



World Health
Organization

Ending the neglect to attain the
Sustainable Development Goals
*A strategic framework for integrated
control and management of skin-related
neglected tropical diseases*

2030

Buruli ulcer

Cutaneous leishmaniasis

*Mycetoma,
chromoblastomycosis and
other deep mycoses*

Leprosy (Hansen's disease)

Lymphatic filariasis

Onchocerciasis

*Post-kala-azar dermal
leishmaniasis*

*Scabies and other
ectoparasitoses*

Yaws





**Ending the neglect to attain the
Sustainable Development Goals
A strategic framework for integrated control
and management of skin-related neglected
tropical diseases**

Ending the neglect to attain the Sustainable Development Goals: a strategic framework for integrated control and management of skin-related neglected tropical diseases

ISBN 978-92-4-005142-3 (electronic version)

ISBN 978-92-4-005143-0 (print version)

© World Health Organization 2022

Some rights reserved. This work is available under the Creative Commons Attribution-NonCommercial-ShareAlike 3.0 IGO licence (CC BY-NC-SA 3.0 IGO; <https://creativecommons.org/licenses/by-nc-sa/3.0/igo>).

Under the terms of this licence, you may copy, redistribute and adapt the work for non-commercial purposes, provided the work is appropriately cited, as indicated below. In any use of this work, there should be no suggestion that WHO endorses any specific organization, products or services. The use of the WHO logo is not permitted. If you adapt the work, then you must license your work under the same or equivalent Creative Commons licence. If you create a translation of this work, you should add the following disclaimer along with the suggested citation: "This translation was not created by the World Health Organization (WHO). WHO is not responsible for the content or accuracy of this translation. The original English edition shall be the binding and authentic edition".

Any mediation relating to disputes arising under the licence shall be conducted in accordance with the mediation rules of the World Intellectual Property Organization (<http://www.wipo.int/amc/en/mediation/rules/>).

Suggested citation. Ending the neglect to attain the Sustainable Development Goals: a strategic framework for integrated control and management of skin-related neglected tropical diseases. Geneva: World Health Organization; 2022. Licence: CC BY-NC-SA 3.0 IGO.

Cataloguing-in-Publication (CIP) data. CIP data are available at <http://apps.who.int/iris>.

Sales, rights and licensing. To purchase WHO publications, see <http://apps.who.int/bookorders>. To submit requests for commercial use and queries on rights and licensing, see <https://www.who.int/copyright>.

Third-party materials. If you wish to reuse material from this work that is attributed to a third party, such as tables, figures or images, it is your responsibility to determine whether permission is needed for that reuse and to obtain permission from the copyright holder. The risk of claims resulting from infringement of any third-party-owned component in the work rests solely with the user.

General disclaimers. The designations employed and the presentation of the material in this publication do not imply the expression of any opinion whatsoever on the part of WHO concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries. Dotted and dashed lines on maps represent approximate border lines for which there may not yet be full agreement.

The mention of specific companies or of certain manufacturers' products does not imply that they are endorsed or recommended by WHO in preference to others of a similar nature that are not mentioned. Errors and omissions excepted, the names of proprietary products are distinguished by initial capital letters.

All reasonable precautions have been taken by WHO to verify the information contained in this publication. However, the published material is being distributed without warranty of any kind, either expressed or implied. The responsibility for the interpretation and use of the material lies with the reader. In no event shall WHO be liable for damages arising from its use.

Foreword	vii
Acknowledgements	viii
Glossary of key terms and abbreviations	x
Executive summary	xii
1. Introduction	2
1.1 Skin conditions and skin NTDs	2
1.2 Rationale for integration	2
1.3 Types of skin NTDs	4
2. Purpose, goal and objectives of the framework	8
3. Assessing the burden of skin NTDs	12
3.1 Reporting	12
3.2 Methods	16
4. Potential areas for integration	20
4.1 Social mobilization	21
4.2 Active case detection	21
4.3 Training and capacity-building	22
4.4 Clinical and laboratory diagnosis	22
4.5 Surgery	22
4.6 Rehabilitation	23
4.7 Wound and lymphoedema management	23
4.8 Self-care	24
4.9 Mental well-being	24
4.10 Stigma reduction, inclusion and human rights	24
4.11 Referral and support systems	24
4.12 Mass drug administration	25
4.13 Advocacy	25
4.14 Supply chain	25
4.15 Integrated planning	26
4.16 Surveillance and data management	26
4.17 Monitoring and evaluation	26
4.18 Water, sanitation and hygiene	26

4.19 Nutrition	27
4.20 One Health	27
5. Services for skin NTDs	30
5.1 The patient's journey	30
5.2 Health services and levels	32
5.3 Mainstreaming within national health systems	34
5.4 Strengthening health systems	34
5.5 Coordinating with other programmes and sectors	34
5.6 Ensuring access to services	34
6. Empowering persons affected by skin NTDs and their family members	38
6.1 Health	38
6.2 Social aspects	39
6.3 Mental well-being	39
6.4 Livelihood	40
7. Targets and indicators for skin NTDs	44
7.1 Tracking indicators at national and global levels	44
7.2 Including the indicators in strong country-owned monitoring and evaluation systems and national NTD plans	45
8. Health information systems and integrated reporting of skin NTDs	48
9. Research gaps in integration and management of skin NTDs	52
10. Factors for successful integration of skin NTDs and the way forward	56
10.1 Political commitment	56
10.2 Country ownership	56
10.3 Partner support	56
10.4 Involvement of persons affected by skin NTDs	56
10.5 Resources and funding	56
10.6 Workplans for integration into the primary health care system	56
10.7 Capacity-building and retention of expertise	57
10.8 Identifying other public health problems for integration	57
10.9 High-quality active case detection	57
10.10 Equitable access to diagnosis and treatment for all	57
11. Conclusions	60
References	61

Annex 1. Process used to develop the framework	64
Annex 2. Training on skin NTDs and skin conditions, by level	67
Annex 3. Training materials and Apps	68
Annex 4. Clinical and laboratory diagnosis of skin NTDs, by disease	70
Annex 5. Potential areas for integration of diagnostic tests for skin NTDs	71
Annex 6. Management of skin NTD-related problems	72
Annex 7. Examples of good practices in integration of skin NTDs, by WHO region	73
Annex 8. Targets and indicators for measuring progress and their relevance to skin NTDs	81
Annex 9. Disease-specific targets and indicators for skin NTDs	83
Annex 10. Form for recording skin NTDs (Skin NTDs 01)	84

Fig. 1. Rationale for integration of skin NTDs	3
Fig. 2. Stakeholders involved in skin NTD integration and control	5
Fig 3. Challenges for integration of skin NTDs	5
Fig. 4. Goal and objectives of the skin NTD framework	9
Fig. 5. Overview of the global disease burden of skin NTDs	13
Fig. 6. Journey of a patient with skin NTDs	31
Fig. 7. Integration of services for skin NTDs at different levels	33
Fig. 8. Empowering persons affected by skin NTDs at the community level	39
Fig. 9. Virtuous cycle expected through successful integration of skin NTDs	57
Fig. A1.1. Professions or affiliations of respondents (first online survey)	65
Fig. A1.2. Areas of work of respondents, by skin NTD (first online survey)	65
Fig. A1.3. Potential areas for integrated activities to control skin NTDs	65
Fig. A1.4. Professions or affiliations of respondents (second online survey)	66
Fig. A1.5. Areas of work of respondents, by skin NTD (second online survey)	66

TABLES

Table 1. Skin NTDs and 2030 road map targets	4
---	----------

Table 2. Potential areas for integrated control and management of skin NTDs	20
--	-----------

BOXES

Box 1. Examples of indicators for skin NTDs and skin NTD integration for in-country management	45
---	-----------

Box 2. Potential research areas for skin NTDs and skin NTD integration	52
---	-----------

Control and management of neglected tropical diseases (NTDs) are prerequisites for successful delivery of global health improvement as delineated in the United Nations Sustainable Development Goals. The commitment to “end the epidemics of ... neglected tropical diseases” as part of the pledge to “ensure healthy lives and promote well-being for all at all ages” (Goal 3) is the most obviously applicable, but effective interventions against NTDs will deliver on other goals. These include eradicating poverty (Goal 1), ending hunger (Goal 2), ensuring inclusive and equitable quality education (Goal 4), promoting productive working lives (Goal 8), and reducing inequality within and among countries (Goals 10).

Effective control, while highlighted as a key objective in WHO’s new NTD road map for 2021–2030, faces significant constraints. These include stretched health care budgets, organizational complexities and competing public health priorities, most recently the COVID-19 pandemic. Schemes that contribute to easing the delivery of the road map’s strategic objectives and operational logistics will have a significant impact on the realization of this endeavour.

The recognition that linking many of the NTDs with their site of initial presentation – the skin – provides a potential route for delivery of the road map through a process of integration in diagnosis, control and management. Changes on the skin are visible and distinctive and thus provide a unique pathway for early recognition of disease. Yet integration means more than this. Other opportunities for amalgamation include designing and

delivering common training pathways for front-line health workers, addressing integration in medicine delivery systems across diseases, and approaching prevention of disability and stigma-reducing initiatives through shared approaches. The publication of a common framework for integrated control and management of skin NTDs provides just such a prospect for measures designed to benefit the strengthening of sustainable health services and the communities they serve.

This strategic framework addresses many of the challenges and opportunities for implementing an integrated approach to the control and management of skin NTDs. These range from common learning platforms to systems for delivering treatment. While it is not possible to fully operationalize this approach without also addressing the common skin problems that prevail in all countries where NTDs are endemic, as this publication shows, integrated methods are being developed in many different regions globally. Schemes to address local endemic NTDs aimed at benefitting entire communities and the overall improvement of skin health are now under way.

Broadening access to an integrated approach to skin NTDs through the implementation of this strategic framework thus offers a solution to many of the issues encountered by those working to overcome NTDs. The framework also describes the wider health benefits supporting progress towards universal health coverage and skin health for all.



Gautam Biswas, Director a.i.,
WHO Department of Control of
Neglected Tropical Diseases



Claire Fuller
International Foundation for
Dermatology, United Kingdom



Roderick Hay
King's College London,
United Kingdom

The World Health Organization (WHO) is grateful to the many individuals who contributed to the development of this framework.

This work was coordinated by Kingsley Asiedu, WHO Department of Control of Neglected Tropical Diseases (WHO/NTD).

Writers

Chandrakant Revankar, Public Health Medical Consultant, North Brunswick, New Jersey, United States of America

Rie Yotsu, Tulane School of Public Health and Tropical Medicine, New Orleans, United States of America

Reviewers

Robert de Arquer Guillermo, British Leprosy Relief Association, Colchester, United Kingdom

Roderick Hay, King's College London, United Kingdom

Aimé Bitakuya Heri, School of Tropical Medicine and Global Health, Nagasaki University, Nagasaki, Japan

Martin Kollmann, German Network Against Neglected Tropical Diseases, Nairobi, Kenya

Jim Cannon, Christian Blind Mission, Dublin, Ireland

Linda Faye Lehman, Consultant in Disability Prevention and Rehabilitation in Neglected Tropical Diseases, Rio Rancho, New Mexico, United States of America

Gale Davey, Brighton and Sussex Medical School, Brighton, United Kingdom

Michael Marks, London School of Hygiene & Tropical Medicine, London, United Kingdom

Belen L. Dofitas, Partners in Leprosy Action/Philippine Leprosy Mission, Inc., Manila, Philippines

Michele Murdoch, West Hertfordshire Hospitals NHS Trust, Watford General Hospital, Watford, United Kingdom

Julian Eaton, Centre for Global Mental Health, London, United Kingdom

Aparna Srikantam, Leprosy Relief Association Society, Telangana, India

Jannine Ebenso, The Leprosy Mission International, Brentford, United Kingdom

Paul Saunderson, American Leprosy Missions, Ålesund, Norway

Lynne Elson, Centre for Tropical Medicine and Global Health, University of Oxford, United Kingdom, and Kenya Medical Research Institute-Wellcome Trust, Kilifi, Kenya

Wim van Brakel, Until No Leprosy Remains International, Amsterdam, Netherlands

Claire Fuller, International Foundation for Dermatology, London, United Kingdom

WHO staff

Junerlyn Farah Virrey Agua, Strategic Operations and Analytics, WHO/NTD, Geneva, Switzerland

Yves Barogui, Tropical and Vector-borne Diseases, WHO Regional Office for Africa, Libreville, Gabon

Gautam Biswas, Strategic Information and Analytics, WHO/NTD, Geneva, Switzerland

Daniel Argaw Dagne, Prevention, Treatment and Care, WHO/NTD, Geneva, Switzerland

Kaloyan Kamenov, Sensory Functions, Disability and Rehabilitation, WHO, Geneva, Switzerland

Pauline Kleinitz, Sensory Functions, Disability and Rehabilitation, WHO, Geneva, Switzerland

Jonathan King, Prevention, Treatment and Care, WHO/NTD, Geneva, Switzerland

Zaw Lin, Communicable Diseases, WHO Regional Office for South-East Asia, New Delhi, India

Alexei Mikhailov, Strategic Information and Analytics, WHO/NTD, Geneva, Switzerland

Abate Mulugeta Beshah, Neglected Tropical Diseases, WHO Regional Office for Africa, Brazzaville, Congo

Pamela Sabina Mbabazi, Strategic Operations and Analytics, WHO/NTD, Geneva, Switzerland

Mwelecele Ntuli Malecela, Director, WHO/NTD, Geneva, Switzerland

Santiago Nicholls, Neglected Infectious Diseases, Pan American Health Organization, Washington (DC), United States of America

José Postigo, Prevention, Treatment and Care, WHO/NTD, Geneva, Switzerland

Anthony Solomon, Office of the Director, WHO/NTD, Geneva, Switzerland

Pemmaraju Venkata Ranganadha Rao, Global Leprosy Programme, WHO Regional Office for South-East Asia, New Delhi, India

Supriya Warusavithana, Neglected Tropical Diseases, WHO Regional Office for the Eastern Mediterranean, Cairo, Egypt

Aya Yajima, Vector-borne and Neglected Tropical Diseases, WHO Regional Office for South-East Asia (formerly Regional Office for the Western Pacific), New Delhi, India

Financial support

Funding to develop this publication was provided by Anesvad, Spain.

This glossary provides brief definitions of terms and abbreviations used in the framework; they may have different meanings in other contexts.

active case detection

Deliberate efforts to identify cases through screening for a disease or diseases in at-risk populations. Active case detection is usually implemented outside of health facilities.

assistive products

Any external product (including devices, equipment, instruments or software), especially produced or generally available, the primary purpose of which is to maintain or improve an individual's functioning and independence, and thereby to promote their well-being. Assistive products are used also to prevent impairments and secondary health conditions.

active surveillance

Process of detecting and reporting cases actively, with stimulus provided by health authorities to health care workers in the form of individual contact, feedback or other incentives. Active case detection activities in the community may be conducted in order to enhance the number of cases reported. The data are often more complete than those for passive surveillance.

assistive technology

The application of organized knowledge and skills related to assistive products, including systems and services. Assistive technology is a subset of health technology.

control

Reduction of disease incidence, prevalence, morbidity and/or mortality to a locally acceptable level as a result of deliberate efforts; continued interventions are required to maintain the reduction. Control may or may not be related to global targets set by WHO.

coordination

Collaboration among adjacent sectors and programmes, within and beyond health, in the broader network for neglected tropical diseases of the skin. Working together more effectively will accelerate and sustain progress to eradicate, eliminate and control these diseases.

disability

Inability to perform routine daily activities adequately or independently; the negative aspects of the interaction between a person with a health condition and his or her context (environmental and personal factors).

disability-adjusted life year (DALY)

A measure of overall disease burden. One DALY represents the loss of the equivalent of one year of full health. DALYs for a disease or health condition are calculated as the sum of years of life lost due to premature mortality and years of healthy life lost due to prevalent cases of the disease or health condition in a population.

elimination as a public health problem

A term related to the control of both infection and disease, defined by achievement of measurable targets set by WHO in relation to a specific disease. When reached, continued action is required to maintain the targets and/or to advance interruption of transmission. Documentation of elimination as a public health problem is called validation.

elimination (interruption of transmission)

Reduction to zero of the incidence of infection caused by a specific pathogen in a defined geographical area, with minimal risk of reintroduction, as a result of deliberate efforts; continued action to prevent re-establishment of transmission may be required. Documentation of elimination of transmission is called verification.

empowerment

A process through which people gain greater control over decisions and actions affecting their health and patients or community members are empowered to assume greater responsibility for their own care and well-being.

equity

The absence of avoidable or remediable differences among groups of people defined socially, economically, demographically, geographically or by sex.

eradication

Permanent reduction to zero of the worldwide incidence of infection caused by a specific pathogen, as a result of deliberate efforts, with no risk of reintroduction. Documentation of eradication is termed certification.

gender responsiveness

Outcomes that reflect an understanding of gender roles and inequalities and which seek to encourage equal participation and equal and fair distribution of programme benefits. Gender responsiveness is accomplished through gender analysis and gender inclusiveness.

impairment

Loss of or abnormality in a bodily structure or physiological function (including mental function), whereby “abnormality” means significant variation from established statistical norms.

integration

Grouping or “packaging” of several diseases, depending on their burden in countries, to facilitate joint delivery of interventions through a common platform such as preventive chemotherapy and use of multiplex diagnostics, and monitoring, evaluation and reporting for all relevant endemic NTDs. Integration among the various health sectors facilitates joint delivery.

mass drug administration (MDA)

Distribution of medicines to the entire population of a given administrative setting (for instance, state, region, province, district, subdistrict or village), irrespective of the presence of symptoms or infection; however, exclusion criteria may apply.

mainstreaming

Planning and delivery of interventions against neglected tropical diseases through the national health system infrastructure to build capacity and contribute to sustainable, efficient disease prevention and control.

monitoring and evaluation

Processes for improving performance and measuring results in order to improve management of outputs, outcomes and impact.

morbidity

Detectable, measurable clinical consequences of infection and disease that adversely affect the health of individuals. Evidence of morbidity may be overt (such as lymphoedema and hydrocele, wounds, scars, blindness or chronic pain) or subtle (such as impact on mental health, impeded school or work performance or increased susceptibility to other diseases).

neglected tropical diseases (NTDs)

A medically diverse set of bacterial, viral, parasitic, fungal and noncommunicable diseases and disease groups that disproportionately affect populations living in poverty, predominantly in tropical and subtropical areas. They remain a public health problem that affects populations left furthest behind by development in the most vulnerable countries and communities. They impose a devastating human, social and economic burden on more than one billion people worldwide.

passive surveillance

Process of constant detection and reporting of cases presenting at health facilities for diagnosis. Health authorities do not stimulate reporting by reminding health care workers to report disease nor provide feedback to individual health workers.

people-centred care

An approach to care that consciously adopts the perspectives of individuals, carers, families and communities as participants in, and beneficiaries of, trusted health systems that respond to their needs and preferences humanely and holistically. People-centred care requires also that people receive the education and support they need to make informed decisions about, and participate in, their own care. It is organized around the health needs and expectations of people rather than by the diseases with which they are affected.

person-centred care

Approaches and practices to care that view the person as a whole, with many levels of needs and goals, with these needs arising from their own personal social determinants of health.

rehabilitation

A set of interventions designed to optimize functioning and reduce disability in individuals with health conditions in interaction with their environment. A health condition refers to disease (acute or chronic), disorder, injury or trauma.

skin-related neglected tropical diseases (skin NTDs)

A subset of neglected tropical diseases with skin manifestations that impair, disable and disfigure and may lead to stigmatization, discrimination and socioeconomic problems.

stigma

A negative stereotype or perception that can lead someone to unfairly judge another person and falsely attribute negative characteristics to them. Stigma can result in prejudice (negative attitudes) and discrimination (negative behaviour) towards persons affected by skin NTDs and/or mental health conditions and their families.

universal health coverage

Universal health coverage is defined as “ensuring that all people can use the promotive, preventive, curative, rehabilitative and palliative health services they need, of sufficient quality to be effective, while also ensuring that the use of these services does not expose the user to financial hardship.”

Background

Skin-related neglected tropical diseases, or “skin NTDs”, are historically neglected because active case detection, individual case management, significant resources and intensive effort are required to control, eliminate and eradicate them. Integrated control and management of skin NTDs offers a pathway to overcome some of these past challenges.

Skin NTDs

At least ten of the diseases included in WHO’s list of NTDs present with changes on the skin before other changes occur in the internal organs or physical disabilities develop. Given this commonality and the likely co-endemicity of many of these diseases, WHO has created a platform for skin NTDs to operationalize the cross-cutting approaches of the road map by integrating relevant activities as applicable. The skin NTDs include Buruli ulcer; cutaneous leishmaniasis; mycetoma, chromoblastomycosis and other deep mycoses; leprosy (Hansen’s disease); lymphatic filariasis; onchocerciasis; post-kala-azar dermal leishmaniasis; scabies and other ectoparasitoses (including tungiasis); and yaws.

Strategic framework for integrated control and management of skin NTDs

The new NTD road map sets global targets and milestones to prevent, control, eliminate and eradicate 20 diseases and disease groups by 2030. It also describes the integrated approaches needed to achieve these targets through cross-cutting activities that intersect multiple diseases.

This strategic framework was prepared as a companion document to the road map in response to the critical actions identified to reach the 2030 targets. Its goal is to assist endemic countries in reducing the morbidity, disability and psychosocial impacts of skin NTDs and other skin conditions through a people-centred approach by identifying areas, key partners and resources for integration as well as systems to embed interventions within national programmes and facilitate country ownership.

Countries in which skin NTDs are endemic are encouraged to adapt the framework in order to plan and implement integrated strategies based on the local endemicity of these and other skin conditions.

Potential areas for integration

National NTD programmes may consider integration in various areas: advocacy; active case detection; clinical and laboratory diagnosis; integrated planning; mass drug administration (MDA); mental well-being; nutrition; monitoring and evaluation; One Health; referral and support systems; rehabilitation; self-care; social mobilization; stigmatization, inclusion and human rights; supply chain; surgery; surveillance and data management; training and capacity-building; wound and lymphoedema management; and water, sanitation, and hygiene (WASH). The potential for integration will depend on the prevalence and co-endemicity of skin NTDs. Integration should maximize use of resources and provide opportunities to mobilize, share and pool resources.

Skin NTD services and person-centred approaches

The framework highlights six core interventions or activities as building blocks for delivering health services to persons affected by skin NTDs, their families and communities:

- early case detection,
- clinical diagnosis,
- laboratory confirmation,
- treatment,
- management of complications and
- prevention.

Ideally, a multidisciplinary team or network of people with diverse trainings and tasks is needed at various levels to deliver skin NTD services comprehensively. The goal of these services is to support patients to reach cure with function, with or without disabilities, and thus to enable their inclusion and participation in social lives. Action to overcome barriers to accessing skin NTD services includes reducing stigma and discrimination associated with certain diseases and ensuring accessible services to people already living with disabilities.

Empowering persons affected by skin NTDs and their family members

The framework emphasizes empowerment of persons affected by skin NTDs in order that individuals gain greater control over decisions and actions affecting their health, mental well-being, livelihood and ability to participate in social lives. The process of empowerment requires support from families and communities as well as social systems.

Implementation of the framework and evaluation of progress

To measure progress against skin NTDs and integrated approaches for their control and management, countries are encouraged to adapt the road map's indicators and define milestones and targets to enable in-country control and management of skin NTDs. Integrated reporting of skin NTDs on a common health information system will not only improve the cost-effectiveness of monitoring and evaluation but also streamline the use of data for planning and action across all endemic skin NTDs.

Ongoing country experiences in integration

Integrated active case detection, wound and lymphoedema management, training of health care workers in basic dermatology using skin NTD training materials, Apps and teledermatology are being practiced by some countries of different regions. These examples of good practices are drivers for other countries to implement integrated control and management of skin NTDs.

Once this framework is adapted by countries in which skin NTDs are endemic, more evidence will be generated and reflected in future editions of this document.

Looking forward

A broad range of research is required to improve control of skin NTDs. Scientific understanding of each skin disease, point-of-care diagnostics and better medicines are needed. Operational research is also needed, for example, to evaluate training and training materials from which to improve integrated case detection on the front line of health care and to identify the roles of persons affected by skin NTDs and their families. Ideally, care should be provided close to where patients live. Given the growing availability of mobile phones and Internet connectivity, new technologies such as mHealth tools and teledermatology can be used. The recently established evidence for chemoprophylaxis supports use of targeted MDA against diseases such as scabies and yaws in areas of high endemicity. Strategies to control and manage skin NTDs are evolving with new knowledge and innovations.

Skin NTDs have been historically overlooked by health systems, contributing to their neglect. Carefully considered steps and actions against skin NTDs both contribute to and benefit from strengthened health systems. It is expected that use of the integrated skin NTD platform and approaches will also benefit control and management of other skin conditions and thereby support the achievement of universal health coverage and skin health for all.

This framework was prepared in consultation with a core group of experts on skin NTDs and related areas of work. Two online surveys elicited feedback in identifying areas for integration and the process of implementation. The document therefore reflects the perspectives of more than 300 individuals, including NTD programme personnel from national to peripheral levels, health care workers, persons affected by skin NTDs, academics, donors and partners as well as technical advisers from all six WHO regions. The initial experiences of integrated skin NTD activities and observations from some endemic countries are referred to in the framework.

O1

A photograph of a rural village scene, likely in a developing country. Several people are sitting on the ground under the shade of a large, leafless tree. They are wearing traditional white clothing and head coverings. In the background, there are simple, thatched-roof huts. The scene is set in a dry, open landscape.

Introduction

Buruli ulcer

Cutaneous leishmaniasis

*Mycetoma, chromoblastomycosis
and other deep mycoses*

Leprosy (Hansen's disease)

Lymphatic filariasis

Onchocerciasis

Post-kala-azar dermal leishmaniasis

Scabies and other ectoparasitoses

Yaws



© WHO/Lindsay Mackenzie

02

Introduction

Neglected tropical diseases (NTDs) affect more than a billion people globally (1). They have long-term consequences including permanent disability, physical impairment, mortality and socioeconomic problems, as well as stigmatization and significant mental health consequences resulting in reduced quality of life.

Ending the neglect to attain the Sustainable Development Goals: a road map for neglected tropical diseases 2021–2030 (1) (“the road map”) encourages three strategic shifts in the approach to tackling NTDs: (i) increasing accountability for impact by using impact indicators instead of process indicators; (ii) moving away from siloed disease-specific programmes to cross-cutting perspectives centred on the needs of people and communities; and (iii) changing operating models and culture to facilitate greater programme ownership by countries.

Integrated interventions addressing cross-cutting activities and intersectoral collaboration, and mainstreaming of NTD programmes within national health systems are emphasized. The aim of these approaches is to ensure that patients have equitable access to all aspects of treatment, care and support in line with the Sustainable Development Goals and the targets for universal health coverage by 2030 (1).

1.1 Skin conditions and skin NTDs

Skin conditions are estimated to affect more than 900 million people worldwide each year (2). In 2019, they ranked as the 15th leading cause of years of healthy life lost due to disability globally (3). The skin is the first and most visible structure of the human body for patients and health care personnel alike. It is therefore an entry point for diagnosis and treatment; this characteristic is especially useful in resource-limited settings where many of those affected live.

Some NTDs can also be considered as part of the broader group of skin conditions, as the lesions they cause are typically located on the skin, or because they first present with changes in the skin well before any changes in the internal organs occur (4, 5). Most of these NTDs with skin manifestations (“the skin NTDs”) cannot be managed by MDA alone but require that each affected person is managed individually. Diseases that are amenable to individual case management have been more neglected than those predominantly targeted by MDA, especially in terms of interest by donors and availability of financial resources. Importantly, even for the diseases that are targeted by MDA (for instance, lymphatic filariasis and onchocerciasis), individual case management is essential for those patients who are already symptomatic. MDA alone does not address the long-term consequences of the disease.

To address these gaps, WHO has created a platform for the skin NTDs to operationalize the cross-cutting approaches of the road map (1). NTDs generally are moving towards greater integration. For a few skin NTDs such as yaws and scabies, for instance, there is growing evidence to support intervention with MDA (6–8), which may be integrated with other MDA-targeted NTDs.

1.2 Rationale for integration

In the context of NTDs, integration means grouping or “packaging” several diseases, depending on their burden in countries, to facilitate joint delivery of interventions through a common platform. The rationale for integration of skin NTDs and the associated benefits includes several factors relevant to all levels of stakeholders, as shown in Fig. 1 and described below.



