

A NEW ATLAS OF LEPROSY (Revised and Updated)

A pictorial manual to assist frontline health workers and volunteers in the detection, diagnosis and treatment of leprosy

SASAKAWA HEALTH FOUNDATION
Tokyo, Japan
2019

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Foreword1

Diagnosis and classification of leprosy..... 3

Multidrug Therapy (MDT) as advised by the World Health Organisation
Illustrations of MDT for multibacillary (MB) and paucibacillary (PB)
drugs in blister calendar packs (BCPs)4

Leprosy



1. Paucibacillary (PB) leprosy..... 7

2. Multibacillary (MB) leprosy 20

Neural leprosy 30

Reactions 31

Reactions - Type 1 (syn.Reversal) 32

Reactions - Type 2 (syn.ENL)..... 36

Disability–deformity 38

Chemoprophylaxis 42

Differential diagnosis

43



(a) Commonly occurring conditions 44

(b) Less commonly occurring conditions 59



Acknowledgements 70

References and Further Reading 71

Publishing Information Inside Back Cover



Leprosy is curable

with Multidrug Therapy, which also prevents disability and transmission.

Let us detect and treat leprosy early and help people lead normal lives.

Foreword

With leprosy on the decline in most parts of the world, there are fewer opportunities to see leprosy patients and acquire clinical skills. With early case finding essential to further reduce transmission and prevent disabilities, it is very important that peripheral healthcare workers and community health volunteers are supplied with appropriate information on the diagnosis and treatment of leprosy.

A NEW ATLAS OF LEPROSY (REVISED AND UPDATED) is a pictorial manual to assist them in their work. It builds on two previous versions of the ATLAS, published by the Sasakawa Memorial Health Foundation (SMHF)*, and has been compiled with technical assistance from the Schieffelin Institute of Health – Research and Leprosy Center, Karigiri, Tamil Nadu, India, and the WHO’s Global Leprosy Programme.

THE ATLAS OF LEPROSY was first published in 1981 and revised in 1983. The aim was to strengthen leprosy control activities by providing high-quality color pictures as an aid to recognition and diagnosis of leprosy. It was developed by Dr. Yo Yuasa (1926 – 2016), Executive and Medical Director of SMHF, in close collaboration with the Leonard Wood Memorial Laboratory in Cebu, the Philippines.

In 2002, A NEW ATLAS OF LEPROSY was published that incorporated some changes in content and format. Almost all the photographs in the original ATLAS were from the Philippines; these were replaced with photographs of leprosy patients from India and Southeast Asia, where the majority of leprosy cases are found. The 2002 volume was produced by the eminent leprologist Dr. A. Colin McDougall (1924 – 2006), with additional input from Dr. Yuasa.

A NEW ATLAS OF LEPROSY (REVISED AND UPDATED) brings the contents in line with the WHO Guidelines for the diagnosis, treatment and prevention of leprosy, published in 2018, and with the WHO’s Global Leprosy Strategy 2016 – 2020 “Accelerating towards a leprosy-free world” and its Operational Manual. Specifically, the text takes into account the following: WHO guidelines on what constitutes multi- and paucibacillary leprosy; WHO recommendations for treating leprosy with multidrug therapy (MDT); disability grading of leprosy; and WHO guidelines on chemoprophylaxis.

Detecting new cases of leprosy in a timely fashion and treating them with MDT forms the basis of leprosy work. It is our hope that this revised and updated edition of A NEW ATLAS OF LEPROSY serves as a useful tool for frontline health workers whose activities are so important to ensuring success against this curable disease.

Sasakawa Health Foundation
September 2019

* On April 1, 2019, Sasakawa Memorial Health Foundation changed its name to Sasakawa Health Foundation.



The leprosy affected patient above was diagnosed by the health worker in the health centre, and is receiving his first blister calendar pack (BCP) of drugs for the treatment of leprosy.

Under WHO initiative, leprosy treatment is available for all patients, worldwide, free of charge, with drugs donated by Novartis Foundation.

This New Atlas of Leprosy (Revised and Updated) concentrates on –

1. Cardinal Signs
2. Classification
3. A description of Multidrug Therapy (MDT), Blister Calendar Packs for the treatment of persons affected by leprosy
4. Lepra Reactions
5. Disability – Deformity
6. Differential diagnosis – i.e. a consideration of numerous other skin diseases which may mimic leprosy.

How to diagnose leprosy

At least one of the following cardinal signs must be present to diagnose leprosy:

1. Hypo-pigmented or reddish skin lesion (s) with definite sensory deficit
2. Involvement of the peripheral nerves, as demonstrated by definite thickening with loss of sensation and/or weakness of muscles of the corresponding nerve
3. Demonstration of *Mycobacterium leprae* (*M leprae*) in the lesions.

The first two cardinal signs can be identified by clinical examination alone while the third can be identified by microscopic examination of the slit skin smear.

New Case (of leprosy): A patient diagnosed with leprosy who has never been treated for the disease.

