Scoping the needs and gaps of endemic countries in the onchocerciasis elimination programme

Findings report, June 2023

World Health Organization

GONE

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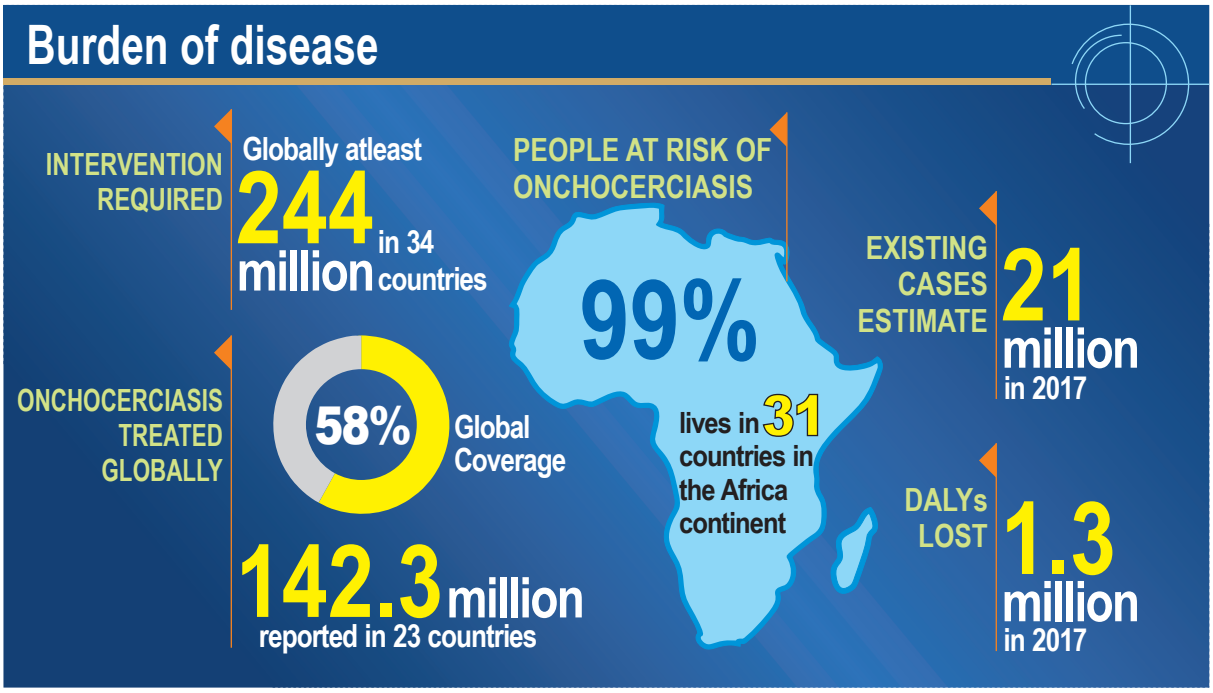
Abbreviations and acronyms

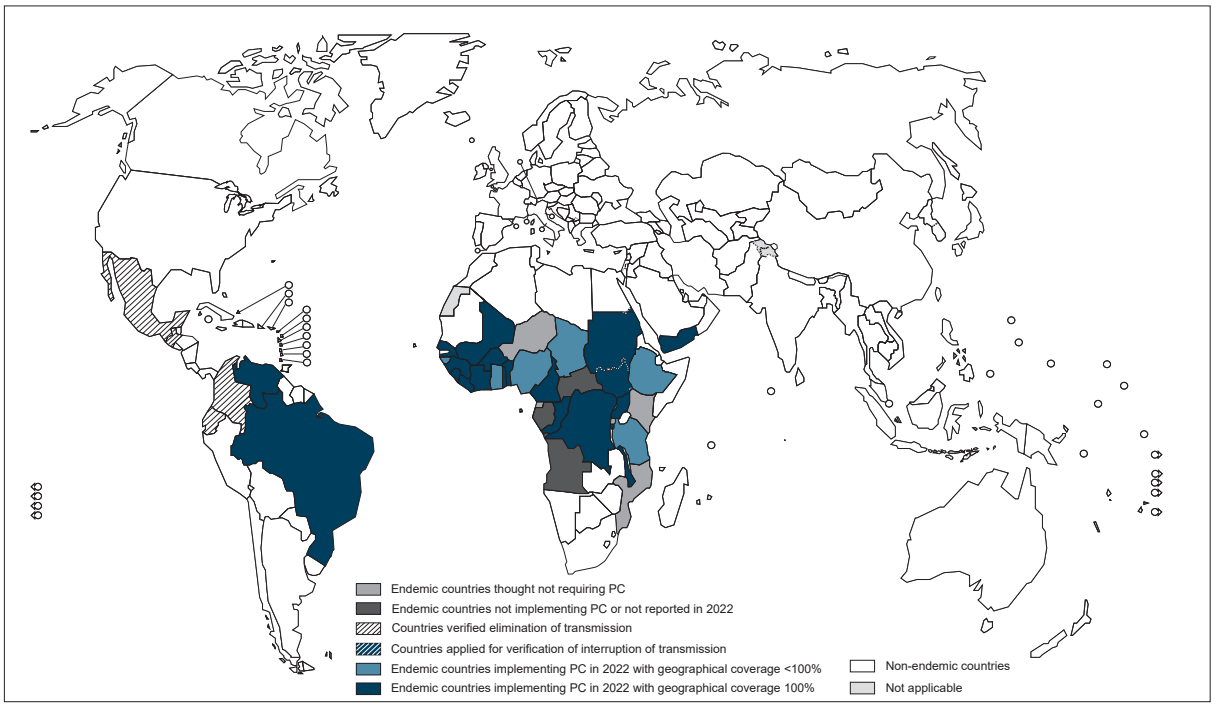
AP	alkaline phosphatase
GONE	Global Onchocerciasis Network for Elimination
M&E	monitoring and evaluation
MDA	mass drug administration
NOEC	National Onchocerciasis Elimination Committee
NTD	neglected tropical disease
OEM	onchocerciasis elimination mapping
Ov	*Onchocerca volvulus*
PTS	post-treatment surveillance
WHO	World Health Organization

Onchocerciasis, also called “river blindness”, is transmitted through the bites of infected blackflies that breed along fast-flowing rivers close to remote rural villages. While there is no vaccine to prevent infection, treatment with the antiparasitic drug ivermectin every year for a period of 12-15 years can help halt its transmission.