Fig. 1. Rationale for integration of skin NTDs

- Skin NTDs are often co-endemic in many countries. Identification of affected communities and mapping of cases and areas of co-endemicity assist in planning and implementing integrated disease control activities.
- Examination of the skin serves as an opportunity to identify multiple skin conditions in a single intervention. This will improve case detection in settings often characterized by fragile health systems.
- A generic examination of the skin aimed at detecting different skin conditions supports in avoiding stigma and discrimination towards an affected individual as compared to through single-disease targeted approach.
- Integration optimizes the use of common laboratory and case management platforms and infrastructures to address many of these diseases.
- Persons affected by skin NTDs often share similar challenges including mental health problems, stigmatization and discrimination, and socioeconomic constraints, which lead to further decrease in their quality of life. Integrated interventions for two or more skin NTDs that address these challenges enable increased access to, and acceptability of, the interventions.
- Resource-sharing through integrated approaches is cost-effective and efficient.
- Integrated approaches will further strengthen overall disease surveillance and data management and synergies between the cross-cutting areas and programmes.
- Integrated training of health workers and community volunteers can enhance their knowledge and skills to identify a number of skin NTDs depending on local co-endemicity.
- Integration would further reduce stigma and discrimination associated with case detection and management (9).
- Integration can foster greater advocacy and commitment, as well as greater visibility of results.
- Integration can improve coordination among different stakeholders including persons affected by skin NTDs, community activities and participation, and educational media.

Successful integration will ensure a patient-centred approach for persons affected by skin NTDs (Fig. 2). It is expected to promote a “holistic approach to health” in response to the physical, mental, spiritual and social needs of those affected and improve their quality of life.

The available resources for skin NTDs can also be used to treat other skin conditions not classified as NTDs wherever possible, and vice-versa.

Extension of coverage to include non-NTD skin conditions would ensure skin health for all and that no one is left behind on the road to universal health coverage.

1.3 Types of skin NTDs

Table 1 lists the nine skin NTDs and groups of skin NTDs targeted in the road map (1).

1.3.1 Skin conditions other than skin NTDs

Several other skin diseases that are not included in the list of WHO skin NTDs share similar characteristics and approaches to detection and management and also significantly impact the same communities and populations. Integration of skin NTDs thus affords opportunities to address other skin conditions, and vice versa, in areas where they are co-endemic.

The integrated skin NTD platform and its approaches may also be used to address and benefit control and management of other severe skin conditions.

1.3.2 Challenges for integration

The potential benefits of integration share some potential challenges. Every skin NTD has specific characteristics, and expertise in each disease should therefore be maintained. Integration should not necessarily lead to the dismantling of existing vertical programmes; rather it should promote synergy and efficiency. A cautious strategic plan must be in place to ensure that health care workers are not overloaded with multiple tasks and with the expected volume of knowledge and skills. Some donors and partners have highly focused areas of support for disease-specific elimination or eradication of some skin NTDs, and there is concern that integration may dilute their focus. In addition, efforts are needed to generate and sustain political commitments and to mobilize domestic funding for integrated skin NTD activities. The challenges for integration are summarized in Fig. 3.

It is therefore essential that the integration process takes carefully considered steps for the approach to be successful, and to make an actual change to the care and quality of life of persons affected by skin NTDs.

Table 1. Skin NTDs and 2030 road map targets

	Disease	Road map target^a
1.	Yaws	Eradication
2.	Leprosy (Hansen's disease)	Elimination (interruption of transmission)
3.	Onchocerciasis	Elimination (interruption of transmission)
4.	Lymphatic filariasis (lymphoedema and hydrocele)	Elimination as a public health problem
5.	Buruli ulcer	Control
6.	Cutaneous leishmaniasis	Control
7.	Mycetoma, chromoblastomycosis, and other deep mycoses (including sporotrichosis)	Control
8.	Post-kala-azar dermal leishmaniasis	Control
9.	Scabies and other ectoparasitoses (including tungiasis)	Control

^a See Glossary of key terms for definitions.

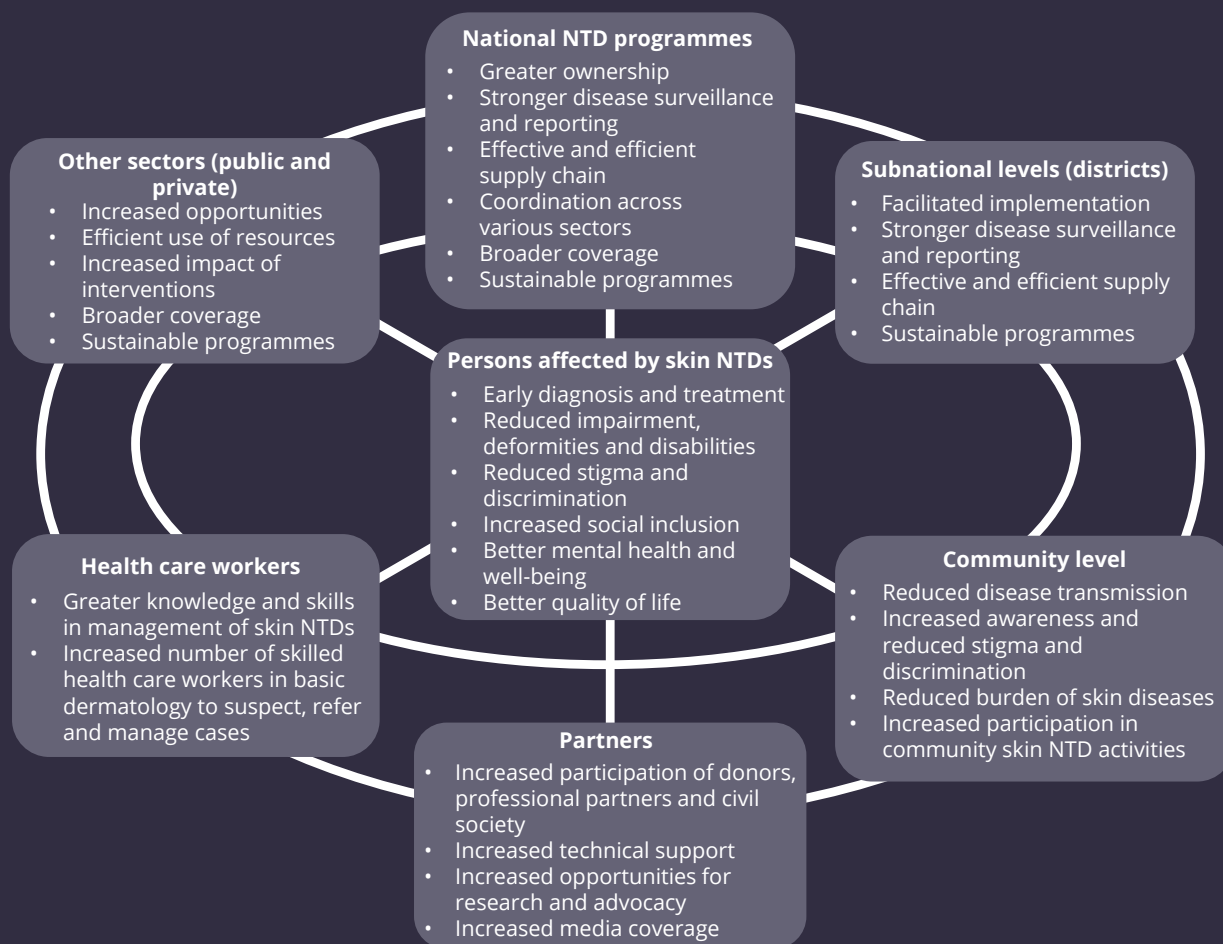


Fig. 2. Stakeholders involved in skin NTD integration and control



Fig 3. Challenges for integration of skin NTDs

OR

A woman wearing a vibrant pink shawl with a floral pattern is shown in profile, looking towards the right. She is standing outdoors in a rural setting with lush green trees and foliage in the background. The scene is partially obscured by a large, stylized 'OR' graphic in the foreground.

Purpose, goal and objectives of the framework

Buruli ulcer

Cutaneous leishmaniasis

*Mycetoma, chromoblastomycosis
and other deep mycoses*

Leprosy (Hansen's disease)

Lymphatic filariasis

Onchocerciasis

Post-kala-azar dermal leishmaniasis

Scabies and other ectoparasitoses

Yaws



© UN Foundation

03

Purpose, goal and objectives of the framework

Purpose

To assist endemic countries in reducing the morbidity, disability and psychosocial impacts of skin NTDs in particular and other skin conditions in general by identifying areas, key players and resources for integration as well as systems to successfully embed interventions within national programmes.

Goal

To reduce the morbidity, disability and psychosocial impacts of skin NTDs and other skin conditions through a people-centred integrated approach.

Objectives

To support endemic countries in:

- adapting and implementing integrated skin NTD strategies based on local endemicity and needs;
- strengthening people-centred skin NTD services and care;
- enhancing early case detection and surveillance for skin NTDs and, wherever possible, other skin conditions;
- strengthening monitoring and evaluation of outcomes and impacts of integrated strategies; and
- enhancing advocacy, coordination, partnerships and national ownership towards aligned targets.

Fig. 4 presents the goal and objectives of the framework towards skin health for all.

Progress will be measured primarily by the number of countries that adapt and implement integrated strategies for the control and management of skin NTDs by 2030 (1).

The overarching aim of skin NTD integration is to provide people-centred care to individuals with skin NTDs in or close to their communities: with adequate support, they also will and should be empowered to participate in people-centred inclusive approaches. In order for this to happen, harnessing synergies within NTD programmes, throughout the health system and across sectors are required. This will all in all lead to reach the targets for control, elimination and eradication of skin NTDs.

This document is intended for use by a broad range of stakeholders involved in skin NTD programme planning, implementation, funding and research. **It is designed to support each endemic country in establishing a strong health care system to deliver holistic services not only for skin NTDs but also for other skin conditions.**



Fig. 4. Goal and objectives of the skin NTD framework

03



Assessing the burden of skin NTDs

Buruli ulcer

Cutaneous leishmaniasis

*Mycetoma, chromoblastomycosis
and other deep mycoses*

Leprosy (Hansen's disease)

Lymphatic filariasis

Onchocerciasis

Post-kala-azar dermal leishmaniasis

Scabies and other ectoparasitoses

Yaws



© WHO/Yoshi Shimizu

04

Assessing the burden of skin NTDs

The baseline information on incidence or prevalence of skin NTDs and their complications or disabilities is crucial for mapping the distribution of disease, determining its burden, identifying areas of endemicity or co-endemicity, and planning and implementing integrated skin NTD strategies. It is also essential for assessing impact after intervention.

3.1 Reporting

Countries should report their progress on implementing the integrated skin NTD strategy to support global reporting on the skin NTD indicator and milestones included among the 10 cross-cutting indicators of *Ending the neglect to attain the Sustainable Development Goals: a framework for monitoring and evaluating progress of the road map for neglected tropical diseases 2021–2030* (10).

Epidemiological data are reported annually by Member States to WHO for some skin NTDs such as Buruli ulcer,

cutaneous leishmaniasis, leprosy, lymphatic filariasis, onchocerciasis, visceral leishmaniasis (post-kala-azar dermal leishmaniasis) and yaws. For other groups of diseases such as mycetoma, chromoblastomycosis and other deep mycoses, and scabies and other ectoparasitoses, data are not yet available to WHO. The WHO Global Health Observatory provides useful data for some skin NTDs (11).

Nevertheless, there are limitations to reporting. These include under-reporting or over-reporting as well as reporting of cases of many diseases without confirmatory tests, either because they are not available or were simply not done, which can affect the credibility of data.

Fig. 5 presents the known global disease burden for the nine skin NTDs and the gaps. The disability-adjusted life years (DALYs) due to skin NTDs have been calculated for some skin NTDs for which data exist and are also presented in Fig. 5.



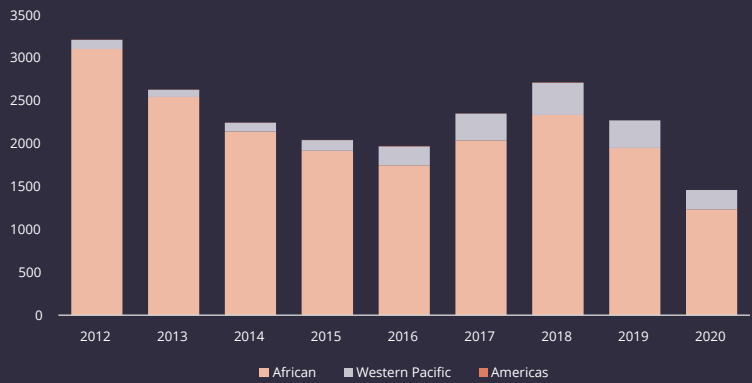
Buruli ulcer

Burden of disease

1 458

new cases reported in 2020

Buruli ulcer cases reported to WHO, by Region, 2012–2020



Source: WHO Global Health Observatory

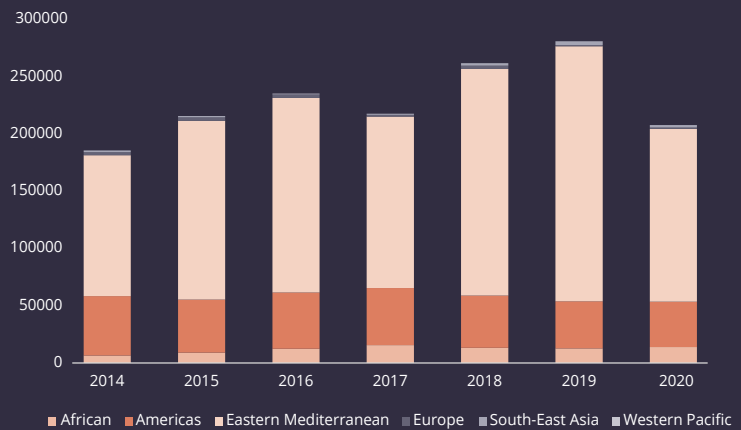
Leishmaniasis (cutaneous)

Burden of disease

207 584

new cases reported in 2020

Number of new CL cases reported by WHO region, 2014–2020



Source: WHO Global Health Observatory

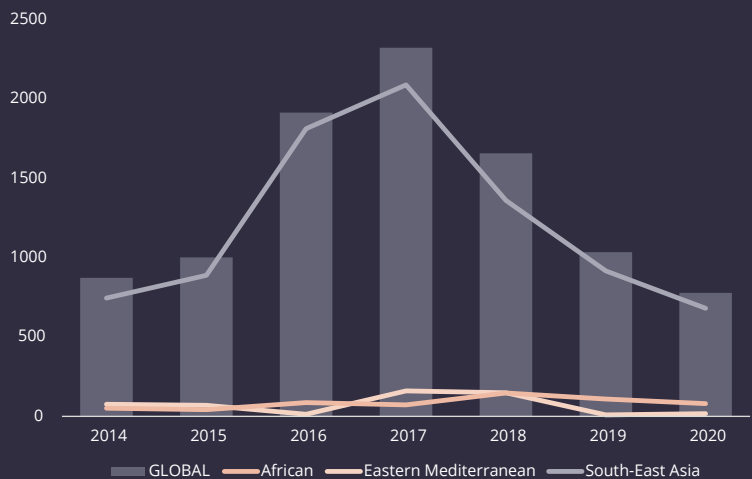
Post-kala-azar dermal leishmaniasis (PKDL)

Burden of disease

778

new cases reported in 2020

Numbers of cases of post-kala-azar dermal leishmaniasis (PKDL), by WHO region, 2014–2020



Source: WER 2021

Fig. 5. Overview of the global disease burden of skin NTDs

Leprosy (Hansen's disease)

Burden of disease

128 405

New leprosy patients diagnosed globally in 2020

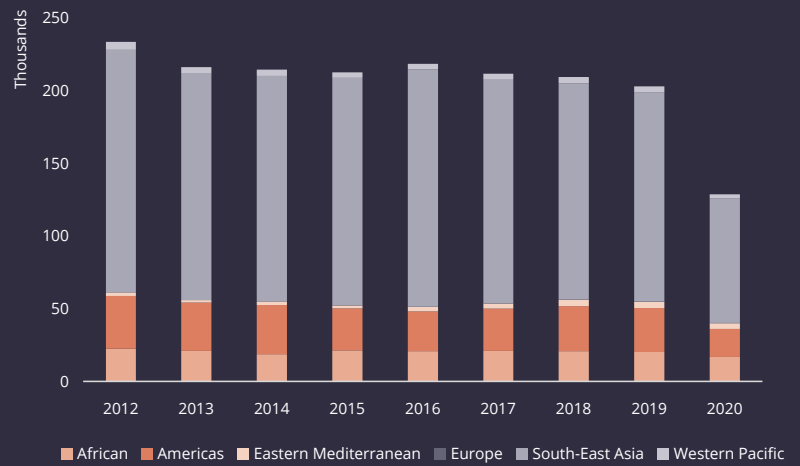
8 661

New paediatric cases diagnosed with leprosy in 2020

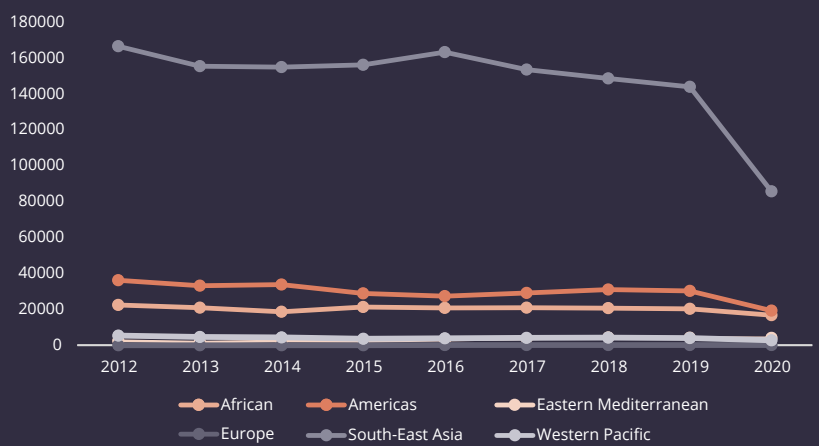
7 216

New leprosy patients with grade 2 disability by WHO region, 2020

New leprosy cases by WHO region, 2012–2020



New Leprosy Cases



Source: WHO Global Health Observatory

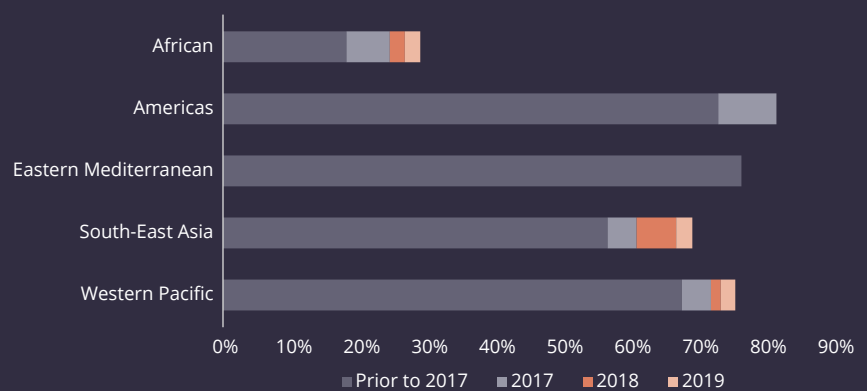
Lymphatic filariasis

Burden of disease

863 000 000

People living in endemic areas requiring MDA in 2020

Proportion of known endemic implementation units (IUs) that have completed transmission assessment surveys (TAS) and no longer require MDA, by Region



Source: WER 2021

Fig. 5. Overview of the global disease burden of skin NTDs

Mycetoma, chromoblastomycosis and other deep skin mycosis

Burden of disease

At least 10 000

cases of CBM, PCM and ST recorded globally since the 1940s; the exact burden is unknown and thought to be higher

Source: NTD road map (1)

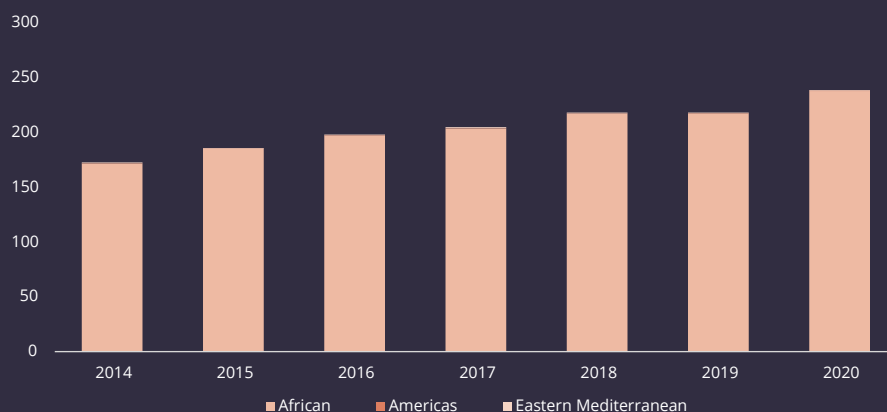
Onchocerciasis

Burden of disease

238 000 000

People living in endemic areas requiring MDA in 2020

Population requiring preventive chemotherapy by WHO region, 2014-2020, million



Source: WHO Global Health Observatory

Scabies and other ectoparasitoses

Burden of disease

About 200 million

people affected at any time

Source: NTD road map (1)

Fig. 5. Overview of the global disease burden of skin NTDs

Yaws

Burden of disease

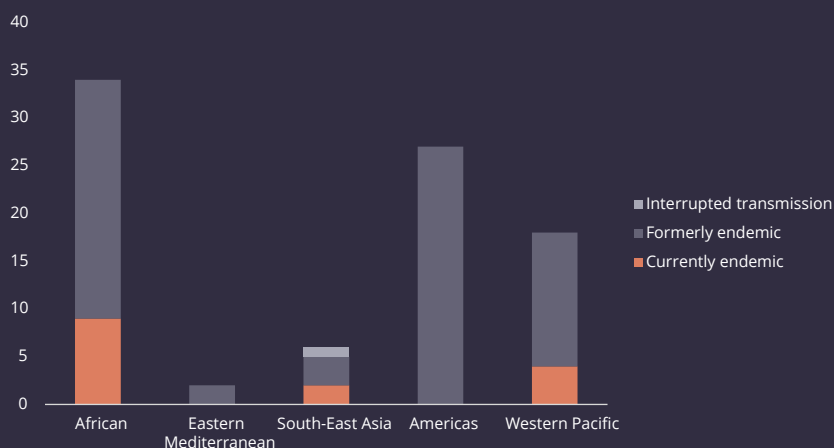
87 877

Suspected yaws cases reported in 2020

346

Confirmed cases reported in 2020

Number of countries by endemicity status, 2020



Source: WHO Global Health Observatory

Fig. 5. Overview of the global disease burden of skin NTDs

3.2 Methods

The burden of skin NTDs has several dimensions. These include (i) prevalence of the disease, (ii) related prevalence of disabilities and deformities, and (iii) DALYs. The following methods may be considered for assessing the baseline burden of skin NTDs depending on gaps and available resources and expertise in each endemic area:

- desk review
- review of health facility records
- predesigned survey questionnaire
- case detection in schools and communities
- population-based prevalence survey.

The assessment of burden may be integrated with that for other locally prevalent skin conditions (for instance, fungal diseases and dermatitis) to increase case detection of specific skin NTDs, with the view also to decreasing stigma and discrimination. While integration

could provide potential benefits, as described in section 1.2, protocols that clearly define the processes by which these other (non-NTD) skin conditions will be managed must be in place.

A careful assessment of the burden of skin NTDs, existing gaps and availability of resources including technical expertise and access to medicines will constitute an important part of planning how to address and manage both the skin NTDs and the other skin conditions in an integrated manner, thereby contributing to universal health coverage.

Information on the number of cases of skin NTDs treated by private health sectors (for instance, medical practitioners, traditional and religious healers) and other providers may not be reported. Ideally, NTD programmes should involve these stakeholders wherever possible in order to better understand the burden of skin NTDs.

O41

Potential areas for integration

Buruli ulcer

Cutaneous leishmaniasis

*Mycetoma, chromoblastomycosis
and other deep mycoses*

Leprosy (Hansen's disease)

Lymphatic filariasis

Onchocerciasis

Post-kala-azar dermal leishmaniasis

Scabies and other ectoparasitoses

Yaws



© WHO/Yoshi Shimizu

05

Potential areas for integration

Based on the consultation undertaken during September 2020 (described in Annex 1), 20 cross-cutting areas, each with several activities, were identified for potential integration across two categories:

- (i) activities that are important and directly related to the patient's journey; and
- (ii) activities that are related to skin NTD programmes.

All areas are inter-related, and some activities overlap both categories. Synergies should be expected; that is, effective and visible programme implementation in one area would provide positive effects to other targeted areas. The 20 areas are summarized in Table 2 and explained below by category.

Table 2. Potential areas for integrated control and management of skin NTDs

Integrated activities that are important and directly related to the patient's journey	
1. Social mobilization	<ul style="list-style-type: none"> • Integrated opportunities for social mobilization and reaching wider communities, including with other programmes and sectors • Integrated health messages (or IEC materials) on locally co-endemic skin NTDs and other skin conditions • Involvement of persons affected by different skin NTDs in delivering messages
2. Active case detection	<ul style="list-style-type: none"> • Integrated skin NTD case detection • Providing prompt treatment and/or connecting patients to quality health services as soon as possible • Integrating active case detection with other programmes and sectors
3. Training and capacity-building	<ul style="list-style-type: none"> • Integrated training on skin NTDs and other skin conditions, including any topics relevant to skin NTDs (wound care, rehabilitation, mental health, stigma, etc.) • Training on common laboratory techniques • Use of materials and tools available via Internet • Inclusion of curricula on skin NTDs at medical and paramedical schools
4. Clinical and laboratory diagnosis	<ul style="list-style-type: none"> • Visual inspection – however, there are limits to clinical diagnosis • Use of common platform for making laboratory diagnosis (microscopy, culture, polymerase chain reaction, etc.)
5. Surgery ^a	<ul style="list-style-type: none"> • Use of same infrastructure, supplies, and anesthesia • Capacity building in surgical skills • Integrating skin NTD-related surgeries within general surgical services
6. Rehabilitation (including counselling) ^a	<ul style="list-style-type: none"> • Integrating rehabilitation services within skin NTDs with disabilities and with general rehabilitation • Provision of assistive technology
7. Wound and lymphoedema management ^a	<ul style="list-style-type: none"> • Use of same infrastructure and supplies • Capacity building in wound and lymphoedema management skills • Integrating with non-NTD skin conditions (for example, diabetic foot ulcers) and within general services
8. Self-care ^a	<ul style="list-style-type: none"> • Similar skills required for self-care (skin and nail care, wound cleaning, dressing, massage, exercises, etc.) • Accessible materials for self-care
9. Mental well-being (including counselling)	<ul style="list-style-type: none"> • Patient and family counselling by health workers and trained peer counselors • Increased accessibility and availability to psychosocial interventions
10. Stigma reduction, inclusion and human rights	<ul style="list-style-type: none"> • Inclusion of persons affected by skin NTDs in family, school, work and community life • Ensuring opportunities for work, education, and personal lives • Ensuring health services are accessible for all including those with disabilities
11. Referral and support systems	<ul style="list-style-type: none"> • Referral pathway in place for all co-endemic skin NTDs to general health care settings • Two-way referral pathway (i.e. not only from the peripheral to the referral centers but also the reverse, bringing care closer to where persons affected by skin NTDs live) • Use of telemedicine services wherever possible
12. Mass drug administration (MDA)	<ul style="list-style-type: none"> • Sharing of opportunities and resources for diseases targeted by MDA at endemic sites, within skin NTDs and other NTDs • Use of MDA campaigns as an opportunity for active case detection

Programme-related areas	
13. Advocacy	<ul style="list-style-type: none"> • Integrated advocacy materials on skin NTDs
14. Supply chain	<ul style="list-style-type: none"> • Integrated supply chain for medicines and diagnostics for skin NTDs as per co-endemicity • Simple skin medications to be included to address skin conditions in general
15. Integrated planning	<ul style="list-style-type: none"> • Integrated plan of action for skin NTDs • Resource mobilization, sharing, and pooling • Planning of integrated monitoring and evaluation
16. Surveillance and data management	<ul style="list-style-type: none"> • Integration of mapping, surveillance and data management for skin NTDs, as locally relevant • Mainstreaming of skin NTD data into national health information systems
17. Monitoring and evaluation	<ul style="list-style-type: none"> • Integration of monitoring and evaluation activities to measure and report progress • Sharing of network for pharmacovigilance and antimicrobial resistance
18. Water, sanitation, and hygiene (WASH)	<ul style="list-style-type: none"> • Integrating cross-cutting areas of WASH and skin NTDs: especially for morbidity management • Accessible and safe access to water and sanitation
19. Nutrition	<ul style="list-style-type: none"> • Access to good nutrition • Integrating skin NTD activities (active case detection, individual case management, etc.) and nutritional interventions
20. One Health	<ul style="list-style-type: none"> • Integrated control activities of human and animal health systems

^a As part of management of complications and prevention of disabilities.

