Global report on neglected tropical diseases

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In January 2021, WHO published its second road map for neglected tropical diseases (NTDs), with the goal of controlling, eliminating or eradicating many of these diseases by 2030. The road map was launched at a critical time, as the COVID-19 pandemic severely disrupted health systems, including supply chains for NTD medicines and health products, especially in low- and middle-income countries.

These disruptions jeopardized support for prompt diagnosis, treatment and care, as well as for the provision of essential interventions such as vector control and veterinary public health, which are the mainstay of NTD programme activities. Other emergencies, such as conflict, flooding and earthquakes, further interrupted activities and compounded the NTD disease burden. Together, these challenges pose a significant risk to achieving the targets of the 2030 road map.

WHO and our partners have been taking steps to mitigate the impact of COVID-19 on NTD services, which are gradually resuming. More broadly, we are also putting in place measures to promote the rapid recovery of services and to make health systems more resilient against emergencies, including conflict and climate change, and to reorient them towards primary health care as the foundation for universal health coverage and health security.

A new investment rationale, complementing the road map, highlights the need to sustainably support cost-efficient interventions to consolidate the hard-won gains of recent years and to accelerate progress. It challenges the global community to invest in cross-cutting interventions outside of the health sector, in areas including water, sanitation and hygiene; education; agriculture; animal welfare; and finance. All these sectors impact the lives of those living in areas endemic for NTDs and are important as part of a holistic, sustainable approach.

This first progress report on the road map 2021–2030 provides an important benchmark in the multisectoral effort needed to alleviate the suffering NTDs inflict on individuals and communities trapped in generational poverty.

As such this document is a clarion call to act now, act together, and invest in NTDs.

Dr Tedros Adhanom Ghebreyesus
Director-General
World Health Organization

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The activities described in this report would not have been possible without the contribution of the global NTD community.

COVID-19	coronavirus disease
DALY	disability-adjusted life year
FGS	female genital schistosomiasis
IDA	ivermectin–diethylcarbamazine citrate–albendazole
MDA	mass drug administration
NTD	neglected tropical disease
RDT	rapid diagnostic test
STAG-NTD	Strategic and Technical Advisory Group for Neglected Tropical Diseases
TPP	target product profile
WASH	water, sanitation and hygiene
WHO	World Health Organization

Executive summary

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The World Health Organization (WHO) and the global community of countries, partners, donors, technical experts, scientists and field implementation teams continue to work towards the ultimate goal of a world free of the burden of neglected tropical diseases (NTDs). This work is described in the NTD road map 2021–2030, WHO's blueprint to drive global efforts in the fight against NTDs in the context of the United Nations Sustainable Development Goals. These goals encompass a vision of a world population for whom equality of opportunity and of health are fundamental.

Within this context, and during the two years since the launch of the road map (2021–2022), progress has been made. Nevertheless, hindrances towards achieving the targets for 2030 have arisen and work to overcome these obstacles continues. These endeavours have also revealed the scale of the task still facing the global NTD community.

Disruption as a result of the COVID-19 pandemic has continued to afflict longstanding and new programmes alike, while other entrenched issues have re-emerged in new and challenging ways. The global NTD community is also confronted with a changing, multi-dimensional funding landscape as donors reassess priorities and adapt to new ways of working, as well as a challenging and unpredictable international context. As a result, progress in controlling, eliminating or eradicating NTDs has not been as far-reaching as expected.

The burden of NTDs continues to be unequally borne by a small number of countries: 16 countries bear 80% of this burden. Slower than expected progress in high-burden countries, uneven progress across certain of the 20 diseases and disease groups, persistent underlying risk factors (poverty, climate change) and rapid population growth are all threats to achieving the 2030 targets within the defined timescales.

There have, however, been many noteworthy successes, which are documented in this report, along with evidence of disease burdens and the relative strengths and weaknesses of programmes designed to address these.

Over the past decade, the number of people requiring interventions against NTDs has decreased by 25%, falling by some 80 million people between 2020 and 2021 alone. The burden of disease calculated in disability-adjusted life years is also steadily decreasing. More than one billion people were treated every year for four consecutive years between 2016 and 2019. As of December 2022, 47 countries had eliminated at least one NTD.

This positive trend was disrupted by the COVID-19 pandemic, however, which severely affected NTD programmes, leading to reduced implementation of community-based interventions, restricted access to health-facility-based services and severe impacts on the supply chains for health products. Consequently, the number of people treated for NTDs decreased by 34% between 2019 and 2020, although a generalized resumption of activities enabled an increase of 11% in 2021. The 2021–2022 period also saw several outbreaks of NTDs, including dengue, chikungunya, leishmaniasis and scabies, whose management was made more challenging by restrictions on movement.

Work around the three main pillars of the 2030 road map has also progressed.

Programmatic action has been accelerated for the areas identified in the road map: strategic and technical recommendations (three meetings of the Strategic and Technical Advisory Group for Neglected Tropical Diseases held), normative guidance and tools (54 WHO publications released in 2021, and 52 in 2022); global advocacy (recognition of 30 January as World Neglected Tropical Diseases Day; adoption of the Abu Dhabi Declaration on Eradication of Guinea Worm Disease and the Kigali Declaration on Neglected Tropical Diseases); capacity-building (launch of the NTD OpenWHO channel); as well as in the areas of medicines and other health products, with expanded donations reaching new diseases (albendazole for cystic echinococcosis) and ensuring more quality-assured medicines (four pharmaceutical products prequalified by WHO in 2021–2022). Innovation has been fostered to fill existing gaps, with several new medicines under evaluation and 18 target product profiles for diagnostics developed. Action has also been taken to address the challenges of antimicrobial resistance, and work on gender, equity and human rights, an area of particular relevance to NTDs, has also progressed.

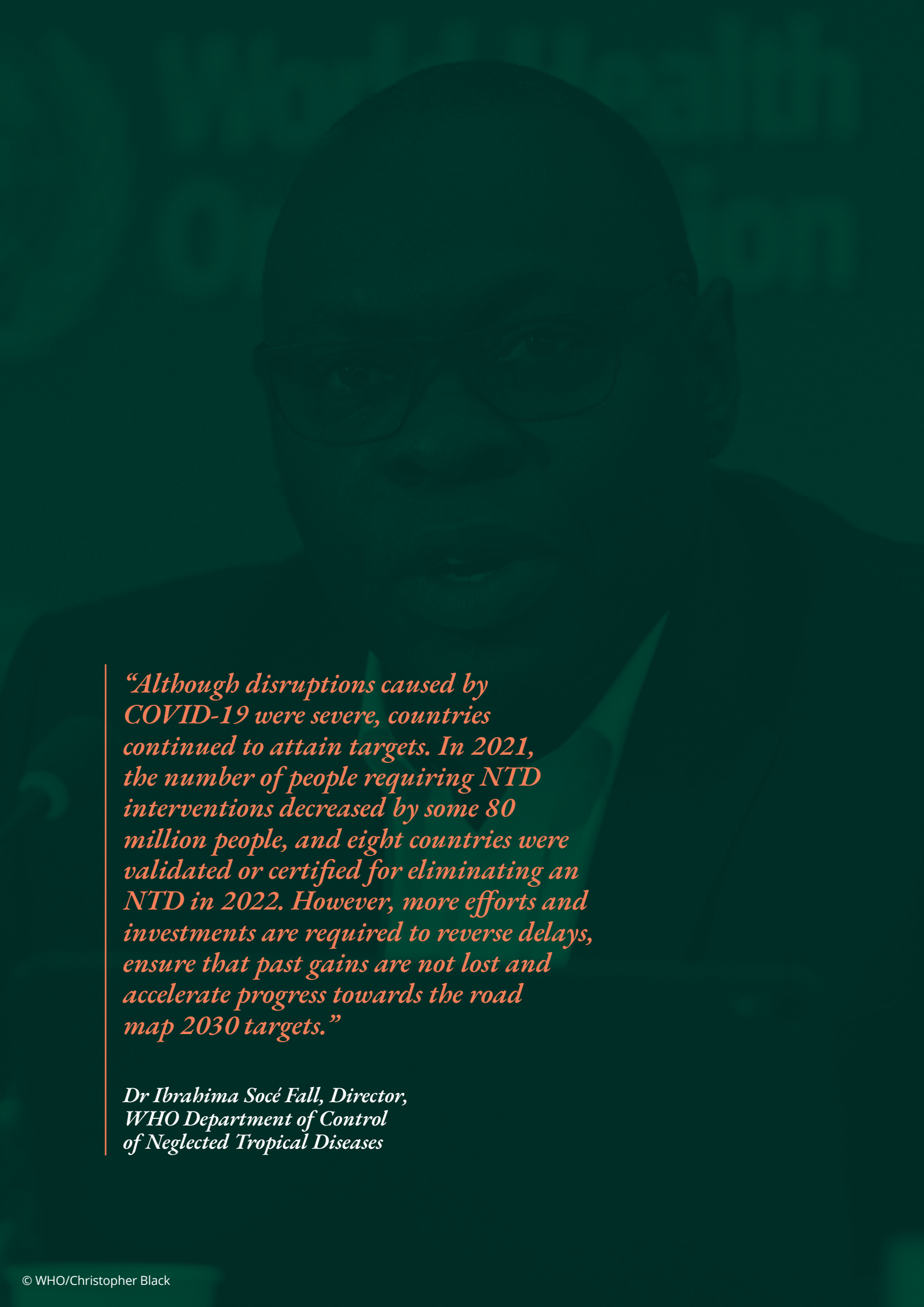
Cross-cutting approaches have been intensified. Preventive chemotherapy is being expanded to other diseases such as taeniasis, and the skin-NTD approach is rapidly imposing itself as a powerful resource to address the burden of at least 10 diseases with dermatological manifestations. Cross-sectoral coordination has also progressed for One Health and WASH, while the global vector control response has been strengthened by the launch of the Global Arbovirus Initiative. Finally, efforts have been made to strengthen the cohesiveness of the monitoring and evaluation process for NTDs, to improve its consistency across all 20 conditions and to boost data visualization through interactive dashboards.

Action has also been taken to change **operating models and culture to facilitate country ownership**, for example in facilitating the adoption of WHO's sustainability framework by a number of countries. Coordination within the NTD community has been stimulated by the establishment or expansion of global collectives of NTD partners and platforms for advocacy and information-sharing. The need for sustainable financing has also emerged as a key factor in enabling the 2030 road map targets to be achieved, amidst the turmoil generated by the COVID-19 pandemic.

Finally, during a year in which the global NTD community mourned the loss of Dr Mwelecele Ntuli Malecela, the preceding Director of WHO's Department of Control of Neglected Tropical Diseases, a mentorship programme was established in her memory, thus cementing the legacy of an inspirational and dedicated public health official who embodied the global fight against NTDs and the pursuit of health as a fundamental human right.

In our pursuit now of the road map 2030 targets, we need to reverse delays to progress and ensure that past gains are not lost. We must invest in innovative operations and financing solutions that foster integration and cross-sectoral collaboration. We must boost global support for countries with the highest NTD burdens, and continue to facilitate country ownership and the sustainability of NTD programmes through new approaches to financing and implementation.

Time is of the essence as we work together to achieve Sustainable Development Goal 3.3 and end the epidemic of NTDs by 2030.



"Although disruptions caused by COVID-19 were severe, countries continued to attain targets. In 2021, the number of people requiring NTD interventions decreased by some 80 million people, and eight countries were validated or certified for eliminating an NTD in 2022. However, more efforts and investments are required to reverse delays, ensure that past gains are not lost and accelerate progress towards the road map 2030 targets."

Dr Ibrahima Socé Fall, Director, WHO Department of Control of Neglected Tropical Diseases

Introduction

The World Health Organization (WHO) manages a diverse portfolio of 20 diseases and disease groups whose public health burden is often overlooked – neglected – by relevant authorities or decision-making bodies. Conservative estimates indicate that these neglected tropical diseases (NTDs) account for some 14.5 million disability-adjusted life years (DALYs), with significant variation among tropical and non-tropical countries and developed and developing areas *(1)*.

In 2021, WHO published a new road map to address the burden of disease and death imposed by *NTDs. Ending the neglect to attain the Sustainable Development Goals: a road map for neglected tropical diseases 2021–2030* ("the road map") *(2)* is aligned with the 2030 Agenda for Sustainable Development and its 17 Goals *(3)* and with WHO's *Thirteenth General Programme of Work 2019–2023 (4)*. The road map builds on the achievements of the past 10 years and the lessons learnt to drive progress towards 2030.

Overall, considerable progress has been made since 2012 when the first road map was published *(5)*. Steady progress was registered until the end of 2019, when the coronavirus disease (COVID-19) pandemic started taking its toll. Although a recovery was observed in 2021 and 2022, the repercussions of the pandemic were severe. Nevertheless, countries continued to be acknowledged for attaining targets: eight countries were certified or validated in 2022 alone. So far, a total of 47 countries have eliminated at least one NTD, the latest being the Democratic Republic of the Congo (in December 2022).

The road map was devised in these uncertain circumstances and has at its core the potential to straighten them out. It advocates for a stronger focus on impact, for a stronger mainstreaming of NTD programmes into health systems and primary health care networks, and for a stronger emphasis on cross-cutting interventions. It also calls for a more sustainable approach to planning and financing of programmes.

The road map also discusses the interface between NTDs and the Sustainable Development Goals *(3)* and emphasizes that progress to control, eliminate as a public health problem, eliminate transmission of, or eradicate NTDs constitutes a reciprocal contribution to achieving multiple Goals.

These include achieving gender equality and empowering all women and girls (Goal 5), ensuring availability and sustainable management of water and sanitation for all (Goal 6), building resilient infrastructure (Goal 9), making cities and human settlements inclusive, safe, resilient and sustainable (Goal 11), and taking urgent action to combat climate change and its impacts (Goal 13). Target 3.3 is "by 2030, to end the epidemics of … neglected tropical diseases."

This document is the first in a series of global reports describing progress towards the 2030 targets, transitioning from the biennial reporting for the previous (2012–2020) road map *(5)*. These annual reports will facilitate reporting of key programme developments across the portfolio of NTDs and across all six WHO regions. The first NTD report was published in 2010 *(6)* and updated in 2011 *(7)*, the second in 2013 *(8)*, the third in 2015 *(9)* and the fourth in 2017 *(10)*.

The present document reports on the first two years of implementation of the road map (2021 and 2022). The information presented is based primarily on epidemiological and programmatic data for 2021 gathered in 2022, but the report also describes a wide range of activities and accomplishments that were registered in both 2021 and 2022; comparisons are often made against 2020 and 2019 data, especially with regard to COVID-19 disruptions. It has four sections including this introduction. Section 2 presents the status of the global NTD response. Section 3 charts progress and developments against the three road map pillars. Section 4 sets out priority actions for 2023 and beyond to sustain implementation of the road map and its companion documents.

Status of the global NTD response

For many NTD programmes, coordinated implementation of the five WHO-recommended strategic interventions[1] is required to control, eliminate or eradicate NTDs. Integrated approaches are closely aligned with efforts to mainstream NTD activities within health systems, particularly as part of primary health care service delivery. These highly effective interventions have provided a foundation on which normative and standard-setting guidance is built.

[1] Innovative and intensified disease management; preventive chemotherapy; vector control; veterinary public health; and water, sanitation and hygiene (WASH).

2.1 Tackling the disease burden

In 2021, 1.65 billion people were reported to require mass or individual treatment and care for NTDs, down from 2.19 billion in 2010, a reduction of 25% (Fig. 1) *(11)*. The majority of these individuals continued to require mass treatment for diseases amenable to preventive chemotherapy, while the numbers requiring other NTD services such as individual disease management or care were much smaller, approximating a few million.

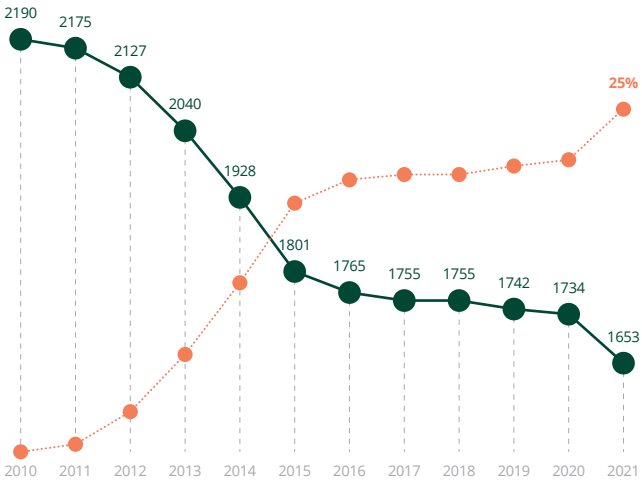
Global progress in reducing the number of people requiring interventions against NTDs, which is one of the road map's overarching indicators, as well as Sustainable Development Goal indicator 3.3.5 *(12)*, was driven by three main factors: first, a number of countries have eliminated at least one NTD; secondly, although not yet certified, verified or validated, several countries have reached the post-intervention surveillance phase for at least one NTD; thirdly, remapping for a number of NTDs has led to the reclassification from endemic to non-endemic status of several geographical areas within a few countries. Improved livelihoods and living conditions may have also contributed, although in uneven and varying ways, as several countries endemic for NTDs are affected by social instability entailing destruction and population displacement.

Notably, between 2020 and 2021, the global reduction of about 80 million was largely attributable to a revision of the number of children requiring preventive chemotherapy for soil-transmitted helminthiases in India, which is the country with the largest population requiring this intervention globally. This decrease was based on impact assessment surveys conducted in the past few years, which changed the endemicity status of some districts.

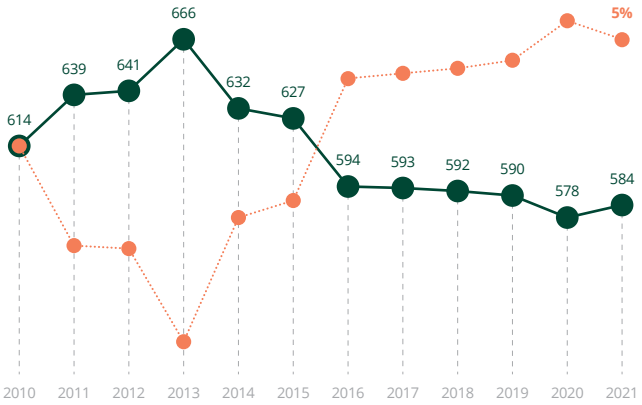
In spite of the above, at the end of 2022, WHO's South-East Asia Region still has the largest number of people requiring interventions against NTDs at 857 million (51.8% of the global total), followed by the African Region (584 million, 35.3%). The remaining four regions account for 212 million people requiring interventions, or 12.9% of the global total (Fig. 1).

Fig. 1. Number of people requiring interventions against NTDs (green) and associated percentage reduction (orange) globally and regionally, 2010–2021

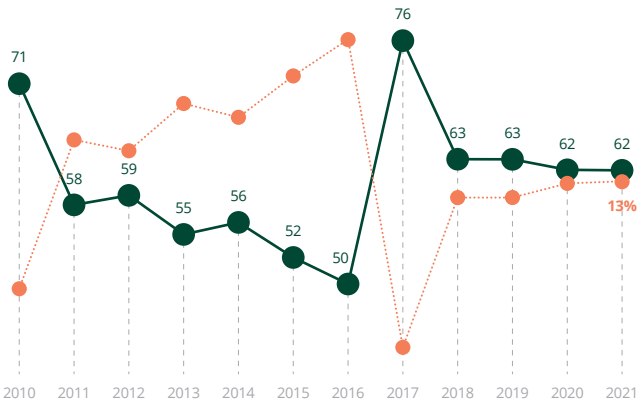
Global



African Region



Region of the Americas



Number of people requiring interventions against neglected tropical diseases (in millions)

Percentage reduction of population requiring interventions against NTDs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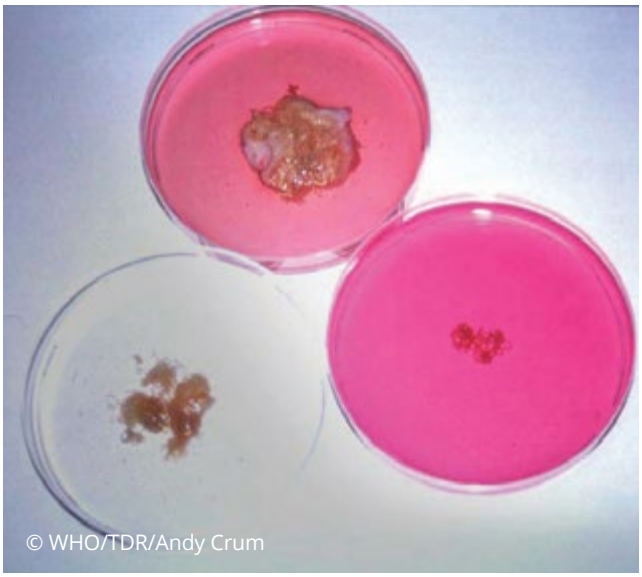
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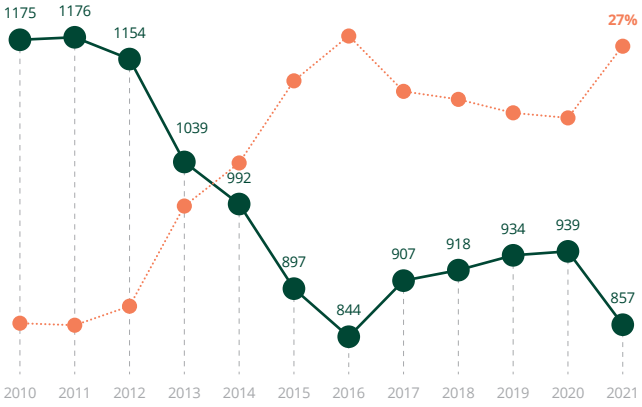
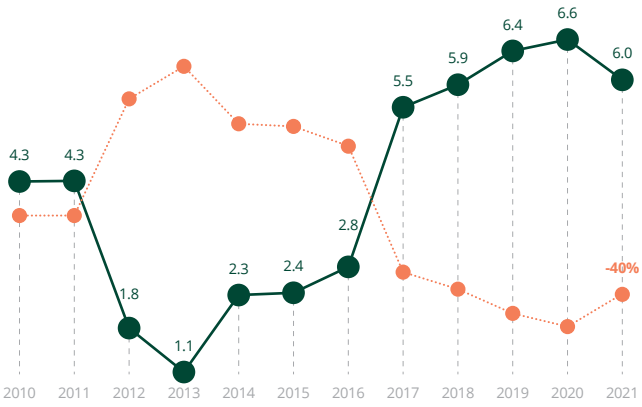
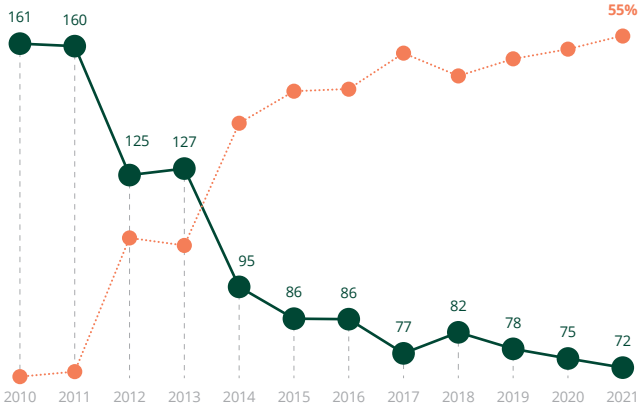
South-East Asia Region



