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Ending the neglect to  
attain the Sustainable  
Development Goals  
*A rationale for continued  
investment in tackling  
neglected tropical diseases  
2021–2030*

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**Ending the neglect to attain the Sustainable Development Goals: a rationale for continued investment in tackling neglected tropical diseases 2021–2030**

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# Dr Mwelecele Ntuli Malecela

**26 March 1963 – 10 February 2022**

This work is dedicated to Dr Mwelecele (“Mwele”) Ntuli Malecela, who served as Director of the WHO Department of Control of Neglected Tropical Diseases from 2018 until her untimely death on 10 February 2022.

As Director, she led the development of the new road map for 2021–2030 and its launch in January 2021.

Mwele devoted her career to fighting neglected tropical diseases. She was sensitive to the suffering of disadvantaged populations and those affected by diseases that could have been prevented through improved living conditions and more equitable access to health services.

An advocate for “spending more and spending better”, she initiated this work on a rationale for continued investment in tackling neglected tropical diseases and prioritizing investments for the decade 2021–2030. She believed that ending the epidemic of neglected tropical diseases was achievable by working smarter and taking concerted action globally, regionally and nationally.



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Foreword

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Acknowledgements

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Glossary of key terms and abbreviations

---

Executive summary

---

**1. Introduction**

---

**2. Investment rationale**

---

2.2 Challenges

---

2.2 Cost-benefit of NTD interventions

---

2.3 Road map vision

---

**3. Investment priorities**

---

3.1 “Best buys” and broader integration

---

3.2 Gaps in specific programme dimensions

---

3.3 Cross-sectoral collaboration

---

**4. A call to action**

---

4.1 Act now

---

4.2 Act together

---

**Annex 1. Mortality and DALYs data for NTDs, 2019**

---

**Annex 2. Disease-specific road map targets and milestones**

---

**Annex 3. Health economic R&D for NTDs: more comprehensive economic evidence to draw the full picture**

---

**Figures**

---

Fig. 1. Progress against NTDs at a glance

---

Fig. 2. Areas that require concerted action

---

Fig. 3. Distribution of NTD-caused DALYs by age and gender, 2019

---

Fig. 4. Overarching global road map targets for 2030

---

Fig. 5. Road map gap assessment by programme dimension

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**Case studies**

---

1. Côte d'Ivoire – An integrated approach to the control and management of skin NTDs

---

2. Sierra Leone – Integrated, coordinated MDA and community sensitization campaigns

---

3. Bangladesh – Integrating WASH and NTD interventions to support control and possible elimination of soil-transmitted helminthiases

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4. Honduras – A strategic plan for the prevention, care, control and elimination of infectious diseases

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**The World Health Organization (WHO)’s high-level strategy document, *Ending the neglect to attain the Sustainable Development Goals: a road map for neglected tropical diseases 2021–2030*, also referred to as “the road map”, was endorsed by the Seventy-third World Health Assembly in November 2020 and launched in January 2021. It charts out our exciting but challenging journey towards achieving the 2030 targets for neglected tropical diseases (NTDs).**

It has been a deeply worthwhile experience to collaborate and consult with the global NTD community – countries, partners and international health funders. We have renewed commitments to this shared vision and defined actions for the coming decade. However, the road ahead will be paved with challenges; to achieve the 2030 targets, substantial efforts are still needed to accelerate progress, including to go the last mile to ensure success in the case of diseases close to elimination or eradication. There is now a common understanding that sustainable control must be fostered by mainstreaming NTD programmes into national health systems, by collaborating beyond the health sector, and by developing more efficient and more affordable diagnostic and treatment tools, particularly in the context of those NTDs for which tools are not currently available. Targeted advocacy and communication will also be essential to ensure that the specific health needs of populations affected by NTDs are considered when pursuing the goal of universal health coverage. These elements will also be key to ensuring that target 3.3 of Sustainable Development Goal 3, that of ending the NTD epidemic, is prioritized by international and national health agendas.

Financing the acceleration of the progress needed to reach the NTD 2030 targets was highlighted throughout the global consultation on which the road map was based and, for some time, a lack of resources has been seen as a significant barrier to the control, elimination and eradication of NTDs. This challenge has only been intensified by the coronavirus disease (COVID-19) pandemic; indeed, the pandemic has altered the course of many public health objectives for the near and long terms alike.

As part of the work of preparing the road map, and in response to the need to raise the funding and resources highlighted by the NTD community, this advocacy document supports the implementation of the road map by presenting a rationale for investing in actions to combat NTDs.<sup>e</sup> This rationale was developed in an already complex funding landscape and in the context of a wide-ranging and diverse set of diseases. It was also prepared against a background of unprecedented cuts to aid budgets and shifting international priorities.

This document sets out, therefore, to explain the socioeconomic value of investing in the fight against NTDs and highlights priorities for global investment attention. Our work was guided by the need not only for additional funding and funders but also for the need to understand the current funding climate, in which value for money and the efficient use of resources to fill the most critical of gaps are more relevant than ever.

As well as hoping that we can make the case for investment in NTDs, we want also to make the case for greater economic understanding of the impact of control, elimination and eradication of NTDs.

We must continue to push forward as one unified community; only in so doing can we succeed in reaching the NTD 2030 targets.



**Dr Gautam Biswas**

Director, a.i.

Department of Control of Neglected Tropical Diseases

World Health Organization



Work on this companion document to the road map was initiated by the WHO Department of Control of Neglected Tropical Diseases (WHO/NTD) under the guidance of the late Dr Mwelecele Ntuli Malecela.

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The writing team comprised Gautam Biswas and Xiao Xian Huang (WHO/NTD). Wouter Deelder, David Humphries and Alex Owens (Dalberg Global Development Advisors, Geneva, Switzerland) developed the concept and framework, facilitated interviews with experts and stakeholders, and drafted the document.

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The document was also reviewed by staff from WHO's departments of Control of Neglected Tropical Diseases and Health Systems Governance and Financing, as well as regional offices.

The four country cases annexed to the document were prepared jointly by staff at WHO headquarters and the WHO regional offices for South-East Asia, Africa and the Americas. WHO country offices and health ministries in Bangladesh, Côte d'Ivoire, Honduras and Sierra Leone facilitated collection of information and review of drafts with national stakeholders.

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## Glossary of key terms and abbreviations

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

### community-based care

Care for people of all ages who need health care assistance at home. Community care services include home support, nursing, physiotherapy and other rehabilitation services.

### coordination

Collaboration among adjacent sectors and programmes, within and beyond health, in the broader NTD network. Sectors such as vector control and water, sanitation and hygiene make critical contributions to progress against NTDs, and working together more effectively will accelerate and sustain progress towards elimination and control of NTDs.

### “best buy” in development

Investment in an intervention or group of interventions that has an “outsized impact” on improving the equitable distribution of health outcomes, economic outcomes and/or broader social outcomes.

### “best buy” in health

Investment in an intervention that represents an “excellent return” on investment, in terms of reducing mortality or morbidity.

### disability-adjusted life year (DALY)

A measure of overall disease burden, expressed as the number of years lost due to ill health, disability or early death; introduced in the 1990s to compare overall health and life expectancy in different countries. DALYs for a disease or health condition are calculated as the sum of the years of life lost due to premature mortality in the population and the years lost due to disability resulting from the health condition or its consequences.

### gap

A current or future challenge for NTD programmes and services that prevents actors from reaching the 2030 targets.

### 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 integrated monitoring, evaluation and reporting for all relevant endemic NTDs.

### International dollar

A hypothetical unit of currency. An international dollar would buy in the cited country a comparable amount of goods and services that a United States dollar would buy in the United States of America.

### mainstreaming

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

### market failure

A general term describing situations in which market outcomes are not Pareto efficient, meaning resources are so allocated that it is not possible to make anyone better off without making someone else worse off. Market failures provide a rationale for government intervention.

### 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. (In this document, the terms mass drug administration and preventive chemotherapy are used interchangeably).



### **neglected tropical diseases (NTDs)**

A diverse set of currently 20 diseases and disease groups<sup>1</sup> that disproportionately affect populations living in poverty, predominantly in tropical and subtropical areas. They impose a devastating human, social and economic burden on more than one billion people worldwide.

### **One Health**

An integrative and systemic approach to health, grounded on the understanding that human health is closely linked to the healthiness of food, animals and the environment, and the healthy balance of their impact on the ecosystems they share, everywhere in the world.

population-based public health interventions  
Interventions aimed at disease prevention and health promotion that affect an entire population and extend beyond medical treatment by targeting contextual or community processes and underlying risk factors, such as tobacco smoking, drug and alcohol abuse; diet and sedentary lifestyles; and social and environmental factors.

### **programme dimensions**

A notion used in the road map that refers to areas that all NTD programmes can be assessed against and identify needed action. The road map listed 11 dimensions: scientific understanding; diagnostics; effective interventions; operational and normative guidance; planning, governance and programme implementation; monitoring and evaluation; access and logistics; health care infrastructure and workforce; advocacy and funding; collaboration and multisectoral action; and capacity- and awareness-building.

### **Sustainable Development Goals (SDGs)**

A set of 17 goals adopted by all United Nations Member States in 2015 as part of the 2030 Agenda for Sustainable Development. The SDGs recognize that in order to end poverty and other deprivations, there must be interconnected strategies to improve health and education, reduce inequality and spur economic growth, tackle climate change and work to preserve our oceans and forests. The SDGs are an urgent call for action by all countries in a global partnership.

### **shared gap**

A gap that is common for two or more NTDs. The road map identifies four critical gaps for which action is required across all NTDs: diagnostics and other key interventions; monitoring and evaluation; access and logistics; and advocacy and funding.

### **target product profile (TPP)**

A document that outlines the desired “profile” or characteristics of a target product that is aimed at a particular disease or diseases. TPPs state intended use, target populations and other desired attributes of products, including safety and efficacy-related characteristics.

### **water, sanitation and hygiene (WASH)**

A subject of dedicated targets within Sustainable Development Goal 6 (Ensure availability and sustainable management of water and sanitation for all). The benefits of having access to an improved source of drinking-water can only be fully realized when there is access also to improved sanitation and adherence to good hygiene practices. Beyond its immediate benefits, WASH has profound broader socioeconomic impacts, particularly for women and girls.

<sup>1</sup> Buruli ulcer, Chagas disease, dengue and chikungunya, dracunculiasis, echinococcosis, foodborne trematodiasis, human African trypanosomiasis, mycetoma, chromoblastomycosis and other deep mycoses, leishmaniasis, leprosy, lymphatic filariasis, onchocerciasis, rabies, scabies and other ectoparasites, schistosomiasis, snakebite envenoming, soil-transmitted helminthiasis, taeniasis and cysticercosis, trachoma, yaws.

# Executive summary

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## **Remarkable progress has been made in the fight against neglected tropical diseases (NTDs) during the past two decades. That progress formed the basis for WHO's high-level strategy document, *Ending the neglect to attain the Sustainable Development Goals: a road map for neglected tropical diseases 2021–2030* (1).**

Increased domestic and international commitment to NTD control, elimination and eradication has accelerated progress against individual disease targets, demonstrating that it is possible to reach some of the world's poorest and most remote communities through creative, low-cost programmes. For the NTD community, the principle of leaving no one behind is a concrete and achievable goal (section 1).

