their invaluable contributions and the staff from the Tuberculosis and Leprosy Central Unit (TLCU) for facilitating the whole process.

Finally, the Ministry expresses sincere gratitude to the programme technical advisors for their endless inputs and all partners supporting NTLP for their financial support in the development and production of this guide.



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Ministry of Health

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LIST OF ABBREVIATIONS

AIDS	Acquired Immuno-Deficiency Syndrome
ARC	AIDS Related Complex
CBHC	Community Based Health Care
CHMT	Council Health Management Team
DMO	District Medical Officer
DOT	Directly Observed Treatment
DOTS	Directly Observed Treatment, Short course
DRA	DOT and Rifampicin Accounting register
DTLC	District Tuberculosis and Leprosy Co-ordinator
ENL	Erythema Nodosum Leprosum
FDC	Fixed Dose Combination
GLRA	German Leprosy and Tuberculosis Relief Association
HIV	Human Immunodeficiency Virus
IEC	Information Education and Communication
MB	Multi-bacillary
MDT	Multi-Drug Treatment
MO	Medical Officer
MoH	Ministry of Health
NGO	Non Governmental Organisation
NTLP	National Tuberculosis and Leprosy Program
OPD	Out Patient Department
PB	Pauci-bacillary
R	Rifampicin
RNE	Royal Netherlands Embassy
RTLTC	Regional Tuberculosis and Leprosy Co-ordinator
SDC	Swiss Development Co-operation
ST	Sensitivity Test
TLA	Tanzania Leprosy Association
TLCU	Tuberculosis and Leprosy Central Unit
VMT	Voluntary Muscle Test
WHO	World Health Organisation

UNIT 1

INTRODUCTION AND BACKGROUND INFORMATION

OBJECTIVES

By the end of this unit you should be able to:

- i. Describe the aims of the Tanzanian National Tuberculosis and Leprosy Programme (NTLP)
- ii. Describe the strategy and activities of NTLP
- iii. Describe the organizational structure of NTLP
- iv. Explain the burden of leprosy in Tanzania
- v. Describe leprosy elimination goal and strategies
- vi. Identify your roles in the management and control of leprosy

THE NATIONAL TUBERCULOSIS AND LEPROSY PROGRAMME

The Tanzanian National Tuberculosis and Leprosy Programme (NTLP) was launched by the Ministry of Health in 1977. The programme is funded by the Tanzania government and external donors from governmental and non-governmental organisations providing drugs and supplies, laboratory equipments, transport, training, technical support and supervision through the NTLP joint account. In addition, the government of Tanzania is providing infrastructure, staff and hospital care for patients.

The vision of the programme is to contribute towards the improvement of the health and well being of all Tanzanians especially those most at risk. The overall objective of the NTLP is to control the occurrence of tuberculosis and leprosy diseases in the community until they are no longer public health problems by:

- Reducing the incidence and prevalence of tuberculosis and leprosy
- Reducing physical and psycho-social suffering from the two diseases
- Reducing the prevalence of disability in leprosy patients

More specifically NTLP aims at:

- Early diagnosis of as many as possible tuberculosis and leprosy patients.

- Curing of at least 80% of the smear positive pulmonary TB patients and 90% of the leprosy patients
- Reducing the disability among newly diagnosed leprosy patients by at least 5% and to reduce the proportion of leprosy patients who develop disabilities during and after treatment
- Preventing the emergence of mycobacteria resistance to tuberculosis and leprosy drugs

NTLP is working towards WHO target of eliminating leprosy in the country by the year 2005. Elimination of leprosy is defined as reducing the prevalence of the disease to less than one case per 10,000 populations.

This target will be achieved through the following strategies:

- i. Availability of leprosy diagnostic and treatment services, free of charge, in all health facilities.
- ii. Early diagnosis and adequate treatment of leprosy patients.
- iii. Raise community awareness of the disease, importance of early reporting to the health facility and ensuring treatment compliance.
- iv. Prevention of disability and rehabilitation of people affected by leprosy
- v. Conducting leprosy elimination campaigns

Activities of NTLP

The core NTLP activities are:

- Early case finding and adequate treatment of TB and leprosy patients
- Prevention of disability and rehabilitation of leprosy patients

Important supportive activities are:

- Provision of health education on tuberculosis and leprosy to patients and the community
- Training of health workers, DTLCs and RTLCs
- Recording and reporting on tuberculosis and leprosy activities to relevant levels
- Resource mobilisation, planning, supervision, monitoring and evaluation of programme activities
- Tracing patients who do not attend the clinic regularly and ensure that they complete their treatment
- Joint TB/HIV control activities

- Integration of specific NTLP activities at different levels in line with health sector reforms
- Operational research and epidemiological surveillance

Organisational structure of the NTLP

NTLP is under the Epidemiology and Disease Control section within the Directorate of Preventive Services in the Ministry of Health. NTLP activities are integrated within the existing primary health care system. Health care providers are responsible for early case detection, appropriate treatment and case holding. They are also responsible for proper management of drugs and supplies, keeping accurate records and providing health education to the patient and community. Though the NTLP falls within the general health service, it needs a managerial and supervisory staff dealing solely with the two diseases, in order to ensure adequate technical competence of all health workers involved. Administratively the NTLP operates at three levels; national, regional and district.

National Level

The Tuberculosis and Leprosy Central Unit (TLCU) is headed by a programme manager who is answerable to the Director of Preventive Services in the Ministry of Health. The Central Tuberculosis Reference Laboratory (CTRL) situated at Muhimbili National Hospital is part of TLCU. TLCU coordinates all activities pertaining to tuberculosis and leprosy in the country. It is responsible for policy formulation, planning, monitoring, evaluation, resource mobilization, coordination of drugs and supplies procurement and distribution. It is also responsible for training of staff, supervision of field activities, data aggregation and analysis, quality assurance of AFB microscopy, surveillance of drug resistance, health promotion and operational research.

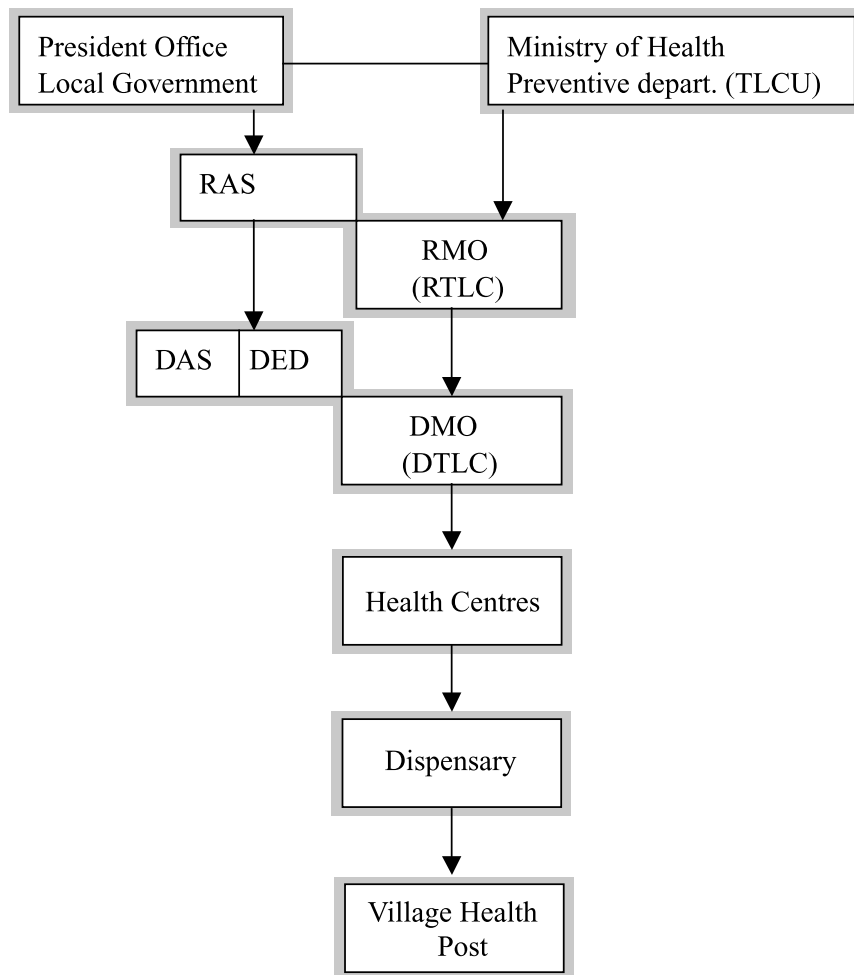
Regional Level

A Regional Tuberculosis and Leprosy Coordinator (RTL) is answerable to the Regional Medical Officer (RMO). The RTL should be a Medical Officer or Assistant Medical Officer who is responsible in his/her own region for the tasks listed in the job description. The RTL has to work closely with TLCU and districts.

District Level

A District Tuberculosis and Leprosy Coordinator (DTLC) is answerable to the District Medical Officer. The DTLC should be a clinical officer who is responsible for the implementation and coordination of TB and leprosy control activities within the district as listed in job description. The DTLC is the main link between TLCU through the region on one hand and health units and community on the other hand.