Source: Global onchocerciasis 2021 progress report, 2030 NTD Road Map

Geographical distribution of onchocerciasis and status of preventive chemotherapy (PC) in endemic countries, 2022

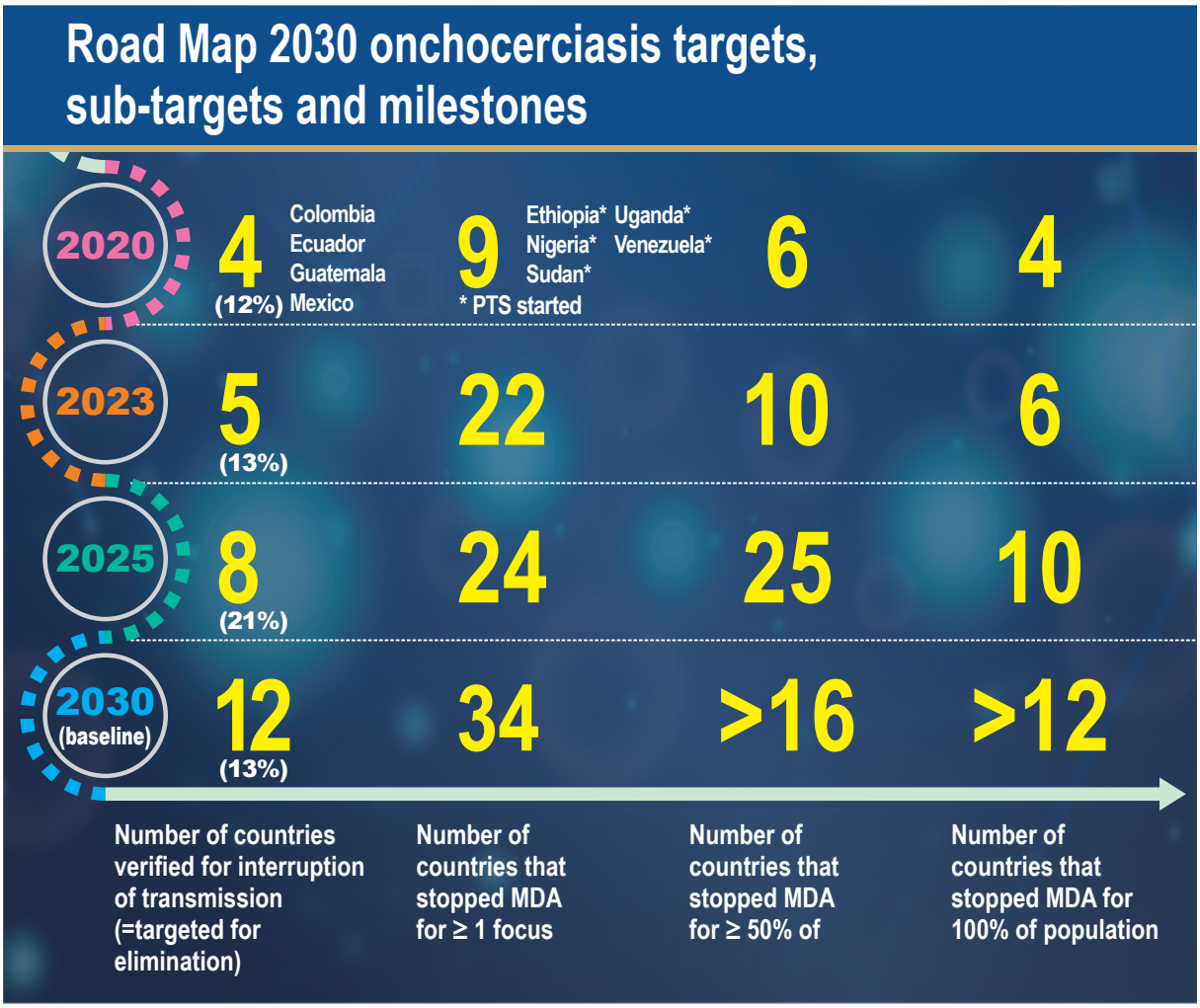


Data Source: World Health Organization
Map Production: Control of Neglected Tropical Diseases (NTD)
World Health Organization

World Health Organization

Executive summary

Ending the neglect to attain the Sustainable Development Goals: a road map for neglected tropical diseases 2021–2030 ("the road map") sets explicit targets for the elimination of onchocerciasis by 2030, including eliminating the need for mass drug administration (MDA) of ivermectin in at least one focus in 34 countries, in more than 50% of the population in at least 16 countries, and in the entire endemic population in at least 12 countries. The road map also targets interruption of onchocercal transmission in 12 countries by 2030. Achieving these targets and milestones will require a number of critical actions. These include establishing a well-coordinated global partnership to connect stakeholders and existing partnerships at all levels in order to improve coordination and collaboration, accelerate technical progress, implement a harmonized research agenda and enhance service delivery.



To address these challenges and opportunities and advance critical actions, the World Health Organization (WHO), Member States and partners have established a **Global Onchocerciasis Network for Elimination (GONE)** to strengthen collaboration and communication and assist Member States with achieving the road map's onchocerciasis elimination targets.

GONE is a country-driven initiative focused on the road map and supported by WHO that will emphasize pragmatic and flexible solutions, to ensure that the needs of individual country programmes are met. The network will work to intensify integrated, cross-cutting approaches and advocate nationally and internationally, so that the drive to eliminate onchocerciasis goes all the way, down to the very last mile.

Objective of the assessment

One of the key recommendations of the first GONE brainstorming meeting, held in September 2022, was to consult with health ministries of countries endemic for onchocerciasis on how GONE can help address gaps and challenges without duplicating the work of existing country initiatives and partnerships. To this end, the GONE Secretariat has undertaken a *needs assessment* in all endemic countries to identify the status of onchocerciasis elimination efforts, challenges, bottlenecks and critical actions required to achieve elimination targets. Findings have been summarized in this report, which can help determine priority areas and critical actions to be implemented by GONE partners. Examples of countries that gave feedback to various questions are listed in the report.

Methods

A structured questionnaire was sent to 34 national onchocerciasis coordinators in health ministries of all endemic countries followed by virtual interviews to discuss feedback on questions. Some countries also provided reports and slides of national onchocerciasis elimination committees (NOECs).

Topics addressed in the assessment

Questions focused on the challenges and problems identified in the different programmatic phases of the elimination programme, from mapping to implementing MDA to post-treatment and post-elimination surveillance. Furthermore, countries gave feedback on cross-border challenges and collaboration and how to jointly tackle difficulties.

Member States also gave feedback on applying integrated approaches with other sectors and on neglected tropical diseases (NTDs) to help accelerate elimination of NTDs, including onchocerciasis. Additionally, countries shared information on the function and composition of their NOECs, their working procedures, meeting dates and key partners supporting onchocerciasis elimination activities in the countries.

Next steps

The findings of the needs assessment will help guide the next steps in strengthening efforts to eliminate onchocerciasis with the disease community. The actions summarized in the conclusions of this report will inform the priority areas of work and the establishment of GONE expert subgroups that will work on key areas and propose strategies and recommendations to address issues in order to reach onchocerciasis elimination targets and milestones.