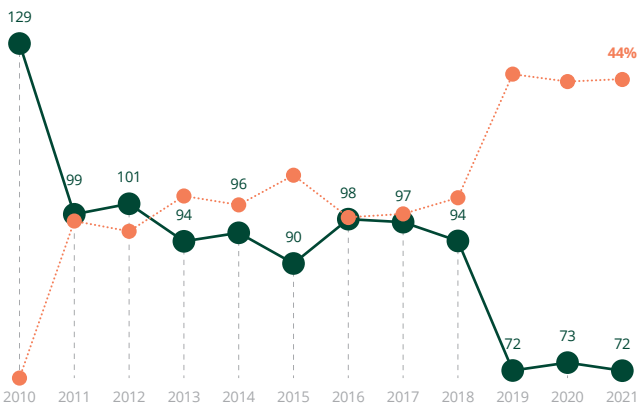
European Region



Eastern Mediterranean Region

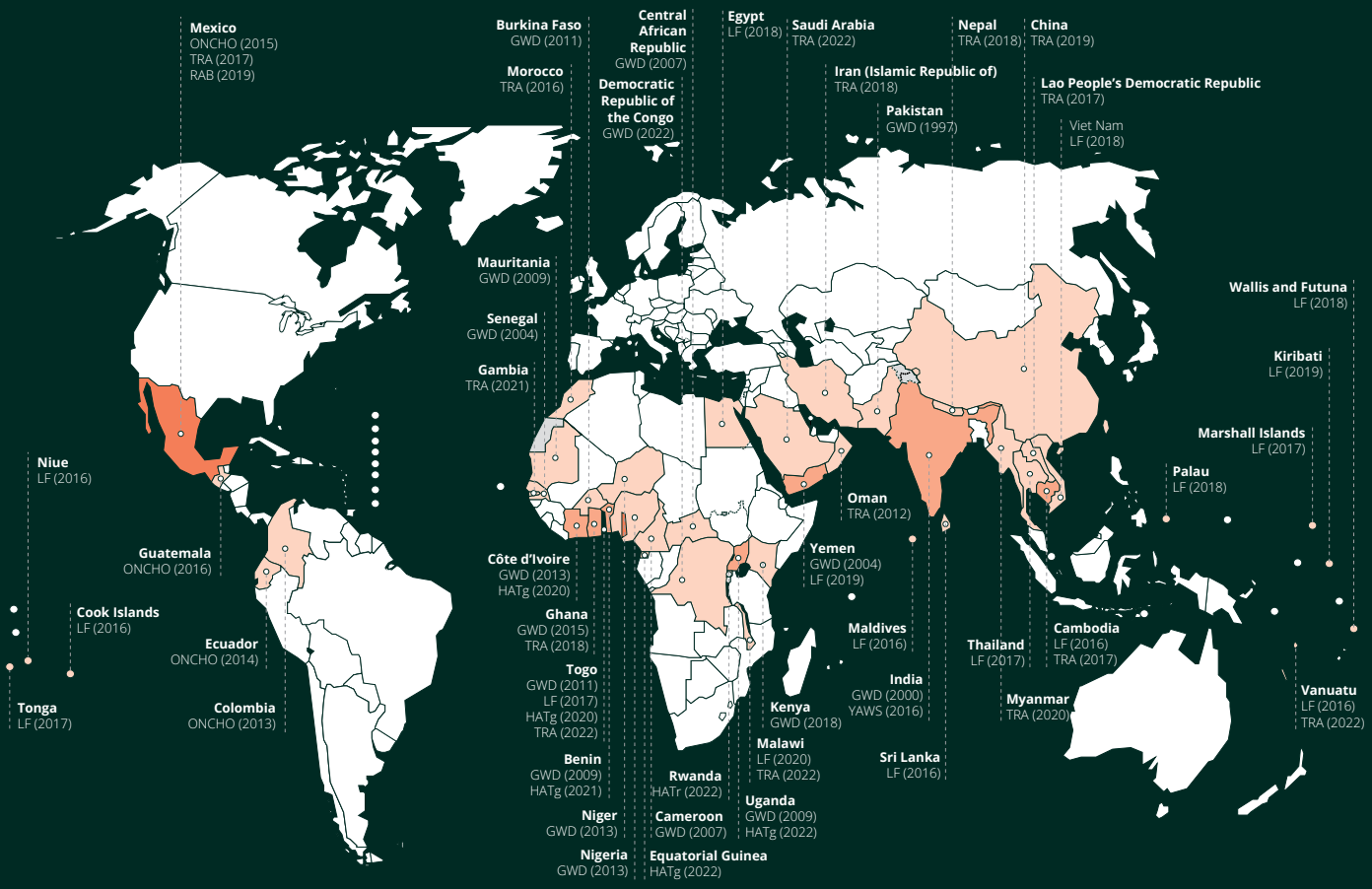


Western Pacific Region



As of December 2022, 47 countries, territories and areas have eliminated at least one NTD, as acknowledged by WHO. Two countries completed the relevant acknowledgment processes in 2021[1], and eight in 2022[2]. Togo and Mexico have eliminated four and three NTDs, respectively, while nine additional countries have eliminated two NTDs (Fig. 2).

Fig. 2. Number of countries, territories and areas that had eliminated at least one NTD by December 2022



GWD - Dracunculiasis (Guinea-worm disease)

HATg - Human African trypanosomiasis (gambiense)

HATr - Human African trypanosomiasis (rhodesiense)

LF - Lymphatic filariasis

ONCHO - Onchocerciasis

RAB - Rabies

TRA - Trachoma

YAWS - Yaws (endemic treponematosis)

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

Data source:
World Health Organization
Map production:
Control of Neglected Tropical Diseases (NTD)
World Health Organization

[1] Benin (for gambiense human African trypanosomiasis) and the Gambia (for trachoma).

[2] Democratic Republic of the Congo (for dracunculiasis); Malawi, Saudi Arabia, Togo and Vanuatu (for trachoma); and Equatorial Guinea, Rwanda and Uganda (for gambiense human African trypanosomiasis).

The COVID-19 pandemic has had a far-reaching social and economic impact worldwide, causing unprecedented disruption across the full range of social and economic activity, including the provision of essential health services. National NTD programmes were also severely affected. According to pulse surveys conducted by WHO, services for NTDs were the second most frequently disrupted by the pandemic (48/109 (44%) of responding countries) and the most severely disrupted (21/109 (19%) of responding countries reported a severe disruption affecting ≥ 50% of NTD services) *(11,13,14)*. Nevertheless, in 2021–2022 efforts continued to mitigate the impact of the pandemic and implement the road map.

The pandemic has, however, also presented opportunities for innovation to support the principle of impact at country level through cross-cutting approaches that are owned and driven by countries themselves and augmented by coordinated support from partners. For example, hand-washing and other WASH-related measures were promoted and enforced during the pandemic in accordance with WHO guidance.

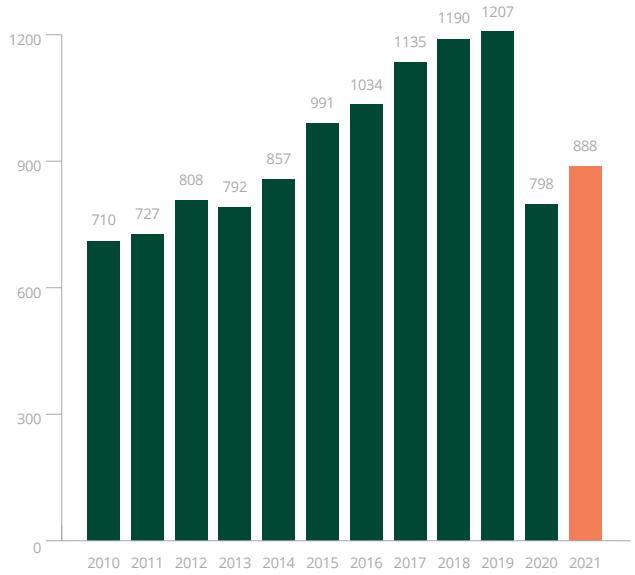
Preventive chemotherapy interventions were the most frequently affected among NTD services. Notably, fewer rounds of mass drug administration (MDA) were implemented overall than before the pandemic, while several of the MDA rounds that were implemented failed to achieve their target coverage. Data reported from 83 countries show that in total 250 MDA campaigns were implemented in 2019. In 2020, only 180 MDA campaigns were implemented in 72 countries, a decrease of 28%. In 2021, data reported from 66 countries show that the number of MDA campaigns implemented (187) slightly increased compared with 2020.

Due to closure of schools in 2020–2021 in many countries, the most affected types of preventive chemotherapy interventions were school-based deworming campaigns for distribution of albendazole or mebendazole against soil-transmitted helminthiases. In 2021, 776.5 million treatments were distributed through school-based deworming campaigns, a 23% reduction from 2019, but an increase of 22% from 2020. This positive trend is also observed for other types of MDA campaigns: in total, 1.805 billion treatments were delivered to individuals in 2019, 1.137 billion in 2020 (−37%) and 1.355 billion in 2021 (-25%); compared with 2020, about 218 more million treatments were distributed in 2021 (+19%).

The number of people receiving NTD treatments has also bounced back after the major disruptions caused by COVID-19.

In 2020, only 798 million individuals had received treatment for at least one NTD through preventive chemotherapy, globally (−34% compared with 2019, when this figure amounted to 1.207 billion). In 2021, however, 90 million more people were treated, bringing the total to 888 million (+11%) (Fig. 3). Although the difference from the pre-COVID-19 era is still substantial (more than one billion people had been treated every year for four consecutive years between 2016 and 2019), the trend registered in 2021 is positive and likely to continue in 2022. Nevertheless, such a positive trend requires further sharpening to compensate for what was lost during the pandemic and enable timely attainment of the 2030 targets set by the road map.

Fig. 3. Number of people receiving interventions against NTDs (in millions), 2010–2021



Major disruptions were also observed in health-facility based services for NTDs, such as prevention, treatment and care (reported from 42% of countries as of January-March 2021 and 48% as of November–December 2021) and surgical procedures (30% and 44%, respectively) *(11,13,14)*.

Consequently, important reductions in the numbers of cases detected and treated for diseases requiring individual management were observed in 2020 compared with 2019 (Table 1). This is the case for Buruli ulcer, human African trypanosomiasis, cutaneous and visceral leishmaniasis, leprosy, rabies, echinococcosis and dengue *(1)*.

Table 1. Number of cases reported for diseases requiring individual case management, 2019–2021 (data refer to WHO Member States only)[a]

	BU	gHAT	rHAT	CL	VL	Leprosy	Rabies	Yaws	Echinococcosis	Dengue	GWD
2019	2271	876	116	280 679	14 505	202 166	1120	98 162	5777	5 014 073	54
2020	1458	565	98	217 799	12 734	128 375	404	106 911	3589	2 733 216	27
2021	1661	747	55	221 746	11 713	140 546	66	123 866	2763	1 681 169	15

[a] Source: WHO Global Health Observatory *(15)*.
BU: Buruli ulcer; CL; cutaneous leishmaniasis; GWD: Guinea-worm disease (dracunculiasis); VL: visceral leishmaniasis.

Although for some of these diseases, a decreasing trend in detection of new cases had occurred for several years (e.g. for human African trypanosomiasis, leprosy and visceral leishmaniasis), the reduction in numbers detected and treated in 2020 should mainly be attributed to disruptions caused by COVID-19 to active and passive case detection; such disruptions are largely due to movement restrictions for both health staff and patients, which resulted in a reduced offer of services and lower health-seeking behaviour.

Nevertheless, as in the case of preventive chemotherapy, 2021 data on some diseases for which the main strategy is individual case-management indicate a progressive growth in the number of new cases reported; this follows the resumption of programme activities and should be interpreted as a sign of recovery of health systems capacities rather than a surge in transmission rates *(1,13)*.

An alternative consideration should be made for the two NTDs targeted for global eradication (dracunculiasis and yaws). Surveillance for these diseases and their focus on the "last mile" was largely maintained amidst the pandemic. The number of yaws cases reported to WHO steadily increased from 2019 to 2020, as a reflection of the progressive strengthening of yaws eradication programmes in most affected countries. For dracunculiasis, the number of reported cases in 2021 recorded a historical low (*n*=15), confirming a decreasing trend (27 cases in 2020 and 57 cases in 2019).

NTDs are often considered endemic diseases with a stable epidemiological equilibrium (the so-called "grandes endémies"). Nevertheless, several of them have significant epidemic potential. In 2021 and 2022, NTD outbreaks affected several countries, which prompted a response by WHO and partners, amidst the difficult operational circumstances brought about by the COVID-19 pandemic. These included: chikungunya in Chad; dengue in Brazil, India, Nepal, Pakistan, Réunion (France), Sao Tome and Principe, Timor-Leste and Viet Nam; visceral leishmaniasis in Chad and Kenya; scabies in Bangladesh and Namibia. Outbreaks of cutaneous leishmaniasis are frequent in middle-eastern and central Asian countries, notably where living conditions are affected by prolonged crises, as in the case of Afghanistan, the Syrian Arab Republic and Yemen.

Maintenance or resumption of interventions during the pandemic and across the spectrum of NTDs can be largely credited to the resilience of health ministries and their determination to provide essential services to populations in need, as well as to the large community of global and local partners that provided unfaltering support through human, in-kind and financial resources. Among the enablers, we can list WHO guidance promoting adaptation of NTD community-based *(16,17)* and health facility-based services *(18)* as well as the adoption of risk-based approaches for safe implementation of community-based activities such as mass treatment, active case-finding and population-based surveys for NTDs in the context of the COVID-19 pandemic *(19)*. Practical WHO guidance was further adapted into derivative tools by WHO regional offices and NTD partners and actively promoted and disseminated *(20–22)*, thus greatly contributing to the resumption of NTD services from late 2020.

2.1.1 DALY data for NTDs

Disability-adjusted life year, or DALY, data are available from the global health estimates for 2005, 2010, 2015 and 2019 (Fig. 4). Since 2005, DALYs have been estimated for 16 diseases in 14 groups of NTDs.[1] Selected projects have been implemented that resulted in important modelling revisions and updated information on DALYs. These included for dengue the introduction of adjustments to factor in under-reporting, for leprosy the incorporation of reported data on grade 2 disability, while for lymphatic filariasis action was taken to reflect the results of geospatial modelling to predict infection prevalence. New methods have been introduced to disaggregate all-age and all-sex data prior to modelling to better account for the population structure in Global Burden of Disease locations, as well as new methods to model data reported across multiple diagnostics to improve estimates of schistosomiasis prevalence *(23)*.


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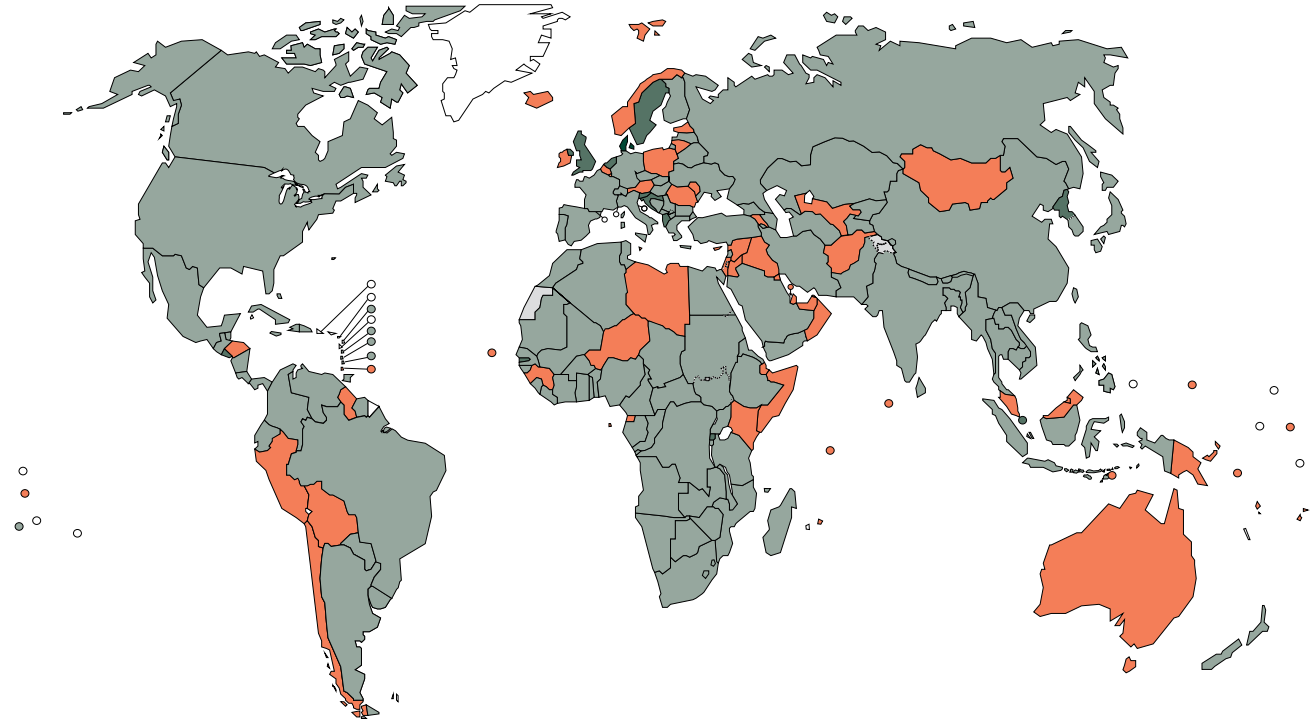
Fig. 4. Percentage reduction in DALYs related to NTDs, based on data available in 2019 versus 2015



[1] Human African trypanosomiasis, Chagas disease, cysticercosis, dengue, echinococcosis, foodborne trematodiases, leishmaniasis, leprosy, lymphatic filariasis, onchocerciasis, rabies, schistosomiasis, soil-transmitted helminths and trachoma.

The percentage reduction in DALYs related to NTDs is a road map indicator, aiming for a 75% reduction by 2030 as compared to 2020. Based on available data as of 2019 for 181 countries, the percentage reduction in NTD DALYs compared with 2015 was 11%. A comparative analysis of NTD-related DALYs data between 2015 and 2019 shows percentage reductions of 36% for human African trypanosomiasis, 24.9% for foodborne trematodiases, 18.9% for soil-transmitted helminthiases, 14.2% for rabies, 13.7% for lymphatic filariasis, 13.4% for schistosomiasis, 6.7% for cysticercosis, 5.4% for leishmaniasis and 4.5% for leprosy (Fig. 5, Fig. 6).

Fig. 5. Burden of NTDs (overall and by disease) assessed using DALYs (in thousands), 2005–2019

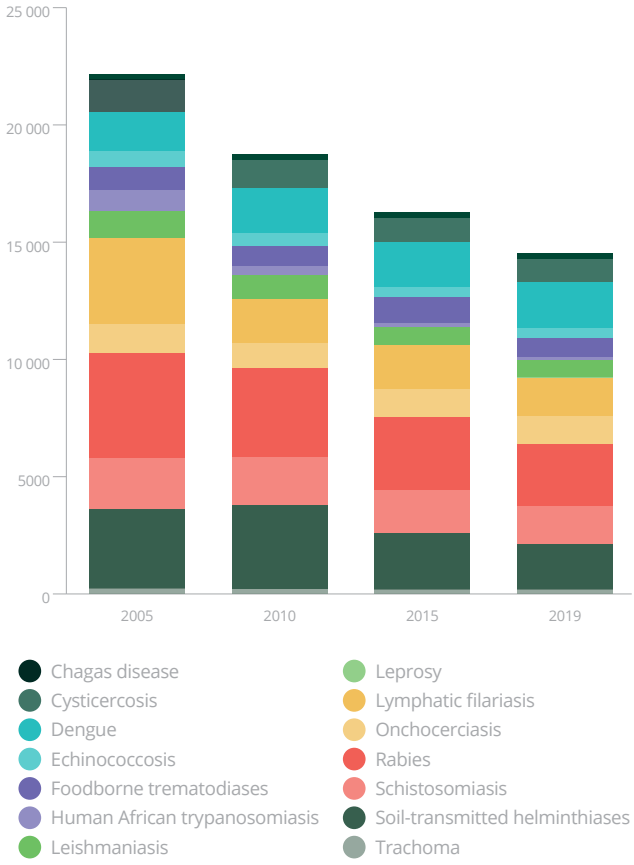


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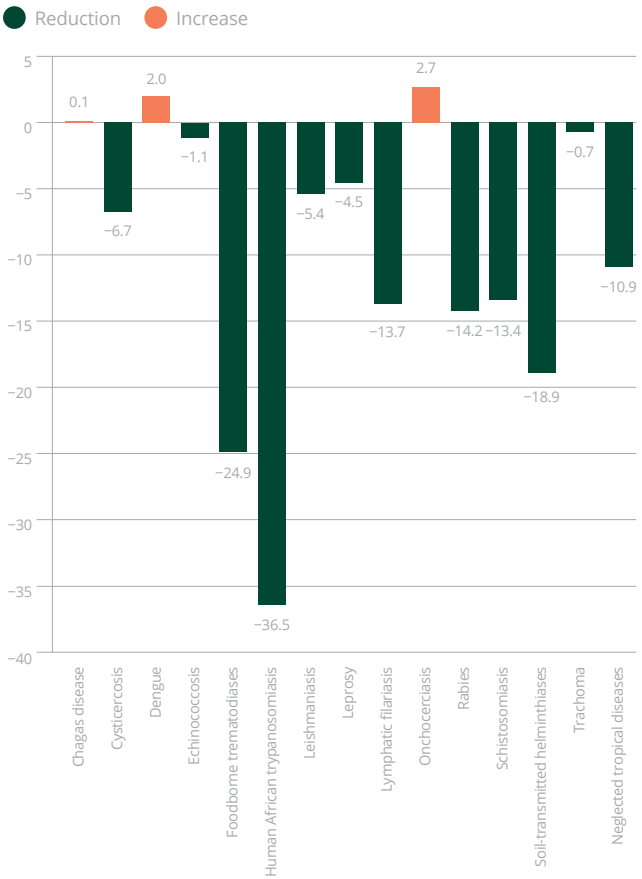
Fig. 6. Percentage reduction or increase in DALYs in 2019 compared with 2015 for 14 groups of NTDs



The conceptual and computational basis for DALYs enables comparison of health burden among NTDs, across populations and over time. Important challenges remain for future efforts to estimate DALYs however, such as accounting for impacts on NTD epidemiology due to the COVID-19 pandemic and ensuring that DALY estimates fully and accurately reflect the range of health states that people living with NTDs can experience. Improved data and methods are needed to better support reporting on the related road map indicator. Additionally, further work is required to compute DALYs for the remaining NTDs[1] for which the WHO Global Health Estimates database does not currently include estimates.

2.1.2 Regional progress

This section reports primarily on data gathered by WHO from national ministries of health in annual rounds of data collection in 2022 for activities conducted in 2021. In addition, major activities and accomplishments that happened in both 2021 and 2022 are reported and discussed.

In 2021, 199 countries and territories reported data for at least one NTD (179 Member States and 20 non-Member States), of which 162 Member States and 17 non-Member States reported at least one case of NTDs. Those countries which reported on NTDs represent over 94% of the global population. During the biennium 2021–2022, all WHO regions have registered important, albeit uneven, achievements (Fig. 7), which reflect progress towards the 2030 road map targets, within the context of the regional burden of disease.

Regional progress in 2021–2022 is summarized in Annex 1. Further technical details on disease-specific progress as published in the *Weekly Epidemiological Record* are listed in Annex 2.

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[1] Buruli ulcer, dracunculiasis, mycetoma, chromoblastomycosis and other deep mycoses, snakebite envenoming, yaws. With regard to taeniasis and cysticercosis, DALY calculations are currently available only for cysticercosis.

Fig. 7. Highlights of progress, by WHO region

African Region

A framework for the integrated control, elimination and eradication of tropical and vector-borne diseases in the African Region 2022–2030 was launched. All endemic countries in the Region have completed mapping for three of the five NTDs amenable to preventive chemotherapy. In 2021–2022, four countries were validated for the elimination of human African trypanosomiasis as a public health problem, bringing the total to six; in the same period, four countries were validated as having eliminated trachoma as a public health problem, and the Democratic Republic of the Congo was certified free of dracunculiasis transmission. There is a steady decline in the number of cases of Buruli ulcer and both cutaneous and visceral leishmaniasis. Community treatment for yaws is being scaled up. The first regional meeting for snakebite envenoming was held.

