

**Ending the neglect to attain the Sustainable Development Goals**  
**A road map for neglected tropical diseases 2021–2030**

Ending the neglect to attain the Sustainable Development Goals: a road map for neglected tropical diseases 2021–2030

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## **Abbreviations and acronyms**

DALY	disability-adjusted life year
MDA	mass drug administration
NTD	neglected tropical disease
SDG	Sustainable Development Goal
WASH	water, sanitation and hygiene
WHO	World Health Organization

## Glossary

The definitions given below apply to the terms as used in this document. They may have different meanings in other contexts.

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

**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.

**Disability:** Inability to adequately or independently perform routine daily activities such as walking, bathing and toileting; the negative aspects of the interaction between a person with a health condition and his or her context (environmental and personal factors).

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

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

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

**Eradication:** Permanent reduction to zero of the worldwide incidence of infection caused by a specific pathogen, as a result of deliberate efforts, with no risk of reintroduction.

**Extinction:** Eradication of a specific pathogen, so that it no longer exists in nature or in the laboratory, which may occur with or without deliberate work.

**Hygiene:** Conditions or practices conducive to maintaining health and preventing disability.

**Integrated vector management:** A rational decision-making process to optimize the use of resources for vector control.

**Mass drug administration:** 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.)

**Morbidity:** Detectable, measurable clinical consequences of infections and disease that adversely affect the health of individuals. Evidence of morbidity may be overt (such as the presence of blood in the urine, anaemia, chronic pain or fatigue) or subtle (such as stunted growth, impeded school or work performance or increased susceptibility to other diseases).

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

**Platform:** Structure through which public health programmes or interventions are delivered.

**Preventive chemotherapy:** Large-scale use of medicines, either alone or in combination, in public health interventions. Mass drug administration is one form of preventive chemotherapy; other forms could be limited to specific population groups such as school-aged children and women of childbearing age. (In this document, the terms preventive chemotherapy and mass drug administration are used interchangeably.)

**Reverse logistics:** relating to the reuse of products and materials, it is the process of moving goods from their typical final destination for the purpose of capturing value or proper disposal.

## EXECUTIVE SUMMARY

### Driving progress

Neglected tropical diseases (NTDs) are ancient diseases of poverty that impose a devastating human, social and economic burden on more than 1 billion people worldwide, predominantly in tropical and subtropical areas among the most vulnerable, marginalized populations.

Since WHO's first road map for the prevention and control of NTDs (*Accelerating work to overcome the global impact of neglected tropical diseases*) was published in 2012, substantial progress has been made. Today, 500 million fewer people require interventions against several NTDs than in 2010, and 40 countries, territories and areas have eliminated at least one disease. Dracunculiasis is on the verge of eradication, with 54 human cases reported in four countries in 2019; lymphatic filariasis and trachoma have been eliminated as public health problems in 16 and nine countries, respectively; onchocerciasis has been eliminated in four countries in the Region of the Americas; the annual number of cases of human African trypanosomiasis has fallen from more than 7000 in 2012 to fewer than 1000 in 2018, halving the original target of 2000 cases by 2020; and the number of new leprosy cases reported globally has continued to decline since 2010 at an average of 1% per year after most endemic countries achieved elimination as a public health problem, defined as less than one case on treatment per 10 000 population.

Progress against NTDs has alleviated the human and economic burden they impose on the world's most disadvantaged communities. Over the past eight years, it has demonstrated the effectiveness of aligning the work of Member States with that of diverse partners. Two important facts have emerged in, namely the recognition that: (i) interventions to prevent and control NTD are one of the "best buys" in global public health, yielding an estimated net benefit to affected individuals of about US\$ 25 per US\$ 1 invested in preventive chemotherapy; and (ii) NTDs are important tracers for identifying disparities in progress towards both universal health coverage and equitable access to high-quality health services.

### Renewing momentum

Despite the substantial progress that has been made since 2010, not all the targets set for 2020 in the earlier road map will be met. The proposed new road map identifies critical gaps and the actions required to reach the targets set for 2030, established through global consultation. Experience from the past decade shows that further multisectoral action is required for all 20 diseases and disease groups, particularly in diagnostics, monitoring and evaluation, access and logistics, and advocacy and funding. Ambitious, impact-oriented targets are required to achieve the Sustainable Development Goals (SDGs) and accelerate control and elimination.

Concerted action in multiple dimensions and agile responses to challenges will be necessary to achieve the targets. The recognition, for example, of *Dracunculus medinensis* infection in mammals other than human beings shows how challenges to eradication can manifest in the last stages – the last mile – of eradication. Circumstances such as epidemics, political instability, migration, the consequences of climate change and antimicrobial resistance increase the complexity of the situation and will require additional action.

### Targets and strategies for the next decade

The proposed road map for 2021–2030 sets global targets and milestones to prevent, control, eliminate or eradicate 20 diseases and disease groups. It also sets cross-cutting targets aligned with both WHO's Thirteenth General Programme of Work, 2019–2023 and the SDGs, with strategies for achieving the targets during the next decade.

The new road map was prepared by extensive global consultation. This process involved regional workshops with managers of national NTD prevention and control programmes, meetings with stakeholders in NTDs and related areas of work, country workshops with stakeholders in NTDs and related areas of work, input from disease experts, disease modellers, donors and partners obtained through more than 100 bilateral interviews and consideration of more than 300 responses from three rounds of online consultations. The document therefore reflects the perspectives of Member States and a wide range of stakeholders.

The draft road map also describes the integrated approaches needed to achieve these targets through cross-cutting activities that intersect multiple diseases. It is built on three pillars that will support global efforts to control, eliminate and eradicate neglected tropical diseases:

Pillar 1. Accelerate programmatic action

Pillar 2. Intensify cross-cutting approaches

Pillar 3. Change operating models and culture to facilitate country ownership.

Pursuant to decision EB146(9) of the Executive Board at its 146th session in February 2020, the proposed road map is being submitted to the Seventy-third World Health Assembly for consideration.

### **Integrating and mainstreaming approaches**

Continued programmatic action is called for, particularly in targeted areas where serious gaps exist across multiple diseases. Adequately structured operational and implementation investigations, including community-based and applied research, are also essential for building a solid foundation on which effective NTD interventions can be designed and delivered.

More radical change is needed for approaches to be integrated and mainstreamed into national health systems and for coordination of actions across sectors. Such cross-cutting concepts are not new; they are outlined in various existing NTD plans, but their operationalization has been problematic in some instances.

The road map aims to renew momentum through its proposed concrete actions within integrated platforms for delivery of interventions, and thereby to improve the cost-effectiveness, coverage and geographical reach of programmes. Strengthening the capacity of national health systems will ensure delivery of interventions through existing infrastructures, improve the sustainability and efficiency of interventions and ensure that patients have equitable access to all aspects of treatment, care and support. Close coordination and multisectoral action within and beyond the health sector, embracing not only vector control, water and sanitation, animal and environmental health and health education, but also, for instance, education and disability, will maximize synergies.

### **Delivering results, achieving impact**

Countries are both the drivers and the beneficiaries of progress towards the 2030 NTD targets. National and local governments must therefore lead work to define agendas and realize their objectives, with financing partly or fully from domestic funds. Countries must integrate and prioritize prevention and control of endemic NTDs in national health plans and dedicate a corresponding line item in national health budgets. Multisectoral action must be fostered and planned well in advance at ministerial and higher levels in order to build the high-level political will required to support NTD plans.

As countries define their national NTD plans, the support of partners will be essential for filling gaps, strengthening capacity and enabling targets to be achieved. Deliberate efforts are needed to



engage the community, especially, young people, in processes that support national NTD programme implementation, follow-up and review.

Given the shift to cross-cutting approaches, structures and ways of working may have to be adapted accordingly, for example by making funding streams more flexible and reporting structures less cumbersome. Much work will be required during the next decade to reach the at least 1.76 billion people who still require interventions against NTDs. These diseases of poverty must be overcome in order to attain the SDGs and ensure universal health coverage. The proposed road map sets out global targets and actions to align and re-focus the work of stakeholders during the next decade. It encourages all parties to evaluate the efficiency and effectiveness of their contributions and approaches and seeks to foster greater collaboration and openness in order to lessen and remove the profound global burden of NTDs.

# Ending the neglect to attain the Sustainable Development Goals

## A road map for neglected tropical diseases 2021–2030

### I. Context and purpose of the road map

1. The proposed road map for neglected tropical diseases 2021–2030 is WHO's second blueprint for preventing, controlling and, where feasible, eliminating and eradicating neglected tropical diseases. It follows the first road map, "*Accelerating work to overcome the global impact of neglected tropical diseases*", issued in 2012, (1) which set out global targets and milestones to 2020 for the 17 NTDs that then comprised WHO's NTD portfolio. The aim of the new road map is to facilitate alignment among Member States and other stakeholders and to accelerate progress towards the prevention, control, elimination and eradication of the 20 NTDs and disease groups now prioritized by WHO and attaining the SDGs.
2. This text issues a call to action for Member States, donors, implementing partners, disease experts and all other stakeholders to align their strategies and plans towards the prevention of infections and alleviation of the suffering of people affected by WHO's expanded portfolio of 20 diseases and disease groups.<sup>1</sup>

***The NTDs prioritized by WHO are a diverse set of 20 diseases and disease groups with a singular commonality: their devastating impact on impoverished communities***

3. The 2030 road map covers a medically diverse set of diseases and disease groups<sup>2</sup> that disproportionately affect people living in poverty, predominantly in tropical and subtropical areas. NTDs impose a human, social and economic burden on more than one billion people in all countries of the world, particularly in low-income countries and the most disadvantaged communities in middle-income countries (Fig. 1). More than 200 000 people die each year from snakebite envenoming, rabies and dengue alone, and lack of timely access to affordable treatment leaves hundreds of millions severely disabled, disfigured or debilitated, often resulting in social exclusion, stigmatization and discrimination.
4. NTDs cost developing communities the equivalent of billions of United States dollars each year in direct health costs, loss of productivity and reduced socioeconomic and educational attainment.(2) NTDs also place considerable financial strain on patients and their families – human African trypanosomiasis in the Democratic Republic of the Congo costs affected households in a typical rural community more than 40% of their annual household income,(3) and up to 75% of households affected by visceral leishmaniasis in Bangladesh,(4, 5) India,(6) Nepal (7) and Sudan (8) experience some type of financial catastrophe in obtaining diagnosis and treatment, even when tests and medicines are nominally free of charge.
5. Although the resources for NTDs are often not commensurate with the vast need, NTD interventions are one of the best buys in global public health. The end of NTDs is expected to result in an estimated net benefit to affected individuals of about US\$ 25 for every US\$ 1 invested in preventive chemotherapy, representing a 30% annualized rate of return, and to contribute significantly towards universal health coverage and social protection for the least well-off.(9)

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

<sup>2</sup> All infectious diseases except snakebite envenoming.

### ***Interventions against NTDs contribute to achievement of the SDGs***

6. NTDs are formally recognized as targets for global action in SDG target 3.3, which calls to “end the epidemics of ... neglected tropical diseases” by 2030, as part of Goal 3 (Ensure healthy lives and ensure well-being for all at all ages). The SDGs can therefore be achieved only if the NTD goals are met. Successful interventions against NTDs contribute to meeting other SDGs, such as alleviating poverty (Goal 1) and hunger (Goal 2), enabling people to pursue an education (Goal 4) and lead productive working lives (Goal 8) and promoting equality, for example with regard to gender (Goals 5 and 10). Progress towards other Goals can accelerate the achievement of NTD goals. For example, wider provision of clean water, sanitation and hygiene (WASH) (Goal 6) is believed to help to eliminate or control NTDs; the availability of resilient infrastructure (Goal 9) should facilitate delivery of medicines and outreach to remote communities; the goals of sustainable cities (Goal 11) and climate action (Goal 13) can support the environmental management necessary for control of disease vectors. Attaining all SDGs and NTD goals is founded on strong global partnerships (Goal 17) (Fig. 2). The interlinkages with the 2030 Agenda for Sustainable development are expected to encourage the NTD community to think differently about the impact of interventions and to work proactively across sectors and disciplines to ensure progress towards sustainable development. Ending the epidemic of NTDs could therefore have an impact on and improve prospects for attaining the SDGs.<sup>(10)</sup>

### ***Action against NTDs is core to the vision of universal health coverage***

7. Tackling NTDs supports the vision of universal health coverage, which means that all individuals and communities receive the health services they need without suffering financial hardship.<sup>(11)</sup> Universal health coverage, the objective of SDG target 3.8, is a cornerstone of WHO’s Thirteenth General Programme of Work, 2019-2023. Actions against NTDs and their monitoring and evaluation reinforce each other: NTD interventions reach some of the world’s most remote communities and can thus improve the potential for equitable access to health care services for these populations. The endemicity of NTDs means that treatment coverage can indicate the extent of universal health coverage,<sup>(12)</sup> which can be achieved only if people at risk of or affected by NTDs have equitable access to high-quality health services. Investment in NTDs can have important benefits for both health and economies.

### ***Considerable progress has been made in the fight against NTDs, with strong support from Member States and the global NTD community***

8. The past decade saw significant progress in the battle against NTDs (Fig. 3), including new preventive measures and interventions, expanded donor support, new strategies and guidelines and strengthening of NTD-related structures, collaboration and country commitment. Establishment of public–private partnerships has vastly facilitated progress towards the elimination and control of NTDs: pharmaceutical companies have donated nearly three billion tablets of safe, quality-assured medicines annually to support the control and elimination of NTDs in countries where they are endemic.
9. These achievements are a testament to the long-standing support and dedication of the global NTD community, from the first meeting of NTD global partners convened by WHO in 2007 to bring together various disease initiatives under the umbrella of the NTD “brand” to the pledges made in the 2012 London Declaration on Neglected Tropical Diseases and the 2017 meeting of global partners. They demonstrate the immense potential that can be unlocked by working in partnership to ensure that NTDs have a prominent position on the global health agenda.

***Concerted action among all sectors is required to sustain and build on the progress of the past decade***

10. Substantial progress has been made on various fronts, but not all the 2020 targets will be met, and the journey to eliminating and controlling NTDs is not over. The past decade showed that further action is required for all 20 diseases and disease groups, including: finding new interventions, diagnostic methods and tools; operational and implementation research; programme management and delivery; effective surveillance, monitoring and evaluation; and adequate financing mechanisms for each disease and for cross-cutting approaches. Sustained efforts are crucial with respect to diseases that are on the verge of eradication; the detection of dracunculiasis in other mammals than human beings shows that new challenges can emerge even towards the end of the road. Efficiency could be improved with cross-cutting approaches, notably by integrating interventions for several NTDs and fostering greater collaboration among groups within and beyond the NTD community.

***The road map for 2021–2030 outlines overarching, disease-specific and cross-cutting targets and strategies and represents the voices of the entire NTD community***

11. The road map outlines specific, measurable targets for 2030 with interim milestones for 2023 and 2025 for the eradication, elimination and control of each of the 20 diseases and disease groups, as well as cross-cutting targets aligned with WHO's Thirteenth General Programme of Work, 2019–2023 and the SDGs. The road map includes the strategies and approaches for achieving these targets, with cross-cutting themes for several diseases.
12. The road map and the 2030 targets are based on extensive consultation with the NTD community. The consultative process included regional workshops with NTD programme managers, and country workshops<sup>1</sup> with stakeholders in NTDs and related areas (e.g. WASH and education). The road map also reflects input from more than 100 bilateral interviews with disease experts and modellers, donors and other partners, as well as more than 300 responses gathered from an online consultation. This document is therefore shaped by the perspectives of Member States and a wide range of stakeholders. It was prepared by the Secretariat under the guidance of the WHO Strategic and Technical Advisory Group for Neglected Tropical Diseases.

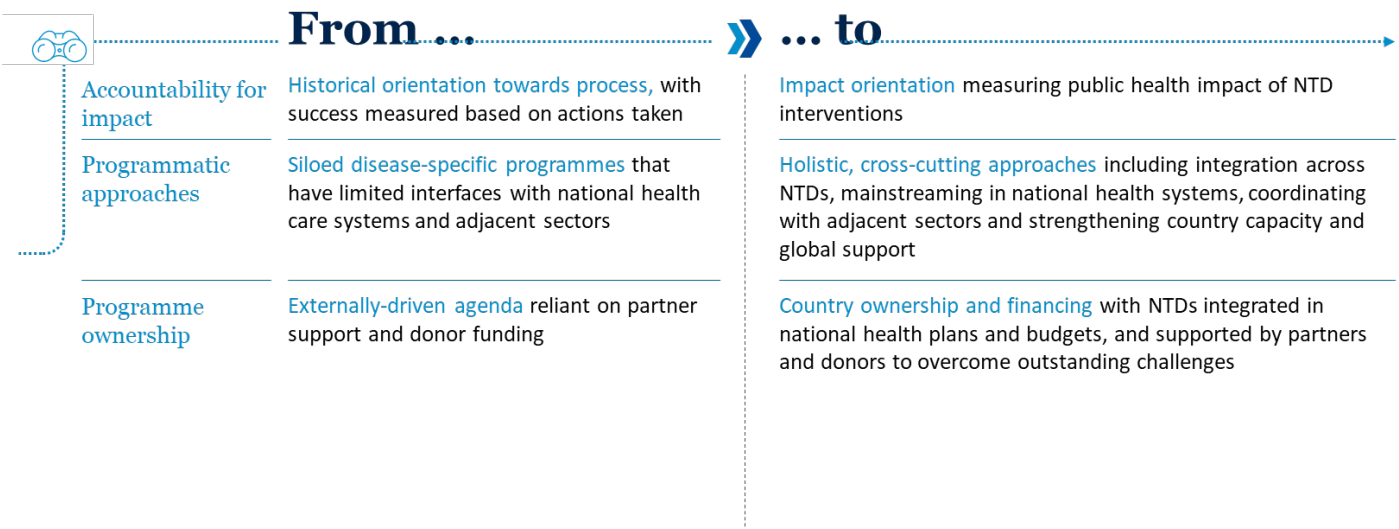
***The purpose of this document is to guide work to overcome NTDs during the next 10 years and to encourage a fundamental shift in the approach***

13. The road map has two main objectives: to enable national governments to take the lead in delivering NTD interventions to reach SDG target 3.3 by providing clear milestones and disease-specific, cross-cutting approaches to reach them; and to encourage the global community of stakeholders – donors, pharmaceutical companies, implementing partners, nongovernmental organizations and academic institutions – to increase their commitments to overcoming NTDs in the coming decade.
14. Broadly, the road map is expected to encourage three fundamental shifts in the approach to tackling NTDs (Fig. 4): first, increase accountability for impact by using impact indicators instead of process indicators, as shown by the targets and milestones in section II, and accelerate programmatic action (section III); secondly, move away from siloed, disease-specific programmes by mainstreaming programmes into national health systems and intensifying cross-cutting approaches centred on the needs of people and communities (section IV); and thirdly, change operating models and culture to facilitate greater ownership of programmes by countries (section V).

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<sup>1</sup> In Egypt, Ethiopia and Indonesia.

Fig.4. Shifts in approaches to addressing NTDs



## II. 2030 targets and milestones

15. This section provides an overview of the targets and milestones for NTDs, which were determined by extensive global consultation with Member States and with other organizations in the United Nations system, scientific and research groups, nongovernmental organizations, implementing partners, donors and private sector organizations. The process is summarized in the Box.
16. The overarching and cross-cutting targets, derived from the SDGs and WHO's Thirteenth General Programme of Work, 2019–2023, are relevant for following progress in integration, coordination, country ownership and equity for several diseases. The targets for sectors such as WASH and vector control are based on established targets. Disease-specific targets for 2030 and milestones for 2023 and 2025 were set for each of the 20 diseases and disease groups for one of the following:
  - (a) eradication, defined as permanent reduction to zero of the incidence of a specific pathogen, as a result of deliberate efforts, with no risk of reintroduction;
  - (b) elimination (interruption of transmission), defined as reduction to zero of the incidence of infection caused by a specific pathogen in a defined geographical area, with minimal risk of reintroduction, as a result of deliberate efforts; continued actions to prevent re-establishment of transmission may be required;
  - (c) elimination as a public health problem, is a term related to both infection and disease, defined by achievement of measurable targets set by WHO in relation to a specific disease. When reached, continued action is required to maintain the targets and/or to advance interruption of transmission; or
  - (d) control, defined as reduction of disease incidence, prevalence, morbidity and/or mortality to a locally acceptable level as a result of deliberate efforts; continued intervention measures are required to maintain the reduction.
17. The proposed targets for each NTD are shown in the Table. Annual reporting and a substantive review of progress against these targets will be conducted in 2024, 2026 and 2031, as well as in 2029, the year after the conclusion of WHO's Fourteenth General Programme of Work. The reviews in 2024, 2026 and 2029 may result in updated targets in line with changing contexts.