PB Case: A case of leprosy with 1 to 5 skin lesions and without demonstrated presence of bacilli in a skin smear.

MB Case: A case of leprosy with 6 or more skin lesions; or with nerve involvement; or with demonstrated presence of bacilli in a slit skin smear irrespective of the number of skin lesions.

Grading of disability due to leprosy

Hands and feet
Grade 0 = No anaesthesia, no visible deformity or damage
Grade 1 = Anaesthesia, but no visible deformity or damage
Grade 2 = Visible deformity or damage present

Eyes
Grade 0 = No eye problems due to leprosy; no evidence of visual loss
Grade 1 = Eye problem due to leprosy present, but vision not severely affected as a result (vision 6/60 or better; can count fingers at six metres)
Grade 2 = Severe visual impairment (vision worse than 6/60; inability to count fingers at 6 metres), lagophthalmos, iridocyclitis, corneal opacities

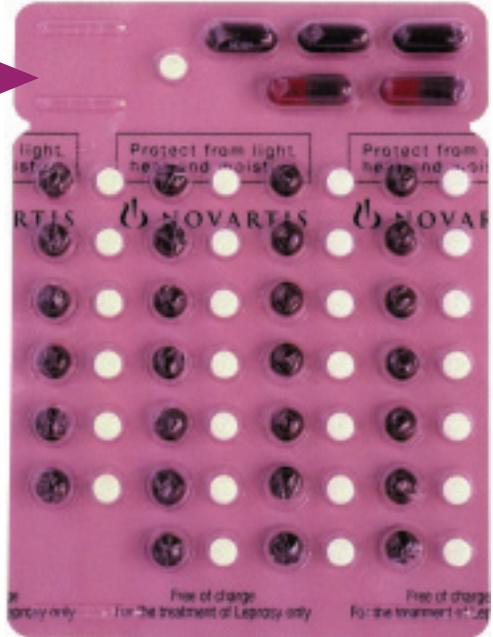
4 MDT– ADULT doses

Front view of the Adult MDT blister pack

Monthly Supervised Treatment (DAY 1 – Top 2 lines break off: detachable): Clofazimine 300mg (three capsules of 100mg), Rifampicin 600mg (two capsules of 300mg) and Dapsone 100mg (one tablet of 100mg)

Unsupervised Daily Treatment (DAYS 2–28): Clofazimine 50mg (one capsule of 50mg) EVERY DAY and Dapsone 100mg (one tablet of 100mg) EVERY DAY
Duration of Treatment:
For MB - 12 blister packs to be taken within 18 months

For PB - 6 blister packs to be taken within 9 months



Back view of the Adult MDT blister pack

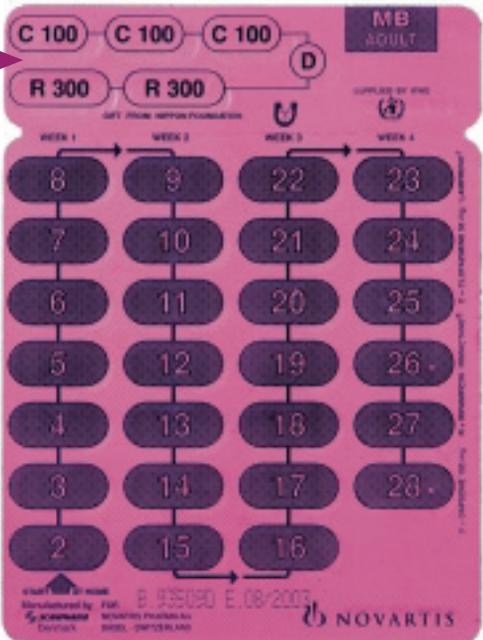
R = Rifampicin: monthly supervised dose is 600mg (2 capsules, each of 300mg).

C = Clofazimine 100mg: monthly supervised dose is 300mg (3 capsules).

D = Dapsone: monthly supervised dose is 100mg (1 tablet).

The figures 2–28 represent 4 weeks of unsupervised Clofazimine (50mg) every day and Dapsone (100mg) daily.

Actual size of blister pack: 106mm x 140mm



MDT– CHILD doses (age 10–14 years)

Front view of the Child MDT blister pack

Monthly Supervised Treatment (DAY 1

– Top 2 lines break off: detachable):
Clofazimine 150mg (three capsules, each of 50mg), Rifampicin 450mg (two capsules, one of 300mg, the other of 150mg) and Dapsone 50mg (one tablet of 50mg)

Unsupervised Daily Treatment (DAYS 2–28): Clofazimine 50mg (one capsule of 50mg) EVERY OTHER DAY and Dapsone 50mg (one tablet of 50mg) EVERY DAY

Duration of Treatment:

For MB - 12 blister packs to be taken within 18 months

For PB - 6 blister packs to be taken within 9 months



Back view of the Child MDT blister pack

R = Rifampicin: monthly supervised dose is 450mg (2 capsules, one of 300mg, the other of 150mg).

C = Clofazimine 50mg: monthly supervised dose is 150mg (3 capsules).