Region of the Americas

NTDs are now embedded in the regional Elimination Initiative, a policy which calls for an integrated sustainable approach to eliminate 35 communicable diseases in the Americas. Sixteen countries have established or strengthened their databases and entomological surveillance systems. A toolkit for integrated serosurveillance of communicable diseases was published and is being implemented in different epidemiological settings. Brazil and Colombia are implementing integrated actions to control tungiasis in populations affected in remote areas. Elimination of Chagas disease as a public health problem is progressing thanks to interruption of vector-borne transmission and implementation of universal screening for blood donors in several countries in the Region. Integration of WASH into the health sector is being scaled up following regional capacity-strengthening activities. Operational tools for trachoma elimination and safety of preventive chemotherapy were launched.

South-East Asia Region

The highest decline in the burden of visceral leishmaniasis (kala-azar) was historically reported, confirming a steady reduction in incidence. The regional strategic framework for accelerating and sustaining kala-azar elimination in the South-East Asia Region: 2022–2026 was published. The first consultation was convened on the Regional Action Plan for prevention and control of snakebite envenoming in South-East Asia 2022–2030, which was launched in December 2022. The National Action Plan for dog-mediated rabies elimination from India by 2030 was also published. Regional capacity strengthening activities on entomology and vector management were implemented, and Nepal and Timor-Leste completed a vector control needs assessment. Elimination of leprosy in the Maldives is progressing under the national plan for "100 Leprosy Free Islands by 2023".

European Region

Armenia conducted 44 two-day training courses nationwide on zoonoses and One Health for epidemiologists, clinicians of different specialties and regional veterinarians. Vector control needs assessment were completed in Armenia, Croatia, Cyprus and Georgia, and several capacity-strengthening and information-sharing initiatives on vector management have been implemented at regional level. Collaboration between the European Centre for Disease Prevention and Control, the European Food Safety Authority, the World Organisation for Animal Health and WHO led to the completion of a study on surveillance, prevention and control of leishmaniasis in the European Union and its neighbouring countries. Kyrgyzstan developed a national strategy on leishmaniasis.

Eastern Mediterranean Region

Seven countries have eliminated at least one NTD. Sudan is in the precertification stage for interrupting transmission of dracunculiasis. Seven schistosomiasis-endemic countries (Djibouti, Islamic Republic of Iran, Jordan, Lebanon, Morocco, Saudi Arabia, Tunisia) do not require MDA and can be verified for interruption of transmission. In 2022, Saudi Arabia was validated as having eliminated trachoma as a public health problem. Sudan maintained interruption of transmission of onchocerciasis in one focus, which therefore no longer requires treatment. Access to treatment for cutaneous leishmaniasis is improving. Regional programmes for Health Emergencies and Communicable Diseases are collaborating to implement the One Health approach for multisectoral control in several countries. A regional platform encompassing all NTDs has been established.

Western Pacific Region

Vanuatu was validated as having eliminated trachoma as a public health problem. French Polynesia, Malaysia, New Caledonia and the Philippines successfully introduced the IDA regimen for lymphatic filariasis and achieved effective coverage. The Lao People's Democratic Republic's dossier for validation of elimination of lymphatic filariasis as a public health problem is under review. Cambodia developed a road map to eliminate leprosy. Fiji and Solomon Islands conducted mass treatment interventions for scabies. Mapping of neglected parasitic zoonoses is ongoing in several countries. Integration of service delivery within NTD programmes and with other disease control programmes has been widely practiced in Papua New Guinea and Vanuatu in alignment with the Region's priority initiative of Reaching the Unreached to expand universal health coverage.

At country level, opportunities for innovation were harnessed where possible to maximize the impact of interventions through cross-cutting approaches, owned and driven by countries themselves, and augmented by coordinated support from partners. Guinea and Guyana are among the country examples that illustrate how interventions were resumed or sustained by country-led initiatives in spite of the operational challenges posed by the COVID-19 pandemic (Box 1, Box 2).

Box 1.

Resuming MDA in Guinea during the COVID-19 pandemic


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Guinea reported its first case of COVID-19 on 12 March 2020. Soon after, a national state of emergency was declared, all land borders were closed, schools were shut down and public gatherings were limited. Following WHO guidance published in April 2020, the Act to End Neglected Tropical Diseases/West Program (ACT/West) and the Ministry of Health of the Government of Guinea suspended the field work required to prepare for MDAs, and many other activities including field-based activities targeting NTDs were paused. The Ministry of Health and its partners decided to resume MDA in mid-August, after WHO issued updated guidance on implementation of NTD community-based activities in the context of COVID-19 on 27 July 2020.

To plan for the resumption of NTD interventions in the context of COVID-19, the national NTD programme and ACT/West developed a national contingency plan focused on a risk–benefit assessment that would identify potential risks and weigh them against the expected beneficial impact of MDA, and a risk mitigation plan to guide implementation of precautionary measures during MDA. A remote supervision plan to monitor compliance with COVID-19 barrier measures in real-time during MDA was also drawn up.

The Ministry of Health and ACT-West then resumed MDA activities and enforced strict risk mitigation measures between August and September. A study *(24)* assessing the exercise highlighted the importance of personal protective equipment for programme staff and other health workers involved in MDA, as well as that of a COVID-19 test rule requiring all fieldworkers and supervisors leaving the capital city of Conakry (the national COVID-19 epicentre) to be tested before travel.

The study also stressed the value of a participatory approach, led by the national NTD programme, in developing the contingency plan which contributed to wide acceptance of restarting the MDA from all key stakeholders, including administrative, political and religious leaders as well as health personnel, donors and implementing partners.

Thanks to this approach, almost 6 million people were safely treated for lymphatic filariasis, schistosomiasis and soil-transmitted helminthiases in 2020 across Guinea, largely exceeding the number reached in 2019. Lessons learnt from the first MDA round conducted amidst the pandemic also contributed to informing interventions in 2021, when approximately the same number was again offered treatment against NTDs. Additional rounds of MDA were also implemented in November–December 2022.

Box 2.

Guyana's second consecutive successful IDA MDA campaign during COVID-19: advances in eliminating lymphatic filariasis as a public health problem


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Guyana is one of four countries in the Region of the Americas where lymphatic filariasis, a disease caused by infection with *Wuchereria bancrofti*, is still a major public health problem. The expressed political will of the nation to scale up all elimination activities remains steadfast. This was demonstrated during the second round of the MDA campaign activity with IDA (ivermectin–diethylcarbamazine citrate–albendazole) implemented in 2021 during the COVID-19 pandemic.

The first round of MDA with IDA for lymphatic filariasis was conducted in 2019 and 100% geographical coverage was achieved. The second round, in 2021, was noted for the challenges imposed by COVID-19. Maintaining high coverage was a feat well recognized for the increased investments needed, especially for ensuring the safety of the health care workers and the communities while distributing the three anthelminthic medicines.

However, commitment from regional and national stakeholders, medicine donations from pharmaceutical companies, donations of personal protective equipment, and provision of financial and technical support by the Pan American Health Organization/WHO Regional Office for the Americas and funding agencies, contributed significantly to the campaign's success.

Treatment activities were implemented during the first quarter of 2021 (February–March) for 6 weeks in the eight endemic regions of Guyana, where every eligible person living in the endemic areas was targeted through mixed drug distribution strategies focusing on schools, fixed treatment points and households. The campaign achieved 100% geographical coverage, and an epidemiological coverage of 72% (486 332 treated/678 082 eligible), exceeding the minimum recommended by WHO (65%).

Some noteworthy enablers during the second round of IDA MDA were:

- strengthened social mobilization through the work of regional communication focal points tasked with spearheading the community engagement activity;
- employment of more human resources to increase access to MDA;
- reinforcement of the relationship among the national NTD programme and stakeholders involved in the previous MDA;
- decentralized monitoring and evaluation activities relying on Supervisors' Coverage Tools used by the MDA regional coordinators; and
- cascade training with special emphasis on the national COVID-19 guidelines.

The success of the first round of IDA MDA demonstrated Guyana's commitment to stopping transmission of lymphatic filariasis, while the success of the second round showed the country's dedication to maintaining its commitments notwithstanding the competing priorities generated by a large-scale public health crisis such as the one caused by COVID-19.


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2.2 Improving the supply chain for medicines, diagnostics and other consumables

During the COVID-19 pandemic, supply chains of health products were severely impacted at global level. As a consequence, several countries experienced stock-outs of NTD medicines and diagnostics. Global donations of NTD medicines were also affected. From 2.79 billion medicines donated in 2019, this figure dropped to 1.98 billion in 2020 and to 1.948 billion in 2021. Post-manufacturing supply chain challenges included countries postponing requested deliveries of NTD medicines because they were unable to store them in facilities that had either been shut down or diverted to the COVID-19 response or lacked the resources to unload trucks at warehouses. The disruption to medicine delivery was of particular concern for medicines with a short shelf-life, such as praziquantel, which is used to treat schistosomiasis. Additionally, most manufacturers of rapid diagnostic tests (RDTs) shifted resources to meet urgent requests for COVID-19 RDTs, cutting back on the production of RDTs used for clinical diagnosis and conducting surveys for NTDs.

With the lifting of lockdown restrictions, the situation improved significantly for the last two quarters of 2021 and 2022, particularly with regard to the availability of active pharmaceutical ingredients, manufacturing, transportation and customs clearance. Challenges faced previously in manufacturing, shipping notification, green light provision, customs clearance, storage and in-country transportation have eased, as have transportation challenges following the re-opening of borders and the relaxation of emergency restrictions to flights, border crossings and road transport, which directly or indirectly limited freight movement. Though transport costs have not yet settled to pre-COVID-19 levels, they have significantly fallen from the lockdown period when they were 5–20 times higher than the expected price. Improvements in booking delays for available transport were also observed.

The new major supply chain challenge is related to reduced demand for preventive chemotherapy medicines by WHO Member States and difficulties in producing realistic demand forecast, notably in the short term *(11, 25)*. These factors will likely spill over at least for the coming two years in the post-COVID-19 era. Persisting challenges in this area are congestion at the ports, shortages of sea freight containers and tax exemption challenges which increase transit time. Many countries fees and taxes continue to be applied on the donated medicines during the customs clearance process, while they should be tax- and duty-free as per international regulations. These are important operational bottlenecks that still need to be addressed.

Progress against road map pillars

The road map describes the approaches needed to reach the set targets through activities built on three pillars: (i) **accelerate programmatic actions** aiming at reducing incidence, prevalence, morbidity, disability, and death due to NTDs by means of scientific advances, filling gap knowledge in research, improving effectiveness of interventions and securing new tools such as effective, standardized, and affordable diagnostics; (ii) **intensify cross-cutting approaches** by the integrated delivery of interventions that are common to several NTDs, mainstreaming them within national health systems in the context of universal health coverage and cross-sectoral frameworks such as WASH, the Global Vector Control Response 2017–2030 and One Health; and (iii) **change operating models and culture to facilitate country ownership**, including by enhancing coordination among stakeholders at global, regional, national and subnational level. This chapter presents an update on activities that have been undertaken in support of these strategic pillars.

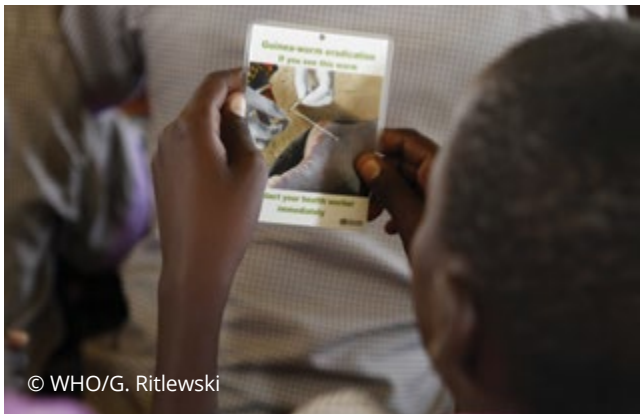
3.1 Accelerating programmatic action

3.1.1 Strategic and technical recommendations

Three meetings of the Strategic and Technical Advisory Group for Neglected Tropical Diseases (STAG-NTD) took place in 2021–2022; the 14th meeting on 22–24 June 2021 *(26)*, the 15th meeting on 7–8 February 2022 *(27)* and the 16th meeting on 27–28 September 2022 *(28)*. STAG-NTD members encouraged the expansion of WHO's work on key thematic issues that will be most impactful for progress towards the 2030 targets *(28)*. This includes prioritizing the maintenance of essential health services, including those for NTDs, within WHO's initiatives, instruments and mechanisms for pandemic prevention, preparedness and response, and that lessons learnt from COVID-19, including programmatic innovations in implementation of NTD programmes, be reviewed and compiled *(18)*.

Expansion in advocacy for NTDs aimed at resource mobilization was also recommended. Additional advice focused on prioritizing support for neglected zoonoses under the One Health umbrella, encouraging more attention to NTDs among refugee populations and internally-displaced peoples, dedicating resources to outbreak-prone NTDs through integrated vector management, and highlighting the urgency to proceed with certification, verification and validation of all eligible countries. The Group also dedicated special sessions to diagnostics for NTDs and visceral leishmaniasis in Africa and the Americas. Finally, STAG-NTD also encouraged the expansion of mathematical modelling work on the impact of COVID-19 on transmission of NTDs to all diseases and all epidemiological contexts. This effort should include economic modelling, given the importance of financial considerations for sustainability of national programmes. Additionally, NTD stakeholders should leverage the greater global interest in repeated serosurveys for revealing the intensity of infectious disease transmission, to benefit of work against multiple NTDs alongside other diseases of local importance, particularly as eradication and elimination targets are approached.

Meetings of several NTD-related WHO working groups and advisory bodies took place during the biennium, with a focus on both cross-cutting and disease specific subjects. Through its convening and normative role, WHO continues to seek advice from global experts with the aim of garnering the best evidence to inform design and implementation of NTD programmes. Even in times of rapid change and unfolding health crisis, important progress has been achieved. Annex 3 presents a summary of key progress and challenges attained to date for each of the diseases in the NTD portfolio.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3.1.2 Normative guidance and tools

WHO's output of global publications on neglected tropical diseases was not affected by the COVID-19 pandemic. A total of 54 products were released in 2021, and 52 in 2022, compared with 39 in 2020. Of these, 29 were labelled as Global Public Health Goods or Technical Products of significant strategic relevance. In addition to the road map and its six companion documents *(29–34)*, WHO's output of global guidance included foundational guidelines on the management of *Taenia solium* neurocysticercosis *(35)*, preventive chemotherapy for the control of *T. solium* taeniasis *(36)*, control and elimination of human schistosomiasis *(37)* and treatment of leishmaniasis in HIV coinfected patients in East Africa and South-East Asia *(38)*. Since the launch of the road map in 2021 the following products have been published: 18 target product profiles for diagnostic tests dedicated to specific NTDs (Annex 4), 17 issues of the *Weekly Epidemiological Record* on progress made on several NTDs (Annex 2), strategic documents such as the global leprosy strategy 2021–2030 *(39)*, policy briefs on deworming adolescent girls and women of reproductive age *(40)*, and COVID-19 related publications such as the mathematical modelling of COVID-19's impact on NTDs *(41, 42)*. Other publications included a set of manuals on monitoring insecticide resistance in mosquito vectors *(43)* and on surveillance and control of arboviral diseases *(44)*, a guide to introducing human rabies vaccine into national immunization programmes *(45)*, a manual on surveillance, monitoring and evaluation for yaws eradication *(46)*, a thematic brief on rehabilitation and assistive technology for people living with NTDs *(47)*; a handbook for veterinary authorities and animal health practitioners in preventing and controlling neglected parasitic zoonoses *(48)*; and several meeting reports, brochures and infographics.

3.1.3 Global advocacy

On 31 May 2021, the Seventy-fourth World Health Assembly recognized 30 January as World Neglected Tropical Diseases Day through the unanimous approval of decision WHA74 (18) by WHO Member States. This Day is now one of the 10 Global Health Days recognized by WHO *(49)*. It is aimed at creating better awareness about the impact of NTDs on populations around the world. WHO officially joined the global NTD partners' community and celebrated the event on 30 January 2022.

WHO also joins Member States and partners each year to celebrate World Chagas Disease day on 14 April (also a Global Health Day), and several other events such as World Leprosy Day on the last Sunday of January, World Rabies Day on 28 September and World Snakebite Awareness Day on 19 September. Additionally on 30 November 2021, the WHO Office in New York convened the launch of the Group of Friends on Defeating NTDs, established at the initiative of four Permanent Missions to the United Nations in New York (Brazil, India, Indonesia and Senegal) with the aim of sensitizing the global diplomatic community.

Several other high-level global advocacy events have been held over the past two years. In March 2022, high-level representatives from eight countries still endemic for dracunculiasis or not yet certified, reconfirmed their commitment to accelerate progress towards a world free of this ancient disease by signing the Abu Dhabi Declaration on Eradication of Guinea Worm Disease. In June 2022, during a global summit held in Kigali, Rwanda alongside the 26th Commonwealth Heads of Government Meeting (CHOGM), the Director-General of WHO signed the *Kigali Declaration on Neglected Tropical Diseases (50)*, a high-level instrument aimed at mobilizing political will and securing commitments to achieve the Sustainable Development Goal 3 target 3.3 on NTDs and deliver the targets set out in the road map. The Declaration reaffirms the endorsement of the road map made in 2020 by WHO Member States through decision WHA73(33) *(51)*, and brings the additional support of a diverse range of partners including the private sector, philanthropists and foundations, several of which committed to major pledges in both financial resources and commodities during the summit. To better capture and monitor them, an online Commitment Tracker *(52)* has been established by Uniting to Combat Neglected Tropical Diseases, a collective of NTD partners which was instrumental in facilitating the drafting and signing of the Kigali Declaration.

Many other occasions, such as the ceremonies and celebrations held in countries acknowledged by WHO for elimination of NTDs, have offered opportunities for advocacy, with the aim of inciting those same countries to finish the job for other diseases as well, and encouraging other countries to invest more in NTDs to get the same international applause and recognition.

3.1.4 Capacity-building and online resources

Over the past two years, WHO has reshaped its training approaches towards online resources in order to continue engaging learners despite movement restrictions imposed by the global response to COVID-19. In early 2021, a dedicated NTD channel was launched on WHO's OpenWHO platform *(53)*. The first self-learning course to be made available focused on NTDs in the context of the COVID-19 pandemic, and is currently available in the six official United Nations languages. As of end 2022, courses on 19 different topics are accessible through this channel, most of them in different languages, for a total of 36 courses. Subjects vary from disease-specific to cross-cutting themes. These include a set of courses dedicated to the road map and several of its companion documents (Sustainability Framework, M&E Framework, One Health), as well as a set of 11 courses dedicated to skin-NTDs, their management and public health control. The number of learners enrolled in NTD courses has now exceeded 70 000, of whom 29% have successfully completed the final assessment. The top five countries of residence of enrolled learners are China, India, Nigeria, Pakistan and the United States of America, in this order. Most learners are students (33%) followed by health care professionals (25%) and a wide range of other profiles (42%).

As of end 2022, courses on 19 different topics are accessible through OpenWHO, most of them in different languages, for a total of 36 courses. Subjects vary from disease-specific to cross-cutting themes.

Another online resource set up during the pandemic has been a series of webinars convened by WHO and dedicated to different aspects of the road map or aimed at launching specific WHO publications on a diverse range of NTDs. Since early 2020, some 25 such global advocacy and technical webinars have been organized, in addition to many others with a regional or country audience.

A wealth of other webinars and virtual events have also been convened by global and local partners working on NTDs, to which WHO has participated in many different ways. For example, a workshop on Female Genital Schistosomiasis (FGS) was conducted online in May 2021 as part of the FAST Project.[1] More than 300 health care professionals in sub-Saharan Africa participated. They were trained on improving the prevention, diagnosis and treatment of FGS.

Generally speaking, holding webinars at regular intervals in time of COVID-19 has been for WHO and partners an opportunity to engage with the global NTD community and keep the visibility of NTDs at a high level in spite of the many competing public health priorities.

In addition, two NTD Apps have been launched by WHO and made available free of charge to global users, thus bringing the fight against neglected tropical diseases to health workers' mobile phones: one on the road map and one on skin-NTDs. The skin-NTD App is currently available in four languages and has reached its fourth version (v4).

In the course of 2022, several in-person capacity strengthening activities have also resumed at global, regional and country levels, with support from WHO, Member States and partners alike.

[1] The FGS Accelerated Scale Together (FAST) project is dedicated to a holistic approach that combines diagnosis and treatment, training, prevention through MDA and community awareness and empowerment *(54)*.

"I have three wishes [...]. First, I hope we can learn from Covid-19 and develop new tools for NTDs. Currently, we are using 19th century tools in the 21st century. Covid-19 has shown us that rapid development of pharmaceuticals and diagnostics is possible with solidarity and collaboration. Second, I hope we change the dynamic of how we address these diseases with stronger and visible participation of people from countries in which the diseases are endemic. To decolonize global health, we must move from rhetoric to action. Lastly, I wish to see a stronger and meaningful participation of women (especially women of color) in global health leadership" (56).

Dr Mwelecele Ntuli Malecela
Forbes, 20 January 2021


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The Mwele Malecela Mentorship Programme for Women in NTDs

WHO and the Bill & Melinda Gates Foundation have established a mentorship programme for African women working in NTD programmes. The initiative is named in honour of the late Dr Mwelecele Ntuli Malecela, who was one of Africa's most highly respected female scientists and public health leaders *(55)*. The mentorship programme aims to provide African women with leadership training skills as well as travel and networking opportunities to become leaders and champions of the efforts to eliminate neglected tropical diseases, at home and internationally.

Dr Malecela served as Director of the Office of the WHO Regional Director for Africa in Brazzaville, Congo and then as Director of the Department of Control of Neglected Tropical Diseases at WHO's headquarters in Geneva. Prior to joining WHO, Dr Malecela served as the Director-General of the National Institute for Medical Research, United Republic of Tanzania – the first woman to occupy this position and as founding Director of the National Lymphatic Filariasis Elimination Programme in Tanzania. An eloquent speaker, Mwele's approach was characterized by passion and dedication to people and causes. Throughout her life, she advocated for the empowerment of women, for gender equality and for the welfare of women and girls. Her preference for telling the truth over seeking to please earned her widespread respect.

3.1.5 Renewed pledges, expanded donations and quality-assured medicines

In 2021–2022, seven Memoranda of Understanding between WHO and major pharmaceutical partners (Bayer AG, Cytiva, Eisai, Gilead Sciences, GlaxoSmithKline, Janssen Pharmaceuticals and Novartis) were signed or renewed for in-kind donations of NTD health products. These memoranda secured the continuation of donated medicines for Chagas disease, foodborne trematodiases, human African trypanosomiasis, leprosy, lymphatic filariasis, soil-transmitted helminthiases and visceral leishmaniasis, and of both medicines and laboratory consumables for human African trypanosomiasis; most notably, they extended the donation of albendazole to enable treatment of cystic echinococcosis, an NTD previously not covered by any donation. A total of 18 different medicines are currently donated to WHO by 10 pharmaceutical donors. These donations cover 11 diseases and are fully managed by WHO's Department of Control of Neglected Tropical Diseases. In addition, two manufacturers donate two medicines through other entities to national authorities in support of two disease programmes: the International Trachoma Initiative (for trachoma) and the Mectizan Donation Program (for onchocerciasis and lymphatic filariasis). Several pharmaceutical companies reaffirmed or extended their commitment to donate during the Kigali Summit on Malaria and Neglected Tropical Diseases in June 2022. The status of commitments by pharmaceutical companies to donations of medicines and health products is summarized in Annex 5.