# Table. Proposed road map targets, milestones and indicators<sup>1</sup>

## Overarching global targets

Indicator	2030
Percentage reduction in people requiring interventions against neglected tropical diseases	90%
Number of countries having eliminated at least one neglected tropical disease	100
Number of neglected tropical diseases eradicated	2
Percentage reduction in disability-adjusted life years related to neglected tropical diseases	75%

## Cross-cutting targets

Indicator		2030
INTEGRATED APPROACHES	Integrated treatment coverage index for preventive chemotherapy	75%
	Number of countries that adopt and implement integrated skin neglected tropical disease strategies	40%
	Percentage reduction in number of deaths from vector-borne neglected tropical diseases (relative to 2016) – to achieve WHO’s global vector control response goal	75%
MULTISECTORAL COORDINATION	Access to at least basic water supply, sanitation and hygiene in areas endemic for neglected tropical diseases – to achieve targets 6.1 and 6.2 of Sustainable Development Goal 6	100%
	Share of the population at risk protected against catastrophic out-of-pocket health expenditure due to neglected tropical diseases – to achieve target 3.8 of Sustainable Development Goal 3	90%
	Share of countries with neglected tropical diseases integrated in national health strategies/plans	90%
UNIVERSAL HEALTH COVERAGE	Share of countries including neglected tropical disease interventions in their package of essential services and budgeting for them	90%
	Share of countries with guidelines for management of neglected tropical disease-related disabilities within national health systems	90%
COUNTRY OWNERSHIP	Share of countries reporting on all relevant endemic neglected tropical diseases	90%
	Share of countries collecting and reporting data on neglected tropical diseases disaggregated by gender	90%

## Impact of integrated approaches on disease-specific targets

Disease	Indicator	2020	2023	2025	2030
TARGETED FOR ERADICATION					
<b>Dracunculiasis</b>	Number of countries certified free of transmission	187 (96%)	189 (97%)	191 (98%)	194 (100%)
<b>Yaws</b>	Number of countries certified free of transmission	1 (1%)	97 (50%)	136 (70%)	194 (100%)
TARGETED FOR ELIMINATION (INTERRUPTION OF TRANSMISSION)					
<b>Human African trypanosomiasis (gambiense)</b>	Number of countries verified for interruption of transmission	0	0	5 (21%)	15 (62%)
<b>Leprosy</b>	Number of countries with zero new autochthonous leprosy cases	50 (26%)	75 (39%)	95 (49%)	120 (62%)
<b>Onchocerciasis</b>	Number of countries verified for interruption of transmission	4 (12%)	5 (13%)	8 (21%)	12 (31%)
TARGETED FOR ELIMINATION AS A PUBLIC HEALTH PROBLEM					
<b>Chagas disease</b>	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	0	4 (10%)	10 (24%)	15 (37%)
<b>Human African trypanosomiasis (rhodesiense)</b>	Number of countries validated for elimination as a public health problem (defined as <1 case/10 000 people/year, in each health district of the country averaged over the previous five-year period)	0	2 (15%)	4 (31%)	8 (61%)
<b>Leishmaniasis (visceral)</b>	Number of countries validated for elimination as a public health problem (defined as <1% case fatality rate due to primary visceral leishmaniasis)	0	32 (43%)	56 (75%)	64 (85%)

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

<sup>1</sup> Source: [https://www.who.int/neglected\\_diseases/WHONTD-roadmap-2030/en/](https://www.who.int/neglected_diseases/WHONTD-roadmap-2030/en/) (accessed 8 April 2020).

**Table. Proposed road map targets, milestones and indicators<sup>1</sup> (cont'd)**

Disease	Indicator	2020	2023	2025	2030
<b>TARGETED FOR ELIMINATION AS A PUBLIC HEALTH PROBLEM</b>					
<b>Lymphatic filariasis</b>	Number of countries validated for elimination as a public health problem (defined as infection sustained below transmission assessment survey thresholds for at least four years after stopping mass drug administration; availability of essential package of care in all areas of known patients)	19 (26%)	23 (32%)	34 (47%)	58 (81%)
<b>Rabies</b>	Number of countries having achieved zero human deaths from rabies	80 (47%)	89 (53%)	113 (67%)	155 (92%)
<b>Schistosomiasis</b>	Number of countries validated for elimination as a public health problem (currently defined as <1% proportion of heavy intensity schistosomiasis infections)	26 (33%)	49 (63%)	69 (88%)	78 (100%)
<b>Soil-transmitted helminthiasis</b>	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> )	7 (7%)	60 (60%)	70 (70%)	96 (96%)
<b>Trachoma</b>	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 of <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)	9 (14%)	28 (44%)	43 (68%)	64 (100%)
<b>TARGETED FOR CONTROL</b>					
<b>Buruli ulcer</b>	Proportion of cases in category III (late stage) at diagnosis	30%	<22%	<18%	<10%
<b>Dengue</b>	Case fatality rate due to dengue	0.80%	0.50%	0.50%	0%
<b>Echinococcosis</b>	Number of countries with intensified control for cystic echinococcosis in hyperendemic areas	1	4	9	17
<b>Foodborne trematodiasis</b>	Number of countries with intensified control in hyperendemic areas	N/A	3 (3%)	6 (7%)	11 (12%)
<b>Leishmaniasis (cutaneous)</b>	Number of countries in which: 85% of all cases are detected and reported and 95% of reported cases are treated	N/A	44 (51%)	66 (76%)	87 (100%)
<b>Mycetoma, chromoblastomycosis and other deep mycoses</b>	Number of countries in which mycetoma, chromoblastomycosis, sporotrichosis and/or paracoccidioidomycosis are included in national control programmes and surveillance systems	1	4	8	15
<b>Scabies and other ectoparasitoses</b>	Number of countries having incorporated scabies management in the universal health coverage package of care	0	25 (13%)	50 (26%)	194 (100%)
<b>Snakebite envenoming</b>	Number of countries with incidence of snakebite achieving reduction of mortality by 50%	N/A	39 (30%)	61 (46%)	132 (100%)
<b>Taeniasis/cysticercosis</b>	Number of countries with intensified control in hyperendemic areas	2 (3%)	4 (6%)	9 (14%)	17 (27%)
Note: In certain cases, reference to "countries" should be understood to signify countries, territories and areas.					

18. Meeting the 2030 NTD targets will require concerted action in three areas (Fig. 5):

*Accelerate programmatic action* against NTDs, including interventions to reduce incidence, prevalence, morbidity, disability and death: to do so will require scientific advances, new interventions and tools, and strengthening strategies and service delivery, and enablers.

<sup>1</sup> Source: [https://www.who.int/neglected\\_diseases/WHONTD-roadmap-2030/en/](https://www.who.int/neglected_diseases/WHONTD-roadmap-2030/en/) (accessed 8 April 2020).



*Intensify cross-cutting approaches* by integrating interventions for several NTDs and mainstreaming them into national health systems, and coordination with related programmes (e.g. WASH, vector control and other programmes).

*Change operating models and culture by increasing country ownership*, clarifying the roles of organizations, institutions and other stakeholders, their culture and perceptions and aligning them to meet the 2030 targets.

### **III. ACCELERATE PROGRAMMATIC ACTION**

19. The disease-specific targets for each NTD are ambitious and will continue to require considerable work by countries and stakeholders. Each disease and disease group can be assessed with regard to the technical requirements, strategy and service delivery, programme capacity and enablers to determine where action is needed. Each of these dimensions is illustrated in Fig. 6.
20. Fig. 7 shows the results of assessments of the gaps for each of these dimensions for each of the 20 diseases or disease groups. Red indicates that critical action is needed to achieve the 2030 target, and green signifies that the dimension will probably not impede meeting the target, although action should be maintained to sustain gains. The colour scale is relative for each disease and category and should not be compared among diseases.
21. The assessment shows that action is required for several diseases or disease groups in certain dimensions, such as diagnostics, monitoring and evaluation, access and logistics, and advocacy and funding (see paragraph 23 on strong health and related systems). The greater need for critical action (red in Fig. 7) for diseases targeted for control than for those targeted for elimination reflects a poorer appropriate evidence base as well as the fact that programmes for diseases targeted for control are still largely in an early stage, implying that more action is required to address systemic issues, particularly strategy and service delivery.
22. Strong coordination also promotes clarity, from patients to donors. For patients and communities in which NTDs are endemic, intersectoral coordination results in clearer, more cohesive communication. For example, one message can be delivered about the importance of hand-washing and face-washing in communities where both soil-transmitted helminthiases and trachoma are endemic instead of one from the WASH sector on hand-washing and another from the trachoma programme on face-washing. For donors, clarification of roles and responsibilities among sectors facilitates the identification of the specific activities to be covered by funding for each sector.

#### ***Strong health and related systems are essential for eliminating and controlling NTDs***

23. Strong health systems are essential to achieving the NTD goals. Robust national systems can deliver NTD interventions in the field, supported by global and regional stakeholders for aspects such as technical understanding of the disease. Overall strengthening of health systems is the long-term goal, but capacity-building in areas such as monitoring and evaluation is beneficial for NTDs. As shown in Fig. 7, some areas for crucial action (highlighted in red) are common to many NTDs, including diagnostics, monitoring, evaluation, access, logistics, advocacy and funding. Strengthening in these areas over the next 10 years will be particularly important to ensure achievement of the 2030 targets.

#### **III.1 Diagnostics and other key innovations**

##### ***Effective diagnostics are critical to accelerating progress towards elimination, reducing morbidity and reducing programme costs***

24. Effective diagnostics are a prerequisite for reaching the 2030 disease targets, as they are essential for key components of NTD programmes, from confirmation of disease to mapping, screening, surveillance, monitoring and evaluation. Better diagnostics can accelerate progress toward elimination by ensuring the identification and treatment of cases so that they are not potential sources

of infection (Fig. 8). Access to diagnostics can also reduce morbidity by ensuring early detection and management to reduce progression and disability, therefore minimizing programme costs. They can also help countries to monitor disease trends and assess the effectiveness of control programmes, and guide policy decisions on interventions and support verification of elimination.

***Considerable progress has been made in new point-of-care diagnostics***

25. New diagnostic tools and innovative approaches for NTDs are becoming available, with continued engagement of key partners. For example, the pharmaceutical company Johnson & Johnson has donated resources for research and development of biomarkers for soil-transmitted helminthiasis and schistosomiasis; the Novartis Foundation has invested in a molecular diagnostic test for leprosy; the Foundation for Innovative New Diagnostics and the Institute of Tropical Medicine of Antwerp, Belgium, are developing diagnostic platforms, such as rapid diagnostic tests for human African trypanosomiasis (gambiense), and WHO has established a Technical Advisory Group on this topic.

***Gaps remain, however, in the availability and accessibility of such tests***

26. Strengthening diagnostics is a top priority for some NTDs (Fig. 9) for which diagnostic tools are either inexistent or inadequate. For example, no test is available to identify cases of early mycetoma (without visible lesions); no validated antigen-based rapid diagnostic test is available for leishmaniasis; and the diagnosis of Buruli ulcer currently requires polymerase chain reaction, which can often be performed only at a distance from endemic communities. Overall, investment in new diagnostics has been limited, representing about 5% of research and development investment for NTDs, whereas about 39% is devoted to medicines and vaccines, about 44% to basic research and about 12% to other areas. Funding for NTDs has been essentially flat for the past decade and in fact at times has gone backwards: funding for NTDs was nearly 10% lower in 2018 than it was in 2009, falling by US\$ 34 million (−9.1%).(13)
27. Even when accurate and effective diagnostic tools are available, they may not be affordable or accessible in a development context in which laboratory infrastructure, equipment and trained personnel are limited. Microscopy is the most widely used method for diagnosing NTDs, yet it requires a laboratory and trained technicians, and the sensitivity of microscopy is often relatively low. Other options such as culturing NTD pathogens or nucleic acid tests are highly specific but are also technically demanding, costly and time-consuming. Effective techniques should therefore not be abandoned until proven, better alternatives become accessible and affordable.

***The priorities include more sensitive diagnostics, such as non-invasive diagnostics and field kits, for diseases for which elimination is near, multiplex diagnostic platforms and strengthening of basic systems such as laboratory network capacity***

28. Global resources and expertise in research and development are required to develop new and innovative diagnostic tests that are accessible in low-resource settings (that is, tests that are low-cost, user-friendly, sensitive, highly specific, allow high throughput, are heat stable and require little and/or simple equipment) and quality assured by a quality control mechanism. For diseases that are nearing elimination, with decreased prevalence and intensity of infection, high-sensitivity and high-specificity diagnostics are required to avoid false-negative results, to ensure that all true cases are detected and treated, and to manage the larger number of samples that must be tested to ensure that transmission has been interrupted. Use of multiplex diagnostic platforms could be cost-effective for surveillance of diseases that are endemic in the same geographical area or that target the same population.
29. Further strengthening will also be required of basic systems such as diagnostic procurement and laboratory network capacity to meet operational needs and ensure access to diagnostics throughout the health system. For example, pooling of investments by donors to increase availability of

diagnostics allowed coordinated procurement of more than two million diagnostic tests for lymphatic filariasis for 40 countries in the past five years.

30. The community of stakeholders can make direct investments and provide in-kind resources to strengthen basic systems, such as pooled procurement and building capacity in laboratory networks and health system workforces. Collective action can overcome technical and operational hurdles to ensure that effective diagnostics are available where they are needed to meet the 2030 goals. Improved diagnostic tools would lead to appropriate interventions or trigger innovation for better treatment.

### **III.2 Monitoring and evaluation**

***Monitoring and evaluation are essential for tracking progress and decision-making to reach the 2030 goals***

31. Monitoring and evaluation are essential for correcting programmes when necessary. When work against NTDs was formalized 10–15 years ago, monitoring and evaluation were conducted to ensure access to medicines and treatment and therefore focused on process indicators such as population coverage. Now, indicators of impact are used in well-established programmes with cross-cutting approaches to obtain high-quality data for effective decision-making at all levels.

***Recently, significant progress has been made in the development of tools and approaches for monitoring and evaluation***

32. In the past few years, WHO and some other stakeholders have improved the quality of surveillance, monitoring and evaluation by standardizing indicators, publishing guidance, developing new tools and approaches, and training programme managers, data managers and surveillance officers in endemic countries. For example, WHO issued the Joint Reporting Form for NTDs that are amenable to preventive chemotherapy, on which countries report annually on the distribution of medicines in a standardized format.
33. The Secretariat is supporting Member States with integrated data platforms to strengthen data collection and reporting on diseases that must be diagnosed and treated at a health facility, which can be used to make decisions at both national and regional levels. The platforms allow collection of individual and aggregated data both online through a web platform and offline on tablets and smartphones. WHO-recommended NTD indicators are packaged for integration into national health information systems, and training has been provided in data collection and use in peripheral health care centres in endemic countries. WHO in collaboration with FAO has prepared an atlas of human African trypanosomiasis generated from data for 2018 in the Global Health Observatory<sup>1</sup> for use by health ministries, nongovernmental organizations and research institutions to monitor the impact of control activities, assess epidemiological trends and plan control and research activities. It is a repository of data provided since 2000 by national programmes on the numbers of cases detected and screened in villages, which were used to produce maps that are published regularly on the WHO website. Training has been provided in all endemic countries to map the main epidemiological indicators for inclusion in the atlas; the Democratic Republic of the Congo has used it for the past three years to better target control activities.
34. The Working Group on Monitoring, Evaluation and Research of WHO's Strategic and Technical Advisory Group for Neglected Tropical Diseases is extending its operating model to ensure that it is commensurate with programmatic needs to meet the goals for 2030 of the road map.

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<sup>1</sup> See <http://origin.who.int/gho/en/> (accessed 8 April 2020).

***Despite advances, monitoring and evaluation for all NTDs are weak in many countries***

35. Control of all NTDs must be monitored and evaluated and is critical for at least 10 diseases and disease groups in order to reach 2030 goals. For example, for onchocerciasis and schistosomiasis, more cost-effective mapping strategies are necessary for targeting preventive chemotherapy, and for trachoma a system for tracking cases and outcomes is needed. The need for monitoring and evaluation is greater for diseases targeted for control, for which investment has been limited, particularly for mapping and understanding their burden.

***Monitoring and evaluation should be prioritized and strengthened by improving data collection and management, analysis, mapping, impact assessments, surveillance and reporting systems***

36. Strengthening the capacity of NTD programmes to collect and analyse data is central to effective monitoring and evaluation of the impact of intervention programmes and tracking progress towards the 2030 goals. Programmes should recognize the importance of monitoring and evaluation at all levels and be equipped with new data, tools and approaches to decision-making. Core components of monitoring and evaluation that should be strengthened are listed below.
- (a) *Data management platforms.* Data systems should have complete, timely, systematic, accurate, disaggregated data (by age, gender and location), centralized in the health ministry, shared with WHO and stored in a standard format on integrated platforms. Examples include WHO's Preventive Chemotherapy Joint Application Package,<sup>1</sup> the WHO Integrated Data Platform and the WHO Integrated Medical Supplies System<sup>2</sup>, which facilitate online applications for medicines for preventive chemotherapy and patients, although these platforms could be better harmonized and integrated. Centralized data can also be used for cross-cutting analyses and decision-making.
  - (b) *Data and analytics tools.* Platforms should also provide tools for data collection, analysis and interpretation to enable informed decision-making, complemented by other information such as that on weather, patterns of land use and socioeconomic profiles. The tools should facilitate reporting, decision-making and policy direction for districts, subdistricts or villages, including digital health platforms for collecting and monitoring data.
  - (c) *Mapping and impact assessments.* New approaches and mapping tools are necessary to obtain a granular view of disease epidemiology and progression for targeted interventions. Mapping of different diseases and diseases groups should be combined, when possible, and sampling strategies could be adapted for several diseases. Mapping data should be compatible for sharing among programmes.
  - (d) *Surveillance.* New approaches and tools are required within routine systems for post-validation and elimination surveillance, through transmission assessment surveys, monitoring drug efficacy and resistance and pharmacovigilance. Post-validation surveillance will become more important as diseases are eliminated and, in some cases, may be combined with transmission assessment surveys. Monitoring of antimicrobial resistance will become more important as access to interventions increases.
  - (e) *Reporting.* National authorities should establish an accessible integrated reporting system, with a framework and mechanisms for monitoring and reporting progress against stated goals. Strong planning with timely reporting and high-quality outputs are needed in order to avoid

<sup>1</sup> See [https://www.who.int/neglected\\_diseases/preventive\\_chemotherapy/reporting/en](https://www.who.int/neglected_diseases/preventive_chemotherapy/reporting/en) (accessed 8 April 2020).

<sup>2</sup> See [http://mss4ntd.essi.upc.edu/wiki/index.php?title=WHO\\_Integrated\\_Medical\\_Supplies\\_System\\_\(WIMEDS\)](http://mss4ntd.essi.upc.edu/wiki/index.php?title=WHO_Integrated_Medical_Supplies_System_(WIMEDS)) (accessed 8 April 2020).

separate reporting by different stakeholders and donors. A combined reporting system could improve delivery of programmes not only today but in the future, such as for target product profiles.

***WHO and the NTD community should monitor progress in achieving the goals of the road map during the coming decade***

37. This road map describes the milestones and 2030 targets and approaches for reaching them. It provides a long-term vision, but progress should be measured over time in a standardized monitoring and evaluation framework. Monitoring will include periodic assessments of substantive progress in achieving both disease-specific and cross-cutting milestones. In addition to annual reporting, formal reviews will be conducted in 2024, 2026 and 2031 and also in 2029, the year after WHO's Fourteenth General Programme of Work concludes. The results of the earlier reviews might signal the need for revision of targets if new information suggests that they should be more or less ambitious. For example, a breakthrough in research and development might increase the level of ambition for a particular disease, whereas identification of a previously unknown animal reservoir might decrease it.

### **III.3 Access and logistics**

38. Achieving the targets outlined in this road map will require consistent emphasis on the availability, accessibility, acceptability and affordability of NTD medicines and other health products and commodities of assured quality. Access to medicines and health products is a multidimensional challenge, which requires comprehensive strategies, from research and development to supply chain management, quality assurance, registration, pricing and rational use.<sup>(14)</sup>

***Effective supply chain management is vital to ensuring access to quality-assured NTD medicines and other products***

39. A strong, responsive supply chain is necessary to ensure access to high-quality, affordable medicines and health products that are accessible to the target populations. At least 1.5 billion treatments are mobilized every year. Forecasting, securing donations of medicines, coordinating delivery, reverse logistics, education and training can be particularly challenging. These processes involve ensuring that medicines manufactured at various locations worldwide are accessible to patients and communities living in some of the places that are most difficult to access. Efficient management will optimize allocation of valuable donated or procured medicines and ensure that they are available at the right place and time, while minimizing wastage. National systems should invest specific resources in the control of NTDs (see Fig. 7).
40. Since the publication of WHO's first road map in 2012, the NTD community has rallied to meet the logistical challenges of getting medicines to those in need, with a focus on the "first mile", namely ensuring that medicines for preventive chemotherapy are sent from their site of manufacture to the central medicine stores in endemic countries. One component was the establishment in 2012 of the NTD Supply Chain Forum, which is a public-private partnership between WHO, pharmaceutical companies, nongovernmental organizations, logisticians, donors and countries where NTDs are endemic. The Forum has enabled the donation and delivery of billions of treatments for five NTDs,<sup>1</sup> partly through initiatives such as the DHL "control tower" for coordination of NTD shipments, which arranges shipments of medicines through customs clearance to national warehouses, and the NTDeliver tracking tool),<sup>2</sup> which consolidates fragmented country information into a comprehensive

<sup>1</sup> Lymphatic filariasis, onchocerciasis, schistosomiasis, soil-transmitted helminthiasis and trachoma.