D = Dapsone: monthly supervised dose is 50mg (1 tablet).

The figures 2–28 represent 4 weeks of unsupervised Clofazimine (50mg) every other day and Dapsone (50mg) daily.

Actual size of blister pack:

106mm x 140mm



For children below 10 years the dose may be adjusted: for example Rifampicin 300mg, Dapsone 25mg and Clofazimine 100mg for the monthly, supervised dose, followed by Dapsone 25mg daily and Clofazimine 50mg twice a week.

Reference: Guidelines for the Diagnosis, Treatment and Prevention of Leprosy, WHO, 2018

LEPROSY

Using the classification on page 3, the following images illustrate patients with

1. Paucibacillary (PB) leprosy, who by definition have 1–5 skin lesions, and

2. Multibacillary (MB) leprosy, who have 6 or more skin lesions or with nerve involvement.

With the exception of two pictures on page 32, this Atlas does not include information on the mainly neural or neurological aspects of leprosy. There are numerous other publications on these important aspects of the disease, several of which are given under References and Further Reading, on pages 73–74.

- These pictures are intended as an aid to recognition and diagnosis
- In nearly all cases, leprosy can be diagnosed on clinical signs alone
- When in doubt about the diagnosis, send the patient to the nearest referral centre

1. Paucibacillary (PB) Leprosy

7



1. This person has a fairly well defined, hypopigmented patch on her right cheek, which is flat (macular). Careful testing revealed that she could not feel light touch on the patch. Paucibacillary (PB) leprosy.

PAUCIBACILLARY (PB) LEPROSY



2. Hypopigmented anaesthetic patch on the thigh (reduced colouring). Note the paucity of hair growth on the patch as compared to the hair growth on the normal pigmented skin. Paucibacillary (PB) leprosy.

PAUCIBACILLARY (PB) LEPROSY

3. There is a patch on the lower part of the back of the forearm, with vague edges. This increased over a period of 2 months' observation and eventually showed loss of sensation. Paucibacillary (PB) leprosy.

PAUCIBACILLARY (PB) LEPROSY



4. These vague patches, with hypopigmentation (reduced colouring), were found on the left shoulder region. They increased in size during a period of observation and showed loss of sensation to light touch (cotton wool). Paucibacillary (PB) leprosy.

PAUCIBACILLARY (PB) LEPROSY

5. This ring-like lesion was the only manifestation of leprosy. The surface, was slightly rough and dry, the edge was raised. Loss of sensation to light touch (cotton wool) was demonstrated. Paucibacillary (PB) leprosy.

PAUCIBACILLARY (PB) LEPROSY



6. This fairly extensive lesion on the back of the forearm had vague edges. Loss of sensation to light touch (cotton wool) was easily demonstrated. Nerves were found normal on palpation, i.e. Ulnar nerve of the limb and other nerves in the body. Paucibacillary (PB) leprosy.

PAUCIBACILLARY (PB) LEPROSY



7. This lady has a single, raised, well-defined lesion on the right cheek, with loss of sensation. Paucibacillary (PB) leprosy. It may be difficult to demonstrate definite loss, or reduction of sensation in early and macular (flat) lesions on the face.

PAUCIBACILLARY (PB) LEPROSY

8. This picture shows a red lesion with raised edges on the upper surface of the foot and ankle region. There was complete loss of sensation to light touch (cotton wool) on the lesion. Paucibacillary (PB) leprosy.

PAUCIBACILLARY (PB) LEPROSY



9. This boy shows a lesion over the left shoulder with hypopigmentation, (reduced colouring) with small 'satellite' lesions near the edge. There was definite loss of sensation to light touch (cotton wool). Paucibacillary (PB) leprosy.

PAUCIBACILLARY (PB) LEPROSY

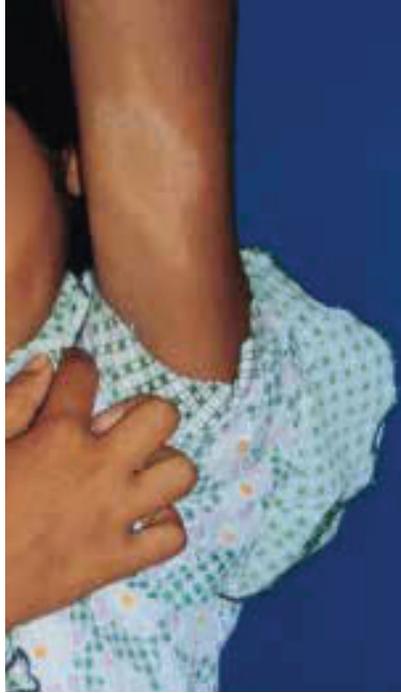
10. There is a large, well-defined lesion on the left buttock. The edge was raised on palpation. Definite loss of sensation, especially towards the edges, to light touch (cotton wool). Paucibacillary (PB) leprosy.