The global context, however, continues to pose particular challenges. The coronavirus disease (COVID-19) pandemic which has swept through the world has had devastating consequences, both direct and indirect (2). In addition to those directly attributable losses, the COVID-19 crisis has also caused severe delays and disruption to the provision of care for countless other illnesses, including NTDs. According to the third WHO global pulse survey (3), NTD services were among those most frequently affected, with nearly half of all responding countries reporting disruption and changes to health-seeking behaviour in targeted populations. Among NTD services, community-based activities including preventive chemotherapy campaigns were those most severely disrupted by the pandemic. This constitutes a serious threat to the global community's ability to meet the targets laid out in the road map (4).

In terms of financing too, it is likely that funding for NTDs will remain constrained in the coming years. As the global economy reels from the double hits of COVID-19 and regional conflicts, projections by the International Monetary Fund suggest a slow-down of economic growth to some 3.6% in 2022 and 2023, down from 6.1% in 2021. Beyond 2023, global growth is forecast to decline to about 3.3% in the medium term (5). In that context, the resources needed to tackle NTDs are at risk of being overlooked.

This document, therefore, presents the compelling case for protecting and promoting spending on NTDs.

The first and foremost argument is that investment in tackling NTDs is synonymous with investing in equity and in equitable access to health care. As NTDs are primarily diseases of poverty, strengthening the systems by which the world's poorest are able to access health care is, by definition, a contribution to strengthening community and country-level responses both to specific diseases and to generalized ill health.

This investment rationale document, as a companion to the road map, advocates for more, and better, investment. It draws particular attention to the strategic areas which are essential to achieve the road map targets and to safeguard the hard-won gains of the past decades. Some of these areas have already attracted political and financial support and have already proven to be highly successful. This support must continue.

Other areas, however, have seen less investment, often because the needs associated with them are more complex to address. It is precisely in these fields that incremental investment and commitments are needed; the decade 2021–2030 is also referred to as the Decade of Action for delivery of the Sustainable Development Goals (SDGs) (6), and achieving the specific SDG target of ending the NTD epidemic will require commitment to these difficult fields, as well as the attendant financial commitments.

**The rationale for investing in actions to combat NTDs is both economical and equitable** (section 2). NTDs affect the health and well-being of more than a billion people worldwide and impose an unfair health and economic burden on the world's most marginalized communities (1). But cost-effective interventions already exist for many NTDs and many of these are affordable as public health interventions even in low-income countries (7).

Integration of interventions can further reduce costs, and the benefits of investment are manifold: as well as the direct health benefits, tackling NTDs is also a vital contribution to economic prosperity, equity, and human health and well-being.

This document, then, in keeping with the road map's main principles, highlights some of the specific fields for which additional investment is needed (section 3) – the so-called “best-buys” among the existing tools and broader integrations that can tackle NTDs effectively and sustainably.

In the past decade, proven cost-effective interventions, particularly preventive chemotherapy, received substantial international and national support and were quickly scaled up in endemic countries across the globe. This expansion contributed significantly to progress in reducing the overall burdens of disease, and continuous support for these interventions too is essential, as is operational research into further integration of specific interventions with existing routine health programmes. In those fields where there are not yet cost-effective interventions for mass treatment, research and development (R&D) is urgently needed. In investment terms, this requires that the most common and pressing gaps be filled – in diagnostics, in monitoring and evaluation, in access and logistics, and in advocacy and funding.

It is worth restating that plugging these gaps by means of intelligent investment will contribute not only to lessening specific disease burdens but also to strengthening health systems in general.

The other main pillar of the road map, which this document seeks to address, focuses on cross-sectoral collaboration, in order to sustainably control NTDs and optimize use of resources. Health outcomes depend on specific health system factors and on others that relate to wider societal structures – and this is especially so in the context of NTDs. Since the publication of WHO's first road map, in 2012, there have been attempts to combine and streamline actions beyond specific health interventions. These include vector control, veterinary public health, and the provision of safe water, sanitation and hygiene (WASH). All of these are important tools in the fight against many NTDs (8) and cross-sectoral collaboration, while complex, is likely to lead to significant returns on investment.

Finally, and directly related to lessons learnt during the COVID-19 pandemic, there is now renewed momentum for One Health approaches to overcoming disease risks

that occur at the human-animal interface (9) This is a particular financial as well as scientific challenge, as it requires effective and jointly financed cross-sectoral collaboration to build sustainable protection and learning. Once again, though, the NTD field is extremely well-positioned to lead innovation in terms of both specific NTDs and of more generalizable solutions in the zoonotic and vector-related fields.

**Given this pressing context, WHO calls upon national governments and international funders to prioritize investment in NTDs**, to champion the shift towards greater integration of NTD programmes in existing health systems and to scale up investment to address the gaps that exist across all NTDs (section 4).

The COVID-19 pandemic threatens to reverse decades of hard-won health gains. It is crucial therefore that the global community acts now to safeguard progress – and to accelerate further progress towards specific NTD goals and the broader SDGs.

To this end, a 2019 WHO report in advance of a United Nations General Assembly meeting on universal health coverage urged countries to increase investment in primary health care by at least 1% of their gross domestic product (10). In 2022, this target is nothing short of essential. Recovery from the pandemic will put health budgets under huge stress, of course, and this will be particularly true in low-income countries. However, it is the central contention of the road map and of this investment rationale document that investment in NTDs is fundamentally an investment in health systems, and in the resilience of communities. When we have stronger health systems, and stronger communities, deadly but curable diseases have less room for manoeuvre. Populations and economies become more resilient, and this yields tangible benefits for people the world over, not only in NTD-endemic countries. Intelligent investment up front can save billions down the road.

The global NTD community will support countries to implement the road map in all its aspects, including the mainstreaming and integration of NTD interventions; promoting national and international investments; and building national financing mechanisms to enable NTD programmes to improve their efficiency and strengthen sustainability.

WHO's commitment to ending NTDs is absolute, and, alongside its numerous partners and investors, the Organization hereby restates its commitment to the central, guiding vision of a world free of NTDs. This document is intended to facilitate just that.



# Introduction



Neglected tropical diseases (NTDs) are a 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. Currently, more than one billion people are affected (1). While the mortality and morbidity caused by some NTDs have been substantially reduced in the past 20 years, these diseases remain a global public health problem.

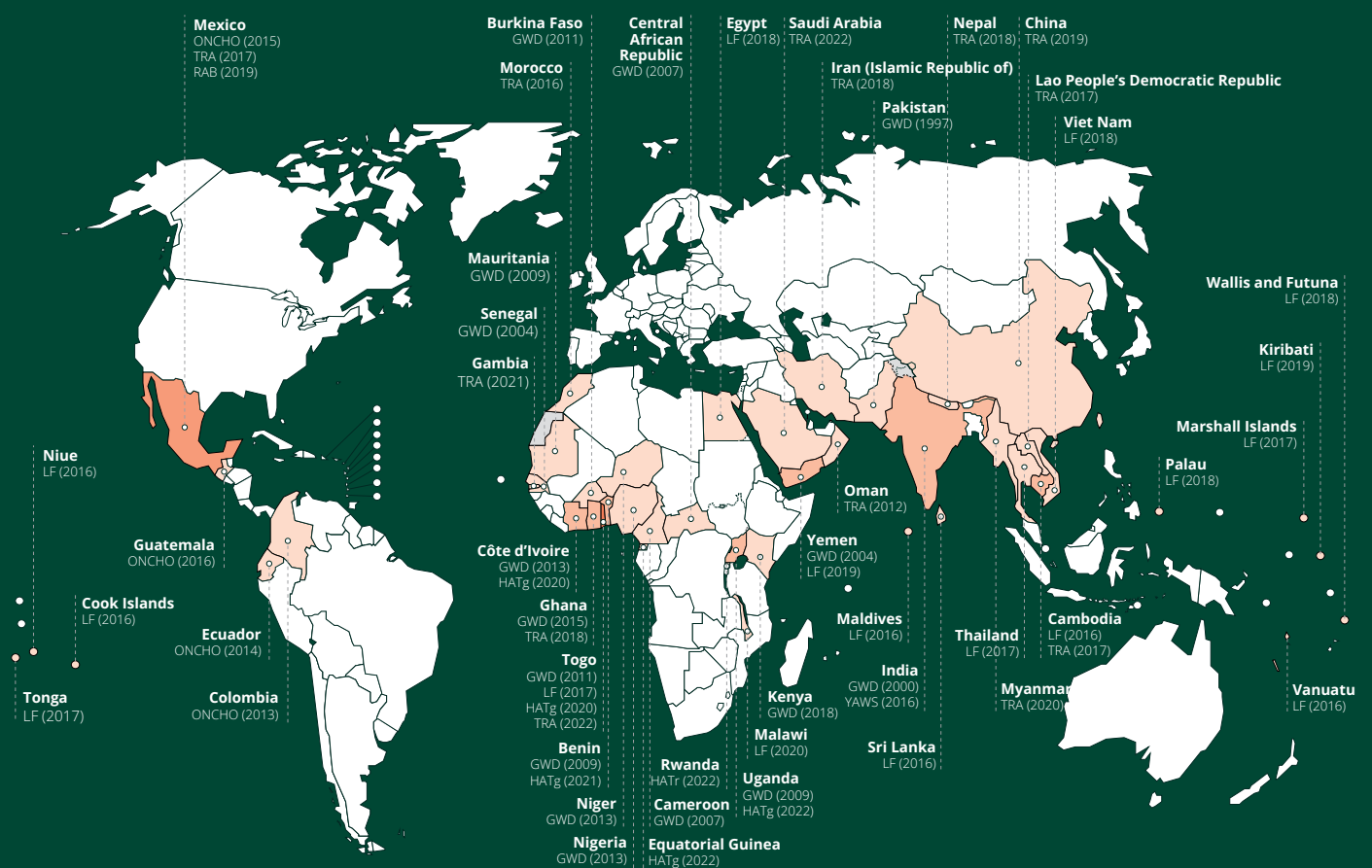
Over the past decade, encouraging progress has been made to raise the visibility of NTDs on the global health agenda. Ending the epidemic of NTDs is listed as a target of SDG 3 (Ensure healthy lives and promote well-being for all at all ages). In 2012, WHO published the first global NTD road map, which included 17 diseases and set the main strategies and milestones for the decade to 2020 (8). In response to this call, pharmaceutical companies, donors, countries endemic for NTDs and nongovernmental organizations rallied around the 2012 London Declaration to commit themselves to the control, elimination and eradication of 10 diseases, mainly through the expansion of preventive chemotherapy (11). In 2013, the World Health Assembly adopted the first resolution ever (WHA66.12) to consider NTDs as a group rather than as individual diseases, which reinforced focus on fighting them through coordinated and integrated approaches (12).

In 2020, 600 million fewer people required interventions against NTDs than in 2010 (1). By June 2022, 46 countries, territories and areas had eliminated at least one disease (13). Dracunculiasis is on the verge of eradication (13). The number of reported cases of leprosy and human African trypanosomiasis has also decreased (13). More and more medicines and diagnostic tools are donated by pharmaceutical companies and other partners and made available gratis for low- and lower-middle income countries (1). Progress against NTDs is summarized in Fig. 1.