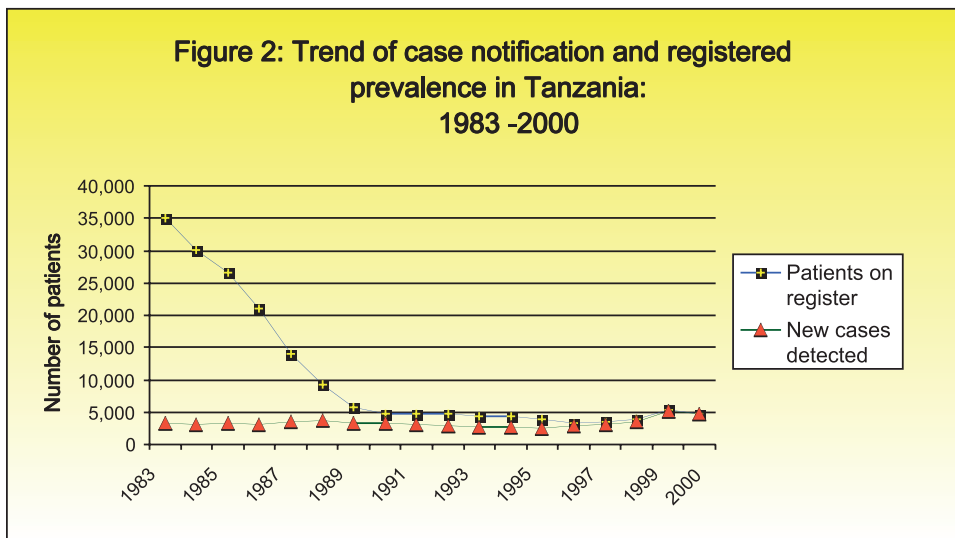
Figure 1: Organogram of the National TB and Leprosy Programme (NTLP)



BURDEN OF LEPROSY IN TANZANIA

Leprosy is a public health problem in Tanzania. It is still an important cause of permanent disability among people and continues to have a very negative social image in the community, frequently responsible for discrimination and stigmatisation. The disease has not been eliminated in Tanzania because prevalence is still above the WHO target of 1 per 10,000 population. However intensified leprosy elimination campaigns and greater involvement of the community combined with appropriate treatment should make it possible to eliminate leprosy in Tanzania by 2005.

The main objective of leprosy control is early detection, treatment of all leprosy patients and prevention of disability from the disease using Multiple Drug Therapy (MDT). MDT was introduced in Tanzania in 1983 and countrywide coverage was reached in 1990. This resulted in a rapid decline of the number of registered leprosy cases on treatment from more than 35,000 cases in 1983 to about 5,000 in the year 2001. However, the number of newly notified patients with visible disability (grade 2) has not significantly changed.



To achieve leprosy control in the country NTLN has been doing the following activities:

- Raising community awareness on the disease
- Early case detection

- Making MDT available at community level free of charge
- Preventing disability by early diagnosis and appropriate treatment of leprosy disease, reactions and other complications

In 1996 Tanzania adopted WHO target of eliminating leprosy by 2005. There are two strategies to accelerate the process toward achieving the above target - Leprosy Elimination Campaigns (LEC) and Special Action Projects for the Elimination of Leprosy (SAPEL). Both strategies are based on early case detection and cure with MDT.

Leprosy Elimination Campaigns (LEC), primarily targeted on early finding of undetected leprosy cases in the community. This can be achieved through:

- Raising community awareness and participation
- Strengthening of existing MDT services
- Capacity building of health workers.

Special Action Projects for the Elimination of Leprosy (SAPEL) aim at providing MDT services for patients living in difficult to reach areas or isolated population groups (nomads, fishermen, islanders, prisoners). The emphasis is on early diagnosis and treatment of leprosy patients. This will contribute to the reduction of leprosy transmission, prevention of disabilities and decrease in the level of the stigma in the community.

JOB DESCRIPTION OF A HEALTH WORKER IN RELATION TO LEPROSY CONTROL

- To suspect/detect leprosy patients among those who seek health care at the health facility
- To ensure that leprosy suspects are correctly examined, diagnosed and properly treated
- To refer to DTLC leprosy suspects who are difficult to diagnose
- To refer patients who develop complications according to NTLP guidelines
- To encourage patients to bring their household members for examination
- To educate patients on leprosy treatment and the importance of completing treatment
- To trace leprosy patients who do not attend the clinic regularly
- To educate leprosy patients with disability on self-care

- To ensure that leprosy relapse suspects are examined by the DTLC
- To assess VMT/ST of all leprosy patients on treatment after every three months
- To maintain and update regularly leprosy unit registers and patient treatment cards
- To ensure that there is a three months stock of drugs available for leprosy patients
- To educate the community on the importance of early diagnosis and proper treatment of leprosy

SELF EVALUATION QUESTIONS

1. What are the aims of NTLP?
2. What are the core activities of NTLP?
3. Why is leprosy a public health problem in Tanzania?
4. What are the strategies for accelerating leprosy elimination in Tanzania?



UNIT 2

GENERAL INFORMATION ABOUT LEPROSY

OBJECTIVES

By the end of this unit, you should be able to:

- i. Describe what is leprosy
- ii. Describe how leprosy is transmitted

LEPROSY DISEASE

What is leprosy?

Leprosy is a chronic infectious disease caused by *Mycobacterium leprae* (*M.leprae*). *M.leprae* is an Acid Fast Bacilli (AFB). Leprosy mainly affects the skin, the peripheral nerves and mucous membranes. It is a disease mainly of human beings, which affects people of all races, all ages and both sexes.

Transmission

The main source of infection is an individual with multibacillary (MB) leprosy. This is a patient harbouring many leprosy bacilli in the body. However, healthy persons carrying the bacilli can also transmit them. The bacilli are transmitted through infectious droplets from an infectious individual when coughing or sneezing. Skin contact with leprosy patients is no longer considered to be an important means of transmission.

M. leprae invades mainly macrophages and cells protecting peripheral nervous system called Schwann cells. After *M. leprae* enters the cell, it starts multiplying and causes an immunological response which is the cause of skin and peripheral nerves inflammation.

Leprosy has a very long incubation period (3-30 years, average 5 years). Only a proportion of the infected population gets the disease (5-10%). The majority of people have a natural immunity to *M. leprae* that is strong enough to prevent the development of disease after infection. Individuals with a partially impaired immunity have a higher chance to develop *paucibacillary* (PB) leprosy (the form

with few bacilli) and those with a low natural immunity to *M. leprae* have a higher chance to develop **multibacillary** (MB) disease. Factors related to poverty increase the risk of developing the disease.

SELF EVALUATION QUESTIONS

1. What is the cause of leprosy?
2. How is leprosy transmitted

UNIT 3

DIAGNOSIS OF LEPROSY

OBJECTIVES

By the end of this unit, you should be able to:

- i. Describe how leprosy is diagnosed
- ii. Test skin patches for sensation
- iii. Describe classification of leprosy
- iv. Differentiate leprosy from other skin conditions
- v. Explain terms used in leprosy case definitions
- vi. Record leprosy cases according to NTLP guidelines

Detection of leprosy in Tanzania is by *passive case finding*. This means that patients present themselves to a health facility when have symptoms suggestive of the disease. Health workers at any health facility should be able to recognize early features of leprosy and examine suspects properly.

When to suspect leprosy?

In an endemic area like Tanzania any individual with one or more of the following signs or symptoms is a suspect leprosy patient:

- One or more pale or reddish, hypo-pigmented patch(es) on the skin with or without loss of sensation
- Painless swelling or lumps in the face and/or earlobes
- Enlarged and/or tender nerves
- Burning sensation of the skin
- Numbness or tingling of hands and/or feet
- Weakness of eyelids, hands and/or feet
- Painless wounds or burns on the hands and/or feet

How to diagnose leprosy?

A properly taken history and careful physical examination of a person for signs of leprosy is enough to make a diagnosis of leprosy in most cases. In rare instances, laboratory investigations are needed to confirm a diagnosis of leprosy. If one is not sure of the diagnosis, the suspect should be seen by the DTLC or other personnel trained in leprosy.

History taking

Proper history taking is very important for understanding the patient's situation and for tracing a lost patient. The following information must be obtained during history taking:

- General information: all three names, sex, year of birth, occupation, full address including the name of village/street leader and distance from home to clinic.
- Main complaints, including date of onset, site of first lesions, subsequent changes and development of the disease, previous treatment received.
- Information regarding other leprosy cases in the patient's household

Physical examination

Physical examination should always be done in adequate (day) light while fully respecting the person's privacy. The person is requested to undress. Examine the patient systematically - **skin, nerves and other organs**. Always explain what is going to follow when proceeding with a systematic examination.

Examination of the skin

Start with the head, neck, shoulders and arms followed by trunk, buttocks and legs. Look for skin discolouration, thickening, or swelling.