Outcome of the assessment

The scoping exercise identified a series of key opportunities and associated needs of the endemic countries. These issues have been raised several times by interviewees and can be summarized as follows:

Cross border collaboration

Develop formalized cross-border collaboration plans with all involved key actors (governments, partners, funders, researchers, procurement agencies): facilitate communication, connect relevant stakeholders for MDA synchronization and information-sharing, and provide guidance

Advocacy for funding

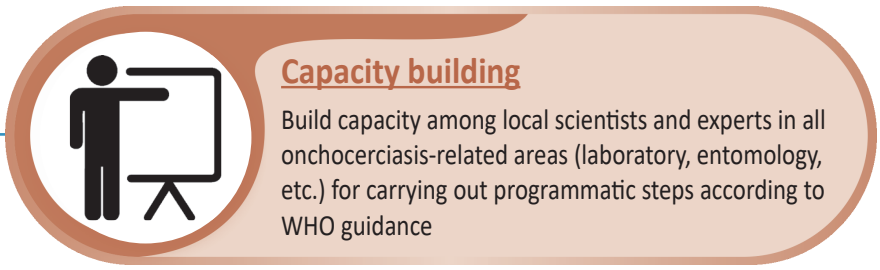
Advocate for increased (domestic - public, private and philanthropic) resources to fully fund onchocerciasis elimination programmes and cross-border activities (e.g. value proposition, investment case, impact modelling)

Sharing best practices

Share best practices on the practical implementation of WHO guidance by country programmes

Access to diagnostics/equipment

Facilitate access/provide the necessary equipment, reagents and supplies for laboratory processes for diagnostics



Capacity building

Build capacity among local scientists and experts in all onchocerciasis-related areas (laboratory, entomology, etc.) for carrying out programmatic steps according to WHO guidance

Laboratories

Support the establishment of quality-assured laboratories in endemic countries

Community support

Develop incentives to recruit and sustain community drug distributors and enhance community support for MDA campaigns

1. Introduction

The Global Onchocerciasis Network for Elimination (GONE) was launched by WHO, Member States and partners on World NTD Day 2023 to strengthen partnerships and communication and assist Member States with achieving the targets for elimination of onchocerciasis set in the road map.

GONE, a country-driven, road map focused initiative supported by WHO, emphasizes pragmatic and flexible solutions to ensure that the needs of individual country programmes are met. Its aim is to provide an open access forum through which to improve communication and coordination among countries, allies, partners and support critical programme actions. It also aims to serve as an advocacy body for sustainable financing of onchocerciasis at global, regional and national levels so that the drive to eliminate onchocerciasis reaches the very last mile.

A key recommendation of the first GONE brainstorming meeting in September 2022 was to consult with health ministries of countries in which onchocerciasis is endemic on how the network can help address gaps and challenges without duplicating the work of existing country initiatives and partnerships. In response, the GONE Secretariat conducted a needs assessment in all endemic countries to identify the status of onchocerciasis elimination efforts, challenges, bottlenecks and critical actions required to achieve the elimination targets. This report summarizes the findings of the scoping exercise and can be used to help determine priority areas and critical actions for implementation by GONE partners.

Annex 1 lists the national onchocerciasis focal points and NOEC chairpersons. Annex 2 provides details of the NOEC meeting calendar and the key partners in endemic countries.

2. Methods

A structured questionnaire was designed to gather information on a variety of topics and sent to country representatives of 31 African countries,[1] two Latin American countries and Yemen. Virtual follow-up interviews were then set up to discuss the information submitted. Some countries provided slides and NOEC reports.

Respondents to the questionnaire

Coordinators of national onchocerciasis elimination programmes, neglected tropical disease (NTD) programme managers, national onchocerciasis elimination committee (NOEC) chairpersons

Countries providing feedback on the questionnaire and/or in interviews (including slides decks)	Angola, Benin, Brazil, Burkina Faso, Burundi, Cameroon, Central African Republic, Chad, Congo, Côte d'Ivoire, Democratic Republic of the Congo, Ethiopia, Gabon, Ghana, Guinea, Guinea-Bissau, Equatorial Guinea, Liberia, Malawi, Mozambique, Mali, Niger, Nigeria, Rwanda, Senegal, Sierra Leone, South Sudan, Sudan, Togo, Uganda, United Republic of Tanzania, Yemen
Countries invited but not responding	Kenya, Venezuela (Bolivarian Republic of)

Focus areas of questions

- Definition of implementation unit used for mass drug administration (MDA) for onchocerciasis; criteria used to exclude certain groups from MDA
- Status of onchocerciasis elimination mapping (OEM) of countries
- Status of MDA in countries
- Challenges affecting completion of OEM, smooth implementation of MDA, conducting stop MDA surveys, monitoring and evaluation (M&E), post-treatment surveillance (PTS) and other challenges in implementing WHO guidelines
- Collaboration with neighbouring countries, cross-border issues and how to tackle them
- Other challenges and approaches to overcome these
- Challenges caused by co-endemicity of lymphatic filariasis and onchocerciasis or loiasis and onchocerciasis
- Suggestions for integrated approaches with other NTDs and health sectors
- Identification of country onchocerciasis focal points, NOEC chairpersons and members, outcome reports, meeting dates, key partners

1 Angola, Benin, Burkina Faso, Burundi, Cameroon, Central African Republic, Chad, Congo, Democratic Republic of the Congo, Côte d'Ivoire, Equatorial Guinea, Ethiopia, Gabon, Ghana, Guinea, Guinea-Bissau, Kenya, Liberia, Malawi, Mozambique, Mali, Niger, Nigeria, Rwanda, Senegal, Sierra Leone, South Sudan, Sudan, Togo, Uganda, United Republic of Tanzania.

3. Summary of findings

The findings at the time of the scoping exercise are summarized below.

Question 1. Areas under treatment: are countries implementing MDA at village, subdistrict, district, or transmission zone level?

Answers Q1:

Countries implementing MDA at village/community level	Angola, Benin, Brazil, Burkina Faso, Congo, Liberia, Malawi, Mali, Nigeria, Togo
Countries implementing MDA at subdistrict level	Cameroon, Chad, Gabon, Ghana, Senegal, Sierra Leone, Uganda
Countries implementing MDA at district level	Burundi, Central African Republic, Côte d'Ivoire, Guinea-Bissau, Ethiopia, Guinea, Mozambique, Niger, United Republic of Tanzania, Yemen
Countries implementing MDA in transmission zones	Democratic Republic of the Congo, Sudan

Question 2. Which criteria are used to exclude certain groups from MDA?

Answers Q2:

MDA decisions are based on epidemiological and entomological criteria.

- There are communities in certain districts that do not benefit from MDA either because they are not considered to be endemic or they are located in the onchocerciasis hypo-endemicity zone or these communities are still in the zone of onchocerciasis/loiasis co-endemicity (Congo, Cameroon, Central African Republic).
- Children aged under 5 years, seriously ill and pregnant women are excluded during any period of MDA.
- Malawi mentioned that their exclusion criteria are based on the 1997 REMO (rapid epidemiological mapping of onchocerciasis) survey whereby only hyper- and meso-endemic areas were eligible for MDA.
- In Togo, large agglomerations with more than 2000 inhabitants are excluded unless entomo-epidemiological conditions require treatment.