PAUCIBACILLARY (PB) LEPROSY

11. A well-defined lesion is shown on the right cheek with loss of sensation. Paucibacillary (PB) leprosy.

PAUCIBACILLARY (PB) LEPROSY

12. Two well-defined hypopigmented lesions are seen. Loss of sensation to light touch (cotton wool) was easily demonstrated. Paucibacillary (PB) leprosy.

PAUCIBACILLARY (PB) LEPROSY

13. A lesion on the back of the arm showed definite loss of sensation to light touch (cotton wool). Paucibacillary (PB) leprosy.

2. Multibacillary (MB) Leprosy



14. This boy has numerous hypopigmented patches scattered over the trunk and there were many more on the front of the body and limbs. In leprosy patches or lesions, normal colour is **reduced (hypopigmented)**, but not completely **lost**. **Loss** of pigmentation (de-pigmentation) occurs in vitiligo and some other conditions. The total number of lesions shown here is more than 5 and some peripheral nerves were affected. Multibacillary (MB) leprosy.

MULTIBACILLARY (MB) LEPROSY

15. A large hypopigmented lesion is seen on the lower trunk with 'satellite' lesions near the edges. Three other skin lesions were also recorded and two peripheral nerves involved. These lesions had loss of sensation to light touch. Multibacillary (MB) leprosy.

MULTIBACILLARY (MB) LEPROSY



16. Numerous hypopigmented lesions are seen over the lower back. Some of the larger patches showed loss of sensation to light touch. Skin smears were positive. Multibacillary (MB) leprosy.

MULTIBACILLARY (MB) LEPROSY

17. The patient shows numerous 'punched out' lesions on the thighs and legs and there are many similar lesions on the trunk and arms. Skin smears were positive. Most of the lesions showed loss of sensation to light touch and there were three enlarged peripheral nerves. Multibacillary (MB) leprosy.

MULTIBACILLARY (MB) LEPROSY



18. This is a close up view of a patient, with punched out lesions. The central part of the lesion showed reduced sensation to light touch (cotton wool). Skin smears were positive. Multibacillary (MB) leprosy.

MULTIBACILLARY (MB) LEPROSY

19. This patient shows classical 'punched out' lesions of leprosy. The diagnosis was confirmed by demonstrating loss of sensation to light touch (cotton wool) on the lesions. Multibacillary (MB) leprosy.

MULTIBACILLARY (MB) LEPROSY

20. This patient has numerous, raised red patches over the trunk and limbs and there were also several on the face. Some peripheral nerves were enlarged and skin smears were positive. Some patches showed loss of sensation to light touch (cotton wool). Multibacillary (MB) leprosy.

MULTIBACILLARY (MB) LEPROSY

21. This is the back of the patient shown in previous figure. In this form of (MB) leprosy, the lesions are typically raised and slope down towards the skin level at the edges, like an inverted saucer. Multibacillary (MB) leprosy.

MULTIBACILLARY (MB) LEPROSY



22. The back and most of the arm show symmetrically distributed macular (flat) lesions. There was no loss of sensation in these lesions. Skin smears were positive and three peripheral nerves were enlarged. Multibacillary (MB) leprosy.

MULTIBACILLARY (MB) LEPROSY

23. This boy shows patches on the face and neck, and many nodules (small lumps) on the right ear. The other ear was similarly affected. Always examine the ears in leprosy. In some cases they are the main, or even the only site of nodule formation. Multibacillary (MB) leprosy.



NEURAL LEPROSY

On the left, enlarged nerves are shown in the neck. Visibly enlarged nerves, as shown here, are valuable in making the diagnosis of leprosy, because such enlargement does not occur in other conditions.

The picture below is a reminder that, in some countries, particularly India, patients may present with nerve enlargement, but no skin lesions: 'Pure Neural Leprosy' (PNL).



The nerve illustrated and arrowed is the superficial peroneal on the upper surface of the foot and lower leg. In PNL the typical nerves affected are ulnar, lateral popliteal, median, posterior tibial and facial. This form of leprosy should not be diagnosed and treated without referral to an experienced clinician or practitioner.

REACTIONS

- Apart from diagnosing, PB and MB leprosy, frontline health workers and volunteers should be able to recognise and refer patients in lepra reaction.
 - Reactions in leprosy occur when the immune system reacts against the bacillary infection.
 - These reactions are often damaging to skin, nerves and other tissues.
 - Skin lesions become swollen, warm, red and painful. Ulceration may occur.
 - More importantly, nerves are also inflamed and swollen and this may result in damage to nerve fibres causing sensory loss and/or muscle weakness/ paralysis.
 - The patient can present with reaction, at the time of diagnosis, during treatment or even after treatment.
 - The pictures in the following pages are included to help frontline health workers and volunteers to recognise reactions and refer the patient for expert advice.
 - In the following pages, reactions are classified into Type 1 reaction (Reversal reaction) and Type 2 reaction (Erythema Nodosum Leprosum (ENL)).
-

Reactions – Type 1 (syn. Reversal)



1. The picture shows a patch of paucibacillary (PB) leprosy on the face and ear, with enlargement of the greater auricular nerve in the neck (arrowed). A reaction developed suddenly after the start of multidrug therapy (MDT). The existing lesion became swollen, painful and tender. The picture is an important reminder of the importance of nerve involvement in Type 1 reactions. The greater auricular nerve shown here happens to have limited clinical significance, but if peripheral nerves in the limbs, or those supplying the eye region are involved, loss of sensation and/or muscle power may occur, sometimes very rapidly. Consult your supervisor or national guidelines on the use of analgesics, splinting or steroids (prednisolone), according to the severity of the reaction. Type 1 reaction.