Fig. 1. Progress against NTDs at a glance (up to May 2022)

# Progress at a glance

*46 countries have eliminated at least one neglected tropical disease*



Note: Countries are those identified as endemic in the road map that have completed the designated validation/verification/certification process and been acknowledged by WHO. China and the Republic of Korea were validated for having eliminated lymphatic filariasis as a public health problem and are no longer considered endemic.

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World Health Organization



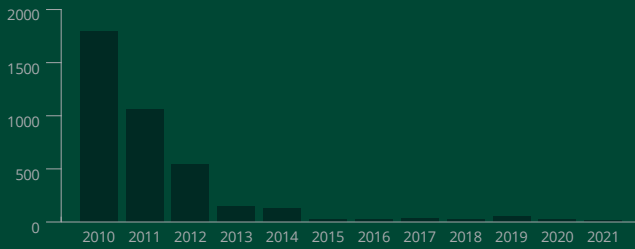
## Dracunculiasis



15 cases (2021)

▼99%

199 countries, areas and territories certified free of dracunculiasis transmission including 187 Member States



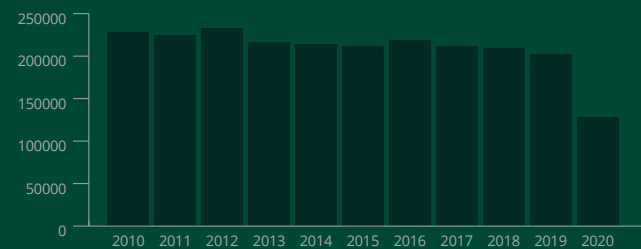
## Leprosy



127 506 cases (2020)

▼35%

35% reduction in number of cases since 2010: 228 488 cases reported in 2010 compared with 127 506 cases in 2020



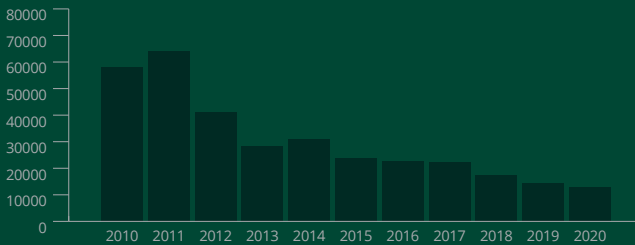
## Visceral leishmaniasis



12 737 cases (2020)

▼78%

78% reduction in number of cases since 2010: 58 257 cases reported in 2010 compared with 12 737 cases in 2020

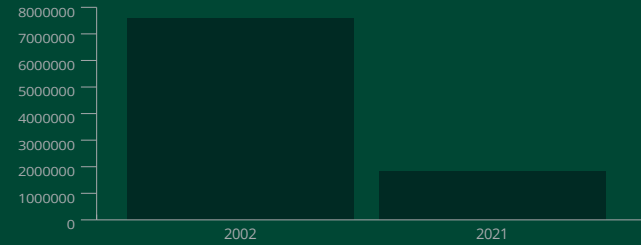


## Trachoma



▼76%

76% reduction in the number of cases of late, blinding stage of trachoma – from 7.6 million in 2002 to 1.8 million in 2021



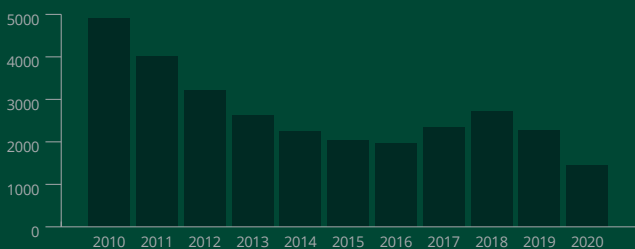
## Buruli ulcer



1458 cases (2020)

▼70%

75% decrease in the number of cases since 2010: 4906 cases reported in 2010 compared with 1458 in 2020



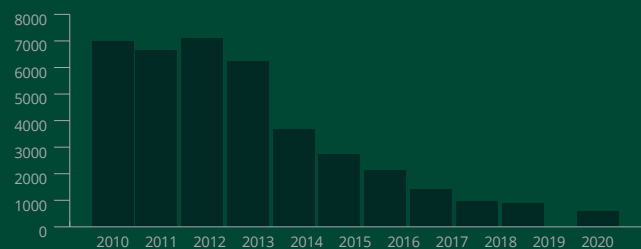
## HAT (gambiense)



565 cases (2020)

▼92%

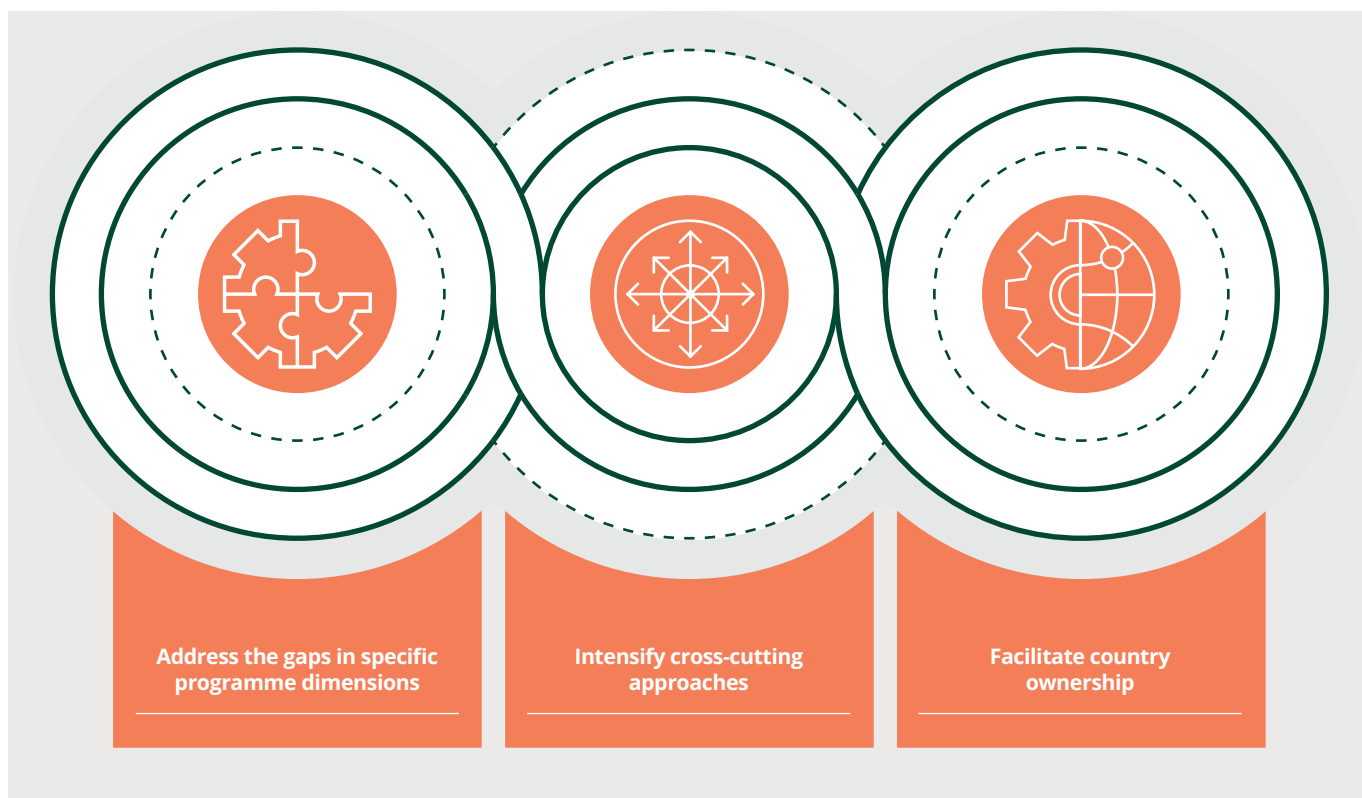
92% reduction in the number of cases reported in 2020 from 6973 in 2010



Source: WHO Global Health Observatory (13).

Note: Population requiring and receiving preventive chemotherapy for at least one disease (million doses).

Fig. 2. Areas that require concerted action



Delivering the road map targets will require the global NTD community to build on the progress made and accelerate efforts to achieve the SDG target of ending the epidemic of NTDs by 2030 (Fig. 2).

**First**, addressing the gaps in specific programme dimensions identified in the road map will require innovative thinking to release funding space through, for instance, re-prioritization and efficiency gains. The road map development team organized a broad global consultation to assess the gaps by key programme dimensions across all 20 NTDs. The gap assessment highlighted the needs for accelerated actions in some programme dimensions where most NTDs are facing challenges, including: diagnostics and other key interventions; monitoring and evaluation; access and logistics; and advocacy and funding.

**Secondly**, the road map calls to intensify cross-cutting approaches through integrated interventions for several NTDs and with other relevant diseases by common service platforms, mainstreaming them into national health systems and coordinating with related programmes within and beyond the health sector. Implementation of cross-cutting approaches will require new reflections on the investment pattern, moving from disease-based vertical investments to more system-based horizontal investment.

**Thirdly**, facilitating country ownership will be key to building sustainable support for NTD programmes. Country ownership implies that planning and budgeting should be led by countries. It should be mainstreamed into national health strategic planning and budgeting cycles, be based on a country's governance, technical and financing capacities, and when needed, be supplemented by external support. In financing terms, this implies additional reflection on how to build synergies between domestic funding and external funding to address additional NTDs, encourage broader integration, and support the construction of a sustainable strategy to control NTDs.

This document supports the road map's call for renewed momentum against NTDs by presenting the rationale and priorities for continued action and investment to achieve the road map's 2030 targets. The intended audience includes global health partners, the pharmaceutical industry, current and new donors, as well as national stakeholders in both health and non-health sectors.

# Investment rationale

## 2.1 Challenges

### ***NTDs exert an unacceptable burden on the world's most vulnerable populations.***

All 20 NTDs have a devastating impact on impoverished communities (14–17). These diseases are neglected because there is a lack of strong political advocacy, insufficient outreach by health systems, or lack of data to quantify their public health impact. All result in low profile and status in public health and financing priorities. Addressing these diseases is critical to achieving SDG3 and to living up to the commitment to leave no one behind.

In 2019, NTDs caused an estimated 200 000 deaths and were responsible for 14.5 million disability-adjusted life years (DALYs) (Annex 1).<sup>1</sup> Many NTDs cause severe pain and disability. Onchocerciasis, for example, affects 20.9 million people, who may have symptoms such as severe itching, skin disfigurement and visual impairment. Lymphatic filariasis disfigures and can cause permanent disability and social stigmatization. Leprosy can cause chronic skin infection which could last 20 years or more. The burden of NTDs is unequal across the world: low- and middle-income countries account for 80% of this burden (8).