Question 3. Has MDA stopped in any area?

Answers Q3:

The status of MDA for elimination of onchocerciasis transmission is shown below.

MDA not started	MDA started but not at scale	MDA scaled to all endemic implementation units	MDA stopped in at least one focus	MDA stop nationwide/ under PTS
Equatorial Guinea Gabon Kenya+ Mozambique+ Rwanda+	Angola Central African Republic Chad South Sudan Yemen	Benin Burkina Faso Burundi Cameroon Côte d'Ivoire Congo Democratic Republic of the Congo Ghana Guinea Guinea-Bissau Liberia Malawi Sierra Leone	Brazil* Ethiopia* Mali Nigeria* Sudan Togo Uganda* United Republic of Tanzania Venezuela (Bolivarian Republic of)*	Niger++ Senegal*
5	**5**	**13**	**9**	**2**

+ Not thought to need mass drug administration (MDA) unless onchocerciasis eliminating mapping identifies transmission.

++ Dossier submitted to the WHO Regional Office for Africa in March 2023.

* Settings/areas in post-treatment surveillance (PTS).

Examples of countries that listed the criteria used to determine stopping MDA in transmission zones/States:

Nigeria

Tool for evaluation	Indicator	Reclassification or programme of action
Ov16 ELISA testing of children aged under 10 years (at least 3000/State) and	If result of (a) < 0.1% of the children and	Stop mass administration of Mectizan (MAM) and classify the zone of Ash. Then start post-treatment surveillance.
PCR of flies (a total of at least 6000 flies from at least 3 catching sites per State in transmission zone)	Result of b) is < infective fly per 2000 flies and/or ATP < 20	
	If a) and b) are not met:	Continue MAM as per WHO flow chart for stopping MAM

ELISA: enzyme-linked immunosorbent assay; Ov: *Onchocerca volvulus*; PCR: polymerase chain reaction.

Senegal

- Ov16 serological test in children aged under 10 years to demonstrate interruption of transmission.
- O-150 PCR test (poolScreen) of flies collected to demonstrate the interruption of transmission.

Ethiopia

- An upper bound of the 95% confidence interval of the prevalence of flies carrying infective larvae (L3) in the head of less than 0.1% (< 1/1000) in parous flies; or
- An upper bound of the 95% confidence interval of the prevalence of L3 of less than 0.05% (< 1/2000) in all flies (assuming a parity rate of 50%).
- The critical threshold for interruption or elimination of transmission is an upper bound of the 95% confidence interval of less than 0.1% confirmed seropositivity to Ov-16 in children aged under 10 years.

Question 4. What are the challenges countries face to complete OEM?

Answers Q4:

⊙ Countries where OEM is completed:	⊙ Brazil, Guinea-Bissau, Malawi, Mali, Niger, Senegal, Uganda
⊙ Countries where OEM has not started yet:	⊙ Burundi, Chad (planned to start in July 2023), Gabon, Rwanda
⊙ Countries where OEM has not been completed	⊙ Angola, Benin, Burkina Faso, Cameroon, Central African Republic, Congo (waiting for equipment to finalize OEM), Côte d'Ivoire, Democratic Republic of the Congo, Ethiopia, Ghana, Guinea, Equatorial Guinea, Liberia, Mozambique, Nigeria, Sierra Leone, South Sudan, Sudan, United Republic of Tanzania, Yemen

Challenges countries face to complete OEM:	Suggestions from countries on how to solve this
⊙ Availability of funding to carry out epidemiological and entomological evaluations according to WHO criteria (Burkina Faso, Cameroon, Central African Republic, Guinea, Liberia, Mozambique, South Sudan, Togo) ⊙ Incomplete data on where to conduct OEM (Côte d'Ivoire) ⊙ Lack of diagnostic tests and laboratory equipment (Cameroon, Central African Republic, Congo, Côte d'Ivoire, Guinea, Guinea, Nigeria, Sierra Leone) ⊙ Irregularity of expert committee meetings due to competing health emergencies (Benin) ⊙ Cross-border and civil conflict issues (Ethiopia, Sudan, Yemen) ⊙ Geographical inaccessibility to areas (Burkina Faso)	⊙ Resource mobilization by all stakeholders (governments, international financial partners, local nongovernmental organizations) (Burkina Faso, Cameroon, Central African Republic, Guinea, Liberia, Mozambique, South Sudan, Togo) ⊙ Complete the mapping of breeding sides, identification of first-line villages (Côte d'Ivoire) ⊙ Acquisition of laboratory equipment and appropriate diagnostic tests (rapid diagnostic test kits and reagents) to analyse dried blood spot samples to implement necessary OEM phases. (Cameroon, Central African Republic, Guinea, Sierra Leone) ⊙ Waiting for laboratory equipment from ESPEN for the last phase of mapping (Congo) ⊙ Advocate with WHO to make OV16 tests and bioplexes available (Côte d'Ivoire, Nigeria) ⊙ Strengthen the programme's capacities to carry out OEM: train a new generation of technicians in entomology and epidemiology (Cameroon) ⊙ Provide clear guidance for carrying out elimination mapping (Cameroon, South Sudan) ⊙ Influence governments for peaceful solutions (Ethiopia, Sudan)

ESPEN: Expanded Special Project for Elimination of Neglected Tropical Diseases.

Question 5. What are the challenges of implementing MDA?

Answers Q5:

Many countries face similar challenges such as:

- Unpredictable funding to sustain 100% geographical coverage: lack of funding to organize second round in certain municipalities, lack of implementing partner, lack of funding for logistical (transport, storage and data management) costs (Angola, Benin, Burundi, Chad, Guinea, Senegal, Sierra Leone, South Sudan, Sudan, Togo, Yemen)
- High rates of community drug distributor turnover as MDA exceeds more than 15 years in certain regions (Burundi, Togo, United Republic of Tanzania)
- Synchronization of MDA at border regions (border region Burkina Faso–Côte d'Ivoire–Ghana, Chad–Cameroon, Congo, Senegal–Guinea–Guinea-Bissau–Mali)
- Delayed arrival of medicines in country at the specified time (Yemen)
- Extension of treatment in areas co-endemic for loiasis (Cameroon, Gabon)
- Extension of treatment in hypo-endemic areas (lack of funding and WHO guidance) (Congo, Cameroon)
- Low uptake of treatment by urban population (Benin, Uganda)
- Lack of funding for studies evaluating potential appearance of resistance to ivermectin and/or strengthening the M&E system (Cameroon, Central African Republic)
- Migration, civil unrest, inaccessibility of certain villages (Ethiopia, Liberia, Nigeria, Sierra Leone, South, Sudan, Uganda, United Republic of Tanzania, Yemen)
- Environmental factors (e.g. travelling across large waters to get the medicines to other communities, rainy season) (Ethiopia, Liberia, Nigeria, Sierra Leone, South, Sudan, Uganda, United Republic of Tanzania, Yemen)
- Lack of technical capacity (qualified staff), awareness-raising among concerned stakeholders to commit to the fight against onchocerciasis (Côte d'Ivoire, Guinea-Bissau, South Sudan)

Question 6. What are the challenges in conducting the assessments needed in order to stop MDA?

