Reaching never treated people to eliminate neglected tropical diseases

A toolkit for national programmes

World Health Organization

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Preface

With the creation of the Sustainable Development Goals in 2015, there has been an increased interest in understanding who is left behind in public health interventions. As programmes move towards the realization of their goals, identifying and reaching individuals who have not received treatment, vaccinations or other public health interventions has become of paramount importance for success. In addition to ensuring that each individual benefits from a campaign or intervention for reasons of equity, reaching all individuals is also important to ensure that public health impact at scale is not threatened by hot spots of infection or recurrence of transmission.

Within the neglected tropical disease (NTD) community, there has been a concerted effort to identify and reach those individuals who have never been treated in mass drug administration (MDA) efforts. MDA campaigns deliver preventive chemotherapy (PC) for diseases such as lymphatic filariasis (LF), onchocerciasis (OV), schistosomiasis (SCH), soil-transmitted helminthiases (STH) and trachoma. While World Health Organization (WHO) guidance differs by disease, multiple rounds of MDA are needed to reduce prevalence to levels at which WHO recommends MDA can be stopped with little threat of disease recrudescence. The term “never treated” refers to individuals who self-report that they have never ingested medicines offered during any MDA campaign. Never treated individuals include those who have missed treatment for intentional reasons (e.g. active refusal due to fear of adverse events, low or no perceived risk, distrust of drug distributors or government) as well as those whose who have missed treatment for unintentional reasons (e.g. being out of the community during MDA, the drug distributor has not visited, drug stock-outs, lack of information provided by the health service, poor timing of the MDA campaign).

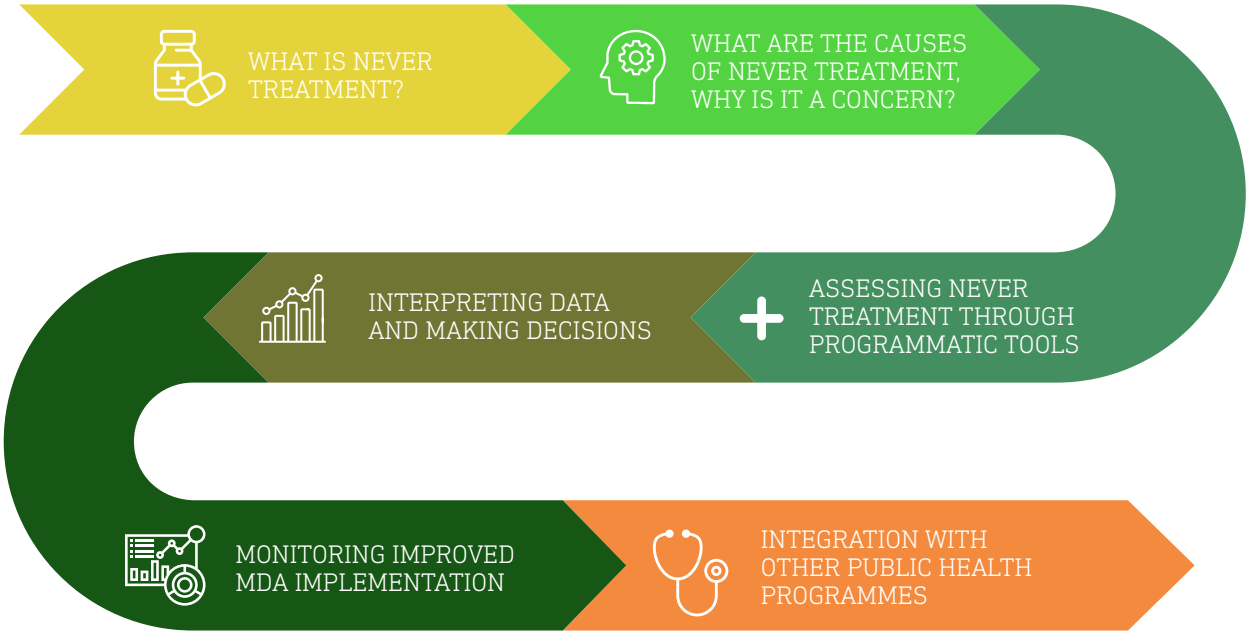
Many NTD programmes aim to eliminate the disease as a public health problem or aim to eliminate transmission as their global goal *(1)* . Research, including modelling studies, has demonstrated the potential risk of never treatment for elimination goals, where never treated individuals may serve as reservoirs for ongoing transmission *(2–6)*. As such, never treatment has become a priority issue within the global NTD community, particularly as more countries enter the final phase of elimination, ending the delivery of MDA and beginning post-MDA surveillance. Groups of never treated individuals risk the reintroduction of transmission in areas under post-MDA surveillance.