Category (i): integrated activities that are important and directly related to the patient's journey

4.1 Social mobilization

Educating community members on skin conditions in general and skin NTDs in particular is essential to encourage early reporting of suspected skin lesions to initiate early diagnosis and treatment and prevent disabilities and other consequences. Health messages (or information, education and communication) should be culturally sensitive and acceptable to the community or the society, and be tailored to the endemic skin conditions. Images of the skin conditions used in educational materials should be of appropriate skin colour. Care should be exercised to avoid creating or increasing perceptions of stigma and discrimination towards those with skin NTDs. Persons affected by different skin NTDs should be encouraged to be involved in community and/or social mobilization activities wherever possible.

4.2 Active case detection

Activities designed to actively screen populations at risk for skin NTDs may increase the number of cases identified and enable early case detection, especially in very remote sites. Active case detection can also help persons affected by skin NTDs to connect with health services as soon as possible; it can also facilitate understanding of the prevalence of diseases, as data may be unavailable or not validated.

The skin NTDs to be targeted should be determined from information on local co-endemicity, availability of expertise in the team, funds, supplies, transportation,

distance and local customs. Protocols describing all measures to be taken when a suspected case of skin NTDs is encountered should be prepared, including provision of prompt treatment, and identification of referral pathways including remote support during the preparation of screening activities. **As a part of universal health coverage, it is essential to provide basic care for patients with other skin conditions;** difficult cases should be referred likewise as the skin NTDs. This will also promote active community support for case detection and related activities. Integrated activities for active case detection of skin NTDs will help in reducing stigma and associated prejudice and discrimination, and promote self-reporting for diagnosis and treatment.

Opportunities should be sought to integrate active case detection with other community or school-based health activities such as MDA, immunization, mother and child clinics, nutrition, school health activities and screening for noncommunicable diseases to reduce the cost of operation and maximize community participation.

For some skin NTDs, contact tracing is important and can be the most efficient way to detect new cases or target preventive measures. For example, in leprosy, research and field observations indicate that significantly more cases are detected among contacts of a patient than among the general population (13–15). Currently, one dose of rifampicin is provided as chemoprophylaxis to enhance uptake and acceptance of contact tracing (16). Evidence around the strategy is currently being evaluated (17).

Efforts should be made to validate case detection activities to improve the quality of data and facilitate the achievement of objectives. Timely availability of diagnostics will improve the confirmation of cases as well as the reported data.

4.3 Training and capacity-building

Ensuring adequate and appropriate knowledge of skin NTDs among health care workers including physicians, nurses and community health workers will be a key objective. Laboratory personnel should be trained in cross-cutting laboratory methods including sample collection and transportation.

Training modules for health care workers should be carefully designed to reflect local needs, for example, training in other skin conditions that are prevalent in the community, wound care methods and rehabilitation could be added. However, it is also important not to overburden participants with excessive information in too short a time, and the duration and amount of information to be delivered must be well determined and appropriate for the skill sets of the recipients during preparation. Annex 2 provides some examples of training contents by different levels. Annex 3 lists some existing materials (including Apps) to support training. Use of teledermatology and web-based training courses and materials may be encouraged wherever possible (18–22).

Medical and paramedical schools should be encouraged to include some aspects of skin NTDs in their undergraduate curricula.

4.4 Clinical and laboratory diagnosis

Skin NTDs may be suspected and clinically diagnosed through visual inspection. The accuracy of clinical diagnosis would depend on the level of knowledge of an individual. Training would therefore be essential to help health care workers to suspect the different conditions.

Although skin manifestations may partially provide a clinical diagnosis, confirmation can often only be made through detecting either the presence of a pathogen (antigen) or the evidence of an immune response to infection (antibodies) (Annex 4). Efforts are under way to bring confirmatory diagnosis closer to patients. However, a rapid diagnostic test is currently available only for lymphatic filariasis (filaria test strip (FTS), Scarborough, ME, USA) and yaws (Dual Path Platform (DPP-POCT); Chembio, Medford, NY, USA). Other rapid diagnostic tests are being developed for Buruli ulcer, leprosy and cutaneous leishmaniasis. Multiplex platforms for diagnosis of several skin NTDs at once are also being explored. Much of the work involves serosurveillance, the method that is likely to be the most amenable to integration for surveillance of multiple diseases across the skin NTDs and beyond.

While these gaps await to be filled, several common laboratory methods already exist to confirm the



diagnoses of many skin NTDs. These conventional methods include microscopy, culture, polymerase chain reaction and dermatopathology (Annex 5). While these methods are not always field-friendly or readily available in some situations, they are often still the gold standard for confirming diagnoses. For integration of the diagnosis of skin NTDs, these methods remain significant because of their cross-cutting use. Facilities and equipment as well as capacity-building to perform these tests should be established or reinforced.

Support for laboratory diagnostic should be strengthened nationally and regionally, with more cross-regional collaboration established to achieve this objective.

Management of complications and disability prevention

For most patients with skin NTDs, if the diagnosis is delayed, complications must be managed and disabilities prevented as part of their package of care; this may be simple short-term care or may require specialized long-term care. Public health services at national, district and subdistrict levels will need adequate capacity-building, planning and service delivery including support for **self-care** at home and in communities. Such management implies collaboration with specialized **surgical, rehabilitation, and wound and lymphoedema services** including private health sectors wherever possible to integrate and reduce the long-term cost of services (Annex 6).

4.5 Surgery

Surgeries are needed for some skin NTDs and should be made more accessible and affordable for those who benefit from them (23); resource-sharing through integration may pave a way forward. The skin NTDs that are amenable to surgery are Buruli ulcer, leprosy, lymphatic filariasis (hydrocele) and mycetoma. Techniques may vary from debridement to reconstruction but all share the same infrastructure, supplies, skills and requirement for anaesthesia.



© WHO/NOOR/Sebastian Liste



© WHO/Syria Relief and Development

Efforts should be made to integrate skin NTD-related surgeries within district and regional surgical facilities by developing local surgical capacity. Proper standardization and supervision of surgical procedures should be in place to reduce adverse outcomes and improve surgical skills. Involvement of rehabilitation therapists wherever available is likely to increase the outcome of surgery.

4.6 Rehabilitation

Rehabilitation addresses the impact of a health condition on a person's everyday life, by optimizing their functioning and reducing their experience of disability. Rehabilitation expands the focus of health beyond preventive and curative care to ensure that people with a health condition can remain as independent as possible and participate in education, work and meaningful life roles – and contributes to the provision of comprehensive person-centred care (24). Rehabilitation services also include provision of **assistive technology** to enable mobility and hand functions or protect areas with loss of sensation. Without assistive technology, people are often excluded, isolated and mired in poverty, thereby increasing the impact of disease and disability on a person, their family and society (25, 26).

Rehabilitation for patients with skin NTDs can be delivered within existing rehabilitation services, which should be made available at all levels of health care (from tertiary to primary levels). Rehabilitation requires specific skills and competencies that should be developed within the existing rehabilitation workforce. This may need orientation of services towards the needs of people with skin NTDs. It is suggested that training is provided for:

- existing rehabilitation workers in skin NTDs and referrals or specialized services as needed; and
- primary health care and community health workers in the identification of rehabilitation needs and the

provision of a basic set of rehabilitation and assistive product interventions.

4.7 Wound and lymphoedema management

Multiple skin NTDs either present with or develop into **wounds (ulcers)** such as Buruli ulcer, cutaneous leishmaniasis, leprosy, tungiasis and yaws; and **lymphoedema** such as lymphatic filariasis and leprosy reactions. Sometimes, both conditions may coexist in one disease; for example, patients with lymphatic filariasis could present with both lymphoedema and ulceration. Wounds at or near a joint can limit movement if appropriate interventions are not started early.

The basics of **wound care** are the same for all wound-causing conditions; they include maintaining moist wound surfaces and changing wound dressings regularly. The basics of **lymphoedema care** are also identical for all lymphoedema-causing conditions; these consist of lymphatic drainage/limb massage, compression therapy and exercise. Washing the lesion and the surrounding skin with clean water and applying skin care, including moisturization, are important in both conditions to avoid secondary infection and promote early healing. Most of these conditions could be managed using the same infrastructure, materials and skill sets. Front-line health care workers including community health workers could be trained in washing and dressing/bandaging and in teaching self-care methods to patients and self-care groups. Examples of such training packages are well established for leprosy (27), lymphatic filariasis (28) and podoconiosis (29).

Patients with complicated non-healing ulcers could be referred to referral centres for further assessment of the diagnosis and for surgery, physiotherapy and assistive devices as needed. Synergies can be expected if resources can be pooled and shared between the noncommunicable diseases that cause the same or



© WHO/Andrew Esiebo



© Marcus Perkins

similar conditions; for example, wound care for leprosy and diabetic foot ulcers is similar. Nutrition plays an important role in healing of wounds from all conditions, which can be integrated within the care.

4.8 Self-care

Self-care is the ability of individuals, families, and communities to promote health, prevent disease, maintain health and cope with illness and disability with or without the support of a health worker (30). Patients with disabilities from different skin NTDs, for example, Buruli ulcer, leprosy, lymphatic filariasis and mycetoma, depending on their co-endemicity, can be taught individually or in groups about different methods of self-care. These include how to care for the skin and nails, clean wounds, and dress to cover and protect wounds; massage and exercises to maintain range of movement, prevent contractures and strengthen muscles; positioning during day and night to prevent contractures; prevention of burns to hands and feet without sensation; scar care; eye care to preserve vision; and how to select and use protective footwear at home. Wherever necessary, family members and caregivers may be advised on how to support patients with disabilities in their home.

Simple pictorial handouts, booklets or smartphone Apps in local languages can be given to patients for their care. These materials should be provided in accessible formats for people who already have disabilities.

4.9 Mental well-being

People with skin NTDs frequently face stigma, discrimination and social exclusion. They fear isolation due to myths and misinformation associated with skin conditions that can cause mental distress and depression, thus affecting their personal and social life. Patients with skin NTDs who are at high risk of developing physical and visual disabilities are more prone to discrimination. One in two people with leprosy or lymphatic filariasis is known to face depression or

an anxiety disorder (31). The integrated control and management of skin NTDs is expected to increase accessibility to, and availability of, mental health interventions and thereby improve the quality of life of those affected.

Reporting forms in the routine disease surveillance system should include variables to collect data on the impact of skin NTDs on the mental health of those affected.

4.10 Stigma reduction, inclusion and human rights

Persons affected by skin NTDs may be deprived of job opportunities, or their disease may affect their marriage prospects due to stigmatization. Children may lose the opportunity for education, with life-long and generational consequences. There is compelling evidence that women may face additional challenges in accessing treatment than men, and increased stigma and social exclusion (32). Programmes should therefore be designed to be gender-responsive. Stigma and related issues can be significantly reduced or overcome by integrating disease management with other skin NTDs and skin conditions in general as well into general health care at primary health care levels.

Inclusion of persons affected by skin NTDs in society is a basic human right and essential for them to lead fulfilling lives.

4.11 Referral and support systems

Referral systems should be available or established to manage complicated cases from primary health care facilities (or sub-health centres) to referral centres for:

- clinical and laboratory investigations to confirm suspected cases;
- disease-specific treatment;
- wound care and lymphoedema management;
- rehabilitation;

- reconstructive surgical services for disabilities and other conditions such as hydrocele; and
- provision of assistive technology appliances and mental health support.

A two-way referral pathway, that is a pathway not only from peripheral to referral centres but also the reverse, should be available to ensure that affected people receive not only specialized care when needed but also a continuation of care as close to their home as possible.

Telemedicine and teledermatology services can be used wherever possible.

4.12 Mass drug administration

With the recently established evidence for chemoprophylaxis, diseases such as scabies and yaws could be included in existing integrated preventive chemotherapy programmes, which are usually limited to a group of five NTDs (lymphatic filariasis, onchocerciasis, schistosomiasis, soil-transmitted helminthiases and trachoma) in co-endemic areas. Published examples show the off-target impact on the burden of skin NTDs obtained during azithromycin MDA against trachoma in reducing cases of yaws in Ghana (33) and the Solomon Islands (34); and of ivermectin MDA against soil-transmitted helminthiases, onchocerciasis and lymphatic filariasis in reducing cases of scabies in the United Republic of Tanzania and in other African countries (35–37).

MDA campaigns may be used as an opportunity for active case detection, or mass screening, of skin NTDs and other skin conditions of importance.

So far, the curative or preventive treatment aspects of NTD services have received most attention. Rehabilitation, surgery, wound care and social issues including mental health services should be further strengthened through integrated approaches.

How these integrations can be built at each level of the health system and in communities for persons affected by skin NTDs are presented in sections 5 and 6, respectively. Cross-cutting areas for skin NTD-related problems requiring management are presented in Annex 6.

Category (ii): programme-related areas

4.13 Advocacy

Country-specific advocacy on integrated approaches based on co-endemic skin NTDs is essential to sensitize and sustain political, programmatic, as well cross-sectoral, partners and community support to promote skin NTD integrated activities. Advocacy should focus on ongoing NTD programme activities, gaps and achievements and on how integrated approaches to skin NTDs can accelerate achievement of disease-specific targets in line with the road map.

4.14 Supply chain

The supply of disease-specific medicines, diagnostics and other medical products required for treatment and care of skin NTDs may be integrated within and with other NTDs to improve the supply chain, minimize wastage and reduce stock-outs. This should also



© WHO/Yoshi Shimizu

include simple skin medications so that any skin condition affecting communities will also be addressed through an integrated approach to control and management of skin NTDs.

4.15 Integrated planning

Based on the integrated skin NTD strategic framework, endemic countries should develop a national integrated skin NTD strategic plan of action for planning and implementing activities to achieve the targets set by 2030. The plan of action depends on the number of skin NTDs co-endemic in a given country, disease burden, funding (both domestic and external), disease-specific objectives and targets of already ongoing skin NTD programmes (for instance, for Buruli ulcer, leprosy and yaws), priorities and other local factors influencing integration and implementation.

There should be resource mobilization, pooling and sharing of budget. New opportunities for additional funding should be sought through integration.

4.16 Surveillance and data management

Surveillance and data management should be integrated for all skin NTDs according to local co-endemicity and should be integrated and mainstreamed into national health information systems as much as possible. Reporting forms and pathways that facilitate this integrated approach should be developed, taking into consideration the country context while also selecting and verifying that the types of data collected are comparable and meet internationally recognized criteria. Depending on availability, the Internet may be used to transmit

data online to facilitate rapid sharing of data for better monitoring. A robust routine surveillance system will enable continuous measurement of the impact of interventions against skin NTDs.

4.17 Monitoring and evaluation

Surveillance, monitoring and evaluation, reporting and pharmacovigilance in the implementation of skin NTD strategies could be integrated within the framework of the NTD road map 2030 wherever possible to measure progress.

There have been some reports of cases of antimicrobial resistance in skin NTDs such as in yaws and leprosy; for other skin NTDs, the situation is unclear. If drug resistance is present and especially if this spreads, it poses a significant challenge to disease control. Countries should therefore strengthen surveillance for antimicrobial resistance.

Integrated monitoring and disease-specific indicators for skin NTDs are presented in section 7. Newer tools/operational models for monitoring and evaluation are also required.

4.18 Water, sanitation and hygiene

Even a small break in the skin can serve as an entry point for pathogens. As such, maintaining good hygiene of the skin through regular washing, preferably with soap and clean water, protects against skin conditions in general as well as skin NTDs and their sequelae. For example, secondary infection (impetigo) in scabies could be prevented by regular washing, leading to less morbidity by reducing the risk of further complications



to the kidneys and to the heart. Improvement in water, sanitation and hygiene (WASH) will also benefit those affected with wound- and lymphoedema-associated conditions. Regular washing with clean water is necessary to remove contamination of the wound surface, avoid secondary infections, and to achieve faster healing.

WASH should be available, accessible and safe for persons affected by skin NTDs at their homes, and their disabilities should not be a barrier to access (38).

4.19 Nutrition

Access to better nutrition is necessary to strengthen immunity and reduce susceptibility to any infection. Malnutrition is faced by a large proportion of persons affected by skin NTDs; at the same time, it is one of the major risk factors for acquiring infection in the first place. Furthermore, repeated or chronic infection from skin NTDs can cause individuals to become malnourished, making them susceptible to other infections. Thus, the relationship between nutrition and infection is both an outcome and a risk factor (39), highlighting the importance of nutrition in integrated programmes to control skin NTDs (40). Malnutrition also influences management of complications, including wounds and lymphoedema.

Food and supplements such as vitamin A to improve immunity and of iron to improve anaemia are being provided in many countries. Vitamin A supplementation programmes have been coupled with immunization

and, in some places, with MDA for NTDs to increase efficiency and coverage (41–44). Active case detection activities for skin NTDs may provide another platform for the nutritional supplementation programmes and vice versa for similar benefits. During case management of patients, it is important that they are assessed for their nutritional status, as nutritionally deprived circumstances often lead to prolonged healing course. Supplementary feeding programmes are usually expensive, and these opportunities can be utilized to improve nutritional status of persons affected by skin NTDs, their families and their communities.

4.20 One Health

For some skin NTDs that are vector-borne (lymphatic filariasis, onchocerciasis, leishmaniasis) or zoonotic (leishmaniasis, tungiasis), a One Health approach is required for their control. Addressing this group of diseases requires collaborative, cross-sectoral action among human and animal health systems and a multidisciplinary approach that considers the complexities of the ecosystems where humans and animals coexist. Preventing and mitigating vector-borne or zoonotic skin NTDs in humans requires control and, where feasible, elimination of the diseases in their animal reservoirs.

Integration in some of these cross-cutting areas is already happening, or has been in practice for a long time, in some countries and projects. Examples of good practice are presented in Annex 7.

05

Services for skin NTDs

Buruli ulcer

Cutaneous leishmaniasis

*Mycetoma, chromoblastomycosis
and other deep mycoses*

Leprosy (Hansen's disease)

Lymphatic filariasis

Onchocerciasis

Post-kala-azar dermal leishmaniasis

Scabies and other ectoparasitoses

Yaws





© WHO Indonesia

06

Services for skin NTDs

This framework highlights six interventions or activities as the building blocks for delivering health services to patients with skin NTDs and their families and communities:

1. Early case detection
2. Clinical diagnosis
3. Laboratory confirmation
4. Treatment
5. Management of complications
6. Prevention.

Details of livelihoods, social lives and mental well-being and their interaction with health are provided in section 6.

5.1 The patient's journey

A patient with a skin NTD typically follows a long-term clinical course unless the disease is detected at an early stage. For many patients, a delay in diagnosis may result in life-long deformities and disabilities. Fig. 6 illustrates an example of a clinical course and the health services needed to achieve cure.

While some skin NTDs are symptomatic early in the disease course (scabies, yaws), others (for instance, Buruli ulcer, leprosy and lymphatic filariasis) are initially often asymptomatic or less symptomatic. For the latter, the journey from disease onset to diagnosis and adequate treatment may take months or years. A patient may access health facilities only when the symptoms and signs are obvious or with the onset of inflammatory symptoms (pain, swelling, fever), for example, with leprosy reactions in leprosy and acute attacks in lymphatic filariasis. Although raising awareness of the diseases may result in patients accessing health facilities at earlier stages, many patients with early lesions will be detected only through active screening activities due to the nature of the diseases. Patients also often access traditional and religious healers rather than health facilities; beliefs, cost and access are some of the reasons for this health-seeking behaviour. Communication and collaboration with traditional and religious healers may help to find hidden cases. Health-seeking behaviour may also be affected by the stigma and discrimination associated

with the diseases. Action is needed to overcome these barriers.

Upon diagnosis, the patient receives medical treatment for the infection, targeting the causative agent. For scabies and yaws, only short-term treatment is necessary: for scabies, two doses of ivermectin one week apart; for yaws, a single dose of azithromycin. However, for most diseases, the recommended minimum duration of medical treatment is longer: for Buruli ulcer, a combination of two medicines (rifampicin and clarithromycin) for 2 months; for leprosy, multidrug therapy (MDT; rifampicin, clofazimine and dapsone) for at least 6 months to one year according to the type of disease (multibacillary or paucibacillary).

Even after completion of medical treatment, patients may require follow up for long-term complications, and treatment is provided when indicated. Some of the complications of leprosy, such as neuritis, are likely to result in disabilities, but could be prevented by patient education on reactions, early detection and treatment. Similarly, acute attacks in lymphatic filariasis, if detected and treated in a timely manner, could prevent further complications.

Management of complications and disability prevention should start at the same time as the medical treatment, where indicated. This includes self-care, wound management, lymphoedema management, rehabilitation, provision of assistive technology and products, and, for some cases, surgery. Community volunteers, primary health services and specialty services can start teaching important self-care practices to patients, families and caregivers during their health care and rehabilitation interventions.

To reduce further spread of the disease, contact tracing and chemoprophylaxis for close contacts are indicated for leprosy, scabies and yaws, as described in the road map (1). For areas in which yaws and scabies are moderately or highly endemic, treatment of individuals is unlikely to yield substantial reduction in the burden of disease since they are at high risk of rapid re-infection. Community assessment and community-based interventions are required.

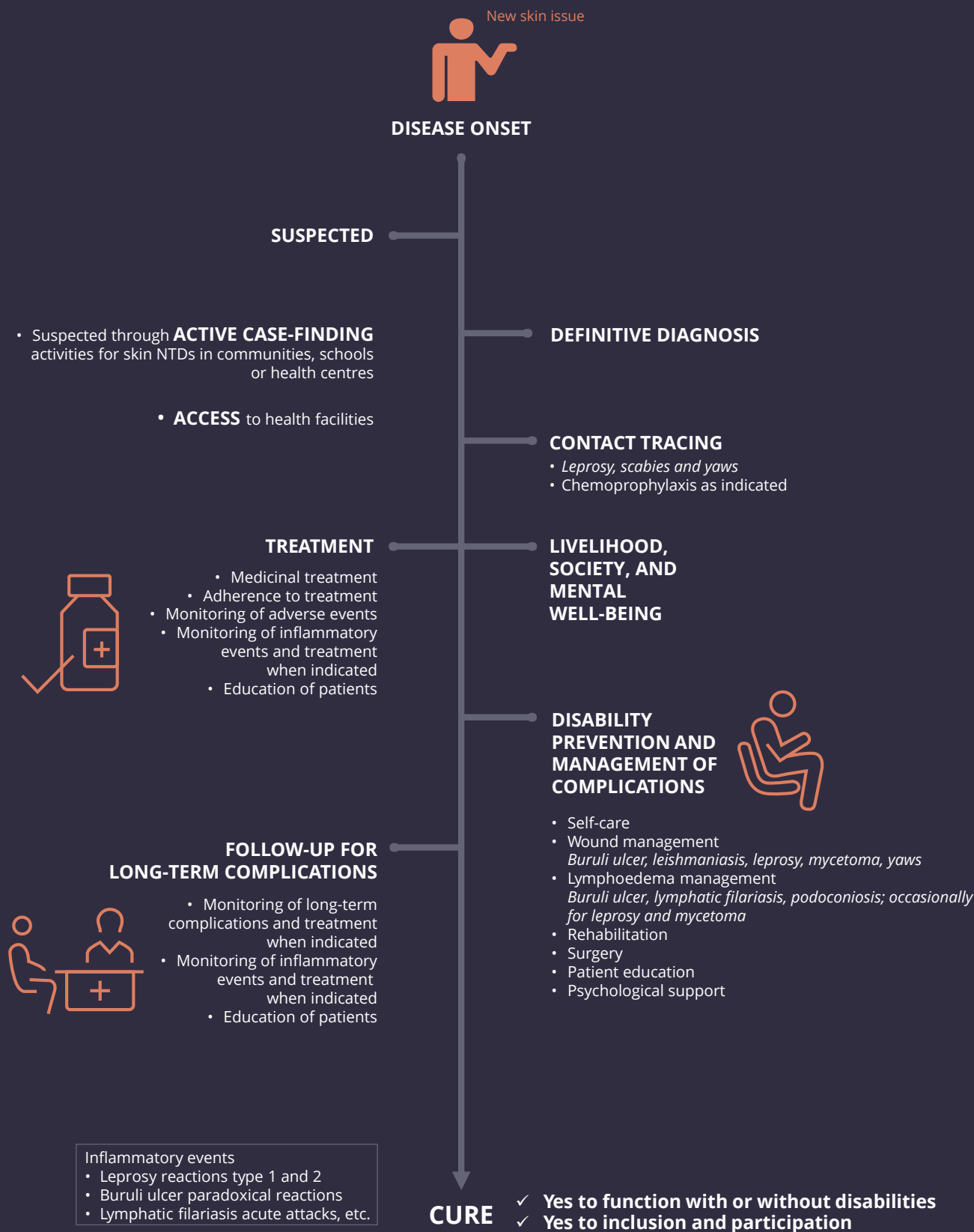


Fig. 6. Journey of a patient with skin NTDs

5.2 Health services and levels

Health services for skin NTDs vary significantly across countries. Fig. 7 illustrates the different types of services and the settings in which they commonly occur. It is important to have a clear view of the health system and its capacity and roles in delivering personal and population-based services to those in need.

Ideally, a multidisciplinary team or a network of people with different training and tasks at various levels is needed to deliver skin NTD services comprehensively.

5.2.1 Community level

Community health volunteers trained in skin NTDs will support screening/surveys, diagnosis, treatment, care and monitoring and refer individuals with suspected signs and symptoms of the disease or its complications. As these volunteers live in the community, they are also well positioned to support self-care and self-support groups.

5.2.2 Primary health centre level

In most areas endemic for skin NTDs, primary health care workers, mainly nurses with appropriate training in diagnosis and management of skin NTDs and other common skin diseases, play a key role in diagnosis and treatment. Uncomplicated cases can be managed at primary health care level; workers will refer patients to upper levels if cases are difficult to diagnose or complicated and require specialized equipment and care. The basic principles of care for wound/lymphoedema, rehabilitation and mental health support can be taught to them to deliver these services at the primary health care level. They should also be trained to report cases of skin NTDs as well as other skin conditions.

5.2.3 Secondary and tertiary levels

Specialists in diagnosis and treatment of skin NTDs and other serious skin conditions at secondary and tertiary levels include dermatologists, rehabilitation specialists such as physiotherapists and occupational therapists, prosthetists and orthotists, surgeons and personnel with mental health training. The full range of expertise is ideal, and efforts should be made to deploy as many of these disciplines as possible to provide holistic care for patients.

However, in many countries where skin NTDs are co-endemic, there is either an extreme lack of expertise to address need or it is not available. Innovative ways to ensure support, such as use of mHealth tools, tele dermatology and online training courses, should be explored. The growing availability of mobile phones and Internet connectivity is making these methods more realistic and practicable, **bringing care closer to where patients live.**

Simultaneously, efforts to educate a new generation of health care workers as experts in their chosen field of interest, combined with national capacity-building, should be prioritized. Skin NTDs should be included in the curricula of medical and paramedical schools. Self-care groups can be used as a focal point for training future clinicians to understand not only the skin manifestations but also the wider barriers and needs of those affected. A new generation of experts will be responsible for the future delivery of skin NTD services, and their participation will become even more important as countries approach elimination or eradication, with fewer but more difficult to identify patients.

Skin NTDs are frequently overlooked by health systems, which contributes to the 'neglect' of the conditions. Action against skin NTDs will both contribute to and benefit from strengthened health systems.