Progress was made also to ensure the quality and safety of NTD medicines available in the market or donated. In 2021 and 2022, four formulations of quality-assured albendazole (one), ivermectin (one) and praziquantel (two) produced by four different pharmaceutical companies were added to the WHO list of 10 prequalified pharmaceutical products for NTDs *(57)*.

Five more formulations of NTD medicines are currently under review. In addition, two formulations of albendazole were approved by WHO Expert Review Panels for time-limited donation or procurement following an ad-hoc review process.

3.1.6 Innovation

Despite the many challenges faced, NTD-related innovation is a main driver of progress by providing new treatment approaches such as triple therapy with IDA for lymphatic filariasis. The prospects for further progress on human African trypanosomiasis have also been improved with the development of an easily accessible, all-oral fexinidazole treatment which was developed by the Drugs for Neglected Diseases *initiative* (DNDi) in collaboration with its partners. Promising results have also been obtained with the development of acoziborole, a new single-dose oral medicine for the treatment of gambiense sleeping sickness. DNDi and partners are also currently investigating the safety and efficacy of fosravuconazole in treating fungal mycetoma (eumycetoma) in Sudan. In addition to an expected higher cure rate, if successful, the adoption of this treatment would allow for a shorter therapeutic protocol, boosting compliance with treatment and saving financial resources for both treatment providers and patients.

Since the original drug packaging for the preventive chemotherapy strategy was proposed, some possibilities have been identified for drug substitutions or additions. These include new potential anthelminthic agents, such as tribendimidine for foodborne trematodiases and soil-transmitted helminthiases; or new potential regimens, such as the addition of ivermectin to albendazole or mebendazole to increase the efficacy of treatment for trichuriasis; the combination pyrantel pamoate-oxantel is a back-up alternative to albendazole or mebendazole as it has long been shown to be efficacious against intestinal nematodes; and moxidectin is being investigated as an alternative to ivermectin in the treatment of onchocerciasis and strongyloidiasis.


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The Pediatric Praziquantel Consortium has supported the development of arpraziquantel, a potential new treatment option for schistosomiasis in preschool-aged children. This consortium announced the completion of its pivotal Phase III trial in Côte d'Ivoire and Kenya in November 2021. The trial reported a favourable efficacy and safety profile for arpraziquantel in children 3 months to 6 years of age. The Consortium is preparing for the submission of the dossier for registration of arpraziquantel by regulatory authorities.

The development of diagnostics is a priority to ensure the road map targets are achieved. Notable advances have occurred in the development of rapid and multiplex diagnostic tests for human African trypanosomiasis, lymphatic filariasis, onchocerciasis and yaws, and the use of circulating cathodic antigen assay for *Schistosoma mansoni*. Other products in the pipeline include a mycolactone RDT for Buruli ulcer. Significant gaps remain, however. Effective diagnostics will be of critical importance as the intensity of infection and prevalence of NTDs progressively decrease and there is a risk that current methods of diagnosis may not have the necessary sensitivity or specificity to support programmes through to the point of target delivery. WHO is therefore working to ensure that this programmatic area receives the scrutiny and expert attention it needs. WHO is also collaborating with the Foundation for Innovative New Diagnostics (FIND) and other partners to improve access to biological resources to facilitate diagnostics research.

A Diagnostic Technical Advisory Group for NTDs (DTAG) has been established and initiated several time-limited subgroups focused on diagnostics for specific diseases and disease groups. Several subgroups have been established within the purview of the Group, tasked with addressing critical issues in diagnostics that span the entire portfolio of NTDs. DTAG is also playing a coordinating role to strengthen access to currently-available diagnostics. Among the tasks undertaken by DTAG and its subgroups has been the development of target product profiles (TPPs) which are used to help define the type of diagnostics that would be most supportive of road map aims. To date, 18 TPPs have been published for diagnostics for: human African trypanosomiasis (*n*=4), lymphatic filariasis (*n*=2), schistosomiasis (*n*=2), soil-transmitted helminthiases and onchocerciasis (*n*=2), including seven TPPs for diagnostics for skin NTDs (Buruli ulcer, dermal leishmaniases, mycetoma, scabies (*n*=2) and yaws (*n*=2)). Additional TPPs for diagnostics for leprosy, visceral leishmaniasis, FGS and other use-cases as well as a TPP for snakebite antivenoms are in development (Annex 5).

Mathematical models have been developed by the NTD modelling consortium and used to estimate the delays that interruptions in NTD interventions due to COVID-19 may cause to the achievement of 2030 road map targets, and the beneficial impacts of mitigation strategies; these efforts build on previous work in this area *(41)*. These models confirm that areas at highest risk of resurgence of transmission and increases in morbidity are those with high transmission rates, or with high prevalence before interventions were introduced. The interruption of vector control interventions further amplifies the overall negative effects on programmes that benefit from these complementary interventions. NTD programmes need to be functioning at the same, or at even higher levels than previously, in order to mitigate the impact of the COVID-19 pandemic on NTDs *(42)*.

The operational constraints due to the COVID-19 pandemic have also prompted innovations in the implementation of NTD programmes. For example, the widespread closure of schools has facilitated the inclusion of NTD services into female community-based networks in India, while the need to reduce risk of increased SARS-CoV-2 transmission associated with "mass gatherings" facilitated the shift towards house-to-house approaches for distribution of treatment and provision of health education in the Lao People's Democratic Republic. In an effort to increase efficiency of interventions in a time of crisis, the pandemic has also facilitated integration among programmes: in Timor-Leste, for example, transmission assessment surveys for lymphatic filariasis and soil-transmitted helminthiases were integrated with skin examinations for yaws and scabies.

In June 2022, major investments in research and development for treatments, diagnostics and essential technologies for NTDs were announced by several global partners during the Kigali Summit on Malaria and Neglected Tropical Diseases.

3.1.7 Antimicrobial resistance against NTD medicines

The development and spread of resistance by pathogens to the different antimicrobials used to treat NTDs threatens to derail progress towards the road map targets. The emergence of treatment failure is a phenomenon that has already been observed in kinetoplastids and in the causative organisms of leprosy among the bacterial NTDs. Various levels of antimicrobial resistance have also been reported in relation to the medicines used to treat human African trypanosomiasis (melarsoprol), all forms of leishmaniasis (pentavalent antimonials) and leprosy (dapsone, rifampicin, fluoroquinolones). Most anthelminthic medicines used in NTD programmes are also used to treat parasitic infections in animal populations: although resistance has been documented in animals, this is not the case yet in humans, but the risk cannot be underestimated. It is therefore of paramount importance that drug efficacy is closely monitored throughout the NTD spectrum, and that surveillance mechanisms to monitor current and emerging resistance are systematically and thoroughly instituted in NTD interventions. WHO has started supporting action and networks to monitor the efficacy of treatments for NTDs, and is committed to reinforcing collaboration with relevant sectors and stakeholders.

For example, the causative agents of eumycetoma have been included in the WHO list of high-priority fungal pathogens for research, development and public health action, including antimicrobial resistance *(58)*, and more than 10 national schistosomiasis and STH programmes that have been distributing anthelminthics for more than six years are currently being monitored through a standardized protocol *(59)*. WHO has also published *A guide for surveillance of antimicrobial resistance in leprosy; 2017 update (60)* that helps countries in establishing or strengthening sentinel surveillance systems for determining primary and secondary resistance to rifampicin, dapsone and ofloxacin in treatment of leprosy; such systems are currently in place in over 50 countries.

Work focusing on the development of alternative or second-line treatments, or combination therapies of existing medicines, as mentioned above in 3.1.4, is also contributing to ensure that interventions against specific NTDs remain efficacious.

3.1.8 Gender, equity and human rights

Poverty and inequality are both the starting point, and the ultimate outcome, for NTDs. The path leading to illness is often determined by a widespread lack of access to formal education, timely health care, adequate living conditions, employment and nutrition. The reasons for such deprivation are complicated, but ultimately result in a persistence of inequalities in affected communities. Once afflicted, the stigma and disability that often accompanies NTD infection can in turn prevent the attainment of other basic human rights such as the right to formal education, work, and to live free from discrimination. Individuals living in vulnerable situations, such as migrant workers, refugees, indigenous peoples and those with physical and mental disabilities, are often more susceptible to NTD-associated infection and morbidity, heightening their potential social exclusion. Addressing NTDs should dedicate attention to mental health, as many persons affected by NTDs, particularly by those that cause disfigurement, develop psychosocial conditions including loss of self-respect, feelings of hopelessness, depression, stigmatization, and drug and alcohol use, which can prevent them from seeking help *(26)*. Yet approaches to tackling NTDs are commonly considered from a biomedical standpoint, with limited exploration of the complex sociocultural factors that influence patients' experiences *(61)*. Without understanding of the illness experience associated with NTDs by axes of inequality for gender, equity and human rights, achieving and sustaining programme gains will be difficult.


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Despite some reflections on the impact of gender on health outcomes for some NTDs, little research has explored how this influences comorbidities such as mental health and quality of life through time. Intersectional research exploring how gender interacts with other axes of inequality, such as age and education and with broader contextual factors such as conflict and poverty, to shape the NTD experience, is also still limited. Additionally, there are insufficient remedial actions implemented to overcome known barriers related to the under-provisioning of health-care systems, mistrust of health-care systems, deficiency in community health knowledge, geographical barriers and financial costs, which prevent access to NTD interventions for the individuals that require them the most *(62)*.

It is vital that those living in situations of vulnerability have the same opportunities to receive NTD treatments as those living in more affluent contexts where access to health services is greater. WHO is in the process of establishing a technical working group on gender, equity and human rights. This group will coordinate a comprehensive scoping study which will be pivotal in identifying major such issues related to NTDs. These will inform the development of technical resources required to support endemic countries working towards the common goal of breaking down the equity, gender and human rights barriers that currently limit access to NTD interventions by populations.

3.2 Intensifying cross-cutting approaches

3.2.1 Integrating approaches across diseases

3.2.1.1 Preventive chemotherapy

Preventive chemotherapy is one of the largest, most successful public health interventions in history, benefitting more than a billion people worldwide through the large-scale distribution of safe, single-administration, quality-assured medicines, either alone or in combination. It is also one of the oldest examples of integration across diseases, certainly in the area of NTDs and possibly throughout the health system. The earliest attempts to integrate control of schistosomiasis and soil-transmitted helminthiases through the co-administration of praziquantel and albendazole or mebendazole, for example, date to the 1980s.

In 2021–2022, the arsenal of guidance on preventive chemotherapy was further expanded with the publication of a manual to facilitate microplanning at country level *(63)*, a manual on safety in administering medicines *(64)* and standard operating procedures for supply chain management *(65)*; the latter two products have been complemented by online courses on the OpenWHO platform.

Preventive chemotherapy is currently extensively used against five NTDs: lymphatic filariasis, onchocerciasis, schistosomiasis, soil-transmitted helminthiases and trachoma; it is also implemented at a smaller scale against foodborne trematodiases and taeniasis, as recommended by the related guideline published in 2021 *(36)*. Furthermore, the mass treatment approach, far from being limited to helminth infections, is now being extended to other diseases. The substantial collateral benefits shown by the large-scale use of ivermectin for lymphatic filariasis or onchocerciasis on scabies, and the effectiveness of mass treatment with azithromycin against yaws have prompted the adoption of this strategic approach as a key intervention for both diseases. Finally, the integrated approach to tackle the burden of several diseases at the same time has prompted several health ministries to consider organizational changes and merge disease-specific programmes into a single one.

These achievements result from the decision by governments to "end the neglect", from the donation by pharmaceutical companies of essential medicines, from the resolution of global and local partners to commit financial resources and from the dedication of community volunteers to distributing medicines. The difference that these efforts make to the lives of individuals, families and communities is generational and is a significant part of WHO's collective work towards more sustainable, resilient, productive and equitable societies.

The further integration of preventive chemotherapy with other health programmes beyond NTDs is also being considered by some countries. For example, the findings regarding ivermectin's effect on malaria vectors may inspire greater interaction between NTD- and malaria-prevention programmes. There is also increasing interest in addressing the burden of FGS in adolescence through preventive chemotherapy as a strategy for preventing HIV/AIDS, as incorporated in the global AIDS strategy 2021–2026 to end inequalities and end AIDS *(66)*. The FGS Integration Group, an innovative coalition of organizations, is galvanizing joint action across the sexual and reproductive health and rights, HIV, human papillomavirus/cervical cancer, NTD and WASH sectors to tackle the neglected issue of FGS. The group is raising awareness of FGS with the aim of improving treatment and prevention with and for women and girls through sustainable integration of FGS into sexual and reproductive health and rights and NTD programmes at scale. Continuing to expand the public health scope and impact of preventive chemotherapy will significantly increase years of healthy life for billions of people affected by NTDs and other comorbidities.

3.2.1.2 Skin-related NTDs

At least 10 of the diseases included in WHO's list of NTDs present with changes on the skin before other changes occur in the internal organs or physical disabilities develop. Given this commonality and the likely co-endemicity of many of these diseases, WHO has created a framework for integration of activities against skin NTDs, as advocated in the companion document *Ending the neglect to attain the sustainable development goals: a strategic framework for integrated control and management of skin-related neglected tropical diseases (33)*. The so-called skin NTDs include Buruli ulcer; cutaneous leishmaniasis; leprosy (Hansen's disease); lymphatic filariasis; mycetoma, chromoblastomycosis and other deep mycoses; onchocerciasis; post-kala-azar dermal leishmaniasis; scabies and other ectoparasitoses including tungiasis, a report for which was published in 2022 *(67)*; and yaws.

An integrated approach to skin NTDs offers a pathway to overcome challenges related to the vertical implementation of case detection, management and follow-up of cases, which required significant resources and intensive efforts. Joint efforts in the areas of active case detection and management of wounds, lesions and affected limbs, or with regard to capacity building of health care workers using skin NTD training materials, are being practiced by some countries of different regions.

These examples of integration show the way for a more effective and efficient approach to tackle the burden of skin NTDs. Other opportunities for integration are represented by the expansion of community-based approaches to skin NTDs. For example, targeted MDA against diseases such as scabies and yaws has proven effective in areas of high endemicity, while the recently established evidence for chemoprophylaxis supports the administration of single-dose rifampicin to contacts of leprosy cases. Strategies to control and manage skin NTDs are evolving with new knowledge and innovations.

Nevertheless, a broad range of research is still required to improve scientific understanding of each skin disease; likewise, point-of-care diagnostics and better medicines are needed. Operational research is also needed, for example, to develop and evaluate training materials and modules so as to improve integrated case detection on the front line of health care, and at household and community levels. Ideally, care should be provided close to where patients live. Given the growing availability of mobile phones and internet connectivity, new technologies such as mHealth tools, teledermatology, as well as the use of Apps, or the simple exchange of pictures of skin lesions by social media for confirmation of diagnosis can be further expanded.

Looking forward, disseminating the skin NTD framework and mainstreaming it into routine health services is crucial. This process can be facilitated by focusing initial support on selected priority countries in which capacity of primary health-care workers should be strengthened on skin NTDs and other common skin diseases. Such support should also aim at fostering integration of skin NTDs into national surveillance systems, most notably for yaws which is slated for eradication. Finally, advocacy is essential to mobilize resources and overcome current gaps in commitment from countries and partners and expand access to diagnostics and treatments for all skin NTDs.

3.2.2 Coordinating across sectors

3.2.2.1 One Health

One Health is an integrated, unifying approach to balance and optimize the health of people, animals and the environment. It requires understanding "whole-of-system" interactions and bringing together relevant stakeholders and sectors to take a coordinated approach where appropriate. This approach is key to sustainably address NTDs, as it mobilizes all relevant sectors, disciplines and communities at varying levels of society to work together. This way, new and better ideas are developed that address root causes and create long-term, sustainable solutions. Although its cross-sectoral nature requires initial efforts in terms of planning and coordination, the One Health approach is gradually being taken up by health ministries and their partners, as the most effective way to address the burden of several NTDs, notably the zoonoses or the vector-borne diseases. For example, the burden of Chagas disease in Latin America has been reduced through an inter-sectoral approach combining vector control, particularly indoor residual spraying, housing improvements and the screening of blood donors to stop transmission of *T. cruzi* via transfusion.

In September 2021, WHO launched the Snakebite Information and Data Platform, a virtual repository of information on all medically important venomous snakes and resources to tackle the burden of snakebite envenoming, as well as a space for collaboration and data-sharing accessible by Member States, the scientific community, the private sector, other stakeholders and the general public *(68)*. In 2022, in addition to the road map companion document dedicated to One Health: *Ending the neglect to attain the sustainable development goals: One health: approach for action against neglected tropical diseases 2021–2030 (32)*, WHO has published an online training course that aims to support countries, international organizations, and partners in the adoption of this approach *(69)*.

3.2.2.2 Global vector control response

Stronger coordination in this area can facilitate integration of vector management activities for all vector-borne diseases, and improve the efficacy, cost-effectiveness and sustainability of vector control. A major step in this direction was taken on 31 March 2022, when WHO launched the Global Arbovirus Initiative *(70)*, with the aim of strengthening monitoring and control of arthropod-borne viral diseases, and enhancing prevention, preparedness and response to outbreaks and future pandemics; this can only be achieved through cross-cutting and cross-sectoral approaches that involve public-private partnerships and community mobilization. The conditions covered by the GLAI notably include two NTDs, dengue and chikungunya, whose burden and public health relevance has increased in recent years, as a result of climate change and expansion of the geographical range of mosquito vectors. Within the framework of the *Global Vector Control Response 2017–2030 (71)*, during 2021–2022, WHO has strengthened its arsenal of global guidance and operational tools; has supported several regional and country-level initiatives aimed at appraising current vector control structures, capacity and partnerships, and assessing vector control needs to guide programmes in establishing or strengthening their capacity and capability for vector control in a way that coordinates multiple sectors and leverages data for local adaptability; and has facilitated capacity strengthening activities on entomology, vector management and testing for insecticide resistance and vector control products. During the biennium WHO has also provided technical support in responding to outbreaks of several vector-borne diseases, including chikungunya, cutaneous and visceral leishmaniasis and, most notably, dengue.

Effective public health control of dengue poses challenges in reason of its large geographical distribution, its high and increasing global incidence, its epidemic potential, its association with climate change and urbanization, and the lack of specific treatment options.

3.2.2.3 WASH and NTDs

The fundamental link between WASH and NTDs gained recognition within the global public health community through the inclusion of provision of safe water, sanitation and hygiene as one of the five core interventions recommended by the road map. However, the significant mutual benefits of increased collaboration between the WASH and NTDs sectors are largely untapped to support improved health outcomes, increase reach of WASH services, and strengthen ability of both sectors, alongside others, to contribute towards overall development outcomes. A global WASH-NTD strategy was launched in 2021, on the occasion of World Water Day (22 March). In *Ending the neglect to attain the sustainable development goals: a global strategy on water, sanitation and hygiene to combat neglected tropical diseases, 2021–2030 (31)*, WHO has outlined paths for better-targeted and joint WASH and NTD efforts. Its four strategic objectives provide a comprehensive approach to achieving the vision of accelerated and sustained achievement of the road map targets through a closer integration between provision of safe water and sanitation and access to NTD services, and are complemented by examples of key actions by endemic countries, WHO and development partners. WHO will monitor and report on progress made on the global strategy in every milestone year of the road map using indicators set out in the monitoring and evaluation framework companion document *(30)*.

Multisectoral collaboration has been growing in this area. Stakeholders in sectors such as environmental management and WASH are working to reduce vector populations (by cleaning irrigation canals) and to implement community-led total sanitation with health education to further reduce transmission of schistosomiasis in endemic communities located along the Mekong River in Cambodia and in the Lao People's Democratic Republic. In Egypt, presence of transmission of schistosomiasis has been added as one of the criteria for geographical prioritization of delivery of safe water and sanitation.

The fundamental link between WASH and NTDs gained recognition within the global public health community through the inclusion of provision of safe water, sanitation and hygiene as one of the five core interventions recommended by the road map.

The COVID-19 crisis widely increased uptake of WASH through activities such as hand-washing. The impact of these efforts on transmission of some NTDs is yet to be fully appreciated, but it is likely to be significant, and even more so if such good practices are maintained in post-COVID-19 scenarios. Conversely, it has to be noted that NTD programmes and community networks gave an important contribution to the COVID-19 response by adapting NTD platforms to accommodate COVID-19 activities including contact tracing, raising awareness, addressing misinformation, and, in the area of WASH, promoting community handwashing, and providing sanitation supplies *(11, 25)*, in line with IFRC-WHO-UNICEF guidance *(16)*. Once again, integration and coordination have proven to be win-win solutions.

3.2.3 Towards integrated monitoring and evaluation

3.2.3.1 Improving methods of measurement and estimation

Immense diversity exists in the manner in which monitoring and evaluation activities are conducted for the various NTDs, with some disease programmes having better-supported and mature information pathways than others. Most programmes have not utilized indicators that enable tracing of cross-cutting aspects of activities which are essential for integration and mainstreaming into national systems in a sustainable manner. Consequently, collecting and analysing global and country response to NTDs against planned actions or processes stipulated in the road map is still quite fragmented.


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To overcome this challenge, work has been carried out to harmonize and integrate monitoring and evaluation across NTDs as an important cross-cutting priority that can boost cohesiveness and coordination throughout all programmatic stages, from policy design, to implementation and iterative learning applicable to all NTD programmes.

With the support of the Working Group on Monitoring, Evaluation and Research for NTDs, WHO has developed a compendium of NTD indicators *(72)*, which lists the 70 core indicators (overarching, cross-cutting and disease-specific) presented in the road map companion document *Ending the neglect to attain the Sustainable Development Goals: a framework for monitoring and evaluating progress of the road map for neglected tropical diseases 2021–2030 (30)*. The compendium provides a comprehensive and standardized listing of the most widely used indicators relevant to countries, with the aim of allowing comparisons over time and across programmes. Future improvements on the method of measurement or estimation for such indicators will be made as more evidence is generated and learning obtained from the implementation of programme activities in the field.

Facilitating access to NTD data for public health and research purposes is an important element in the global health policy agenda. Improvements in this sense are being achieved with the development of an appropriate data IT infrastructure. An electronic dashboard to display progress against the road map, called the NTD road map tracker, has been created to display the most recently available data *(73)*. The dashboard is supported by data formally reported to WHO by Member States with a focus on the overarching and cross-cutting indicators included in road map, but with a plan to include the disease-specific ones as well, thus bringing the total to 70. Interactive dashboards providing epidemiological and programmatic information by country and by disease have also been developed.

Well–functioning routine health information systems provide the information needed to improve governance, accountability, planning, policy-making, and the overall quality of health interventions. However, a number of NTD programmes are challenged by poor information system support, which not only affects their planning, management and performance, but also poses a major obstacle to an adequate reporting against road map indicators. To address this issue, WHO is taking advantage of digitalization technologies. A routine health information system toolkit has been developed using a modular approach to facilitate collection of NTD data whenever individuals come in contact with the health system and their routine reporting. This will contribute to strengthening cost-efficiency, sustainability and enable comparable inclusion of NTD programmes in national health expenditure review processes alongside other major health programmes, as well as facilitating global compilation and analysis of NTD information.

Facilitating access to NTD data for public health and research purposes is an important element in the global health policy agenda.

3.3 Changing operating models and culture to facilitate country ownership

3.3.1 Strengthening sustainable planning

During the past decade, more than 50 countries have developed national plans for NTD control. International partners and governments have invested in these plans in pursuit of the goals against NTDs. Since 2021, WHO has further supported countries to revise and update their national plans in alignment with the road map.

Many national NTD programmes are largely reliant on donor funding, so that often NTDs are not included in established national policy, financial, and coordination processes. While this model has driven significant progress towards disease goals, as we move forward it is imperative that these investments are complemented with more sustainable approaches that build on that progress. Ultimately, NTD interventions need to be a routine part of national systems and services to preserve the progress made, continue protecting those benefiting from services, and expand services where needed.