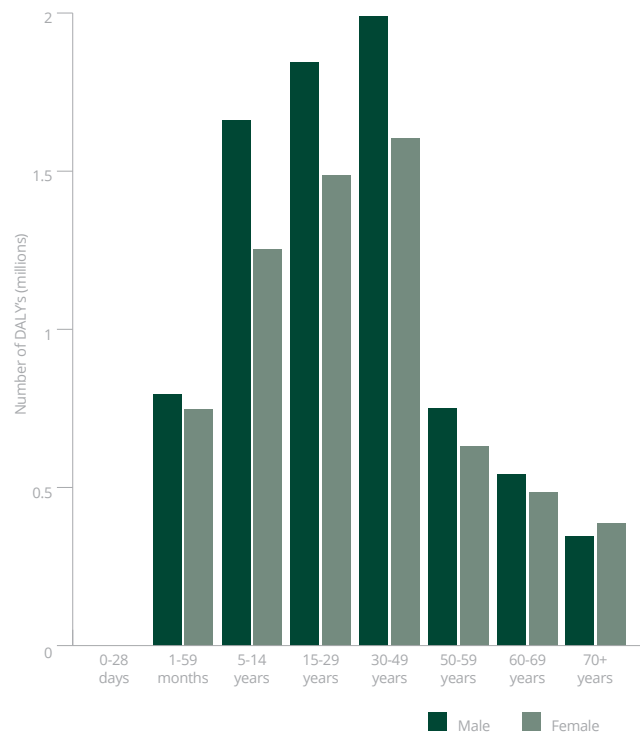
### ***The economic cost of NTDs is high for affected households.***

The household income lost from out-of-pocket health expenditures and the wages lost due to NTDs is estimated to be at least 33 billion International dollars per year (19). Overall, the benefit of ending NTDs for affected individuals in terms of averted out-of-pocket health expenditure and lost productivity exceeds US\$ 342 billion during 2015–2030. Some of the most prevalent NTDs, including lymphatic filariasis, onchocerciasis, schistosomiasis and soil-transmitted helminthiases, are responsible for an average annualized loss to productivity of about 29% in people with these diseases compared to uninfected persons (20).

Of note is that this is just a partial picture of the situation. In the current literature, evidence of the economic impact of many NTDs, especially those not covered by preventive chemotherapy, remains limited. There is therefore an urgent need to expand studies on the cost of illness to all 20 NTDs to provide a comprehensive picture on their economic impact.

For households, NTDs affect the main income providers, primarily family members aged 15–49 years, followed by school-aged children (Fig. 3). If not addressed properly, NTDs will both reduce households' current income and their future productivity.

Fig. 3. Distribution of NTD-caused DALYs by age and gender, 2019



Source: WHO Global Health Observatory (13).

<sup>1</sup> Six NTDs were not included in the current calculation of DALYs caused by NTDs, and even the existing calculation was underestimated (18). They are Buruli ulcer, dracunculiasis, mycetoma, chromoblastomycosis and other deep mycoses, scabies and other ectoparasitoses, snakebite envenoming and yaws.



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### ***The burden of certain NTDs falls disproportionately on women and girls.***

This is partly explained by the impact of gender roles, which can increase female exposure and vulnerability to infections. For example, through close contact with children, women are two to four times more likely to develop trachomatous trichiasis and are blinded up to four times as often as men (21). Since women and girls perform two-thirds of water collection globally, they have a higher risk of developing schistosomiasis in endemic areas. Approximately 56 million women are estimated to have female genital schistosomiasis, which increases risks of contracting HIV and causes organ damage (22). Cultural norms may also impede affected women from accessing health care services, while the stigma from disability and disfigurement can undermine their social status, employment and financial independence (23). Without appropriate prevention and treatment measures, NTDs can contribute to maternal health risks such as poor fetal development, maternal anaemia and maternal mortality. In countries endemic for soil-transmitted helminthiasis, a third of pregnant women are infected with hookworm, which causes anaemia and blood-loss during childbirth (24). The disease burden of rabies is disproportionately borne by rural poor populations, with approximately half of cases attributable to children aged under 15 years. That said, for other NTDs, gender can play a different role in transmission dynamics, influencing health-seeking behaviours in ways that put men and boys at higher risk of infection than women and girls.

## **2.2 Cost-benefit of NTD interventions**

***NTDs could be tackled at affordable cost and the benefit of reducing NTD risks extended beyond the health sector.***

**Investment in tackling NTDs has significant return on investment.** Although socioeconomic development addresses the root cause of health risks linked with poverty, health interventions can provide some affordable solutions to protect the poor before they can fully benefit from economic development. Fitzpatrick and colleagues, for instance, compared the cost of the yaws eradication programme with the cost of inaction. They suggested that a global yaws eradication campaign could be established with a relatively modest investment (US\$ 26 for each year of life lived without disability or disfigurement) without waiting for “more roads to be built” (that is, for the end of poverty) and save the cost of many more years of life affected at the price of inaction (25). An NTD investment case for ending NTDs published in 2017 estimated that preventive chemotherapy brought an estimated net benefit to affected individuals of about US\$ 25 per US\$ 1 invested (20).

### **Interventions to prevent and control certain NTDs can be relatively inexpensive for countries.**

Thanks to the long-term engagement and support from pharmaceutical manufacturers, many medicines for the treatment of NTDs are donated to endemic countries and free of charge for patients (26). Many control measures rely on simple interventions that can be carried out by non-specialists, making community-based delivery possible. A cost-effectiveness study estimated the dracunculiasis eradication programme costs US\$ 11 per case averted during 1986–2030 (27). A literature review on the cost of mass treatment for lymphatic filariasis, onchocerciasis, soil-transmitted helminthiasis, schistosomiasis, trachoma and yaws found that financial cost per person would be less than 2015 US\$ 0.50 for a targeted population of 100 thousand or more (28).



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**Integration can further reduce the cost.** A modelling study on preventive chemotherapy targeting five NTDs in sub-Saharan Africa projected a saving of 26–47% of intervention cost thanks to integration (29). Another study on triple drug administration in Nigeria found 41% reduction of total programmatic cost for the mass drug administration thanks to the co-administration of ivermectin, albendazole and praziquantel (30). Integrating skin NTDs is another key recommendation of WHO to optimize the resource utilization. Although still very limited, the evidence on the cost saving impact of integrated skin NTDs surveillance and management has begun to be recorded in the field (31). If curative and preventive interventions identify and focus on the hot spots where several NTDs are co-endemic, more cost-efficient integrated interventions will be possible (Case study 1).

**NTD interventions can bring the health system to hard-to-reach populations.** Many NTD interventions are community based. In remote rural areas and urban slums where access to health facilities is difficult, NTD-related community-based health interventions often provide the first or only point of contact with health systems. Bringing NTD interventions to the targeted population, allows the health system to identify and extend its coverage to those who would be left out otherwise.

**NTD control, elimination and eradication are development best-buys.** NTDs affect predominantly regions and populations with the greatest needs for development. The link between tackling NTDs and development has been recognized through the SDGs. In 2016, NTDs were added into the SDG 3.3, in addition to HIV, tuberculosis and malaria, as epidemics to be ended by 2030. In addition, reducing the disease burden due to NTDs can also contribute to alleviating poverty (Goal 1) and hunger (Goal 2), promoting quality education (Goal 4), improving gender equity (Goal 5) and reducing inequality (Goal 10). By building human capital, it will ultimately contribute to economic growth (Goal 8).

*Maintaining the momentum for disease eradication and elimination is critical to protect hard-won gains and achieve SDG target 3.3 of ending the epidemic of NTDs by 2030.*

The 2010–2020 decade marked encouraging progress against NTDs (Fig. 1). This was achieved through strong, long-term support from Member States and the global NTD community. The establishment of public–private partnerships improved access to medicines and tests for populations in countries with low capacity to pay, stimulated development and research on new diagnostics and treatment, and supported the implementation of national NTDs strategies. Eleven pharmaceutical companies annually donate a total of nearly 3 billion tablets of safe, quality-assured medicines worth the equivalent of hundreds of millions of dollars (1).

Reaching elimination and eradication can release health resources for other diseases and health systems in a sustainable way. Elimination of NTDs is a precondition to stop population-based interventions; 13 of the 20 NTDs are targeted for eradication or elimination. The decade 2021–2030 will be critical to reach the SDG of ending the epidemic of NTDs by 2030. This requires protecting past success and accelerating the momentum in the fight against NTDs.

# Case study 1. Côte d'Ivoire – An integrated approach to the control and management of skin NTDs



**Key stakeholders:** Ministry of Health and Public Hygiene, Côte d'Ivoire; International Federation of Anti-Leprosy Associations; local health authorities.

## Overview

Côte d'Ivoire is endemic for three skin NTDs (Buruli ulcer, leprosy and yaws). In most health districts, screening, diagnosis and treatment is provided separately under the respective single-disease programmes. As the incidence of these skin NTDs has declined, so too has the efficiency and effectiveness of these programmes. The implementation of integrated programmes for all three diseases has been challenging primarily because single-disease control programmes have separate technical staff, budgets, strategic aims, management tools, and notification and reporting systems. A pilot programme aimed at integrating these functions across programmes in three co-endemic health districts was implemented by the Ministry of Health and Public Hygiene of Côte d'Ivoire in 2016–2017 with support from the project “Rational Approach to Effective Wound Care in West Africa”.

## Measurement for integrated skin NTD management

- Analysis of country-level data to identify areas co-endemic for Buruli ulcer, leprosy and yaws
- Training of nurses and community health workers to identify and treat all three skin NTDs
- Social mobilization and sensitization campaign for the three skin NTDs
- “One stop” mobile screening for Buruli ulcer, leprosy and yaws (as well as identification of non-NTD lesions).

## Outcomes and impact

- **The pilot programme reached 16 140 people with high-quality services.** Screening was performed according to WHO clinical criteria and cases were tested at the Pasteur Institute of Côte d'Ivoire.
- **Integrating social mobilization and sensitization initiatives improved community engagement and reduced stigmatization.** Community leaders and health workers were eager to participate in the integrated pilot programme as a more efficient use of resources and to achieve greater impact. Communications reached more members of the public and stigmatization surrounding skin NTDs was reduced, resulting in increased attendance rates at screening clinics.
- **Integrated and free-of-charge NTD clinics improved access to diagnosis and treatment.** This removed a key barrier to access for the individuals who participated.
- **Integrated clinic logistics increased efficiency.** Transport costs for mobile medical consultation were high due to the poor accessibility of each locality. Grouping the assessments of the three skin NTDs, as well as the identification of other dermatological lesions, made better use of each outreach missions and thus increased the total number of services delivered by the outreach programme.
- **Integrated training for nurses expanded their clinical skill sets.** The nurses, who led mobile medical consultations and were already experienced in the management of Buruli ulcer and leprosy, benefitted from training to diagnose and treat other skin conditions.

## 2.3 Road map vision

### ***Pursuing ambitious but achievable NTD targets for 2030.***

The road map presents the vision and agenda of the global NTD community and endemic countries for combating NTDs in the coming decade. It sets ambitious but achievable targets, which were endorsed at the Seventy-third World Health Assembly in November 2020. As part of the SDGs<sup>1</sup>, the international community has committed to accelerate work on tackling NTDs and their risk factors. Coverage of interventions against NTDs is a core indicator for the equity of health care coverage. The road map set concrete targets for these commitments, which were derived through a consultative process with all stakeholder constituencies.

By 2030, the road map envisions a world where 90% fewer people require interventions against NTDs, where NTD morbidity is reduced by 75% and where 100 countries have eliminated at least one NTD (Fig. 4). In addition to these overarching targets, the road map also sets disease-specific targets for each of the 20 diseases and disease groups (Annex 2).