TYPE 1 REACTIONS



2. This large paucibacillary (PB) patch was initially flat, but has become swollen and red, especially along the edges, due to Type 1 reaction. Reaction cases are better treated in a referral centre, but consult your national guidelines with regard to the immediate treatment of mild or severe cases. Type 1 reaction.

TYPE 1 REACTIONS



3. The raised red, swollen, painful, tender lesions seen here, particularly on the hands and fingers, occurred during the course of treatment for multibacillary (MB) leprosy. A reaction of this extent and severity is best managed in a referral centre or specialised unit, if available, but consult your national guidelines on steps to be taken. Type 1 reaction.

TYPE 1 REACTIONS



4. Raised red lesions are seen above and below the navel (umbilicus) in a patient with multibacillary (MB) leprosy. There were numerous other patches of Type 1 reaction on the trunk and limbs. Reactions of this kind may occur suddenly. It is the element of **peripheral nerve involvement** which is of particular concern. Type 1 reaction.

Reactions – Type 2 (syn. ENL)



1. Numerous cutaneous and subcutaneous lesions are shown, mostly red and raised, with pustule formation and ulceration in several places. ENL stands for 'erythema nodosum leprosum' and is a frequent complication of MB leprosy near the lepromatous end of the immune spectrum. Attacks of ENL typically last for about 2 weeks, often accompanied by fever, malaise, pain in the nerves, joint involvement and eye complications. Mild cases may be managed under field conditions (consult your national guidelines), but severe or persistent cases are best managed in a referral unit or special centre. Type 2 reaction.

TYPE 2 REACTIONS



2. The pink or red coloured tender nodules of ENL are often seen on the face and limbs, but may be generalised, as seen here in a patient who had lesions over the whole trunk. In some cases, ENL nodules may become vesicular, pustular, bullous or gangrenous and break down with considerable tissue damage. Mild cases may be handled under field conditions, but those with severe symptoms and/or involvement of peripheral nerves, eyes or testicles are usually better managed in a referral centre or special unit. Type 2 reaction.

DISABILITY—DEFORMITY

Patients can develop deformity before, during or after treatment of leprosy.

- If leprosy is diagnosed late, and either not treated or inadequately treated, peripheral nerves can be damaged, leading to loss of sensation and muscle power.
 - Early detection and regular treatment with MDT play a crucial role in preventing deformity and disability.
 - Timely management of reactions can prevent / limit disability and deformity
-



1. **Hands.** The upper picture, taken in a rural village, illustrates

(a) Bilateral 'claw' hands, due to nerve damage, muscle weakness and contractures, and

(b) burns and scars of the fingers due to loss of sensation.

The patient presented late. On diagnosis, she had obvious involvement of the median and ulnar nerves on both sides. MDT arrested the progress of her bacterial infection, but did little or nothing for the established disabilities.

The lower picture shows 'wrist drop' due to damage to the radial nerve in the upper arm in a young boy with MB leprosy.

DISABILITY–DEFORMITY

2. **Feet.** The picture opposite (right) shows a left 'drop foot' due to involvement of the lateral popliteal nerve in the leg during a reaction. The patient presented in reaction, with muscle weakness and loss of sensation.



The picture opposite (left) shows the plantar (under) surface of a patient's foot with ulceration at the base of the big toe, on one of the main pressure points. There is also deformity and some 'clawing' of the toes. He presented late with established damage to the peripheral nerve supplying sensation and muscle power to the foot.

DISABILITY-DEFORMITY



3. Face, nose and eyes. Upper picture; Loss of facial hair is a characteristic of lepromatous leprosy. In this case, loss of eyebrows (madarosis) is seen as a deformity of lepromatous leprosy. **Middle pictures;** Collapse of the nasal bridge because of secondary infection of the nasal cartilage and the nasal bones was a common deformity in lepromatous leprosy. The pictures show the frontal view and the side view of the deformity. **Lower pictures;** Inability to close the eye because of paralysis of the eyelids (lagophthalmos) is often seen in borderline leprosy. The pictures show the deformity with the patient keeping his eyes open and when he attempts to close his eyes.

CHEMOPROPHYLAXIS

Prevention of leprosy through chemoprophylaxis

The use of Single dose of Rifampicin (SDR) as preventive treatment for contacts of leprosy patients (adults and children 2 years of age and above), after excluding leprosy and Tuberculosis disease, and in the absence of other contraindications is recommended. This intervention shall be implemented by programmes that can ensure: (i) adequate management of contacts and (ii) consent of the index case to disclose his/her disease.