Securing and maximizing contributions from all sectors requires country leadership to fully incorporate NTD programmes into national governance, finance, and planning processes. WHO, in collaboration with partners, has published the NTD road map companion document *Ending the neglect to attain the Sustainable Development Goals: a sustainability framework for action against neglected tropical diseases 2021–2030 (29)*. The success of the road map will depend on the effective and sustained implementation of interventions against NTDs. This will require additional efforts and new approaches to financing and implementing national NTD programmes.

In order to foster country ownership, WHO recommends that governments develop NTD plans as part of their national health sector plan and include NTD programmes in their health budget allocation. Sustainability of NTD interventions can be reinforced through integration among NTD programmes, mainstreaming within primary health care, cross-sectoral coordination and strengthening of health systems.

Some Member States are in the process of implementing the sustainability framework in their respective contexts. The United Republic of Tanzania, for example, has developed a sustainability plan for the NTD control programme for 2021–2026 following a participatory and interactive process involving reviews of various relevant documents, consultations and interviews with key informants and working sessions with multi-level stakeholders including key staff from the Ministry of Health Community Development Gender Elderly and Children and the President's Office Regional Administration and Local Governments. Other stakeholders included development partners, major programmes, the private sector, and regional and council health management teams *(74)*. Once such national sustainability plans are developed and validated by the country's leadership, Member States can make use of the 10 cross-cutting indicators of the road map to foster sustainability of their national NTD programmes.

Similarly, it is noteworthy that USAID has supported nine countries in West Africa to work on their respective sustainability plans, defining how NTD programmes will look in the future. Of those, four countries (Côte d'Ivoire, Ghana, Senegal and Togo) have validated those plans across multiple sectors of government and at the highest levels of national leadership. Despite the demands of the COVID-19 pandemic, these countries went through a systematic process (ranging 8–15 months), convening various ministries to review how and where services are provided. They also determined how services can be better incorporated across the government for greater sustainability while establishing multi-year plans towards those objectives.

As more countries are increasing work on their on long-term policy and financing needs as well as programme and service delivery issues, additional resources need to be mobilized to support the updating of existing costing tools for national NTD programmes (e.g. Tool for Integrated Planning and Costing [TIPAC], Country investment toolkit) and a practical guide to support annual microplanning (for subnational activities) and macroplanning (budgeting projections 30–50+ years) at country level.

3.3.2 Enhancing collaboration

Not only has the road map sparked increased support for NTD-related initiatives, but such support is also made increasingly more effective thanks to greater collaboration and coordination among the different partners responsible for implementation of NTD interventions. Such collaboration is exemplified by the growing role of platforms such as the Neglected Tropical Disease NGO Network (NNN), a global forum for non-governmental organizations working to control lymphatic filariasis, onchocerciasis, schistosomiasis, soil transmitted helminthiases and trachoma that was established in 2009. Another example is represented by Uniting to Combat NTDs, a diverse partnership of over 100 organizations, from industry, bilateral and multi-lateral donors, trusts and foundations, NGOs and academic institutions that was launched in 2012 in support of the first (2012) road map *(5)* and the commitments of the *London Declaration on Neglected Tropical Diseases (75)*, and more recently, has been instrumental in the adoption of the Kigali Declaration *(50)* through high-level advocacy. A third example of collaboration is represented by the NTD Supply Chain Forum, a public-private platform gathering manufacturers of medicines and diagnostics, major nongovernmental organizations, the United States Agency for International Development, the Bill & Melinda Gates Foundation, DHL and WHO, among others. The Forum aims at establishing common operating principles, strengthening national drug supply chains for NTDs, and resolve logistical challenges. Finally, we cannot omit the wealth of smaller groups, networks and platforms that have stemmed from civil society and rally NTD stakeholders at national, subnational and community level; they facilitate the smooth implementation of NTD interventions in endemic countries and, in non-endemic countries, tirelessly advocate for more visibility and recognition; their dedication, commitment and contribution to relieve the burden of NTDs is without match in the public health arena.

Nevertheless, looking forward, there is a need to extend the global NTD community to new partners and establish new relationships, striking a balance between the rich diversity of the different NTD constituencies and the necessity to enhance cohesiveness and join forces. This approach will ensure that support is consistently distributed across the whole spectrum of conditions and that NTDs are no longer neglected.

3.3.3 Ensuring sustainable financing

Progress towards 2030 can take place only if sustained by a steady flow of financial resources enabling activities at global, regional and country levels. However, as of end 2022, implementation of NTD interventions is constrained by funding shortfalls which translate, among others, into insufficient human resources at all levels. According to a recent analysis based on national health account data from 29 low-income and lower-middle-income countries, on average, domestic investment in NTDs (from both government and private sector) covers around two-third of NTD programme expenditures, the other one third being financed by various external partners (Table 2). Notwithstanding the increasing number of countries that include NTDs in their national health care budgets, limited government funding for NTDs, notably in high-burden countries, is a core concern. Overall, total expenditure on NTDs remains inadequate, typically representing only a marginal share of infectious disease spending, ranging from close to 0% to 19%, with a median value of only 1.3%. This compares with a median value of 29% for malaria, 14% for HIV in these 29 countries (Fig. 8).

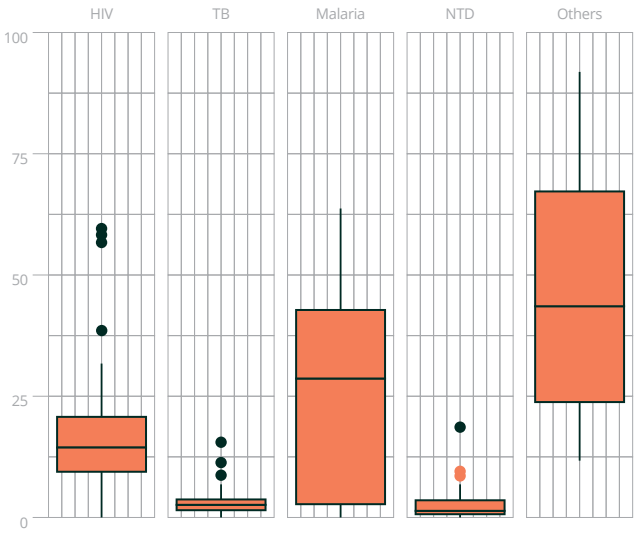
Table 2. Statistical distribution of financing sources in total NTD programme spending in sampled low and lower middle-income countries in 2018[a]

Financing source	Mean	Median
Domestic – Government	38.54%	23.99%
Domestic – Private	31.02%	21.78%
External	32.46%	10.66%

[a] The statistics are based on 29 low- and lower-income countries which have NTD spending data in the 2018 global health expenditure database.

Data source: WHO Global Health Expenditure Database (https://apps.who.int/nha/database/Select/Indicators/en, accessed 10 January 2023).

Fig. 8. Percentage share of selected diseases in total infectious disease programme spending in 2018



Data source: WHO Global Health Expenditure Database (https://apps.who.int/nha/database/Select/Indicators/en, accessed 10 January 2023).

Unlike malaria, HIV/AIDS and tuberculosis, NTDs have no dedicated financing initiative or formally-established partnership designed to meet the challenge they pose. The most important commitment to tackling NTDs made in the past decade on which pledges were met was the London Declaration *(75)*. Additionally, the COVID-19 pandemic has done little to improve funding for NTD programmes and has had further negative implications caused by the closure of international borders which hampered trade. As a result, many countries have experienced a reduction in fiscal space due to economic slow-downs that have caused some to review their spending on disease programmes, including NTDs. The long-term economic impact of the COVID-19 pandemic has yet to be fully analysed and projected.

The global NTD community is aware of the risk inherent in chronically underfinanced NTD programmes; it is also aware of the additional challenges NTD programmes are facing because of COVID-19, notably the need to overcome the slowdown of interventions through the implementation of mitigation measures, so as to keep 2030 targets on track. The risk of seeing progress jeopardized cannot be underestimated. This is why, regardless of the difficult economic circumstances, major new pledges in cash and kind were made in June 2022 through the Kigali Declaration *(50)*.

In order to support and guide further investment in NTDs at global and national levels, WHO has identified priorities for investment in NTD programmes through its advocacy companion document to the road map, *Ending the neglect to attain the Sustainable Development Goals: a rationale for continued investment in tackling neglected tropical diseases 2021–2030 (34)*. These priorities include (i) programme dimensions that can substantially increase the efficiency of NTD interventions, such as diagnostics, monitoring and evaluation, access and logistics, and advocacy and funding; (ii) innovations on financing approaches which can promote and support implementing cross-cutting approach; and (iii) investments in building country ownership.

A call to action and the way forward in 2023: Act now. Act together. Invest in NTDs

The COVID-19 pandemic has adversely affected the NTD landscape in multiple ways. Disruption of NTD programmes has been substantial, affecting all service delivery platforms: school-based, community-based and health facility-based, although with different degrees of severity, and in a non-homogeneous way across diseases and geographical areas. Disruptions have determined setbacks in the progress towards control, elimination and eradication of NTDs and exposed the achievement of the road map targets to risk of delay. In 2020, the number of people treated for at least one NTD was reduced by one-third, plummeting to the levels of 10 years before. Although a resumption of activities has occurred in 2021 compared with 2020, the observed recovery is too partial and heterogeneous to reassure the global public health community. Remedial strategies will have to be implemented to keep progress on track, which will require additional efforts and commitment.

As NTD programmes gradually recover full functionality, it is imperative to facilitate a gradual shift towards integration of services, with the aim of increasing reach, maximizing impact, and strengthening cross-sectoral approaches towards more holistic, resilient and sustainable interventions and outcomes. As emphasized in the fourth (2017) WHO progress report *Integrating neglected tropical diseases into global health and development (10)*, NTD programmes and initiatives are well positioned to embark on this shift and have much to contribute, having fostered collaboration in strong global partnerships for more than a decade, by working with governments, international agencies, pharmaceutical companies, international nongovernmental organizations, academia, civil society and United Nations agencies.

Nevertheless, in contrast to the increased needs required to accompany a full post-COVID-19 recovery and the strengthening of interprogrammatic links, the pandemic has severely impacted support from donors and partners that traditionally assist global efforts to tackle the burden of NTDs. The need to address the emergency has determined a reprioritization of resources to other areas, in cash and kind. Financial support to NTD programmes has been affected at all levels, from global to local, jeopardizing job security and activities. Production lines for medicines and diagnostics have been repurposed to support the need for products in high demand during the pandemic. There is a need to reverse this negative trend, by increasing the sustainability and predictability of funding as well as the availability of medicines and diagnostics across the whole NTD spectrum, to ensure a progressive strengthening of NTD programmes and services along the three dimension of Universal Health Coverage (maximizing who is covered, which services are covered, and the proportion of the costs covered). The crisis stemming from the COVID-19 pandemic is further compounded by an increasingly unpredictable global financial and economic landscape, and, in the area of public health, by challenges inherent in a global change of focus from top-down, vertical programmes, to more horizontal initiatives aimed at expanding primary health care as a whole, thus prompting a repositioning of NTD programmes within the wider context of health system strengthening.

Advocacy events such as World NTD Day and the Kigali Summit on Malaria and NTDs have certainly contributed to reinforcing existing commitment from Member States, partners and donors and to mobilizing new support. Investment cases can further facilitate this process, by showing the cost-effectiveness of NTD interventions and their impact in terms of better educational outcomes for children and enhanced productivity for adults. The contribution of NTD activities to universal health coverage should also be emphasized, as community-based interventions for NTDs are often the main point of access to health systems that rural, poor populations have. NTD platforms are flexible and can be further expanded to accommodate other health services, as shown during the COVID-19 pandemic. Conversely, NTD interventions should not be left out of initiatives that aim at strengthening health services, such as packages of universal health coverage targeting the most vulnerable sectors of the population. Likewise, global efforts to enhance preparedness and response to future pandemics or other health crises should make provision for maintenance of NTD activities among the essential health services that should not be discontinued under any circumstances.

Nevertheless, COVID-19 disruptions and financial constraints are not the only limiting factors on the way to reaching the 2030 targets and the only reasons for slow progress. Programmatic and organizational weaknesses need to be addressed as well.

First, **high-burden countries** should be progressing more rapidly: the burden of NTDs is unequal across countries, with 16 countries bearing 80% of the global NTD burden. Compared to 2010, three of them saw increased numbers of people requiring NTD interventions as of 2021; another six countries had a decrease of 50% or less; and the remaining seven had a decrease more than 50%. There is a need to focus on high-burden countries to make an impact at global level. Second, **the weakest disease programmes could compromise overall progress towards overarching targets:** many countries are endemic for several NTDs; more than three-quarters of African countries, for instance, are co-endemic for at least five NTDs. Therefore, for a given country, progress made in one NTD (e.g. in terms of reduction of population requiring interventions) could be buried by the lack of progress in another NTD. There is a need to address all relevant NTDs through a whole-of-health-system approach to make an impact at country level.

Third, **factors beyond the health sector can threaten the sustainability of progress made by NTD programmes:** thanks to effective interventions, the incidence or prevalence of certain NTDs in several geographical areas has reached the threshold for scaling down interventions. However, as the underlying risk factors (poverty, climate change, insufficient management of animal health and vectors) are not consistently addressed, transmission rates could climb back. There is a need cross-sectoral, cross-cutting interventions to sustain progress. Fourth, **population growth brings additional pressure making it more difficult to keep progress on track**. Countries with the highest NTD burdens are also the countries in which population growth will be fastest. The United Nations' *World Population Prospects 2022 (76)* projected that more than half of the increase in global population up to 2050 will be concentrated in eight countries: the Democratic Republic of the Congo, Egypt, Ethiopia, India, Nigeria, Pakistan, the Philippines, and the United Republic of Tanzania. All are among the 16 countries with the highest NTD burden. Plans need to factor in this challenge to adequately address NTDs; the acceleration in provision of NTD services needs to at least exceed the population growth rate.

Going forward, outcome evaluations are required in order to support programme reviews to identify critical issues that pose a risk towards attaining the set road map goals. This approach requires open communication and exchange mechanisms to encourage participation at several levels, maintain momentum and promote new learning. The findings of these evaluations shall be included in accountability reports to stakeholders, which notably include the World Health Assembly for which the next progress report is due in 2024.

The global community needs to continue moving forward steadily with hope, redoubling efforts and investments to urgently return to the necessary trajectory of progress that can provide much-needed prevention and care for the millions affected by these ancient diseases.

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Annexes

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Regional progress summaries


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A1.1 WHO African Region

In the WHO Regional Office for Africa, the regional NTD programme is under the tropical and vector-borne diseases unit in the UCN cluster. Accordingly, a **Framework for the integrated control, elimination and eradication of tropical and vector-borne diseases in the African Region 2022–2030** *(1)* was considered by the Seventy-second session of the WHO Regional Committee for Africa (22–26 August 2022), and the actions proposed therein were endorsed. This consolidated regional framework harmonizes the implementation frameworks for the NTD road map 2021–2030 *(2)*, the Global vector control response 2017–2030 *(3)* and the Global technical strategy for malaria 2016–2030 *(4)*.

In 2021, four countries reported a total of 15 human cases of **dracunculiasis**: Chad (eight cases), South Sudan (four cases), Mali (two cases) and Ethiopia (one case). This represents a 48% reduction compared with the 27 cases reported in 2020. Only 13 human cases were reported in 2022 (provisional count). Following the certification of the Democratic Republic of the Congo as free of *Dracunculus medinensis* transmission in December 2022, a total of five endemic countries in the Region remain to be certified. Since 2020, three countries (Cameroon, Central African Republic and Congo) have been implementing total community treatment with azithromycin for **yaws** eradication.

Only 802 new cases of **human African trypanosomiasis** were reported in 2021: for the first time in 50 years, the number fell below 10 000 in 2009, below 2000 in 2017 and has been sustained since then. Six countries (Benin, Côte d'Ivoire, Equatorial Guinea, Rwanda, Togo and Uganda) have been validated for the elimination of the disease as a public health problem so far. Ghana has submitted a dossier for validation.

Ghana, the Gambia, Malawi and Togo were validated as having eliminated **trachoma** as a public health problem. Malawi and Togo were validated also for the elimination of **lymphatic filariasis** as a public health problem, bringing the number of Member States in the Region validated for having eliminated as a public health problem at least one NTD amenable to preventive chemotherapy to four.

Between 2011 and 2021, the prevalence of leprosy in the Region decreased from 0.33 to 0.18 cases per 10 000 inhabitants. Only in Comoros is **leprosy** still a public health problem. The number of cases of **Buruli ulcer** reported fell from 2143 cases in 2014 to 1370 in 2021. The number of **visceral leishmaniasis** cases reported decreased from 11 119 cases in 2014 to 3825 cases in 2021. A total of 9125 **cutaneous leishmaniasis** cases were reported in 2021 in the African Region, an increase from the 6546 cases reported in 2014. The number of reported cases in 2020 was 13 889.

The first Regional Meeting (strategic and technical) for **snakebite envenoming** was held in February 2021, bringing together various stakeholders from all Member States as well as WHO and partners. The stage has been set for the development of national plans for snakebite envenoming integrated into annual and multi-year master plans, aligned with the global strategy to prevent and control snakebite envenoming *(5)*, the road map *(2)* and the regional framework for tropical and vector-borne diseases *(1)*.

The Expanded Special Project for Elimination of Neglected Tropical Diseases has strengthened and expanded the **NTD Data Portal** to enable evidence-based interventions. New tools and resources have been added to enhance and facilitate data collection, data reporting and analytics by national NTD programmes and stakeholders.

All endemic countries in the Region have completed **mapping** for three of the five NTDs amenable to preventive chemotherapy (lymphatic filariasis, schistosomiasis and soil-transmitted helminthiases). Work is under way to complete the mapping of the two other NTDs, which are major causes of blindness (onchocerciasis and trachoma). Onchocerciasis elimination mapping is required in only a few settings (717 implementation units [IUs]) formerly classified as hypoendemic.

In 2021, **mass drug administration** (MDA) has been implemented for each of the five diseases amenable to preventive chemotherapy across the Region; overall, numbers treated have increased compared with 2020, although not in all countries and for all diseases. The geographical coverage has also increased in all the endemic Member States compared with 2020. Of the 47 countries in the Region, 38 reached 100% geographical coverage for at least one of these diseases for at least one year in 2016–2021, while all other endemic Member States have started MDA for at least one disease. During 2016–2021, WHO facilitated the donation of 3.3 billion tablets for use in MDA. As a result of disease control interventions, the number of people requiring preventive chemotherapy in the Region has decreased from 594 million in 2016 to 584 million in 2021.

In 2022, two in-person Regional workshops on laboratory diagnosis of helminthiases and One Health were conducted for Anglophone and Francophone participants at the WHO Collaborating Centre for Neglected Tropical Diseases on Pemba Island (Zanzibar, United Republic of Tanzania); they were attended by a total of 40 participants from 20 countries.

The development of national multi-year NTD master plans, aligned with the road map and the regional framework, for adoption and integration into national annual plans of NTD programmes, is ongoing.


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A1.2 WHO Region of the Americas

The restrictions imposed by coronavirus disease (**COVID-19**) in 2020 and at the beginning of 2021 impacted all the interventions for NTD control and elimination throughout the Region. During the second half of 2021 and in 2022, national NTD programmes have recovered gradually from the negative impact of the pandemic. Most countries have resumed their MDA activities and some countries have either carried out or are planning to undertake surveys.

Efforts to eliminate NTDs in the Region are now embedded in the **Elimination Initiative**, a policy that calls for an integrated sustainable approach to eliminate 35 communicable diseases in the Americas. The Elimination Initiative promotes a life-course, person-centred approach based on four dimensions (preventing new infections, ending mortality and morbidity, and preventing disability) and four critical lines of action (strengthening health systems integration and service delivery, strengthening health surveillance and information systems, addressing environmental and social determinants of health, and furthering governance, stewardship and finance). The vision is a future free of the burden of these diseases in the Americas, beginning no later than 2030.

The first training course on the **WASH and Health working together tool kit** *(6)* was completed in 2021 by the Pan American Health Organization/WHO Regional Office for the Americas (PAHO/WHO) and delegates from five countries (Colombia, Honduras, Mexico, Paraguay and Peru). During the eight-week online course, an intersectoral team from each country completed a proposal on how the WASH and health sectors can work together to accelerate the elimination of NTDs in the Region.

A **Toolbox for trachoma elimination in the Region of the Americas** *(7)* was published (in Spanish) with the purpose of adapting international recommendations to the Region. The toolbox has four modules: (i) trachoma rapid assessments, (ii) trachomatous trichiasis (TT) active case-finding, (iii) monitoring and follow up of TT cases, and (iv) planning and organization of TT surgery campaigns. The toolbox is currently being translated into Portuguese.

Guatemala completed house-to-house active searches for TT cases in districts endemic for **trachoma**; and the Ministry of Health engaged with Sightsavers to start using the TT-tracker to record, track and follow-up TT cases *(8)*. Colombia and Guatemala continue involving ophthalmic oculo-plastic surgeons to perform high-quality TT operations using the internationally recommended surgical techniques. Brazil completed the first phase of the reassessment of the trachoma epidemiological situation in non-indigenous areas. The second phase is ongoing among indigenous populations. The Bolivarian Republic of Venezuela completed the protocol to carry out trachoma mapping in 10 evaluation units where the disease is suspected to be a public health problem, and is planning to integrate this activity with the screening of other eye health problems (pterygium, cataracts, etc.) and with serosurveillance for several other communicable diseases. PAHO/WHO/TDR granted funding to two operational research projects (in Colombia and Peru) to improve facial cleanliness in indigenous populations of the Amazon Basin, including testing innovative monitoring and evaluation methodologies.

Trachoma is affecting mostly indigenous populations in hard-to-reach areas, which poses challenges to moving forward towards its elimination as a public health problem. Political will and complementary funding are required to reach these populations, notably with WASH interventions, which are logistically complex and very expensive.

A **Microplanning manual to guide implementation of preventive chemotherapy to control and eliminate neglected tropical diseases** *(9)* was developed under the joint leadership of the PAHO/WHO Neglected, Tropical and Vector Borne Diseases unit of the Department of Communicable Diseases and Environment and the WHO/NTD department, in collaboration with RTI International, the United States Centers for Disease Control and Prevention (CDC) and the United States Agency for International Development. A Spanish version is in preparation. The manual describes the basic concepts of microplanning, steps, and examples of tools to develop and implement a microplan.

PAHO/WHO, in alliance with national health ministries and the WHO Collaborating Centre for Trachoma at CDC, is implementing **integrated serosurveillance of communicable diseases** (including trachoma) as a complementary tool for surveillance in different epidemiological settings. Three countries with populations affected by trachoma (Brazil, Guatemala and Mexico) are participating in this initiative. A **Toolkit for integrated serosurveillance of communicable diseases in the Americas** was published in 2022 *(10)* based on the experience using multiplex bead assays in the Region.

After the two successful rounds of triple (ivermectin-diethylcarbamazine citrate-albendazole [IDA]) therapy MDA for elimination of **lymphatic filariasis** in Guyana, an epidemiology monitoring survey was implemented in regions 2-6 and 10 during the last quarter of 2021. In 11 out of the 13 evaluation units the number of microfilaraemia-positive participants was below the 1% cut-off value; in two of them the results were borderline. An IDA impact survey will be carried out during the first quarter of 2023, following a protocol developed in 2022, in all endemic regions, using geostatistical sampling, an innovative, robust and efficient methodology. Social instability in Haiti delayed implementation of activities. TAS3 in Brazil was postponed because of the COVID-19 pandemic.

Four countries (Colombia, Ecuador, Guatemala and Mexico) have been verified for elimination of **onchocerciasis** in the Region of the Americas; transmission continues in a remote area in the Amazon rainforest on the border between Brazil and the Bolivarian Republic of Venezuela, where approximately 35 000 Yanomami people live.