© WHO SEARO/Florian Lang

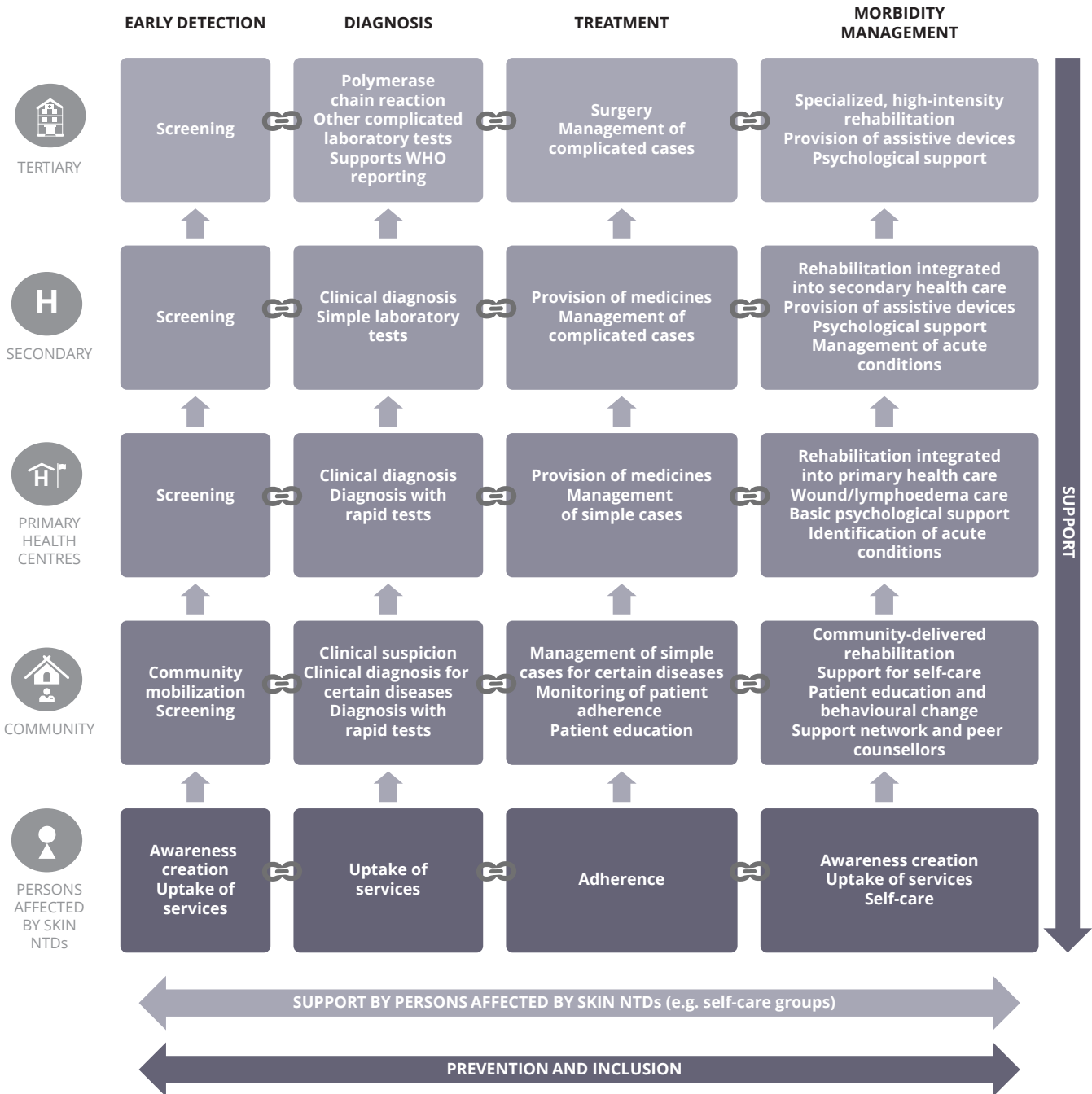


Fig. 7. Integration of services for skin NTDs at different levels

5.3 Mainstreaming within national health systems

The quality of skin NTD management can be improved in the context of universal health coverage. Skin NTDs can be integrated more effectively through existing systems and structures, such as dermatological services, wound care, rehabilitation, surgery, community-based programmes, education and health care worker training.

5.4 Strengthening health systems

Engagement of every level of the health system is essential for successful integration of skin NTDs and to reach the targets. To strengthen a country's health system, health ministries should develop a national policy and strategic plan as well as technical guidance including training materials to implement activities with technical support from WHO and other partners (from multiple sectors and with external donors wherever feasible).

Global and regional resources and expertise should be identified to extend overall support for skin NTD programmes, for example, expert inputs, advocacy and funding. The plans should be flexible, innovative and suited to the local conditions within an agreed broad framework. Focused and strategic advocacy policies should emphasize the benefits of integrated approaches for skin conditions in general, in relation to skin NTDs.

5.5 Coordinating with other programmes and sectors

Working with other sectors within and beyond health on skin NTD-relevant interventions will further strengthen the health system for skin NTDs. Other sectors may include WASH, education, labour, reproductive and child health, immunization and nutrition. Although how the health system functions will vary depending on the country's size, culture and context, each level of the health system must be aware of the targets and the strategies, and be engaged, **to ensure a strong and sustainable health system.**

5.6 Ensuring access to services

Over a billion people, or about 15% of the global population, are estimated to be living with some form of disability (45).

People with disabilities may face challenges accessing skin NTD services for different reasons.

It is therefore essential that skin NTD services are accessible for those who already have disability, focusing on three types of barriers that normally exist in delivery of services.

5.6.1 Physical barriers

Physical barriers can vary from ensuring that people who live far from skin NTD services or do not have accessible transportation options can access them, or ensuring that facilities are accessible for people with disabilities.

5.6.2 Communication barriers

A key barrier to skin NTD services for people who have a hearing impairment is the limited availability of written material or sign language interpreters at health services. Also, health information or prescriptions may not be provided in accessible formats, including Braille or large print, which presents a barrier for people with vision impairment. Making health information available in easy-to-follow formats – including plain language and pictures or other visual cues – can make it easier for people with cognitive impairments to follow.

5.6.3 Attitudinal barriers

People with disability commonly report experiences of prejudice, stigma and discrimination by health service providers and other staff at health facilities. In this sense, training of service providers that normally have limited knowledge and understanding of the rights of people with disability and their health needs is recommended.



OBS

Empowering persons affected by skin NTDs and their family members

Buruli ulcer

Cutaneous leishmaniasis

*Mycetoma, chromoblastomycosis
and other deep mycoses*

Leprosy (Hansen's disease)

Lymphatic filariasis

Onchocerciasis

Post-kala-azar dermal leishmaniasis

Scabies and other ectoparasitoses

Yaws



© WHO

07

Empowering persons affected by skin NTDs and their family members

This section offers practical guidance on how persons affected by skin NTDs and their family members can be empowered at the community level and ensure high-quality continuum of care.

Fig. 8 emphasizes a person-centred approach, with key actions within health, society, livelihood and mental well-being for persons affected by skin NTDs. Many of these aspects are components of human rights, and ensuring them greatly contributes to the empowerment of persons affected by skin NTDs and their family members.

The aim of empowerment is for individuals to gain greater control over decisions and actions affecting their health and their ability to participate in social lives (46).

Persons affected by skin NTDs will need to make health decisions in order to be diagnosed and treated early, and, in case of already-existing disabilities, to manage their disabilities. This will eventually affect their livelihoods, mental well-being and social participation. The process of empowerment requires support from families, communities and social systems.

The WHO *International classification of functioning, disability and health: ICF (47)* states that health is not just the absence of disease but the result of complete physical, mental and social functioning of a person. It defines participation as the involvement in life situations – which will lead to positive mental and physical health outcomes as well as belonging to society (48).

6.1 Health

Persons affected by a skin NTD are best placed to take control of their own condition, for example by learning how to suspect a possible skin NTD and how to find help to confirm the diagnosis. In addition, they can learn how to check for complications (such as wounds, secondary infections, sensory impairment, movement

limitations, oedema) and learn what actions to take. There must be both **timely access to diagnosis and management of complications, including rehabilitation** and **timely access to referral systems**. Persons affected by skin NTDs must be made aware of existing referral centres, and receive logistic support (for example, transport, food) to ensure successful access to referral services. As described in section 4, the referral system must be two-way (not only from the peripheral to the referral centres but also the reverse). This relies on a good communication system between peripheral health care clinics and referral centres. In addition, ongoing supportive supervision for peripheral health care clinics should be offered by referral centres as part of the effort to ensure high-quality continuum of care. Rehabilitation services are also relevant along the continuum of care and should be provided continuously from the acute to the long-term phases of the disease (24).

As a part of rehabilitation, **assistive technology** can facilitate access to health services, for example, wheelchairs or crutches when mobility is limited. Assistive technology reduces the need for formal health and support services and long-term care, and facilitates the work of caregivers. The benefits of assistive technology extend beyond health by enabling people to live healthy, productive, independent and dignified lives, and to participate in education, the labour market and civic life. Increasingly, **access to communication devices** can empower people to receive health services and advice, and to be followed up in a timely manner.

Self-care and self-support groups are informal groups of people who come together to share common problems and support each other. They can address health issues, emotional needs and depression, social discrimination and livelihoods. Self-care and self-support groups must be inclusive to society as much as possible. Health workers or self-support groups may identify issues requiring them to link up with other community sectors that can facilitate daily

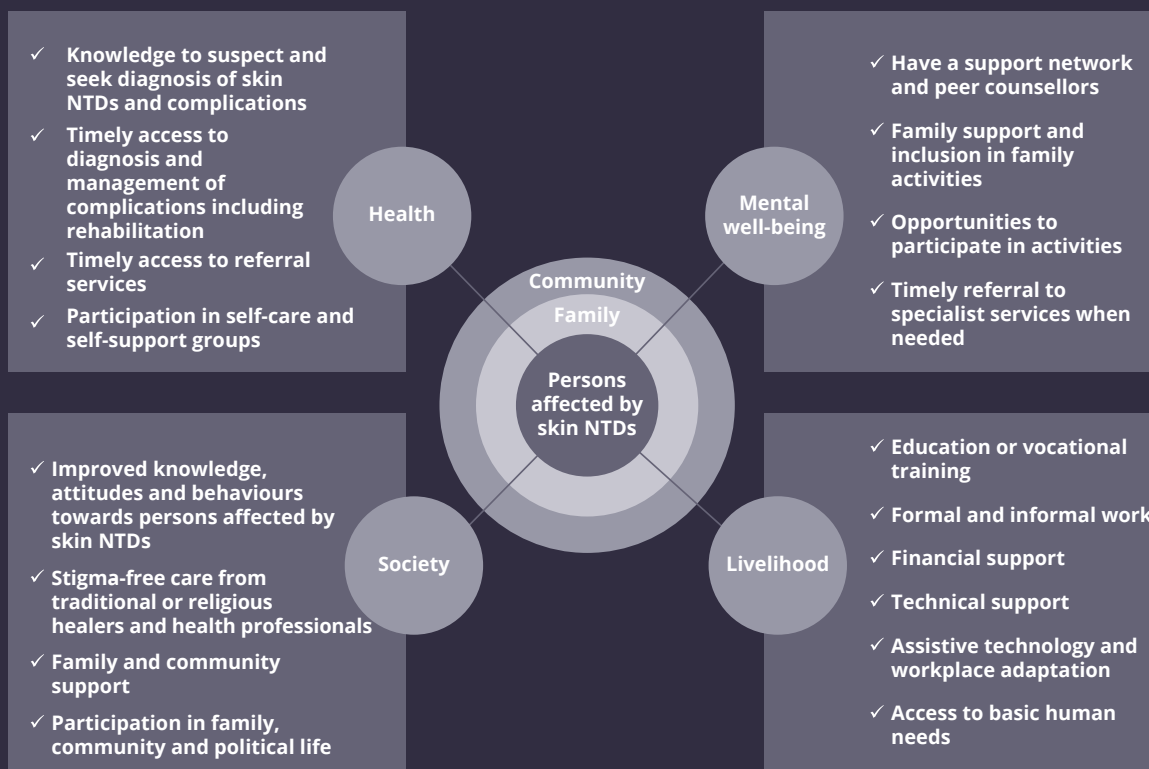


Fig. 8. Empowering persons affected by skin NTDs at the community level

self-care practices or participation in school, work and community life. This cross-sectoral collaboration may be with education, WASH, transportation, housing, social services, communications, construction, agriculture, governance and other sectors.

6.2 Social aspects

Improved knowledge, attitudes and behaviour towards people with skin NTDs among the general population will reduce barriers to participation in society. This can be done through awareness-raising activities including the use of media to reach a larger population. Organizations of persons affected by disabilities (for example, persons affected by leprosy, or persons with disabilities) are important voices in promoting change and should be involved in such activities. It is also important that health care providers, including community volunteers, traditional and religious healers, and health professionals, offer non-stigmatizing care. Professional education can be encouraged to include social aspects of skin NTDs in their curricula (including thinking about stigma), which will help them to provide equitable care and services to future patients/clients with skin NTDs and beyond: much can be learnt from skin NTDs in this respect.

Support by families and communities and participation in family, community and political life creates feelings of belonging to society and thus improved mental well-being. Key questions a community volunteer or health workers could ask are whether there has been a change in relationships with spouse/family and in participation in school, work, and community life since a diagnosis of skin NTD. This helps to target interventions and linkage to others could be made **to prevent restrictions, improve, or restore participation early.**

6.3 Mental well-being

People can often feel distressed, or even develop depression or anxiety, as a consequence of having a skin NTD. This might be due to persistent pain, disability or a result of the stigma and social exclusion that they may experience. **Having a support network** is essential, especially for those feeling distressed by their illnesses. Having a person to talk to who understands is a simple but highly effective intervention. Self-help groups and peer supporters can provide important support as they understand the situation well. They can be taught simple skills such as psychological first aid and help to ensure timely referral

to specialist services when needed. As with physical health, **early recognition of signs of depression and anxiety** can prevent the development of more severe mental ill health. Mental health services must therefore be identified, and referral mechanisms established. Persons affected by skin NTDs, their families and their networks must be made aware that such support services exist.

As stigmatized and excluded people can lose motivation and self-esteem, activities such as paid employment, household chores or recreational activities are important **to promote independence and agency**. This can also contribute to community development and the economy of the family.

Finally, efforts should be made **to change stigmatizing attitudes and discrimination**, which are often major causes of distress and mental health problems. Some countries still have stigmatizing laws which should be abolished immediately. Family members should be educated to not exclude relatives due to their conditions, but rather to include them in all family activities. One of the most important ways of changing attitudes in populations is for them to meet persons affected by skin NTDs, to hear their stories and to form relationships that transcend the label of a skin NTD.

6.4 Livelihood

Livelihood means having **access to social protection measures** and being able to earn enough income to lead dignified lives and contribute economically to their families and communities (48). By encouraging and facilitating both formal and informal education and work for persons affected by skin NTDs, they and their families can be helped to secure the necessities of life and improve their economic and social situations (49).

Impairment should not prevent them from participating in economic activities that sustain their livelihood.

Access to livelihoods is supported through access to education, access to rehabilitation, assistive

technology and adaptation of work environment which enable people to work, and **access to low interest loans and technical expertise to set up business**. Village Savings and Loans/Informal Savings & Loan Groups, a form of self-care and self-support groups, can be key entry points for accessing savings and loans for livelihoods including income generation activities as well as basic financial literacy and business training, for members and their families. It can be a first step towards group members graduating to more formal microcredit services.

Accessing livelihood opportunities is one of the key factors in eliminating poverty and ensuring sustainability of rehabilitation and inclusion efforts.

Promoting inclusion of persons affected by skin NTDs in delivery of skin NTD services

Recognizing the perspectives and lived experience of persons affected by skin NTDs and promoting their inclusion are essential for successful skin NTD control and care programmes and interventions. Persons who have skin NTDs have a unique perspective on the needs of those affected and can make an important contribution from their personal experience with the disease, disability and associated discrimination. Alongside persons with skin NTDs, it is also important to consider the participation of persons with disabilities, who represent the more vulnerable population groups.

They may be involved in policy-making; all stages of skin NTD programme development, from planning and implementation to monitoring and evaluation; leadership roles in self-care and self-support groups and other relevant local, national and international network; advocacy and public presentation; and research (50). It is important to ensure that persons affected have the space and support for meaningful and effective participation. Specific attention should be paid to ensure equal participation by women affected by skin NTDs in each of these actions.



© Markus Perkins



O7

Targets and indicators for skin NTDs

Buruli ulcer

Cutaneous leishmaniasis

*Mycetoma, chromoblastomycosis
and other deep mycoses*

Leprosy (Hansen's disease)

Lymphatic filariasis

Onchocerciasis

Post-kala-azar dermal leishmaniasis

Scabies and other ectoparasitoses

Yaws



©WHO Timor-Leste

08

Targets and indicators for skin NTDs

Measuring indicators to monitor progress towards the set targets are signposts of change along the path of development. Section 7.1 describes the global targets that have been identified in the road map and their significance for measuring progress towards skin NTD integration. Section 7.2 describes how context-specific indicators, aligned with the road map indicators, can support strengthening of integrated skin NTD programmes in endemic countries.

7.1 Tracking indicators at national and global levels

The road map identifies 36 core quantitative indicators and 34 additional disease-specific indicators for monitoring global progress, among which are 12 disease-specific indicators related to skin NTDs. The road map companion document on monitoring and evaluation (10) provides guidance on mainstreaming these indicators within health information systems.

For skin NTD integration, progress will be measured primarily by the number of countries that adopt and implement an integrated approach for the control and management of skin NTDs. The target is to reach more than 40 countries by 2030. Milestones have been set by which a minimum number of countries should have adopted the integrated approach in order for the set 2030 goal to be attained.

The four **overarching indicators** are quantitative measures of the combined impact on population health of all global NTD programmes. These indicators will be calculated by the WHO secretariat; at country-level, disease-specific data are essential to be measured as they constitute the building blocks on which these global targets will be measured. Country-level data on each disease may be aggregated at the global level, and then aggregated across all NTDs. For the skin NTDs, countries are responsible for submitting dossiers to

apply for certification of disease eradication (yaws); verification of elimination [interruption of transmission] (leprosy and onchocerciasis); and validation of elimination as a public health problem (lymphatic filariasis) (Annex 8).

The **10 cross-cutting indicators** for measuring progress against NTDs identified in the road map are in four broad categories: integrated approaches, multisectoral coordination, universal health coverage and country ownership (1). While some of these data will be collected from national NTD programmes, others will generally be collected by other sectors using well-established processes (for example, WASH indicators) (Annex 8).

For most skin NTDs, **disease-specific targets and indicators** are already well-defined, with established data processes (Annex 9). However, for some, indicators have been newly added to the road map, and additional work is necessary to obtain reliable data from the peripheral to the central levels, to be reported and compiled at the global level. Such diseases include cutaneous leishmaniasis, mycetoma, chromoblastomycosis and other deep mycoses, and post-kala-azar dermal leishmaniasis. Furthermore, even for those skin NTDs with already established data processes, it is still important that endemic countries check and evaluate their reporting systems, data flow and data quality. For example, yaws is already included in the reporting system of several countries in West Africa and in the Pacific regions, but it is not yet a reportable disease in some endemic countries and is often reported only based on clinical suspicion unsupported by diagnostic testing.

Annual reporting and a substantive review of progress against the global targets will be conducted in 2022, 2024, 2026, 2029 and 2031 (Annex 9).

7.2 Including the indicators in strong country-owned monitoring and evaluation systems and national NTD plans

To ensure country ownership, context-specific indicators must be identified and measured. Selecting indicators for a strategic integrated plan and a monitoring framework requires understanding of the different types of indicators and what they measure. The road map indicators are not the only indicators that countries should monitor. Rather, the country should start by setting its goals and objectives based on the global goals and the local context in order to define the impact, short-term, mid-term and long-term outcome benefits or changes the national programme plans to achieve to meet those targets, in alignment with the road map. Countries are encouraged to adapt the road map monitoring and evaluation framework (12) to inform their own milestones and targets for implementation of the integrated skin NTDs strategy in their country.

Additionally, each Member State is requested to identify the inputs, activities and outputs required to achieve the targeted outcomes and impact, assigning indicators for each, guided by disease-specific monitoring and evaluation frameworks and the cross-cutting road map indicators to enable global reporting. Not all of the programme-level indicators will be reported to WHO for global monitoring of the road map's progress, but they are essential for in-country management of skin NTD programmes and should be reviewed regularly to inform decisions and corrective actions. Box 1 provides some example of indicators routinely collected by national programmes.

Although importance is recognized, indicators such as for mental health are currently difficult to measure routinely.

For more information, refer to the road map companion document on monitoring and evaluation (10).

Box 1. Examples of indicators for skin NTDs and skin NTD integration for in-country management

Primary indicators^a

1. Number of new cases^b
2. Number of new cases cured without disabilities or deformities
3. Number of people with disabilities or deformities

^a All indicators should be reported by age and sex.

^b For some skin NTDs, prevalence may be reported.

Secondary indicators

1. Number of peripheral health care workers trained in skin NTDs in country
2. Number of cases confirmed with laboratory test or point-of-care diagnostic tool
3. Number of people affected by skin NTDs included in policy and strategy making

OIS

Health information systems and integrated reporting of skin NTDs

Buruli ulcer

Cutaneous leishmaniasis

*Mycetoma, chromoblastomycosis
and other deep mycoses*

Leprosy (Hansen's disease)

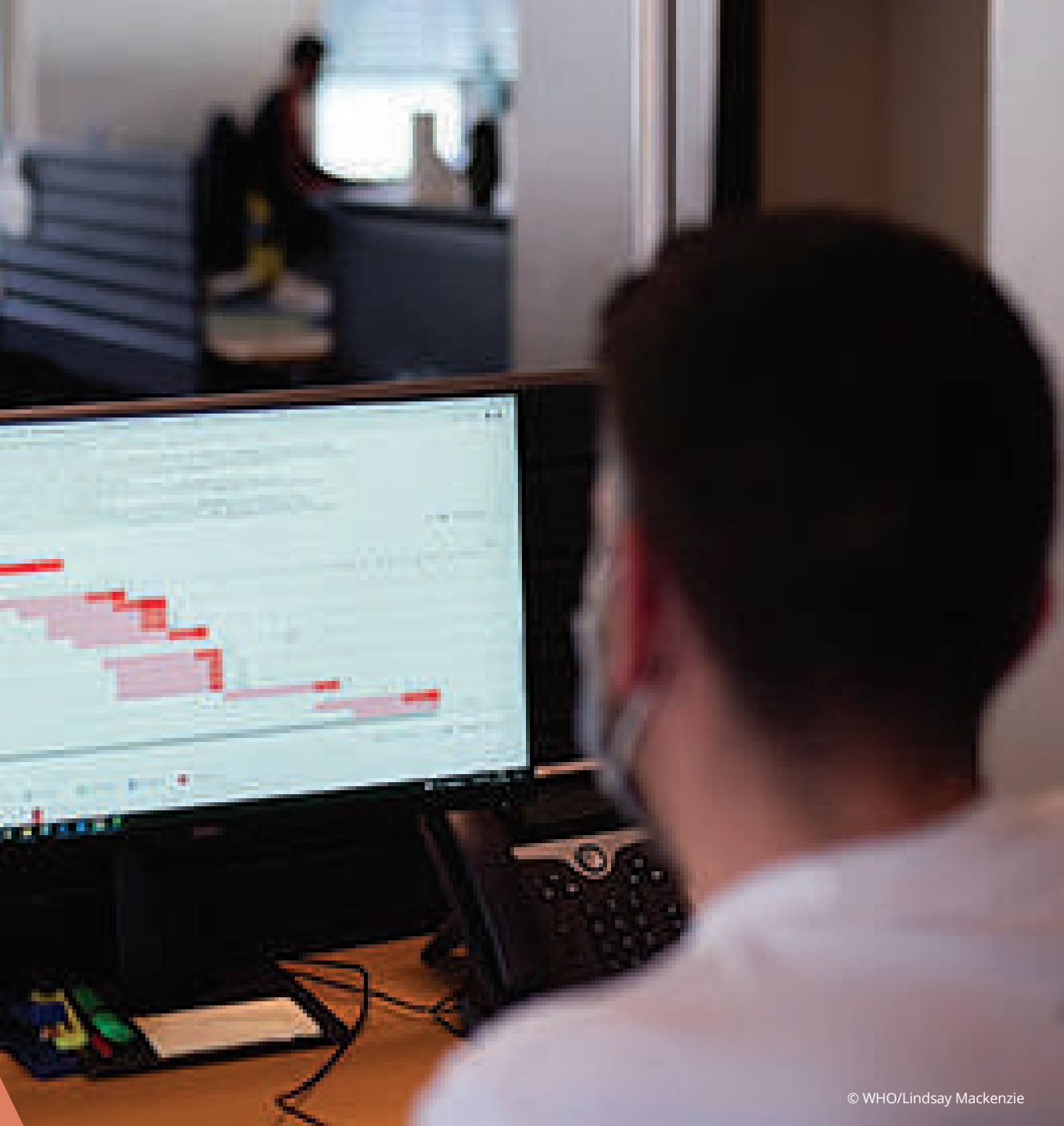
Lymphatic filariasis

Onchocerciasis

Post-kala-azar dermal leishmaniasis

Scabies and other ectoparasitoses

Yaws



© WHO/Lindsay Mackenzie

09

Health information systems and integrated reporting of skin NTDs

Data on skin NTDs appear fragmented at every level including nationally, regionally and globally. Where appropriate, monitoring and evaluation of endemic skin NTDs should be integrated into common platforms. Activities such as routine surveillance, active case detection, community-based surveys, health facility assessments or data supervision could similarly be conducted and integrated for the relevant endemic skin NTDs. Integration should be promoted for the different data processes (collection, reporting, management and storage, dissemination) and at the different levels of the health information system (from community to national, regional and global levels). This should not only improve the cost-effectiveness of monitoring and evaluation for all skin NTDs but also streamline the use of data for planning and action across all NTDs in a sustainable manner.

Mainstreaming skin NTD data into national health information systems and building capacity at all levels to manage data processes through its infrastructure are also important in contributing to sustainable and efficient monitoring and evaluation of progress against NTDs. WHO will avail a toolkit with general and disease-specific guidance documents to facilitate integration and mainstreaming of skin NTD data into the routine health management information system of countries.

WHO has developed recording and reporting tools for skin NTDs, including a patient file integrating data

recording for three of the skin NTDs (see Annex 10: Skin NTDs 01 form), and standardized disease-specific registers that share a common structure and common variables for the different skin NTDs. A registry to record data related to integrated active case detection activities in the community has also been developed and was pilot-tested in Côte d'Ivoire in 2020. All these recording forms are available as soft copies, in electronic format (Word, Excel) and as metadata packages which can easily be integrated into national online platforms based on the open-source software District Health Information Software 2 (DHIS2).

WHO has also designed integrated tools to enable reporting and data sharing across the three levels of the Organization. For example, the WHO Integrated Data Platform, facilitates standardized data reporting on several skin NTDs (Buruli ulcer, cutaneous leishmaniasis, leprosy, post-kala-azar dermal leishmaniasis and yaws) and provides interactive dashboards to strengthen integrated, shared data analysis, dissemination and use. Further work is needed to include other skin NTDs on this integrated online platform to consolidate monitoring of all the indicators presented in Annexes 8 and 9. Additionally, overall progress on the implementation of the integrated skin NTD strategy can be visualized through the NTD road map tracker, which is a dashboard depicting global progress towards the 2030 goals.



O9

Research gaps in integration and management of skin NTDs

Buruli ulcer

Cutaneous leishmaniasis

*Mycetoma, chromoblastomycosis
and other deep mycoses*

Leprosy (Hansen's disease)

Lymphatic filariasis

Onchocerciasis

Post-kala-azar dermal leishmaniasis

Scabies and other ectoparasitoses

Yaws



© WHO SEARO

10

Research gaps in integration and management of skin NTDs

Research on skin NTDs has been hampered by limited funds. This has led to a limited number of scientists working on skin NTDs and delayed research and development successes compared with those achieved for diseases of developed countries or with higher numbers of cases. For example, there are no effective rapid diagnostic tests for many skin NTDs other than those for lymphatic filariasis and yaws. Also, for many years, there have been no improved regimens for treatment of diseases such as leprosy and

leishmaniasis, which have relied on the same medicines for decades with very few new effective alternatives. While these treatments are effective to an extent, they require long treatment courses and are sometimes associated with significant adverse events.

Various research questions remain to be answered for skin NTDs and skin NTD integration programmes. Box 2 lists some potential areas for research.