Answers Q6:

Many African countries face similar challenges such as:

- Insufficient resources to conduct a large-scale assessment (pre-stop surveys, epidemiological surveys, entomological assessments) across the entire country in order to evaluate it in one go (Benin, Burkina Faso Burundi, Cameroon, Côte d'Ivoire, Malawi, Mali, Togo, United Republic of Tanzania)
- Difficulty of finding reagents (for Ov-16 ELISA and PCR testing) on the market, especially for pool screening of blackflies (in spite of it being funded by partners) (Cameroon, Guinea)
- No clear guidance on conducting elimination mapping (Cameroon)
- Essential material for collection of blackflies (catching tubes), though funded, have become unavailable on the local market and from known sources abroad (using bijou bottles instead – Ghana)
- Insufficient collection of blackflies on site and implementation of PCR O-150, insufficient collection of dried blood spots for Ov16-ELISA (Senegal)
- Insufficient human resources and laboratories (Liberia, Nigeria, Malawi, Togo)
- Geographical inaccessibility of certain areas and indigenous mobility (Burkina Faso, Brazil (Amazon forest), Ethiopia)

Not applicable for (as yet to conduct stop MDA assessment or stop MDA assessment is completed): Angola, Gabon, Mozambique, Niger, Rwanda, South Sudan

Question 7. What are the challenges countries face with M&E and PTS?

Answers Q7:

Several countries answered these questions. Those that have already started PTS in one or more areas (Ethiopia, Mali, Niger, Nigeria, Senegal, Sudan, Uganda) and some countries where PTS is not in place yet but are thinking already about the challenges they are facing when arriving at this programme phase:

- Insufficient financial resources for carrying out post-MDA coverage surveys (Benin, Burundi, Cameroon, Congo, Guinea-Bissau, Guinea Equatorial, Sierra Leone, Sudan, Togo, Uganda)
- Lack of sampling protocols and adequate diagnostics (Congo)
- Timely availability of diagnostic test kits (Guinea)
- Inadequate laboratories and lack of trained personnel to implement M&E and PTS (Benin, Burkina Faso, Cameroon, Central African Republic, Equatorial Guinea, Liberia, Mali, Nigeria, Senegal (lack of entomologists), Sierra Leone (how to use diagnostic tests for assessment), South Sudan, Togo)
- Lack of integrated entomological surveillance as part of cross-border management (Equatorial Guinea, Senegal)
- Lack of accurate knowledge of PTS activities (Cameroon, Guinea-Bissau, Uganda)
- Variations in reported data from implementation units that call for data validation through coverage evaluation surveys (United Republic of Tanzania)
- Lack of integration of onchocerciasis into national health information systems for routine data collection and analysis (Brazil)
- Weak anchoring of onchocerciasis control strategies into routine surveillance systems (Benin, Mali, Uganda, Togo)
- Population movement from onchocerciasis transmission areas to PTS (Ethiopia)

Countries where PTS is not applicable (yet): Angola, Benin, Burkina Faso, Burundi, Central African Republic, Cameroon, Chad, Congo, Côte d'Ivoire, Gabon, Ghana, Guinea, Guinea-Bissau, Malawi, Mozambique, Rwanda, Sierra Leone, South Sudan, Togo, United Republic of Tanzania

Question 8. Are there any other challenges in implementing WHO guidance?

Answers Q8:

- Long delay in returning Ov16 ELISA test results (Burkina Faso)
- Unclear guidance regarding surveys (sampling) (Burundi, Cameroon)
- Lack of in-country human capacity: country would like to build its own knowledge base and expertise to implement WHO guidance and not depend on imported consultants. Training of national technicians at master's and doctoral level, particularly in entomology, for ownership of the programme (Guinea-Bissau, Liberia)
- Lack of technical support (Malawi)
- Difficulty in obtaining historical data on onchocerciasis in the country since the time of the Onchocerciasis Control Programme in West Africa (Mali)
- Lack of clear guidance on writing the dossier (Niger)
- Competing NTD priorities, lack of staff – to integrate onchocerciasis elimination plan into NTD elimination strategy (Rwanda)

- Unclear guidance referring to flexibility of serological methods and entomological collection data (Senegal)
- Challenges with implementing vector control using environmentally safe spraying of insecticides or a new strategy under development for removal of trailing vegetation in rivers. Given that the endemic area lies in the Amazon forest, the programme does not do any of these strategic interventions (Brazil)

Question 9. Collaboration with neighbouring countries to coordinate cross-border elimination efforts: what are the cross-border issues and how can they be addressed?

Answers Q9:

Most of the countries are in cross-border dialogue with their neighbours to address cross-border elimination issues.

There are four groups of countries:

- countries that have held occasional cross-border meetings, e.g. once a year or ad hoc meetings, and have started sharing information;
- countries that have already developed a concrete plan of action or collaboration framework but agreed activities cannot be implemented given security, financial or logistical issues;
- countries that have no cross-border collaboration in place but are planning to do so; and
- countries that collaborate on some NTD topics within an established regional cooperation platform which could be expanded to onchocerciasis cross-border meetings.

Sporadic cross-border meetings (with some implementation challenges due to issues listed in below table)
Benin, Togo and Nigeria
Brazil and the Bolivarian Republic of Venezuela
Burkina Faso, Côte d' Ivoire and Ghana
Congo and the Democratic Republic of the Congo
Ghana and Togo collaboration since 2014: action plans developed but not fully implemented because of non-synchronized MDA due to lack of funding by Togo
Uganda, South Sudan and Democratic Republic of the Congo (inviting neighbouring countries to NOECs)
Togo–Benin–Ghana: sharing activities implemented on both sides of the border
Sierra Leone, Liberia, Guinea, Côte d'Ivoire (cross-border collaboration through Mano River Union)
Guinea-Bissau, Guinea and Senegal in 2017 but no follow-up meeting
Mozambique and Malawi
Niger and Benin, Burkina Faso and Nigeria
Countries with plan of action developed (lack of implementation due to below-listed issues)
Ethiopia, Sudan, South Sudan
Nigeria, Benin, Cameroon (created an operational framework to address cross-border challenges; Nigeria inviting neighbouring countries to NOECs)
Uganda, DRC and South Sudan

Countries without cross-border collaboration that plan to (re)-start collaboration
⊙ Angola needs to explore with the Democratic Republic of the Congo and Zambia whether there are issues. ⊙ Burundi with neighbouring countries ⊙ Cameroon ⊙ Guinea Equatorial ⊙ Liberia ⊙ Senegal has no collaboration at the moment; the last meeting with neighbours was organized in 2019 ⊙ Rwanda has no cross-border collaboration started yet ⊙ Ghana plans to start collaboration with Burkina Faso and Côte d'Ivoire ⊙ Mali plans to start collaboration with neighbours (they have in the past been invited by Senegal to participate in their meetings) ⊙ The United Republic of Tanzania plans to establish contacts with Burundi and Kenya ⊙ South Sudan plans to engage with the Democratic Republic of the Congo
Other platforms where NTD-related topics are discussed that could be expanded to onchocerciasis cross-border meetings
⊙ Cameroon, Central African Republic, Chad, Congo, Gabon, Guinea Equatorial: One Health meeting of Central African Economic and Monetary Community members ⊙ Cameroon, Central African Republic, Chad: Guinea-worm disease surveillance