<sup>2</sup> See <https://www.ntdeliver.com/dashboard?locale=en> (accessed 8 April 2020).



database for planning and forecasting.

41. WHO continues to coordinate and liaise with national programmes on almost all donations of NTD medicines and diagnostics. Its activities range from ensuring timely submission of requests for medicines to provision of technical support and capacity-building to resolving problems along the supply chain until the medicines reach the intended beneficiaries.

***The challenges that remain include improving “last-mile” delivery, integrating provision of NTD medicines and products and improving the transparency of the supply chain***

42. Last-mile delivery, at the end of the supply chain, should be a priority, including stock management and reverse logistics at subnational levels (Fig. 10) to improve the supply chain, minimize wastage and reduce stock-outs.

***The priorities include extending access to quality-assured medicines for all NTDs in an integrated way and strengthening national planning and monitoring of the supply chain***

43. Closing the gap in the availability of medicines by securing access to quality-assured products at affordable prices for all NTDs is fundamental. Integrated supply and logistics can ensure efficient management, for example by reducing duplication and the costs of parallel supply chains and benefitting from pooled or coordinated procurement. An integrated platform might be set up to accelerate access to new NTD medicines.
44. Access to quality-assured products is being facilitated by promoting WHO’s prequalification of NTD products and collaborative registration with the Secretariat. Guidance on quality assurance in the procurement and donation of NTD products aims to ensure access to safe, efficacious, affordable medicines and other health products.
45. At country level, integration of the NTD supply chain with national medicine supply networks should be assured, including national medicine procurement and distribution systems and health management information systems. The tools and platforms that could be used include the WHO Supply Chain Management Tool for preventive chemotherapy<sup>1</sup> and the Integrated Medical Supply System<sup>2</sup> for diseases that require complex treatment of individual patients. A priority for countries is to improve the availability and quality of information on NTD treatments so as to ensure better decisions and more accurate forecasting. This improvement can be facilitated by the use of tools and guidelines such as real-time online reporting on logistics and handling procedures for NTD medicines, thereby minimizing wastage and improving the return of unused medicines. Stronger monitoring is essential for quality assurance, which should be overseen by national regulatory authorities, to improve the accuracy of forecasting and thus ensure more effective allocation of medicines to meet patients’ needs beyond elimination targets.

### **III.4 Advocacy and funding**

***The message that NTD treatments are a “best buy” in development can be used in advocacy for funding***

46. NTD treatments are considered one of the “best buys” in development, as they are donated, provide a high social return and are cost-effective. The United States Agency for International Development estimated that, for every US\$ 1 spent on NTD programmes, US\$ 26 in donated medicines are given through partnerships with pharmaceutical companies. In addition, for every US\$ 1 invested in preventive chemotherapy for NTDs, the net benefit to individuals could be up to US\$ 25 in averted

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<sup>1</sup> See [https://www.who.int/neglected\\_diseases/preventive\\_chemotherapy/reporting/en/](https://www.who.int/neglected_diseases/preventive_chemotherapy/reporting/en/) (accessed 8 April 2020).

<sup>2</sup> See [http://mss4ntd.essi.upc.edu/wiki/index.php?title=WHO\\_Integrated\\_Medical\\_Supplies\\_System\\_\(WIMEDS\)](http://mss4ntd.essi.upc.edu/wiki/index.php?title=WHO_Integrated_Medical_Supplies_System_(WIMEDS)) (accessed 8 April 2020).

out-of-pocket payment and lost productivity, representing a 30% annualized rate of return. Evidence in favour of including certain NTD interventions in the package of essential interventions for all low-income countries endemic for NTDs is based on a cost per disability-adjusted life year (DALY) averted of 2012 US\$ 250 or less.<sup>(9)</sup> The interventions include preventive chemotherapy for at least five NTDs, comprehensive control (including vector control) for visceral leishmaniasis and early detection and treatment of cutaneous leishmaniasis, human African trypanosomiasis and leprosy.<sup>(13)</sup> The cost of delivering preventive chemotherapy, estimated to be US\$ 0.4 per person, is low and could be even lower with cross-cutting approaches. As NTDs affect the most disadvantaged people in many countries, continued funding for NTDs is a sound investment with a significant social and long-term financial return.

***Considerable progress has been made in advocacy and funding globally and nationally***

47. Advocacy and funding provide countries with the necessary support for delivering NTD interventions. Considerable progress has been made both globally and domestically. For example, Brazil, India and Indonesia contribute significant funding for leprosy and other NTDs programmes. In some countries there have been some increases in overall funding available for integrated NTD programmes, as a result of which geographical coverage and the number of people treated has been expanded and treatments targeted at new diseases have been added.<sup>(15)</sup> The London Declaration on Neglected Tropical Diseases (2012) brought new energy, new partners and additional funding. Pharmaceutical companies donate an average of nearly three billion tablets of safe, quality-assured medicines annually, worth hundreds of millions of United States dollars, to support control and elimination in countries where NTDs are endemic. At WHO's second Global partners meeting on NTDs (Geneva, 19 April 2017), more than US\$ 800 million were pledged for 5–7 years, with new donors such as the END Fund, the Reaching the Last Mile Fund established by the Crown Prince of Abu Dhabi, the Government of Belgium and many others.

***Continued attention and additional funding are still needed to fill gaps in financing***

48. Nonetheless, more advocacy and funding are required to continue towards the 2030 targets and to sustain progress, especially for diseases that are approaching elimination. A clear indicator of the proportion of domestic financing allocated to NTDs would allow quantification and tracking of such investments. Although in 2016 up to US\$ 300 million were donated annually, WHO estimated that NTDs could cost up to US\$ 750 million a year by 2020 over and above the costs of vector control and donations of medicines, leaving a considerable gap. In 2016, at the annual meeting of the WHO Alliance for the Global Elimination of Trachoma by 2020 (GET2020) it was estimated that eliminating trachoma by 2020 would cost about US\$ 1 billion, whereas only US\$ 200–300 million had been pledged at that time.<sup>(16)</sup>
49. To support this road map an investment case and a sustainability framework will be prepared. Both governments and global stakeholders should help to close the funding gaps necessary to fulfil the 2030 targets set herein.

***Domestic financing and mainstreaming into the health system will be critical***

50. Domestic financing will have to be increased to meet the targets, especially in countries that are moving away from bilateral funding. If countries are to carry out their NTD programmes sustainably as part of universal health coverage, NTDs must be accounted for in national strategies and budgets for health, development and poverty alleviation and not only in NTD strategic plans. Inclusion of NTDs in government policies is affordable, as it would require less than 1% of domestic expenditure to meet the 2030 targets.<sup>(2)</sup>
51. Unless NTDs receive adequate resources, they will continue to be neglected. It has been shown that countries procure rabies vaccine only when they have surplus budget, indicating the importance of

initial budgeting for this important product. As national programmes for some NTDs are discontinued (including those for lymphatic filariasis), countries should plan funding for some core activities supported by those programmes, such as sustained preventive chemotherapy for soil-transmitted helminthiasis. NTD advocates and health ministers could inform finance ministries that NTD treatments are “best buys” in development and that therefore investing in NTDs will not only improve the health and well-being of populations but also benefit the most disadvantaged citizens financially and increase productivity.

***Global stakeholders should continue to support and raise the profile of NTDs and ensure coordination and commitment at various levels***

52. The global fight against NTDs involves a diverse group of stakeholders united towards a common goal. One of the strengths of WHO’s work on NTDs is collaboration among communities of practice (such as the supply chain forum), academic institutions and various alliances, which support the Secretariat in responding to countries’ needs. Such partnerships can be strengthened with the continued support of global stakeholders in funding and in advocating sustained commitment and increased support globally and nationally.

***Advocacy and funding are essential for increased and sustained access to effective interventions***

53. Access to effective interventions, often through the generosity of companies, has been the basis for progress in achieving the 2020 goals (Fig. 11). More companies are committing funds to areas such as vector control and diagnostics (e.g. General Electric and Abbott). In addition, countries are finding domestic funding and partners. Moving towards 2030 goals, it will remain crucial to ensure equitable access to effective interventions, for example through renewed commitments to extending the timeframe of donations of medicines. Sustained advocacy and funding from both global and domestic stakeholders will be needed.

***Research and innovation are fundamental enablers of programmatic progress for all diseases***

54. Research, development and innovation are crucial to finding appropriate solutions against all diseases throughout the course of the programmes. Basic, operational and implementation research are required to answer various questions and for establishing a baseline for the prevalence of an NTD and determining when to stop mass drug administration. The research and development of new interventions, diagnostics, tools and treatment approaches must therefore be supported, in collaboration with other stakeholders by means that include product development partnerships (e.g. the Drugs for Neglected Diseases *initiative* and the Foundation for Innovative New Diagnostics). Research is needed into the behavioural and social aspects of communities’ needs and perceptions in enhancing treatment compliance and healthy behaviours in the context of NTDs. WHO’s Global Observatory on Health Research and Development, the UNICEF/UNDP/World Bank/WHO Special Programme for Research and Training in Tropical Diseases and the Coalition for Operational Research on Neglected Tropical Diseases provide leadership and direction on research priorities and support. Innovation may also include potential use of molecular epidemiology, mathematical modelling and new technologies such as “big data”, artificial intelligence, digital health, satellite imagery and drones. For quick assimilation of new findings, technologies and products in local contexts, research and development must be supported in countries where NTDs are endemic, thereby strengthening local research capacity and stimulating further investment.

***Risks of political instability, migration, climate change and antimicrobial resistance are associated with many diseases***

55. Common risks that have been identified for several NTDs include political instability, migration, urbanization, climate change and antimicrobial resistance. Political instability and conflict can be barriers to progress in NTD programmes, such as those for dracunculiasis, human African



trypanosomiasis and cutaneous leishmaniasis. Political instability can also result in gaps in governance, diversion of NTD funding to other causes and difficulties for implementation, such as disruption of infrastructure, restricted access to local populations and risks for health care personnel. Migration and other population movement can result in the introduction or re-introduction of diseases, particularly when displaced populations live in temporary accommodation with inadequate sanitation, poor water storage practices and limited access to health care. Local epidemics or pandemics may significantly limit the implementation of interventions against NTDs during outbreaks. Climate change alters the epidemiology of vector-borne diseases and the spread of NTDs such as dengue and chikungunya. Antimicrobial and insecticide resistance are emerging threats for certain NTDs, especially in view of the expansion of preventive chemotherapy and the widespread use of insecticides for vector control.

56. These challenges highlight the importance of new and innovative approaches to NTDs, such as development of new antimicrobial agents and systems to monitor antimicrobial resistance. Contingency planning would be essential to mitigate the effects of the unforeseen events. Collaboration with governmental actors such as environmental policy makers and migration authorities will be essential to mitigate risks to achieving the 2030 targets.

***Each disease will require a unique set of actions to meet the milestones and targets***

57. Even though certain themes are relevant to many diseases, a unique set of critical actions will be required for each disease and disease group, as outlined in Fig. 12.

**IV. INTENSIFY CROSS-CUTTING APPROACHES**

58. Given the breadth and diversity of the NTD portfolio, a focus on each disease in its own silo to achieve the 2030 targets will be neither cost-effective nor sustainable. These diseases and disease groups and the necessary response must involve not only health systems but also broader public and private sectors. The psychosocial and neurological effects of certain NTDs cannot be managed without well-functioning mental health and social support structures. NTD programmes should incorporate interventions aimed at reducing stigmatization and breaking down barriers to timely access to care and treatment for individuals, families, communities and marginalized groups, such as migrants. Strong data, monitoring systems and supply chains are essential for all NTD programmes. Strengthening links of NTD programmes with national health information systems and among specialized programmes, such as those for polio and vector control for malaria, will be essential for surveillance. Cross-cutting approaches are also cost-effective: mass administration of medicines for treatment of three diseases simultaneously is cheaper and more convenient for communities than in three separate visits. Cross-cutting approaches are also consistent with the vision of universal health coverage and with health systems strengthening in which patients are at the centre of the objectives and operating model.
59. The road map includes four categories of cross-cutting themes, as shown in Fig. 13: *integration* among NTDs; *mainstreaming* into national health systems; *coordination* with relevant programmes such as vector control and programmes for other diseases; and delivery through *strong country health systems* with robust regional and global support. Although these cross-cutting concepts have been stated in various other NTD plans, such as WHO's Global plan to combat Neglected Tropical Diseases 2008–2015 and the actions advocated by the World Health Assembly in resolution WHA66.12 (2013) on neglected tropical diseases, programmes have so far remained largely disease-specific. One aim of the proposed road map is to encourage a shift to cross-cutting work, by providing a clear framework (Figs. 12 and 13) and proposing concrete strategies and courses of action. Most of the recommended cross-cutting actions are based on best practices in countries. Not all will be applicable in every country, but, together, they represent a comprehensive guide for action.

## **IV.1 Integrate approaches across diseases**

### ***A common platform requires combining activities for NTDs with similar delivery strategies and interventions***

60. In some countries, the NTD platform might be a formal programme or directorate within the health ministry, while in others it might be represented by less formal structures such as a task force or national coordinating body. An integrated approach will bring the programmes for NTDs that are endemic in a country onto a single NTD platform, which will allow links among programmes, when practical. A single platform will also centralize planning, implementation and evaluation of interventions for several NTDs, such as for the so-called skin NTDs (Fig. 14) and delivery of NTD interventions in schools. Integration will change the focus from technical interventions in vertical disease silos to an approach based on the needs of patients and communities. An integrated platform will encourage a broader, more holistic approach to include not only prevention but also treatment, care, rehabilitation and health education. An integrated NTD platform can provide support for even the most neglected of the NTDs, ensuring that they are addressed systematically and that the action is commensurate with the need.

### ***There are concrete opportunities for joint interventions among NTDs***

61. Fig. 15 exemplifies ways in which activities for several NTDs can be integrated to ensure more effective, efficient programming. Integration of planning and programme management allows coordinated monitoring and integration of implementation for NTDs with similar delivery strategies and interventions. Several diseases can be grouped or “packaged”, depending on the burden of each in a country, for joint delivery of interventions such as preventive chemotherapy and use of multiplex diagnostics, shown by ticks on each row in the figure. Monitoring, evaluation and reporting should be integrated for all relevant endemic NTDs.

## **IV.2 Mainstreaming delivery platforms within national health systems**

62. NTDs are designated as “neglected” partly because they are frequently overlooked by health systems. Actions against NTDs both contribute to and benefit from strengthened health systems and especially primary and community health care. NTDs must be well positioned to benefit from and contribute to better monitoring and evaluation. Within national governance structures, the NTD platform should build on common and synergistic work for different diseases. Mainstreaming NTD activities into the health system and building capacity to deliver interventions through its infrastructure will contribute to sustainable, efficient NTD prevention and control and enable NTD patients to access all aspects of treatment, care and support. A common indicator and accountability mechanism should be defined to track progress in mainstreaming. These activities will contribute to overall health system strengthening, greater country ownership and poverty alleviation.
63. Integrated approaches to NTDs can and should be mainstreamed within various components of national health systems; for example, planning should be incorporated into overall national health planning and budgeting, data management should be included in health management information systems at all levels, and delivery of medicines should be coordinated through national medicines supply and logistics systems. Diligent monitoring for safe administration of treatment for NTDs and reporting and responding to adverse events align with the objectives of national pharmacovigilance programmes and demonstrates a core element of universal health coverage and high-quality people-centred care. Integrated NTD interventions, from prevention to diagnosis, treatment, care and rehabilitation, can and should be delivered through community or primary- or secondary-care facilities in the national health system (Fig. 16). Existing structures should be used; for example,

NTD capacity-building could be part of a standard health ministry training module or part of staff induction. Even when interventions against NTDs, such as preventive chemotherapy, are required in settings with weak formal health systems, they should be integrated into informal and community health structures. Fig. 16 proposes ways in which NTD programme components can be mainstreamed into health systems, although the details will differ by country.

### ***Benefits of integration and mainstreaming***

64. An integrated approach to NTD activities is expected to result in better health outcomes, greater cost efficiency and effectiveness and better programme management (see Fig. 16). A gradual shift has been occurring towards integrated management of NTDs since 2006, when approaches for combined delivery of preventive chemotherapy were introduced. Additional work is now required to realize the full benefits of integration and mainstreaming. Diseases such as scabies and yaws should be included in existing integrated preventive chemotherapy programmes, which are usually limited to a group of five diseases.<sup>1</sup> Furthermore, more work is required to integrate operations against diseases with similar treatment measures, epidemiology and geographical distribution. NTDs can be integrated more effectively through existing systems and structures, such as vaccination programmes, cold chain, delivery, education and health worker training.
65. Some disease-specific focus will still be required, despite an overall transition to integration. Fig. 17 indicates considerations for achieving a balance between disease-specific and integrated approaches.

## **IV.3 Coordinate efforts across sectors**

### ***Meeting the 2030 targets will require coordination, collaboration and cooperation among many sectors***

66. The SDGs show that there is no single development target. Meeting the 2030 targets for NTDs will require coordination among adjacent sectors and programmes, both within and beyond health, in the broader NTD network. Sectors such as vector control and WASH make critical contributions to progress on NTDs, and working together more effectively can accelerate and sustain progress towards disease elimination and control. Coordination is also necessary with the wide array of relevant NTD partners, including donors, academic institutions, pharmaceutical companies, disease experts, multilateral organizations and implementing partners, to ensure effective service delivery.
67. Coordination is particularly important for the 12 NTDs targeted for elimination and eradication. Experience has shown that NTD interventions alone may be insufficient to eliminate a disease. For example, deworming to prevent schistosomiasis in the Mekong sub-region alone did not prevent reinfection but required parallel activities, including WASH, health education and the One Health approach to deal with animal reservoirs. Furthermore, the burden of Chagas disease in the southern cone of the American continent was reduced by vector control, particularly indoor residual spraying and house improvements, in combination with screening of blood donors to stop transmission via transfusion.

### ***Other sectors play critical roles in the prevention, treatment and care of patients with NTDs***

68. The activities of other sectors can significantly contribute to the prevention, treatment and care of many NTDs. Fig. 18 shows activities that can be undertaken by various health departments and non-health sectors, and Fig. 19 shows the NTDs for which the activities are pertinent. Certain sectors may be particularly appropriate; for example, schools may be the channel for health education on all NTDs.

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<sup>1</sup> Lymphatic filariasis, onchocerciasis, schistosomiasis, soil-transmitted helminthiasis and trachoma.

***The form of coordination depends on the sector and may range from action in NTD-endemic areas to use of the platforms of other sectors to deliver NTD interventions***

69. The purpose and scope of activities and the mechanisms used for coordination depend on the sector and national structures. There is no standard approach to multisectoral collaboration, Fig. 20 outlines three broad categories of coordination at a high level. First, *referral management* comprises coordination primarily among health sectors for a smooth system in which NTD patients are referred to relevant services. *Strategic input* will ensure that other programmes benefit NTD programmes, with relatively little change in programming; for example, vector control for malaria is also beneficial against lymphatic filariasis and leishmaniasis. *Operational collaboration* ensures delivery of NTD interventions through other platforms (such as deworming in schools) or joint implementation (such as detection of paragonimiasis in examinations for tuberculosis). The activities that could be coordinated and the potential mechanisms for interaction with NTDs are shown for WASH in Fig. 21, for the global vector control response in Fig. 22 and for the One Health approach in Fig. 23.

***Effective intersectoral coordination facilitates concerted action towards attaining the SDGs***

70. A well-coordinated NTD network, with defined roles for stakeholders and clear mechanisms of interaction and exchange, has several benefits. Through collaboration, NTDs can benefit from the resources and activities of other sectors. For example, sharing of micro-mapping data on the endemicity of WASH-related NTDs with WASH programmes can direct WASH activities to NTD hotspots. Collaboration may also improve the quality and cost-effectiveness of interventions by ensuring that they are delivered through the most suitable channel. For example, veterinary services would be better suited than an NTD programme to implement an intervention for animal health, such as vaccinating pigs. Effective coordination can also minimize duplication of work. For example, harmonized vector control for both malaria and lymphatic filariasis can reduce overlapping initiatives in countries that are endemic for both diseases.