Box 2. Potential research areas for skin NTDs and skin NTD integration

- The epidemiology of skin NTDs, their causes, transmission modes and risk factors
- Socioeconomic impact of skin NTDs and of their control, elimination and eradication
- Development and assessment of better treatment regimens for integrated case management
- Antimicrobial resistance for medicines used to treat skin NTDs and their detection and reporting
- Development of diagnostic platforms for multiple or integrated screening in the community and in clinics
- Design of integrated information systems to ensure reliable reporting and responses, including mapping to identify overlaps
- Evaluation of training and training materials to improve integrated case detection on the front line of health care
- Linkages between disability and skin NTDs
- Development of technologies/assistive devices for prevention and reduction of impact of skin NTD related disabilities
- Impact of skin NTDs on mental health
- Roles of persons affected by skin NTDs and their families
- Evaluation of the use and impact of this framework

100



Factors for successful integration of skin NTDs and the way forward

Buruli ulcer

Cutaneous leishmaniasis

*Mycetoma, chromoblastomycosis
and other deep mycoses*

Leprosy (Hansen's disease)

Lymphatic filariasis

Onchocerciasis

Post-kala-azar dermal leishmaniasis

Scabies and other ectoparasitoses

Yaws



© WHO/Pierre Albouy

11

Factors for successful integration of skin NTDs and the way forward

Successful adoption and implementation of the integrated skin NTD strategy will require consideration of contextual inputs, health system building blocks and cross-sectoral interactions. WHO has developed a sustainability framework which provides guidance on how to develop specific actions to foster sustainability for NTD programmes (51). Like all programmes, the following factors would facilitate successful and sustainable integration of skin NTDs within national health systems.

10.1 Political commitment

Strong political commitment and leadership are key at national and subnational levels for integrating control and management of skin NTDs. It is important to develop national policy and strategy with funding. This should be supported with an accountability mechanism for tracking stakeholder commitments for actions on sustainability, to support reporting on high-impact opportunities and assess whether sufficient progress is being made relative to government commitments.

10.2 Country ownership

Country ownership is essential to ensure sustainability of activities for skin NTD integration. Robust political support and leadership combined with cross-sectoral collaboration with various ministries are also essential. This should be demonstrated by embedding the integrated skin NTD strategy in the national NTD policy documents and consequently the National Health Policies, Strategies and Plans (NHSPs). Appropriate advocacy materials on integrated skin NTDs should be developed and endorsed by the government to engage different health and non-health sectors as well as donor partners and communities. Countries should conduct periodic assessments to gauge progress on their implementation of the integrated skin NTD strategy.

10.3 Partner support

Partnerships and fairness in partnerships are required among governments, international agencies, implementing partners, donors, and representatives or representative groups of persons affected by skin NTDs to achieve shared targets and goals and sustain activities. Private health sector partnership would further strengthen integrated control of skin NTDs.

10.4 Involvement of persons affected by skin NTDs

Involvement of persons affected by skin NTDs in all areas of planning and implementation of integrated skin NTD control activities would:

- build community confidence in service delivery by the health facilities; and
- exert influence in overcoming social stigma and discrimination issues.

10.5 Resources and funding

In the long term, integration is likely to deliver substantial cost savings. In the short to medium term, additional funding and human resources must be mobilized to avoid reversing the progress achieved under existing vertical programmes. Resources and funding must be made available for a more integrated health system, providing a higher quality of care.

10.6 Workplans for integration into the primary health care system

The long-term goal is to have a health care structure in endemic countries that address these diseases with minimal external technical and financial support.

10.7 Capacity-building and retention of expertise

Capacity-building of peripheral health workers and encouragement to work with all relevant sectors to address skin NTDs are important. While the skin NTDs share some general characteristics, they have also particular characteristics and complications for which specific expertise in diagnosis and case management is required. It is important to sustain a minimum level of in-country expertise in each skin NTD, including diagnostic services as well as support by local/regional centres of expertise, both for shared activities and disease-specific requirements, especially during the last mile of the NTD programmes.

10.8 Identifying other public health problems for integration

Integration of case detection and diagnostic services for skin NTDs with other public health programmes and activities such as those for tuberculosis; HIV/AIDS; diabetes mellitus, immunization; school health; sexual and reproductive health; and maternal and child health would open more opportunities to increase coverage.

10.9 High-quality active case detection

The better the understanding of prevalence, the greater the reliability of measurement of impact. Active case

detection provides not only better understanding of prevalence but also opportunities for those affected to be connected with health services promptly.

10.10 Equitable access to diagnosis and treatment for all

Access to affordable, quality-assured diagnostics and treatment services should be ensured and must be provided to every person equitably. Programme strategies should be formulated with respect to different cultural backgrounds and traditional beliefs.

A “virtuous cycle” can be expected through successful skin NTD integration, leading to cure with function with or without disabilities, stigma reduction, and social inclusion (Fig. 9).

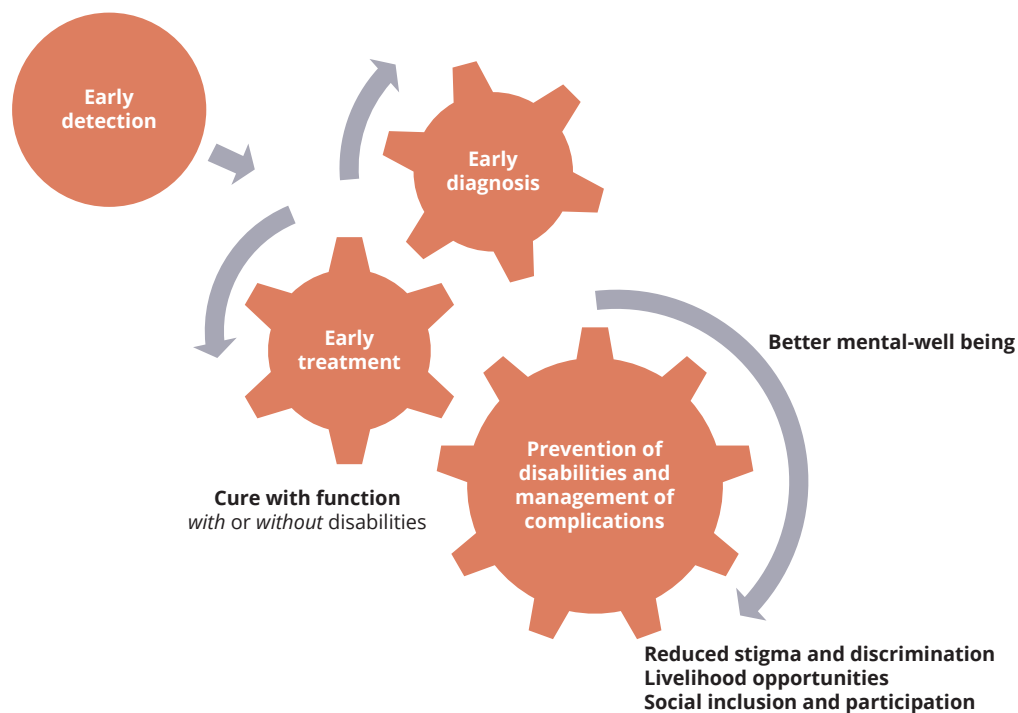


Fig. 9. Virtuous cycle expected through successful integration of skin NTDs

11

Conclusions

Buruli ulcer

Cutaneous leishmaniasis

*Mycetoma, chromoblastomycosis
and other deep mycoses*

Leprosy (Hansen's disease)

Lymphatic filariasis

Onchocerciasis

Post-kala-azar dermal leishmaniasis

Scabies and other ectoparasitoses

Yaws





© WHO Vanuatu



Conclusions

Multiple skin NTDs require active detection and management of individual cases and are therefore more resource-intensive than NTDs that could be predominantly targeted by MDA. This has posed significant challenges in disease control of this set of diseases. This strategic framework for integrated control and management of skin NTDs will enable these challenges to be overcome through opportunity and resource sharing. Countries and stakeholders have started to adapt the strategy to make progress towards achieving the global targets and milestones set for NTDs. This companion document to the road map aims to guide and assist countries and stakeholders in this process.

Skin manifestation is the fundamental commonality among the skin NTDs that has promoted integration. However, areas for integration are limited not only to interventions related directly to the skin such as active case detection, wound and lymphoedema management, and training of health care workers, but

also to areas including rehabilitation, mental well-being, and reduction of stigma and discrimination. It is expected that innovative integration will happen through successful utilizing available resources and opportunities, which may also go beyond skin NTDs. Currently, there is growing evidence of the effectiveness of MDA against scabies and yaws, which may well be integrated with other MDA-targeted NTDs in co-endemic areas.

It is time that work against skin NTDs moves forward in partnership to reach the targets. Through the actions taken, **persons affected by skin NTDs should receive quality, stigma-free and continued care, while living with their families and in their communities.**

Furthermore, the strategy envisions benefits beyond the skin NTDs in particular to encompass skin conditions in general, and thereby to achieve **skin health for all.**



References

1. Ending the neglect to attain the Sustainable Development Goals: a road map for neglected tropical diseases 2021–2030. Geneva: World Health Organization; 2020 (<https://apps.who.int/iris/handle/10665/338565>, accessed 31 March 2022).
2. Recognizing neglected tropical diseases through changes on the skin: a training guide for front-line health workers. Geneva: World Health Organization; 2018 (<https://apps.who.int/iris/handle/10665/272723>, accessed 31 March 2022).
3. Global health estimates 2019: disease burden by cause, age, sex, by country and by region, 2000–2019. Geneva: World Health Organization; 2020 (<https://www.who.int/data/gho/data/themes/mortality-and-global-health-estimates/global-health-estimates-leading-causes-of-dalys>, accessed 4 May 2022).
4. Mitja O, Marks M, Bertran L, Kollie K, Argaw D, Fahal AH, et al. Integrated control and management of neglected tropical skin diseases. *PLoS Negl Trop Dis.* 2017;11(1):e0005136.
5. Yotsu RR. Integrated management of skin NTDs: lessons learned from existing practice and field research. *Trop Med Infect Dis* 2018;3:120. doi:10.3390/tropicalmed3040120.
6. Mitjà O, Houinei W, Moses P, Kapa A, Paru R, Hays R, et al. Mass treatment with single-dose azithromycin for yaws. *N Engl J Med.* 2015 Feb 19;372(8):703–10. doi:10.1056/NEJMoa1408586.
7. Mitjà O, Hays R, Ipai A, Penias M, Paru R, Fagaho, et al. Single-dose azithromycin versus benzathine benzylpenicillin for treatment of yaws in children in Papua New Guinea: an open-label, non-inferiority, randomised trial. *Lancet.* 2012; 379(9813):342–7. doi:10.1016/S0140-6736(11)61624-3.
8. Romani L, Marks M, Sokana O, Nasi T, Kamoriki B, Cordell B, et al. Efficacy of mass drug administration with ivermectin for control of scabies and impetigo, with coadministration of azithromycin: a single-arm community intervention trial. *Lancet Infect Dis.* 2019; 19:510–18.
9. Stuber J, Meyer I, Link B. Stigma, prejudice, discrimination and health. *Soc Sci Med.* 2008; 67(3):351–357. doi:10.1016/j.socscimed.2008.03.023
10. Ending the neglect to attain the Sustainable Development Goals: a framework for monitoring and evaluating progress of the road map for NTDs 2021–2030. Geneva: World Health Organization; 2021 (<https://apps.who.int/iris/handle/10665/341313>, accessed 31 March 2022).
11. Neglected tropical diseases. In: *The Global Health Observatory.* Geneva: World Health Organization; 2021 (<https://www.who.int/data/gho/data/themes/neglected-tropical-diseases>, accessed 31 March 2022).
12. Global leishmaniasis surveillance, 2019–2020, a baseline for the 2030 road map. *Wkly Epidemiol Rec.* 2021; 35:402–19 (<https://www.who.int/publications/i/item/who-wer9635-401-419>), accessed 31 March 2022).
13. Fine PEM, Sterne JAC, Ponnighaus JM, Bliss L, Saul J, Chihana A, et al. Household and dwelling contact as risk factors for leprosy in Northern Malawi. *Am J Epidemiol.* 1997; 146(1):91–102.
14. Urgesa K, Bobosha K, Seyoum B, Weldegebreal, Mihret A, Howe R, et al. Evidence for hidden leprosy in a high leprosy endemic setting, Eastern Ethiopia: the application of active case-finding and contact screening. *PLoS Negl Trop Dis.* 2021; 15(9):e0009640. <https://doi.org/10.1371/journal.pntd.0009640>.
15. Taal AT, Blok DJ, van Brakel WH, de Vlas SJ, Richardus JH. Number of people requiring post-exposure prophylaxis to end leprosy: a modeling study. *PLoS Negl Trop Dis.* 2021; 15(2):e0009146. <https://doi.org/10.1371/journal.pntd.0009146>.
16. *Leprosy/Hansen disease: contact tracing and post-exposure prophylaxis.* New Delhi: World Health Organization Regional Office for South-East Asia; 2020 (<https://apps.who.int/iris/handle/10665/336679>, accessed 31 March 2022).
17. Barth-Jaeggi T, Steinmann P, Mieras L, van Brakel W, Tiwari A, Bratschi M, et al. Leprosy post-exposure prophylaxis (LPEP) programme: study protocol for evaluating the feasibility and impact on case detection rates of contact tracing and single dose rifampicin. *BMJ Open.* 2016; 6(11):e013633. doi:10.1136/bmjopen-2016-013633.

18. Mieras LF, Taal AT, Post EB, Ndeve AGZ, van Hees CLM. The development of a mobile application to support peripheral health workers to diagnose and treat people with skin diseases in resource-poor settings. *Trop Med Infect Dis.* 2018; 3(3).
19. Faye O, Bagayoko CO, Dicko A, Cisse L, Berthe S, Traore B, et al. A teledermatology pilot programme for the management of skin diseases in primary health care centres: experiences from a resource-limited country (Mali, West Africa). *Trop Med Infect Dis.* 2018; 3(3).
20. Williams V, Kovarik C. Long-Range Diagnosis of and support for skin conditions in field settings. *Trop Med Infect Dis.* 2018; 3(3).
21. Neglected tropical diseases [course series]. In: OpenWHO [online training platform]. Geneva: World Health Organization (<https://openwho.org/channels/ntd>), accessed 31 March 2022).
22. Carrion C, Robles N, Sola-Morales O, Aymerich M, Postigo JAR. Mobile health strategies to tackle skin neglected tropical diseases with recommendations from innovative experiences: systematic review. *JMIR Mhealth Uhealth.* 2020; 8(12):e22478. doi: 10.2196/22478.
23. Karun V, Hotez PJ, Rosengart TK. Global surgery and the neglected tropical diseases. *PLoS Negl Trop Dis.* 2017; 11(9):e0005563.
24. Rehabilitation in health systems. Geneva: World Health Organization; 2017 (<https://apps.who.int/iris/handle/10665/254506>, accessed 31 March 2022).
25. Assistive technology [WHO fact sheet]. Geneva: World Health Organization; 2018 (<https://www.who.int/news-room/fact-sheets/detail/assistive-technology>, accessed 31 March 2022).
26. Improving the health and well-being of people living with neglected tropical diseases through rehabilitation and assistive technology: thematic brief. Geneva: World Health Organization; 2021 (<https://apps.who.int/iris/handle/10665/351174>, accessed 31 March 2022).
27. Ten steps health guide. Greenville (SC): American Leprosy Missions; 2021 (<https://www.leprosy.org/ten-steps/>, accessed 31 March 2022).
28. Chronic care for neglected infectious diseases: leprosy/Hansen's disease, lymphatic filariasis, trachoma, and Chagas disease. Washington (DC): Pan American Health Organization; 2020 (<https://iris.paho.org/handle/10665.2/53312>, accessed 31 March 2022).
29. Podoconiosis: training of health workers at national and district levels on skin-NTDs. In: OpenWHO [online training platform]. Geneva: World Health Organization (<https://openwho.org/courses/NTDs-podoconiosis-EN>, accessed 31 March 2022).
30. WHO guideline on self-care interventions for health and well-being. Geneva: World Health Organization; 2021 (<https://apps.who.int/iris/handle/10665/342741>, accessed 31 March 2022).
31. Mental health of people with neglected tropical diseases: towards a person-centred approach. Geneva: World Health Organization; 2020 (<https://apps.who.int/iris/handle/10665/335885>, accessed 31 March 2022).
32. Mbabazi PS, Del Pino S, Ducker C, Dean L, Broekkamp H, et al. Promoting gender, equity, human rights and ethnic equality in neglected tropical disease programmes. *Trans R Soc Trop Med Hyg.* 2021; 115(2):188–9 doi:10.1093/trstmh/traa159.
33. Ghinai R, El-Duah P, Chi KH, et al. A cross-sectional study of 'yaws' in districts of Ghana which have previously undertaken azithromycin mass drug administration for trachoma control. *PLoS Negl Trop Dis.* 2015; 9(1):e0003496. doi:10.1371/journal.pntd.0003496.
34. Marks M, Vahi V, Sokana O, Chi K-H, Puiahi E, Kilua G, et al. Impact of community mass treatment with azithromycin for trachoma elimination on the prevalence of yaws. *PLoS Negl Trop Dis.* 2015; 9(8):e0003988. doi:10.1371/journal.pntd.0003988.
35. Mohammed KA, Deb RM, Stanton MC, Molyneux DH. Soil transmitted helminths and scabies in Zanzibar, Tanzania following mass drug administration for lymphatic filariasis: a rapid assessment methodology to assess impact. *Parasit Vectors.* 2012; 5:299 doi:10.1186/1756-3305-5-299.
36. Martin D, Wiegand R, Goodhew B, Lammie P, Mkocho H, Kasubi M. Impact of ivermectin mass drug administration for lymphatic filariasis on scabies in eight villages in Kongwa District, Tanzania. *Am J Trop Med Hyg.* 2018; 99(4):937–9. doi:10.4269/ajtmh.18-0018
37. Krotneva SP, Coffeng LE, Noma M, Zouré HT, Bakoné L, Amazigo UV, et al. African Program for Onchocerciasis Control 1995–2010: impact of annual ivermectin mass treatment on off-target infectious diseases. *PLoS Negl Trop Dis.* 2015; 9:e0004051.

38. Ending the neglect to attain the Sustainable Development Goals: a global strategy on water, sanitation and hygiene to combat neglected tropical diseases, 2021–2030. Geneva: World Health Organization; 2021 (<https://apps.who.int/iris/handle/10665/340240>, accessed 31 March 2022).
39. Nweze JA, Nweze EI, Onoja US. Nutrition, malnutrition, and leishmaniasis. *Nutrition*. 2020; 73:110712. doi:10.1016/j.nut.2019.110712.
40. Hall A, Zhang Y, MacArthur C, Baker S. The role of nutrition in integrated programs to control neglected tropical diseases. *BMC Med*. 2012; 10:41. doi:10.1186/1741-7015-10-41.
41. Mwingira UJ, Means AR, Chikawe M, Kilembe B, Lyimo D, Crowley K, et al. Integrating neglected tropical disease and immunization programs: the experiences of the Tanzanian Ministry of Health [perspective piece]. *Am J Trop Med Hyg*. 2016; 95(3):505–7 doi:10.4269/ajtmh.15-0724.
42. Deardorff KV, Rubin Means A, Ásbörnsdóttir KH, Watson J. Strategies to improve treatment coverage in community-based public health programs: a systematic review of the literature. *PLoS Negl Trop Dis*. 2018; 12(2):e0006211.
43. Grada A, Phillips TJ. Nutrition and cutaneous wound healing. *Clin Dermatol*. 2021; 26:S0738-081X(21)00214-5. doi:10.1016/j.clindermatol.2021.10.002.
44. Pappas A, Liakou A, Zouboulis CC. Nutrition and skin. *Rev Endocr Metab Disord*. 2016; 17(3):443-8. doi:10.1007/s11154-016-9374-z.
45. World report on disability. World Health Organization & World Bank; 2011 (<https://apps.who.int/iris/handle/10665/44575>, accessed 4 May 2022).
46. Health promotion glossary. Geneva: World Health Organization; 1998 (<https://apps.who.int/iris/handle/10665/64546>, accessed 31 March 2022).
47. International classification of functioning, disability and health: ICF. Geneva: World Health Organization; 2001 (<https://apps.who.int/iris/handle/10665/42407>, accessed 31 March 2022).
48. Community-based rehabilitation: CBR guidelines. Geneva: World Health Organization; 2010 (<https://apps.who.int/iris/handle/10665/44405>, accessed 31 March 2022).
49. DFID sustainable livelihoods guidance sheets. London (UK): United Kingdom Department for International Development; 2000 (DFID sustainable livelihoods guidance sheets | ENN (enonline.net), accessed 31 March 2022).
50. NNN statement of commitment to the participation of persons affected by NTDs. Neglected Tropical Disease NGO Network; 2020 (<https://www.ntd-ngonetwork.org/nnn-statement-of-commitment-to-the-participation-of-persons-affected-by-ntds>, accessed 31 March 2022).
51. Ending the neglect to attain the Sustainable Development Goals: a sustainability framework for action against neglected tropical diseases 2021–2030. Geneva: World Health Organization; 2021 (<https://apps.who.int/iris/handle/10665/338886>, accessed 31 March 2022).

Process used to develop the framework

This strategic framework was developed in collaboration with a group of independent experts. The process included convening two online consultation groups comprising managers of neglected tropical disease (NTD) programmes, technical advisors from all six regions of the World Health Organization (WHO), researchers, partners, health care doctors including dermatologists and persons affected by NTDs from different regions of WHO. A virtual global webinar was organized in 2020 to discuss the initial views of experts. The process of drafting the framework was initiated during 2017 and 2019 at WHO meetings held in Geneva, Switzerland.

First online survey, September 2020

The first online survey in September 2020 involved a total of 240 programme personnel, technical advisers, researchers, health care workers, donor partners, dermatologists and persons affected by NTDs from 59 countries: 84 (35%) were programme personnel working at national and peripheral levels and 79 (33%) were from research organizations.

Of the 240 respondents, 128 (53%) were working in countries or in projects where integrated activities for some of the skin NTDs are practised or implemented (Fig. A1.1). Nearly 50% (116) indicated that they already have experience in integrating skin NTDs such as Buruli ulcer, leprosy, lymphatic filariasis and scabies in the countries where they are working (Fig. A1.2).

During the survey, potential areas for integrating skin NTD control activities, challenges and existing opportunities in countries were identified. More than 70% of the respondents favoured integrated approaches; a lesser number indicated stigma and

inclusion (69%), surgery (55%) and mental health (63%) as potential areas for integration, indicating need for further advocacy in these respective areas (Fig. A1.3).

Second online survey, September–October 2021

For the second online consultation in September–October 2021, a total of 100 programme personnel, researchers, partners and technical advisers from 34 countries from different regions of WHO provided feedback on a revised draft framework (Fig. A1.4). Of the 100 respondents, 34 (34%) were programme personnel at national to peripheral levels and 37 (37%) were researchers (Fig. A1.5). Some 94 (94%) of the respondents indicated that the framework document provided the required information from which to plan and implement integrated control of skin NTDs in the country. A total of 88 (88%) were satisfied with the document's contents and descriptions. About 60 (60%) indicated that it was practical in supporting skin NTD-related integrated activities in each endemic country.

Independent reviews and discussion

The framework document was independently reviewed by 12 external experts and representatives of organizations with diverse expertise and by technical advisers at WHO headquarters and regional offices.

The draft framework was presented and discussed during an ILEP¹ Technical Advisory meeting, meetings for NNN cross-cutting working groups² on DMDI and on Skin NTDs, as well as during an IACS³ meeting to receive the experts' views.

¹ The International Federation of Anti-Leprosy Associations (ILEP) is a consortium of international nongovernmental organizations with a shared desire to see a world free from leprosy, and an acknowledgment that none of us can achieve this on our own. Through the programmes of its Member associations, ILEP spans more than 60 countries and 1000 project locations worldwide.

² The NTD NGO Network (NNN) cross-cutting working groups on Disease Management and Disability Inclusion (DMDI) provide a unique and growing platform for engagement, shared learning, coordination, capacity development and advocacy for interested stakeholders. Among the several groups are the Disease Management and Disability Inclusion (DMDI) group and the Skin NTD group. In this context, they systematically coordinate and collaborate with WHO's Department of Control of Neglected Tropical Diseases and related departments and initiatives in achieving the common goals.

³ The International Alliance for the Control of Scabies (IACS) is a global network of researchers, clinicians and public health experts committed to the control of human scabies and the promotion of health and well-being of all those living in affected communities.