For **skin lesions** note the following:

- Number, size, distribution
- Shape (nodules, patches)
- Surface (rough, smooth, dry, moist)
- Colour (hypo-pigmented, redness)
- Tenderness
- Margin
- Satellite lesion(s) with or without central healing
- Loss of hair
- Absence of sweating

Then **test sensation** in one or a few typical skin patches with a wisp of cotton wool as follows:

- Roll the end of the wisp into a fine point
- Explain to the patient that the purpose of the test is to see how well the skin feels
- Do a trial test by touching the patient on normal skin with the point of cotton wool until it just bends. Do this while the patient's eyes are open so that s/he can see exactly what is done. Repeat several times until the patient has demonstrated to you that s/he understands the purpose of the test. The

- patient is expected to touch with one finger the exact spot that is tested
- Then, with the person's eye closed, touch the skin with the cotton wool. First, test on normal skin and ask the patient to touch with one finger the exact spot that is touched. When s/he points correctly, do the test on the skin patch(es). Compare the patient's response by intermittently testing an area of normal skin.

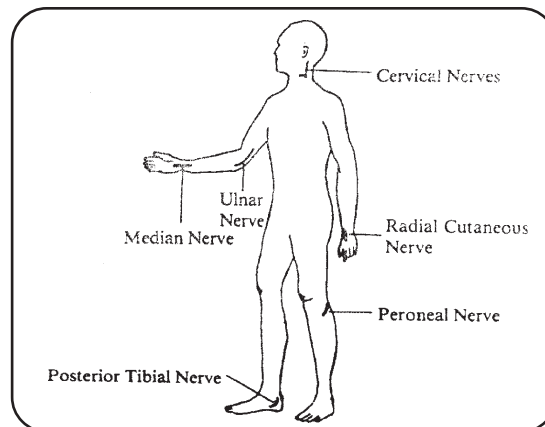
Sometimes a patient points accurately to areas of normal skin, but points more than 2 centimetres away from where the skin in a patch is tested. This is called **mis-reference** and shows diminished sensation in the patch. If consistent during repeated testing of a patch, mis-reference may suggest leprosy.

A patient who repeatedly does not feel the touch in a lesion, has loss of sensation and thus shows a cardinal sign of leprosy

Examination of the nerves

Palpate the nerves to assess **thickness, consistency, and tenderness**. In order to detect thickening, the health worker should know the normal size of that nerve. This can be learned by examining one's own nerves and on suspected leprosy patients. Always compare the left with the right side. Palpation of the nerve is done with two or three fingers by rolling the nerve on the surface of the underlying bone. Figure 3 shows the nerves that can be affected by leprosy and that are easily accessible for examination.

Figure 3. Places where superficial nerve trunks can be palpated.



Thick and/or tender nerves, especially in combination with other signs and symptoms of leprosy, are diagnostic for leprosy

Examination of other organs

Depending on the duration of the disease and the spread of leprosy through the body,

various other organs may show signs typical for leprosy:

- Examine the face and ears for diffuse or nodular swellings. The ear lobes may be elongated and hanging down
- Examine the eye for:
 - Eyebrow hair loss
 - Cornea clearness, ulcers or scars
 - Conjunctiva redness
 - Pupil shape, reaction and signs of cataract.
 - Eyeball pressure
 - Vision

- Examine the nose for depression or even collapse of the nasal bridge, bleeding, ulceration or blockage
- Examine the mouth for nodules or ulcers on the palate
- Check the teeth for looseness
- Note any hoarseness of voice when the patient speaks (vocal cords may be damaged due to leprosy). Sometimes a soft whistling sound on breathing could be heard
- Palpate the breast tissue in male patients. Assess if swollen (gynaecomastia), pointing to involvement of testicles
- Examine the testes and scrotum for nodules, infiltration, and size. Small soft testes are usually the result of damage by *M. leprae*.

Many of the above signs occur in patients with **multibacillary** leprosy.

After history and physical examination decide whether the person has leprosy or not. When the diagnosis of “leprosy” is certain, **complete the full examination and record all information** accurately on the Patient Record Card (LEP01). If uncertain of the diagnosis, refer leprosy suspect to DTLC or hospital.

A diagnosis of leprosy should be made if **ONE** of the following **CARDINAL SIGNS** is present.

1. **Skin lesion with loss of sensation**
2. **One or more enlarged peripheral nerves**
3. **A skin smear positive for leprosy bacilli**

It is important to realize that the diagnosis of leprosy has a major impact on the individual and his family. Always refer leprosy suspects to the DTLC if in doubt.

Classification

The main purpose of classification is to decide on the treatment regimen to be given to the patient. Also, classification may indicate the degree of infectiousness and the possibility of occurrence of leprosy reactions or other complications.

Leprosy can be classified on the basis of clinical manifestations and skin smear results. In the classification based on skin smears, patients showing few bacilli in skin smears are grouped as **Paucibacillary** (PB), while those showing many bacilli in skin smears are grouped as having **Multibacillary** (MB) leprosy.

In practice, classification is based on clinical criteria, which uses the number of skin lesions and nerves involved.

Paucibacillary patients have:

- 1 - 5 skin lesions with definite loss of sensation
- Maximum of one nerve trunk enlarged

Multibacillary patients have:

- Six or more skin lesions with definite loss of sensation
- More than one nerve trunks enlarged

Any patient showing a positive skin smear, irrespective of the clinical classification should be treated with MDT regimen for MB leprosy

If there is any doubt regarding the classification, the patient should be classified and treated as a multibacillary case. This applies to patients who have been treated

in the past and of whom insufficient information is available on the treatment previously used.

DIFFERENTIAL DIAGNOSIS OF LEPROSY

There are many skin conditions that look like leprosy and it can be difficult to differentiate them. The most important criteria to differentiate leprosy from other skin conditions are the cardinal signs. Skin conditions which should be differentiated are as follows:

Pityriasis alba: this is a form of eczema which occurs predominantly in children and adolescents. Multiple hypo-pigmented, vaguely bordered, very finely scaling patches are found on the face and the trunk and sometimes the extremities. These can persist for years, sometimes reacting to steroid cream but most times clearing spontaneously with time.

Lichen simplex: In most times there is one well-circumscribed lesion of lighter thickened skin, which is very itchy. It is caused by continuous scratching or rubbing on a part of the skin that started itching. The vicious circle of itch-scratch-lichenification-itch can be broken if the patients stops scratching. Coal tar or zinc ointment can be given to reduce the itching.

Nutritional dyschromia: single or multiple, ill defined, hypo-pigmented lesions can occur, usually over the cheeks, due to lack of vitamins. Other features of avitaminosis such as glossitis and angular stomatitis are present. The patches will disappear on treatment with vitamins.

Pityriasis versicolor: this is a common, chronic, superficial fungal infection. It presents with multiple, small, hypo-pigmented macular lesions without loss of sensation and often itching. The condition usually clear within six weeks if an appropriate anti-fungal treatment is given.

Tinea corporis (ringworm): a common fungal infection presenting with typical round lesions, which show scaling at the periphery, or in concentric rings. Usually one or a few lesions on arms, face or shoulders are present. The condition clear up in six weeks if treated with an appropriate anti-fungal.

Vitiligo (leucoderma): a common, sometimes familial depigmentation of the skin.

It can start at any age but most times in young adults and progresses from small round white macules to larger lesions with often bizarre shapes. There is no loss of sensation or any other signs or symptoms. The skin feels normal.

Psoriasis: this is chronic, recurrent, inherited, non-infectious skin disease caused by an abnormal fast turnover of the skin cells. The skin grows too fast, becomes too thick forming silvery-white scales, which easily bleed when scratched.

Birthmark: hypo- or hyper-pigmented lesions of different sizes, which have been present since birth and do not change.

Onchocerciasis: (in endemic areas) hypo-pigmented macules and signs of scratching are often the manifestations of onchocerciasis. There is itching but no loss of sensation. In a later stage of the disease there are mottled lesions particular in loins and armpits. Previous complaints of itching exclude leprosy.

Syphilis: secondary syphilis presents as a generalised symmetric rash, which can mimic almost any other skin condition. Ask for the history of a genital ulcer 1-2 months prior to the onset of the rash.

Kaposi sarcoma: the nodules are firm and have a purplish colour. They are usually located at the feet but can be present elsewhere.

Neurofibromatosis: Multiple deeply pigmented soft nodules, which usually appear in adulthood.

Case definitions

New case

A paucibacillary (PB) or multibacillary (MB) leprosy patients who has never been treated before

Relapse after MDT

- A patient who has previously been treated and completed a full course of Multi Drug Treatment (MDT) and who returns with active disease.

Return after default

A leprosy patient with either PB or MB leprosy, with active disease returning after having defaulted treatment. For PB leprosy defaulting means not receiving any

treatment for more than 3 months. For MB leprosy defaulting means not receiving treatment for more than 6 months.

Transfer in

A leprosy patient coming from another region, who has already started treatment and is already notified in that region.

Other

Any leprosy patient who does not fit in the above categories, including patients who return with active disease and who were previously treated with a course of Dapsone.