Fig. 4. Overarching global road map targets for 2030



Source: NTD road map (1).



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The road map calls for concerted efforts by multilateral organizations, donors and national governments to achieve these targets. For financing, it asks the NTD community to secure national and international financial engagement to date and make new and strategic investments.

***Key terms highlighted in the road map to orient NTD investment include: accelerated actions, cross-cutting approaches, country ownership and sustainability.***

The following chapter gives more detail about the priority areas for more investment attention.

<sup>1</sup> Goal 3 (the health goal), Goal 2 (zero hunger), Goal 4 (quality education), Goal 6 (clean water and sanitation), Goal 11 (sustainable cities and communities) and Goal 17 (Global Partnership for Sustainable Development).





# Investment priorities



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## 3.1 “Best buys” and broader integration

### ***Secure continuous investment in proven NTD interventions and strategies with a high return on investment.***

To meet the resource needs for implementing the road map, the successes of the past decade should be maintained by investing in proven, cost-effective interventions while developing innovative technologies and strategic approaches in order to upgrade tools.

**Cost-effective NTD interventions exist.** Many NTD interventions are highly cost-effective. Preventive chemotherapy through MDA has consistently shown high cost-effectiveness, particularly when linked to medicine donation initiatives, which have played a key role in global efforts to tackle NTDs. For example, an economic evaluation conducted by World Bank on the Onchocerciasis Control Program in West Africa estimated a cost of US\$14–30 per DALY averted conditioned on donated medicine (32). A literature review of 93 health interventions found that many NTD interventions, such as the detection and treatment of leprosy, visceral leishmaniasis and human African trypanosomiasis, as well as preventive chemotherapy for trachoma, onchocerciasis, schistosomiasis and soil-transmitted helminthiasis cost less than US\$ 200 per averted DALY. The study suggested that these interventions could be considered for publicly-funded health care even in low-income countries (7).

During the strategic period 2012–2020, WHO and its partners published several studies making the case for investment in ending NTDs (19,20,33). The funding needs were based on the available data at the time of the study and mainly reflected the investment needs for implementing cost-effective interventions. The treatment costs, excluding medicines, averaged US\$ 750 million per year for 2015–2020 and US\$ 300 million per year for 2020–2030. The substantial decrease in funding needs after 2020 was based on the assumption that most of the 2020 milestones would have been achieved. However, according to the NTD data up to 2020, it is clear that many of the 2020 milestones have yet to be achieved and thus continuous commitment is needed to finish the work before entering into the scale-down phase.

**Broad integration can further reduce costs and create synergies.** Disease-specific investments will continue to be crucial in addressing the gaps that hinder progress towards the 2030 targets. However, integrating similar interventions across NTD programmes and, in some cases, with other health interventions, has the potential to improve the efficiency and effectiveness of existing programmes as well as furthering their equity and sustainability.

**Many NTDs could be treated or prevented with similar interventions, providing opportunities to integrate or package interventions.** The past two decades demonstrated the benefit of reaching larger populations and achieving cost-savings by integrated MDA campaigns for two or more diseases simultaneously (26, 34–36). The Sierra Leone country case illustrates the benefits of integrated MDA in a resource-restricted setting (Case study 2). Opportunities for integrated control and management of skin-related NTDs have attracted increasing attention in the design of strategies to combat NTDs (37,38). Many field studies support its feasibility and programme benefit (39–41). However, a dedicated health economic evaluation on such integration is still needed to quantify its benefit on cost.

## Case study 2. Sierra Leon – Integrated, coordinated MDA and community sensitization campaigns



**Key stakeholders:** Ministry of Health and Sanitation, Sierra Leone; community drug distributors; health care workers; nongovernmental organizations.

### Overview

Sierra Leone emerged from a civil war in 2002. The country faced a shortage of health workers and limited health infrastructure, which hindered its ability to tackle NTDs effectively. To optimize use of limited resources, in 2006 the Ministry of Health and Sanitation, in consultation with WHO and with support from Sightsavers and Helen Keller International, integrated the management of four NTDs (soil-transmitted helminthiases, onchocerciasis, lymphatic filariasis and schistosomiasis) into a single “Neglected Tropical Disease Programme”. The United States Agency for International Development and the African Programme for Onchocerciasis Control were the main funding partners.

### Integrated interventions

- Comprehensive national mapping of all major NTDs.
- Lymphatic filariasis and onchocerciasis integrated MDA campaign (in 2008) and deworming programmes for soil-transmitted helminthiases and schistosomiasis (in 2009).
- Training on both treatment delivery and programme monitoring across all targeted NTDs.
- Integrated sensitization activities for the targeted NTDs.
- Regional coordination, through stakeholder meetings, to harmonize control strategies and synchronize MDA activities in border areas.

### Outcomes and impact

- **Reduction of prevalence of the four targeted NTDs.** The prevalence of the four targeted NTDs decreased following the MDA and deworming campaigns:
  - onchocerciasis by more than 60% (2007–2009) (42);
  - lymphatic filariasis by almost 90% (2007–2011), with the number of endemic districts falling from all 14 in 2007 to just one in 2011 (43);
  - schistosomiasis by more than 66% (2009–2012) (44); and
  - soil-transmitted helminthiases achieved a new low of 20% prevalence in school-aged children in 2014.
- **More efficient sensitization efforts.** Multiple independent sensitization activities were no longer needed as messages about multiple NTDs were delivered together, reducing the cost of sensitization activities, as well as health promotion fatigue in local communities (45).
- **“Spill-over” effects on health system strengthening.** This includes more skilled health workforce, more accurate data thanks to the censuses conducted before MDA campaign, better knowledge about the importance of hand washing and maintaining good hygiene practices.



In addition to more integrated service delivery across NTDs, **broader integration with other relevant diseases programmes can also create synergy.** There is a close link between the incidence of NTDs and that of HIV/AIDS, tuberculosis and malaria. All diseases disproportionately affect impoverished populations, all overlap geographically and all carry a risk of coinfection (46). They leverage similar community-based service delivery platform to extend health services to the most difficult-to-reach areas and populations. The onchocerciasis, lymphatic filariasis and malaria communities, for instance, share common interests in vector control and MDA. Ivermectin MDA, which traditionally addressed NTDs, was found also to be effective in reducing malaria vectors (47). The scale-up of distribution of insecticide-treated nets or regular application of indoor residual spraying by the malaria programme will also benefit interruption of transmission for several vector-borne NTDs. Many other opportunities for integration of malaria and NTD interventions exist and merit discussion on cross-programme investment (48). This includes the recent invasion of *Anopheles stephensi* (an urban vector of malaria present in the South-East Asian Region) in the Horn of Africa, affecting countries such as Djibouti, Ethiopia, Somalia and Sudan, which provides an opportunity to work across other well-established urban dengue vectors such as *Aedes aegypti* and to harmonize vector surveillance, control and community outreach. Such efforts will not only be cost-effective but also significantly enhance the health of the urban population exposed to all these vector-borne diseases (49).

Another example of cross-programme collaboration is with Gavi, the Vaccine Alliance. The Gavi Board approved support for human rabies vaccine for post-exposure prophylaxis in its 2021–2025 investment strategy (50). This funding opportunity will not only bolster actions to end human deaths from dog-mediated rabies by 2030 but also encourage countries to improve the capacity of rabies programmes through training, data collection and supply chain strengthening.

*Opportunities for integration exist across disease programmes but also through the connection with health systems.*

It is now widely accepted that health care should be centred around people's health needs rather than disease programmes' specific objectives. Integration provides opportunities to build common platforms across diseases which share the same target population. Examples of such opportunities include health promotion and social mobilization, the diagnosis and treatment of conditions with similar clinical presentations, and integrated surveillance including active and passive case-finding. The case study for Bangladesh provides an example of how skin NTD interventions can be integrated (Case study 3).

## Case study 3. Bangladesh – Integrating WASH and NTD interventions to support control and possible elimination of soil-transmitted helminthiases



**Key stakeholders:** Ministry of Health of Bangladesh; Directorate of Primary Education of Bangladesh; Children Without Worms; Save the Children.

consumables (chlorine tablets, soapy water solution, nutrient supplements), strengthening of sanitation infrastructure and promotion of adherence to improved WASH and nutrition behaviours.

### Overview

Bangladesh has faced high prevalence of soil-transmitted helminthiases. Surveys in 2005 found a 79.8% prevalence of worm infections, with nearly 20 million Bangladeshi children at risk of infection (51). MDA programmes in schools succeeded in reducing prevalence, but poor sanitation and hygiene have left the population at risk of reinfection. Recognizing this risk, two programmes, among others, sought to use WASH interventions to strengthen efforts to control soil-transmitted helminthiases in Bangladesh. One was led by Save the Children and another was part of an academic study.

### Cross-cutting approaches

**Combined WASH and disease control efforts for school-aged children in Nasirnagar.** Between 2002 and 2008, Save the Children implemented a School Health and Nutrition programme targeting soil-transmitted helminthiases. The programme used the existing education infrastructure to deliver basic health and nutrition services, provide health promotion/education, improve the water and sanitation situation in schools and communities and build capacity to support and sustain these activities.

**WASH interventions targeting pregnant women in areas with ongoing MDA.** Researchers conducted a randomized controlled trial in the Gazipur, Kishoreganj, Mymensingh and Tangail districts of central rural Bangladesh to assess the potential of WASH interventions in reducing soil-transmitted helminthiases in a setting with ongoing MDA. Researchers allocated pregnant women into groups who either received with WASH-based interventions alongside MDA or MDA exclusively. Interventions included supply of

### Outcomes and impacts

- **Integrating WASH led to a reduction in the prevalence of soil-transmitted helminthiases in both programmes.** Save the Children found that integrating WASH and disease control activities resulted in a significant decrease in worm loads (52). In the randomized control trial, combining WASH interventions with ongoing MDA led to a modest but sustained reduction in the prevalence of hookworm infection in comparison with provision of MDA exclusively (53).
- **An integrated approach enabled cost saving.** The Save the Children programme delivered MDA through the same mechanism as WASH activities. Health workers conducted deworming during visits where they also promoted safe handwashing and hygiene practices. Adding MDA to WASH programmes incurs a marginal cost. As such, while not directly tracked by the programme, it is likely that combined delivery of these interventions reduced the total cost for the two programmes.
- Small-scale pilot projects demonstrating the potential of integration have led to **an inclusion of WASH interventions in Bangladesh's strategy to control and eliminate soil-transmitted helminthiases.** The Ministry of Health's new strategy is now targeting elimination of soil-transmitted helminthiases, with a clear recognition of the benefits of including WASH as part of that elimination programme. Bangladesh plans to explicitly integrate, for the first time, the delivery of health promotion efforts into the larger soil-transmitted helminthiases control programme while pursuing greater integration with other government departments to improve access to safe water and sanitation.



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### **Promising innovations can accelerate progress in the control, elimination and eradication of NTDs.**

Innovative approaches to NTD screening, diagnosis, treatment and surveillance promise to further improve the efficiency and effectiveness of NTD interventions. In addition to existing “best buy” interventions, scaling up recent or future innovations across the 20 diseases and disease groups will be crucial to reaching the road map targets cost-effectively.