## **V. CHANGE OPERATING MODELS AND CULTURE TO FACILITATE COUNTRY OWNERSHIP**

71. Roles and responsibilities must be clear at each level and sector of the global NTD community to define the appropriate operating model. Meeting the targets set in this road map will also require shifts in organizational structures, ways of working and thinking. The Secretariat remains committed to supporting countries in implementing their national NTD programmes for better overall global health outcomes and for monitoring and evaluation.

***Country ownership is essential for meeting the 2030 NTD targets with the support of regional and global stakeholders***

72. Countries are both the drivers and the beneficiaries of progress towards the road map targets for 2030. Eliminating at least one NTD in 100 countries and reducing the population that needs interventions against NTDs by 90% will require concerted action by national and local governments in countries endemic for NTDs, and those countries should increasingly assume the leadership in designing, delivering and evaluating their NTD programmes. Local governments (at municipality and district levels) are also essential for successful implementation of interventions and coordination of multisectoral action. As national and local governments increasingly assume leadership, the role of regional and global stakeholders will primarily be one of support.
73. Global development of norms, guidance and tools and technical advances will remain vital. WHO's collaborating centres for NTDs constitute a global network of expertise in activities such as target

product profiles for new NTD products and diagnostics. Regional stakeholders occupy an important position as the interface between global and local levels, providing guidance to countries in translating global targets and in sharing best practices. While the specific activities conducted globally, regionally and nationally will vary and will evolve as the leadership of countries increases, the roles of the three tiers are broadly consistent (Fig. 24).

74. Partners play a pivotal role at all levels but particularly in countries. As countries define their goals in relation to the road map targets, partners can help to fill gaps identified by countries as areas where they need additional support. Clear delineation of responsibilities among partners will ensure geographical coverage, avoid duplication and ensure that no community is overlooked. The coordination of this extensive, diverse network will be supported by WHO, which will work with all stakeholder groups.

#### ***Organizational structures are necessary to support strategies and approaches***

75. Meeting the targets set for 2030 and benefiting from cross-cutting approaches will require effective alignment of organizational structures at all levels. As countries set their NTD targets, which may include several disease-specific and cross-cutting goals, they should consider whether their programme structure can support the strategies and their execution. Transition to cross-cutting approaches can be facilitated by moving along the four dimensions outlined in Fig. 25. This may include setting up a formal NTD unit or a virtual structure as a task force or steering committee for all relevant NTDs and establishing formal mechanisms for multisectoral collaboration. The place at which countries position themselves on the scale in Fig. 25 depends on factors including country size, ministerial structures and disease endemicity. The aim is to shift programmes towards the right-hand side of the scale, thereby marking greater prioritization of NTDs and cross-cutting orientation.
76. Changes in the ways that WHO and global and regional stakeholders work will facilitate the transition of countries towards cross-cutting activities. As countries integrate activities for several NTDs, global stakeholders might consider doing the same. Intersectoral collaboration beyond the health sector, notably for environmental and veterinary health, should be a priority.

#### ***Thinking and culture should also be aligned with the 2030 targets***

77. National leadership in achieving the targets for 2030 set in the road map will require a sense of ownership, commitment and accountability. It is envisaged that national and local governments will take a proactive approach in defining and carrying out an NTD agenda, financed in part or fully from domestic funds. Countries should actively integrate and prioritize endemic NTDs in national and local government health plans, with a dedicated line in the national and local health budgets, ensuring that the amount is commensurate with the burden (for instance, in terms of US\$ spent per DALY). Countries should also proactively foster multisectoral action and build the political will necessary to support NTD elimination and control. Fig. 26 exemplifies the activities a country may undertake to design a national NTD plan and to attract the necessary support.
78. Country ownership of NTDs is not confined to one national entity, as it is relevant at all levels of government. Health systems in many countries are becoming decentralized; therefore, the commitment and funding required to sustain progress towards 2030 should extend to local governments and authorities and also include civil and community leaders at all levels of society, given their core role in raising awareness about endemic diseases, behavioural change and building local support for NTD interventions. For example, in trachoma-endemic communities, women who have undergone eye surgery are among the most effective groups for encouraging others with the disease to seek treatment. Additionally, involvement of patient groups and people living with NTDs in designing NTD programmes can empower them and ensure that interventions adequately cater to patient needs. Mainstreaming the participation of young people across all NTD activities will be

important for the attainment of the goals of this road map. Youth engagement builds the capacity of youth to influence positive change, harnessing their energy, values-based motivation and social connectedness in order to spread information, generate innovative solutions and change communal behaviours and norms in favour of national NTD programmes.

79. Changes in thinking in global and regional organizations can aid the transition towards the cross-cutting approaches proposed in this road map. These changes include moving away from a siloed disease-specific approach to consideration of areas of mutual benefit and collaboration with other organizations to progress towards elimination and control. As countries move towards stronger coordination and collaboration with other sectors vital for NTD control - such as WASH, the veterinary and agricultural sectors and vector control - stakeholders can initiate such links at global and regional levels, for instance interactions between the NTD and WASH programmes within WHO. Connections will thus be formed at all levels to strengthen overall multisectoral exchange. Donors could make their funding more flexible to cover cross-cutting initiatives, for example by funding integrated programmes (such as capacity-building for skin NTDs, morbidity management and integrated preventive chemotherapy campaigns). They could also accept general reports on NTDs from countries rather than requiring separate reports for each funded programme; that change would reduce the workload of countries and empower them to manage their NTD programmes.

## **VI. CONCLUSIONS**

80. Despite the significant progress that has been made, the burden of NTDs remains heavy for the populations who carry it, who are some of the most vulnerable and marginalized people in the world. In view of the growing commitment of the global community to attaining the SDGs and universal health coverage, particularly in the decade of action for the SDGs, this road map builds on the experiences and lessons learned and the momentum of the past decade. All parties are encouraged to evaluate their approaches to improve the efficiency and effectiveness of their contributions.
81. The road map will be revised in accordance with evolving disease epidemiology and emerging opportunities for concerted action. Formal global reporting on progress is planned in 2024, 2026 and 2029, so that adjustments can be made as required. The overall impact of the actions set out in the road map will be evaluated in a final report in 2031. The dynamism and openness of the iterative and consultative process are expected to foster greater collaboration within and beyond the NTD community in order to lessen the global burden.
82. This road map is a call to action for Member States, donors, implementing partners, disease experts and all other stakeholders to align their strategies and plans towards the prevention of infections and alleviation of the suffering of people affected by NTDs.



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### **Box. Process used to set targets for 2021–2030**

#### **2018**

- The Strategic and Technical Advisory Group for Neglected Tropical Diseases requests a broad, evidence-based process to prepare the new road map.
- Disease-specific expert groups review global progress, national programme data and research outcomes and propose targets.

#### **2019**

- An NTD Steering Committee consisting of the relevant director in headquarters and regional advisors on NTDs from all WHO regions is established to oversee the development process.
- Targets and their determinants are reviewed through epidemiological models with the NTD Modelling Consortium.
- Two rounds of online surveys are administered on the targets and disease summaries, and more than 300 responses are received.
- Leads of disease programmes review and confirm targets, in consultation with relevant stakeholders and disease experts,
  - focus on outcome, impact and cross-cutting indicators
  - review process and outcome indicators for diseases targeted for control or new NTDs
- Regional workshops attended by national programmes and various stakeholders convened to formulate targets and the strategic approach for attaining them and how to monitor progress.
- Detailed multisectoral consultations held with selected Member States, national NTD programme managers and WHO regional offices on overall road map strategy and to endorse targets and milestones.
- The Strategic and Technical Advisory Group for Neglected Tropical Diseases and the NTD Steering Committee review and endorse the targets and milestones.

#### **2020**

- The Executive Board at its 146th session requested the Director-General to develop the road map for neglected tropical diseases 2021–2030.
- Following the decision of the Executive Board, the draft road map is made available for online consultation, an informal briefing is held with Member States (9 March) and feedback is incorporated.
- Finalized draft road map submitted to the Seventy-third World Health Assembly for consideration.



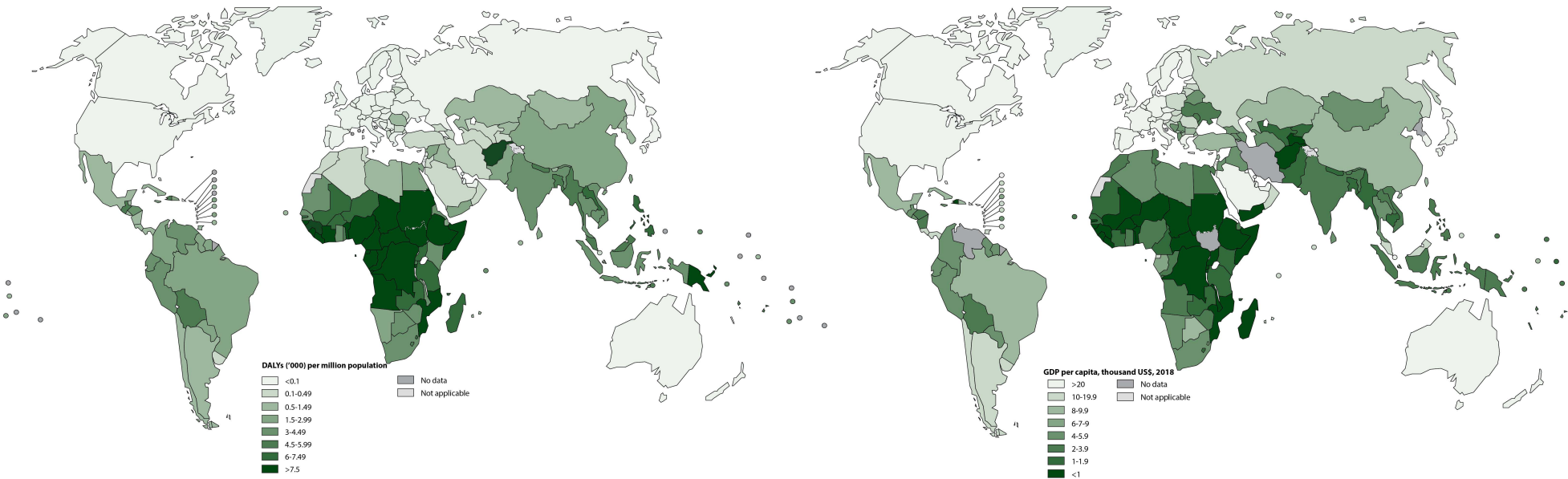
**Fig. 1. Geographical spread of the NTD burden, by DALY and gross domestic product**

<sup>1</sup> Data for cumulative DALYs are available only for human African trypanosomiasis, Chagas disease, schistosomiasis, leishmaniasis, lymphatic filariasis, onchocerciasis, cysticercosis, echinococcosis, dengue, trachoma, rabies, leprosy and soil-transmitted helminthiasis.  
Note: The number of NTD-related DALYs would be significantly higher if issues such as stigmatization, mental health (e.g. anxiety and depression) and co-morbidity were considered.

Data source: WHO ([https://www.who.int/healthinfo/global\\_burden\\_disease/metrics\\_daly/en/](https://www.who.int/healthinfo/global_burden_disease/metrics_daly/en/)) for DALYs and the World Bank (<https://data.worldbank.org/indicator/NY.GDP.PCAP.CD>) for GDP per capita

NTD burden per million inhabitants, DALYs<sup>1</sup>,

GDP per capita, thousand US\$, 2018



**Fig. 2. Interactions among interventions against NTDs and SDGs**

Successful interventions against NTDs can contribute to various other SDGs besides good health and well-being



Progress on other SDGs can help achieve the NTD goal



SDGs require strong global partnerships



**Fig. 3. Progress against NTDs**



### Delivery of interventions and impact

**65% preventive coverage** (2018) for populations at risk in endemic areas, up from 42% in 2012

**500 million fewer people no longer require interventions against NTDs**

**Close to 1 million surgical treatments provided** for trachomatous trichiasis since 2014

**40 countries, territories and areas have eliminated at least one NTD**



### New interventions, tools and diagnostics

**New treatment approaches** e.g. ivermectin–diethylcarbamazine citrate–albendazole (IDA) for lymphatic filariasis, fexinidazole for human African trypanosomiasis, paediatric praziquantel (in the pipeline) for schistosomiasis, antibiotics for Buruli ulcer (instead of surgical treatment) and azithromycin for yaws (instead of injected benzathine benzylpenicillin)

**New diagnostics** e.g. rapid and multiplex diagnostic tests for onchocerciasis, lymphatic filariasis, yaws and human African trypanosomiasis; circulating cathodic antigen assay for *Schistosoma mansoni*; others in the pipeline, e.g. mycolactone rapid diagnostic test for Buruli ulcer

**Novel vector control tools** such as sterile insect technique, incompatible insect technique, cytoplasmic incompatibility technique and population replacement techniques (by *Wolbachia* spp.), new traps and insecticides



### Extension of overall scope and support for NTDs

**Three new disease groups added to the portfolio of NTDs:** mycetoma, chromoblastomycosis and other deep mycoses, scabies and other ectoparasitoses and snakebite envenoming, increasing the total to 20 diseases and disease groups

**New donor commitment of over US\$ 1 billion** pledged since 2017

**Drug donation commitments secured for six additional drugs:** 11 pharmaceutical companies annually donate a total of nearly 3 billion tablets of safe, quality-assured medicines worth hundreds of millions of US dollars



### Creation of strategies, guidelines and resolutions

**Resolution WHA66.12 adopted on NTDs (2013)**

**Health Assembly adopted resolutions for two diseases:** mycetoma (2016) and snakebite envenoming (2018); additional resolution on the global vector control response (2017); in total, the Health Assembly has adopted resolutions for 17 the 20 diseases.

**15 NTDs with global disease strategies** in place

**14 NTDs for which WHO disease guidelines and manuals** are available

**Development of integrated strategies** e.g. for skin NTDs and vector control



### Strengthening NTD structures and cross-sectoral collaboration

**45 WHO collaborating centres** support WHO's activities on NTDs

**Formation of the NNN (NTD NGO Network)** to coordinate the work of organizations engaged in the fight against NTDs, and other NTD-related alliances

**Establishment of the Coalition for Operational Research on NTDs** as a leading scientific body focused on NTDs

**Stronger multisectoral collaboration**, e.g. development of global 2015–2020 WASH strategy for NTDs, NTDs included in Global Vector Control Response, One Health approach

**Creation of the Expanded Special Project for Elimination of Neglected Tropical Diseases (ESPEN)** to strengthen WHO capacity to tackle five NTDs amenable to preventive chemotherapy in Africa.



### Increase in country ownership and commitment

**More than 50 countries have national plans** related to NTDs.

**An increasing number of countries include NTDs in their national health care budgets** and contribute domestic funding to tackle these diseases.

Dengue	<p><b>Sustainable dengue vector control interventions established</b> in 10 endemic priority countries</p> <p><b>Dengue control and surveillance systems established</b> in five of the six WHO regions</p>
Dracunculiasis	Currently on the verge of eradication with <b>54 human cases reported in four countries</b> (Angola, Cameroon, Chad and South Sudan) <b>in 2019</b> , down from over 500 cases in 2012; <b>187 Member States certified free of the disease</b>
Human African trypanosomiasis	<b>Reduction in the annual number of cases from over 7000 in 2012 to fewer than 1000 today</b> , eclipsing the original target of 2000 cases by 2020
Leishmaniasis (visceral)	<b>Reduction in the number of cases reported annually in South-East Asia from more than 50 000 cases to fewer than 5000 in 2018</b> ; 93% of cases in 2018 were reported from India and 7% from Bangladesh and Nepal
Lymphatic filariasis	<b>40% (or 597 million) reduction in the population requiring mass drug administration</b> since the beginning of the Global Programme to Eliminate Lymphatic Filariasis; <b>disease eliminated as a public health problem in 16 countries</b>
Onchocerciasis	<b>Transmission eliminated in four countries in the Region of the Americas</b> (Colombia, Ecuador, Guatemala, Mexico)
Rabies	<b>Elimination of dog-mediated human rabies in one country</b> (Mexico)
Schistosomiasis	<b>63% preventive chemotherapy coverage rate achieved for school-aged children</b> , almost reaching 2020 target of 75%
Soil-transmitted helminthiasis	<b>54% of pre-school and school-aged children who require treatment are regularly treated</b> , almost reaching 2020 target coverage rate of 75% <b>46 countries with 75% treatment coverage in pre-school and school-aged children</b> , almost reaching 2020 target of 75 countries
Trachoma	<b>Eliminated as a public health problem in nine countries</b> (Cambodia, China, Ghana, Islamic Republic of Iran, Lao People's Democratic Republic, Mexico, Morocco, Nepal, Oman)
Yaws	<b>Elimination of transmission verified in one country</b> (India) Donation of azithromycin secured
Leprosy	<b>21.4% reduction in number of cases with grade 2 disabilities</b> , with possibility to reach the target of reducing grade 2 disabilities to less than one case per million population Donation of multidrug therapy is assured

**Fig. 4. Shifts in approaches to addressing NTDs**



**Fig. 5. Areas that require concerted action**

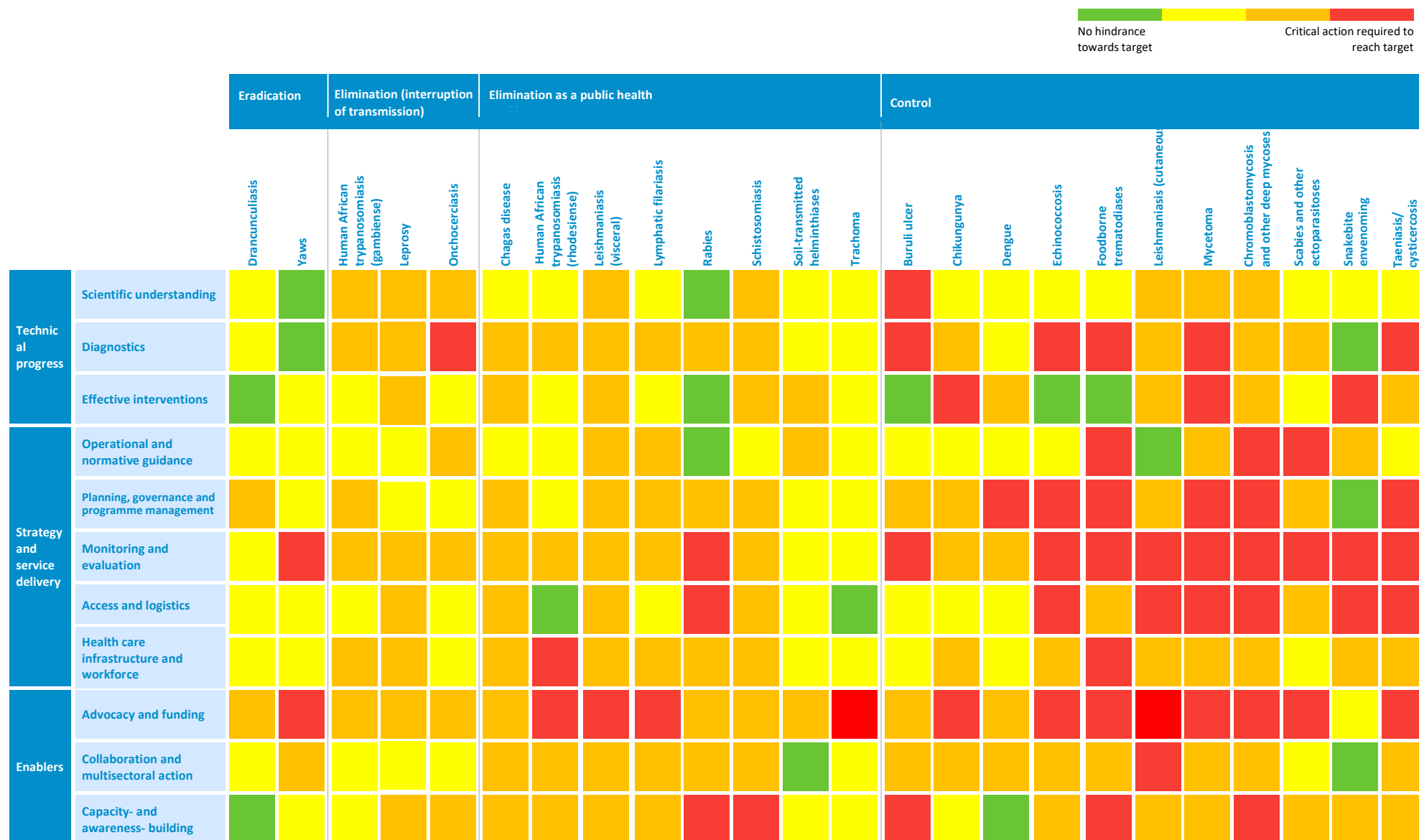
<b>Accelerate programmatic actions</b>	Technical progress, e.g. scientific understanding, effective intervention
	Strategy and service delivery, e.g. planning and implementation, access and logistics
	Enablers, e.g. advocacy and funding, collaboration and multisectoral action
<b>Intensify cross- cutting approaches</b>	Integrating NTDs on common delivery platforms that combine work on several diseases
	Mainstreaming within national health systems to improve the quality of NTD management in the context of universal health coverage
	Coordinating with other sectors within and beyond health on NTD-related interventions
<b>Change operating models and culture to facilitate country ownership</b>	Country ownership at national and subnational levels
	Clear stakeholder roles throughout NTD work
	Organizational set-ups, operating models and thinking aligned to achieve the 2030 targets
Supported by enablers, e.g. disaggregated data, monitoring and evaluation, capacity-building	