Rifampicin dose for single-dose rifampicin (SDR)

Age / Weight	Rifampicin single dose
15 years and above	600 mg
10–14 years	450 mg
Children 6–9 years (weight ≥ 20 kg)	300 mg
Children < 20 kg (≥ 2 years)	10–15 mg/kg

Reference: Guidelines for the Diagnosis, Treatment and Prevention of Leprosy, WHO, 2018

DIFFERENTIAL DIAGNOSIS

(Non-leprosy conditions of the skin)

Some of the non leprosy skin conditions can resemble leprosy lesions. Knowing the differential diagnosis will be of help to the peripheral health care workers in diagnosing leprosy.

Failure to keep leprosy in mind, leading to under-diagnosis (missing the diagnosis) is a serious matter. Over or wrong diagnosis is equally serious.

We have divided the pictures into two groups:

- (a) Commonly occurring skin conditions mimicking leprosy, 1–13, and
- (b) Less commonly occurring skin conditions mimicking leprosy, 14–23.

Differential Diagnosis - Commonly occurring conditions



1. **Birthmark.** Typically single or few in number. Present from birth, unchanging over long periods of observation. Edges may be very sharply defined and jagged, as shown here. Hypopigmented, with normal sensation. It is called naevus anaemicus.

NON-LEPROSY CONDITIONS OF THE SKIN – Commonly occurring conditions



2. **Birthmark.** Left shoulder region. Present since birth; normal sensation and sweating. Take a history; ask the parents or close relatives about the duration of the lesion; test for loss or reduction of sensation.

NON-LEPROSY CONDITIONS OF THE SKIN – Commonly occurring conditions



3. **Post-inflammatory hypopigmentation.** Reduction of normal pigment at the site of previous (possibly recent) inflammation from wounds and simple inflammatory conditions as shown here is common and may occasionally mimic early leprosy. Take a history; examine for loss or reduction in sensation.

NON-LEPROSY CONDITIONS OF THE SKIN – Commonly occurring conditions



4. **Scar tissue.** Scars are seen very commonly in patients in leprosy-endemic areas. They may be caused by cutting, burning or simple trauma (physical damage). Those shown here followed the application of native medicine. Some scars may show loss of sensation and be mistaken for a patch of leprosy.

NON-LEPROSY CONDITIONS OF THE SKIN – Commonly occurring conditions



5. Contact dermatitis. Skin contact with a wide range of substances, including dyes, soaps, detergents, cosmetics, plants, plastics, etc. In contrast to leprosy, itching is usually present, especially in the early stages; may be intense and lead to scratching and secondary infection. Sensation and peripheral nerves are all normal.

NON-LEPROSY CONDITIONS OF THE SKIN – Simple commonly occurring conditions



6. **Seborrhoeic dermatitis.** The lesions are widespread, scaly and itchy. The hairy scalp may be involved with lesions behind the ears. Sensation is normal..

NON-LEPROSY CONDITIONS OF THE SKIN – Commonly occurring conditions



7. **Lichenoid dermatitis.** Sometimes the lesions are round and look like coins (nummular LD). These very itchy, scaly lesions with hypo-pigmentation (reduced colouring) may resemble leprosy. Sensation is normal and there are no other signs to support a diagnosis of leprosy.

NON-LEPROSY CONDITIONS OF THE SKIN – Commonly occurring conditions



8. **Tinea versicolor.** A very common tropical condition. Well-defined, scaly lesions are often widely scattered over the trunk, neck and limbs. Sensation is normal; fungal elements easily seen under the microscope.

NON-LEPROSY CONDITIONS OF THE SKIN – Commonly occurring conditions



9. **Tinea circinata.** Typical lesions are shown on the face and leg. This is a fungal disease. Sensation is normal.

NON-LEPROSY CONDITIONS OF THE SKIN – Commonly occurring conditions

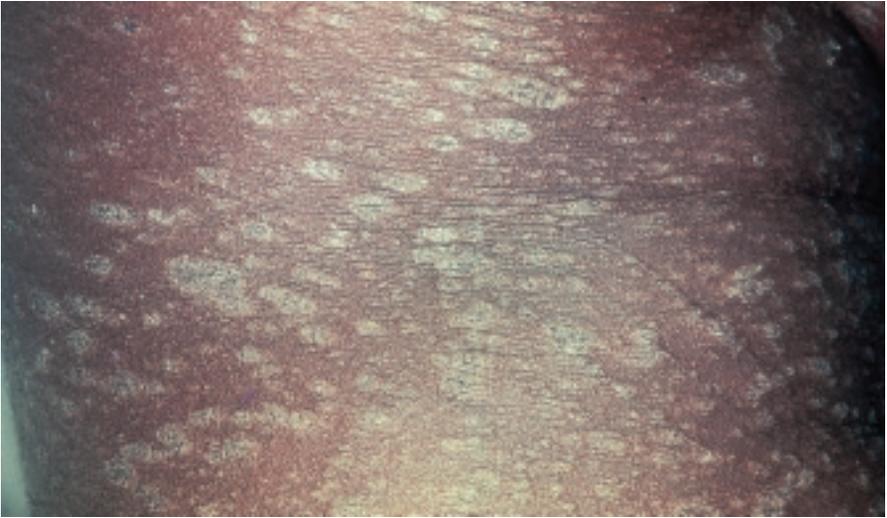
10. **Tinea corporis**, above the (slightly bulging) navel. This prominent, scaly lesion is due to fungal infection. Sensation is normal.