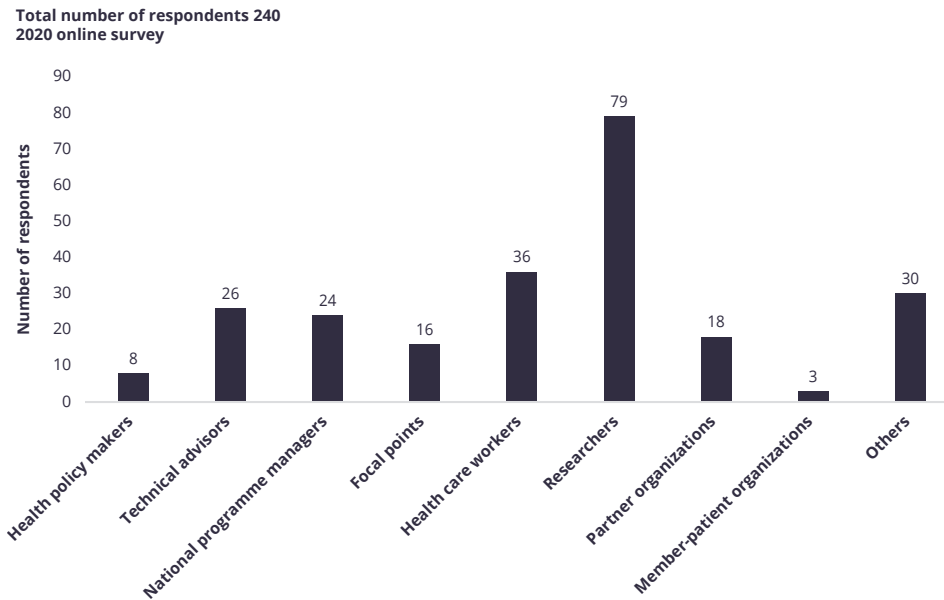


Fig. A1.1. Professions or affiliations of respondents (first online survey)

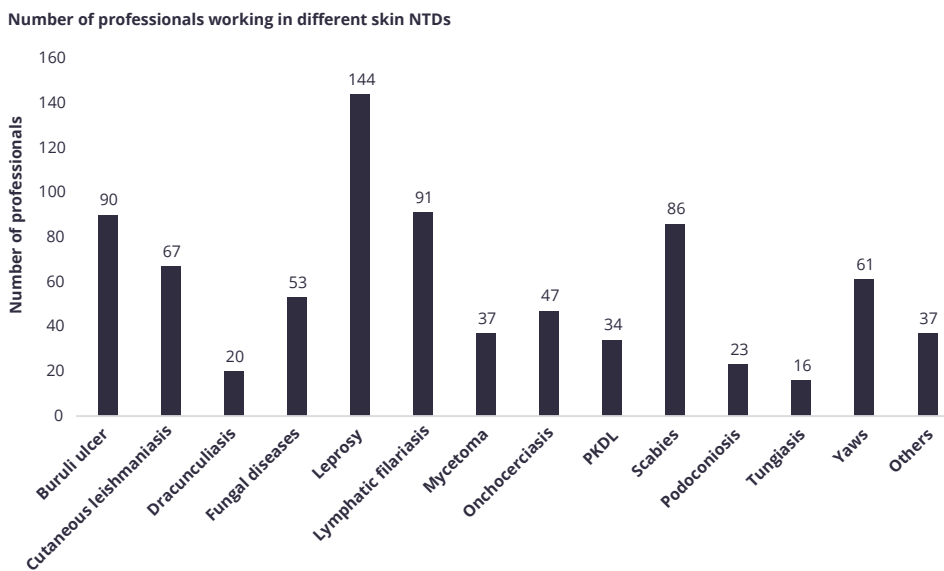


Fig. A1.2. Areas of work of respondents, by skin NTD (first online survey)

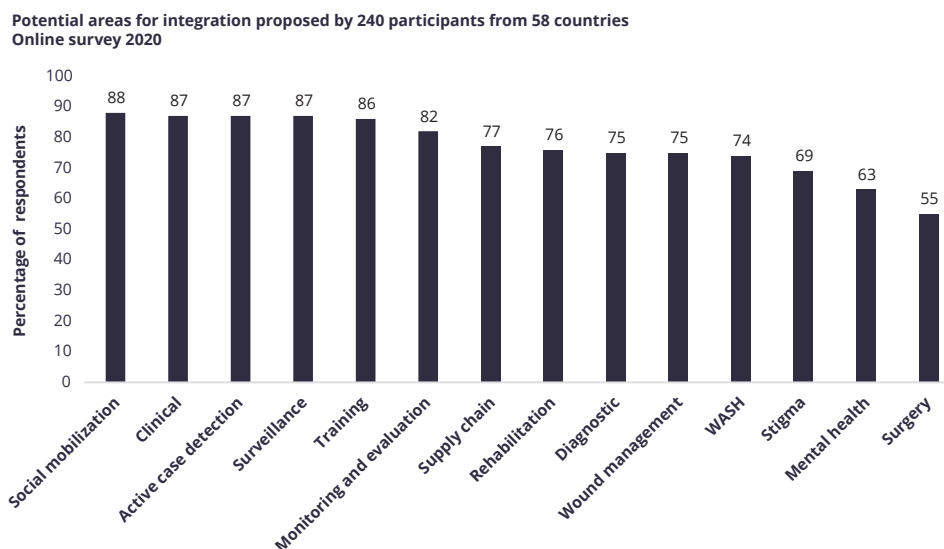


Fig. A1.3. Potential areas for integrated activities to control skin NTDs

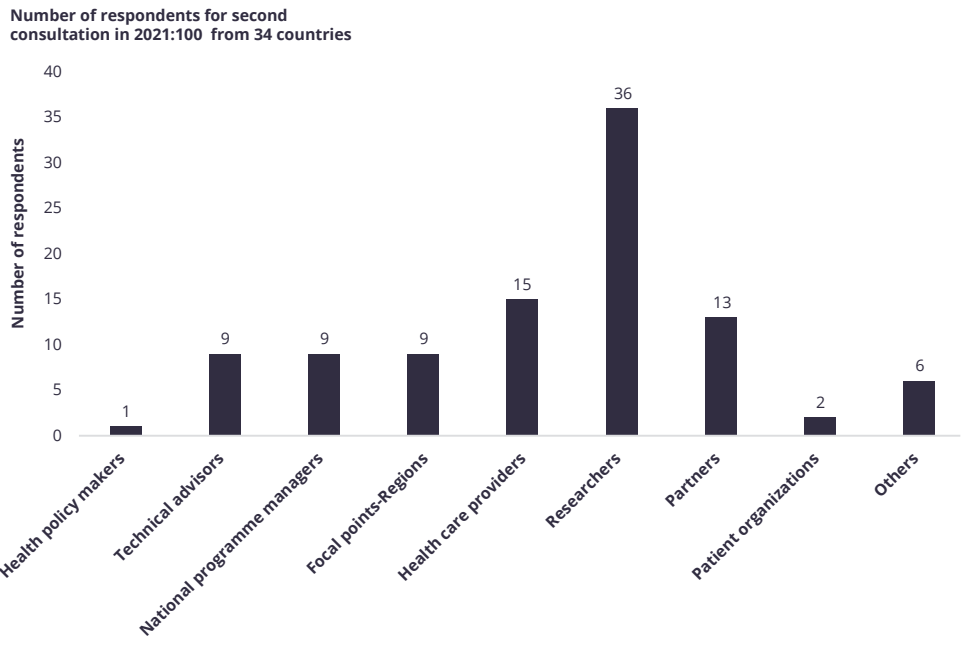


Fig. A1.4. Professions or affiliations of respondents (second online survey)

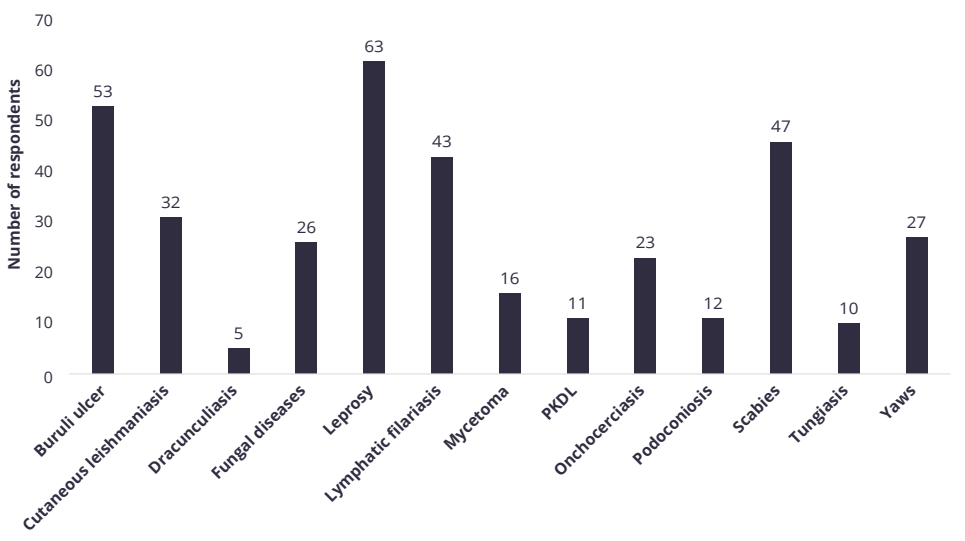


Fig. A1.5. Areas of work of respondents, by skin NTD (second online survey)

Training on skin NTDs and skin conditions, by level

Level	Category of health personnel	Tasks	Training materials	Duration (Flexible)	Training team/s
Community	Community health workers/ volunteers	<ul style="list-style-type: none"> • Screening/examining community members to suspect skin NTDs and other skin diseases • Community education • Advise on self-care for persons affected by skin NTDs • Reducing skin NTD-related stigma 	<ul style="list-style-type: none"> • Pictorial pocket booklets/ posters on type of skin lesions for skin NTDs and other skin diseases • Suspected case register • Referral slips • Pictorial pocket booklets/ posters for self-care 	1–2 days	Health centre staff assisted by district/ regional team
Primary health centre/community health centre	Health care workers (doctors, nurses, laboratory personnel)	<ul style="list-style-type: none"> • Clinical diagnosis • Rapid diagnostic tests • Sample collection • Recording and reporting • Managing uncomplicated cases • Wound dressing • Referral for further investigations/confirmation of diagnosis, complicated wound management, surgery, rehabilitation • Reducing skin NTD-related stigma 	<ul style="list-style-type: none"> • Pictorial book/posters on basic dermatology/skin NTDs • Records and reporting forms • Referral registers • Smart phone use for skin NTD apps^a • Simple wound management • Self-care using online training materials • Use of online web dermatological packages, guides and teledermatology 	2–3 days	District team with one doctor with basic dermatology background and a laboratory technician
District	Surveillance/outbreak rapid response team, data manager, laboratory personnel, physiotherapist, counsellor	<ul style="list-style-type: none"> • Training of subdistrict health facility personnel in skin NTDs and other skin diseases • Diagnosis support • Treatment with help of dermatology team/ teledermatology • Rehabilitation • Mental health support • Reducing skin NTD-related stigma • Referral of complicated cases • Recording and reporting • Use of digital/mobile technology • Surveillance • Supervision and monitoring 	<ul style="list-style-type: none"> • Training guides (WHO and others) • Atlas on skin NTDs and other diseases • Recording and reporting forms including laboratory tests • Transportation of samples for polymerase chain reaction • Use of smart phone with skin NTDs App^a • Use of web-based training packages/teledermatology 	1–2 days	National team with: <ul style="list-style-type: none"> • programme personnel • basic dermatology-trained personnel or dermatologists • basic rehabilitation trained personnel or physiotherapists/ occupational therapists • Counsellor • Laboratory experts

^a For example, Skin NTDs App (WHO) and SkinApp by NLR [No Leprosy Remains].

Training materials and Apps

Title	Recognizing neglected tropical diseases through changes on the skin: a training guide for front-line health workers
Description	This training guide was developed by WHO and skin NTD experts, and is available in English, French, Portuguese and Spanish. It explains how to identify the signs and symptoms of skin NTDs through their visible characteristics (lumps, ulcers, swollen limbs/face/body, patches, others). It also contains information on how to diagnose and manage common skin problems that front-line health workers may encounter. The guide is intended for use by front-line health workers without specialist knowledge of skin diseases.
Skin diseases covered	Mainly skin NTDs (Buruli ulcer, cutaneous leishmaniasis, post-kala-azar dermal leishmaniasis, leprosy, lymphatic filariasis, mycetoma, onchocerciasis, scabies and other ectoparasitoses, and yaws)
Access link	https://apps.who.int/iris/handle/10665/272723




Title	Neglected Tropical Diseases Course Series
Description	This WHO online training course offers learning resources to support implementation of the road map. Each course has several modules which participants can take at their own speed and convenience. A Record of Achievement is awarded at the end of the course to participants who scored at least 80% of the maximum number of points from all graded assignments. The course lasts 30 minutes to 2 hours and is available in different languages depending on the disease (Arabic, English, French, Portuguese, Russian and Spanish).
Skin diseases covered	Mycetoma, podoconiosis, scabies, tungiasis and yaws [other skin NTDs to be added]
Access link	https://openwho.org/channels/ntd




Title	Skin NTDs App
Description	This App was developed from the WHO publication on <i>Recognizing neglected tropical diseases through changes on the skin: a training guide for front-line health workers</i> , to facilitate easy access and use. The new version (3.0) integrates the SkinApp developed by NLR (Until No Leprosy Remains) and synergizes both tools. It has a function that narrows down the differential diagnosis by choosing the country where the patients is supposed to have been infected. The App is available in English, French, Portuguese and Spanish.




Skin diseases covered	Mainly skin NTDs and other skin diseases
Access link	Android: https://play.google.com/store/apps/details?id=com.universaldocor.skin_ntds&hl=en&gl=US iPhone: https://apps.apple.com/us/app/skin-ntds-app/id1499080526

Title	SkinApp by NLR [No Leprosy Remains]
Description	This App was developed to support and empower peripheral health workers in recognizing the early signs and symptoms of skin diseases. It covers a limited number of important skin diseases that prevail in remote underserved communities of low- and middle-income countries. The App describes the most common skin diseases, skin NTDs, life-threatening skin diseases and HIV/AIDS-related skin diseases. It has a function that narrows down the differential diagnosis from locations of the lesion(s) and signs and symptoms. It also includes information on management of the diseases that are featured.
	

Skin diseases covered	Mainly skin NTDs and common skin diseases
Access link	https://nlrinternational.org/what-we-do/projects/skinapp/

Title	Community Skin Health Journal
Description	This journal is the official, free teaching journal of the International Foundation for Dermatology. It was first published in 2004 (initially, Community Dermatology Journal), and is available in hard copy in English and French with two issues per year. It is also available electronically in English, French, Spanish and simplified Chinese. All back issues are available as an App with a search function, for both Android and iOS. It features a wide range of current topics related to community skin health, with special focus on treatments available in resource-limited settings. The journal is aimed at frontline health workers with little access to dermatological training.
	


Skin diseases covered	Skin diseases in general, especially skin infections
Access link	https://ids.org/our-foundation/community-skin-health-journal/

Title	VisualDx
Description	This diagnostic clinical decision support system was designed to enhance diagnostic accuracy, aid therapeutic decisions and improve the safety of patients with skin diseases. Features include a medical image library, a smart search for chief complaints/diagnosis/and drug reactions, and a custom patient-specific differential diagnosis builder using artificial intelligence. The system is used by more than 2300 hospitals, clinics and medical schools worldwide.
	

Skin diseases covered	Various skin diseases. The user can build a custom differential from symptoms as an entry point. The symptoms are largely divided into: rash or multiple lesions; single skin lesion; fever and rash; nail lesion; hair lesion; and pruritus.
------------------------------	---

Access link	https://www.visualdx.com
--------------------	---

Title:	Cyberderm/DOIT (Dermatology Online with Interactive Technology)
---------------	--

Description	This multi-language (English, French, German, Italian, Mandarin-Chinese Spanish, Portuguese) e-learning-platform provides an interactive, systematic, case-orientated programme originally developed for medical students. It is accessible worldwide free of charge (> 35 000 registrations from > 340 universities in > 75 countries), available as a web and mobile app (iOS, Android) and suitable for use by medical students, health care providers and general physicians. It is regularly updated by an international panel of experts/specialists.
	

Skin diseases covered	A total of about 160 chapters covering common and rare skin diseases, (including NTDs) in a concise Wikipedia-like structure. All chapters are elaborated by an international group of experts/specialists and illustrated by almost 3000 high-quality clinical pictures from patients with different skin colours.
------------------------------	---

Access link	https://www.cyberderm.net/
--------------------	---

Clinical and laboratory diagnosis of skin NTDs, by disease

Skin NTD (pathogen)	Types of skin lesion	Lesion location	Other clinical signs	Laboratory tests
Buruli ulcer (mycobacteria)	Nodules Plaques Oedema Ulcers	Mainly limbs	Ulcer with undermined edges, swelling, limited pain	<i>Samples:</i> swab, fine needle aspiration <i>Methods:</i> microscopy (acid-fast bacilli), histopathology, PCR
Leprosy (mycobacteria)	Macules Plaques Papules Nodules	Any location of body, generalized or localized	Loss of sensation of the lesions, enlargement of peripheral nerves, nerve function impairment	<i>Samples:</i> slit-skin smear, skin biopsy <i>Methods:</i> microscopy (acid-fast bacilli), histopathology, PCR (No or a very few bacilli may be detected for pauci-bacillary type)
Cutaneous leishmaniasis (protozoa)	Papules Nodules Plaques Ulcers	Often exposed sites	Painless, indurated ulcer edges, seasonal	<i>Samples:</i> swab, skin biopsy <i>Methods:</i> microscopy, histopathology, PCR
Post-kala-azar dermal leishmaniasis (protozoa)	Macules Papules Nodules	Mainly face, arms, and upper trunk	Hypopigmented lesions, history of visceral leishmaniasis	<i>Samples:</i> skin smear, skin biopsy <i>Methods:</i> microscopy, histopathology, PCR, monoclonal antibodies
Lymphatic filariasis (microfilaria)	Oedema	Limbs, scrotum	Usually unilateral for the limb	<i>Samples:</i> peripheral blood <i>Methods:</i> blood film, RDT-FTS
Onchocerciasis (microfilaria)	Nodules (at early stage) Papules Plaques	Often exposed sites	Itchy skin (both in early and late stages), hypopigmentation at late stage; eye symptoms	<i>Samples:</i> skin snip biopsy <i>Methods:</i> microscopy after 24 h in normal saline, RDT-FTS <i>Other:</i> slit-lamp eye examination
Mycetoma (bacteria, fungus)	Nodules Ulcers	Mainly limbs, site of trauma	Drainage of pus, formation of grains	<i>Samples:</i> skin biopsy <i>Methods:</i> culture, microscopy, histopathology, PCR
Chromoblastomycosis (fungus)	Nodules Macules Plaques Ulcers	Mainly limbs, site of trauma	Often itchy at lesion site	<i>Samples:</i> skin biopsy <i>Methods:</i> culture, microscopy, histopathology, PCR
Sporotrichosis (fungus)	Nodules Ulcers	Mainly limbs, site of trauma	Limited pain, indurated ulcer edges, often spreads along the lymphatics	<i>Samples:</i> skin biopsy <i>Methods:</i> culture, microscopy, histopathology, PCR
Scabies (mite)	Papules Nodules	Any location of body besides face/head, generalized or localized	Scabies burrows, itch, positive contact history	<i>Samples:</i> skin scrapings <i>Methods:</i> microscopy <i>Other:</i> dermoscopy
Tungiasis (flea)	Papules Nodules	Mainly feet	Itch and/or pain, frequent secondary bacterial infection	<i>Methods:</i> direct observation of adult flea and eggs <i>Other:</i> dermoscopy
Yaws (bacteria)	Papules Nodules Ulcers	Any location of body but mainly on limbs	Papilloma, ulceration with indurated edges, hyperkeratosis of the hands and feet, deformities of the bones and joints	<i>Samples:</i> fingerprick blood, swab from skin lesion <i>Methods:</i> RDT and DPP, PCR

DPP: dual path platform; FTS: filariasis test strip; PCR: polymerase chain reaction; RDT: rapid diagnostic test.

Potential areas for integration of diagnostic tests for skin NTDs

Diagnostics	Skin-related neglected tropical diseases								
	Buruli ulcer	Cutaneous leishmaniasis	Mycetoma, chromoblastomycosis and other deep mycoses (including sporotrichosis)	Leprosy (Hansen's disease)	Lymphatic filariasis (lymphoedema and hydrocele)	Onchocerciasis	PKDL	Scabies and other ectoparasitoses (including tungiasis)	Yaws
Microscopy	✓	✓	✓	✓	✓	✓	✓	✓	
Histopathology	✓	✓	✓	✓			✓		
Culture	✓		✓						
Serum testing		✓			✓		✓		✓
PCR	✓	✓	✓	✓	✓	✓	✓		✓
LAMP	✓	✓							
Rapid diagnostic test					✓				✓

LAMP: loop-mediated isothermal amplification; PCR: polymerase chain reaction; PKDL: post-kala-azar dermal leishmaniasis.

Management of skin NTD-related problems

Examples of skin NTD-related problems requiring management	Skin-related neglected tropical diseases								
	Buruli ulcer	Cutaneous leishmaniasis	Mycetoma, chromoblastomycosis and other deep mycoses (including sporotrichosis)	Leprosy (Hansen's disease)	Lymphatic filariasis (lymphoedema and hydrocele)	Onchocerciasis	PKDL	Scabies and other ectoparasitoses (including tungiasis)	Yaws
Immunological reactions	✓		(✓) ^a	✓					
Acute attacks, secondary infections	✓	✓	✓	✓	✓			✓	✓
Wounds	✓	✓	✓	✓	✓			✓	✓
Lymphoedema (including hydrocele)	✓			✓	✓				
Pain	✓		(✓) ^b	✓	✓			✓ ^c	
Itch						✓		✓	
Muscle weakness or paralysis, limitations of movement	✓		✓	✓	✓				✓
Skin dryness, scars	✓	✓	✓	✓	✓	✓	✓	✓	✓
Eye and vision	✓			✓		✓			
Depression	✓	✓	✓	✓	✓	✓	✓	✓	✓
Anxiety	✓	✓	✓	✓	✓	✓	✓	✓	✓
Stigma	✓	✓	✓	✓	✓	✓	✓	✓	✓
Restricted participation	✓	✓	✓	✓	✓	✓	✓	✓	✓

PKDL: post-kala-azar dermal leishmaniasis.

^a In sporotrichosis due to *Sporothrix brasiliensis*, immune reactions such as erythema multiforme are common.

^b May occur in some.

^c In tungiasis.

Source: Modified from Assistive technology [fact sheet]. Geneva: World Health Organization; 2018 (<https://www.who.int/news-room/fact-sheets/detail/assistive-technology>, accessed 31 March 2022).

Examples of good practices in integration of skin NTDs, by WHO region

WHO African Region

Benin, Côte d'Ivoire, Ghana, Togo

Integrated diseases	Buruli ulcer, leprosy, lymphatic filariasis, yaws
Integration areas	Social mobilization; active case detection; training and capacity-building
Strategy details	<ol style="list-style-type: none"> 1. Training of front-line health workers in screening, detection and treatment of skin NTDs and other common skin conditions 2. Organizing integrated case detection of skin NTDs 3. Integrated implementation of cross-cutting approaches, for example, WASH and wound care.
References	<p>Health ministries; Anesvad Foundation (https://www.anesvad.org/en/).</p> <p>Barogui YT, Diez G, Anagonou E, Johnson RC, Gomido IC, Amoukpo H, et al. Integrated approach in the control and management of skin neglected tropical diseases in Lalo, Benin. <i>PLoS Negl Trop Dis</i>. 2018; 12(6):e0006584. doi:10.1371/journal.pntd.0006584.</p> <p>Koffi AP, Yao TAK, Barogui YT, Diez G, Djakeaux S, Zahiri MH, et al. Integrated approach in the control and management of skin neglected tropical diseases in three health districts of Cote d'Ivoire. <i>BMC Public Health</i>. 2020; 20(1):517 doi:10.1186/s12889-020-08632-6.</p>

Botswana

Integrated diseases	All skin diseases, including skin NTDs (mycetoma, leprosy, scabies)
Integration area	Training and capacity-building, clinical and laboratory diagnosis, and case management
Strategy details	<p>The Botswana UPenn Partnership (BUP) has been working with the Ministry of Health of Botswana and the University of Botswana (UB) since 2008 to support the development of dermatology care in Botswana. Currently, there are five dermatologists working in the public sector. To ensure the availability of continuous dermatology care in the public health care system, BUP and the American Academy of Dermatology have supported up to 15 dermatology residents per year from North America to rotate for 4–6 weeks at the country's largest referral hospital and provide consultation services free of charge. Outreach clinics are conducted each week and various teledermatology initiatives have been pilot tested. WhatsApp and private Facebook groups are being successfully utilized for teledermatology care, education and for teletriaging urgent patient bookings. This has extended to the inclusion of dermatology curricula into medical student education at UB; all students have a 2-week clinical rotation in a dermatology clinic. A Botswana-specific curriculum for training primary care providers in dermatology was created and is offered in teaching workshops throughout the country. BUP has also developed dermatopathology services in Botswana by training local pathologists and setting up telepathology services to assist with difficult cases. A quality improvement project at the national health laboratory has led to a significant decrease in the pathology turnaround time for Kaposi's sarcoma specimens. Various research projects on skin diseases have been conducted to help better understand the local disease patterns and outcomes.</p>
Reference	Botswana UPenn Partnership (https://www.med.upenn.edu/botswana/)

Cameroon

Integrated diseases	Buruli ulcer, leishmaniasis, leprosy, yaws
Integration areas	Social mobilization; active case detection; training and capacity-building
Strategy details	<ol style="list-style-type: none"> 1. Culturally sensitive awareness-raising campaigns developed through ethnographic research (for Buruli ulcer) 2. Developing integrated training guides for skin NTDs for health personnel and community health workers 3. Organizing integrated case detection of skin NTDs

References	<p>Ministry of Health; FAIRMED Cameroon (https://www.fairmed.cm); Stop Buruli Consortium</p> <p>Boock AU, Awah PK, Mou F, Nichter M. Yaws resurgence in Bankim, Cameroon: the relative effectiveness of different means of detection in rural communities. <i>PLoS Negl Trop Dis.</i> 2017; 11(5):e0005557 doi: 10.1371/journal.pntd.0005557.</p> <p>Tabah EN, Nsagha DS, Bissek A-C, Njamnshi AK, Bratschi MW, Pluschke G, et al. Buruli ulcer in Cameroon: the development and impact of the national control programme. <i>PLoS Negl Trop Dis.</i> 2016; 10(1):e0004224. doi:10.1371/journal.pntd.0004224.</p>
------------	--

Côte d'Ivoire

Integrated diseases	Skin NTDs (Buruli ulcer, leprosy, lymphatic filariasis, scabies, yaws) and other common skin diseases
Integration area	Training and capacity-building; surveillance; telemedicine/teledermatology; wound care; nutrition
Strategy details	<p>A research consortium, drawn from researchers and clinicians from Côte d'Ivoire, Japan and USA, policy-makers and nongovernmental organizations, focuses their work on skin NTDs and skin NTD integration. The aim of the consortium is to support individuals with skin NTDs and other skin conditions to receive timely diagnosis and quality care, and to gather evidence to contribute in creating stronger health system for skin diseases. The research team work on surveillance for early case detection and treatment, enhancement of training to local healthcare workers, and development of better wound care methods fit-for-use in resource-limited settings. From the beginning of establishment since 2014, they have been running skin surveillance in an integrated manner; the challenges have been the high prevalence of skin diseases in communities and a method to follow-up detected patients who live in one of the most remote areas. Currently, the team is developing a digital health tool for skin diseases, the 'eSkinHealth': an application to be used as a case management tool for skin diseases in smartphones / tablets, both in on-line and off-line environment.</p> <p>This is an ongoing project funded by the Japan Medical Research and Development, the Leprosy Research Initiative and the National Institute of Health.</p>
References	<p>Integrated approach for skin NTDs in Côte d'Ivoire. In: Leprosy Research Initiative [website]. Amsterdam: Leprosy Research Initiative (https://leprosyresearch.org/projects/disability/integrated-approach-for-skin-ntds-in-cote-d-ivoire, accessed 31 March 2022).</p> <p>MIND-the-SKIN Project: multifunctional innovative digital toolkit for the skins diseases in LMICs and beyond. In: NIH [website]. Bethesda (MD): Fogarty International Center at the National Institutes of Health (https://www.fic.nih.gov/Grants/Search/Pages/1R21TW011860-01.aspx, accessed 31 March 2022).</p> <p>Ugai K, Koffi DY, Kouadio D, Yao A, Yotsu RR. Nutritional status and wound healing process in patients with <i>Mycobacterium ulcerans</i> disease (Buruli ulcer): a pilot study from rural Côte d'Ivoire. <i>Eur J Dermatol.</i> 2022 [in press].</p> <p>Yotsu RR, Comoé CC, Ainyakou GT, Konan N, Akpa A, Yao A, Aké J, et al. Impact of common skin diseases on children in rural Côte d'Ivoire with leprosy and Buruli ulcer co-endemicity: a mixed methods study. <i>PLoS Negl Dis.</i> 2020; 14(5):e0008291. doi:10.1371/journal.pntd.0008291.</p> <p>Yotsu RR, Kouadio K, Vagamon B, N'guessan K, Akpa AJ, Yao A, Aké J, et al. Skin disease prevalence study in schoolchildren in rural Côte d'Ivoire. <i>PLoS Negl Trop Dis.</i> 2018; 12(5):e0006489. doi:10.1371/journal.pntd.0006489.</p>

Ethiopia

Integrated diseases	Lymphoedema-causing NTDs (leprosy, lymphatic filariasis, podoconiosis)
Integration area	Holistic care package in routine health care services and reduced stigma within morbidity management and disability prevention activities
Strategy details	<p>The Excellence in Disability Prevention Integrated across NTDs (ENDPOINT) Consortium, drawn from UK-based researchers and Ethiopia-based researchers, policy-makers and practitioners, aims to integrate the different foot care and psychosocial care interventions for NTDs that cause lymphoedema into a holistic care package, which is embedded into routine health care services in selected districts in Ethiopia. An implementation research approach is allowing the research team to document the processes and outcomes of the integration efforts in "real-time". The outcomes are expected to inform existing plans on the part of the Ministry of Health of Ethiopia to scale up integrated foot care and psychosocial support for lymphoedema patients, nationally. The research team intends to transfer the insights gained through this work beyond Ethiopia to inform further research, policy and action in similar low-income settings.</p>
References	<p>The ENDPOINT Consortium (https://www.bsms.ac.uk/research/global-health-and-infection/nih-global-health-research-unit-for-ntds/nih-work-packages.aspx)</p> <p>Ketema K, Tsegay G, Gedle D, Davey G, Deribe K. Food insecurity among households with and without podoconiosis in East and West Gojjam, Ethiopia. <i>EC Nutr.</i> 2018; 13(7):414-23 (https://pubmed.ncbi.nlm.nih.gov/30101228/).</p> <p>Mousley E, Deribe K, Tamiru A, Tomczyk S, Hanlon C, Davey G. Mental distress and podoconiosis in Northern Ethiopia: a comparative cross-sectional study. <i>Int Health.</i> 2015; 7(1):16-25. doi:10.1093/inthealth/ihu043.</p> <p>Sime H, Deribe K, Assefa A, Newport MJ, Enquselassie F, Gebretsadik A, et al. Integrated mapping of lymphatic filariasis and podoconiosis: lessons learnt from Ethiopia. <i>Parasit Vectors.</i> 2014; 7:397. doi:10.1186/1756-3305-7-397.</p> <p>Tora A, Mengiste A, Davey G, Semrau M. Community involvement in the care of persons affected by podoconiosis: a lesson for other skin NTDs. <i>Trop Med Infect Dis.</i> 2018; 3(3):87. doi:10.3390/tropicalmed3030087.</p>