RECORDING OF LEPROSY CASES

The main purpose of recording is to be able to collect information that enables monitoring of patients progress and programme performance at all levels. Health workers are responsible for keeping accurate, reliable, updated and complete records. The following documents are used in recording leprosy patients:

- LEP01 - Leprosy Patient Record Card
- LEP02 - Leprosy Identity Card
- LEP03 - Unit Leprosy Register
- LEP05 - Leprosy Laboratory Register
- TB/LEP 01 - Request Form for Sputum/Skin smear examination
- TB/LEP 02- Referral and Transfer Form

SELF EVALUATION QUESTIONS

1. List the important areas of the body where signs of leprosy can be found
2. What are the cardinal signs of leprosy
3. Describe the two types of leprosy
4. List five skin conditions that may mimic leprosy in appearance

UNIT 4

ASSESSING THE EXTENT OF DISEASE AND GRADING OF DISABILITY

OBJECTIVES

By the end of the unit, you should be able to:

- i. To test for autonomic, motor, and sensory nerve functions in a leprosy patient
- ii. Assess and grade the level of disability in a leprosy patient

ASSESSING THE EXTENT OF DISEASE

Once the diagnosis of leprosy is made the next step is to assess the **extent of disease** by doing nerve function tests. The assessment is important for establishing a baseline record for immediate action and future follow up. All information should be accurately recorded in the patient card:

Nerve function tests

Nerve trunks are mixed nerves and as such carry three types of nerve fibres:

- *Autonomic fibres*, which stimulate sweat glands to moisten the skin.
- *Motor fibres*, which stimulate muscle function.
- *Sensory fibres*, which carry messages of sensation from skin to brain.

All or any one of these fibres may be damaged in a patient with leprosy. It is therefore necessary to assess each nerve function separately. Any loss of function will indicate possible damage to the relevant nerve fibres.

Autonomic nerve function

Assess autonomic nerve function loss by looking for dry skin, especially of the palms or soles of the foot.

Motor nerve function

By testing the strength of voluntary muscles (voluntary muscle strength test) you can find out if the motor nerve fibres function normally or not. To know what is abnormal, you should first learn the normal range of movement and strength of different people who are normal.

Procedure for Voluntary Muscle strength Test (VMT)

Voluntary Muscle strength Test (VMT) consists of testing the motor (muscle) function of several peripheral nerves. All muscle movements should be executed full and strong against the resistance of the examiner's hand. Indicate "S" for "strong" (normal), "W" for weakened function (reduced strength, less than normal movement) and "P" for "paralysis" (no muscle action at all).

- *Facial nerve function*
 - Ask the patient to CLOSE THE EYES as in sleep; record any lid gap in millimetres. A lid gap of more than 5 mm necessitates immediate action to prevent damage.
 - Test the strength of eyelid muscles by asking the patient to close the eyes tightly and to resist the gentle efforts of the examiner to part the eyelids.

- *Ulnar nerve function*
 - Ask the patient to move the little finger all the way in (touching the side of the ring finger) and all the way out. Is the movement full?
 - If movement is full, ask the patient to hold the LITTLE FINGER OUT fully while you apply resistance to the outward movement at the base of the finger by pushing it in (as shown in Figure 4). Record your findings accordingly.

- *Median nerve function*
 - Ask the patient to bring the THUMB UP AND ACROSS, in front of the index finger but as far away from it as possible. Focus attention for movement at the thumb base rather than at the tip. Can the patient achieve this testing position? Is movement full?
 - Now test the strength of this movement. Instruct the patient to maintain the starting position while you push out/across, away from the little finger (as shown in Figure 5). Record your findings accordingly

- *Radial nerve function*
 - Test the EXTENSION OF THE WRIST by asking the patient to lift the wrist against the palm of the examiner's hand (as shown in Figure 6). Record your findings accordingly.

- *Peroneal nerve function*
 - Ask the patient to fully LIFT UP his FOOT, check to see if the movement is full (no more movement available at the joint).
 - Test for power by applying resistance to the top of the foot as patient lift up (as shown in Figure 7). Record your findings accordingly

Sensory nerve function

Sensation test (ST) of cornea, hands and feet assesses sensory nerve function.

Procedure for sensation testing

- *Cornea*
 - Observe the eyelids of the patient when you talk to him/her. If the patient is blinking regularly, it can be assumed that the corneal sensation is normal. If the patient does not blink, record loss of corneal sensation.

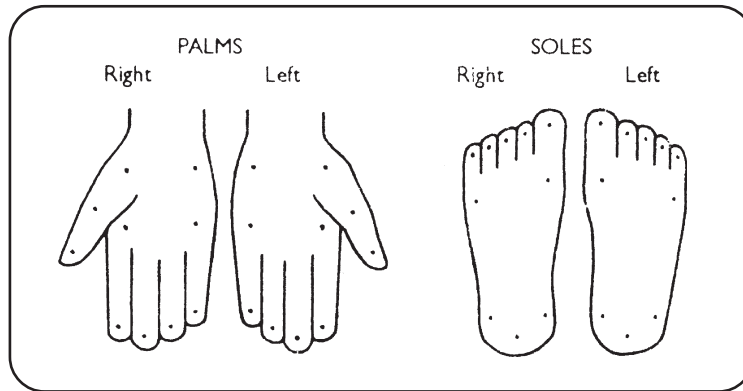
- *Hands and feet*
 - Gently touch the skin with a ballpoint pen tip on each of the 10 testing points shown in Figure 8 (touch = small indentation, little more than the weight of a ball pen).

 - Ask the patient, first with the eyes open and then with the eyes closed, to point with one finger exactly to the point touched.

 - Support the hand or foot well so as to avoid stimulating other sensory pathways:
 - * Avoid moving joints (proprioception);
 - * Avoid applying too much pressure (deep sensation).

 - Record sensation on the hand and foot maps on the patient's record card. If the patient can touch within 2 cm, record '√' (tick) at the place on the map. If the patient cannot point within 2 cm, record 'X' at the place on the map.

Figure 8: Hands and feet sensation testing points



THE IMPORTANCE OF VMT / ST

Doing VMT/ST at least once quarterly is important for the following reasons:

- 1) To detect early changes in nerve function.
- 2) To detect silent neuritis.
- 3) To assess the need for medical treatment.
- 4) To monitor the effectiveness of medical treatment, recovery of nerve function.
- 5) To identify health education needs on specific self-care/need for protective aids.

The time spent doing VMT/ST provides an important opportunity to provide “one to one” health education and for the patient to report any changes of nerve function.

DISABILITY GRADING

Assessment and recording of disability is important for the management of leprosy complications. Disability is defined as difficulty or inability to perform certain acts considered normal for a human being because of impairment. In leprosy control the

word disability is used in a much wider sense and includes also visible deformities. All disabilities found during examination of the peripheral nerves, eyes, hands, feet and other organs should be noted or recorded on the Leprosy Patient Card (LEP01).

This includes:

- Injured cornea
- Loss of vision
- Clawed fingers or toes
- Wrist or foot drop
- Skin cracks and wounds on palms and soles together with sensation loss
- Absorption of bone together with sensation loss
- Scarring together with sensation loss

This should then be followed by assessing the disability grade using the **WHO disability grading system**. Each eye, hand and foot needs to be graded separately. The highest value of the leprosy disability grade for any part should be taken as the overall disability grading of patient.

Table 1. WHO leprosy disability grading system

DISABILITY GRADE	EYE	HANDS/FEET
Grade 0	No eye problem due to leprosy. No loss of vision.	No anaesthesia, no visible deformity or damage.
Grade 1	Eye problems due to leprosy, but vision intact (6/60 or better, can count fingers at 6 metres).	Anaesthesia present, but no visible deformity or damage.
Grade 2	Lagophthalmos, iridocyclitis or corneal opacity. Vision severely affected (<6/60 or unable to count fingers at 6 metres)	Visible deformity or damage, with anaesthesia.

SELF EVALUATION QUESTIONS

1. How would you assess the extent of disease in a leprosy patient?
2. Describe the procedures for assessing the function of facial, ulnar, and radial nerves
3. Describe the procedure for sensation testing of hands and feet
4. What does grade 2 leprosy disability mean?

UNIT 5

TREATMENT OF LEPROSY

OBJECTIVES

By the end of the unit, you should be able to:

- i. Explain the aim of leprosy treatment
- ii. Describe the leprosy treatment regimes being used by NTLP
- iii. Recognize and manage side effects of anti-leprosy drugs
- iv. Explain the system of monitoring treatment in leprosy patients
- v. Explain terms used in defining leprosy treatment outcome

The aim of leprosy treatment

The aims of leprosy treatment are to:

- Cure patients
- Treat leprosy reactions
- Prevent further damage to nerves and other tissues
- Prevent transmission to other community members

Multiple Drug Treatment

Multi Drug Treatment (MDT) is the recommended treatment for leprosy. MDT is a combination of a minimum of two anti-leprosy drugs. Treatment of leprosy with only one drug (mono-therapy) will result in development of drug-resistance, therefore it should be avoided.

Patients having multibacillary leprosy are given a combination of rifampicin, dapson and clofazimine while those having paucibacillary leprosy are given a combination of rifampicin and dapson. Both regimens are given in the form of a blister pack on a four weekly basis. Patients should thus attend the nearest clinic where he/she is registered. Then he/she will visit the clinic every four weeks (“monthly”) to obtain the blister pack. Table 2 shows the drugs and dosage.