The Latin American and Caribbean region has 11 countries endemic for **schistosomiasis**, eight of which (including the Dominican Republic and Saint Lucia) could have eliminated transmission and are waiting to compile the necessary evidence to verify its interruption. School-based and community-based surveys were implemented in the Dominican Republic during November–December 2021 whereby children and adults were sampled in the historically known endemic areas; the samples are being processed and the results are pending. In Saint Lucia, a survey to determine the role of snail intermediate hosts in transmission was carried out in the third quarter of 2022; the results are being analysed and a final report is due by the first quarter of 2023. Surveys in children and adults are being planned, also as part of the process to assess if elimination of transmission of schistosomiasis has been achieved.

Mexico worked on the confirmation of active transmission of **taeniasis** in some areas considered at risk in Durango Region where, however, no evidence of active transmission was found. The Dominican Republic has also been working to identify at-risk areas. Costa Rica is planning the confirmation of active *T. solium* transmission in the areas identified at higher risk. Colombia and Peru are planning MDA with niclosamide. Honduras is implementing integrated strategies to control taeniasis in endemic areas, including education and health promotion, improved sanitation, management of pigs and MDA with albendazole.

PAHO/WHO's regional program for neglected infectious diseases is working to develop a regional plan of action to eliminate fascioliasis as a public health problem.

A **Regional Workshop on safety of preventive chemotherapy for the elimination of neglected infectious diseases in the Americas** was conducted virtually in June 2022 with the participation of delegates from Colombia, the Dominican Republic, Guyana, Honduras, Nicaragua and Paraguay; facilitators from PAHO/WHO; and observers from nongovernmental organizations involved in neglected infectious diseases (NID). Objectives included (i) highlighting the importance of safety and familiarizing NID program managers with WHO safety modules and training materials; (ii) facilitating incorporation of safety into national NID plans of action, policies and practices; and (iii) developing a "route" towards strengthening safety during preventive chemotherapy in each participating country. In order to continue strengthening country capacities on safety when administering medicines, a "training of trainers" workshop was conducted on 15–16 November 2022. National and subnational country teams from Colombia, the Dominican Republic, Honduras and Paraguay were trained in the safety of preventive chemotherapy medicines to qualify as facilitators and focal points for NID medicine safety in each participating country. Tailored educational materials and the WHO modules on **Safety in administering medicines for neglected tropical diseases** *(11)* were used; a national curriculum on safety of preventive chemotherapy was also developed for front-line health workers and community drug distributors. Finally, WHO modules were translated and published in French *(12)*, Spanish *(13)* and Portuguese *(14)*.

The prevention, control and care of **Chagas disease** have advanced substantially due to the cooperative efforts among countries. The pandemic slowed progress, and greater effort is needed to safeguard achievements, which were mostly protected. These include the interruption of vector-borne transmission at different administrative levels in 17 affected countries, the elimination of certain species of vectors and the routine implementation of universal screening of blood donors for Chagas disease in 21 endemic countries. Activities aimed at elimination of mother-to-child transmission (EMTCT) for Chagas disease have started within the framework of the "EMTCT Plus" initiative in some countries.

Ecuador carried out a **yaws serology survey** in a formerly endemic area using samples from a serum bank. Very low antibody responses were found. The country will conduct a serosurvey of children aged < 15 years in the formerly endemic area to confirm the absence of transmission.

Countries in the Region of the Americas need to progress in compiling information to demonstrate that interruption of yaws transmission has been achieved. This will require the investment of funding and dedicated technical teams in the post-pandemic situation, which is a challenge since countries are focused on other public health priorities.

Brazil and Colombia are implementing integrated actions to control **tungiasis** in populations affected in remote rural areas. PAHO/WHO is supporting both countries to access an oil-based product for treatment, which was included in the list of products offered by PAHO/WHO's Strategic Fund. PAHO/WHO also published the results of a literature review on tungiasis in the Americas *(15)*. It is now working on a first proposal of a manual with tungiasis control operational recommendations and a guideline for treatment of cases. PAHO/WHO participated in a global informal expert meeting in January 2021 at which the most recent evidence on the different aspects of control of tungiasis was reviewed and compiled *(16)*.

A regional meeting on scabies was held on 5 May 2022 and was attended by 10 countries and experts from the International Alliance for the Control of Scabies; the aims included disseminating information, reviewing progress, identifying gaps, strengthening country capacity and creating a regional network for control of NIDs of the skin, including scabies.

The **dengue** case-fatality rate had been steadily increasing since the 1980s until 2010. However, the introduction of new guidance on clinical management of dengue, focused on the prevention of severe dengue, has led to a declining trend in case-fatality rates in the Americas. As of the end of December 2022, the dengue case fatality rate in the Americas is 0.045.

Because of the disruptions to health services caused by the COVID-19 pandemic, the number of new **leprosy** cases detected fell sharply in the Region, from 30 153 in 2019 to 19 195 in 2020, a 36.3 % reduction, and in the number of cases registered for treatment at the end of the year, from 35 557 to 25 786, a 27.5% reduction. There was only a slight increase in the number of new cases detected in 2021, to 19 826 (631 more cases), while the number of cases registered for treatment dropped to 25 053 (733 fewer cases).

Despite the **leishmaniases** remaining a public health problem in the Region, advances can be observed. Cutaneous and mucosal leishmaniasis have shown a decreasing trend in the past 17 years, reaching the lowest number of reported cases in 2021, with a 44.4% reduction compared with 2005. For visceral leishmaniasis, there is also a downward trend from 2011 to 2021, with the lowest number of reported cases in 2021. Also, there has been an overall improvement in case detection by laboratory testing and numbers of treated patients among those diagnosed. Efforts and actions continue to be carried out to strengthen surveillance and control interventions, as well as to increase access to early diagnosis, and to implement adequate, integrated treatment of cases. These include publishing a second edition of the **Guideline for the treatment of leishmaniasis in the Americas** *(17)*, developing a new distance learning course on diagnosis and treatment of leishmaniasis in the Americas, carrying out eight rounds of the external evaluation for the microscopic diagnosis of cutaneous leishmaniasis in reference laboratories from endemic countries, keeping the Leishmaniasis Regional Information System (SisLeish) updated for monitoring and data analysis, and providing training and technical cooperation to endemic countries.

Work was implemented to promote and facilitate the use of multisectoral integrated approaches by national vector control programmes, in collaboration with the Member States. PAHO/WHO used the **Handbook for integrated vector management in the Americas** *(18)* to guide countries in elaborating national vector control plans.

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Sixteen countries have established or strengthened their **databases and entomological surveillance systems** in accordance with PAHO/WHO guidelines or recommendations, and 15 countries have reported using data and information from a variety of sources, at different levels of analytical complexity, for integrated decision-making in their vector control programmes. Some 19 countries have strengthened their actions to monitor and manage resistance to insecticides used in public health.

A1.3 WHO South-East Asia Region

Of the 11 Member States of the Region, six have eliminated at least one NTD, including **lymphatic filariasis**, **trachoma** and **yaws**.

The South-East Asia Region has the highest burden of **leprosy** of all WHO regions. In 2020, a total of 85 687 new cases were reported across the Region, representing 66.7% of all new global cases and a 40.4% decrease compared with 2019; this could be attributed to the impact of COVID-19 on active case-finding. In 2021, this number increased to 93 485 due to partial recovery of health services; nevertheless, the proportion of undetected cases remains high. Two countries (the Democratic People's Republic of Korea and the Maldives) reported zero new cases in 2021.

To strengthen and sustain health system capacity for the elimination of leprosy, e-learning modules on leprosy were launched in 2021 by the WHO Regional Office together with the Global Leprosy Programme and other stakeholders. The aim of the modules is to build capacity of health-care workers on case detection, diagnosis, referral, treatment, disability management and self-care for leprosy, and are also available in the NTD channel of the OpenWHO platform.

Six countries implemented **preventive chemotherapy** against NTDs in the Region in 2021. The population requiring MDA for lymphatic filariasis only decreased by 10.4 million in Indonesia after TAS (transmission assessment survey) 1 was passed in 12 IUs. India has 55% of the global population that requires MDA; TAS was implemented in 45 of the 109 evaluation units in which surveys were planned. Nepal implemented and passed community-based TAS1 in three IUs and TAS2 in 15 IUs, and also implemented the first round of IDA in five districts in 2021. In 2021, Timor-Leste passed TAS and stopped MDA for elimination of lymphatic filariasis nationwide. Bangladesh also passed the final survey (TAS3) and initiated the development of a national dossier for WHO validation of elimination of lymphatic filariasis as a public health problem. India conducted the first independent assessment/Joint Monitoring Mission for the Lymphatic Filariasis Elimination Programme in 2022.

During 2012–2021, the Region observed the highest decline in the burden of **visceral leishmaniasis (kala-azar)**, from 23 056 to 1464 new cases, a 94% decline in incidence. In 2021, the lowest number of cases historically were reported. In this year, the elimination target for kala-azar was achieved in all endemic upazilas of Bangladesh, 99% of all endemic blocks in India and 87% of endemic districts in Nepal. Bangladesh has sustained the target of < 1 case per 10 000 population in all implementing units since 2017.

To further accelerate progress, the Regional Office convened a virtual multilateral meeting in September 2021 to enhance cross-border collaboration for the elimination of kala-azar across the Region. Meetings of programme managers and of the Regional Technical Advisory Group for the kala-azar elimination programme were also convened in 2022, after which the new **Regional Strategic Framework for accelerating and sustaining kala-azar elimination in the South-East Asia Region 2022–2026** *(19)* was launched, with particular focus on establishment and sustainment of post-validation surveillance and response strategy.

The Regional Office convened a first consultation on the **Regional Action Plan for prevention and control of snakebite envenoming in South-East Asia 2022–2030** *(20)*. The document was officially launched by the Regional Office for South-East Asia in New Delhi (India) on 7 December 2022.

India has sustained its **yaws**-free status since 2016. A Regional Consultation on yaws eradication was organized virtually in May 2021 to accelerate progress in other endemic countries (Indonesia and Timor-Leste). In 2021, Indonesia reported 169 confirmed yaws cases from remote, isolated pockets of communities with poor socioeconomic development in three provinces; in total, 8027 suspected cases were reported. In 2021, a yaws survey was integrated in a lymphatic filariasis TAS to evaluate the impact of ongoing MDA (2016–2022) throughout the country; zero yaws cases were found.

A **Regional Technical Advisory Group for dog-mediated human rabies** was established in 2022 to provide evidence-based recommendations to WHO on strategies to accelerate progress in eliminating dog-mediated human rabies in the Region towards the 2030 global elimination targets. The first meeting is planned in early 2023. On the occasion of World Rabies Day (25 October 2021), the Government of India launched the **National Action Plan for dog-mediated rabies elimination from India by 2030** *(21)* and subsequently initiated State-level action planning for rabies elimination.

A virtual meeting of the **Regional Technical Advisory Group on dengue and other arbovirus diseases** was convened in 2021 and the report published *(22)*. A **vector control needs assessment** was completed in Nepal and Timor-Leste during 2021–2022. An **integrated field entomology workshop** for vector-borne diseases of public health importance in the Region was convened in 2022 to strengthen entomological knowledge and build capacity for integrated vector management among entomologists and vector control programme staff in Member States of the Region for prevention and control of vector-borne diseases.

As part of progress towards integration, a **consultation with disease experts and programme managers** was held in 2021 to identify various programmatic and knowledge gaps that are challenging the effective implementation of interventions and strategies and to determine operational research priorities in the Region, focusing on **dengue**, **leprosy**, **lymphatic filariasis**, **schistosomiasis** and **visceral leishmaniasis**.

A1.4 WHO European Region

In 2021, the Region, for the first time, received a Sasakawa Health Foundation grant to improve surveillance and strengthen capacities in diagnosis and management of **leprosy** in endemic countries. Implementation of the planned activities triggered interest also among leprosy-free countries to review and update the in-country methodological documents on leprosy. In the framework of this grant the following activities have been implemented since 2021:

- regional training for trainers on diagnosis and management of leprosy covering more than 50 specialists from Armenia, Kyrgyzstan, Tajikistan, Turkmenistan, Ukraine and Uzbekistan;
- development of a National Strategic Plan for leprosy elimination in Uzbekistan for 2022–2030; and
- preparation of a manual on management of leprosy reactions and prevention of disability in Tajikistan, together with a series of 12 one-day seminars in 12 cities/districts attended by 180 family doctors, neuropathologists, ophthalmologists, dermatovenerologists, pediatricians, epidemiologists and infectious diseases specialists.

Moving towards implementation of the **Global vector control response 2017–2030** *(3)*, vector control needs assessments were completed in four countries (Armenia, Croatia, Cyprus and Georgia); WHO also supported an insecticide resistance study in Armenia.

In June 2021, the Regional Office supported and participated in the international conference "Re-emerging arboviruses in the shadow of COVID-19 pandemic" organized by the Croatian Institute of Public Health. Participants from Croatia, Italy, Serbia, Slovenia, Barbados and Oman participated in the event and shared their experiences on issues including emerging arboviruses in Europe, arboviruses in Croatia in the "One Health" context, (re)-emerging arboviruses in the tropics, clinical manifestations, and diagnosis of arboviral infections and surveillance and prevention of arboviral infections in Croatia.

In 2020–2021, the European Centre for Disease Prevention and Control in collaboration with the WHO Regional Office for Europe, the European Food Safety Authority and the World Organisation for Animal Health conducted a study on **Surveillance, prevention and control of leishmaniasis in the European Union and its neighbouring countries**. The objectives of the study are (i) to describe the epidemiology of leishmaniasis in the European Union and its neighbouring countries and assess its potential emergence, (ii) to describe the surveillance, prevention and control measures in place, including the availability of diagnostic tests and treatments, and (iii) to identify gaps in surveillance, prevention and control of human and animal leishmaniases. The **Technical Report of the study** was published in 2022 *(23)*.

Furthermore, Azerbaijan published a set of guiding/methodological documents on **leishmaniasis** prevention and control; and epidemiological and entomological data from foci of visceral leishmaniasis in the Samtskhe-Javakheti region of southern Georgia were studied; finally, a round table was conducted on the development of a national strategy on leishmaniasis in Kyrgyzstan, which involved all relevant stakeholders.

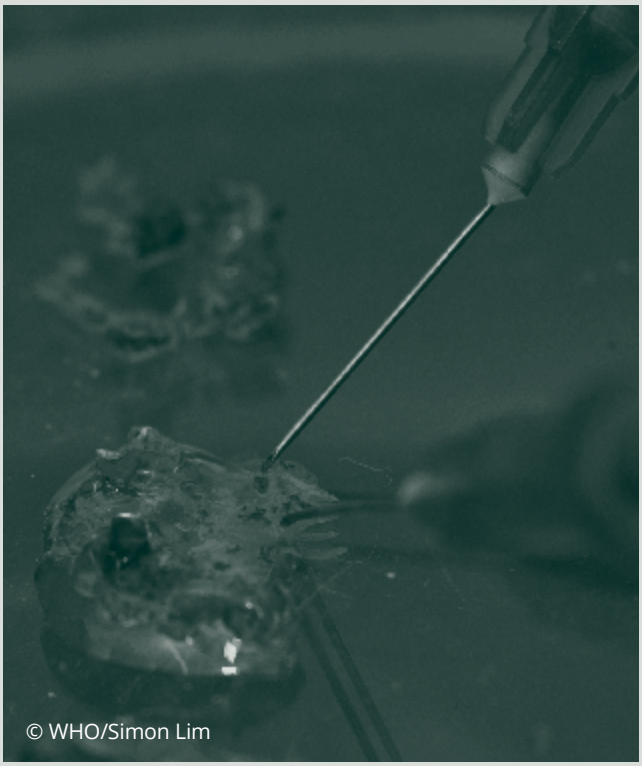
Preventive chemotherapy campaigns against **soil-transmitted helminthiases** were conducted in Tajikistan and Uzbekistan in 2021.

To increase the sensitivity of the epidemiological surveillance system for early detection of and response to zoonoses and to ensure the implementation of the **One Health** approach, the WHO Regional Office for Europe supported the Ministry of Health of Armenia to conduct a training course on "Zoonoses and One Health" for epidemiologists, clinicians of different specialties and regional veterinarians. A total of 44 two-day trainings covering zoonoses of viral, parasitic and bacteriological origin, their etiology, epidemiology, clinical features, control and prevention were conducted throughout Armenia.

Additional efforts were made to translate **WHO guidance and training materials** into Russian to increase their uptake in Russian-speaking countries, which are among those worst affected by NTDs in the Region. The following key materials were translated into Russian:

- rabies *(24)* and scabies *(25)* courses on the OpenWHO platform;
- Global leprosy strategy 2021–2030 *(26)* as well as technical guidance on management of reactions and prevention of disabilities *(27)*;
- Framework for a national vector control needs assessment *(28)*;
- Guideline for preventive chemotherapy for the control of *Taenia solium* taeniasis *(29)*.

On 9–13 May 2022, the Regional Office in collaboration with the International Atomic Energy Agency conducted a **Regional Training on national vector control needs assessment in preparation for integrated vector management including the sterile insect technique** in Limassol, Cyprus. The purpose of the training was to provide participants with knowledge and guidance for a complete situation analysis of vectors and vector borne-diseases control at country level and to identify opportunities and needs for integrated vector management including the sterile insect technique against Aedes mosquitoes. The training course was attended by 27 participants from Albania, Bosnia and Herzegovina, Bulgaria, Croatia, Cyprus, Georgia, Greece, Montenegro, North Macedonia, Portugal and Serbia, as well as specialists from the International Atomic Energy Agency, the European Centre for Disease Prevention and Control, and WHO.



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A1.5 WHO Eastern Mediterranean Region

The **number of people requiring interventions against NTDs** was reduced by 55% in 2021 compared with 2010. The percentage of NTDs leading to the loss of DALYs was reduced by 3.9% in 2019 compared with 2015.

Seven countries have eliminated at least one NTD, the latest being Saudi Arabia which in 2022 was validated for having eliminated **trachoma** as a public health problem. Sudan is in the precertification stage for interrupting transmission of **dracunculiasis**. Seven **schistosomiasis**-endemic countries (Djibouti, Islamic Republic of Iran, Jordan, Lebanon, Morocco, Saudi Arabia and Tunisia) do not need to conduct MDA and can be verified for interruption of transmission.

The number of children requiring preventive chemotherapy against soil-transmitted helminthiases decreased by 25.4% during 2014–2021 in response to interventions with MDA; Sudan was reclassified as not requiring preventive chemotherapy for **soil-transmitted helminthiases** after the remapping conducted in 2021. Egypt and Yemen have been validated for eliminating **lymphatic filariasis** as a public health problem; Sudan is the only country in the Region that still requires MDA.

In 2020, Sudan implemented **MDA** for lymphatic filariasis, onchocerciasis and trachoma; and for trachoma in 2021. The country has achieved interruption of transmission of **onchocerciasis** in one focus, which therefore no longer requires treatment. Yemen, the only other country in the Region endemic for onchocerciasis, treated over 715 000 people in 2021, in spite of protracted combats and severe hardships.

Sudan is integrating registration of people with **lymphoedema** during MDA and referral for care. Egypt conducted an impact survey after conducting two rounds of IDA in a former hotspot in September 2022 which reconfirmed the elimination of lymphatic filariasis as a public health problem. Yemen continued to improve the availability of care for people with lymphoedema by integrating services into leprosy clinics. The activities included integrated orientation and training for primary health-care workers in seven districts of three governates.

The Region carries the highest global burden of **cutaneous leishmaniasis**. A WHO Collaborating Centre was established in Tunisia to support WHO to improve clinical management of **cutaneous leishmaniasis**. In addition to expanding access to medical treatment with antimonials, all high-burden countries for cutaneous leishmaniasis, except Iraq, established physical treatment options such as cryotherapy or local heat therapy (thermotherapy) to improve case management. The number of **visceral leishmaniasis** cases reported was reduced by 32.5% during 2012–2021.

A number of NTD scientists were supported by regional TDR small grants to conduct operational research investigations at country level. The evidence generated is aimed at increasing the performance of several NTD control interventions.

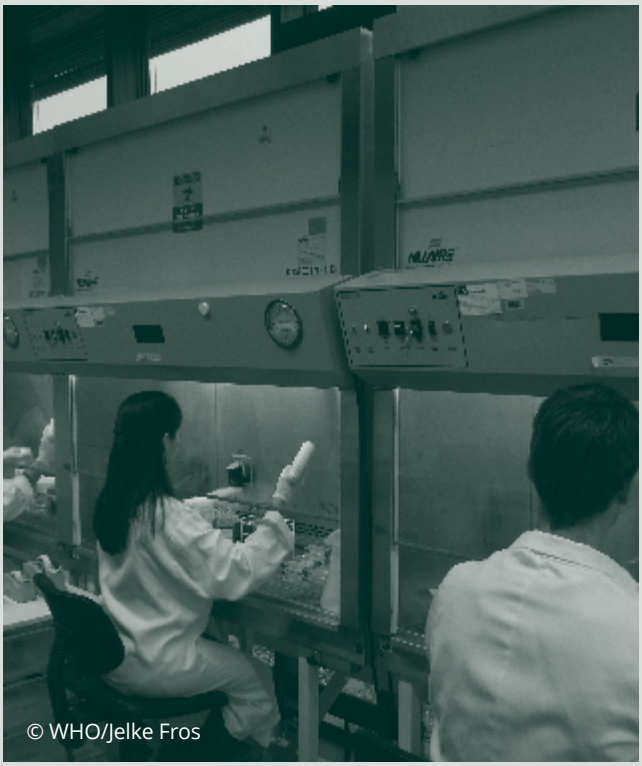
In 2021, eight countries reported zero new autochthonous **leprosy cases**. By 2022, all the countries providing case management for autochthonous leprosy cases had adopted the WHO-recommended treatment guidelines. The grade 2 disability rate due to leprosy reduced by 37.5% (from 0.56 in 2012 to 0.35 per million population) during 2012–2020.

Four countries endemic for **trachoma** do not require further interventions for its elimination as a public health problem and can soon be considered for validation by WHO; Iraq already submitted its request to the Regional Dossier Review Group. The number of people at risk requiring A, F and E of the SAFE (surgery, antibiotics, facial cleanliness, environmental improvement) strategy for trachoma elimination was reduced by 70.7% from 2013 to 2021.

The primary **dengue** vector *Ae. aegypti* has spread throughout the Region and is currently established in 10 countries (Afghanistan, Djibouti, Egypt, Islamic Republic of Iran, Oman, Pakistan, Saudi Arabia, Somalia, Sudan and Yemen). Since 2019, the number of dengue outbreaks has increased and outbreaks have been frequently reported from seven countries (Afghanistan, Djibouti, Oman, Pakistan, Somalia, Sudan and Yemen). The secondary dengue vector *Ae. albopictus* is now established in 10 countries (Afghanistan, Islamic Republic of Iran, Jordan, Lebanon, Morocco, Pakistan, Sudan, Syrian Arab Republic, Tunisia, and the West Bank and Gaza Strip. **Vector surveillance** is being strengthened in the Region to address invasive vectors, *Anopheles stephensi* and *Ae. aegypti* through capacity-building including cross-border collaboration. Countries in the Region updated their vector control strategies in line with the **Global vector control response** *(3)*, notably with the aim of addressing risks associated with invasive vectors. WHO is supporting implementation of insecticide resistance monitoring in high-burden countries for malaria and dengue. A gap analysis and needs assessment of **insecticide resistance monitoring** was conducted in 15 countries and supported the development of relevant management plans for 2023–2026.

WHO's Regional programmes for Health Emergencies and Communicable Diseases are coordinating and collaborating to implement the One Health approach for multisectoral control of zoonoses including rabies and cystic echinococcosis in several countries across the Region.