NON-LEPROSY CONDITIONS OF THE SKIN – Commonly occurring conditions



11. **Vitiligo.** The remarkably white lesions seen here are due to de-pigmentation, (i.e. complete loss of colour) as opposed to the much more typical hypo-pigmentation (reduction of pigment) seen in leprosy. However in the early stage of this disease, incomplete loss of pigment may lead to confusion with leprosy. Sensation is normal.

NON-LEPROSY CONDITIONS OF THE SKIN – Commonly occurring conditions



12. **Pityriasis rosea.** Occurs typically in adolescents or young adults. 'Pityriasis' means bran and individual lesions are red, with a collar of fine scales pointing towards the centre. The condition often starts with a 'herald' patch, (lower picture), which is larger than the subsequent lesions, which are widely distributed, especially on the trunk. Sensation is normal.

NON-LEPROSY CONDITIONS OF THE SKIN – Commonly occurring conditions



13. **Psoriasis.** The typical lesions shown here are usually itchy, multiple and symmetrical. Treated lesions may mimic leprosy. Some psoriatic lesions may look like leprosy in type I reaction.

NON-LEPROSY CONDITIONS OF THE SKIN – Commonly occurring conditions



14. **Granuloma annulare.** As shown here, the lesions may closely resemble leprosy. It affects mainly children and young adults. The upper picture shows the common localised form. The lower picture illustrates a much less common, widely distributed form. Papules are nodules appear in a ring-like (annular) pattern. Lesions are symptomless and there are no enlarged peripheral nerves. Sensation is normal.

NON-LEPROSY CONDITIONS OF THE SKIN – Commonly occurring conditions



15. **Lichen planus.** Relatively common disease of the skin and mucous membranes. Can affect any part of the body, but commonly the wrists, lumbar region and ankles. As shown here, lesions often have a striking violet colour and on fading may leave areas of hyper pigmentation (dark colouring). Sensation is normal.

Differential Diagnosis - Less commonly occurring conditions

The preceding pictures 1–13 illustrated relatively simple, straightforward, commonly occurring conditions.

The following pictures (14–23) deal with less common conditions, some of which may in fact be rare in your country or area. They are intended mainly as a reminder of the wide group of non-leprosy conditions which may resemble or mimic leprosy.

- All the conditions shown here have been reported as giving rise to a wrong diagnosis of leprosy.
 - It is hoped that at least these pictures will help you to avoid wrong diagnosis, which can have serious consequences for the individual patient and the family. As already noted above, it is important for you to find out which conditions are known to cause confusion in your area.
-

NON-LEPROSY CONDITIONS OF THE SKIN – Less commonly occurring conditions



16. Neurofibromatosis (von Recklinghausen's Disease). Multiple nodular lesions, which are soft and may become pendulant (hanging). The peripheral nerves typically involved in leprosy are not involved. Sometimes the disease manifests itself as scattered coffee brown ('café au lait') spots and patches. Occasional cases may need biopsy for confirmation of diagnosis.

NON-LEPROSY CONDITIONS OF THE SKIN – Less commonly occurring conditions



17. **Sarcoidosis.** Skin lesions of sarcoidosis may closely resemble leprosy. This lady has a large, single, slightly hypopigmented patch covering most of the left side of her face, with some infiltration and small nodules on the rim of the nose. Sensation was normal and there was no enlargement of nerves near the patch. Peripheral nerves were not affected.

NON-LEPROSY CONDITIONS OF THE SKIN – Less commonly occurring conditions



18. **Lupus Vulgaris (skin tuberculosis).** Skin manifestations are variable and may mimic some forms of leprosy. Lesions are red (erythematous), infiltrated, slow growing, well defined and symptomless, but with a tendency to ulceration and scar formation. Nerves are not involved and sensation on the lesions is normal. This little girl has a well developed lesion on the arm, but the most commonly affected areas are the face, neck and buttocks.

NON-LEPROSY CONDITIONS OF THE SKIN – Less commonly occurring conditions

19. Discoid lupus erythematosus. The pictures shown here are from two different patients. The upper picture shows typical distribution of lesions on the face, with some tendency towards de-pigmentation (i.e. loss of pigment). This is shown much more markedly in the lower picture. Sensation is normal and peripheral nerves not affected.