Although for some NTDs cost-effective interventions exist, for other NTDs gaps remain in the availability, accessibility and affordability of diagnostic and treatment tools. The R&D in the field of NTDs can bring relatively less commercial interest as they are targeting the populations that have the least capacity to pay. The 2021 G-Finder report (54) found that funding for the NTDs covered by the G-FINDER survey totalled US\$ 328 million, or 8% of total R&D funding on neglected diseases, a decrease of US\$ 21 million (–6.3%), marking four years of decline from its 2016 peak and continuing a decade of relative stagnation.

Recognizing that the availability of the intervention tools will be the precondition to combat NTDs, WHO launched the development of a series of NTD target product profiles (TPPs) to set R&D targets for funders and developers.

***As of 1 June 2022, 14 TPPs have been published and one is in the final stage of production (55). This will be a key area that additional funding can create high leverage effect.***

In addition to more effective tools, the technology innovation can also improve the efficiency of programme implementation. Digital tracking of preventive chemotherapy programmes, for instance, will improve country's ability to monitor and improve the coverage of interventions (56). Artificial intelligence guided diagnosis also showed benefit in the expansion of diagnostics for NTDs (57–59). Aerial imagery technology is used to guide targeted vector control (60). Digital information, education and communication showed higher impact on health promotion and behavioural change than traditional channels (61). **Given the limited resources available for NTD interventions, invest in the innovations that improve programme efficiencies could be an alternative way to optimize outcome.**

Fig. 5. Road map gap assessment by programme dimension

### 3.2 Gaps in specific programme dimensions

#### *Invest in reducing gaps in specific programme dimensions to foster sustainable NTD programmes.*

Experience has demonstrated the success of focusing on the cost-effective interventions (such as preventive chemotherapy and health education) and strategies (such as promoting integrated service delivery platforms). The new decade will build on this success, but also call for more attention to addressing the health system weaknesses which hamper an optimal transformation from investment to impact.

To identify those health system weaknesses that affect the programme performance for all 20 NTDs, the road map, through a broad global consultation, conducted a gap assessment to identify the key bottlenecks by disease and by programme dimensions. Programme dimensions, in the road map, refer to the areas in the health system that all NTD programmes can be assessed against and identify needed action. In total, 11 programme dimension gaps were assessed across the 20 NTDs (Fig. 5). Although each disease has its own challenges which need to be addressed individually, there are also gaps found in certain programme dimensions that affect a large number of NTDs.

Investing in filling gaps in specific programme dimensions could substantially increase the overall programme performance for many reasons.

**First**, progress in some programme dimensions will be decisive to enable the advancement of the whole strategy. This is typically the case for diagnostics. Effective diagnostics are a prerequisite for reaching the 2030 disease targets. Positioning surveillance, prevention, and treatment, effective, standardized, affordable diagnostics at the starting point of health intervention process for NTDs will be a critical trigger for all follow-up actions. Without such tools, the remaining actions will not deliver their full impact.

<b>Technical</b>	<b>Scientific understanding</b>
	<b>Diagnostics</b>
	<b>Effective interventions</b>
<b>Strategy and service delivery</b>	<b>Operational and normative guidance</b>
	<b>Planning, governance and programme management</b>
	<b>Monitoring and evaluation</b>
	<b>Access and logistics</b>
	<b>Health care infrastructure and workforce</b>
<b>Enablers</b>	<b>Advocacy and funding</b>
	<b>Collaboration and multisectoral action</b>
	<b>Capacity and awareness building</b>

Source: NTD road map (1).





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**Secondly**, certain programme dimensions are the foundations of the whole system for tackling NTDs. It is neither efficient nor desirable to address them through individual disease programme. Monitoring and evaluation, for instance, are essential to track progress and make decisions on integrated planning of all NTD programmes. However, good performance relies on a monitoring and evaluation system which cannot be built by siloed disease programmes for the following reasons:

- (i) Monitoring and evaluation require specific skills, such as data management and analysis, which could be shared across disease programmes. Building a common monitoring and evaluation mechanism for disease programmes that require similar information can bring economies of scope.
- (ii) Effective monitoring and evaluation needs to take a system perspective rather than siloed approach. Without understanding the health system context, any disease-specific modelling will be biased in estimating inputs and projecting outcomes. Integrated monitoring and evaluation mechanisms allow disease programmes to go beyond their own scope and get a bird's eye view of their position in the health system.
- (iii) The demand for monitoring and evaluation arises from a culture of evidence-based decision-making. This is not specific to any disease programme but lies in the health system foundation. The best way to invest in monitoring and evaluation is therefore to create conditions for mainstreaming disease-specific data collection into national health system monitoring and evaluation and actively participate in the strengthening of the latter.

**Thirdly**, in certain programme dimensions, resources are allocated by function rather than by disease. A good example of such programme dimension is access and logistics. The supply chain management deploys many resources that are to be shared, including human resources, storage space and transportation. Planning and allocating those shared resources from a specific disease programme perspective without understanding other competing resource requirements could cause bottlenecks and reduce the system's general performance. In addition, if the same location or population is targeted for several disease interventions, integrated supply chain management will save costs and reduce wastage. By investing in augmenting the capacity, quality and efficiency of a common supply chain platform, it will benefit all covered disease programmes in a more sustainable way.

**Fourthly**, certain gaps across diseases could have common root causes. Addressing those common root causes as a group will be more efficient and effective than developing siloed disease-specific solutions. Funding gaps, for instance, are identified as a challenge for all NTDs in the road map. One of their root causes is the low visibility of NTD programmes on the national health agenda. Compared with many high-profile diseases, such as HIV, tuberculosis or malaria, any single NTD will not stand out in terms of disease burden measured by DALYs. However, most NTDs share the commonality of being closely linked with poverty. An integrated advocacy campaign for all endemic NTDs could emphasize their disastrous impact on the most fragile populations and draw higher political and financial attention.

**Finally**, WHO recommends that countries manage NTD programmes in a more integrated way by developing multi-year NTD plans. This integrated management could facilitate the involvement of NTD programmes into national planning and mark their political importance as a group. The Honduras case study illustrates the benefit of integrated NTD programme planning and management (Case study 4). Mainstreaming efforts will be guided and supported by the WHO Sustainability Framework for Action, which will provide a participatory and inclusive methodology for embedding NTD services within national health policies, strategies and plans (62).





# Case study 4. Honduras – A strategic plan for the prevention, care, control and elimination of infectious diseases



**Key stakeholders:** Ministry of Health, Honduras; Pan-American Health Organization (PAHO); WHO; United States Agency for International Development (USAID).

## Overview

The Government of Honduras was the first in the Latin America and Caribbean Region to adopt and implement a Strategic Plan for the Prevention, Care, Control and Elimination of Neglected Infectious Diseases (63). This integrated plan, called PEEDH (“Strategic plan for the prevention, care, control and elimination of neglected infectious diseases in Honduras” [acronym in Spanish]), was developed for the period 2012–17. It targeted six NTDs endemic in the country: Chagas disease, leishmaniasis, leprosy, human rabies transmitted by dogs, soil-transmitted helminthiases, and taeniasis and cysticercosis. PEEDH replaced fragmented and siloed vertical programmes that operated in individual regions and municipalities.

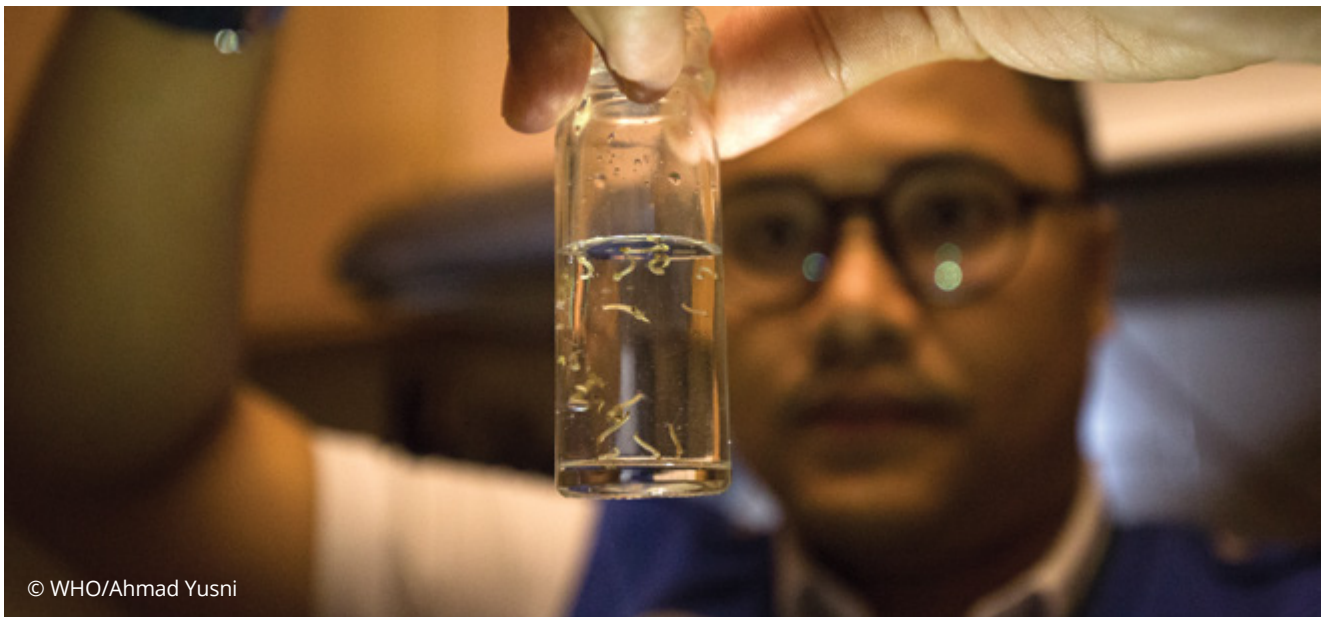
## Integrated programme planning

- **Broad involvement of key stakeholders.** The Ministry of Health engaged key stakeholders from NTD programmes to identify opportunities for collaboration, integration and joint programme management. It also secured commitment from national authorities and disease programme directors to finance medicines, insecticides, laboratory reagents and technical advice. Schools and other educational facilities invited key partners to join forces in delivering NTD interventions, such as deworming campaigns (64). Community leaders, nongovernmental organizations, teachers and religious leaders and others played a key role in embedding disease programming into community activities.
- **Resource-based planning.** A situation analysis using a tool for integrated planning and costing (TIPAC) was conducted to characterize the capacity of national, regional and local teams and to identify common gaps across NTD programmes. These findings were then used to quantify the support needed from the integrated disease programme, as well as the local health system, to ensure adequate coverage for all targeted NTDs.
- **Investments in improving health information.** The epidemiological and laboratory surveillance system at the municipal level was strengthened to enable the health system to design and apply integrated interventions to targeted NTDs. Health management and information systems were strengthened to improve the availability of reliable, timely and dynamic health information and enable effective decision-making.
- **Integrated health promotion.** Health promotion was a core component of the PEEDH strategy. Education, information and communication materials regarding the transmission, prevention and control of NTDs were developed and disseminated in collaboration with regional and municipal partners. It was important that materials for schools and communities were designed to be simple, understandable and tailored to the needs of ethnic groups. This remains a particular challenge in the context of Honduras’ high adult illiteracy rates: 14.9% of the population over 15 years of age cannot read or write (65). This challenge was addressed through radio campaigns with educational messages. Health messaging was continually reinforced through an education campaign by health personnel and teachers.