Aim of the toolkit

This toolkit aims to provide guidance to national and district NTD programmes, partner organizations, researchers and communities on never treatment. The toolkit chapters address the following steps in understanding and responding to never treatment (Fig. 1):

- How to define never treatment;
- Why never treatment may be an important contributor to persistent low coverage or persistent transmission;
- How to estimate levels of never treatment using routinely collected programmatic data;
- How to interpret data about never treatment and decide when action is needed;
- How to reach individuals with treatment for the first time;
- How to monitor improvements to MDA;
- How to integrate NTD activities to address never treatment with other public health programmes; and
- How NTD programmes have collected and used never treatment data to improve MDA.

Fig. 1. Flow of the never treated toolkit



This toolkit was developed through the Improving Community Health Outcomes through Research, Dialogue and Systems Strengthening (iCHORDS) community of practice. While the toolkit largely focuses on never treatment within LF elimination programmes, it also provides examples and adaptations to account for other NTD programmes. The concepts and approaches in the toolkit can be applied across the NTD portfolio to identify those who qualify for NTD medicines but have never swallowed them during MDA, and to understand how to reach them.

This toolkit aims to provide guidance to national and district NTD programmes, partner organizations, researchers and communities on never treatment.

Intended readership

This manual is intended for managers of national NTD elimination programmes; national, regional and district NTD programme staff; development and technical agencies; nongovernmental organizations (NGOs); regional programme review and technical advisory groups; and other organizations involved in supporting NTD activities. While the focus is on NTDs, other public health programmes requiring high levels of participation may find the toolkit relevant and useful.

Methodology

Details on the methodology used to create this toolkit, including declarations of interest and their management, can be found in Annex 1.

Acknowledgements

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Abbreviations

Ag	antigen
CES	coverage evaluation survey
CDD	community drug distributor
DEC	diethylcarbamazine (citrate)
DOT	directly observed therapy
EMS	epidemiological monitoring survey
EU	evaluation unit
iCHORDS	Improving Community Health Outcomes through Research, Dialogue and Systems Strengthening
IDA	ivermectin, diethylcarbamazine, albendazole
IDP	internally displaced people
IIS	IDA impact survey
IU	implementation unit
LF	lymphatic filariasis
M&E	monitoring and evaluation
MDA	mass drug administration
Mf	microfilaraemia
NGO	nongovernmental organization
NTD	neglected tropical disease
OARS	open-ended questions, affirmations, reflective listening and summarizing
OV	onchocerciasis
PC	preventive chemotherapy
RDT	rapid diagnostic test
SAC	school-aged children
SCT	supervisor's coverage tool
SCH	schistosomiasis
STH	soil-transmitted helminthiases
TAS	transmission assessment survey
TIS	trachoma impact survey
TSS	trachoma surveillance survey
WASH	water, sanitation and hygiene
WHO	World Health Organization

Glossary

The definitions given below apply to the terms as they are used in this manual. They may have different meanings in other contexts. The definitions are extracted from references *(1,7,8)*.

antigen (Ag)