Gabon	
Integrated diseases	Leprosy, Buruli ulcer and common skin diseases
Integration area	Training and capacity-building
Strategy details	<p>From 1990, the fight against leprosy was integrated on a pilot basis in the management of frequent skin diseases in a region of southern Gabon. The first training materials with clinical images were produced by a leprologist employed at the regional level, adopting the “dermatological” training approach and with the financial support of the “Association Clermontoise pour les Lépreux du Gabon (ACLG)” (NB: the term was not yet listed as discriminatory). The objective was to promote: (i) patient self-presentation through better management of other common skin diseases (strengthening of health system); (ii) better awareness of health care workers and referral of suspected leprosy cases by officers of the district general health services; and (iii) progressive integration of leprosy diagnosis and management into general health care services. ACLG also funded the reproduction of various media with the slogan “I care about my skin, I’m going to see the Doctor”. Secondly, the same approaches were used in another Health Region, and further applied, at a national level, by the national leprosy control programme. The Education and Mobilization for Another Image of Leprosy (EMAIL) campaign and the integrated “dermato-leprosy” trainings developed by the programme aimed to respond to new identified challenges: improvement of an early diagnosis of leprosy in a context of low prevalence and development of a prevention of disability component. Finally, following the merger of the leprosy and Buruli ulcer control programs, in 2011, the “Programme de Lutte contre les Maladies Infectieuses (PLMI)” developed integrated modular training so-called “dermato-lèpre-Buruli”, including illustrated PowerPoint on: the aspects of basic skin lesions and common skin diseases; skin manifestations of early leprosy, leprosy reactions and Buruli ulcer; but also those of some other skin neglected tropical diseases, such as yaws. This development was encouraged and supported from the start by the main partners of the programme: the Raoul Follereau Foundation and the WHO Regional Office for Africa. Nowadays, it fully benefits from global consensus about an integrated fight against NTDs and new WHO tools on skin NTDs.</p>
References	<p>Association Clermontoise pour les Lépreux du Gabon (https://assoce.fr/waldec/W602001496/ASSOCIATION-CLERMONTAISE-POUR-LES-LEPREUX-DU-GABON)</p> <p>Mondjo A. Chasser la lèpre au Gabon (tome 1) – Polycopié illustré photocopié en France pour le compte de l’ACLG (in French); 1993.</p> <p>Mondjo A. Chasser la lèpre au Gabon (tome 2) – Polycopié illustré photocopié en France pour le compte de l’ACLG (in French); 1994.</p> <p>Mondjo A. La Lutte contre la lèpre au Gabon – Des chiffres et des lèpres:réévaluation des résultats de la campagne de lutte contre la lèpre et de la stratégie d’élimination par PCT, Bulletin de l’Association des Léprologues de Langue Française (in French); 2006. 19:5-2.</p> <p>Mondjo A. Rapport du Séminaire Atelier de Formation/Recyclage des Points Focaux Lèpre et Buruli du Programme de Lutte contre les Maladies Infectieuses (PLMI), Libreville, INFASS, 09-12 juillet 2013 – République Gabonaise/Ministère de la Santé (in French).</p>
Mali	
Integrated diseases	Skin NTDs (leprosy, scabies) and other common skin diseases
Integration areas	Training and capacity-building; clinical diagnosis; telemedicine/teledermatology
Strategy details	<p>The “Bamako Project”, the first initiative for skin diseases in Mali, was supported by the International Dermatology Foundation from 2001 to 2004. Its objective was to test the feasibility and effectiveness of a short-term dermatological training programme that was supported by the promotion of both educational messages to the population and the availability of essential dermatological medicines. The training was based on the use of decision-making algorithms, then tested and validated for the detection and management of common skin diseases (<i>i.e.</i> pyoderma, scabies, superficial mycoses, leprosy and hypochromic associated skin diseases and contact dermatitis). Within 2 months, approximately 495 primary health care workers (doctors, nurses) were trained and the skin health of populations improved considerably: the proportion of patients without a precise diagnosis decreased from 36.8% to 10.8% respectively before and after the training ($P < 10^{-6}$). Leprosy screening also improved after the training; five new cases were detected in one year. The average cost of prescriptions fell by 25% one year after training and by 34% some 2 years later ($P < 10^{-6}$). The cost ratio of the project and the number of health workers trained showed that the average cost of training a health worker was about US\$ 50. This cost would be almost reimbursed by the gain realized after 25 patients consulted.</p> <p>The second training initiative was the extension of the Bamako project. It began in 2006 and ended in 2012. It was also the opportunity to initiate in the meantime, in 2008, the training of skin disease specialists in order to increase the number of specialists. About 2000 primary health workers (doctors, nurses) were trained in this programme that covered four health regions of Mali with an estimated population of 13 million people. The funding source came from several societies of dermatology (Canada, France, Switzerland), the Pierre Fabre Foundation and the International Dermatology Foundation.</p> <p>To counteract population displacement that occurred after the March 2012 coup, a teledermatology pilot programme based on store and forward was implemented in 10 primary health centres randomly selected in three health regions of Mali in 2015. The project objective was also intended to test the feasibility, effectiveness and conditions for success of a teledermatology programme in a developing country context. After one year of testing, 180 patients were treated in the target areas. The programme was highly appreciated by patients, health workers and even dermatologists. Today, with the support of the Pierre Fabre Foundation, the teledermatology programme is available in all health regions of Mali, including desert areas where nomadic populations live; 72 of the 80 referral health centres participate in the programme, which also includes nine dermatologists posted in the regions and 15 dermatologists based in Bamako at the Marcoux Institute, which is now being set up as Bamako Dermatology Hospital. On the basis of this experience, two other countries (Togo and Mauritania) have adopted the model and launched a similar programme.</p>

References	<p>Mahé A, Faye O, Thiam N'diaye H, Ly F, Konaré HD, Keita S, et al. Definition of an algorithm for the management of skin diseases at primary health care level in sub-Saharan Africa. <i>Trans R Soc Trop Med Hyg.</i> 2005; 99:39–47. doi:10.1016/j.trstmh.2004.03.008.</p> <p>Mahé A, Faye O, Thiam N'diaye H, Konaré HD, Coulibaly I, Keita S, et al. Integration of basic dermatologic care into primary health care services in Mali through short training of general health staff. <i>Bull World Health Organ.</i> 2005; 83:935–41. PMID:16462986</p> <p>Faye O, Bagayoko CO, Dicko A, Cissé L, Berthé S, Traoré B, et al. A teledermatology pilot programme for the management of skin diseases in primary health care centres: experiences from a resource-limited country (Mali, West Africa). <i>Trop Med Infect Dis.</i> 2018;3(3): E88. doi:10.3390/tropicalmed3030088.</p>
------------	--

Liberia

Integrated diseases	Leprosy, lymphatic filariasis, Buruli ulcer and yaws
Integration areas	Training and capacity-building; case-finding tools; morbidity management and disability prevention (MMDP) services
Strategy details	<ol style="list-style-type: none"> 1. Establishing integrated model for identification, referral and confirmation of MMDP cases, thus preventing disability 2. Comprehensive training in NTDs for local health care practitioners as well as a community health worker programmes to better find and monitor cases of NTD 3. Testing of an optimal model at selected sites <p>This is an ongoing pilot project by the Ministry of Health, AIM Initiative, Liverpool School of Tropical Medicine and UL-PIRE Africa, funded by the Coalition for Operational Research on Neglected Tropical Diseases (COR-NTD).</p>
Reference	American Leprosy Missions (https://www.leprosy.org ; https://aiminitiative.org/category/news_resources/)

Nigeria

Integrated diseases	Leprosy and Buruli ulcer
Integration areas	Mental health
Strategy details	<p>In Nigeria, it is estimated that there is only one mental health expert for hundreds of thousands of inhabitants. There is a need to explore sustainable ways to make mental health services accessible to those in dire need, especially those affected by leprosy and Buruli ulcer. The project aims to: (i) determine the burden/extent of mental illness (especially depression) among persons affected by leprosy and Buruli ulcer; and (ii) ascertain whether a holistic (multi-layered) community-oriented approach involving patient self-help groups, lay community counsellors and non-specialist health workers (none with specialist mental health background) improves the mental health and well-being of leprosy and Buruli ulcer patients in southern Nigeria. It is anticipated that the use of self-help groups, lay community counsellors and trained health workers will reinforce and complement each other synergistically, resulting in outcomes superior to approaches based on health workers alone. This is an ongoing project by the National TB, Leprosy and Buruli ulcer Control Programme, the German Leprosy and TB Relief Association, Ebonyi State University and CBM International, funded by the Leprosy Research Initiative.</p>
Reference	Improving mental health and well-being of persons affected by leprosy/BU. In: Leprosy Research Initiative [website]. Amsterdam: Leprosy Research Initiative (https://leprosyresearch.org/projects/improving-mental-health-and-well-being-of-persons-affected-by-leprosy-bu , accessed 31 March 2022).

Nigeria

Integrated diseases	Noma and skin NTDs
Integration areas	Integration of oral screenings and noma education into existing skin NTD activities to increase early case detection and referral of noma patients in the early reversible stages of the disease
Strategy details	<p>The Nigerian Ministry of Health has been offering care for noma patients for many years at the Noma Children's Hospital in Sokoto, northwest Nigeria, and Médecins Sans Frontières has supported these initiatives since 2014. The comprehensive model of care consists of four main components: acute care (medications including antibiotics, oral hygiene, treatment of underlying morbidities, wound debridement and wound dressing), care for noma sequelae (surgical interventions and post-operative care), integrated hospital-based services (nutrition, mental health, physiotherapy, laboratory services, water and sanitation, vaccinations) and community-based services (follow-up, active case detection, awareness-raising, health promotion and education). Noma and other skin NTDs (Buruli ulcer, cutaneous leishmaniasis, leprosy, lymphatic filariasis, mycetoma, onchocerciasis, scabies and yaws) can have dire long-term ramifications, require similar detection and case-management approaches, and have a similar geographical distribution, which creates opportunities for integration. The main areas of focus for current integrated skin NTD activities (community awareness, epidemiological surveillance and disease mapping, training for health workers and community health workers, and programme monitoring and evaluation) are all necessary to improve control of noma. The Noma Project is currently exploring ways to include a further opportunity for integration by including noma in skin NTD research initiatives, one of which includes research activities with the London School of Hygiene & Tropical Medicine's Skin Health Africa Research Programme. The integration of noma into such activities would increase the amount of research being conducted on noma and generate new knowledge about the disease.</p>
Reference	The Noma Children's Hospital, supported by Médecins Sans Frontières (https://noma.msf.org/) or The Noma Project (https://thenomaproject.org/)

Nigeria

Integrated diseases	Buruli ulcer, leprosy and lymphatic filariasis
Integration areas	Self-care interventions for integrating morbidity management and disability prevention

Strategy details	An integrated self-care intervention was carried out for people with these skin NTDs in two endemic communities of Anambra state. The intervention had the following components: (i) improvement of healthcare workers (HCWs)' knowledge and skills to identify and manage NTD impairments and complications locally or refer participants to other individuals or organizations that could help; (ii) HCWs' provision of health education about NTDs and teaching participants with NTD self-care skills on how to manage their own care; and (iii) improvement in self-care practices among participants with skin NTDs. The effectiveness of the intervention was measured by monthly cost of morbidity care and on participants' disability status and their quality of life – which all resulted in positive results (6-month follow-up period, 37.5% drop-outs). This study was conducted by a group of researchers from the German Leprosy and TB Relief Association, American Leprosy Mission (ALM), and Alex Ekwueme Federal University Teaching Hospital, and universities in USA, funded by the ALM.
Reference	Eze CC, Ekeke N, Alphonsus C, Lehman L, Chukwu JN, et al. Effectiveness of self-care interventions for integrated morbidity management of skin neglected tropical diseases in Anambra State, Nigeria. BMC Public Health. 2021; 21:1748. doi:10.1186/s12889-021-11729-1.

United Republic of Tanzania

Integrated diseases	All skin diseases
Integration areas	Training and capacity-building
Strategy details	The Regional Dermatology Training Centre (RDTC) was established in 1990 in Moshi as a partnership between the Tanzanian Ministry of Health, the International Foundation for Dermatology (IFD) and the Good Samaritan Foundation to provide super-regional specialist training in dermatology for front-line health care workers. The initial target was to provide a new generation of leaders with advanced skills in dermatology, skin NTDs such as leprosy and sexually transmitted infections by empowering a cadre of specialist assistant medical officers, medical officers and nurses. Over 24 years it has trained, through a 2-year diploma course, more than 400 graduates from 11 different African countries, many of whom have regional or national roles in the provision of services for skin disease, HIV or leprosy. In 2000, it accepted the first medical graduate for a 4-year residency programme, and it has now trained 27 new dermatologists for African countries. Finally, it provides short-term attachments for doctors or health advisers needing further specialist training in areas ranging from the delivery of community programmes for skin conditions and skin NTDs, surgery, cancer care and HIV medicine. It has strong links with other countries in sub-Saharan Africa as well as other parts of the world, with active alliances designed to improve specialist services such as dermatopathology and occupational dermatology. The governance of the RDTC is delivered through a Principal and Deputy principal backed by an advisory board with governmental and international medical representation (East African Community, IFD and WHO) and a dedicated administrative team, nurses and medical staff. It has its own wards, medical compounding and surgical areas. It has also developed several programmes to improve care of regional priorities such as prevention and care of skin cancer in people with albinism and HIV-related skin illness. It has worked with other international bodies such as WHO in helping to pilot new initiatives such as diagnostic schemes for skin disease in HIV and the WHO training manual on skin NTDs.
Reference	Regional Dermatology Training Center (https://rdtcmoshi.wordpress.com)

WHO Region of the Americas/Pan American Health Organization

Brazil

Integrated diseases	Leprosy, trachoma and schistosomiasis
Integration areas	Active case detection; mass drug administration; school health
Strategy details	In 2013, the Ministry of Health of Brazil began an innovative integrated campaign to improve the health of schoolchildren in the 852 municipalities where people are living in poverty and there is a high disease burden due to leprosy, trachomatous blindness and schistosomiasis. This initiative includes intestinal deworming and efforts to identify cases of leprosy and trachoma among students. The campaign integrated activities that are commonly conducted separately and simultaneously combined two strategies: the mass treatment of population groups at risk for infections such as soil-transmitted helminthiasis and trachomatous blindness; and individual treatment of leprosy cases. The spearhead of the campaign involved educating children about symptoms of leprosy and how to detect them to enable them to recognize the disease among themselves and other members of their households. A form (a "self-image sheet"), including six simple screening questions that could be answered "yes" or "no" was distributed to schoolchildren. Respondents were instructed to complete and return the forms to the schools within one week. The forms were then delivered to health personnel for review. When cases were suspected, the children were referred to family health teams for medical assessment and to determine if the disease was present. When the disease was confirmed in a child, the local health teams examined the entire family for additional cases. Through the campaign, nearly 3 million questionnaires were provided to public schools, and 293 cases of leprosy were detected early among children, as well as 114 additional cases among their contacts.
Reference	Ministry of Health; Pan American Health Organization (https://www.paho.org/hq/index.php?option=com_content&view=article&id=15434:brasil-innovacion-en-la-lucha-contra-las-enfermedades-desatendidas&Itemid=72543&lang=en)

Colombia

Integrated diseases	Ectoparasitoses (tungiasis, pediculosis, scabies, cutaneous larva migrans, myiasis), trachoma, and visual health (cataract and pterygium)
Integration areas	Active case detection; training and capacity-building; self-care; mass drug administration; surveillance and data management; WASH

Strategy details	In Colombia, between 2013 and 2015, activities for the control and elimination of several neglected infectious diseases prevalent in the Amazon region were integrated into the framework of massive drug administration campaigns. Previously trained health personnel traveled by combining waterways, air and land to reach the rural indigenous communities affected by trachoma, soil-transmitted helminths, scabies, pediculosis, cutaneous larva migrans and myiasis. The populations of the Amazon regions are more vulnerable to these diseases because they live in conditions that include poor access or no access to basic services for drinking water, sanitation, education, housing, and health. During the visit, the health personnel update the population census; detect cases of trachoma trichiasis in people over 15 years of age; identify cases of pterygiums and cataracts in people over 50 years of age, and parasitic skin diseases from 1 year of age; provide education for the prevention of these diseases, strengthening of self-care and hygiene measures; and the delivery of massive treatment for trachoma, directed or individual according to the type of disease. Within the framework of this strategy, instruments were integrated to collect information from all these programs; common risk factors for these pathologies were identified; and the co-administration of azithromycin and albendazole was carried out as an activity that continues to be carried out as a part of the SAFE strategy and anthelmintic preventive chemotherapy. The population that received the interventions expresses appreciation and acceptance for the development of these integrated strategies that take into account the overlap of more than one health problems; simultaneously, the health sector optimizes financial resources by integrating several control activities in a single round for various pathologies.
References	<p>An integrated approach to trachoma, other neglected infectious diseases, and eye diseases that can cause blindness in remote Amazon populations. Meeting report (Panama City, 21 and 22 October 2019). Washington (DC): Pan American Health Organization; 2020 (https://iris.paho.org/handle/10665.2/52508).</p> <p>Quiroz DJG, Lopez SPA, Arango CM, Acosta JEO, Parias LDB, Alzate LU, et al. Prevalence of soil transmitted helminths in school-aged children, Colombia, 2012-2013. <i>PLoS Negl Trop Dis.</i> 2020; 14(7):e0007613. doi:10.1371/journal.pntd.0007613.</p> <p>Miller HA, de Mesa CBL, Talero SL, Cárdenas MM, Ramírez SP, Moreno-Montoya J, et al. Prevalence of trachoma and associated factors in the rural area of the department of Vaupés, Colombia. <i>PLoS ONE.</i> 2020; 15(5): e0229297. doi:10.1371/journal.pone.0229297.</p> <p>Miller H, Ocamo J, Ayala A, Trujillo J, Feldmeier H. Very severe tungiasis in Amerindians in the Amazon lowland of Colombia: a case series. <i>PLoS Negl Trop Dis.</i> 2019; 13(2):e0007068. doi: 10.1371/journal.pntd.0007068.</p> <p>Trujillo J, Jesudason T, Sankar G. Reaching remote Amazonian communities to eliminate trachoma. <i>Community Eye Health Journal.</i> 2017; 30(99):65.</p>

Mexico

Integrated diseases	Skin NTDs (leprosy, mycetoma, chromoblastomycosis, sporotrichosis) and other skin diseases
Integration areas	Training and capacity-building; active case detection; telemedicine/teledermatology
Strategy details	Community-based surveys undertaken in the state of Guerrero have established skin diseases including skin NTDs as a common and disabling problem of concern to the population and health authorities of the state. The goal of the Community Dermatology Program is to improve dermatological care provided to marginalized communities and where there is no access to specialized dermatological services. The programme focuses on using telemedicine to train health personnel to identify and treat the most frequent dermatosis in rural areas backed by clinical treatment and training sessions organized throughout the year. The programme covers communities in Guerrero and adjacent states such as Oaxaca, Chiapas, Quintana Roo, Campeche, Hidalgo, Zacatecas and Mexico State through the State Health Secretariats. Local health providers are also trained to identify complex diseases including skin NTDs such as leprosy and mycetoma. They liaise directly with members of the Community Dermatology Team. A simple diagnostic handbook has been developed for local health workers along with patients' leaflets to explain treatments. The group also undertakes operational research to answer key questions such as the best methods of identifying skin NTDs at community level or to spot new trends that affect the prevalence and impact of skin diseases. More than 25,000 patients have been covered by this scheme in Guerrero state alone. The team has also helped others to set up similar schemes in other Latin American countries such as in Argentina, Costa Rica, Dominican Republic, Honduras, Panama and Paraguay.
References	<p>Estrada-Castanon R, Hay R, Andersson N. Mexico: community dermatology in Guerrero. <i>Lancet.</i> 1991; 337:906-7.</p> <p>Estrada-Castanon R, Chavez-Lopez G, Estrada G. Community dermatology: a Utopia come true. <i>Continuing Medical Education.</i> 2013; 31:7.</p> <p>Roberto E, Guadalupe CL, Guadalupe EC, Hay R. Mycetoma and the Community Dermatology Program, Mexico. <i>Trans R Soc Trop Med Hyg.</i> 2021; 115(4):383-86. doi:10.1093/trstmh/traa1199.</p>

WHO South-East Asia Region

India

Integrated diseases	Leprosy and lymphatic filariasis
Integration areas	Active case detection; training and capacity-building; morbidity management and disability prevention
Strategy details	<p>The three states of India (Bihar, Telangana and Madhya Pradesh) have high numbers of leprosy and lymphatic filariasis cases. Lepra operates in all three states and aims to reduce the numbers of these cases and increase early detection so that fewer people are forced to live with a life-long disability. The project has two components:</p> <ol style="list-style-type: none"> 1. Implementation of NTD referral units that offer disability services and shoe units 2. Technical support and training to local governments to deliver campaigns that will diagnose these diseases <p>They are expected to directly contribute to the goal of reducing the disease burden of leprosy and lymphatic filariasis and preventing disease-related disabilities amongst marginalized communities.</p>
Reference	Lepra (https://www.lepra.org.uk/where-we-work/india)

Nepal	
Integrated diseases	Leprosy, lymphatic filariasis
Integration areas	Training and capacity-building; referral system
Strategy details	<ol style="list-style-type: none"> 1. Capacity building of health workers to suspect and refer skin NTDs 2. Case management of leprosy and lymphoedema from lymphatic filariasis 3. Integrated activities with maternal and child health care and antenatal clinics; suspect skin problem and refer to dermatologist for diagnosis 4. Increasing coverage by saving time and money of patients in hilly terrain of Nepal and support Nepalese NTD programme
Reference	FAIRMED project on skin NTDs in Nepal with Government of Nepal (https://www.fairmed.org.np)
Nepal	
Integrated diseases	Common skin diseases and skin NTDs
Integration areas	Training and capacity-building
Strategy details	<p>Skin diseases are among the 5–10 commonest causes of morbidity in Nepal. There are only 170 dermatologists for a population of more than 26 million. Health workers who provide health care in the primary health care centers of rural and remote Nepal are not trained adequately to treat skin diseases. The project first determined the prevalence and social impact of skin diseases and skin NTDs in rural Nepalese populations. Delivery of care in peripheral locations, organized directly with primary care centres with the approval of the district health office of the Health Ministry of Nepal, has involved developing and validating a skin atlas/manual and training designed for front-line health workers using face-to-face teaching and teledermatology for distance consultations. The team has now developed an App designed for local health care workers that allows them to communicate directly with dermatologists in Katmandu for advice on diagnosis and treatment in real time.</p>
Reference	Dermatology Patient Care in Rural Nepal (https://www.inspireskinconfidence.com/project/dermatology-patient-care-in-rural-nepal-reaching-the-unreachable/)

WHO Western Pacific Region

Australia	
Integrated diseases	Scabies (especially crusted scabies) and sequelae from scabies including skin infections
Integration areas	Surveillance; training and capacity-building; WASH
Strategy details	One Disease is a nongovernmental organization in Australia with a mission to eliminate crusted scabies as a public health concern in the country. Their strategy is to enhance crusted scabies control by combining expertise in disease-specific areas with surveillance, education, capacity building, advocacy and research.
Reference	One Disease (https://www.onedisease.org)
Philippines	
Integrated diseases	Common skin diseases, leprosy, yaws and other skin NTDs
Integration areas	Training and capacity-building; active case detection; surveillance; stigmatization, inclusion and human rights
Strategy details	<p>Partners In Leprosy Action (PILA) is an initiative that serves to integrate stakeholders in the national leprosy control system and provide them with resources such that awareness, education and care for patients affected by leprosy can be improved and stigma associated with the disease can be reduced. It is a programme of the Philippine Leprosy Mission and an extension service of the Department of Dermatology-Philippine General Hospital. PILA was established in 2006 to address the problem of leprosy and other skin NTDs through the following activities: (i) increasing awareness about primary skin care; (ii) increasing consultations and case detection of common primary dermatological problems, including leprosy and skin NTDs; (iii) improving local advocacy for establishing primary skin care in all rural health units; and (iv) reducing the stigma attached to leprosy through proper health information. PILA was conducted for around 3 years in each province: Ilocos Norte (2006–2008) and Ilocos Sur (2009–2012). PILA was also conducted in North Cotabato (2018–2019), Pangasinan, Tarlac and Abra (2017–2019).</p>
Reference	Philippine Leprosy Mission (https://leprosy.org.ph/what-we-do/pil/ ; https://socialinnovationinhealth.org/case-studies/partners-in-leprosy-action-pila-2/)
Solomon Islands	
Integrated diseases	Scabies and trachoma
Integration areas	Mass drug administration; mapping
Strategy details	The azithromycin ivermectin mass drug administration (AIM) trial, a prospective, single-arm, before-and-after community intervention study, was conducted in the Solomon Islands to assess the efficacy of mass drug administration of ivermectin for scabies and impetigo, with coadministration of azithromycin for trachoma. With the coadministration, mass drug administration could be scaled to a population of over 25 000 with high efficacy for both NTDs.

References	<p>Romani L, Marks M, Sokana O, Nasi T, Kamoriki B, Wand H, et al. Feasibility and safety of mass drug coadministration with azithromycin and ivermectin for the control of neglected tropical diseases: a single-arm intervention trial. <i>Lancet Glob Health</i>. 2018; 6:e1132–38. doi:10.1016/S2214-109X(18)30397-8.</p> <p>Romani L, Marks M, Sokana O, Nasi T, Kamoriki B, Cordell B, et al. Efficacy of mass drug administration with ivermectin for control of scabies and impetigo, with coadministration of azithromycin: a single-arm community intervention trial. <i>Lancet Infect Dis</i>. 2019; 19(5):510–18. doi:10.1016/S1473-3099(18)30790-4.</p> <p>Taleo F, Macleod CK, Marks M, Sokana O, Last A, Willis R, et al. Integrated mapping of yaws and trachoma in the five northern-most provinces of Vanuatu. <i>PLoS Negl Trop Dis</i>. 2017; 11(1):e0005267. doi:10.1371/journal.pntd.0005267.</p>
------------	---

Solomon Islands, Vanuatu, Papua New Guinea

Integrated diseases	Leprosy, Buruli ulcer, yaws and scabies
Integration areas	Training and capacity-building
Strategy details	In the Western Pacific Region, 15 NTDs are endemic or reported in 28 countries and areas. As countries progress towards the elimination of lymphatic filariasis and trachoma, many countries in the region are gradually shifting their focus on control and elimination of other remaining NTDs such as Buruli ulcer, leprosy, scabies and yaws, which all cause skin-related symptoms. In order to progress control and elimination of skin NTDs, accurate case detection and timely reporting are essential to determine the next course of action, whether treatment, active case investigation in suspected communities/schools, targeted mass drug administration or referral. The Regional Office is developing training modules for four skin NTDs to support roll-out of expanded, integrated NTD training to assist health ministries in building primary health care capacity to accurately detect, treat, respond to and report NTDs in the Pacific.
Reference	Controlling and eliminating neglected tropical diseases. In: WHO health topics [website]. Manila: World Health Organization Western Pacific Region (https://www.who.int/westernpacific/activities/controlling-and-eliminating-neglected-tropical-diseases).

Targets and indicators for measuring progress and their relevance to skin NTDs

Indicator	Targets for 2030	Buruli ulcer	Leprosy (Hansen's disease)	Lymphatic filariasis	Leishmaniasis	Onchocerciasis	Mycetoma, chromoblastomycosis and other deep mycoses	PKDL	Scabies and other ectoparasitoses	Yaws
Overarching indicators										
Percentage reduction in people requiring interventions against neglected tropical diseases	90%	← Relevant to all skin NTDs →								
Percentage reduction in disability-adjusted life years related to neglected tropical diseases	75%	← Relevant to all skin NTDs →								
Number of countries having eliminated at least one neglected tropical disease	100		✓	✓		✓				
Number of neglected tropical diseases eradicated	2									✓
Cross-cutting indicators										
Integrated approaches										
Percentage reduction in number of deaths from vector-borne neglected tropical diseases (relative to 2016) – to achieve WHO's vector control response goal	75%			✓	✓	✓				
Integrated treatment coverage index for preventive chemotherapy	75%			✓		✓			(✓)	(✓)
Number of countries that adopt and implement integrated skin neglected tropical disease strategies	40	← Relevant to all skin NTDs →								
Multisectoral coordination										
Access to at least basic water supply, sanitation and hygiene in areas endemic for neglected tropical diseases – to achieve targets 6.1 and 6.2 of Sustainable Development Goal 6	100%	← Relevant to all skin NTDs →								
Share of countries with neglected tropical diseases integrated in national health strategies/plans	90%	← Relevant to all skin NTDs →								
Share of the population at risk protected against catastrophic out-of-pocket health expenditure due to neglected tropical diseases – to achieve target 3.8 of Sustainable Development Goal 3	90%	← Relevant to all skin NTDs →								

Universal health coverage							
Share of countries including neglected tropical disease interventions in their package of essential services and budgeting for them	90%	← Relevant to all skin NTDs →					
Share of countries with guidelines for management of neglected tropical disease-related disabilities within national health systems	90%	✓	✓	✓		✓	
Country ownership							
Share of countries reporting on all relevant endemic neglected tropical diseases	90%	← Relevant to all skin NTDs →					
Share of countries collecting and reporting data on neglected tropical diseases disaggregated by gender	90%	✓	✓	✓	✓	✓	✓

Source: Adapted from *Ending the neglect to attain the Sustainable Development Goals: a road map for neglected tropical diseases 2021–2030*. Geneva: World Health Organization; 2020 (<https://apps.who.int/iris/handle/10665/338565>, accessed 31 March 2022).