Table 2. Drug and dosage in MDT

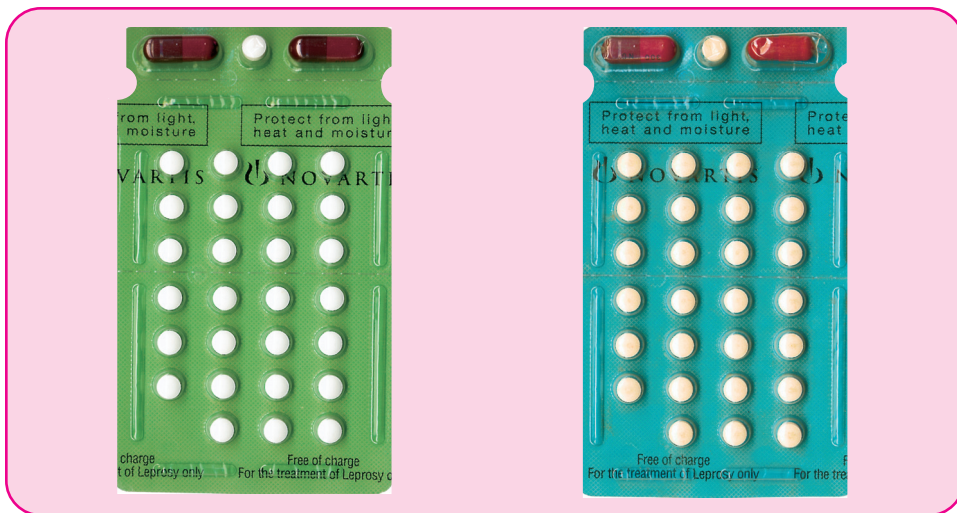
Dosage (Adult MB)	Dosage (Child MB 10-14 years)
<p>Monthly Treatment: Day 1 Rifampicin 600 mg (2 x 300mg) Clofazimine 300 mg (3 x 100mg) Dapsone 100mg Daily Treatment: Days 2-28 Clofazimine 50 mg Dapsone 100 mg. Duration of Treatment 12 blister packs to be taken within a period of between 12-18 months</p>	<p>Monthly Treatment: Day 1 Rifampicin 450 mg (3 x 150mg) Clofazimine 150 mg (3 x 50mg) Dapsone 50 mg Daily Treatment: Days 2-28 Clofazimine 50 mg every other day Dapsone 50 mg daily Duration of Treatment 12 blister packs to be taken within a period of between 12-18 months</p>
Dosage (Adult PB)	Dosage (Child PB 10-14 years)
<p>Monthly Treatment: Day 1 Rifampicin 600 mg (2 x 300mg) Dapsone 100mg Daily Treatment: Days 2-28 Dapsone 100 mg. Duration of Treatment 6 blister packs to be taken within a period of between 6-9 months</p>	<p>Monthly Treatment: Day 1 Rifampicin 450 mg (3 x 150mg) Dapsone 50 mg Daily Treatment: Days 2-28 Dapsone 50 mg daily Duration of Treatment 6 blister packs to be taken within a period of between 6-9 months</p>

The patient takes the **first dose under direct observation of a health worker**; meaning that the health worker should ensure that the patient swallows the drugs. During the following 27 days the patient takes the drugs without being supervised by a health worker.

Figure 9. Blister pack for multibacillary patients (MB)



Figure 10. Blister pack for paucibacillary patients (PB)



Duration of MDT

Paucibacillary leprosy

- Patients should receive 6 doses to be taken within a maximum period of nine months. When collecting the 6th dose the patient should be released from treatment (**treatment completed**)
- Every effort should be made to enable patients to complete chemotherapy. A patient whose treatment is cumulatively interrupted for more than three 'months' or patient who has missed three doses of MDT in total and hence cannot complete the 6 doses within 9 months, should be recorded as **defaulter**.
- If a defaulter returns later to the clinic, s/he should be given ONE-second course of Paucibacillary leprosy MDT.

Multibacillary leprosy

- MB patients should receive 12 doses to be completed within a maximum period of 18 months. When collecting the 12th dose of MDT the patient should be released from treatment (**treatment completed**).
- Patients who fail to collect the 12 doses of MDT within 18 months should be given ONE second chance to complete a full course of MB Blister Pack. The procedures for a second course of MB Blister Pack as follows:
 - A patient whose treatment is cumulatively interrupted for more than six 'months' or A patient who has missed 8 doses of MDT in total and hence cannot complete the 12 doses within 18 months, should be recorded as defaulter.
 - When a defaulter reports at a clinic, a second course of MDT should be started after the importance of regular treatment has been discussed with the patient. Patients who restart treatment must be registered into the unit register District Leprosy Register again with a new number as return after default and thus should be included in another treatment cohort for assessing completion of treatment.
 - Every effort should be made to ensure that patients complete the second course of MDT as recommended.
 - After completion of the second course of MDT the patient should be recorded as treatment completed.

- A patient who fails to complete the second course should **only** be commenced on the third course of MB Blister Pack after consultation with the DTLC

Treatment in special cases

Pregnancy: The standard MDT regimens are considered safe, both for mother and child and should therefore be continued during pregnancy.

Tuberculosis: Patients suffering from both tuberculosis and leprosy require appropriate anti-tuberculosis therapy in addition to the MDT. Rifampicin must be given in the dose required for the treatment of tuberculosis. Once the intensive phase of anti TB treatment is complete the patient should continue his monthly rifampicin for leprosy treatment.

HIV: The management of a leprosy patient infected with HIV is the same as that of any other patient. The response and cure rate of HIV positive patients is the same as in other patients. The management, including treatment of reactions, does not require any modifications.

Monitoring treatment

MDT should be provided to the patient as close to the patient's home as possible based on the geographical distribution of clinics and the patient's wish. In principle every health facility should be able to provide MDT. Patients should have access to treatment on any day after finishing the Blister pack. However, they should be given an appointment to attend a fixed clinic day in order to be reviewed and assessed by the Clinician and DTLC every three months. The DTLC is responsible for the supply of MDT drugs and additional drugs for treatment of reactions. The health worker should update the Leprosy Patient Card (LEP01) with the findings of the VMT/ST. Progress should be recorded. The health worker in collaboration with DTLC should take action when deterioration is noted. There should always be a minimum of three blister packs in stock for every patient attending that clinic, at any given time.

Under normal circumstances patients should not be given more than one month (one blister pack) drug supply. Those patients who can not come on monthly basis to a health facility due to problems such as long distance, impassable roads during the rainy season, nomadic life-style etc, may be given drugs for more than one month, sufficient to cover the expected period of absence. Under exceptional circumstances a full course supply can be given, with the involvement of a formal

or informal community leader or relative. Such patients should be advised to report to the nearest health facility if they develop any complication.

Each time a patient attends for treatment, staff at the health facility should ask the patient about new complaints regarding nerve function impairment. If there are indications of (further) nerve damage, the patient should be referred to DTLC. Health staff at the clinics should always give the monthly rifampicin and clofazimine under direct observation at the clinic. The health staff is also responsible for tracing a patient who does not attend two consecutive months. When the patient is found, she/he should be persuaded to continue treatment (see defaulter management).

The health workers are also responsible for maintaining appropriate patient records, which includes updating the Leprosy Identity Card (LEP02) and Leprosy Unit Register (LEP03).

Defaulter management

There are several reasons that may result into failure of patients to collect drug doses or defaulting. These include:

- Migration
- Experience of side effects.
- Feeling they have been cured following disappearance of symptoms.
- Lack of confidence in the treatment.
 - Negative attitude of health workers towards patients.
 - Irregular supply of MDT drugs in health facility

When a patient does not attend clinic, try to get information about him/her from the other patients. If possible, send a reminder to the patient or inform the Community Health Worker. Patients on MDT who did not collect their drugs for more than two months are potential defaulters and should be traced by health staff of the centre where the patient is getting treatment, in collaboration with the DTLC. If an absentee is traced, find out the reason for non-attendance. Appropriate further action should then be taken. S/he should be persuaded to continue treatment. If possible involve relatives or village leaders as well to ensure that the patient completes the treatment.

Side effects of MDT drugs

The majority of leprosy patients complete their treatment without developing any significant side effects of the anti-leprosy drugs. Dapsone is a relatively safe drug in the dosage used in MDT. Patients taking monthly rifampicin rarely experiences toxic effect of the drug. Clofazimine is well tolerated and has few side effect virtually

non-toxic. However few patients might develop side effects and therefore patients need to be educated and monitored on these possible side effects (Table 3). The decision to stop and change treatment because of side effects should be taken with great care to avoid inadequate treatment. Explain to every patient the potential side effects of the drugs being taken. Whenever a patient complains, check if it may be the result of a side-effect of one of the drugs.

Table 3. Possible side effects of anti-leprosy drugs and action to be taken

SIDE EFFECT	POSSIBLE CAUSE	ACTION
Urine may stain slightly reddish for a few hours after taking the supervised dose.	Rifampicin	This is harmless and should be explained to the patient at the start of MDT.
Skin may in the course of months gradually turn brownish-black and show dryness.	Daily Clofazimine (MB patient)	It will disappear within a few months after completion of MDT, but the patient should be informed upon starting MDT.
Itching and skin rash; even blisters may appear and skin may start to peel off; the patient will feel very ill.	Typical for an allergic reaction due to Dapsone, which may be serious.	The patient should <u>stop</u> taking dapsone and go to the TBL clinic if he has rash only or go immediately to the TBL hospital if more severely ill. PB patients should receive daily 50 mg Clofazimine and a monthly dose of 300 mg as a substitute for Dapsone. MB patients continue with only Rifampicin and Clofazimine in the usual dosage.
Jaundice, often accompanied by lack of appetite, nausea and vomiting.	Either Rifampicin or Dapsone	<u>Stop</u> MDT and refer to the TBL referral hospital.
The patient may experience nausea, vomiting and diarrhoea.	Clofazimine	Abdominal complaints may spontaneously disappear, but if they continue, the patient needs to be referred for further examination and management at the TBL referral hospital.
A patient may quite suddenly develop chills, fever, headache and bone pains, in a few hours followed by weak, quick pulse (shock) and renal failure.	Rifampicin	This flu-like syndrome needs urgent hospital treatment. Stop Rifampicin.
Tiredness and shortness of breath.	Anaemia, a known side-effect of Dapsone	This is often a dose related effect and treatment with Dapsone can be continued with half or a quarter of the daily dose.
Exceptionally a patient may become very excited or frightened, even psychotic.	Dapsone	Stop the drug and refer to the TBL referral hospital.