A new Regional Programme Review Group for all NTDs was established to support countries with additional expert guidance. A meeting of NTD national programme managers was conducted virtually and the relevant meeting report was disseminated.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A1.6 WHO Western Pacific Region

Guided by the **Regional Action Framework for control and elimination of neglected tropical diseases in the Western Pacific** *(30)*, in 2021–2022 WHO and Member States continued to spearhead joint efforts to combat the 15 NTDs prevalent in the Region. As of 2021, approximately 72 million people in 28 countries, territories and areas in the Region require interventions against NTDs.

Despite the challenges of COVID-19, the Region continued to make progress in the control and elimination of NTDs through both focused and system-based approaches, especially for **lymphatic filariasis** and **trachoma**, whose elimination as a public health problem has been validated in seven and four countries in the Region, respectively. Notably, Vanuatu successfully completed its validation process for trachoma in 2022, while the dossier claiming the elimination of lymphatic filariasis as a public health problem in the Lao People's Democratic Republic is under review by the Regional Dossier Review Group and is due to be completed by early 2023. The national programme of Viet Nam has convened an elimination dossier review group workshop for trachoma.

Among those countries and territories requiring MDA against lymphatic filariasis, French Polynesia, Malaysia, New Caledonia and the Philippines successfully introduced the IDA regimen and achieved effective coverage in most of the eligible IUs. In Malaysia, 93% of IUs no longer required MDA in 2021, and IDA MDA is being implemented in hot spot communities identified in post-MDA surveillance. In the Philippines, province-wide MDA is required in only one of 46 endemic provinces (Zamboanga del Norte), which will introduce IDA in 2023; IDA MDA has been implemented in hot spot communities of Oriental Mindoro and Sultan Kudarat provinces.

COVID-19 delayed the second IDA MDA round in the East New Britain province of Papua New Guinea, but the national programme was able to implement it in May 2022; the New Ireland province was the first in the country to complete TAS and stop MDA. The Federated States of Micronesia were unable to implement TAS in Chuuk, the last endemic area in the country to be surveyed after MDA, although preparatory exercises have been done by the national programme; the survey is expected to be completed by early 2023, when the schools are open. Fiji has also yet to implement its TAS3 originally scheduled in 2022 in the Central Division but implemented its second IDA round in integration with scabies MDA.

The burden of leprosy in the Western Pacific is the second smallest across WHO regions, with 2480 new cases reported in 2021. Nevertheless, leprosy remains a public health problem in a few Pacific Island countries such as Kiribati, Marshall Islands and Nauru. A strategy dedicated to small island States is being prepared by WHO and partners. Several countries in the Region have achieved very low incidence and, in line with WHO guidance, are moving towards elimination. In 2022 Cambodia developed a road map 2022–2030 focused on decentralization of leprosy services, integration with other health programmes such as that against tuberculosis, intensified action in areas of residual transmission ("hotspots"), as well as capacity strengthening and awareness-raising activities.

For WHO's work in the Region to expand universal health coverage and improve health and well-being, the theme of **Reaching the Unreached** is recognized by Member States as a priority. As such, the Region is strengthening its focus on transforming health-care delivery and public health systems to reach the most vulnerable, marginalized and stigmatized populations. In accordance, **integration of service delivery** within the NTD programme and with other disease control programmes has been widely practiced. Since 2019, Vanuatu has integrated deworming, yaws MDA and screening and consultation for scabies and noncommunicable diseases. This has been further strengthened by applying the new training manual and visual aid for detection, diagnosis, treatment and prevention of skin NTDs *(31)* following the new strategic framework for integrated control and management of skin-related NTDs *(32)*. In 2021–2022, Vanuatu continued integrated yaws/scabies/soil-transmitted helminthiases MDA and serosurveillance of multiple communicable diseases, including vector-borne diseases and malaria in two priority provinces. Raising **community awareness** via outreach campaigns for prevention of COVID-19 and NTDs through hygiene were also integrated.

Likewise, Papua New Guinea has started planning a first exercise integrating MDA against lymphatic filariasis, soil-transmitted helminthiases and yaws with the screening of **skin NTDs** such as leprosy, scabies and yaws; this will take place in West New Britain province in 2023. Kiribati has integrated post-validation surveillance of lymphatic filariasis with MDA against trachoma, for the first time since validation of elimination of lymphatic filariasis as a public health problem in 2019. The Solomon Islands conducted the ever-first round of nationwide MDA against **scabies** in 2022; the original plan was to combine it with MDA against **yaws**, as the country is one of three countries in the region with remaining yaws endemicity; however, this was not possible mainly due to logistic challenges associated with delays in delivery of donated azithromycin, highlighting the need to improve coordination mechanisms among concerned partners. In 2021, Fiji also conducted a national baseline prevalence survey for scabies, followed by MDA with ivermectin in 2022; the exercise was integrated with mass treatment for lymphatic filariasis.

With the availability of the new WHO guidance on **Safety in administering medicines for neglected tropical diseases** *(33)*, **pharmacovigilance** has been strengthened in several Member States, helping national NTD programmes to plan, prepare for and monitor the safe administration of medicines during MDAs. Thanks to the development of training materials derived from existing WHO guidance, **capacity-building workshops** were organized for health staff in Papua New Guinea, the Solomon Islands and Vanuatu to strengthen prevention, reporting and management of serious adverse events associated with MDA.

Mapping of **neglected parasitic zoonoses** is ongoing in priority countries to enhance understanding of their geographical distribution and burden and generate evidence to prove that coordinated **One Health** interventions involving both human health and animal health sectors can most effectively eliminate transmission of such diseases. Cambodia completed nationwide mapping of **foodborne trematodiases**, while **human taeniasis** mapping is ongoing. Pilot MDA rounds against **opisthorchiasis** and **taeniasis** in respective high-risk areas have been conducted in 2022. The Lao People's Democratic Republic and the Philippines also progressed with mapping of human taeniases and **cysticercosis** recently.

Finally, Ms Fasihah Taleo, the National Professional Officer for Neglected Tropical Diseases in the WHO Country Office, Vanuatu, won the **2022 Director-General's Award for Excellence** and was recognized for her critical contributions towards the elimination of trachoma as a public health problem in Vanuatu.

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Disease summaries: progress and challenges in 2021–2022

Buruli ulcer

Progress

- Promoted integrated surveillance (active case-finding) in all endemic countries
- Implemented integrated capacity-building of health workers in three countries[1]
- Convened LabNet (virtual) meetings and built capacity for laboratory staff in Congo and Central African Republic, where case confirmation is gratis for patients
- Secured uninterrupted availability of medicines free of charge for all countries
- Published TPP for a diagnostic test to be employed at primary health care level
- Published online training course for national and district-level health workers on skin-related NTDs
- Evaluated newly developed rapid diagnostic tools in Côte d'Ivoire for use in public health and community centres to ensure early diagnosis, reduce morbidity and confirm cases
- Conducted training to strengthen web-based surveillance and reporting (DHIS2 software) in several countries (ongoing).

Challenges/action required

- Overcome disruptions caused by COVID-19 to case detection activities.
- Mobilize financial support for activities in countries.

Chagas disease

Progress

- World Chagas Disease Day celebrated on 14 April every year
- Verified interruption of domiciliary vectorial transmission in three countries[2]
- Interrupted domiciliary vectorial transmission of *Trypanosoma cruzi* in some areas of four countries[3]
- Interrupted vectorial transmission by principal triatomine bug in three countries[4] and in some areas of seven countries[5]
- Fully implemented universal screening of blood and blood products in 27 countries[6] in the Americas, European and Western Pacific regions
- Initiated interventions for elimination of transmission of congenital Chagas disease
- Provided technical support and antiparasitic medicines to all 44 countries with Chagas disease.

Challenges/action required

- Strengthen advocacy with health ministries to recognize the public health relevance of the disease.
- Reinforce prevention, control, care and surveillance (case detection, data collection and reporting) in all affected countries, territories and areas, including outside the Americas.
- Strengthen capacities by training health care workers in-service and integrating training at all levels of health services.
- Coordinate vector control management among countries, stakeholders and other sectors (e.g. tourism) through multisectoral national bodies to maximize synergies, including monitoring of insecticide resistance of triatomine bugs.
- Develop criteria and processes for verification of interruption of transmission through transfusion, organ transplantation and congenital routes.

[1] Cameroon, Central African Republic and Congo.
[2] Chile, Paraguay and Uruguay.
[3] Belize, Costa Rica, Honduras and Nicaragua.
[4] Brazil, El Salvador and Guatemala.
[5] Argentina, Bolivia (Plurinational State of), Colombia, French Guiana, Guyana, Mexico and Peru.
[6] Argentina, Belize, Bolivia (Plurinational State of), Brazil, Chile, Colombia, Costa Rica, Ecuador, El Salvador, Guatemala, Guyana, Honduras, Mexico, Nicaragua, Panama, Paraguay, Peru, Suriname, Uruguay, Venezuela (Bolivarian Republic of), France, Japan, Portugal, Spain, Sweden, Switzerland and the United Kingdom of Great Britain and Northern Ireland.


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Chikungunya

Progress

- Launched the Global Arbovirus Initiative
- Published assessment on country capacities for surveillance and control of arboviral diseases in Africa.

Challenges/action required

- Incentivize public–private partnerships for vaccine development.
- Advocate for funding to facilitate comprehensive mapping of disease burden and develop national strategic approaches.
- Strengthen the evidence base on effectiveness of vector control strategies.
- Develop the required quality-assured rapid diagnostic tests.

Chromoblastomycosis and other deep mycoses

Progress

- Conducted a global online survey to collect data on diagnostic capacities and treatment practices in different settings for four deep (implantation) mycoses.[7]

Challenges/action required

- Develop differential rapid diagnostic tests 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.
- Improve access to affordable diagnosis and treatment.
- Support selected endemic countries to establish national disease surveillance and control programmes.

Dengue

Progress

- Decreased dengue CFR thanks to new strategies to manage severe dengue, despite consistent increase in case counts since the 1980s
- Implemented guidance to manage dengue in primary health care settings, identify early predictors of severe disease and prevent disease progression (to achieve target of reducing CFR)
- Published new guidelines on clinical management of dengue and other arboviral diseases in the Americas; disseminated accompanying distance-based, virtual course gratis through PAHO/WHO's virtual campus for public health
- Launched the Global Arbovirus Initiative
- Published 2022 update of the WHO guidance on Laboratory testing for Zika virus and dengue virus infections[8]
- Published assessment on country capacities for surveillance and control of arboviral diseases in Africa.[9]

Challenges/action required

- Address socioeconomic and environmental determinants in reducing transmission of dengue virus.

[7] Chromoblastomycosis, cutaneous sporotrichosis eumycetoma, and actinomycetoma.
[8] https://apps.who.int/iris/handle/10665/359857
[9] https://apps.who.int/iris/handle/10665/364827

Dracunculiasis

Progress

- Certified the Democratic Republic of the Congo as free of *Dracunculus medinensis* transmission (December 2022)
- Maintained precertification surveillance in Sudan in 2021–2022; no human cases or infected animals were found
- Achieved significant progress towards interruption of transmission: 15 human cases reported in 2021 and 13 cases (the lowest number ever reported) in 2022 (provisional count): Chad (six cases), South Sudan (five), Ethiopia (one) and Central African Republic (one imported from Chad)
- Achieved 46% reduction in animal infections (2021) compared with 2020; and an additional 21% reduction in 2022 compared with 2021
- Implemented preventive and proactive tethering of dogs in all endemic countries except Angola where it is planned
- Expanded and improved vector control interventions through preventive application of temephos in open stagnant water bodies of endemic villages
- Continued operational research on diagnostics to support programme implementation and certification
- Expanded surveillance in Angola, which led to the identification of seven infected dogs in 2022; work to stop transmission is ongoing; no human cases reported
- Strengthened interventions in Chad, Ethiopia, and South Sudan, which enabled achieving great impact (number of infected hosts reduced and level of intensity of infections dropped significantly)
- Intensified surveillance on the remaining foci in the Niger river inland areas (the alleged source of transmission) of Mali thanks to improved security; the number of animals reported with infections has consequently increased from 17 in 2021 to 41 in 2022
- Cross-border transmission at the Chad–Cameroon border is being addressed
- Adopted Abu Dhabi Declaration on the Eradication of Guinea Worm Disease (23 March 2022) during global summit (Abu Dhabi with the aim of renewing MoH commitment in endemic countries
- Progress report to WHA75 discussed and appreciated by Member States; commitment to road map goal (dracunculiasis eradication) renewed.

Challenges/action required

- Reconcile funding gap to reach the eradication target.
- *Dracunculus medinensis* infection in dogs remains a challenge to the global eradication campaign.
- Improve access to areas afflicted by conflict, insecurity, political instability or population displacement in certain areas of Mali, Central African Republic, South Sudan and Sudan.

Echinococcosis

Progress

- GSK's donation of ALB expanded to cover CE
- Included ALB and MEB in WHO EML (2021) for treatment of echinococcosis
- CE and AE included in ICD-11
- FAO–WHO–WOAH (tripartite) regional offices continued longstanding, successful partnership to promote and facilitate One Health approach to addressing challenges at human–animal– environment interface, including rabies and antimicrobial resistance
- Published awareness material
- Incorporated EG95 vaccine for intermediate hosts (sheep) into international standards set up by WOAH.

Challenges/action required

- Map disease prevalence to establish baseline data, and strengthen integrated national surveillance.
- Develop guidelines for management of CE to supplement effective prevention and control strategies, and implement them in the field.
- Strengthen implementation of ultrasound diagnosis and effective interventions, and improve access to ALB.

Foodborne trematodiases

Progress

- Obtained PZQ donation for clonorchiasis and opisthorchiasis through Bayer
- Published awareness material on fascioliasis[10]
- Bolivia (Plurinational State of) and Peru implementing MDA with donated TBZ targeting communities endemic for fascioliasis; sporadic cases reported in four countries[11] treated with TBZ donation.

Challenges/action required

- Develop accurate surveillance and mapping tools and methods, with information on environmental factors involved in infection.
- Estimate the 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.

[10] https://apps.who.int/iris/handle/10665/349921

[11] Brazil, Chile, Cuba and Ecuador.

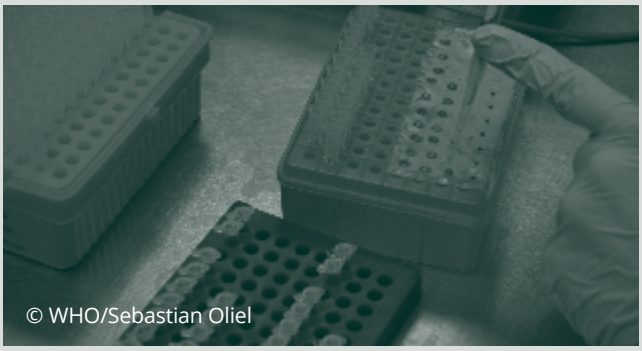
Human African trypanosomiasis (gambiense)

Progress

- Achieved continued progress towards elimination yielding progressive decrease in number of reported cases
- Elimination as a public health problem validated in five countries[12] and process supported in another two countries[13]
- Published three TPPs for diagnostic tests to be employed in different settings and circumstances
- Renewed agreements with Bayer and Sanofi for medicine donations and with Cytiva for donation of laboratory consumables for diagnosis
- Introduced new treatment guidelines and provided training in 11 countries[14]; treatment is available for all detected cases
- Implemented active pharmacovigilance of fexinidazole in those 11 countries
- Coordinated different stakeholders and convened fourth WHO stakeholders meeting (1–3 June 2021)[15]
- Held discussions with experts in socioeconomic aspects linked to HAT elimination
- Convened meeting with stakeholders in vector control for gHAT elimination
- Updated WHO Atlas of HAT and published 2020 update of monitoring HAT elimination
- Sentinel surveillance of HAT ongoing in 19 countries[16]
- Collaboration ongoing with EMA to evaluate new therapeutic tools
- Maintained HAT specimen bank and provided samples for different research institutions.

Challenges/action required

- Overcome COVID-19 disruptions, notably with regard to active and passive screening as well as monitoring.
- Reinforce country ownership of elimination activities and secure government funding.
- Establish an elimination surveillance plan, integrated in primary health care
- Improve access to diagnostic tests and maintain production lines
- Adapt interventions to a context of low endemicity, better integrating HAT activities into the health system.
- Address current gaps in understanding the epidemiological role of human and animal reservoirs in transmission.
- Finalize guidance on the process for verification of elimination.



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Human African trypanosomiasis (rhodesiense)

Progress

- Continued progress towards elimination as a public health problem with overall reduction in number of cases despite occasional localized outbreaks
- Published one TPP for a diagnostic test to be employed in peripheral health facilities
- Validated elimination as a public health problem in Rwanda and supported process in Kenya
- Coordinated different stakeholders and convened fourth WHO stakeholders meeting (1–3 June 2021)[17]
- Renewed agreement with Bayer and Sanofi for donation of medicines; treatment is available for all detected cases
- Published progress update on HAT elimination[18]
- Surveillance ongoing in six countries[19]
- Collaboration with EMA for evaluation of evaluation of fexinidazole in rHAT ongoing
- Conducted staff training (Malawi, Uganda)
- Coordinated control activities with FAO, IAEA, PATTEC and WOAH (mainly vector control).

Challenges/action required

- Reinforce country ownership of elimination activities and secure government funding.
- Mobilize investments to enable the development of better treatments and diagnostic tools.
- Maintain capacities for microscopic diagnosis at peripheral level.
- Develop safer medicines.
- Synergize human health activities with animal health interventions in both domestic and wild animals, within the wider context of One Health.

[12] Côte d'Ivoire, Benin, Equatorial Guinea, Togo and Uganda.
[13] Chad and Ghana.
[14] Angola, Cameroon, Chad, Central African Republic, Congo, Democratic Republic of the Congo, Equatorial Guinea, Gabon, Guinea, South Sudan and Uganda.
[15] https://apps.who.int/iris/handle/10665/355156
[16] Angola, Benin, Burkina Faso, Cameroon, Central African Republic, Chad, Congo, Côte d'Ivoire, Democratic Republic of the Congo, Equatorial Guinea, Gabon, Ghana, Guinea, Liberia, Mali, Senegal, South Sudan, Togo and Uganda.
[17] https://www.who.int/publications/i/item/9789240045040
[18] https://pubmed.ncbi.nlm.nih.gov/35041668/
[19] Malawi, Rwanda, Uganda, United Republic of Tanzania, Zambia and Zimbabwe.


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Leishmaniasis (cutaneous)

Progress

- Conducted seventh (2021) and eighth (2022) PEED cycles with 21 participatory national laboratories from 18 endemic countries in the Americas
- Included antileishmanial medicines in PAHO/WHO's strategic fund to support endemic countries in acquiring low-cost, high-quality medicines
- Published updated treatment guidelines for the Americas[20]
- Implemented WHO global web-based and PAHO/WHO's (SisLeish) surveillance system for the leishmaniases in most high-burden countries
- Expanded access to physical therapy (cryotherapy and thermotherapy) in several EMR countries
- Published TPP for diagnostic test to be employed at point of care.

Challenges/action required

- Improve surveillance, thus enabling an accurate assessment of the disease burden, the estimate of incidence of infection, and the calculation of proportion of cases who are detected and treated.
- Address limited security in high endemic countries in EMR, as this leads to outbreaks and prevents adequate preparedness, case management and vector-control activities.
- Mobilize domestic and external donor support for case management and vector control in EMR countries, so as to limit catastrophic out-of-pocket expenditure for cutaneous leishmaniasis and its complications.

Leishmaniasis (visceral)

Progress

- Published new WHO treatment guideline on VL in HIV coinfected patients in East Africa and South-East Asia[21]
- Established AmBisome treatment for pregnant women and children in Somalia
- Published updated treatment guidelines for the Americas[22]
- Included antileishmanial drugs in PAHO/WHO's strategic fund to support endemic countries in acquisition of low-cost, high-quality medicines
- Provided virtual capacity building for national health professionals on case management (including immunopathology, diagnosis, treatment, patient care, and assistance)
- Published two online courses on OpenWHO platform
- Established a Regional procurement mechanism for VL medicines in the Americas
- Renewed agreement between Gilead Sciences and WHO for donation of liposomal amphotericin B and financial support to VL activities.

Challenges/action required

- Improve surveillance thus allowing an accurate estimate of the disease burden, especially for the cases treated in the private sector.
- Improve reporting of treatment outcomes (especially deaths) in patients.
- Improve domestic and external donor support for procurement of the rapid diagnostic tests and the first-line medicines for case management, thus limiting the catastrophic out-of-pocket expenditure for patients in several high-burden countries in East Africa.
- Address current gaps related to lack of funds and high donor dependence; and lack of proven vector control approaches and tools in East Africa.

[20] https://iris.paho.org/handle/10665.2/56120
[21] https://apps.who.int/iris/handle/10665/354703
[22] https://iris.paho.org/handle/10665.2/56120

Leprosy

Progress

- Increased integration of leprosy elimination activities with NTD programmes, tuberculosis programmes or primary health care
- Global Leprosy Strategy included in the road map
- WHO guidelines adopted by most countries introducing three-drug regimen treatment for all patients and recommending post-exposure prophylaxis with single-dose rifampicin
- DHIS2-based application used by leprosy endemic countries for reporting annual leprosy statistics
- Achieved adequate supply of medicines and other consumables both for treatment of leprosy as well as for reactions in all countries
- Implemented surveillance of antimicrobial resistance as a sentinel surveillance in 50 countries
- Published online training course for health workers on the OpenWHO platform
- Repealed laws and legislation that allow discrimination on the basis of leprosy in Bangladesh and India.

Challenges/action required

- Strengthen domestic funding support and political commitment to control and eliminate the disease in-high burden countries.
- Address the dwindling expertise in clinical and programme management areas, which is affecting implementation of quality leprosy services.
- Sustain funding and expertise to cover ground lost due to the COVID-19 pandemic.
- Develop a point of care test for diagnosis of infection and all forms of disease.
- Improve availability of rifampicin (in child friendly formulations) in those countries where limited access is affecting implementation of post-exposure prophylaxis.
- Ensure packages for continuum of care for people with disabilities due to leprosy.
- Promote inclusion of persons affected by leprosy at all levels of programme implementation.

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Lymphatic filariasis (LF)

Progress

- Increased reporting on MMDP data
- Published second edition of MMPD aide mémoire including web annex tools for assessing the quality and readiness of care for persons affected[23]
- Built capacities to detect and manage chronic cases; work ongoing to strengthen and expand the minimum package of care in all countries
- Published two TPPs for diagnostic tests to be employed for monitoring and evaluation and for surveillance purposes
- In 2021 and 2022, implemented triple-therapy MDA (ivermectin, diethylcarbamazine, albendazole; IDA) in several countries across all WHO regions
- Several countries passed TAS or IDA impact surveys and moved to post-MDA surveillance
- Despite the pandemic, several countries implemented MDA and impact surveys
- Held a global workshop on integrated and sustainable LF post-validation surveillance (Bangkok, Thailand, 13–15 December 2022).

Challenges/action required

- Start or scale-up MDA in all relevant settings; expand implementation of IDA regimen where appropriate.
- Promote integration of essential packages of care for people affected by LF into primary health care.
- Develop standards for post-validation surveillance and improve diagnostics.

[23] https://apps.who.int/iris/handle/10665/339931


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Mycetoma

Progress

- Conducted a global online survey to collect data on diagnostic capacities and treatment practices in different settings for four deep (implantation) mycoses[24]
- Published TPP for a diagnostic test to be used at primary health care level (to differentiate eumycetoma and actinomycetoma and determine when to stop treatment)
- Included the causative agents of eumycetoma in the list of high-priority fungal pathogens developed by WHO for research, development and public health action.[25]

Challenges/action required

- Develop a differential rapid diagnostic test and effective treatment and establish surveillance for case detection and reporting.
- Improve access to affordable diagnosis and treatment.
- Fill existing gaps in information on epidemiology of the disease outside Sudan.
- Support selected endemic countries to establish national disease surveillance and control programmes.