Disease-specific targets and indicators for skin NTDs

Disease	Indicator	2020	2023	2025	2030
Targeted for eradication					
Yaws	Number of countries certified free of transmission	1 (1%)	97 (50%)	136 (70%)	194 (100%)
Targeted for elimination (interruption of transmission)					
Leprosy	Number of countries with zero new indigenous cases	50 (26%)	75 (39%)	95 (49%)	120 (62%)
	Annual number of new leprosy cases detected	184 000	148 000	123 500	62 500
	Rate (per million population) of new cases with grade 2 disability	1.3	0.92	0.68	0.12
	Rate (per million children) of new paediatric cases with leprosy	7.81	5.66	4.24	0.77
Onchocerciasis	Number of countries verified for interruption of transmission	4 (12%)	5 (13%)	8 (21%)	12 (31%)
	Number of countries that stopped MDA for ≥ 1 focus	9	22	24	34
	Number of countries that stopped MDA for ≥ 50% of population	6	10	25	>16
	Number of countries that stopped MDA for 100% of population	4	6	10	>12
Targeted for elimination as a public health problem					
Lymphatic filariasis	Number of countries validated for elimination as a public health problem (defined as infection sustained below TAS thresholds for at least 4 years after stopping MDA; availability of essential package of care in all areas with known patients)	19 (26%)	23 (32%)	34 (47%)	58 (81%)
	Number of countries implementing post-MDA or post-validation surveillance	26 (36%)	37 (51%)	40 (56%)	72 (100%)
	Population requiring MDA	TBC	330 million	180 million	0
Targeted for control					
Buruli ulcer	Proportion of cases in category III (late stage) at diagnosis	30%	< 22%	< 18%	< 10%
	Proportion of laboratory-confirmed cases	65%	> 85%	> 95%	> 95%
	Proportion of confirmed cases who have completed a full course of antibiotic treatment	90%	> 95%	> 98%	> 98%
Leishmaniasis (cutaneous)	Number of countries having reached: 85% of all cases are detected and reported, and 95% of reported cases are treated	N/A	44 (51%)	66 (76%)	87 (100%)
Leishmaniasis (visceral; PKDL)	In SEAR, PKDL cases detected (VL post-treatment follow-up 3 years) and treated	Unknown	90%	95%	100%
Mycetoma, chromoblastomycosis and other deep mycoses	Number of countries where mycetoma, chromoblastomycosis, sporotrichosis, and/or paracoccidioidomycosis are included in national control programmes and surveillance systems	1	4	8	15
Scabies and other ectoparasitoses	Number of countries having incorporated scabies management in the universal health coverage package of care	0	25 (13%)	50 (26%)	194 (100%)
	Number of countries using MDA intervention in all endemic districts	0	3	6	25

MDA: mass drug administration; N/A: not applicable; PKDL: post-kala-azar dermal leishmaniasis; SEAR: WHO South-East Asia Region; TAS: transmission assessment survey. Source: Adapted from *Ending the neglect to attain the Sustainable Development Goals: a road map for neglected tropical diseases 2021–2030*. Geneva: World Health Organization; 2020 (<https://apps.who.int/iris/handle/10665/338565>, accessed 31 March 2022).

Form for recording skin NTDs (Skin NTDs 01)

Health facility : _____		Name of health worker treating patient: _____	
Name of patient: _____	ID#: _____	Date of birth (dd/mm/yyyy) : ___/___/_____	Age (years): _____
Country: _____	District: _____	Sex: <input type="checkbox"/> Male <input type="checkbox"/> Female	
Province/Region/State: _____	Village/town: _____	Phone number: _____	Occupation: _____
Landmark: _____		Contact name: _____	Contact phone: _____
HISTORY AT ADMISSION			
Mode of detection:		Classification of patient:	
<input type="checkbox"/> Active screening <input type="checkbox"/> Contact tracing <input type="checkbox"/> Passive/voluntary <input type="checkbox"/> School survey <input type="checkbox"/> Transfer in <input type="checkbox"/> Other: _____ <input type="checkbox"/> New <input type="checkbox"/> Recurrent/relapse <input type="checkbox"/> Retreatment		<input type="checkbox"/> Recurrent/relapse <input type="checkbox"/> Retreatment	
Duration of illness before seeking care (weeks): _____	Previous treatment of current lesion(s)	<input type="checkbox"/> Yes <input type="checkbox"/> No	REFERRED BY:
Use of traditional treatment	Duration (days): _____	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Self-referral <input type="checkbox"/> Former patient
Family member or close contact with similar lesion(s)	Treatment for previous lesion(s) (if recurrent)	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Family member <input type="checkbox"/> Schoolteacher
Relationship: _____	Duration (days): _____	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Health worker (HW) <input type="checkbox"/> Other (specify) _____
Diagnosis : _____			<input type="checkbox"/> Village HW
INITIAL CLINICAL EXAMINATION			
Date of clinical examination (dd/mm/yyyy) : ___/___/_____	BCG: <input type="checkbox"/> Scar seen <input type="checkbox"/> Scar dubious <input type="checkbox"/> No scar	Pregnant: <input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Unknown <input type="checkbox"/> Unknown
	Weight (kg): [___]	HIV status: <input type="checkbox"/> Positive <input type="checkbox"/> Negative <input type="checkbox"/> Unknown	
LIMITATION			
Limitation of movement (at any joint)	<input type="checkbox"/> Yes <input type="checkbox"/> No	Limitation of activities: <input type="checkbox"/> Yes <input type="checkbox"/> No	
<input type="checkbox"/> Macule (M)	<input type="checkbox"/> Oedema (E)	<input type="checkbox"/> Papilloma (Pa)	<input type="checkbox"/> Ulcer (U)
<input type="checkbox"/> Nodule (N)	<input type="checkbox"/> Osteomyelitis (O)	<input type="checkbox"/> Papule (P)	<input type="checkbox"/> Skin patches(S)
<input type="checkbox"/> Abdomen (AB)	<input type="checkbox"/> Head and neck (HN)	<input type="checkbox"/> Lower limb (LL)	<input type="checkbox"/> Buttocks and perineum (BP)
<input type="checkbox"/> Back (BK)	<input type="checkbox"/> Ear**	<input type="checkbox"/> Toe**	<input type="checkbox"/> Genitalia*
<input type="checkbox"/> Breast (BR)*	<input type="checkbox"/> Eye*	<input type="checkbox"/> Upper limb (UL)	<input type="checkbox"/> Inguinal/Groin
<input type="checkbox"/> Thorax (TH)	<input type="checkbox"/> Face**	<input type="checkbox"/> Finger**	
TYPE OF LESION(S)/ SWELLING			
Limitation of movement (at any joint)		<input type="checkbox"/> Deformity (D)	
Pruritus <input type="checkbox"/> Yes <input type="checkbox"/> No		Sensory loss <input type="checkbox"/> Yes <input type="checkbox"/> No	
Nerve tenderness <input type="checkbox"/> Yes <input type="checkbox"/> No		Nerve enlargement <input type="checkbox"/> Yes <input type="checkbox"/> No	
Motor function loss: <input type="checkbox"/> Yes <input type="checkbox"/> No			
LOCATION OF LESION(S)			
No. of lesions: [___]		Diameter of biggest lesion: [___] cm / [___] cm	
CLINICAL SUSPICION			
<input type="checkbox"/> BU	<input type="checkbox"/> Category I : Single lesion, ≤ 5 cm in diameter	<input type="checkbox"/> Category II : Single lesion, 5–15 cm in diameter	<input type="checkbox"/> Category III : Single lesion > 15 cm in diameter, multiple lesions, lesions at critical sites, osteomyelitis
<input type="checkbox"/> CL	<input type="checkbox"/> Situation I : < 4 lesion(s), < 4 cm in diameter, not potentially disfiguring, infected with <i>Leishmania major</i> , not immunocompromised	<input type="checkbox"/> Situation II : < 4 lesions, < 4 cm in diameter, locally treatable, infected with <i>L. infantum</i> or <i>L. tropica</i> , not immunocompromised	<input type="checkbox"/> Situation III : ≥ 4 lesions, ≥ 4 cm in diameter, not compatible with local treatment, immunocompromised or suffering from unbalanced diabetes
<input type="checkbox"/> Leprosy	<input type="checkbox"/> Paucibacillary (PB) ≤ 5 lesions	<input type="checkbox"/> Multibacillary (MB) > 5 lesions	
<input type="checkbox"/> Lymphatic filariasis	<input type="checkbox"/> Scabies	<input type="checkbox"/> Yaws	
<input type="checkbox"/> Other	Please specify: _____		

* Critical site for Buruli ulcer (BU)

** Critical site for cutaneous leishmaniasis (CL)

LABORATORY CONFIRMATION					
Specimen(s) collected: <input type="checkbox"/> Yes <input type="checkbox"/> No Date first specimen(s) taken dd / mm / yyyy;		Specimen(s) type(s): <input type="checkbox"/> Biopsy <input type="checkbox"/> Blood <input type="checkbox"/> Fine needle aspiration (FNA) <input type="checkbox"/> Slit skin smear <input type="checkbox"/> Swab <input type="checkbox"/> Urine			
<input type="checkbox"/> BU	Type of test	Date initial test	Initial result	Date repeated test	Repeated result
	<input type="checkbox"/> PCR	dd-mm-yyyy	<input type="checkbox"/> Positive <input type="checkbox"/> Negative <input type="checkbox"/> Inconclusive	dd-mm-yyyy	<input type="checkbox"/> Positive <input type="checkbox"/> Negative <input type="checkbox"/> Inconclusive
	<input type="checkbox"/> Mycolactone*	dd-mm-yyyy	<input type="checkbox"/> Positive <input type="checkbox"/> Negative <input type="checkbox"/> Inconclusive	dd-mm-yyyy	<input type="checkbox"/> Positive <input type="checkbox"/> Negative <input type="checkbox"/> Inconclusive
	<input type="checkbox"/> Ziehl-Neelsen	dd-mm-yyyy	<input type="checkbox"/> Positive <input type="checkbox"/> Negative <input type="checkbox"/> Inconclusive	dd-mm-yyyy	<input type="checkbox"/> Positive <input type="checkbox"/> Negative <input type="checkbox"/> Inconclusive
	<input type="checkbox"/> Histology	dd-mm-yyyy	<input type="checkbox"/> Positive <input type="checkbox"/> Negative <input type="checkbox"/> Inconclusive	dd-mm-yyyy	<input type="checkbox"/> Positive <input type="checkbox"/> Negative <input type="checkbox"/> Inconclusive
	<input type="checkbox"/> Culture	dd-mm-yyyy	<input type="checkbox"/> Positive <input type="checkbox"/> Negative <input type="checkbox"/> Inconclusive	dd-mm-yyyy	<input type="checkbox"/> Positive <input type="checkbox"/> Negative <input type="checkbox"/> Inconclusive
<input type="checkbox"/> CL	Type of test	Date initial test	Initial result	Date repeated test	Repeated result
	<input type="checkbox"/> Culture	dd-mm-yyyy	<input type="checkbox"/> Positive <input type="checkbox"/> Negative <input type="checkbox"/> Inconclusive	dd-mm-yyyy	<input type="checkbox"/> Positive <input type="checkbox"/> Negative <input type="checkbox"/> Inconclusive
	<input type="checkbox"/> Direct exam	dd-mm-yyyy	<input type="checkbox"/> Positive <input type="checkbox"/> Negative <input type="checkbox"/> Inconclusive	dd-mm-yyyy	<input type="checkbox"/> Positive <input type="checkbox"/> Negative <input type="checkbox"/> Inconclusive
<input type="checkbox"/> Leprosy	Type of test	Date initial test	Initial result	Date repeated test	Repeated result
	<input type="checkbox"/> Skin smear	dd-mm-yyyy	<input type="checkbox"/> Positive <input type="checkbox"/> Negative <input type="checkbox"/> Inconclusive	dd-mm-yyyy	<input type="checkbox"/> Positive <input type="checkbox"/> Negative <input type="checkbox"/> Inconclusive
	<input type="checkbox"/> AMR** test:	dd-mm-yyyy	<input type="checkbox"/> Susceptible <input type="checkbox"/> Resistant	If resistant, specify: <input type="checkbox"/> Rifampicin <input type="checkbox"/> Dapsone <input type="checkbox"/> Ofloxacin	
	<input type="checkbox"/> Yaws	Type of test	Date initial test	Visible lines	Date repeated test
<input type="checkbox"/> RDT		dd-mm-yyyy	<input type="checkbox"/> Control <input type="checkbox"/> Trep line	dd-mm-yyyy	<input type="checkbox"/> Control <input type="checkbox"/> Trep line
<input type="checkbox"/> DPP		dd-mm-yyyy	<input type="checkbox"/> Control <input type="checkbox"/> Trep line <input type="checkbox"/> Non Trep line	dd-mm-yyyy	<input type="checkbox"/> Control <input type="checkbox"/> Trep line <input type="checkbox"/> Non Trep line
<input type="checkbox"/> PCR		dd-mm-yyyy	<input type="checkbox"/> Positive <input type="checkbox"/> Negative <input type="checkbox"/> Inconclusive	dd-mm-yyyy	<input type="checkbox"/> Positive <input type="checkbox"/> Negative <input type="checkbox"/> Inconclusive
OTHER LABORATORY TESTS					
	Type of test	Date initial test	Initial result	Date repeated test	Repeated result
	<input type="checkbox"/> HIV test	dd-mm-yyyy	<input type="checkbox"/> Positive <input type="checkbox"/> Negative <input type="checkbox"/> Inconclusive	dd-mm-yyyy	<input type="checkbox"/> Positive <input type="checkbox"/> Negative <input type="checkbox"/> Inconclusive
	<input type="checkbox"/> Pregnancy test	dd-mm-yyyy	<input type="checkbox"/> Positive <input type="checkbox"/> Negative <input type="checkbox"/> Inconclusive	Please specify tests and results:	
	<input type="checkbox"/> Other tests	dd-mm-yyyy			
FINAL DIAGNOSIS					
<input type="checkbox"/> Buruli ulcer	<input type="checkbox"/> Cutaneous leishmaniasis	<input type="checkbox"/> Leprosy PB	<input type="checkbox"/> Lymphatic filariasis	<input type="checkbox"/> Yaws	<input type="checkbox"/> Other (specify): _____
		Parasite: _____			

* WHO-recommended routine tests to confirm BU cases
 ** AMR: antimicrobial resistance

FOR BURULI ULCER CASES

TREATMENT	Date treatment started: ___/___/_____	Was the patient hospitalized? <input type="checkbox"/> Yes <input type="checkbox"/> No	Date of admission (if applicable): ___/___/_____
TREATMENT PLAN <i>(Tick all applicable)</i>	<input type="checkbox"/> Wound management	<input type="checkbox"/> Antibiotics	<input type="checkbox"/> POD (prevention of disability)
ANTIBIOTIC (AB) TREATMENT <i>(Dosage)</i>	<input type="checkbox"/> Rifampicin: _____ (mg)	<input type="checkbox"/> Clarithromycin: _____ (mg)	<input type="checkbox"/> Other (name): _____ : _____ (mg)
	<input type="checkbox"/> Wound management	<input type="checkbox"/> Surgery (date: ___/___/_____)	<input type="checkbox"/> Rehabilitation

DOSAGE GUIDE					
Weight of patient (kg)	Rifampicin*, once a day			Clarithromycin**, twice a day	
	Dose (mg)	Number of tablets (300 mg/tablet)	Number of tablets (150 mg/tablet)	Dose (mg)	Volume (mL)/ # tablets
5-10	75	0.25	0.5	125	5 mL
11-20	150	0.50	1.0	250	10 mL
21-39	300	1.00	2.0	500	1 tablet
40-54	450	1.50	3.0	750	1.5 tablets
> 54	600	2.00	4.0	1000 (maximum)	2 tablets

* Syrup rifampicin may be used

** Extended release formulation of clarithromycin (tablets) may be used at 15 mg/kg once a day

DIRECT OBSERVATION		Cross out each day (X) after administering the antibiotics; if antibiotics are not taken, indicate with the symbol Ø																																		
Day	Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Total doses			

END OF AB TREATMENT	Date of AB treatment assessment (dd/mm/yyyy) : ___/___/_____
Serious adverse event(s)	<input type="checkbox"/> Yes <i>Specify:</i> _____ <input type="checkbox"/> No
Antibiotics completed:	<input type="checkbox"/> Yes <input type="checkbox"/> No, defaulter <input type="checkbox"/> No, medical reason <i>If no, number of days the antibiotics was taken: [___]</i> <i>If yes, number of days missed: [___]</i> Longest gap without treatment (days) [___]

TREATMENT OUTCOME	Date of treatment assessment (dd/mm/yyyy): ___/___/_____	
Treatment outcome	<input type="checkbox"/> Healed <input type="checkbox"/> Referred <input type="checkbox"/> Lost to follow-up <input type="checkbox"/> Died	
If healed, please specify	Date of discharge (dd/mm/yyyy): ___/___/_____	Date of complete healing (dd/mm/yyyy): ___/___/_____
	Healed with surgery: <input type="checkbox"/> Yes <input type="checkbox"/> No Healed with joint limitation: <input type="checkbox"/> Yes <input type="checkbox"/> No	Healed with scar: <input type="checkbox"/> Yes <input type="checkbox"/> No

FOLLOW-UP OF PATIENT DURING AND AFTER ANTIBIOTIC TREATMENT	
DATE (dd/mm/yyyy)	COMMENTS
___/___/_____	
___/___/_____	
___/___/_____	
___/___/_____	
___/___/_____	
___/___/_____	

FOR CUTANEOUS LEISHMANIASIS

TREATMENT ROUTE (tick all applicable):		<input type="checkbox"/> Wound management	<input type="checkbox"/> Antiparasitic intramuscular/systemic
		<input type="checkbox"/> Cryotherapy	<input type="checkbox"/> Thermotherapy
		Other: _____	
TREATMENT MEDICINE	Sodium stibogluconate: _____ (mg)	Glucantime: _____ (g)	Other (name): _____ : _____ ()
	Number of doses: _____	Treatment start date: ___/___/_____	Treatment end date: ___/___/_____

TREATMENT OUTCOME	
INITIAL	Date (dd/mm/yyyy): ___/___/_____ Severe adverse event: <input type="checkbox"/> Yes <i>Specify:</i> _____ <input type="checkbox"/> No Treatment completed: <input type="checkbox"/> Yes <input type="checkbox"/> No, defaulter <input type="checkbox"/> No, medical reason Initial treatment outcome: <input type="checkbox"/> Initial cure <input type="checkbox"/> Failure <input type="checkbox"/> Lost to follow-up <input type="checkbox"/> Death
FINAL (D45-D90)	Date (dd/mm/yyyy): ___/___/_____ Final treatment outcome: <input type="checkbox"/> Cure <input type="checkbox"/> Relapse <input type="checkbox"/> Lost to follow-up <input type="checkbox"/> Death

FOR LEPROSY

PRE-TREATMENT ASSESSMENT		Pre-treatment assessment date (dd/mm/yyyy): ____/____/____									
TYPE OF PATIENT: <input type="checkbox"/> New case <input type="checkbox"/> Transfer in <input type="checkbox"/> Relapse <input type="checkbox"/> Other retreatment <input type="checkbox"/> Retreatment after loss to follow-up		Leprosy reaction: <input type="checkbox"/> Yes <input type="checkbox"/> No If yes, <input type="checkbox"/> T1R <input type="checkbox"/> T2R <input type="checkbox"/> Neuritis									
Trunk and superficial nerve assessment (circle) L = left, R = Right											
	Normal	Enlarged	Tender/Pain	Radial/ Radial cutaneous	Normal	Enlarged	Tender/Pain	Superficial peroneal	Normal	Enlarged	Tender/Pain
Great auricular	L R	L R	L R		L R	L R	L R	L R	L R	L R	L R
Ulnar	L R	L R	L R	Ulnar cut	L R	L R	L R	Sural	L R	L R	L R
Median	L R	L R	L R	Common peroneal	L R	L R	L R	Posterior tibial	L R	L R	L R
Sensory testing											
Cross [X] in blue if sensation intact; in red if sensation is absent on each foot and hand and score individually Tick - either [S] Strong; [W] Weak; [P] Paralyzed											
	Area	Score	Nerve	Muscle actions tested	Left			Right			
	Right foot	__ / 4	Facial	Eye closure	S	W	P	S	W	P	
	Left foot	__ / 4	Ulnar	Little finger abduction							
	Right hand	__ / 4	Median	Thumb abduction							
	Left hand	__ / 4	Peroneal	Foot dorsiflexion							
Sensory nerve function impairment (less than 4/4 score in any of feet and hands) <input type="checkbox"/> Yes <input type="checkbox"/> No											
Assessment eyes, L = Left, R = Right											
	Madarosis	Watery/Redness	Blink reflex	Corneal ulceration	Lid gap (mm)	Visual acuity 0 = Normal, 1 = Blurred vision 2 = Unable to count fingers					
R	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	[__]	[__]					
L	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	[__]	[__]					
Disability grading - Indicate the grade: 0=Grade 0; 1=Grade 1; 2=Grade 2											
Eye			Hand			Foot			EHF score (a+b+c+d+e+f)		
Left (a)	Right (b)	Left (c)	Right (d)	Left (e)	Right (f)	Maximum grade			[__]		
[__]	[__]	[__]	[__]	[__]	[__]	[__]			[__]		

TREATMENT	Date of treatment start (dd/mm/yyyy) ___/___/_____											
TREATMENT PLAN <i>(Tick all applicable)</i>	<input type="checkbox"/> Wound management <input type="checkbox"/> Antibiotics (AB) <input type="checkbox"/> POD (prevention of disability) <input type="checkbox"/> Rehabilitation <input type="checkbox"/> MULTIDRUG THERAPY PB: <input type="checkbox"/> Rifampicin <input type="checkbox"/> Dapsone <input type="checkbox"/> Other(s): _____ <input type="checkbox"/> MULTIDRUG THERAPY MB: <input type="checkbox"/> Rifampicin <input type="checkbox"/> Dapsone <input type="checkbox"/> Clofazimine <input type="checkbox"/> Other(s): _____ <input type="checkbox"/> INITIAL: <input type="checkbox"/> Ofloxacin / Moxifloxacin <input type="checkbox"/> Clofazimine <input type="checkbox"/> Clarithromycin <input type="checkbox"/> Minocycline <input type="checkbox"/> ADDITIONAL: <input type="checkbox"/> Ofloxacin / Moxifloxacin <input type="checkbox"/> Clofazimine											

DIRECT OBSERVATION																		
Cross out each month (X) after administering the antibiotics ; if antibiotics are not taken, indicate with the symbol Ø																		
Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
<input type="checkbox"/> PB																		
<input type="checkbox"/> MB																		

FOLLOW-UP ASSESSMENTS												
FOLLOW-UP 1	Date of follow-up 1 (dd /mm/yyyy): ___/___/_____ Leprosy reaction: <input type="checkbox"/> Yes <input type="checkbox"/> No <i>If yes,</i> <input type="checkbox"/> T1R <input type="checkbox"/> T2R <input type="checkbox"/> T2R <input type="checkbox"/> Neuritis											
Disability grading Indicate the grade: 0=Grade 0; 1=Grade 1; 2=Grade 2	Eye		Hand		Foot		EHF score (a+b+c+d+e+f)		Maximum grade			
	Left (a)	Right (b)	Left (c)	Right (d)	Left (e)	Right (f)	Left (e)	Right (f)	Left (e)	Right (f)	Left (e)	Right (f)
	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]
FOLLOW-UP 2	Date of follow-up 2 (dd /mm/yyyy): ___/___/_____ Leprosy reaction: <input type="checkbox"/> Yes <input type="checkbox"/> No <i>If yes,</i> <input type="checkbox"/> T1R <input type="checkbox"/> T2R <input type="checkbox"/> T2R <input type="checkbox"/> Neuritis											
Disability grading Indicate the grade: 0=Grade 0; 1=Grade 1; 2=Grade 2	Eye		Hand		Foot		EHF score (a+b+c+d+e+f)		Maximum grade			
	Left (a)	Right (b)	Left (c)	Right (d)	Left (e)	Right (f)	Left (e)	Right (f)	Left (e)	Right (f)	Left (e)	Right (f)
	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]
FOLLOW-UP 3	Date of follow-up 3 (dd /mm/yyyy): ___/___/_____ Leprosy reaction: <input type="checkbox"/> Yes <input type="checkbox"/> No <i>If yes,</i> <input type="checkbox"/> T1R <input type="checkbox"/> T2R <input type="checkbox"/> T2R <input type="checkbox"/> Neuritis											
Disability grading Indicate the grade: 0=Grade 0; 1=Grade 1; 2=Grade 2	Eye		Hand		Foot		EHF score (a+b+c+d+e+f)		Maximum grade			
	Left (a)	Right (b)	Left (c)	Right (d)	Left (e)	Right (f)	Left (e)	Right (f)	Left (e)	Right (f)	Left (e)	Right (f)
	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]

TREATMENT OUTCOME	Date of assessment (dd/mm/yyyy): __/__/----						EHF score (a+b+c+d+e+f)	Maximum grade
	Eye		Hand		Foot			
	Left (a)	Right (b)	Left (c)	Right (d)	Left (e)	Right (f)		
Disability grading (end of treatment) Indicate the grade: 0=Grade 0; 1=Grade 1; 2=Grade 2	[]	[]	[]	[]	[]	[]	[]/12	[]
Adherence	<input type="checkbox"/> Treatment completed within standard duration <input type="checkbox"/> Treatment completed beyond standard duration <input type="checkbox"/> Treatment completed with unsatisfactory clinical response <input type="checkbox"/> Transfer in <input type="checkbox"/> Death <input type="checkbox"/> Lost to follow-up							
Serious adverse event	<input type="checkbox"/> Yes Specify: _____ <input type="checkbox"/> No							
Status as the end of treatment	<input type="checkbox"/> With new grade 1 disabilities <input type="checkbox"/> With new grade 2 disabilities <input type="checkbox"/> Without new grade 2 disabilities							

FINAL TREATMENT OUTCOME (3 years)	Date of assessment (dd/mm/yyyy): ___/___/----
Status compared to end of treatment (N+3)	<input type="checkbox"/> Relapse <input type="checkbox"/> Reaction <input type="checkbox"/> With new grade 2 disabilities <input type="checkbox"/> Without new grade 2 disabilities <input type="checkbox"/> Death <input type="checkbox"/> Lost to follow-up

FOR YAWS

TREATMENT	Azithromycin : <input type="checkbox"/> Yes <input type="checkbox"/> No	Treatment date (dd/mm/yyyy): ___/___/____
	Dose: _____	Number of tablets: _____
	Serious adverse event: <input type="checkbox"/> Yes <i>Specify:</i> _____ <input type="checkbox"/> No	

TREATMENT OUTCOME (4 weeks)	Date (dd/mm/yyyy): ___/___/____
	<input type="checkbox"/> Completely healed <input type="checkbox"/> Partially healed <input type="checkbox"/> No improvement <input type="checkbox"/> New lesion(s) <input type="checkbox"/> Lost to follow-up

DOSAGE GUIDE			
Age of patient (years)	Azithromycin		
	Total dose (mg)	Number of tablets	Syrup (mL)
6 months – 5 years	500	1	12.5
6–9 years	1000	2	
10–14 years	1500	3	
≥ 15 years	2000	4	



The new NTD road map sets global targets and milestones to prevent, control, eliminate and eradicate 20 diseases and disease groups by 2030. It also describes the integrated approaches needed to achieve these targets through cross-cutting activities that intersect multiple diseases.

This strategic framework was prepared as a companion document to the road map in response to the critical actions identified to reach the 2030 targets. Its goal is to assist endemic countries in reducing the morbidity, disability and psychosocial impacts of skin NTDs and other skin conditions through a people-centred approach by identifying areas, key partners and resources for integration as well as systems to embed interventions within national programmes and facilitate country ownership.