Challenges countries face	Suggested approaches by countries
⊙ Lack of funding for cross-border activities (e.g. to secure involvement of key actors in cross-border meetings) (Benin, Cameroon, Chad, Guinea-Bissau)	⊙ Advocate for funding for cross-border collaboration activities (Benin, Cameroon, Guinea) ⊙ Establish a fund for cross-border activities (Chad)
⊙ Difficult to synchronize campaigns due to human/nomad and black-fly cross-border movements (Benin, Burkina Faso, Chad, Guinea, Guinea-Bissau, Sudan, Uganda)	⊙ Harmonize the treatment period so that migratory populations do not miss treatments (Chad, Guinea-Bissau, Uganda) ⊙ Strengthen logistic coordination and technical and financial support to reach nomads (Chad) ⊙ Increase community involvement in entomological surveillance based on a clear strategy (Burkina Faso)

Challenges countries face	Suggested approaches by countries
⊙ Lack of coordination and collaboration on onchocerciasis elimination on both sides of the border (e.g. omission of certain villages, unknown activities on the other side of the border, no synchronization of MDA activities given different or no funding cycles; vector control activities; different by-laws affecting compliance during MDA; sharing vector control activities) ⊙ (Brazil, Cameroon, Chad, Congo, Ghana, Guinea-Bissau, Guinea, Malawi, Mali, Mozambique, Niger, Senegal, Sierra Leone, Togo)	⊙ Develop/formalize a cross-border collaboration plan/annual meeting framework between neighbouring countries (Burundi, Central African Republic, Cameroon, Chad, Congo, Ghana, Togo, Guinea, Guinea-Bissau, Mozambique, Malawi, Mali, Niger, Togo, Sierra Leone, Senegal, South Sudan) ⊙ Align MDA campaigns by coordinating with all concerned stakeholders and funders to ensure no one is left behind (Burundi, Cameroon, Chad, Congo, Guinea-Bissau) ⊙ Explore existing regional platforms for organizing cross-border meetings (e.g. Mano River Union, CEMAC, ECOWAS-members of respective countries) ⊙ Invite neighbouring countries to NOECs to share activity updates and harmonize programme implementation at borders (Nigeria, Uganda)
⊙ Civil unrest (Ethiopia, Sudan, South Sudan) or other disease outbreaks (Ebola/Uganda)	⊙ Establish diplomatic channels of communication between health ministries for cross-border activities: advocate for peace and stability with the respective governments ⊙ Political leaders to ensure security during execution of activities (Brazil, Ethiopia, South Sudan, Sudan)

In general, there is keen interest in and willingness for cross-border collaboration among countries. There is a strong desire for a formalized cross-border meeting framework and action plan with sufficiently funded cross-border meetings, synchronization of MDA and harmonization of funding cycles on both sides of the border, exchange of best practices, sharing border transmission zone data and vector control activities. Other key recommendations include more rapid and sustainable sharing of border zone data and activities between NOECs among neighbouring countries (by e.g. inviting neighbouring countries to NOEC meetings) and using existing African regional platforms to organize cross-border meetings.

Question 10. What other bottlenecks and issues are you facing? How do you think they should be addressed?

Answers Q10:

Other challenges countries face	Suggested approaches by countries
⊙ Lack of funding to extend MDA activities to hypo-endemic and co-endemic *Loa loa*/ onchocerciasis communities (Central African Republic, Cameroon, Congo) ⊙ Lack of funding to support the incorporation of vector control interventions in the elimination programme (United Republic of Tanzania)	⊙ Implement advocacy activities (advocacy roundtables; build champions) to secure (domestic) funding from different sources (Cameroon, Central African Republic, Congo, Côte d'Ivoire, Guinea-Bissau, Togo, United Republic of Tanzania) ⊙ Mainstream vector control in routine activities and advocate for vector component funding (United Republic of Tanzania) ⊙ Establish more partnerships – with expert/ research/academic institutions/donors (advocacy roundtables with stakeholders) (Côte d'Ivoire, United Republic of Tanzania)
⊙ No NOEC in place due to lack of technical support (Angola, Central African Republic, Congo (NOEC members appointed by no joint meeting to date: Gabon, Guinea-Bissau, Mozambique)	⊙ Recruit/identify experts and provide technical support to operationalize or establish NOECs
⊙ Lack of operational research to understand drivers of MDA challenges (Chad, Sudan, Guinea-Bissau)	⊙ Undertake operational research to study phenomena such as movement of nomads (Chad, Sudan) ⊙ Build capacity of national technicians in operational research in order to highlight problems and ways to solve them (Guinea-Bissau)
⊙ Competing priorities with other pandemics/ diseases (Benin)	⊙ Intensify integrated and cross-cutting approaches by organizing multisectoral meetings and plans (Benin, Niger)
⊙ Frequent turnover of staff due to lack of motivation (Nigeria)	⊙ Mobilize community drug distributors from the same families (Nigeria) ⊙ Provide incentives to keep such distributors motivated (Nigeria)
⊙ Living habits of affected communities make case management difficult: the patient is kept under surveillance by the health team for 35 days of supervised treatment with doxycycline. Keeping patients at home could lead to abandonment of treatment due to their hunting habits, e.g. collecting fruits in the forest and making incursions into the jungle (Brazil)	⊙ Ensure availability of a reference health unit to address difficulties of case management (Brazil)

Other challenges countries face	Suggested approaches by countries
⊙ Lack of awareness in communities: traditional beliefs and mistrust about the disease and the MDA medicines (Sierra Leone)	⊙ Intensify community engagement and social mobilization (Sierra Leone) ⊙ Engage with village chiefs and religious leaders to secure their support for advocacy in communicating appropriate messages to communities on the importance of adhering to treatment during MDAs (Niger) ⊙ Train/recruit more female community drug distributors to better access vulnerable families (Nigeria, Sierra Leone)
⊙ Inaccurate population figures due to outdated household population census (Brazil, South Sudan)	⊙ Conduct household population census for updated population information (Brazil South, Sudan)

Question 11. How does the country tackle issues of co-endemicity: lymphatic filariasis/onchocerciasis or loiasis/onchocerciasis?