**Fig. 6. Dimensions for assessing disease-specific actions**

**Dimensions**

Technical	Scientific understanding	Thorough <b>understanding of disease epidemiology and pathology</b> <b>No gaps</b> in research that would hinder progress towards achieving targets <b>Understanding of the non-target effects</b> of interventions (e.g. ancillary benefits, environmental effects)
	Diagnostics	<ul style="list-style-type: none"> <li>▪ <b>Availability of effective, standardized, affordable diagnostics</b> for timely detection, assessment of end-points, surveillance</li> <li>▪ <b>Availability of point-of-care diagnostics</b> (where appropriate) usable at community level and in low-resource settings</li> </ul>
	Effective interventions	<ul style="list-style-type: none"> <li>▪ <b>Effective, affordable interventions</b> for prevention, treatment, case management, rehabilitation and care</li> <li>▪ <b>Continued innovation and adaptation</b> of interventions</li> </ul>
Strategy and service delivery	Operational and normative guidance	<ul style="list-style-type: none"> <li>▪ <b>Clear definitions of end-points and operational approach</b> to achieve and sustain them</li> <li>▪ <b>Availability of technical guidelines</b>, e.g. for validation or verification</li> </ul>
	Planning, governance and programme implementation	<ul style="list-style-type: none"> <li>▪ <b>Alignment and coordination of work</b> among relevant stakeholders to achieve overall goals and milestones, based on a strategic plan</li> <li>▪ <b>Appropriate country governance and commitment</b> for programme management and effective delivery</li> <li>▪ <b>Clear stakeholder responsibilities</b> and effective, coordinated working processes to implement relevant interventions</li> <li>▪ <b>Effective planning and implementation</b> at the country level</li> <li>▪ <b>Safe administration of treatment and diligent monitoring and response</b> to adverse events</li> </ul>
	Monitoring and evaluation	<ul style="list-style-type: none"> <li>▪ <b>NTD monitoring and evaluation framework and mechanisms to monitor and report progress</b> towards stated goals</li> <li>▪ <b>Standardized mapping and impact assessment</b> for detailed view of disease epidemiology and progression</li> <li>▪ Continuous, systematic, institutionalized collection, analysis and interpretation of <b>health data disaggregated by age, gender, location</b>, supported by strong data management systems and tools to assist in data interpretation for informed decision-making at all levels</li> <li>▪ <b>Strengthened and institutionalized surveillance</b> for the disease, including post-validation and elimination surveillance</li> </ul>
	Access and logistics	<ul style="list-style-type: none"> <li>▪ <b>Adequate supply of affordable, quality-assured medicines, diagnostics and other medical products</b> at all levels</li> <li>▪ <b>Efficient supply chain</b> for effective allocation and distribution of medicines, diagnostics and other medical products where they are needed while minimizing wastage and loss, e.g. with modern online inventory management systems</li> </ul>
	Health care infrastructure and workforce	<ul style="list-style-type: none"> <li>▪ <b>Robust health systems and primary health care infrastructure</b> for delivering NTD interventions in models of integrated patient care</li> <li>▪ <b>Laboratory capacity and network</b> to support NTD programmes</li> <li>▪ <b>Aptly skilled health care workers, including community volunteers</b> and community healers, to meet clinical, entomological and community needs</li> </ul>
Enablers	Advocacy and funding	<ul style="list-style-type: none"> <li>▪ <b>Clear identification of funding gaps, and resource mobilization plans to address them</b></li> <li>▪ <b>Effective policy dialogue and advocacy</b> to mobilize support for interventions in national and district health care delivery plans</li> <li>▪ <b>Adequate international and domestic funding</b> to ensure sustainability of programmes, deployed with adequate lead time and consistency</li> </ul>
	Collaboration and multisectoral action	<ul style="list-style-type: none"> <li>▪ <b>Collaboration among stakeholders</b> across levels and sectors with clear accountability to ensure an effective, synergetic approach to delivering interventions</li> </ul>
	Capacity- and awareness-building	<ul style="list-style-type: none"> <li>▪ <b>Capacity-building</b> to ensure high-performing programmes, e.g. <b>pre-deployment</b> and <b>in-service training</b>, transfer of skills from vertical NTD programmes to primary health systems, plans to handle health worker attrition and retirement, sharing uptake of best practices</li> <li>▪ <b>Awareness-generation activities</b> to educate and inform endemic communities e.g. on behaviour changes, MDA scheduling, treatment and care options</li> </ul>

**Fig. 7. Gap assessment for each NTD**





**Fig. 8 The role of diagnostics**

	Details	Examples (non-exhaustive)
Accelerates elimination	Use data to inform elimination strategies more rapidly	<p><b>Human African trypanosomiasis</b> – specific field diagnostics for screening and high-throughput, cost-effective tools for surveillance</p> <p><b>Leprosy</b> – A molecular test would allow earlier detection and facilitate breaking transmission</p>
Reduces morbidity	Reduce morbidity by identifying cases in order to target treatment (or to not treat in cases of severe adverse effects)	<p><b>Visceral leishmaniasis</b> – A more sensitive rapid diagnostic test would improve treatment in East Africa</p> <p><b>Onchocerciasis and loiasis</b> – In the absence of diagnostics for <i>Loa loa</i>, hypo-endemic areas (millions of people) are not treated because of fear of risk of severe adverse events</p>
Reduces or optimizes cost	Reduce costs to country programmes, pharmaceutical partners and international donors by targeting treatment more effectively or saving years of mass drug administration	<p><b>Lymphatic filariasis</b> – Because of lack of diagnostics, 5–6-year programmes have to be extended by 1–3 years, resulting in 15–50% excessive use of medicines</p> <p><b>Schistosomiasis</b> – A rapid test would allow targeted preventive chemotherapy for more efficient control</p>

Diagnostics are also critical for monitoring, evaluation and surveillance, e.g. to

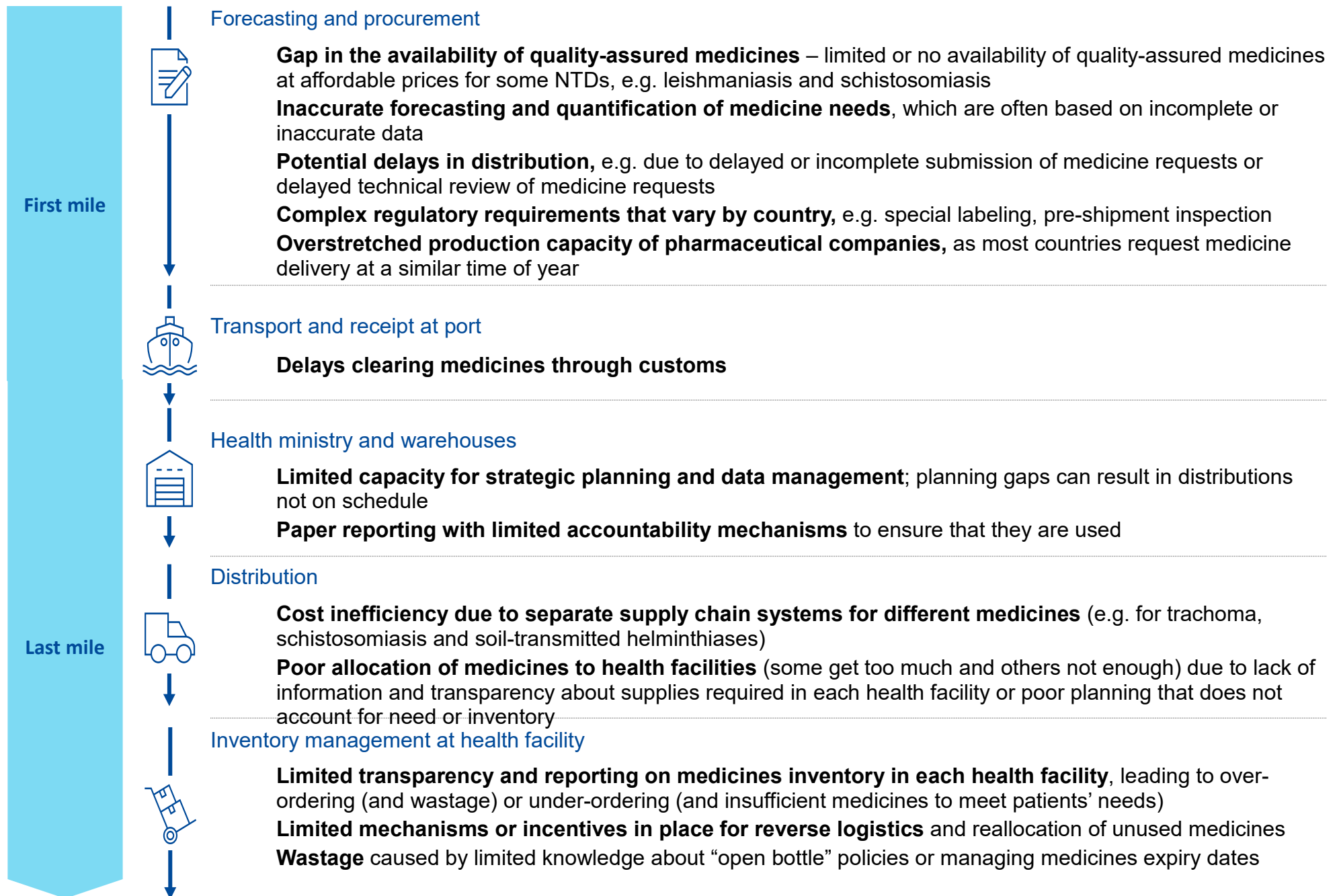
- **guide policy decisions** on the necessary intensity, frequency and duration of intervention; and
- **monitor disease trends** and assess the effectiveness of interventions.

# Fig. 9. Assessment of diagnostic gaps and priorities



Disease	Mapping	Starting treatment	Stopping treatment	Post-treatment surveillance	Priorities
Lymphatic filariasis					Develop rapid diagnostic tests that are not cross-reactive with <i>Loa loa</i> Improve reliability of the Alere filariasis test strip and the Brugia rapid point-of-care cassette test; improve diagnostics for post-MDA surveillance Ensure reporting of problems with diagnostic tests for monitoring their quality
Onchocerciasis					Optimize the Ov16/dual <i>O. volvulus/Wuchereria bancrofti</i> antigen test for onchocerciasis and lymphatic filariasis, and find biomarkers for new surveillance tools Continue to evaluate performance of diagnostics in development Develop target product profiles for new and rapid diagnostic tests designed for the needs of programmes Develop a confirmatory diagnostic or diagnostics for use in low-prevalence settings for use in mapping, deciding to stop MDA and surveillance Develop diagnostic strategy for determination of intensity of <i>Loa loa</i> infection Relate prevalence measured by serology to indices of vector transmission
Scabies and other ectoparasitoses					Validate clinical diagnostic algorithms for programmatic use Develop population level diagnostics to facilitate integration with other NTD activities, and evaluate programme end-points
Schistosomiasis					Develop or introduce standardized, sensitive point-of-care diagnostic for use in various prevalence settings and all schistosome species; use for mapping Create a repository of sera, urine and stools for development, validation and evaluation of diagnostics Develop test for resistance to praziquantel Develop molecular test for xenomonitoring and surveillance Develop point-of-care diagnostic for genital manifestations
Soil-transmitted helminthiasis					Develop highly specific and sensitive biomarkers in a test for use in the field to decide on stopping preventive chemotherapy Develop to detect resistance for use in the field Develop molecular platforms (multiplex) to detect NTDs other than soil-transmitted helminthiasis in the field for cross-cutting use
Trachoma					Standardize diagnostic procedures and prepare guidance Conduct research to understand whether tests for current or previous ocular <i>Chlamydia trachomatis</i> infection would help programmes to determine whether to discontinue interventions and monitor populations afterwards
Disease	Screening	Confirm diagnosis	Surveillance	Priorities	
Buruli ulcer				Develop rapid diagnostic tools for use in a public health centre or community for early diagnosis, reducing morbidity and confirming cases Improve detection of viable <i>Mycobacterium ulcerans</i> in wound samples to distinguish between treatment failure and paradoxical reaction with methods such as mycolactone detection and sequencing of the rRNA	
Chagas disease				Validate effectiveness of rapid diagnostic tests and develop affordable ones Validate an effective point-of-care diagnostic for infants Evaluate biomarkers of success or failure of treatment Simplify and bring up to date diagnostic algorithms to improve access and shorten time to diagnosis	
Dengue				Improve quality assurance for point-of-care rapid diagnostic tests Develop polymerase chain reaction (PCR) test for confirmation of diagnosis	
Dracunculiasis				Develop field test to detect pre-patent infection in humans, dogs and other animals Develop field pond-side test for detecting <i>Dracunculus medinensis</i> DNA in copepods	
Echinococcosis				Bring standardized ELISA for dogs to market Define target product profile, and develop optimal diagnostic for humans	
Foodborne trematodiasis				Finish development of more sensitive serological techniques and polymerase chain reaction assays	
Human African trypanosomiasis				Develop field-adapted diagnostic and detection tools (e.g. rapid screening or diagnostic tests) for use in primary health care facilities Ensure independent, multicentre evaluation of new tools Include blood microscopy in clinical and laboratory algorithms (for rhodesiense human African trypanosomiasis)	
Leishmaniasis (visceral)				Develop more sensitive rapid diagnostic tests for use in East Africa Develop less invasive, highly specific tests to measure parasite level Develop less invasive test of cure of post-kala-azar dermal and visceral leishmaniasis	
Leprosy				Maintain and strengthen capacity for clinical diagnosis Maintain access to and capacity for slit-skin smear technique Develop a point-of-care test to confirm diagnosis and detect infection in populations at risk Develop a vaccine to improve prevention of new leprosy cases	
Mycetoma, chromoblastomycosis and other deep mycoses				Develop rapid diagnostic or serological tests to improve early detection in primary health care Evaluate and standardize sporotrichin skin testing for diagnosis of sporotrichosis Facilitate skin scraping, biopsy and fungal culture and histopathology assessment of deep skin lesions	
Rabies				Develop an ante-mortem diagnostic test for use in primary health care facilities Validate post-mortem diagnosis of rabies in animals (e.g. non-invasive sample collection combined with rapid diagnostic test) to improve post-bite treatment	
Snakebite envenoming				Standardize and validate current clinically-relevant bedside diagnostic tests to confirm specific clinical syndromes (e.g. 20-minute whole blood clotting test for coagulopathy) Develop simple low-cost "Yes/No" diagnostic (immunoassay or other method for identifying biting species for disease ecology) to reduce delays in administration of antivenom	
Taeniasis and cysticercosis				Develop and validate specific, sensitive diagnostic tools for porcine cysticercosis Develop a sensitive, specific point-of-care diagnostic for human taeniasis and neurocysticercosis in resource-limited settings	
Yaws				Develop a sensitive point-of-care molecular test (e.g. polymerase chain reaction) to distinguish yaws from other skin ulcers (e.g. <i>Haemophilus ducreyi</i> ) and to monitor resistance to azithromycin	

Fig. 10. Current challenges along the NTD supply chain



**Fig. 11. Current status of commitments to donations of medicines**

<b>Company</b>	<b>Medicine</b>	<b>Quantity donated</b>	<b>Disease</b>	<b>Commitment</b>	<b>Donation coordinator</b>
<b>Bayer</b>	Nifurtimox	7 750 000 tablets total	Chagas disease	2016–2021	WHO
	Nifurtimox (120 mg)	300 000 tablets annually	Human African trypanosomiasis	2019–2021	WHO
	Nifurtimox (30 mg)	20 000 tablets annually	Human African trypanosomiasis	2019–2021	WHO
	Suramin	10 000 vials annually	Human African trypanosomiasis	Until 2020	WHO
	Niclosamide (400 mg)	2 800 000 tablets total	Taeniasis/cysticercosis	2020–2024	WHO
	Praziquantel (600 mg)	1 339 000 tablets total	Taeniasis/cysticercosis	2020–2024	WHO
<b>Eisai</b>	Diethylcarbamazine citrate	2 200 000 000 tablets total	Lymphatic filariasis	Until elimination	WHO
<b>Gilead Sciences</b>	Liposomal amphotericin B	380 000 vials total	Visceral leishmaniasis	2017–2020	WHO
<b>Sanofi</b>	Eflornithine	Unlimited	Human African trypanosomiasis	Until 2020	WHO
	Melarsoprol	Unlimited	Human African trypanosomiasis	Until 2020	WHO
	Pentamidine	Unlimited	Human African trypanosomiasis	Until 2020	WHO
	Fexinidazole	Unlimited	Human African trypanosomiasis	Until 2020	WHO

<b>Novartis</b>	Multidrug therapy <sup>1</sup>	Unlimited	Leprosy	2000–2020	WHO
	Clofazimine	Unlimited	Severe erythema nodosum leprosum reactions	2000–2020	WHO
	Triclabendazole	600 000 tablets total	Fascioliasis	2016–2022	WHO
<b>EMS</b>	Azithromycin	Up to 153 000 000 tablets	Yaws	2018–2022	WHO
<b>Pfizer</b>	Azithromycin	Unlimited	Trachoma	1998–2025	International Trachoma Initiative
<b>Johnson &amp; Johnson</b>	Mebendazole	200 000 000 tablets annually	Soil-transmitted helminthiasis (SAC) <sup>2</sup>	Until 2025	WHO
<b>GlaxoSmithKline</b>	Albendazole	600 000 000 tablets annually	Lymphatic filariasis	Until elimination	WHO
		400 000 000 tablets annually	Soil-transmitted helminthiasis (SAC) <sup>2</sup>	Until elimination	WHO
<b>Merck KGaA</b>	Praziquantel	250 000 000 tablets annually	Schistosomiasis (SAC) <sup>2</sup>	Unlimited	WHO
<b>MSD</b>	Ivermectin	Unlimited	Onchocerciasis	Until elimination	Mectizan Donation Program
		Unlimited	Lymphatic filariasis in co- endemic countries	Until elimination <sup>3</sup>	Mectizan Donation Program
		Up to 100 000 000 treatments annually	Lymphatic filariasis for triple- therapy MDA	Until 2025	Mectizan Donation Program

<sup>1</sup> Rifampicin, clofazimine, dapsone.

<sup>2</sup> For school-aged children (SAC).

<sup>3</sup> In Yemen and African countries where lymphatic filariasis and onchocerciasis are co-endemic.