NON-LEPROSY CONDITIONS OF THE SKIN – Less commonly occurring conditions



20. **Xanthomatosis.** The nodules, as shown here, may mimic some forms of leprosy. The disease is usually associated with high levels of blood cholesterol and appears more commonly in young people. The elbow region illustrated is a common site for nodules.

NON-LEPROSY CONDITIONS OF THE SKIN – Less commonly occurring conditions



21. **Dermal leishmaniasis.** The patient (above, right) shows lesions of disseminated leishmaniasis which resemble some forms of leprosy. The patient (below, left) shows nodular lesions of post-kala-azar dermal leishmaniasis (PKDL), which may also be mistaken for leprosy. Leishmaniasis has a markedly regional distribution worldwide.

NON-LEPROSY CONDITIONS OF THE SKIN – Less commonly occurring conditions



22. **Granuloma multiforme.** This condition also mimics leprosy. Its cause is unknown; possibly a variant of granuloma annulare (see picture 14 on page 59). Initial stages are characterised by itching (not typical for leprosy). Lesions disappear sooner or later and do not respond to any form of treatment. Sensation and peripheral nerves – all normal.

NON-LEPROSY CONDITIONS OF THE SKIN – Less commonly occurring conditions



23. **Pellagra.** Lesions may mimic leprosy in reaction (see Reactions). Lesions are typically symmetrical, symptomless, and often associated with malnutrition, alcoholism and poverty. Sensation and peripheral nerves are normal. Lesions respond to nicotinic acid.

NON-LEPROSY CONDITIONS OF THE SKIN – Less commonly occurring conditions

24. **Lymphoma.** (Also called mycosis fungoides, granuloma fungoides or cutaneous T-cell lymphoma.) The typical shiny nodules seen here on the face may mimic some forms of leprosy. Occurs mostly in adult males.

NON-LEPROSY CONDITIONS OF THE SKIN – Less commonly occurring conditions

25. **Kaposi's sarcoma.** Various forms of this malignant condition may occur in leprosy-endemic countries, some of them associated with HIV-AIDS. The lesions shown here are from two different patients. The lesions on the forearm (upper picture) are from a patient who later died of AIDS. The hard bluish, vascular nodules bleed easily. Feet (lower picture) and hands are the commonest site of involvement. Sensation and peripheral nerves — all normal.

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8. E. Nunzi and D.L. Leiker, *A Manual of Leprosy*, O.C.S.I., Bologna, Italy, 1990 (p. 69 (lower)).
9. American Leprosy Missions, Inc., 1 ALM Way, Greenville, SC 29601, USA (p. 32).
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13. Images from Jerry Joshua collection (pp 7, 8, 17, 41)

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7. Don't treat me like I have leprosy: Frist – a book about the history of leprosy and the importance of social issues.

**From International Federation of Anti-Leprosy Associations (ILEP), Quai de l'Île 13, 1204 Genève, Switzerland
<https://ilepfederation.org>**

1. Leprosy: A Bryceson and R E Pfaltzgraff (1990) – a readable reference book for medical students, general practitioners and physicians.
2. Care of the Eye in Hansen's Disease: M Brand (1993) in English and French – outlines the management of eye complications in leprosy for ophthalmologists and other health workers.
3. Insensitive feet: P Brand (1994) – a

InfoNTD.org is the one-stop source of information on cross-cutting issues in Neglected Tropical Diseases.
<https://www.infontd.org/>

INFOLEP: Infolep is the international knowledge centre for access to (digital) information resources on leprosy and related subjects. Infolep provides scientists, professionals and others working in the field of leprosy with knowledge and information to support their daily work. Infolep also offers library services such as access to subscription-only articles and assistance with literature searches for those unable to do this themselves.

REFERENCES & FURTHER READING

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In association the Leprosy Division of the Directorate General of Health Services, Ministry of Health and Family Welfare, Government of India, New Delhi

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From Health Books International, formerly Teaching-aids at Low Cost (TALC)

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<https://healthbooksinternational.org/>

Books

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From International Resource Centre International Centre for Eye Health, Institute of Ophthalmology, 11-43 Bath Street, London, EC1V 9EL, United Kingdom

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NOTE

Clinical diagnosis of leprosy entails examination of the whole person under good light
(preferably daylight) to look for skin lesions that can occur anywhere on the body. A
New Atlas of Leprosy (Revised and Updated) is a training material to educate health
workers on clinical diagnosis of leprosy and contains pictures showing skin lesions
and information about the disease. The images are for teaching purposes and are not
intended for a general audience.

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A NEW ATLAS OF LEPROSY (REVISED AND UPDATED)

“Frontline health workers play a very important role in leprosy case-finding. For that reason, ensuring that they have access to all the information they need as they go about their work is crucial. I believe they will find A NEW ATLAS OF LEPROSY (REVISED AND UPDATED) to be an excellent reference tool for use in the field, and I hope it will contribute to the accurate and timely detection of as many new cases of leprosy as possible.”

—Yohei Sasakawa, WHO Goodwill Ambassador for Leprosy Elimination