## Outcomes and impact

- **Accelerated progress towards elimination goals.** Better results were achieved for Chagas diseases, leprosy, congenital syphilis, neonatal tetanus and human rabies transmitted by dogs. Less promising but positive results were achieved for soil-transmitted helminthiases, leptospirosis, leishmaniasis and taeniasis.
- **An integrated approach brought NTD interventions into more remote regions.** Integrated services were brought to hard-to-reach populations at less cost than a vertical approach. This also reduces the burden and intervention fatigue that could be created by parallel interventions across multiple NTD programmes.
- **Higher country ownership on Honduras' NTD strategy.** Honduras' NTD strategy mobilized capital and human resources for its activities using governmental budgets and across the country's health, education and social sectors. This strategy has a greater probability of being able to continue to serve remote and disadvantaged communities at risk of NTDs as it does not heavily rely on external direction.
- **Investments in the NTD strategy created "spill-over" effects.** By improving access to the remote regions in which NTDs are endemic and engaging with these communities and populations, the strategy serves as an entry point for the broader health system through which other services and strategies (such as, for example, nutritional health or sanitation and hygiene interventions) can be introduced.





### 3.3 Cross-sectoral collaboration

#### ***Adopt a more thorough approach to disease control.***

Poor health due to NTDs results not only from insufficient access to preventive and curative healthcare but also reflects the need for accelerated action beyond the health sector. Infection and transmission of some NTDs are closely linked with water and sanitation, housing and clustering, environment and climate change, migration, education, as well as other sociocultural factors (17, 53, 66–68). This means that NTDs cannot be addressed in silos but should be part of an integrated strategy to improve the well-being for all at all ages.

Promoting interventions in other priority areas, such as animal health and WASH, have a high return on investment. A 2014 systematic review and meta-analysis found that providing improved hygiene and sanitation practices and safe water and sanitation facilities in areas endemic for soil-transmitted helminthiases resulted in an odds reduction of 33–70% of the chance of acquiring soil-transmitted helminth infections (69). One Health approaches, which bring together health, agricultural and veterinary stakeholders in intervention and policy design, are required to manage public health risks at the human–animal–environment interface. For example, vaccination of dogs against dog-mediated rabies is a tried and tested intervention. An estimated 90% of human rabies exposures are linked to rabid dogs; it is estimated that vaccination campaigns are highly cost-effective or even cost-saving at scale (70). Mass vaccination has achieved local elimination of rabies in some geographies (71).

Although theoretically appealing, implementation of this cross-sectoral collaboration is complex and requires both political and financial engagement. Currently, and pushed by the lessons learnt from the COVID-19 pandemic, there is renewed momentum for One Health approaches to overcoming diseases risks that occur at the human-animal interface. The Tripartite Plus Alliance (the Food and Agriculture Organization of the United Nations, the World Organization for Animal Health, the United Nations Environment Programme and WHO) has created a multidisciplinary One Health High Level Expert Panel responsible for advising the four organizations and their Member States on One Health related issues (9).

Financially, however, the question of how to effectively and jointly finance cross-sectoral collaboration to build sustainable protection against NTDs remains to be answered. There is urgent need to collect successful experiences in the field, especially financial arrangements, on how to implement cross-sectoral actions and finance tackling NTDs as part of an integrated strategy to reduce poverty. Capturing the global political momentum on enforcing One Health, international health partners and donors need also to reach out to actors in sectors other than health to jointly create and test innovative and alternative financing approaches to support tangible cross-sectoral collaboration globally and nationally.

## A call to action

# Increase domestic and international funding to accelerate progress and support greater integration and investment in shared gaps.

*The global community needs to act now to safeguard the progress made against individual NTDs in the last decade. A renewed momentum is also needed to meet the 2030 targets.*



*Governments and funders should better coordinate to foster country ownership of their NTD programmes, and also consider greater use of alternative financing approaches*



*An increase in investment in NTDs is needed from Governments, International funders and pharmaceutical actors*



*Academia and research institutions should pay more attention to the gaps in health economic studies*



*Governments should champion integrated approaches, especially through primary health care.*



*WHO commits to working with global partners to support countries*



## 4.1 Act now

**The global community needs to act now to safeguard the progress made against individual NTDs in the last decade.** In 2020, the COVID-19 pandemic forced NTD interventions to slow down. According to a WHO global survey of health activities, NTD services were among those most frequently and most severely disrupted by the pandemic (3). NTD modelling studies predict that, without mitigation measures, there will be delays in reaching road map 2030 goals for certain diseases (4). The COVID-19 situation provides a real world experiment on the impact of interrupting NTD interventions before reaching the goals - premature scale down of NTD interventions can halt progress to disease targets.

It is crucial that the progress that has been made during the past decade is secured. Preventive chemotherapy was reaching more than 1 billion people a year until 2019 (but dropped by one third in 2020), reducing their risk of death, painful disability, social stigmatization, and devastating economic costs. Today, 46 countries, territories and areas have eliminated at least one NTD. However, investments need to be made now in post-intervention programming to reduce the risk of reinfection, detect early cases, and avoid a resurgence that reverses past gains.

**Renewed momentum is also needed to meet the 2030 targets.** Interventions against NTDs are health best-buys, offering excellent returns on investment by reducing mortality and morbidity. They are also development best buys: a crucial tool for tackling poverty and addressing economic disparities. Yet they do not reach everyone today. Coordinated action with WASH, One Health and other sectors is needed to ensure low-cost interventions in those sectors that have the greatest impact on NTDs. Greater investment is needed to bring affordable new medicines, diagnostics, and devices to market, to ensure that countries have access to the tools they need to fight the 20 diseases and disease groups.

A shift is needed towards greater integration and investment in the shared gaps that stall progress by countries in expanding and mainstreaming interventions against NTDs. There are compelling examples from countries and regions across the world that have taken concerted action to integrate programming targeting NTDs. They have demonstrated the improved return on investment that is realized through greater integration across NTDs, but also with other disease programmes. Investing in reducing the gaps in specific programme dimensions will facilitate the mainstreaming of NTDs into national health system and enable stronger country

ownership of NTD programmes. Reducing shared gaps is also a key element in realizing universal health coverage, not least because the communities targeted are often the most remote and vulnerable communities.

## 4.2 Act together

**Governments should increase their investment in NTDs, and champion integrated approaches, especially through primary health care.** The third NTD global report estimated that the funding needs to support treatment and vector control in NTD endemic countries would represent less than 0.1% of their domestic health spending (19). In addition to maintaining this investment, incremental funding will be needed to implement the cross-cutting approaches and address shared gaps.

The organization and financing of NTD interventions should be integral to PHC. PHC relies on four delivery platforms: (i) community-based care; (ii) health centres; (iii) first-level hospitals; and (iv) population-based public health interventions (72). These platforms are also the service delivery channels for most NTD interventions. Strengthening all primary health care platforms will consequently strengthen NTD service delivery, and conversely investing in the existing NTD service delivery platforms will contribute to strengthening primary health care.

In 2019, WHO informed the United Nations General Assembly that countries needed to increase spending on primary health care by at least 1% of their GDP, to close coverage gaps and meet health targets agreed in the SDGs (10). This global call, if supported by countries' commitment, will bring additional funding for primary health care. The governments should take this opportunity to mainstreaming interventions against NTDs into the essential package of primary health care priorities. In the context of the COVID-19 pandemic, which has created unprecedented demands on national health financing, it is crucial that the world's poorest and most disadvantaged populations are not disproportionately impacted. Prioritizing actions to address NTDs within primary health care funding is the most realistic plan to optimize available resources and ensure that no one is left behind.



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### **International funders and pharmaceutical actors need to sustain and increase current investments**

in NTD programmes to enable the delivery of the road map targets, including through targeted investments to support NTD service delivery and through health systems strengthening activities. Currently, international funding for NTDs is mainly focussed on increasing the quality and quantity of specific interventions against some NTDs. However, the road map highlights the importance of addressing all of the NTDs and tackling the shared gaps to unlock progress towards its targets.

### **Governments and funders should better coordinate to foster country ownership of their NTD programmes, and also consider greater use of alternative financing approaches**

to provide additional funding of the road map's targets. The road map calls for a shift in focus from measuring processes and activities to greater emphasis on measuring outcomes and impact in NTD programming. This shift could be a potential starting point for the design and testing of mechanisms that create financial incentives to achieve (and measure) that impact. Specifically, where there are concrete measurable targets on intervention coverage, disease burden reduction and local elimination, it may be possible to create financial rewards for meeting those goals. Performance-based financing or pay-for-performance funding models (which link part of the payment to verified results) as well as impact bonds (in which funders pay only when an intervention has proven successful) could help to align incentives for governments, funders, and implementers around key targets. These tools have historically been underused in the NTD setting (73), but as many of the diseases enter new phases of control, elimination and eradication, governments and funders could consider the settings in which performance-based financing and other alternative financing approaches could be implemented efficiently and effectively.

### **Academia and research institutions should pay more attention to the gaps in health economic studies**

addressing NTD intervention and programme management. The current literature on economic evaluation for NTD programmes is relatively slim and often focused on a sub-group of NTDs and a small list of interventions. This is one of the reasons why a global comprehensive estimation on the cost of implementing the road map is challenging. In the past, the investment case took a conservative approach to estimate the needs based on the available data. However, if the missing pieces are not addressed, the most neglected NTDs will risk being further left out (see Annex 3 for further discussion on health economic R&D needs for NTDs).

### **WHO commits to working with global partners to support countries**

as they identify and prioritize investments in NTDs and test and scale up innovative integrated approaches and alternative financing approaches. "Strengthening country ownership and financing with NTDs integrated in national health plans and budgets" is one of the three key shifts encouraged in the road map. WHO will support countries to realize this shift by providing practical guidance and tools, offering in-country technical support, and facilitating sharing of experience with peer countries. Meanwhile, WHO calls on partners to support countries during the transition of ownership and financing for NTDs by contributing to health system strengthening to help create the conditions in which greater integration and investment in shared gaps by countries becomes possible, and also by supporting innovative financing and service delivery to improve programme efficiency. Coordinated action is needed to support the implementation of integrated approaches, and the evaluation of the outcomes of these efforts to build the evidence base for further intervention.

Only with this global action and investment will it be possible to meet the targets of the road map and to reduce the unacceptable health and economic burden of NTDs on the world's most vulnerable populations.