Answers Q11:

Countries with areas co-endemic for onchocerciasis and lymphatic filariasis: Angola, Benin, Burkina Faso, Burundi, Cameroon, Central African Republic, Congo, Côte d'Ivoire, Democratic Republic of the Congo, Ethiopia, Gabon, Ghana, Guinea, Liberia, Malawi, Mozambique, Niger, Nigeria, Senegal, Sierra Leone, Sudan, Yemen

Tackling co-endemic onchocerciasis and lymphatic filariasis:

- ⊙ Carry out an annual integrated MDA, including with combined ivermectin and albendazole
- ⊙ A potential technical problem arises from conducting studies on one or the other disease and the obligation to temporarily interrupt the treatment and/or after having declared the zone free from one of the diseases while the other is not and being forced to continue the same MDA scheme (Guinea-Bissau)
- ⊙ Lack of clear guidance on how to Integrate M&E (e.g. integrated transmission assessment surveys)

Countries with areas co-endemic for loiasis and onchocerciasis: Angola, Cameroon, Central African Republic, Congo, Democratic Republic of the Congo, Gabon, Nigeria, South Sudan

Tackling co-endemic loiasis and onchocerciasis:

- ⊙ Improve WHO guidance on MDA, particularly in areas with hypo-endemic onchocerciasis (e.g. how to incorporate the use of LoaScope) (Cameroon, Central African Republic)
- ⊙ Train community drug distributors to inspect individual eyes regularly (South Sudan)

Question 12. How can integrated approaches with other NTDs and health sectors be intensified?

Answers Q12:

- Establish a multisectoral NTD working group/framework, centralize/coordinate all NTD policies in one ministerial department (Chad, Côte d'Ivoire, Liberia, Malawi, Niger)
- Operationalize a One Health platform to intensify integrated approaches with other NTDs and sectors (Chad)
- Integrate a comprehensive onchocerciasis elimination strategy into NTD, HIV, TB, malaria and broader health strategies, including scorecard, financing, indicators for all NTDs (Benin, Brazil, Congo, Equatorial Guinea, Ethiopia, Ghana, Nigeria)
- Identify/harmonize MDA cycles of onchocerciasis and other diseases where feasible (Sudan)
- Use point-of-care multiplex diagnostics platforms, including for onchocerciasis (Angola, Chad, Mozambique)
- Provide counselling and psychological support, including for onchocerciasis patients (Angola, Mozambique)
- Develop capacity-building strategies to diagnose and treat, including for onchocerciasis (Angola, Uganda)
- Integrate entomological surveillance of onchocerciasis and human African trypanosomiasis (sleeping sickness) with trapping in co-endemic areas (Burkina Faso)
- Establish and/or strengthen national NTD diagnostic laboratories, including for onchocerciasis diagnosis (Burkina Faso)
- Conduct integrated transmission assessment surveys for soil-transmitted helminthiases and onchocerciasis (Senegal)
- Integrate onchocerciasis in other parasitic disease control programmes (Gabon)

Examples of integrated approaches

- Multisectoral NTD control committee (Mali)
- Integrated skin working group (Rwanda)
- Integrated MDA for NTDs amenable to preventive chemotherapy (Senegal)
- Integrated approach for leprosy, TB and onchocerciasis whereby suspected cases of leprosy or TB are checked by staff for onchocerciasis (Burundi)
- Lymphatic filariasis and onchocerciasis integrated in national surveillance systems (Sierra Leone)
- Efforts ongoing to integrate all NTDs into one directorate (South Sudan, United Republic of Tanzania)
- 11 NTDs integrated into one programme (Togo)

The findings of the needs assessment will help guide the next steps in strengthening efforts to eliminate onchocerciasis with the disease community. The opportunities summarized in the conclusions will inform the priority areas of work by GONE partners, who will work on key areas and propose strategies and recommendations to address issues in order to reach the onchocerciasis elimination targets and milestones of the road map.

4. Conclusions

The scoping exercise identified a series of key opportunities and associated needs of the endemic countries. These issues have been raised several times by interviewees and can be summarized as follows:

Cross border collaboration

Develop formalized cross-border collaboration plans with all involved key actors (governments, partners, funders, researchers, procurement agencies): facilitate communication, connect relevant stakeholders for MDA synchronization and information sharing, provide guidance

Advocacy for funding

Advocate for increased (domestic – public, private and philanthropic) resources to fully fund onchocerciasis elimination programmes and cross-border activities (e.g. value proposition, investment case, impact modelling)

Sharing best practices

Provide assistance on the practical implementation of WHO guidance

Access to diagnostics/equipment

Facilitate access/provide necessary equipment, reagents and supplies needed to conduct diagnostic tests

Capacity building

Build capacity among experts (including training for local scientists) on all onchocerciasis-related areas (laboratory, entomological, etc.) to carry out programmatic steps according to WHO guidelines

Laboratories

Support the establishment of diagnostic laboratories

Community support

Design incentives to recruit and sustain community drug developers and provide community support for MDA campaigns to reduce attrition

Annex 1.

Country onchocerciasis focal points and national onchocerciasis elimination committee presidents

Country	Onchocerciasis focal point	NOEC Chairpersons
Angola	Dr Maria Cecília César de Almeida	No NOEC
Benin	Dr Marie Adama Bassabi-Alladji	Professor Achille Massougbodji
Brazil	Dr Joao Luiz Araujo	TBC
Burkina Faso	Mr Justin Compaore	TBC
Burundi	Dr Juvénal Niyongabo	Dr Adrian Hopkins
Cameroon	Dr Theophile Mpaba	Professor Same Ekobo Albert
Central African Republic	Dr Georges Hermana	No NOEC
Chad	Dr Hamit Chidi Djorkodeï	Professor Boy Otchom Brahim
Congo	Dr Francois Missamou	TBC
Côte d'Ivoire	Dr Huges N'Gassa	Prof Mamadou Samba
Democratic Republic of the Congo	Dr Naomi Awaca Uvon	Dr Adrian Hopkins
Equatorial Guinea	Dr Rufino Nguema	Dr Policarpo Ncogo
Ethiopia	Mr Kadu Meribo	Professor Rory Post
Gabon	Dr Julienne Atsame	No NOEC
Ghana	Mr Odame Asiedu	Dr Yankum Dadzie
Guinea	Mr Siradio Balde Mamadou	Dr Bangoura Ousmane
Guinea-Bissau	Dr Victorino Martinho Aiogalé	Dr Cristóvão Manjuba
Kenya	Ms Sophia Moraa Ayienga	Dr David Poumo Tchouassi
Liberia	Ms Sonnie Ziama	TBC
Malawi	Ms Loncy Sajeni	Dr Newton Isaac Kumwenda
Mali	Dr Yacouba Sangare	Professor Mamadou Souncalo Traore
Mozambique	Dr Isaias Pedro Marcos	No NOEC
Niger	Dr Salisou Adamou	Dr Hassan Nouhou
Nigeria	Dr Makata Chukwuemeka	Professor Bertram Nwoke
Rwanda	Dr Jean Bosco Mbonigaba	Dr Ladislas Nshimiyimana
Senegal	Dr Ngayo Sy	Dr Barnabé Guing
Sierra Leone	Mr Abdulai Conteh	Professor Moses Bockarie
South Sudan	Mr Yak Bol	Professor Charles Mackenzie
Sudan	Dr Isam M. A. Zarroug	TBC
Togo	Mr Koffi Padjoudoum	Dr Siamevi Komla Etienne

Uganda	Mr David Oguttu	Professor Thomas Unnasch
United Republic of Tanzania	Dr Clara Jones	Professor Rory Post
Venezuela (Bolivarian Republic of)	Dr Harland Schuler	TBC
Yemen	Dr Sami Al-Haidari	Professor Charles Mackenzie

NOEC: national onchocerciasis elimination committee; TBC: to be confirmed.