**Fig. 12. Critical actions for each disease and disease group to reach the 2030 targets**

	Critical action 1	Critical action 2	Critical action 3
TARGETED FOR ERADICATION			
Dracunculiasis	Develop scientific and operational protocols for elimination of infections in animals	Investigate why dracunculiasis infection occurred in Angola to better understand the current challenges and take appropriate measures to stop transmission.	Initiate certification in Democratic Republic of the Congo and Sudan to avoid missing targets.
Yaws	Start MDA in all endemic areas after mapping.  Strengthen active and passive surveillance, including in countries of unknown status.	Ensure effective, efficient integration and/or co-implementation with other programmes and sectors (e.g. integrated management of skin NTDs).	Increase funding and advocacy for yaws eradication, including securing longer-term commitments and increasing the priority of yaws as suitable for preventive chemotherapy and a skin NTD
TARGETED FOR ELIMINATION (INTERRUPTION OF TRANSMISSION)			
Human African trypanosomiasis (gambiense)	Integrate control and surveillance activities in the peripheral health system; identify and prepare sentinel sites for surveillance post-elimination.	Develop a long-term funding plan, including campaigns for resource mobilization to meet needs.	Reinforce ownership of elimination and targets by endemic countries by advocacy to health authorities and heads of states in the context of decreasing numbers of cases.
Leprosy	Update country guidelines to include use of single-dose rifampicin for post-exposure prophylaxis for contacts; advance research on new preventive approaches.	Continue investment into diagnostics for disease and infection. Develop surveillance strategies, systems and guidelines for case-finding and treatment. Ensure resources for validation.	Ensure medicines supply, including access to multi-drug therapy, single-dose rifampicin, second-line treatments and medicines to treat reactions. Monitor adverse events (pharmacovigilance) and resistance.
Onchocerciasis	Start mass drug administration in all endemic areas after mapping, improve delivery of current programmes, and implement alternative strategies where appropriate.	Develop improved diagnostics to facilitate mapping and decisions to eliminate transmission; develop improved diagnostic strategy for loiasis; increase programme capacity to perform entomological and laboratory diagnostics.	Develop a macrofilaricide and diagnostic or other elimination strategies to accelerate interruption of transmission; design a case management strategy; develop and implement elimination strategies for areas where loiasis is endemic but onchocerciasis is hypoendemic
TARGETED FOR ELIMINATION AS A PUBLIC HEALTH PROBLEM			
Chagas disease	Advocate with national or federal health ministries to recognize Chagas disease as a public health problem, and establish effective prevention, control, care and surveillance in all affected territories.	Improve medical care for Chagas disease, from training health care workers in-service to integrating training at all levels of health services.	Ensure that countries in which domiciliary vector transmission is still registered in certain territories comply with prevention, control and surveillance.
Human African trypanosomiasis (rhodesiense)	Develop new field-adapted tools to detect the disease (e.g. rapid diagnostic test) for use in primary health care facilities, and safe and effective treatment.	Integrate control and surveillance into national health systems, and strengthen capabilities through national plans for health care staff for training, awareness and motivation	Coordinate vector control and animal trypanosomiasis management among countries, stakeholders and other sectors (e.g. tourism and wildlife) through multisectoral national bodies to maximize synergies.
Leishmaniasis (visceral)	Enable early detection to ensure prompt treatment, through, for example, active case detection.	Ensure supply of medicines to ensure prompt access to treatment, especially during outbreaks, and especially for children and young adults, who make up 50-70% of the affected population.	Develop more effective and user-friendly treatment and diagnostics, especially for East Africa.
Lymphatic filariasis	Start mass drug administration in all endemic districts and strengthen it in all settings. Implement improved interventions where appropriate (e.g. three-medicine treatment in settings that qualify; strategies for hotspots).	Improve capacity for morbidity management and disability prevention; prioritize in primary health care and as part of universal health coverage.	Improve diagnostics, strengthen criteria for stopping mass drug administration and establish surveillance before and after it and in post-validation standards; update guidelines with new tools and strategies as appropriate.
Rabies	Improve forecasting of demand for rabies vaccine and immunoglobulin to ensure adequate supply in facilities, and develop innovative approaches for delivery to ensure timely access to post-exposure prophylaxis and dog vaccination.	Build national capacity of health workers (e.g. rabies exposure assessment, diagnosis, administration of post-exposure prophylaxis) and for dog management (e.g. mass dog vaccination).	Strengthen and institutionalize surveillance for rabies; improve country compliance with reporting to ensure data availability.
Schistosomiasis	Define indicator for measuring morbidity.	Implement effective interventions, including extending preventive chemotherapy to all populations in need and ensuring access to the necessary medicines; implement targeted snail control with updated guidelines; continue micro-mapping and targeting.	Develop diagnostic tests, including standardized point-of-care diagnostic, and develop new interventions, including alternatives to praziquantel and methods of snail control.
Soil-transmitted helminthiasis	Increase political commitment to ensure sustainable domestic financing.	Develop more effective medicines and medicine to improve patient outcomes and in case of drug resistance.	Develop comprehensive surveillance and mapping systems to target treatment and monitor drug resistance.
Trachoma	Improve access to high-quality surgery, tracking of outcomes and management of post-surgery trachomatous trichiasis; initiate management of people with trachomatous trichiasis as soon as possible (about 2.5 million in 2019).	Increase knowledge through research, and extend partnerships to increase work, specifically on facial cleanliness and environmental improvement to reduce transmission.	Develop an efficient, cost-effective way to detect and monitor recrudescence of infection, which could be important for post-validation.

## TARGETED FOR CONTROL

Buruli ulcer	Build capacity of health workers to clinically diagnose and treat the disease and community health workers to detect and refer cases for early treatment, furthering integration among skin NTDs.	Develop rapid diagnostic tools for use in public health and community centres to ensure early diagnosis, reduce morbidity and confirm cases	Create comprehensive surveillance systems in all endemic countries, including micro-mapping, to improve targeting and integrating interventions with those for other NTDs in co-endemic areas to improve case detection.
Dengue and chikungunya	Continue developing preventive vaccines for all at-risk populations.	Further develop the evidence base on effectiveness of vector control strategies.	Continue collaborating with environmental sector and engineers to reduce mosquito habitats.
Echinococcosis	Map disease prevalence to establish baseline data, and strengthen integrated national surveillance.	Develop guidelines for effective prevention and control strategies, and implement them in the field.	Strengthen implementation of ultrasound diagnosis and effective interventions, and ensure access to albendazole.
Foodborne trematodiasis	Develop accurate surveillance and mapping tools and methods, with information on environmental factors involved in infection.	Estimate number of tablets required for control and secure donations of praziquantel	Promote application and awareness of preventive chemotherapy, WASH and One Health interventions. Evaluate impact, and use the results in training health care staff.
Leishmaniasis (cutaneous)	Develop and scale up easy-to-administer oral or topical treatment that could be used in health centres.	Improve the affordability and sensitivity of rapid diagnostic test for detection of cases, and the availability of treatment.	Estimate the burden of the disease by improving surveillance, and establish a patient database to ensure effective monitoring of the impact of control interventions.
Mycetoma, chromoblastomycosis and other deep mycoses	Develop differential rapid diagnostic test and effective treatment, and establish surveillance for case detection and reporting.	Develop a standardized field manual for diagnosis and treatment, and ensure proper training of health care workers.	Provide access to affordable diagnosis and treatment.
Scabies and other ectoparasitoses	Develop guidance and tools for mapping in endemic countries to estimate the burden of disease.	Develop guidance for implementation of preventive chemotherapy.	Create an advocacy and funding plan; secure financing for ivermectin and topical treatments; advocate for inclusion in universal health coverage.
Snakebite envenoming	Improve training of physicians in managing snakebite, and build awareness in communities on best practices in prevention and seeking treatment for snakebite envenoming.	Improve the quality of anti-venoms, and invest in research and development of new products.	Enhance overall production capacity for quality-assured products, and ensure their availability and accessibility in rural areas.
Taeniasis and cysticercosis	Develop a high-throughput test for evaluating control programmes in resource-limited settings, and map endemic areas.	Conduct targeted interventions in areas of high endemicity.	Increase advocacy from WHO, FAO and OIE to raise the priority of controlling the diseases.



Fig. 13. Four categories of cross-cutting themes



### – Integrating ...

... across NTDs: joint delivery of interventions that are common to several diseases



### – Mainstreaming ...

... within national health systems: improving the quality of NTD management in the context of universal health coverage



### – Coordinating ...

... among stakeholders: working with other sectors within and beyond health on NTD-relevant interventions

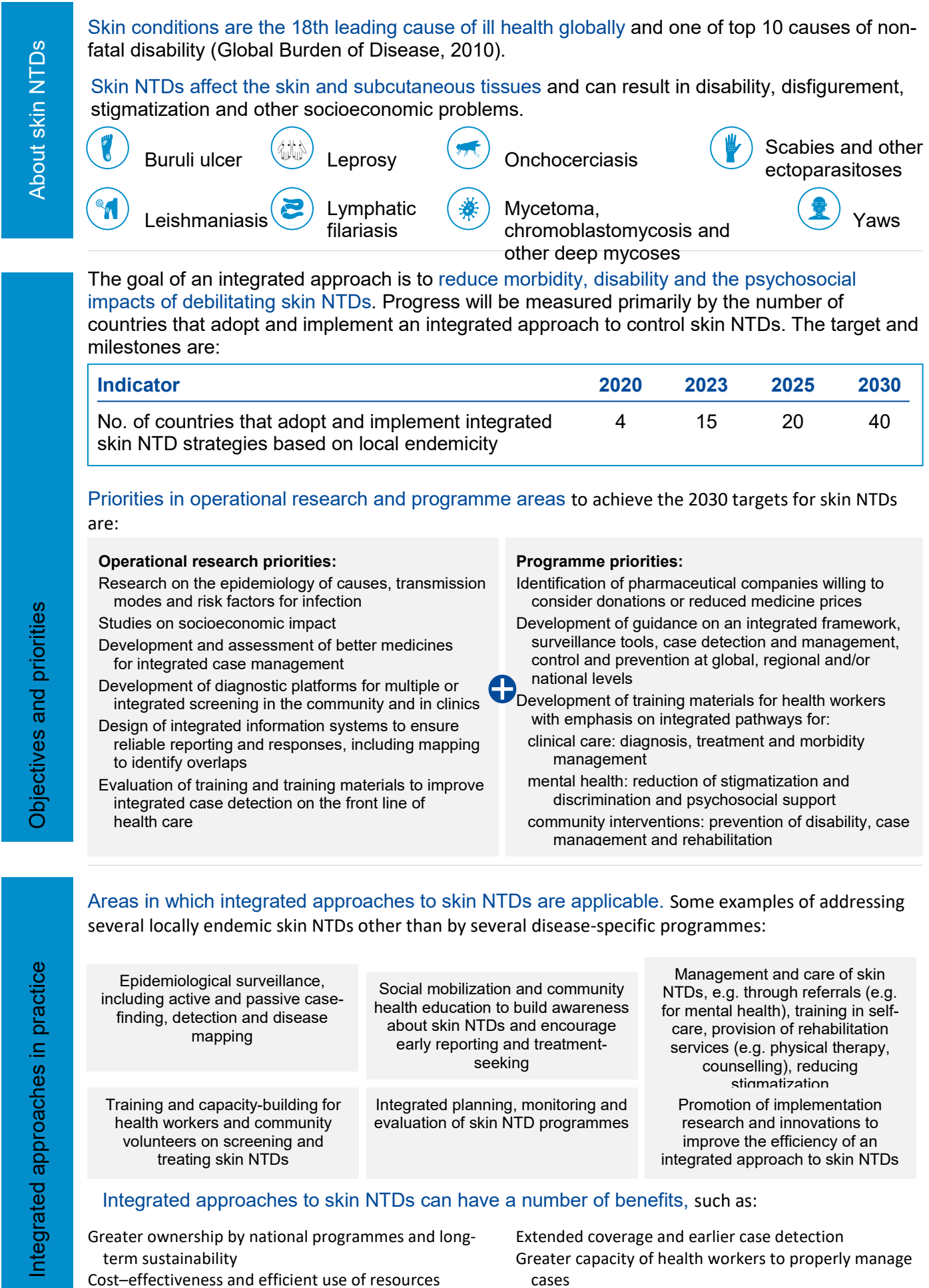


### – Strengthening health systems ...

... basic national systems: improving capacity to deliver interventions on the ground, e.g. supply chain, monitoring and evaluation

... global and regional resources and expertise: extending overall support for NTD programmes, e.g. advocacy, funding

Fig. 14. Integrated approaches to the management of skin NTDs



**Fig. 15. Disease groupings for which joint interventions may be applicable**

Examples of approaches to integration		Relevant NTDs																				
		Dracunculiasis	Yaws	Human African trypanosomiasis	Leprosy	Onchocerciasis	Rabies	Schistosomiasis	Soil-transmitted helminthiases	Trachoma	Lymphatic filariasis	Chagas	Buruli ulcer	Dengue and chikungunya	Taeniasis and cysticercosis	Echinococcosis	Foodborne trematodiasis	Leishmaniasis	Snakebite envenoming	Scabies and other ectoparasitoses	Chromoblastomycosis and other deep mycoses	
Planning and programme management		<ul style="list-style-type: none"><li><b>Strategy and action planning:</b> Developing a national strategy and annual plans covering all NTDs, including cross-cutting and disease-specific targets (see section IV)</li><li><b>Data management:</b> Hosting a data management tool (e.g. a cross-disease dashboard within the broader national health management information system) to collect, store and display disaggregated data for several NTDs for decision-making and reporting</li><li><b>Mapping:</b> Mapping several NTDs in a specified area or a defined population to enhance understanding of disease incidence and prevalence</li><li><b>Supply chain management:</b> Forecasting, procuring, transporting, clearing customs, storing, distributing and tracking medicines and other products within existing national medicine supply networks</li><li><b>Quality assurance of health products:</b> Developing harmonized quality assurance guidelines to facilitate access to safe, efficacious, affordable NTD medicines, e.g. through prequalification</li></ul>																				
		Relevant for all NTDs <sup>2</sup>																				
Implementation	Social mobilization	<ul style="list-style-type: none"><li><b>Joint awareness-building and community education</b> on all NTDs, e.g. behaviour change, MDA scheduling, availability of care, anti-stigmatization and discrimination</li></ul>																				
	Preventive chemotherapy		✓		✓	✓		✓	✓	✓	✓				✓		✓			✓		
	Active case-finding	✓	✓	✓	✓							✓	✓			✓	✓	✓				
	Targeted prevention				✓		✓	✓						✓								
	Vector control	✓		✓		✓		✓		✓	✓	✓		✓					✓			
	One Health approaches	✓		✓			✓	✓			✓				✓	✓	✓	✓	✓			
	Point-of-care diagnosis		✓	✓		✓		✓		✓	✓	✓	✓	✓	✓	✓			✓			
	Support networks		✓	✓		✓		✓		✓	✓			✓	✓				✓	✓	✓	✓
	Self-care		✓		✓			✓		✓	✓	✓		✓					✓		✓	✓
	Counselling and psychological support		✓	✓		✓		✓		✓	✓		✓	✓	✓	✓			✓	✓		✓
	Health care worker training	<ul style="list-style-type: none"><li><b>Building the capacity of health care workers</b> to diagnose, treat and care for patients with NTDs</li></ul>																				
	Relevant for all NTDs																					

**Fig. 15. Disease groupings for which joint interventions may be applicable (cont'd)**

Examples of approaches to integration

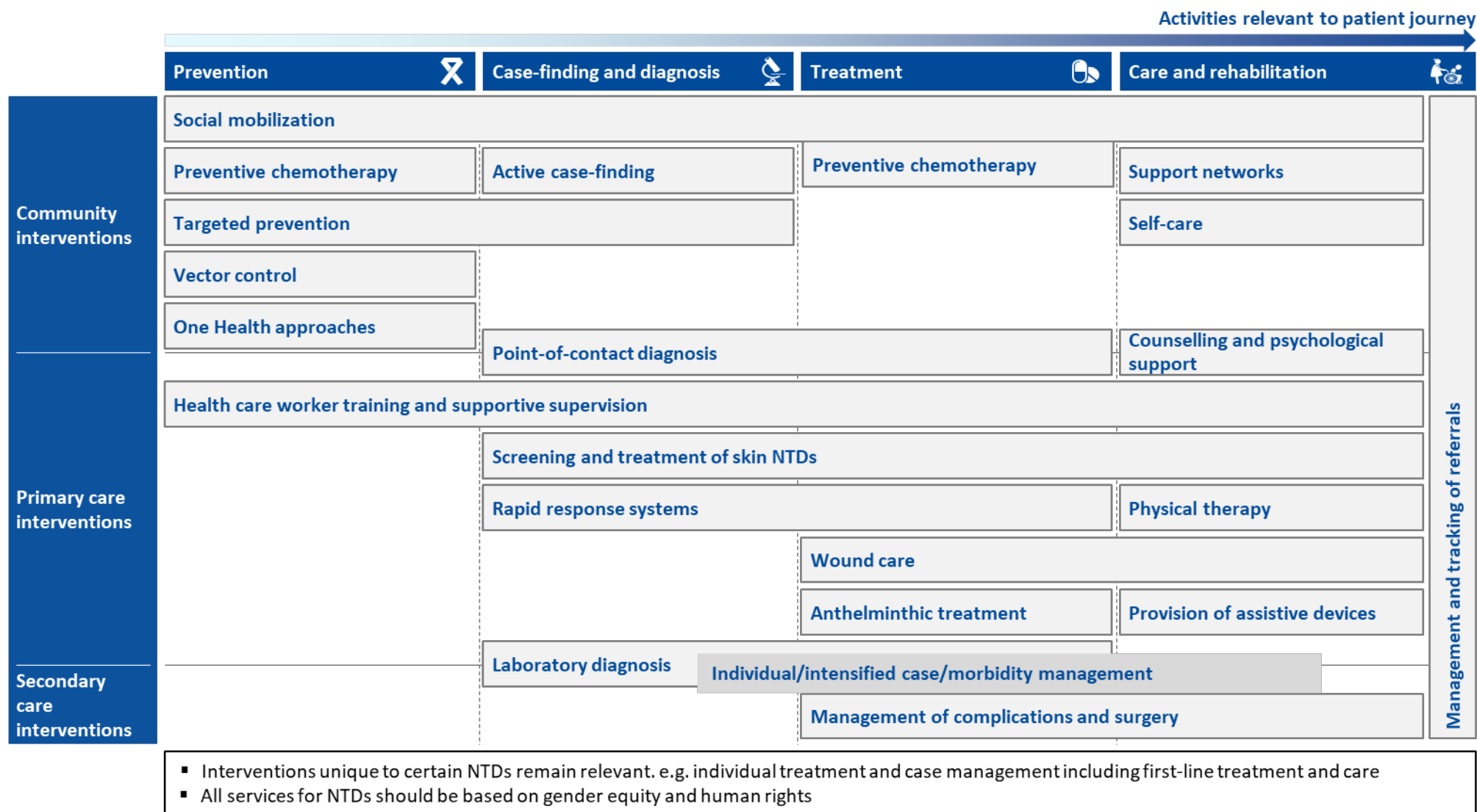
Relevant NTDs

			Dracunculiasis	Yaws	Human African trypanosomiasis	Leprosy	Onchocerciasis	Rabies	Schistosomiasis	Soil-transmitted helminthiasis	Trachoma	Lymphatic filariasis	Chagas	Buruli ulcer	Dengue and chikungunya	Taeniasis and cysticercosis	Echinococcosis	Foodborne trematodiasis	Leishmaniasis	Snakebite envenoming	Scabies and other ectoparasitoses	Mycetoma, chromoblastomycosis and other deep mycoses
Implementation	Screening and treatment of skin NTDs	<ul style="list-style-type: none"> <li>Capacity-building to enable health care workers to screen for skin NTDs by visual examination and/or referral for subsequent clinical examination and relevant treatment</li> <li>Provision of care and rehabilitative services, e.g. lymphoedema management (Buruli ulcer, yaws, lymphatic filariasis, mycetoma)</li> </ul>		✓		✓	✓					✓		✓						✓	✓	✓
	Rapid response systems	<ul style="list-style-type: none"> <li>Development and use of emergency response systems for rapid access to medical treatment for diseases that require immediate attention</li> </ul>			✓		✓ <sup>1</sup>	✓					✓						✓	✓		
	Physical therapy	<ul style="list-style-type: none"> <li>Provision of physical therapy services and advice (e.g. exercises) or referral to relevant services to restore the full range of motion and functional ability of patients</li> </ul>				✓						✓		✓	✓					✓		✓
	Wound care	<ul style="list-style-type: none"> <li>Capacity-building for health care workers to wash, dress and care for various types of severe or extensive wounds at a health facility and to teach affected people about self-care</li> </ul>	✓	✓		✓		✓				✓		✓					✓	✓		
	Anthelmintic treatment	<ul style="list-style-type: none"> <li>Capacity-building to diagnose and treat patients with certain parasitic infections e.g. intestinal helminths</li> </ul>					✓		✓	✓		✓				✓	✓	✓			✓	
	Provision of assistive devices	<ul style="list-style-type: none"> <li>Provision of assistive devices required for disability due to several diseases (e.g. walking devices, orthopaedic footwear), and training of health care workers to select relevant devices</li> </ul>				✓					✓	✓		✓	✓					✓		✓
	Laboratory diagnosis	<ul style="list-style-type: none"> <li>Integrated use of laboratory capacity and technical training for laboratory staff to test for the NTDs that are endemic in a given region</li> </ul>	← Relevant for all NTDs →																			
	Management of complications and surgery	<ul style="list-style-type: none"> <li>Capacity-planning to ensure affordable access to surgery and management of complications</li> <li>Training in NTD surgery and complications that require medical management, e.g. nerve damage due to leprosy, acute attacks in lymphatic filariasis (including managing referrals when relevant)</li> </ul>				✓	✓		✓		✓	✓	✓	✓		✓	✓	✓		✓		✓
Monitoring and evaluation	Management and tracking of referrals	<ul style="list-style-type: none"> <li>Integrated referral management and tracking system to recognize when secondary or other forms of care are required and to direct the patient to those resources</li> </ul>	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓
	Monitoring and evaluation	<ul style="list-style-type: none"> <li>Surveillance: Integration of NTDs into national health information systems for routine data collection and analysis, which might include joint administration of surveys for several NTDs (e.g. coordination of transmission assessment surveys, surveillance for outbreaks and mortality)</li> <li>Monitoring and evaluation: Integrated activities for several NTDs, such as for progress, impact assessment, monitoring for drug efficacy, antimicrobial resistance, quality control</li> <li>Pharmacovigilance: Monitoring and recording of adverse events; providing reliable, balanced information for effective assessment of the risk–benefit profile of medicines and communicating the findings to national regulatory departments</li> <li>Reporting: Consolidated reporting on NTDs, providing input into planning, e.g. to determine development priorities such as target product profiles</li> </ul>	← Relevant for all NTDs <sup>2</sup> →																			
<ul style="list-style-type: none"> <li>Other interventions unique to individual NTDs remain relevant, e.g. individual treatment and case management, including first-line treatment and care</li> <li>All services for NTDs should be based on gender equity and human rights</li> </ul>																						