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# Mortality and DALYs data for NTDs, 2019

Disease	Deaths	Men	Women	DALYs	Men	Women
Dracunculiasis	–	–	–	N/A	N/A	N/A
Yaws	–	–	–	N/A	N/A	N/A
Human African trypanosomiasis	1 616	785	831	102 099	49 967	52 133
Leprosy	253	185	67	36 437	24 404	12 033
Onchocerciasis	0	0	0	1 209 720	649 273	560 447
Rabies	46 989	24 063	22 926	2 634 780	1 426 233	1 208 547
Schistosomiasis	11 792	6 612	5 180	1 627 844	800 993	826 851
Soil-transmitted helminthiasis	2 151	1 145	1 006	1 943 014	834 411	1 108 603
Trachoma	1	1	–	194 391	92 068	102 323
Lymphatic filariasis	3	–	–	1 616 133	1 315 324	300 808
Chagas disease	7 558	4 097	3 461	217 113	125 148	91 966
Buruli ulcer	–	–	–	N/A	N/A	N/A
Dengue and chikungunya <sup>a</sup>	30 020	15 936	14 084	1 952 369	1 041 637	910 732
Taeniasis and cysticercosis <sup>b</sup>	7 408	2 804	4 604	987 809	415 898	571 911
Echinococcosis	9 263	3 714	5 550	460 923	196 010	264 913
Foodborne trematodiasis	0	0	0	805 406	518 591	286 815
Leishmaniasis	5 780	3 909	1 871	722 278	416 796	305 481
Snakebite envenoming	81 000– 138 000	N/A	N/A	N/A	N/A	N/A
Scabies and other ectoparasitoses	N/A	N/A	N/A	N/A	N/A	N/A
Mycetoma, chromoblastomycosis and other deep mycoses	–	–	–	N/A	N/A	N/A

N/A: not available. <sup>a</sup> Data presented only for dengue. <sup>b</sup> Data presented only for cysticercosis.

Source: Cells shaded white from: Global Health Estimates: life expectancy and leading causes of death and disability for 2019. In: WHO Global Health Observatory [website]. Geneva: World Health Organization ([https://www.who.int/healthinfo/global\\_burden\\_disease/estimates/en/index1.html](https://www.who.int/healthinfo/global_burden_disease/estimates/en/index1.html), accessed 23 June 2022). Cells shaded green sourced from WHO fact sheets).

# Disease-specific road map targets and milestones

Disease	Indicator	2023	2025	2030
<b>Targeted for eradication</b>				
Dracunculiasis	Number of countries certified free of transmission	189 (97%)	191 (98%)	194 (100%)
Yaws	Number of countries certified free of transmission	97 (50%)	136 (70%)	194 (100%)
<b>Targeted for elimination (interruption of transmission)</b>				
Human African trypanosomiasis (gambiense)	Number of countries verified for interruption of transmission	0	5 (21%)	15 (62%)
Leprosy	Number of countries with zero new autochthonous leprosy cases	75 (39%)	95 (49%)	120 (62%)
Onchocerciasis	Number of countries verified for interruption of transmission	5 (13%)	8 (21%)	12 (31%)
<b>Targeted for elimination as a public health problem</b>				
Chagas disease	Number of countries achieving interruption of transmission through the four transmission routes (vectoral, transfusion, transplantation and congenital), with 75% antiparasitic treatment coverage of the target population	4 (10%)	10 (24%)	15 (37%)
Human African trypanosomiasis (rhodesiense)	Number of countries validated for elimination as a public health problem (defined as	2 (15%)	4 (31%)	8 (61%)
Leishmaniasis (visceral)	< 1 case/10 000 people/year, in each health district of the country averaged over the previous five-year period)	32 (43%)	56 (75%)	64 (85%)
Lymphatic filariasis	Number of countries validated for elimination as a public health problem (defined as < 1% case-fatality rate due to primary visceral leishmaniasis)	23 (32%)	34 (47%)	58 (81%)
Rabies	Number of countries having achieved zero human deaths from rabies	89 (53%)	113 (67%)	155 (92%)
Schistosomiasis	Number of countries validated for elimination as a public health problem (currently defined as <1% proportion of heavy intensity schistosomiasis infections)	49 (63%)	69 (88%)	78 (100%)

Disease	Indicator	2023	2025	2030
<b>Targeted for elimination as a public health problem cont'd</b>				
Soil-transmitted helminthiasis	Number of countries validated for elimination as a public health problem (defined as < 2% proportion of soil-transmitted helminth infections of moderate and heavy intensity due to <i>Ascaris lumbricoides</i> , <i>Trichuris trichuria</i> , <i>Necator americanus</i> and <i>Ancylostoma duodenale</i> )	60 (60%)	70 (70%)	96 (96%)
Trachoma	Number of countries validated for elimination as a public health problem (defined as (i) a prevalence of trachomatous trichiasis “unknown to the health system” of <0.2% in > 15-year-olds in each formerly endemic district; (ii) a prevalence of trachomatous inflammation-follicular in children aged 1-9 years and <5% in each formerly endemic district; and (iii) written evidence that the health system is able to identify and manage incident cases of trachomatous trichiasis, using defined strategies, with evidence of appropriate financial resources to implement those strategies)	28 (42%)	43 (65%)	66 (100%)
<b>Targeted for control</b>				
Buruli ulcer	Proportion of cases in category III (late stage) at diagnosis	< 22%	< 18%	< 10%
Dengue	Case-fatality rate due to dengue	0.50%	0.50%	0%
Echinococcosis	Number of countries with intensified control for cystic echinococcosis in hyperendemic areas	4	9	17
Foodborne trematodiasis	Number of countries with intensified control in hyperendemic areas	3 (3%)	6 (7%)	11 (12%)
Leishmaniasis (cutaneous)	Number of countries in which: 85% of all cases are detected and reported and 95% of reported cases are treated	44 (51%)	66 (76%)	87 (100%)
Mycetoma, chromoblastomycosis and other deep mycoses	Number of countries in which mycetoma, chromoblastomycosis, sporotrichosis and/or paracoccidioidomycosis are included in national control programmes and surveillance systems	4 (13%)	8 (27%)	15 (50%)
Scabies and other ectoparasitoses	Number of countries having incorporated scabies management in the universal health coverage package of care	25 (13%)	50 (26%)	194 (100%)
Snakebite envenoming	Number of countries with incidence of snakebite envenoming achieving reduction of mortality by 50%	39 (30%)	61 (46%)	132 (100%)
Taeniasis/cysticercosis	Number of countries with intensified control in hyperendemic areas	4 (6%)	9 (14%)	17 (27%)

N/A: not applicable.

**Note:** In certain cases, reference to “countries” should be understood as signifying countries, territories and areas.

Source: 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 24 May 2022).

# Health economic R&D for NTDs: more comprehensive economic evidence to draw the full picture

This annex tries to map the gaps in NTD-related health economic R&D and proposes areas that would benefit from greater attention and investment to improve our economic knowledge and data.

## **A1. Economic evidence must cover more NTDs and more interventions.**

WHO recommends five core strategic interventions for the control, elimination and eradication of NTDs: (i) preventive chemotherapy by mass drug administration; (ii) innovative and intensified disease management; (iii) vector ecology and management; (iv) veterinary public health services; and (v) provision of safe water, sanitation and hygiene (also called WASH) (1). Of these, preventive chemotherapy through mass drug administration has drawn most economic research interest. To extend the investment to all NTDs, it is urgent to collect the economic evidence about NTD interventions beyond preventive chemotherapy to support investment decisions.

Vector control, One Health and WASH are interventions beyond health service provision. Although there is consensus from the global community about the crucial role of such cross-sectoral collaboration in improving the effectiveness and sustainability of NTD interventions, measurement of both their health outcomes and their implementation costs is very rare. There is a pressing need to collect more empirical evidence on the benefit and cost of such cross-sectoral collaborations in order to develop common financing plans and coordinate advocacy efforts across sectors.

## **A2. To identify the financing gap, it is essential to understand the current financing landscape.**

At country level, supporting WHO to improve the data on NTD expenditure in WHO's Global Health Expenditure database will provide long-term benefits for NTD financing. It will provide a historical record of the evolution of NTD expenditure, allow for cross-country and cross-programme comparison, and will also strengthen the existing data platform rather than duplicating reporting channels, mainstreaming NTDs into national health system resource tracking.

At the global level, understanding the current financing situation is crucial to identifying gaps and developing a more targeted fundraising strategy. Tracking international aid has been somewhat easier for disease programmes where there is a mechanism for the pooling of international funding, such as the Global Fund to Fight AIDS, Tuberculosis and Malaria and Gavi, the Vaccine Alliance. For the NTD community, it will be worthwhile to reflect on building a financial information sharing mechanism, without necessarily pooling funds, which will allow the entire community to understand the financing situation, as well as associated challenges, and to develop concerted efforts on resource mobilization.

### **A3. More tools are needed to measure the benefit and cost of NTD interventions.**

Ensuring that appropriate tools and methodologies are used to assess the value for money of different investment options is critical. One key measurement technique is the assessment of the cost-effectiveness/cost-benefit of each intervention. WHO is working with the United Nations Development Programme, the Global Health Innovative Technology Fund, and the Government of Japan to fill this gap by proposing a country toolkit for national NTD investment cases, which will combine the health impact of NTD interventions, programme costs and the cost-effectiveness ratio to support countries as they develop tailored and coherent arguments in favour of NTD investment.

### **A4. New evidence is needed to mobilize resources around the three pillars of the road map.**

#### *A4.1 Resources required to reduce gaps in programme dimensions*

When assessing the cost of NTD programmes, the focus is often on the cost of delivering the NTD intervention itself. However, there are other programme management costs that are often assumed to be borne by the local health system.

There is widespread consensus, from governments, health partners and donors, on the need to support health system strengthening. However, the concrete approach to supporting governments in that endeavour remains blurred. **One way to contribute to the reflection on how best to strengthen health systems from a disease programme perspective is to collect evidence on “what” and “how much” improvement there will be.**

#### *A4.2 Resources required and benefits of cross-cutting approaches*

The 2030 road map called for an intensifying of the cross-cutting approach through integrating interventions for several NTDs, mainstreaming them into national health systems, and coordinating with related programmes within and beyond the specific domain of health.

### **More operational research is needed on how to further improve the performance of existing interventions.**

The practice of integrating service delivery, for instance, is seen increasingly in the literature (2-4). However, evaluation of the cost-effectiveness of such practice is far from systematic. Existing studies addressing the economic benefits of an integrated approach often focus on the measurement of cost-saving (5,6). But data on changes to health outcomes brought about by integrated service delivery are scarce.

#### *A4.3 Resources required to facilitate country ownership*

Country ownership of their NTD programmes is the key to sustaining NTD health gains. In terms of financing, country ownership means that individual countries lead on the development of financing plans for NTD programmes and proactively mobilize both domestic and external resources to support their plans. External donors will align with this country plan and supplement the country's efforts.

Countries need data on NTD endemicity, interventions required, the cost of implementation, and sources of finance to develop strategic plans. When considering resource allocation, decision makers also need information that will enable them to compare cost-effectiveness across different investment options. Economic evaluation can address this need. More investment in conducting economic evaluation on multiple NTD intervention scenarios will provide vital information to optimize the use of resources both at the individual country and global levels.

In summary, in the last decade there has been a noticeable increase in the economic evaluations of interventions to address NTDs and estimates of the impacts of the diseases. However, there remain critical gaps in our knowledge. To support the implementation of the road map, there must be a step-change in evidence: on intervention costs, cost-effectiveness (individual interventions and comprehensive packages of NTD prevention and treatment), the efficiency of different delivery models, the direct and indirect costs for the most disadvantaged population, and the financial resources needed to sustainably address the burden of disease.



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