Annex 2.

National onchocerciasis elimination committee meeting calendar and key partners of endemic countries

Country	NOEC meetings up to December 2022	NOEC meetings in 2023	Key partners in country
Angola	--	--	End Fund, Mentor Initiative, ESPEN
Benin	Four mtgs (2017, 2018, 2019, 2022)	Q1/2023 national mtg; Q3/2023 international mtg	Sightsavers, FHI360, CRS, MDP, ESPEN
Brazil	One mtg in July 2017	TBC	MoH, indigenous health secretariat; reference laboratory for Simulium and onchocerciasis, ESPEN
Burkina Faso	Three mtgs (2016, 2017, 2021)	TBC	ESPEN, Sightsavers
Burundi	First NOEC in Apr 2022, second in Dec 2022	April 2023; Dec 2023	Government and municipalities, ESPEN, CBM, FH360, MDP
Cameroon	Two mtgs in 2018 and Jan 2022	TBC	HKI, International Eye Foundation, Perspective, Sightsavers, CRFilMT, YIF; OCEAC, MDP, WHO, ESPEN
Central African Republic	--	--	WHO, CBM, ESPEN
Chad	Jan 2019	Nov 2023	END Fund, OPC
Congo	None; only bilateral mtgs with NOEC members	Mtg planned after OEM	OPC, Fairmed supported by OCEAC, ESPEN
Côte d'Ivoire	Two mtgs (2018/2019)	March 2023	Sightsavers, FHI360, ESPEN
Democratic Republic of the Congo	NOEC founded in 2018; four meetings until now	TBC	ESPEN, END Fund, SSI, UFAR, CBM, MDP, DNDi
Equatorial Guinea	--	--	Instituto Carlos III/ Fundacion CSAI

Country	NOEC meetings up to December 2022	NOEC meetings in 2023	Key partners in country
Ethiopia	Yearly mtg, latest in Oct 2022	Oct 2023	The Carter Center, RTI, Liverpool John Moores University; University of Tubingen; USF, University of Rotterdam, Light for the World, Addis University, Regional health offices, ESPEN
Gabon	--	--	ESPEN
Ghana	Seven mtgs since 2016; good ad hoc mtgs, latest in March 2022	March 2023	WHO, USAID Act to END NTDs/ West, Sightsavers, ESPEN
Guinea	Two mtgs to date in 2017 and 2019	Next mtg 13–16 Feb 2023	Helen Keller Int, Sightsavers, Speak Up Africa, ESPEN
Guinea-Bissau	--	--	Sightsavers, WHO
Kenya	TBC	TBC	ESPEN
Liberia	NOEC mtg in 2018; plans to reconstitute NOEC	TBC	Sightsavers, University of Liberia, ESPEN
Malawi	Three meetings (2016, 2017, 2021)	TBC	Sightsavers, MDP, TAM, WHO, Communities (volunteers), GLIDE, COR-NTD, END Fund, University of Malawi, ESPEN
Mozambique	--	--	ESPEN
Mali	Three mtgs since 2018	TBC	END fund, Sightsavers, HKI, ESPEN
Niger	Yearly mtgs since 2018, latest in Dec 2022	May 2023, Dec 2023	HKI, End Fund, ESPEN
Nigeria	Two mtgs per year (May/Dec), latest in Dec 2022	May 2023, Dec 2023	Carter Center, CBM, Sightsavers, MITOSATH, Amen Health And Empowerment Foundation, HANDS, RTI, HKI, WHO, UNICEF, MDP, ESPEN, BMGF, END Fund, Sir Emeka Offor Foundation, T. Y. Danjuma Foundation, Dr. Darin Evans of USAID, Prof. Monsuru Adeleke of Osun State University Osogbo, Prof. Rory Post, LSHTM, Dr Paul Cantey, CDC
Rwanda	ENEC for onchocerciasis and trachoma; no mtg yet	TBC	END Fund, WHO, ESPEN
Senegal	Latest mtg Oct 2022	TBC	END Fund, RTI, ESPEN

Country	NOEC meetings up to December 2022	NOEC meetings in 2023	Key partners in country
Sierra Leone	Biannual meetings in June and Dec since 2016; 12 mtgs in total until now	June 2023, Dec 2023	HKI through Act|West Program, WHO, ESPEN, Sightsavers
South Sudan	Mtgs in 2019, 2020, 2021	3-4 Feb 2023	CBM, Mentor Initiative, ESPEN
Sudan	Annual mtgs in Oct	TBC	Carter Center, End Fund, ESPEN
Togo	Nine mtgs since 2016; latest in Oct 2022	TBC	USAID/FHI360, Sightsavers; ESPEN, MDP, Deloitte, HDI
Uganda	15 yearly mtgs since 2008, latest in Aug 2022	Aug 2023	Carter Center, RTI/ACT East Program, Sightsavers, ESPEN, USF, Makerere University, Auburn University; Mulago School of Entomology and Parasitology
United Republic of Tanzania	Five mtgs since its inception in 2016, latest in Aug 2022	23–25 Aug 2023	USAID/RTI MDP, ESPEN
Venezuela (Bolivarian Republic of)	TBC	TBC	
Yemen	Eight mtgs in total, latest in March 2021	TBC	END Fund, WHO EMRO MDP, EMPHNET

BMGF: Bill & Melinda Gates Foundation; CBM: Christoffel-Blindenmission; CDC: United States Centers for Disease Control and Prevention; CRFilMT: Centre de Recherche sur les Filarioses et Autres Maladies Tropicales; CRS: Catholic Relief Services; EMPHNET: Eastern Mediterranean Public Health Network; DNDi: Drugs for Neglected Diseases *initiative*; ENEC: Eye NTD Elimination Committee; ESPEN: Expanded Special Project for Elimination of Neglected Tropical Diseases; GLIDE: Global Institute for Disease Elimination; HDI: Health and Developpement International; HKI: Helen Keller International; LSHTM: London School of Hygiene & Tropical Medicine; MDP: Mectizan Donation Program; OCEAC: Organization for Coordinating the fight against endemics in Central Africa; OPC : l'Organisation pour la prévention de la cécité; RTI: Research Triangle Institute; TAM: Tea Association of Malawi; TBC: to be confirmed; UFAR: United Front Against Riverblindness; USAID: United States Agency for International Development, USF: University of South Florida; YIF: Yaoundé Initiatve Foundation.

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