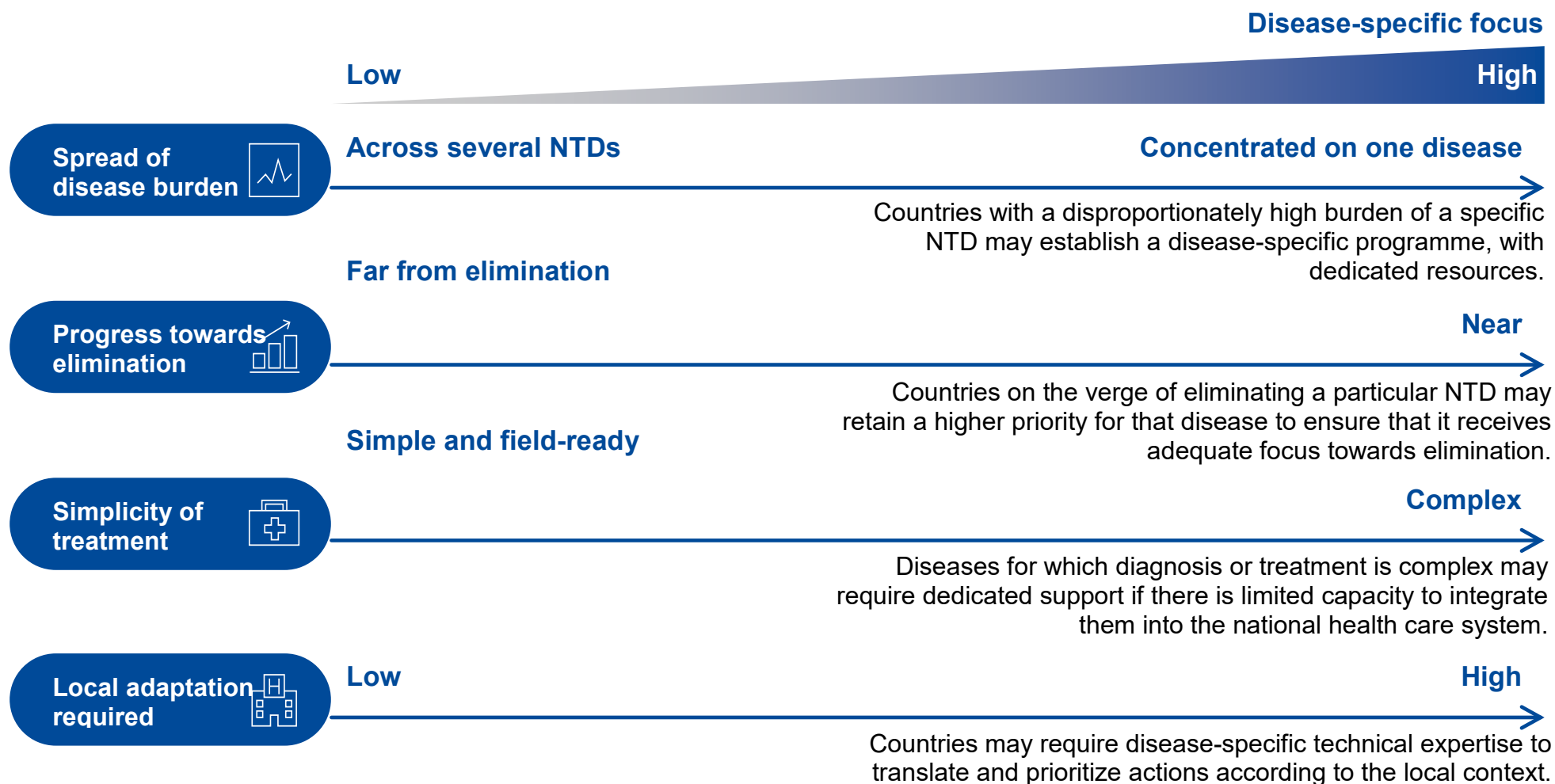
<sup>1</sup> Required in Loo-loo co-endemic areas

<sup>2</sup> Quality assurance of health products and pharmacovigilance is not relevant for dracunculiasis because there is no medicine to treat this disease








Fig. 16. Mainstreaming NTDs into national health systems



**Fig. 17. Considerations for balancing disease-specific and integrated approaches**



**Fig. 18. Coordination with health ministries and other ministries and authorities**

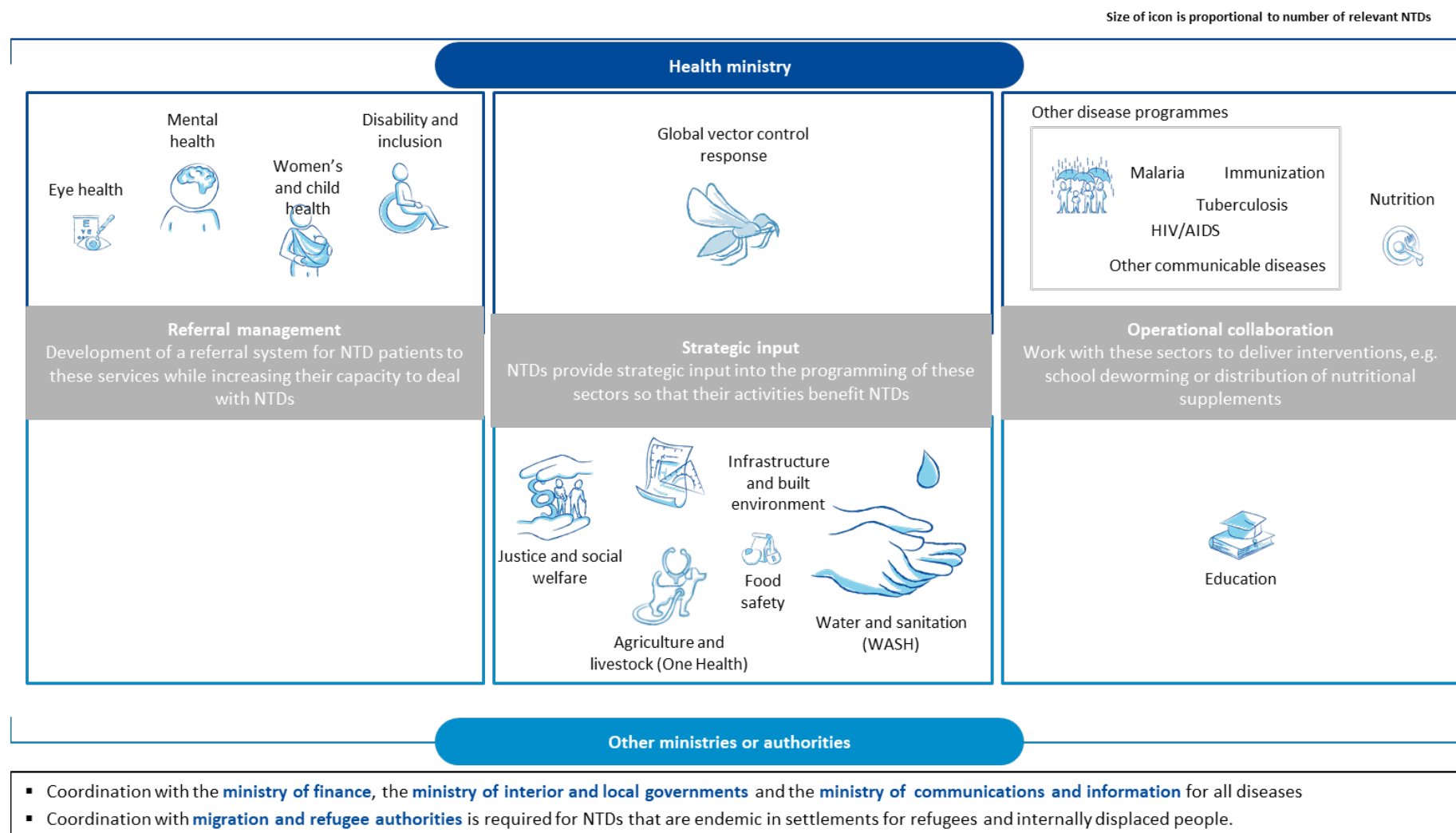
Health ministry	
Activities of health ministry departments that are relevant for NTDs	
<b>Global vector control response</b> (may be under the ministry of environment in some countries) 	<p><b>Use of repellents and traps</b>, e.g. insecticide-treated bed nets, screens, insecticides or molluscicides, fogging</p> <p><b>Environmental management</b> to minimize mosquito habitats, including:</p> <ul style="list-style-type: none"> <li>- <b>Housing improvements</b> (in collaboration with ministry of infrastructure), e.g. plans to build vector-free housing, including safe storage of water, sanitation, window screens, and ensuring air flow to prevent vector entry and to help to keep houses cool</li> <li>- <b>Container management</b>, e.g. covering, emptying, cleaning and disposing of containers (e.g. old tyres)</li> <li>- <b>Draining or treating stagnant water</b> (in collaboration with ministry of water and WASH)</li> </ul> <p><b>Behavioural change</b>, e.g. wearing long clothing</p> <p><b>Use of other innovative approaches</b>, e.g. release of modified, transgenic or sterile vectors, spatial repellents to stop vector entry into households</p>
<b>Mental health</b> 	<p><b>Psychological support and counselling</b> services for NTD patients</p> <p><b>Routine assessment of mental health</b> for patients with specific NTDs, particularly those with chronic conditions</p>
<b>Disability and inclusion</b> 	<p><b>Treatment of disability and morbidity management</b>, e.g. physical therapy</p> <p><b>Provision of support services</b> and devices, e.g. walking devices and prosthetics</p> <p><b>Training for self-management of disability</b> and self-care</p>
<b>Women's and child health</b> 	<p><b>Awareness-building about diseases</b> for which women and children are disproportionately at risk or for which there are particular manifestations in women (e.g. female genital schistosomiasis)</p> <p><b>Use of pre- and post-natal contacts, e.g. in maternal health clinics, to deliver interventions</b>, e.g. deworming tablets, and supplements (e.g. iron) for pregnant women and children to prevent anaemia</p>
<b>Eye health</b> 	<p><b>Promotion of eye care</b>, e.g. face-washing, protecting eyes and eye examinations</p> <p><b>Provision of treatment</b> for eye conditions related to NTDs, including surgery when required</p>
<b>Nutrition</b> 	<p><b>Access to better nutrition</b> to strengthen immune systems and reduce susceptibility to infection, e.g. for visceral leishmaniasis for which malnutrition is a risk factor</p> <p><b>Provision of food and supplements</b> (e.g. iron and vitamin A) to combat common side-effects of NTDs, such as anaemia and nutritional impairment</p>
<b>Other disease programmes</b> 	<p><b>Immunization programmes</b>: joint delivery of preventive chemotherapy to pre-school-age children</p> <p><b>Tuberculosis</b>: joint detection of paragonimiasis (foodborne trematodiasis), leprosy and other mycobacterial diseases, e.g. Buruli ulcer</p> <p><b>Malaria</b>: joint diagnosis with human African trypanosomiasis, vector control against <i>Anopheles</i> mosquitoes</p> <p><b>HIV/AIDS</b>: education about risks, e.g. of coinfection with certain NTDs</p>



**Fig. 19. Relevance of coordination for each NTD**

		PRIMARY LINKAGES WITH NTDs SHOW																			
		Dracunculiasis	Yaws	Chagas disease	Human African trypanosomiasis	Leprosy	Onchocerciasis	Leishmaniasis	Lymphatic	Rabies	Schistosomiasis	Soil-transmitted helminths	Trachoma	Buruli ulcer	Dengue and chikungunya	Echinococcosis	Foodborne	Mycetozoa chromoblastomycosis and other deep mycoses	Scabies and other ectoparasites	Snakebite envenomation	Taeniasis/cysticercosis
Health ministry	Global vector control response	✓		✓	✓		✓	✓	✓		✓		✓		✓						
	Mental health		✓		✓	✓	✓	✓	✓	✓	✓		✓	✓	✓			✓		✓	✓
	Disability and inclusion			✓	□	✓	✓	✓	✓		✓		✓	✓	✓			✓		✓	✓
	Women's and child health		✓	✓		✓		✓	✓		✓	✓	✓						✓	✓	
	Eye health					✓	✓						✓								
	Nutrition					✓		✓			✓	✓									
	Malaria				✓			✓	✓						✓						
	Tuberculosis		✓			✓								✓			✓				
	HIV/AIDS			✓				✓				✓	✓		✓						
	Immunization programmes	✓																			
Other ministries or authorities	Water and sanitation (WASH)	✓	✓	✓	✓	✓			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓
	Agriculture, livestock, wildlife, environment (One Health)	✓			✓			✓	✓	✓	✓				✓	✓	✓				✓
	Infrastructure and the built environment	✓	✓	✓	□		✓	✓	✓		✓	✓	✓		✓				✓	✓	
	Education (school delivery of)		✓						✓		✓	✓	✓	✓	✓	✓	✓				✓
	Justice and social welfare	✓	✓		□	✓	✓	✓	✓		✓		✓	✓	✓			✓	✓		
	Food safety			✓													✓	✓			✓
<div>▪ Coordination with the ministries responsible for finance, the interior and local governments, and communications and information is critical for all diseases.</div> <div>▪ Coordination with migration and refugee authorities is required for NTDs that are endemic in settlements for refugees and internally displaced people.</div>																					







**Fig. 20. Examples of coordination with other disciplines and sectors**



**Fig. 20. Examples of coordination with other disciplines and sectors (cont'd)**

## Other ministries or authorities

Activities conducted by other ministries or authorities that are relevant for NTDs

<b>Water and sanitation (WASH)</b>		<p><b>Providing access to improved water sources</b> (protected from external contamination)</p> <p><b>Hygienic conditions for case management</b>, e.g. wound-washing (rabies), self-care and morbidity management (e.g. personal hygiene and wound care for lymphatic filariasis, leprosy and yaws), surgical procedures (e.g. surgery for hydrocele and trichiasis)</p> <p><b>Sanitation – access to facilities and safe management of fecal waste</b> to prevent transmission (e.g. of soil-transmitted helminthiasis, taeniasis and foodborne trematodiasis)</p> <p><b>Promoting hygienic practices</b> (e.g. hand- and face-washing, prevention of open defecation, food hygiene, filtering water from open water bodies before drinking)</p> <p><b>Proper storage and disposal/drainage of water</b> to reduce vector habitats</p>
<b>Agriculture, environment, livestock, wildlife (One Health approach)</b>		<p><b>Understanding animal reservoirs and zoonotic transmission</b></p> <p><b>Treating animals to prevent transmission</b></p> <p><b>Vaccination</b>, e.g. mass dog vaccination (rabies), and pig and sheep vaccination (taeniasis, cystic echinococcosis)</p> <p><b>Medical treatments</b>, e.g. deworming for pigs (taeniasis), dogs (cystic echinococcosis) and foxes (alveolar echinococcosis)</p> <p><b>Animal husbandry and management</b>, e.g. dog tethering (dracunculiasis), keeping domestic animals and livestock away from human dwellings (mycetoma) and preventing pig contact with human feces (taeniasis)</p>
<b>Education</b>		<p><b>MDA in schools<sup>a</sup></b> against childhood diseases like soil-transmitted helminthiasis, schistosomiasis and yaws</p> <p><b>Awareness of practices to prevent NTDs</b> embedded in national curricula (e.g. hygienic practices and preventing mosquito breeding sites)</p>
<b>Justice and social welfare</b>		<p><b>Preventing structural discrimination</b> associated with high levels of stigmatization associated with NTDs (leprosy, cutaneous leishmaniasis, lymphatic filariasis and neurocysticercosis), e.g. abolishing discriminatory laws</p> <p><b>Promoting inclusive access to</b> resources and facilities, health and social services, education and employment opportunities</p> <p><b>Conducting anti-stigmatization interventions</b> (e.g. community dialogue and engaging local leaders to share anti-stigmatization messages)</p>
<b>Infrastructure and the built environment</b>		<p><b>Housing improvements</b> to minimize mosquito habitats, including safe storage of water, sanitation, window screens, constructing drains that do not provide breeding sites for mosquitoes and ensuring air flow to prevent vector entry and help keep houses cool</p>
<b>Food safety</b>		<p><b>Food safety practices and regulations</b>, including:</p> <p>for households and food handlers (e.g. properly washing and cooking food before consumption and ensuring food quality) for farmers and livestock keepers (e.g. safe disposal of offal during slaughtering (echinococcosis))</p>

- Coordination with the **ministries of finance**, interior and **local government** and **communications and information** for all diseases
- Coordination with **migration and refugee authorities** is required for NTDs that are endemic in settlements for refugees and internally displaced people.

<sup>a</sup> School is one venue for delivering MDA to school-aged children, but efforts should be made to ensure that school-aged children not in school also receive MDA.

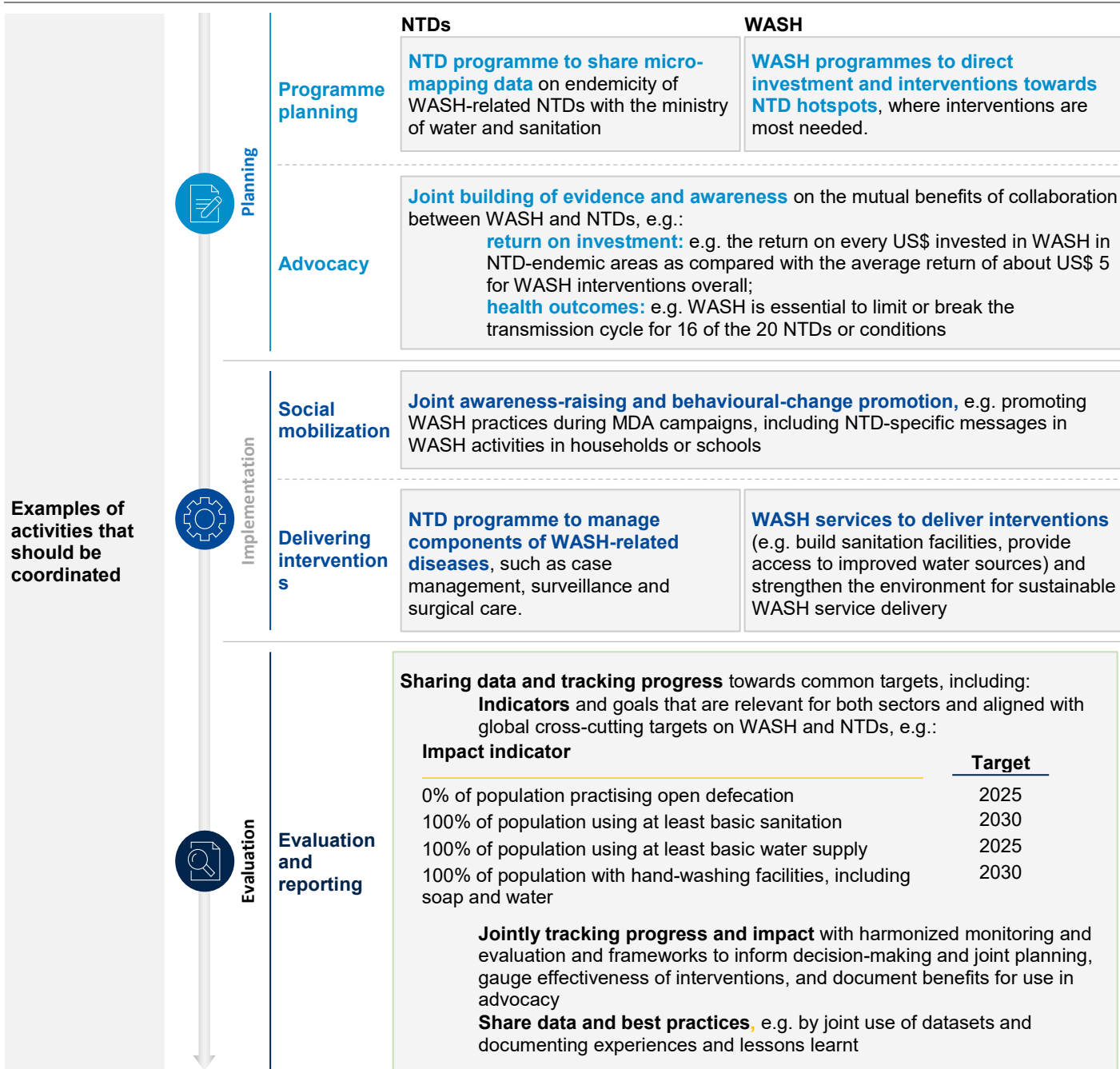
Fig. 21.