Definitions of treatment outcome:

Treatment completed

PB patient: A patient who has received 6 PB MDT doses within 9 months.

MB patient: A patient who has completed 12 MB MDT doses within 18 months.

Died A patient who dies for any reason during treatment.

Defaulter

PB patient: A patient whose treatment is cumulatively interrupted for more than three 'months' or patient who has missed three doses of MDT in total and hence cannot complete the 6 doses within 9 months.

MB patient: A patient whose treatment is cumulatively interrupted for more than six 'months' or a patient who has missed 8 doses of MDT in total and hence cannot complete the 12 doses within 18 months.

Transferred out A patient on MDT treatment transferred to another region and whose treatment outcome is not known.

Before releasing the patient from treatment do a complete physical examination including VMT/ST. Record the results in the patient record card and **compare VMT/ST at the end of treatment with the baseline assessment at start of MDT.** Score the result as IMPROVED, NO CHANGE or DETERIORATED and enter the result in the patient treatment card and unit register. Give necessary health education and remind the patient to come back whenever she/he has complaints compatible with reactivation of the disease or a complication.

SELF EVALUATION QUESTIONS

1. What are the aims of leprosy treatment?
2. What is MDT and why is it important in the control of leprosy?
3. What treatment regimes are recommended by NTLP for patients with:
 - (a) Paucibacillary leprosy?
 - (b) Multibacillary leprosy?
4. What are the reasons that may cause a patient to default from treatment?
5. How are patients on anti-leprosy drugs monitored?

UNIT 6

LEPROSY REACTIONS AND RELAPSE

OBJECTIVES

By the end of this unit, you should be able to:

- i. Describe the reactions that may occur in patients with leprosy
- ii. Explain the measures to be taken when leprosy reactions occur
- iii. Describe the meaning of leprosy relapse and how it differs from type I leprosy reaction
- iv. Describe the treatment for leprosy relapse

What is a leprosy reaction?

A leprosy reaction is the sudden appearance of acute inflammation in the lesions (skin patches, nerves, other organs) of a patient with leprosy. This is due to an alteration in the immunological status of the patient. **Reactions are the major cause of nerve damage and disability in leprosy.** Therefore they should be detected early and treated promptly.

Leprosy reactions are part of the natural course of the disease and can occur at any time. Reactions commonly occur during the early stage of the disease. Sometimes patients report for the first time to a health unit because of a leprosy reaction. Some reactions are seen after completion of treatment.

Clinically one can find swelling and redness of skin lesions, which are warm and sometimes tender when touched. There may be swelling, pain or tenderness of nerves indicating neuritis, which is often accompanied by loss of nerve function (sensory and/or motor). New lesions may appear. All health workers should be aware of the danger, frequency, signs and symptoms of leprosy reactions. The diagnosis and treatment of severe reaction is urgent because of the risk of permanent nerve damage.

Health care providers should explain the following to all patients who start MDT:

- Possibility of occurrence of reactions
- Signs and symptoms of reaction in skin and nerves
- Occurrence of leprosy reactions does not indicate that MDT is not effective.
- A reaction is not an adverse side effect of the drugs
- MDT should be continued during a reaction.

Types of leprosy reactions

There are two types of reactions:

1. Reversal Reaction (RR) or type I reaction
2. Erythema Nodosum Leprosum (ENL) or type II reaction

Reversal Reaction (RR) or type I reaction

This is the most common type of reaction. It occurs in about 10 - 20% of PB patients and in up to 40% of MB patients. Reversal reactions can occur before the patient is diagnosed, during MDT or after completion of MDT. Reversal reaction is caused by a sudden increase in the immunity to leprosy bacilli. It is important to differentiate between mild and severe reactions. Only the severe reactions need treatment with corticosteroids (e.g. prednisolone).

A reversal reaction is considered severe if:

- One or more nerves are painful or tender on palpation (neuritis), with or without signs of nerve damage (loss of sensation and/or muscle weakness)
- Muscle weakness developed or increased within the last six months (compare VMT with previous VMT).
- Loss of sensation developed or increased within the last six months (compare ST with previous ST).
- A raised red lesion around an eye.
- Skin lesions have become red, raised and ulcerative.
- There may be oedema of hands and feet.

Sometimes there is a gradual change in strength or loss of sensation without the typical signs of neuritis (nerve pain/tingling/tenderness). This indicates the presence of *silent neuritis* requiring also treatment with prednisolone and rest. It can only be detected if VMT/ST is routinely done.

All reactions with nerve involvement are classified as severe reactions

Any health worker should be able to suspect leprosy reactions based on the above symptoms. Depending on the condition of the patient the health worker should consult the DTLC at the earliest opportunity or refer the patient immediately.

Treatment of Reversal Reactions:

Depending on severity, treatment of RR is by giving anti-inflammatory drugs or corticosteroids usually prednisolone for a prolonged period.

Mild Reactions:

Advice the patient to rest and give usual doses of analgesics (aspirin, paracetamol, ibuprofen).

Severe Reactions:

Give initial dose of prednisolone if available **and then refer to the nearest hospital**. The standard treatment schedule of reversal reactions with prednisolone is shown in Table 4.

Table 4. Standard Treatment of Severe RR with Prednisolone

40 mg daily (8 tablets of 5 mg or 1 tablet of 40mg Prednipac)	2 weeks
30 mg daily (6 tablets of 5 mg or 1 tablet of 30mg Prednipac)	2 weeks
20 mg daily (4 tablets of 5 mg or 1 tablet of 20mg Prednipac)	2 weeks
15 mg daily (3 tablets of 5 mg or 1 tablet of 15mg Prednipac)	2 weeks
10 mg daily (2 tablets of 5 mg or 1 tablet of 10mg Prednipac)	2 weeks
5 mg daily (1 tablet of 5 mg)	2 weeks
Total	12 weeks
Continue MDT during treatment of reversal reaction	

Supportive measures to RR treatment

Additional to prednisolone, it is important to provide complete rest to the affected nerve(s) until the symptoms clear. It might be useful to immobilise the affected limb with a splint.

When the signs of acute inflammation have subsided, other measures, especially physiotherapy, should be given.

Monitoring of Prednisolone treatment

It is advised to give the first 4 weeks of prednisolone under supervision of a health worker. Thereafter the patient can collect new prednipac supplies after every two weeks. Patients on ambulatory treatment with prednisolone who *missed less than 4 weeks* treatment, should continue with the same dose of prednisolone as they were taking before they stopped.

Patients who *miss more than 4 weeks* of prednisolone treatment should start a full course of prednisolone again unless there are no signs of nerve damage anymore.

At each visit the health staff should inquire about problems and side effects. If there is no improvement within two weeks after starting standard treatment, the patient should immediately be referred to the DTLC or a hospital. Signs of improvement are subsiding of fever, pain and oedema.

At the hospital the dose of prednisolone should be adjusted, especially in the presence of severe nerve pain and/or acute motor paralysis. It is recommended to start with a 60mg dose, which then has to be tapered off slowly as shown in Table 5. In exceptional cases (very sick patients, body weight above 60kg) give 80mg prednisolone for a few days until the acute inflammation subsides. In such severe cases and in those with recurrent reactions it is important to give a 20mg maintenance dose for 10 weeks, as this will increase the chance of full recovery.

Table 5. Treatment of Severe RR with Prednisolone at the Hospital level

60 mg daily (12 tablets of 5 mg prednisolone)	1 week
50 mg daily (10 tablets of 5 mg prednisolone)	1 week
40 mg daily (8 tablets of 5 mg prednisolone)	2 weeks
30 mg daily (6 tablets of 5 mg prednisolone)	2 weeks
20 mg daily (4 tablets of 5 mg prednisolone)	10 weeks
15 mg daily (3 tablets of 5 mg prednisolone)	2 weeks
10 mg daily (2 tablets of 5 mg prednisolone)	2 weeks
5 mg daily (1 tablet of 5 mg prednisolone)	2 weeks
Total	22 weeks
Continue MDT during treatment of reversal reaction	

If a nerve remains very painful and swollen after two or more weeks of high dose prednisolone, there may be a **nerve abscess** and surgical decompression should be considered. Refer the patient to a specialist centre where possible.

If the signs of reaction return when lowering the dose of prednisolone, the dose should be increased again until the reaction subsides and an even slower process of tapering off the prednisolone should be followed.