Onchocerciasis

Progress

- Elimination interventions started in all endemic countries
- Achieved at least one round (of four scheduled) of MDA in 2021–2022 in all remaining endemic areas in the Americas, though not always with optimal coverage
- Published two TPPs for diagnostic tests to be employed for mapping and surveillance
- Maintained elimination status in four countries[26] verified for elimination of onchocerciasis
- Drafted a dossier for verification of elimination of onchocerciasis in Niger
- In 2021, almost 2 million people in 31 implementation units, in eight countries[27] lived in areas no longer requiring MDA for onchocerciasis, where MDA has stopped and post-treatment surveillance completed, including four countries where verification of elimination has been achieved
- Created new Global Onchocerciasis Network for Elimination to provide advocacy and communication platform to accelerate progress towards road map targets
- Moxidectin proven to be an efficient microfilarial treatment. Ongoing research may inform the inclusion of this new tool in different programmatic settings
- Promising progress towards enhanced mapping, monitoring and evaluation of programmes offered by new diagnostic such as qPCR and new *Onchocerca volvulus* antibody test.

Challenges/action required

- Develop high-quality point-of-care diagnostics applicable in the field.
- Strengthen programme capacity to perform entomological and laboratory diagnostics.
- Develop and implement elimination strategies for areas where loaiasis is co-endemic but onchocerciasis is hypoendemic.
- Complete elimination mapping in all endemic countries to identify remaining untreated areas with active transmission.

[24] Chromoblastomycosis, cutaneous sporotrichosis, eumycetoma and actinomycetoma.
[25] https://apps.who.int/iris/handle/10665/363682
[26] Colombia, Ecuador, Guatemala and Mexico.
[27] Colombia, Ecuador, Equatorial Guinea, Guatemala, Mexico, Sudan, Venezuela (the Bolivarian Republic of) and Uganda.


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Rabies

Progress

- Published OpenWHO online (multilingual) courses on rabies and One Health
- Coordination of partners strengthened under the United Against Rabies Forum[28]
- Developed DHIS2 data platform and training and provided support to 19 countries (17 in EMR and two in EUR) to report national minimum epidemiological indicators for rabies
- Updated section on rabies immunoglobulins and monoclonal antibodies in EML (2021)
- Published two reviews on the impact of COVID-19 on rabies programmes[29,30] and practical guidance on introducing human rabies vaccine into national immunization programmes[31]
- Established National Bridging Workshop – Rabies to bring together different national stakeholders from different sectors and levels to assess current collaboration gaps in key technical areas and to develop a joint road map of corrective measures and strategic priorities; first workshop piloted in Ghana (August 2022).

Challenges/action required

- Improve surveillance and availability and quality of data.
- Strengthen financial and political commitment, especially for mass dog vaccination activities.
- Advocate with Gavi (the Vaccine Alliance), to ensure that their Vaccine Investment Strategy 2021–2025, which includes human rabies vaccine, is fully implemented and scaled up.
- Build workforce capacity for rabies to build One Health capacity.

Scabies and other ectoparasitoses

Progress

- Convened WHO informal (virtual) meeting on the development of a conceptual framework for tungiasis (11–13 January 2021)[32]
- Published two TPPs for diagnostic tests to be used to decide when MDA with ivermectin should be started and stopped
- Started mass treatment in the Western Pacific and held a regional review and planning meeting in the Americas
- Published (multilingual) online training course on scabies in the NTD channel of the OpenWHO platform
- First WHO Collaborating Centre for Scabies Control established in 2021
- Strong partnership established with the World Scabies Program and the International Alliance for the Control of Scabies (IACS).

Challenges/action required

- Develop guidance and tools for mapping in endemic countries to estimate the burden of disease.
- Develop guidance for implementation of MDA for scabies.
- Create an advocacy and funding plan; secure financing for ivermectin and topical treatments; advocate for inclusion in universal health coverage.

[28] http://www.unitedagainstrabies.org/
[29] https://doi.org/10.1093/trstmh/trab123
[30] https://doi.org/10.3389/fitd.2022.866811
[31] https://www.who.int/publications/i/item/9789240052499
[32] https://apps.who.int/iris/handle/10665/363972

Schistosomiasis

Progress

- Established technical advisory group on schistosomiasis and soil-transmitted helminthiases. Systematic reviews on relationship between morbidity indicators in preparation
- Published new guideline on control and elimination of human schistosomiasis[33] and translated into French and Chinese; disseminated through regional virtual meetings (jointly organized with AFRO and EMRO); updated JAP forms to reflect new recommendation to expand preventive chemotherapy to all groups at-risk); implications discussed by ITFDE (September 2022)
- Published policy brief on deworming adolescent girls and women of reproductive age[34] as a joint UNICEF, UNESCO, WFP, WHO product
- Published two TPPs for diagnostic tests to be employed for monitoring and evaluation and surveillance purposes
- Completed surveys of schistosomiasis oversampling study in four countries[35] (study is funded by COR-NTD and aims to propose an impact assessment protocol for schistosomiasis; data analysis and modelling simulations ongoing
- Created FGS Integration Group (FIG) uniting partners with the aim of establishing links and promoting integration with reproductive health programmes
- Established WHO Collaborating Centre in Egypt to support development of cost-effective immuno-diagnostic tools for early detection and management, especially in low endemic areas
- Developed CAA RDT and field tested in Kenya and Philippines by FIND
- Published review showing that PZQ preventive chemotherapy decreased prevalence of schistosomiasis in sub-Saharan Africa by almost 60% during the past 20 years[36]
- Developed training tools and conducted FGS capacity building activities in collaboration with Bridges to Development reaching more than 900 health professionals in Africa.

Challenges/action required

- Improve availability of praziquantel for treatment of adults and enable access to paediatric praziquantel.
- Mobilize funding to support surveys aimed at assessing the impact of preventive chemotherapy and measuring progress towards elimination as a public health problem; improve impact survey methodology.
- Finalize guidance on the process for validation of elimination as a public health problem.
- Facilitate integration of schistosomiasis interventions at all levels of the health system.

Snakebite envenoming

Progress

- Launched Snakebite Information and Data Platform[37] to facilitate greater access to data on medically important venomous snakes, antivenoms, clinical guidelines, epidemiological data and accessibility and supply chain analysis tools
- Held high-level and technical meetings with countries in sub-Saharan Africa to raise awareness, identify priorities and build regional partnerships
- Supported the development and technical review of a regional action plan on snakebite envenoming in South-East Asia
- Undertook extensive engagement with a range of stakeholders to inform the preparation of a community engagement toolkit underpinned by broad multisectoral consultation and consensus to address a key pillar (empower and engage communities) of the WHO strategy
- In consultation with regional medical experts, drafted a minimum set of capacity requirements for health-care facilities treating snakebites in sub-Saharan Africa
- Developed TPPs for conventional animal plasma-derived snake antivenoms intended for use in sub-Saharan Africa
- Developed a framework for geospatial analysis of venomous snake distributions, human–snake risk mapping, health-care accessibility following snakebites (via AccessMod5 in ArcGIS), and the use of these and other data to develop a proposal for establishment of a pilot antivenom stockpile project in sub-Saharan Africa
- Secured external funding until 2023 to support TPP development and establish the antivenom stockpile project framework tools addressing two of four key pillars (safe, effective treatment; strengthening health systems) of the WHO strategy to prevent and control snakebite envenoming.[38]

Challenges/action required

- Mobilize resources to implement the WHO snakebite strategy; prioritize identifying financial resources and generating political will to support implementation of work at regional and country levels.
- Expand the collection of baseline data including epidemiological data at all levels of health systems; building data on antivenoms supplied and used by countries, their costs and outcomes; and data on health systems, supply chain and resources.
- Mobilize funding for commodities to support the implementation of an antivenom stockpile facility in sub-Saharan Africa.
- Increase engagement with regions and countries to support implementation of the WHO strategy.
- Develop and implement guidance on diagnosis and treatment of snakebites in consultation with relevant experts to provide improved support to health-care workers in affected countries.

[33] https://apps.who.int/iris/handle/10665/351856
[34] https://apps.who.int/iris/handle/10665/351106
[35] Cote d'Ivoire, Ghana, Mali and Togo.
[36] https://pubmed.ncbi.nlm.nih.gov/34863336/
[37] https://www.who.int/teams/control-of-neglected-tropical-diseases/snakebite-envenoming/snakebite-information-and-data-platform
[38] https://apps.who.int/iris/handle/10665/324838

Soil-transmitted helminthiases (STH) including strongyloidiasis

Progress

- Published a policy paper on periodical deworming adolescent girls and women of reproductive age[39]
- Established a working group to develop guidelines for control of strongyloidiasis; conducted 12 systematic reviews to prepare the issuing of WHO recommendations on strongyloidiasis control
- Established a working group to develop a manual for assessing the elimination of STH as a public health problem; draft developed
- Established a working group to develop a monitoring and evaluation framework for STH programmes: draft developed
- Published a TPP for a diagnostic test to be employed in monitoring and evaluation of STH programmes
- Tested a geostatistical approach for conduction of impact survey, demonstrating the possibility to reduce survey cost by > 70%. Conducted drug efficacy assessment on mebendazole or albendazole in 12 countries; published albendazole results[40]
- Conducted surveys on impact of STH interventions in 17 countries out of the 23 identified as in need of impact surveys)
- Launched web site on STH preventive chemotherapy (in collaboration with the WHO Collaborating Centre in Naples;[41] the site presents three series of maps (at global, regional and country levels) on (i) progress of implementation; (ii) impact of interventions on STH prevalence; and (iii) impact of interventions on STH morbidity
- Published a study showing the reduction in DALYs lost for STH from 2010 to 2020 and its relationship with the increase of coverage of STH control programme globally.[42]

Challenges/action required

- Increase political commitment to ensure sustainable domestic financing.
- Develop more effective medicines to improve patient outcomes and mitigate the risk of drug resistance.
- Develop comprehensive surveillance and mapping systems to target treatment and monitor drug efficacy.
- Scale-up surveys to assess impact of preventive chemotherapy, to inform decision-making and measure progress towards elimination as a public health problem; improve impact survey methodology.
- Finalize guidance on the process for validation of elimination as a public health problem.


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Taeniasis and cysticercosis

Progress

- Launched WHO guidelines on management of *T. solium* neurocysticercosis[43] and PAHO/WHO Guideline for preventive chemotherapy for the control of *T. solium* taeniasis.[44] Engaged with mental health professionals to disseminate the information
- Started distribution to countries of PZQ and niclosamide donated by Bayer for preventive chemotherapy; MDA conducted in Madagascar and Cambodia (2022)
- Included PZQ and ALB for the treatment of neurocysticercosis in the WHO Model List of Essential Medicines, 22nd List (2021)
- Developed technical material and tools to help countries identify at-risk areas and implement key strategies.
- Launched first version of *T. solium* mapping protocol
- Updated global *T. solium* endemicity map (2022)[45]
- Published awareness material on prevention developed by FAO–WHO–WOAH tripartite in 10 languages[46]
- Created two posters to assist with awareness and training on neurological adverse events, with inputs from other programmes
- Reviewed use of existing diagnostic tools in public health programmes and published the meeting report[47]
- Drafted *T. solium* monitoring and evaluation framework.

Challenges/action required

- Prepare monitoring and evaluation framework and TPPs to support the development of more effective diagnostics for confirmation of endemicity and monitoring of interventions.
- Mobilize funding to support animal health interventions in One Health projects.

[39] https://apps.who.int/iris/handle/10665/351106
[40] https://journals.plos.org/plosntds/article?id=10.1371/journal.pntd.0009888
[41] https://www.whocc.ita116.unina.it/
[42] https://journals.plos.org/plosntds/article?id=10.1371/journal.pntd.0010575
[43] https://apps.who.int/iris/handle/10665/344802
[44] https://iris.paho.org/handle/10665.2/54800
[45] https://apps.who.int/iris/handle/10665/353612
[46] https://apps.who.int/iris/handle/10665/360863
[47] https://www.who.int/publications/i/item/9789240060722


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Trachoma

Progress

- Validated five countries[48] as having eliminated trachoma as a public health problem during 2021–2022
- The estimated global number of people with trachomatous trichiasis (the late, blinding feature of trachoma) fell from 2.0 million in May 2020 to 1.7 million in June 2022
- Reduced the estimated number of people needing the A (antibiotics), F (facial cleanliness) and E (environmental improvement) components of the SAFE strategy for trachoma elimination from 154 million in May 2020 to 125 million in June 2022.

Challenges/action required

- Continue to develop survey methodologies to maximize fieldwork efficiency.
- Promote integration with other public health programmes, including other NTD and eye health programmes, to sustain progress towards trachoma elimination goals.
- Foster operational research to find ways to better estimate coverage of antibiotic mass drug administration and to manage evaluation units with persistent or recrudescent active trachoma.
- Mobilize more funding for research and programmatic implementation.

Yaws

Progress

- Published two TPPs for diagnostics tests to be employed to detect a case of yaws and a case of azithromycin-resistant yaws
- Started total community treatment in Cameroon
- Integrated surveillance strengthening for skin NTDs in all endemic countries
- Conducted training of health workers in Congo and Central African Republic
- Carried out a serology survey in the former endemic area of Ecuador using samples from a serum bank; very low antibody responses were found. Also, planned a serosurvey on children aged ≤ 15 years to confirm the absence of transmission.

Challenges/action required

- Improve access to rapid diagnostic tests and dual path platform assays.
- Mobilize financial support for yaws eradication activities.
- Strengthen surveillance and awareness in all countries.
- Encourage countries in the Americas to progress work in compiling information to demonstrate interruption of yaws transmission. This will require investment of funding and dedicated technical teams in the post-pandemic situation, which is a challenge as countries are focused on other public health priorities.

Abbreviations and acronyms used in Annex 3.
AE: alveolar echinococcosis; ALB: albendazole; CE: cystic echinococcosis; CFR: case-fatality rate; CL: cutaneous leishmaniasis; COVID-19: coronavirus disease; DHIS: District Health Information System; DNDi: Drugs for Neglected Diseases initiative; EMA: European Medicines Agency; EML: WHO Model List of Essential Medicines (22nd list, 2022); EMR: WHO Eastern Mediterranean Region; EUR: WHO European Region; FAO: Food and Agriculture Organization of the United Nations; FGS: female genital schistosomiasis; gHAT: gambiense human African trypanosomiasis; GSK: GlaxoSmithKline; HAT: human African trypanosomiasis; ICCDE: International Commission for Certification of Dracunculiasis Eradication; ICD-11: WHO International Classification of Diseases (11th revision, 2022) ICT: International Certification Team; ITFDE: International Task Force for Disease Eradication; LF: lymphatic filariasis; MDA: mass drug administration; MEB: mebendazole; MMDP: morbidity management and disability prevention; MoH: ministry of health or equivalent; OTS5: Fifth meeting of the Onchocerciasis Technical Subgroup; PAHO/WHO: Pan American Health Organization/WHO Regional Office for the Americas; PATTEC: Pan-African Tsetse and Trypanosomiasis Eradication Campaign; PEED: Regional Program for Direct External Performance Assessment; PHC: primary health care; PZQ: praziquantel; TAS: transmission assessment survey; TBZ: triclabendazole; TPP: target product profile; WHA: World Health Assembly; WIPD: WHO Integrated Data Platform; WOAH: World Organisation for Animal Health (founded as OIE).

[48] The Gambia, Malawi, Saudi Arabia, Togo and Vanuatu.

Diagnostic target product profiles published as of December 2022

Disease	Subject	Web link to publication
Buruli ulcer	TPP for a rapid test for diagnosis of Buruli ulcer at primary health-care level	https://apps.who.int/iris/handle/10665/353982
Human African trypanosomiasis	TPP for a gambiense human African trypanosomiasis test to identify individuals to receive widened treatment	https://apps.who.int/iris/handle/10665/352579
	TPP for a test for rhodesiense human African trypanosomiasis diagnosis usable in peripheral health facilities	https://apps.who.int/iris/handle/10665/344165
	TPP for an individual test to assess gambiense human African trypanosomiasis infection in low prevalence settings	https://apps.who.int/iris/handle/10665/365383
	TPP for a high throughput test for verification of elimination of gambiense human African trypanosomiasis	https://apps.who.int/iris/handle/10665/365384
Leishmaniases (dermal)	TPP for a point-of-care test for dermal leishmaniases	https://apps.who.int/iris/handle/10665/353980
Lymphatic filariasis	TPP for lymphatic filariasis to support decisions for stopping triple-therapy mass drug administration	https://apps.who.int/iris/handle/10665/340080
	TPP for surveillance of lymphatic filariasis	https://apps.who.int/iris/handle/10665/340081
Mycetoma	TPP for a rapid test for diagnosis of mycetoma at primary health-care level	https://apps.who.int/iris/handle/10665/353979
Onchocerciasis	TPP for mapping onchocerciasis	https://apps.who.int/iris/handle/10665/341719
	TPP for stopping mass drug administration	https://apps.who.int/iris/handle/10665/341719
Scabies	TPP for starting mass drug administration	https://apps.who.int/iris/handle/10665/353981
	TPP for stopping mass drug administration	https://apps.who.int/iris/handle/10665/353981
Schistosomiasis	TPP for monitoring and evaluation	https://apps.who.int/iris/handle/10665/344813
	TPP for transmission interruption and subsequent surveillance	https://apps.who.int/iris/handle/10665/344813
Soil-transmitted helminthiases	TPP for monitoring and evaluation of soil-transmitted helminthiases control programmes	https://apps.who.int/iris/handle/10665/342539
Yaws	TPP for identifying a single case of yaws	https://apps.who.int/iris/handle/10665/353978
	TPP for detecting azithromycin resistance	https://apps.who.int/iris/handle/10665/353978

Links to WHO target product profiles and product profile characteristics are available from WHO's Global Observatory on Health Research and Development:
https://www.who.int/observatories/global-observatory-on-health-research-and-development/analyses-and-syntheses/target-product-profile/links-to-who-tpps-and-ppcs

Status of commitments for donations of medicines and health products as of December 2022

Disease	Manufacturer	Product name	Period of MoU	Donation commitments
Donations managed by WHO				
Chagas disease	Bayer AG (Germany)	Nifurtimox (120 mg tablets)	2007–2025	• Up to a total of 12 500 000 tablets for the treatment of Chagas disease
	Chemo Group (Mundo Sano)	Benznidazole (100 mg tablets; 12.5 mg tablets)	2020–2023	• 3000 tablets (12.5 mg) and 105 000 tablets (100 mg)
Foodborne trematodiases (fascioliasis and paragonimiasis)	Novartis (Switzerland)	Triclabendazole (250 mg tablets)	2016–2025	• Up to 600 000 tablets for the treatment of fascioliasis and paragonimiasis
Foodborne trematodiases	Bayer AG (Germany)	Praziquantel (600 mg tablets)	2020–2024	• Within the limits of the donation of praziquantel for taeniasis and cysticercosis
Human African trypanosomiasis	Bayer AG (Germany)	Nifurtimox (120 mg tablets)	2009–2026	• Up to 150 000 tablets for five years, adjustable to needs to treat human African trypanosomiasis
		Suramin (1 g vials)	2002–2026	• Up to 10 000 vials for five years, adjustable to needs to treat human African trypanosomiasis
	Sanofi (France)	• Eflornithine (200 mg per mL in 100-mL bottles); • Melarsoprol (3.6% in 5-mL ampoule solution (180 mg of active compound); • Pentamidine (200 mg powder for injection)	2001–2026	• Unlimited quantity for the treatment of human African trypanosomiasis
		Fexinidazole (600 mg tablets)	2019–2026	
	Cytiva (Sweden)	Diagnostics: DE52 cellulose (10 kg packs) and cytopore 2 (1 kg packs)	2022–2024	• 230 kg of DE52 cellulose and 9 kg of cytopore 2


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Disease	Manufacturer	Product name	Period of MoU	Donation commitments
Leprosy	Novartis (Switzerland)	Clofazimine (100 mg capsules)	2000–2025	• Up to 1 650 000 capsules for the treatment of severe erythema nodosum leprosum reactions
		Clofazimine (50 mg capsules)		
		MDT[a] MB adult and child		• Up to 2 478 000 blister packs annually for the treatment of leprosy and its complications
		MDT PB adult and child		
Lymphatic filariasis	Eisai (Japan)	Diethylcarbamazine citrate (100 mg tablets)	Since 2012 until elimination	• Up to 2.2 billion tablets committed for the first seven-year period for use in the preventive chemotherapy of lymphatic filariasis • Extended in 2017 until elimination is achieved • Current MoU is until 2025
	GlaxoSmithKline (United Kingdom)	Albendazole (400 mg tablets)	Since 1997 until elimination	• Up to 600 million tablets annually for use in the preventive chemotherapy of lymphatic filariasis
Schistosomiasis	Merck (Germany)	Praziquantel (600 mg tablets)	Since 2007 for an unlimited period	• Up to 250 million tablets annually for the treatment of schistosomiasis in school-aged children (notably in Africa) • Since 2017, donation scaled up to 220 million tablets annually for the treatment of schistosomiasis in school-aged children and adults (in specific epidemiological context)
Soil-transmitted helminthiases	GlaxoSmithKline (United Kingdom)	Albendazole (400 mg tablets)	2012–2025	• Up to 200 million tablets annually for use in the preventive chemotherapy of soil-transmitted helminthiases
	Johnson & Johnson (United States of America)	Mebendazole (500 mg tablets)	Since 2012; current MoU is until 2025	• Up to 200 million tablets annually for the treatment of soil-transmitted helminthiases in school-aged children and women of reproductive age group

[a]MDT with rifampicin (150 mg and 300 mg tablets), clofazimine (300 mg and 50 mg tablets) and dapsone (100 mg tablets) in blister packs depending on age and type of leprosy; loose clofazimine in capsules.

Disease	Manufacturer	Product name	Period of MoU	Donation commitments
Visceral leishmaniasis	Gilead Sciences, Inc. (United States of America)	Liposomal Amphotericin B (lyophilized 50 mg formulation in vials) (AmBisome®)	2012–2016	• Up to 445 000 vials for the treatment of visceral leishmaniasis in South-East Asia and East Africa
			2016–2021	• Up to 380 400 vials for the treatment of visceral leishmaniasis in South-East Asia and East Africa
			2022–2025	• Up to 304 700 vials for the treatment of visceral leishmaniasis in South-East Asia and East Africa
Yaws	EMS SA Pharma (Brazil)	Azithromycin (500 mg tablets)	2017–2022	• 153 million tablets to support the global eradication of yaws
Taeniasis and cysticercosis	Bayer AG (Germany)	Niclosamide (400 mg tablets)	2020–2024	Up to a total of 2 800 000 tablets for the treatment of taeniasis
		Praziquantel (600 mg tablets)		Up to a total of 1 339 000 tablets for the treatment of taeniasis
Cystic echinococcosis	GlaxoSmithKline (United Kingdom)	Albendazole (400 mg tablets)	2022–2025	Up to 5 million tablets as long as it is within the limit of the overall donation of albendazole from GlaxoSmithKline
Donations managed outside WHO				
Onchocerciasis	Merck, Sharpe & Dohme (United States of America)	Ivermectin (3 mg tablets)	Since 1987 until elimination	Unlimited supply for the treatment of onchocerciasis
Lymphatic filariasis			Since 1997 until elimination	Unlimited supply for the treatment of lymphatic filariasis
			2018–2025 for IDA strategy	Up to 250 million tablets for use in WHO-recommended triple (IDA) therapy MDA regimen to eliminate lymphatic filariasis in countries not co-endemic for onchocerciasis
Trachoma	Pfizer Inc. (United States of America)	Azithromycin (250 mg tablets or 1200 mg in 30-mL (200 mg/5 mL) powder for oral suspension)	1998–2025	Unlimited quantity for the elimination of trachoma as a public health problem

IDA: ivermectin–diethylcarbamazine citrate–albendazole; MB: multibacillary; MDA: mass drug administration; MDT: multidrug therapy; MoU: memorandum of understanding; PB: paucibacillary; WHO: World Health Organization.

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