## WASH and NTDs: activities and mechanisms for coordination

### Purpose of coordination

Improve the targeting of WASH investment and activities to better support the prevention, treatment and care of NTDs



### Potential coordination mechanism

Dedicated committee or task team at national and/or local level (within cross-sector coordination platforms), with clear assignment of roles in coordinating activities among stakeholder groups

### Case studies

**Cambodia and Lao People's Democratic Republic** community-led initiative to eliminate schistosomiasis by combining deworming with WASH interventions (CL-SWASH): the two countries set up national task forces with representatives from NTD, WASH, nutrition and education sectors to develop community-led initiatives to eliminate schistosomiasis by combining deworming, nutrition and WASH interventions.

**Ethiopia**: Ethiopia has a national technical working group, a dedicated coordinator of WASH and NTDs at the Federal Ministry of Health, regional WASH and NTD coordinators and a national WASH and NTD framework

See WASH/NTD strategy for further details: [https://www.who.int/water\\_sanitation\\_health/publications/wash-and-ntd-strategy/en/](https://www.who.int/water_sanitation_health/publications/wash-and-ntd-strategy/en/)

Fig. 22.



## Global vector control response: activities and mechanisms for coordination

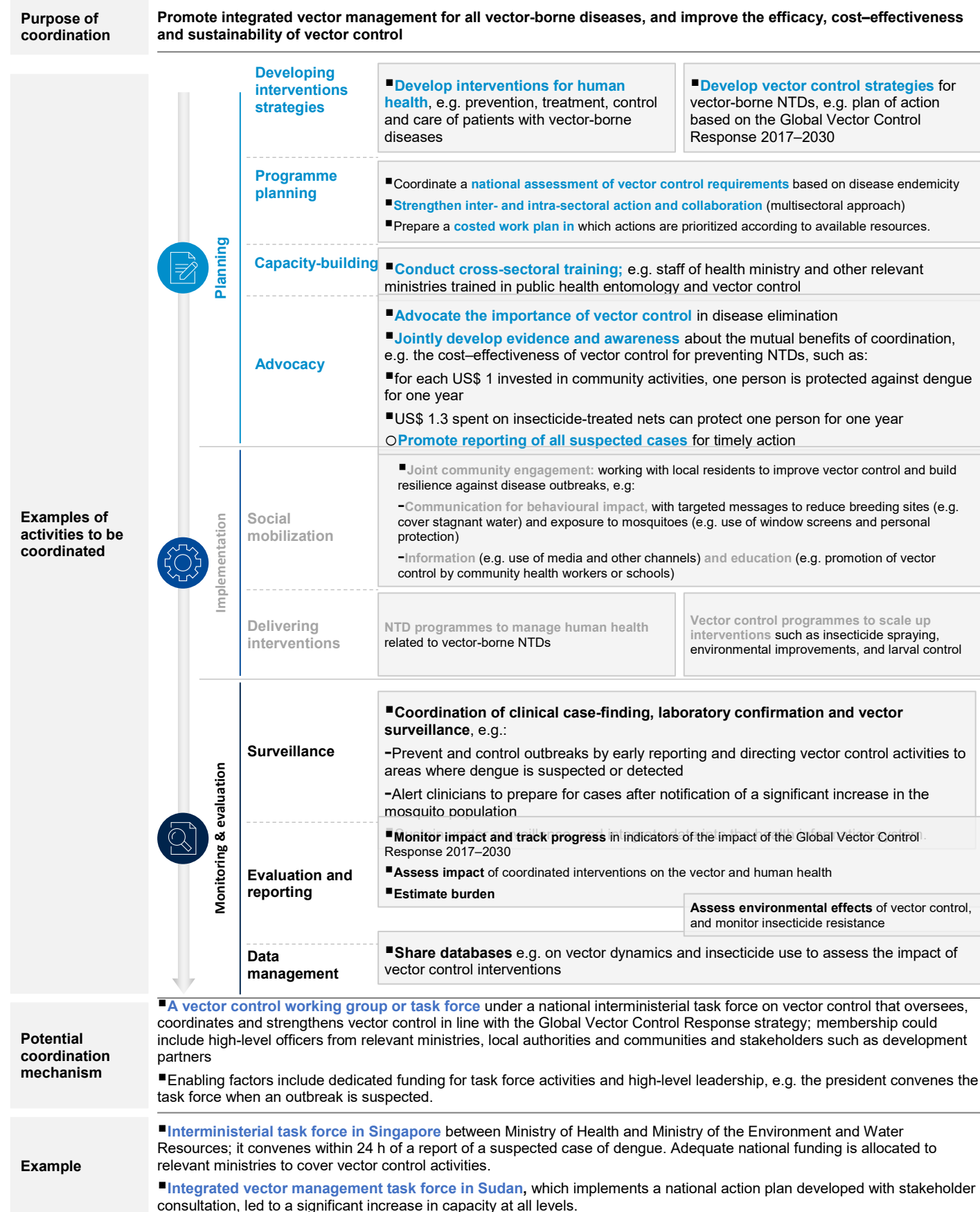


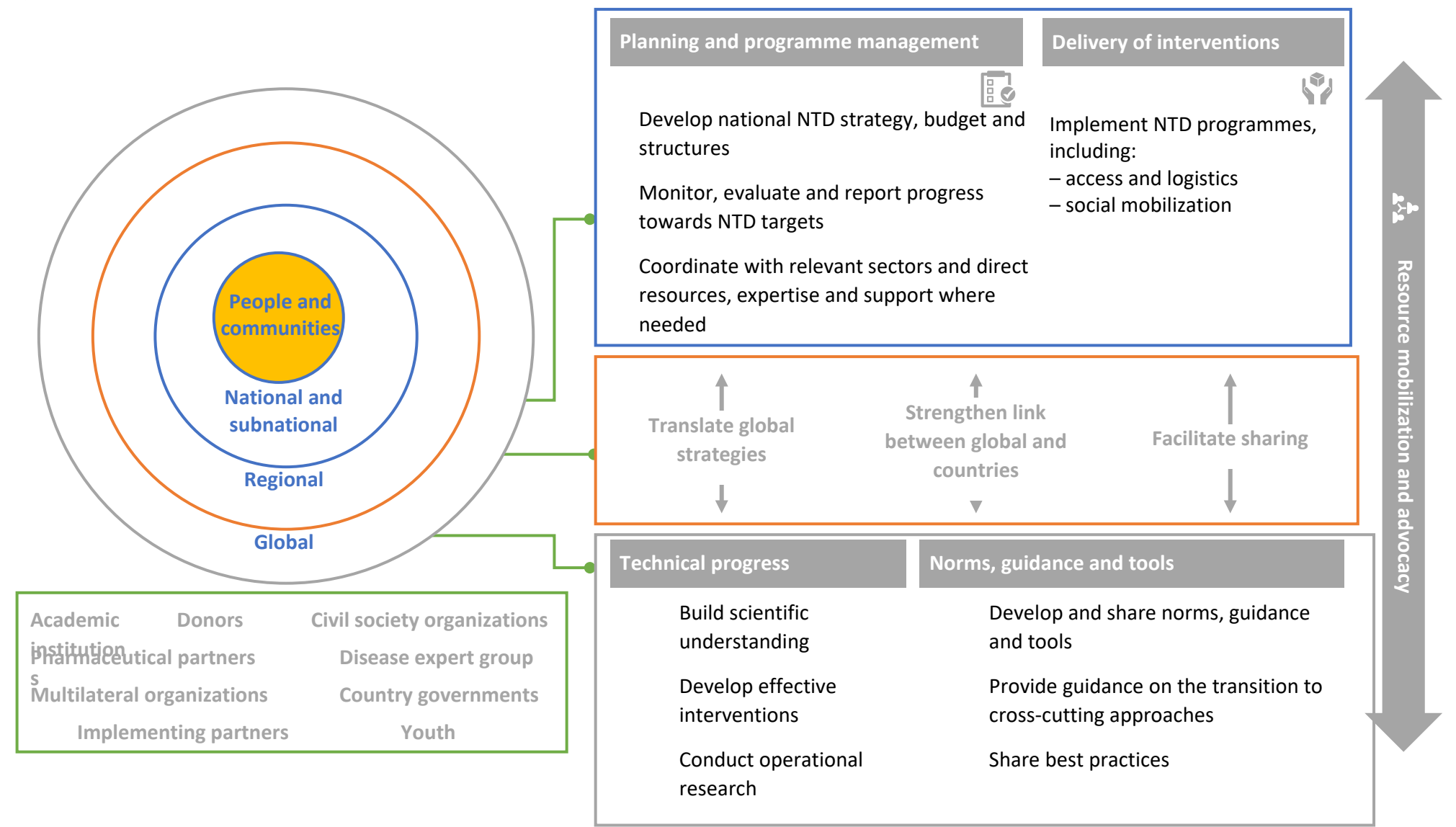
Fig. 23.



## One Health approach and NTDs: activities and mechanisms for coordination

Purpose of coordination	Ensure a coordinated approach to disease hosts and environmental factors related to NTDs, with clear assignment of roles and responsibilities		
Example activities requiring coordination	Planning	<b>Developing a One Health strategy for NTDs</b>	<p><b>Develop a One Health strategy for NTDs</b>, including case definition, common targets, strategies and mechanisms for collaboration among agriculture, livestock, wildlife, environment, food safety, health and other ministries</p> <p><b>Integrate NTD into existing One Health platforms</b> and ensure that they are considered and included in local strategies and plans</p> <p><b>Create national operational plans to deliver interventions for NTDs with a human–animal–environment interface, with clear attribution of roles and responsibilities</b>, e.g. a coordinated plan outlining stakeholder accountability for human-, animal-, food- and ecosystem-related actions</p>
		<b>Developing scientific understanding</b>	<ul style="list-style-type: none"> <li>Use a One Health approach to improve understanding of human–animal transmission of NTDs, including social and economic implications</li> </ul> <p><b>Identify key hosts</b> for NTDs and <b>tailored control work</b>. <b>Develop diagnostics and interventions for animals</b> that are lacking, e.g. for cysticercosis and cystic echinococcosis</p> <p><b>Investigate parasite evolution</b>, e.g. how movements of infected animals and people transfer parasites to new host species; e.g. evolution of zoonoses as more land is used for livestock production</p>
		<b>Programme planning</b>	<ul style="list-style-type: none"> <li><b>Share data on occurrence of NTDs</b> in various human and animal hosts among sectors to guide activities, e.g. surveillance in animals as a proxy for humans.</li> <li><b>Develop plans for coordinated disease control</b>, e.g. simultaneous interventions for both humans and animals in a geographical area</li> </ul>
		<b>Advocacy</b>	<b>Jointly develop evidence and awareness about</b> the importance of a One Health approach for elimination and for maintaining the social and commercial value of animals for populations affected by NTDs
	Implementation	<b>Social mobilization</b>	<ul style="list-style-type: none"> <li><b>Conduct joint awareness-raising and behavioural-change promotion</b> with specific messages for targeted groups such as livestock keepers</li> <li><b>Provide education on animal husbandry and management</b>, e.g. tethering dogs, safe disposal of offal containing cystic stages</li> </ul>
		<b>Delivering interventions</b>	<ul style="list-style-type: none"> <li><b>NTD programme to:</b> <ul style="list-style-type: none"> <li>manage human health for NTDs with an animal interface, e.g. prevention, case management, palliative care and surveillance</li> <li>Deliver animal interventions outside One Health activities, e.g. dog tethering is unique to NTDs</li> </ul> </li> <li><b>One Health stakeholders to use existing platforms to deliver interventions involving animals</b>, e.g. use other disease or livestock programmes to deliver animal interventions, such as deworming and pig vaccination (cysticercosis)</li> <li><b>Explore opportunities for corporate social responsibility of pharmaceutical companies</b> to support animal aspects of programmes</li> <li><b>Explore opportunities to increase availability and use of human and animal health products for disease management and control</b>, e.g. regional stockpiles of medicines or vaccines</li> </ul>
	Evaluation	<b>Evaluation and reporting</b>	<ul style="list-style-type: none"> <li><b>Coordinate surveillance programmes among sectors</b>, e.g. surveillance in animals as a proxy for humans, monitoring antimicrobial resistance in humans and animals</li> <li><b>Share data and track progress</b> towards common targets, including: <ul style="list-style-type: none"> <li>using harmonized indicators and monitoring and evaluation frameworks to inform decision-making and joint planning, gauge effectiveness of interventions and to document benefits for use in advocacy</li> </ul> </li> <li><b>Share data and best practices</b>, e.g. by joint use of data sets, documenting experiences and lessons learned</li> </ul>
<b>Potential</b>	Include NTDs in national, regional and global One Health working groups through partnerships with FAO and OIE.		
<b>Case study</b>	WHO, OIE, FAO and the Global Alliance for Rabies Control use a comprehensive strategic plan to reach the target of ending human deaths from dog-mediated rabies by 2030.		

Fig. 24. Roles of stakeholders at all levels and in all sectors





**Fig. 25. Shifts in organizational structures in countries**

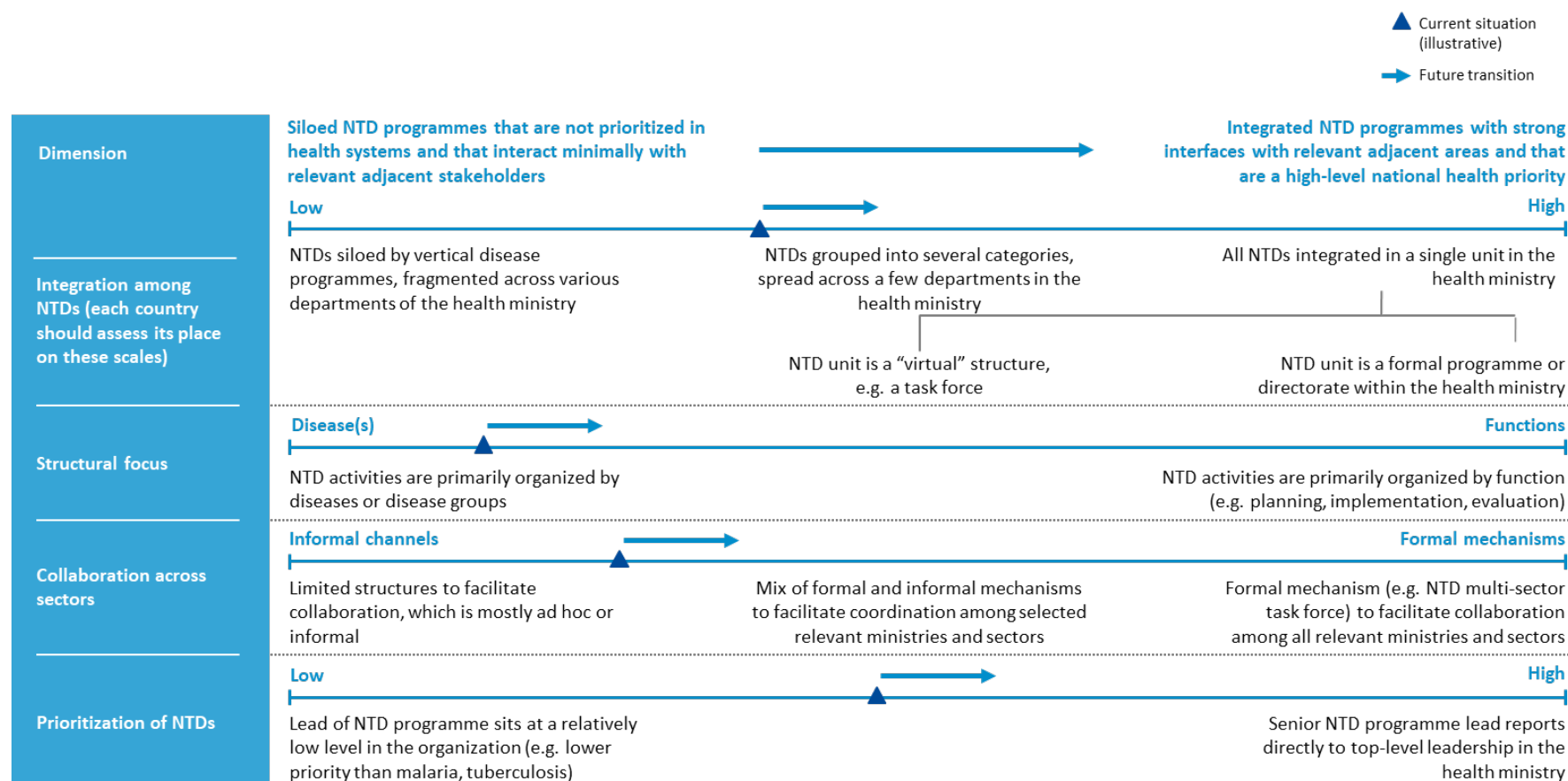
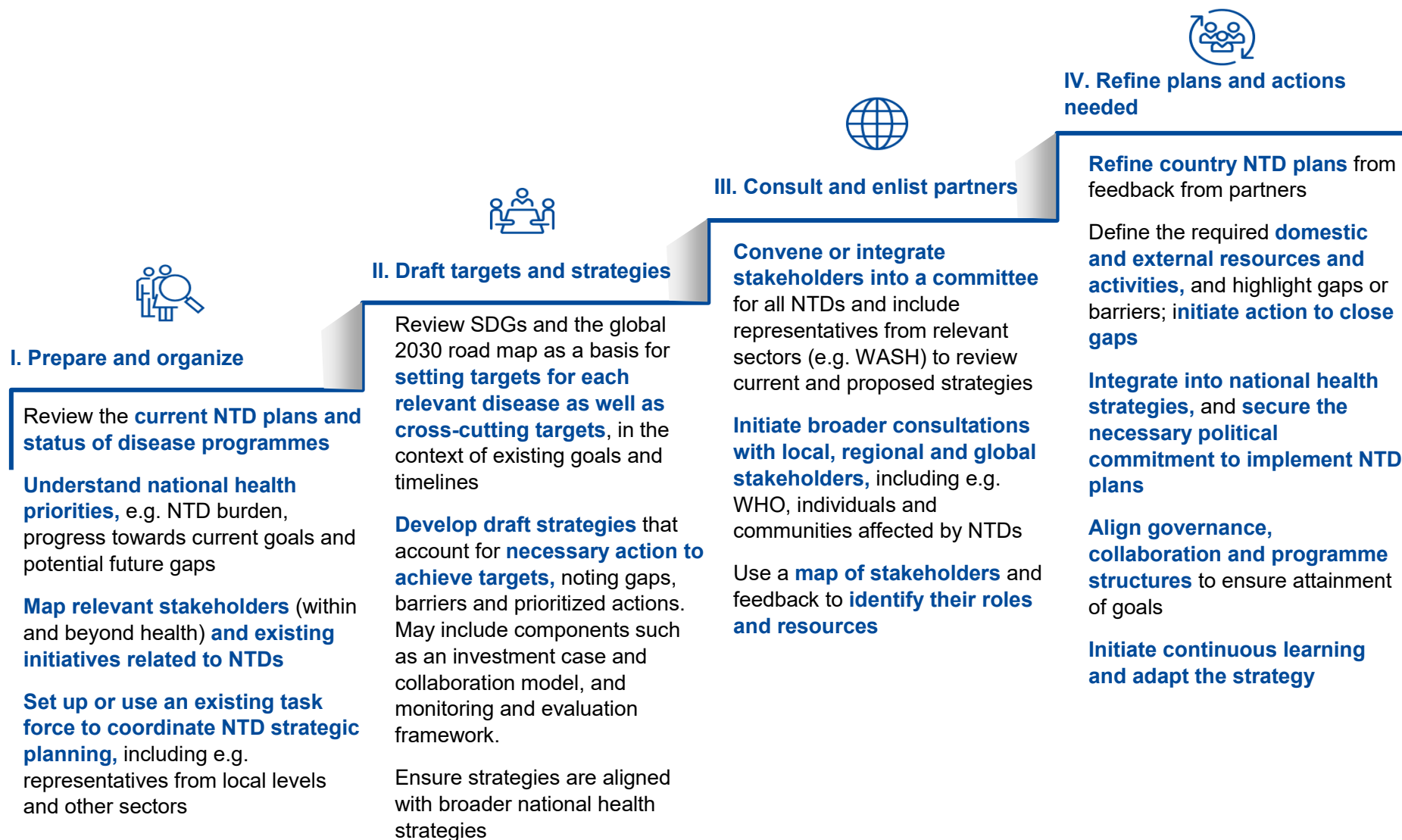


Fig. 26. Examples of steps in designing a national NTD plan



Countries can adapt this process given their current NTD plans and status of disease programmes