Precautions before starting prednisolone treatment

Prednisolone is a powerful hormonal drug, which can be dangerous if not given properly. Instruct the patient to adhere to prescribed treatment, as a sudden interruption or stopping of the treatment can cause severe side effects, which can lead to death. Give the treatment schedule and explanation on paper, so that the patient has a reference.

Prednisolone may worsen any other existing infection. It is therefore important to treat existing infections such as dysentery, trachoma, worm infections, scabies, etc. Treatment for these infections should be started immediately and does not need to be finalised before starting prednisolone.

Side effects and complications of prednisolone

There are many side effects and complications of prednisolone. The most common are:

- Exacerbation of infections, which have not been treated fully for example tuberculosis, amoebic dysentery, etc
- Abdominal discomfort
- Rarely patients develop gastric ulcers
- Gastro-intestinal bleeding (vomiting of blood or passing black stool)
- Diabetes mellitus etc.

Education of patients

Before starting treatment with prednisolone, explain to the patient the following:

- The need for daily and continued treatment with Prednisolone and the expected duration of the course
- Expected effect on the pain reduction within a few days and loss of feeling and/or strength improvement after considerable period
- The arrangements for examination and drug collection every two weeks.
- The need to report immediately if pain increases, loss of feeling increases and/or muscle strength decreases
- The need to report immediately if any general illness and/or fever develops
- The need to report immediately if any side-effect of the drug occurs

Recurrence of severe reversal reaction

When a patient has responded positively on a previous course of prednisolone but the reaction recurs or nerve function deteriorates refer to the DTLC or hospital.

Erythema Nodosum Leprosum (ENL) or type II reaction

Erythema Nodosum Leprosum occurs only in multibacillary leprosy patients. An estimated 5 to 10% of MB patients develop an ENL reaction. It is caused by an

interaction between dead *M. leprae* and substances accumulating in the blood and tissues. The reaction is often triggered by special circumstances like emotional stress, pregnancy or childbirth, infectious diseases (malaria, TB), etc.

In general ENL presents as:

- Tender reddish skin nodules
- Fever and malaise
- Joint pain

There are mild and severe ENL reactions.

Severe forms can present with:

- Ulcerating nodules (necrotising ENL)
- Tender nerves with or without loss of sensation or motor weakness.
- Painful red eye(s) due to iridocyclitis
- Painful swollen testes (orchitis)
- Painful swollen fingers (dactylitis)
- Oedema of lower arms and legs

Patients with ENL sometimes present in a serious life threatening condition, hence immediate recognition and treatment in a hospital is necessary.

Treatment of ENL

Mild ENL: Advise the patient to rest and provide analgesics such as aspirin (600mg three times daily) and chloroquine if available (150 mg two times daily), for one-week duration. Re-examine the patient for signs of new nerve damage at weekly intervals. If no improvement after six weeks with analgesics or if signs of a more severe ENL reaction occur, use prednisolone.

Severe ENL: Refer the patient to the nearest hospital for appropriate examinations and treatment. Prednisolone is given for 3 weeks as per schedule shown in Table 6.

Table 6. The standard treatment schedule of severe ENL at hospital level

Daily dose prednisolone (mg)							
Week	1	2	3	4	5	6	7
1.	50	50	50	50	40	40	40
2	40	30	30	30	30	20	20
3	20	10	10	10	5	5	5

Recurrent ENL

A few patients get regular episodes of ENL as soon as the dose of prednisolone comes below 20 or 15 mg per day. This is called chronic or recurrent ENL. Patients with recurrent ENL should be referred to hospital.

Very few patients develop ENL and RR reactions simultaneously.

Leprosy relapse after MDT

A **relapse** is a patient who has previously been treated and completed a full course of Multi Drug Treatment (MDT) and who returns with active disease. Relapse is due to multiplication and spread of surviving leprosy bacilli. Patient should be considered to have active disease when present with one or more of the following:

- Reddish and/or elevated skin lesions, especially at the edge of the patch
- Appearance of new skin lesions since last examination
- New nerve involvement since last examination
- Lepromatous nodules (MB)
- Positive skin smear

Above signs can, however, also be observed in patients with a leprosy reaction (reversal reaction or ENL) after completing a full course of MDT.

It is difficult to distinguish on clinical grounds alone, between a relapse and a reaction. An important diagnostic criterion for the differentiation is the period between the release from MDT and the occurrence of new signs and symptoms of active disease. In general a reaction occurs **within two years** and a relapse usually **after two years** following release from treatment. Table 7 lists the differences in more detail.

Table 7. Differences between type I reaction and relapse

Feature	Type 1 reaction	Relapse
Time interval	generally occurs during chemotherapy or within 6 months of stopping treatment, up to 2 years after release from treatment	usually occurs long after chemotherapy is discontinued, generally after an interval of 2 years
Onset	abrupt and sudden	slow and insidious
Systemic disturbance	may be accompanied by fever or malaise	never accompanied by fever or malaise
Old lesions	some or all become erythematous, shiny and considerably swollen with infiltration	the margins of some may show erythema
New lesions	usually several	few
Ulceration	lesions may break down and ulcerate	ulceration is unusual
Subsidence	with desquamation	desquamation does not Occur
Nerve	many nerves may be involved, with pain, tenderness, and motor disturbances occurring rapidly	may occur only in a nerve; motor disturbances develop very slowly
Response to steroids	excellent	not distinctive

All patients suspected as relapses should be referred to DTLC/RTLTC

SELF EVALUATION QUESTIONS

1. List the two types of reactions seen in patients with leprosy
2. What measures would you take if severe reactions occur in a leprosy patient?
3. How does leprosy relapse differ from type I reaction?

UNIT 7

PREVENTION OF DISABILITIES (POD)

OBJECTIVES

By the end of the unit, you should be able to:

- i. Explain the causes of disability in leprosy
- ii. Explain the three levels of disability prevention in leprosy
- iii. Explain the criteria used to select patients for rehabilitative surgery
- iv. Advise leprosy patients on prevention of disabilities

Definitions

When talking about disability prevention the following terms are used.

Impairment: any loss or abnormalities of body parts or body functions

Disability: Difficulty or inability to perform certain acts considered normal for a human being because of impairment

Deformity: Visible impairment or visible consequences of hidden impairment

Handicap: A disadvantage that limits or prevents the fulfillment of a role that is considered normal for an individual of comparative age, sex, social and cultural background.

In leprosy, the word disability is also used for deformity.

Causes of disability in leprosy

Most disabilities result directly or indirectly from loss of function of peripheral nerves supplying the eyes, hands and feet. Nerve function loss in the eye results into incomplete eye closure causing corneal dryness, injuries, vision loss and eventually blindness. Nerve function loss in the hands and feet results in loss of sensation and sweating, which leads to skin cracks, injuries, wounds and secondary infection. Muscles nerve damage cause function loss leading to joint stiffness and contractures.

Prevention of disabilities

Prevention of disabilities comprises all activities that lead to diminishing the occurrence of permanent nerve damage and its consequences. The key to prevention of disabilities is good communication with the patient and the community at large. It is important to convince patients, relatives and other community members to report suspected leprosy patients as early as possible.

Levels of prevention

Prevention of disability consists of three important levels, *first, second, and third level*

First level prevention

Early diagnosis and treatment of leprosy disease and associated reactions is the first level of prevention.

Patients who are on MDT treatment or who completed treatment should be instructed how to recognise signs and symptoms of leprosy reactions with nerve involvement. If nerves are involved, treatment with prednisolone should be commenced as early as possible.

Early case detection and treatment of leprosy disease and reactions is essential for primary prevention of disabilities

Second level prevention

This consists of assisting the patient in preventing the existing disability from worsening by convincing the patient to adapt his behavior in daily life in such a way that the existing disabilities don't get worse. In many cases simple daily care and exercises have proved to be effective in keeping the skin supple, the joints mobile and even restore muscle strength in case of partial paralysis (paresis). Wearing shoes with a hard outer sole and a soft inner sole can prevent much damage to insensitive feet.

It often is difficult for people to change habits of daily life and persons with disabilities encounter many practical problems as they seek to adopt self-care. Thus staff needs to train them carefully and in a practical way, to gently motivate them to persevere and to help them solve the problems of self-care implementation. The

full understanding and co-operation of the family is essential for success. Thus health education on the importance of self-care should be extended to members of the patient's immediate family.

Practical education on self-care includes the “**ABC of preventing complications**”, proper care of ulcers and exercises to avoid stiffness or contractures. Instruct the patient repeatedly on the following:

A. Avoid Injury

Continuous or repetitive moderate pressure on one anaesthetic area of the skin is the most common and important cause of injury. To avoid injury patients must learn also to use their eyes and think:

Hands and feet

- Stay away from hot or sharp objects
- Bandage tools that are frequently used or cover the hands
- Avoid working with the same tool for a long time; change from one task to another when working with tools
- Wear protective footwear and thus avoid sharp objects, like thorns
- Avoid tight shoes or sandals
- Walk with short steps, avoid running
- Avoid walking long distances without resting
- Avoid unnecessary long standing and squatting, change position regularly
- Avoid standing or sitting close to fire.

Eyes

- Think and Blink. Patient should learn to actively blink his/her eyes several times per minute, especially when dust or dirt is around.
- Avoid contact with dust or dirt by wearing a hat, (sun) glasses and/or face cloth.
- Cover the eyes during the night with a clean piece of cloth. Apply eye drops (castor oil or methyl cellulose) at night to prevent drying out of the cornea.

B. Be careful with dry cracked skin and eyes with lagophthalmos

Hands and feet

- Soak hands and feet daily in cool water for 30 minutes. If available, add soap or salt.
- If no bucket available: wrap a piece of cloth drenched in water around hands and feet.
- After soaking scrape off the hard skin using e.g. pumice stone. This should immediately be followed by applying oil or vaseline on the skin, while hands and/or feet are still wet.

Eyes

- In case of paresis of eyelids (lagophthalmos, eye lidgap < 5mm), tell the patient to exercise the eyelids by closing them tightly for 5 seconds only using the muscles around the eyes. Do this 30-40 times, three times per day.
- If lidgap is >5mm, refer the patient for tarsorrhaphy or other reconstructive surgery. Also ectropion and entropion can be operated.

C. Check daily for the first sign of injury

This should become a routine activity of every patient in the evening.

Hands and feet

- Look for small cuts, blisters, thorns or swollen areas.
- Feel the feet and hands and test for hot areas of the skin as a sign of possible infection.
- Press the skin of affected areas to see if there are any tender spots.

Eyes

- Check daily for any dirt in the eyes or redness
- Remove dirt with a clean cloth and/or clean (boiled) cooled water.

If the daily check shows that there is any sign of injury, the patient should treat this seriously. Rest is the key factor. Where the response to the above ABC measures fail, ulcers may develop.

An ulcer is a localized necrotic lesion of the skin or mucous surface in which the superficial epithelium is destroyed and deeper tissues are exposed in an open sore.

A septic ulcer is an infected ulcer. The ulcer has purulent discharge. The surrounding tissue is warm, red and swollen. This may be associated with fever and enlargement of the lymph glands.

Care of ulcers

Regardless its size, an ulcer will heal fastest when:

- The foot/hand has complete rest. For a foot it means no walking or walking under complete protected immobilization with a plaster of paris (POP). For the hand the patient can use a sling or splint in the anatomical rest position.
- The ulcer is kept clean. This is achieved by soaking the affected foot or hand in soapy or salted water for 30 minutes twice per day. The ulcer should then be dressed with a clean cloth or dressing. Antibiotics are only needed in case of spreading infection (redness, warmth, swelling, lymphadenitis and fever).

Exercises to prevent contractures in hands and/or feet

All exercises can prevent stiffness and decrease existing contractures. Active exercises can in addition strengthen the muscles. Any patient with paresis of any kind should start appropriate active exercises, whereby the patient should use his weakened muscles to maintain suppleness, strengthen the muscles of the affected hand/foot and improve the function.

All patients with a total paralysis of hand or foot should start the appropriate passive exercises e.g. the patient uses his good hand to straighten the fingers of his paralysed hand.

Experienced health worker, physiotherapist or the DTLC should instruct patients on how to do the exercises. If available, the patient should be supplied with a leaflet explaining all the exercises. Exercises should be done 20-30 times, three times a day. Report progress on the patient card and/or the POD journal.

Referral criteria for surgical treatment

The majority of leprosy patients can and should be treated on out-patient basis at the nearest clinic to their home. However, there are certain conditions that need specialized care and hospital attendance for which admission is necessary.

How to select candidates who could benefit from septic and preventive surgery?

Eyes

1. When a patient cannot close one or both eyes (lagophthalmos), especially when this goes together with red eye, exposure keratitis, cornea ulcer, etc.
2. When a lower eyelid is paralysed (ectropion).
3. When the upper eyelid is inverted and eyelashes scratch the cornea (entropion).

Refer immediately patients with eye complications such as “red eye” and/or diminished vision. Simple conjunctivitis can be treated at the peripheral level, but iritis, keratitis, corneal ulcer, lagophthalmos and glaucoma should be referred to an ophthalmologist.

Hands

1. Acute infections of the hand, characterised by all signs of inflammation of the palm (palmar spaces) of the hand and along tendon sheaths and synovial sacs, with or without oedema of the dorsum of the hand. Cause: perforating trauma, spreading tendovaginitis from finger infection. Such conditions need urgent surgery for drainage, antibiotics, splints and physiotherapy.
2. Chronic infections / non-healing ulcers. Test for osteomyelitis, sequestra and/or osteoarthritis (probe, massage pus, feel hypermobility, check for crepitations). Can be treated by a doctor trained in Preventive and Septic Surgery.

Feet

1. Septic condition of the (fore) foot with pus, but without drainage

**Ulcers under the 5th metatarsal base and under the heel are
HIGH RISK ULCERS
and need certainly referral to hospital**

2. Ulcer with deep infection
3. Ulcer with undermined edges, usually over a joint.
4. Larger plantar ulcer (> 3 x 3 cm).
5. When an ulcer shows no progress in healing with conservative treatment including real bed rest.
6. When there is an ulcer scar with a recurrent ulcer overlying a bony prominence

- as pressure point or a joint (when movement reduction with a POP splint does not help).
7. Semi fixed or fixed clawing of toes without ulcers (for upgrading the foot to fit a shoe).
 8. Chronic ulcers on the toes and sequestra.
 9. If a patient comes with signs of a sprained ankle without a history of trauma i.e. swollen, warm and painful ankle joint, with hypermobility and crepitations and no abnormalities on the X-ray, it is likely to be **tarsal disintegration**, which is an emergency!

There are a number of general hospitals in Tanzania with medical officers specifically trained in septic and preventive leprosy surgery. Other hospitals have orthopaedic workshops where specific protective footwear, prostheses and crutches are made and supplied. Some hospitals are visited by the Leprosy Surgeons from AMREF. Few hospitals offer plastic surgery or rehabilitative leprosy surgery. Patients requiring such services should be referred to the DTLC.

Third level prevention

This is basically physical and social **rehabilitation** of those persons affected by severe deformities and destitution. These patients can be rehabilitated by means of community based rehabilitation, sometimes reconstructive surgery, or vocational training.

Rehabilitation

Rehabilitation and reintegration of patients in society can only be achieved by the sustained efforts of the patients, the health worker and the community as a whole. It is necessary to make the most of the patients abilities rather than focusing on their disabilities. This can be achieved more effectively through a community-based approach than through the traditional institution based approach, which is not only highly expensive but also often inappropriate.

The following points should be emphasized in rehabilitation:

- Rehabilitation should take place in the environment in which the patient lives, which might require some adaptation of the home
- Priority should be given to POD by simple methods with emphasis on self-care, ie. what the patients can do themselves to prevent development and/or

- worsening of disabilities
- Health education should form an important component of rehabilitation
 - Health workers should receive adequate training in POD
 - Rehabilitation of leprosy patients should preferably be an integral part of general rehabilitation services.

How to select candidates who could benefit from rehabilitative surgery

Priority for rehabilitative surgery is given to young people and children, to individuals in danger of losing their job or to those who may regain employment after surgery. The patient should be motivated to accept rehabilitation.

Indications for rehabilitative surgery:

- Lagophthalmos with exposure of cornea
- Mobile claw hand
- Mobile thumb with paralysed abduction/opposition
- Mobile hand drop
- Mobile foot drop.

Before referral, make sure the patient has:

- No signs of active leprosy and has completed MDT
- No sign of reaction and/or has completed a prednisolone course
- No skin infection, no scabies
- Accepted a long process of rehabilitation.

Indication for orthopedic appliance

- A patient with a below knee or an above knee amputation
- A patient with severe deformity of a foot needing orthopaedic shoes.

SELF EVALUATION QUESTIONS

1. What are the causes of disability in leprosy patients?
2. Which leprosy patients need rehabilitative surgery?
3. What are the important measures to prevent disabilities in leprosy
4. What are the important self-care measures to be taken by patients to prevent disabilities?

Glossary

- New case** - A leprosy patients who has never been treated before
- Passive case finding** - patients presents themselves to a health facility when they have symptoms suggestive of the disease
- Paucibacillary patient (PB)** - a leprosy patient with few bacilli in skin smear
- Multibacillary patient (MB)** - a leprosy patient with many bacilli in skin smear
- Transferred out** - a patient on MDT treatment transferred to another region and whose treatment outcome is not known
- Relapse after MDT** - a patient who has previously been treated and completed a full course of Multi Drug Treatment (MDT) and who returns with active disease
- Return after default** - a PB or MB patient, with active disease returning after having defaulted treatment. For PB patient defaulting means not receiving any treatment for more than 3 months. For MB patient defaulting means not receiving treatment for more than 6 months
- Transfer in** - a patient coming from another region, who has already started treatment and is already notified in that region
- Multi-Drug Treatment** - is a combination of a minimum of two anti-leprosy drugs
- Treatment completed** - a paucibacillary patient who has received 6 PB MDT packages within 9 months or a multibacillary patient who has completed 12 MB MDT packages within 18 months

Defaulter

- a paucibacillary patient whose treatment is cumulatively interrupted for more than three ‘months’ or patient who has missed three doses of MDT in total and hence cannot complete the 6 doses within 9 months or a multibacillary patient whose treatment is cumulatively interrupted for more than six ‘months’ or a patient who has missed 8 doses of MDT in total and hence cannot complete the 12 doses within 18 months

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