Any foreign substance that stimulates the human immune system to produce antibodies.

coverage evaluation survey (CES)

A population-based probability survey designed to provide a statistical estimate of MDA coverage, as an independent validation of reported coverage.

drug coverage

Proportion of individuals, expressed as a percentage, in a specific population who ingested the drugs delivered during PC.

elimination as a public health problem

Achievement of measurable global targets for both infection and disease. When reached, continued actions are required to maintain the targets and/or to advance to interruption of transmission.

elimination (interruption) of transmission

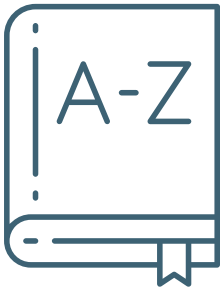
Reduction to zero of the incidence of infection in defined areas, with minimal risk of reintroduction, as a result of deliberate work. Continued actions to prevent re-establishment of transmission may be required.

epidemiological monitoring survey (EMS)

A survey designed to measure whether the prevalence at sentinel and spot-check sites has been lowered below threshold levels. The EMS is used as the first part of a two-tier strategy for deciding to stop LF MDA. Once epidemiological criteria are met in sentinel and spot-check sites, the EU can conduct an IIS or a TAS.

evaluation unit (EU)

An area selected for an epidemiological survey; may comprise several implementation units (IUs) or part of an IU.



IDA impact survey (IIS)

In areas where the triple therapy MDA regimen (ivermectin, diethylcarbamazine, albendazole) has been used, a survey designed to measure whether EUs have lowered the prevalence of infection to a level at which recrudescence is unlikely to occur, even in the absence of MDA.

implementation unit (IU)

The administrative unit in a country that is used as the basis for decisions about implementing MDA.

lymphatic filariasis (LF)

A vector-borne disease in humans caused by infection with the filarial parasites *Wuchereria bancrofti*, *Brugia malayi* and *B. timori*. Infections damage the lymphatic vessels and impair vessel function, leading to clinical manifestations such as lymphoedema and hydrocoele.

mass drug administration (MDA)

A modality of preventive chemotherapy in which anthelminthic medicines are administered to the entire at-risk population of an area (e.g. state, region, province, district, subdistrict, village) at regular intervals, regardless of individual infection status.

microfilariae

Microscopic larval stage of LF parasites that circulate in the blood and are transmitted by mosquitoes.

microfilaraemia (Mf)

Presence of microfilariae in the blood.

monitoring and evaluation (M&E)

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

neglected tropical disease (NTD)

A WHO-recognized group of more than 21, primarily infectious diseases that are mainly endemic in tropical climates, which often affect marginalized communities of society. Control or elimination of these diseases has historically been less of a priority than that of other major infectious diseases, such as malaria, HIV, tuberculosis and vaccine-preventable diseases.

never treatment

A self-reported state of never having ingested medicine during any round of NTD MDA.

onchocerciasis (OV)

A vector-borne disease in humans caused by infection with the filarial parasite *Onchocerca volvulus*. Symptoms include severe itching, disfiguring skin conditions, epilepsy and visual impairment, including permanent blindness.

preventive chemotherapy (PC)

Use of anthelminthic drugs, either alone or in combination, as a public health tool against helminth infections. MDA is one modality of preventive chemotherapy.

recrudescence

An increase in the prevalence of infection in a defined area after being brought to below-threshold levels.

reported coverage

Coverage calculated from aggregated data reported by all drug distributors; census figures or previous reports from drug distributors are used to estimate the population denominator.

schistosomiasis (SCH)

An acute and chronic parasitic disease caused by infection with blood flukes (trematode worms) of the genus *Schistosoma*. People are infected when schistosomes are transmitted during contact with fresh water contaminated with human excreta containing parasite eggs. The disease manifests in intestinal and urogenital forms. Intestinal schistosomiasis usually results in diarrhoea and blood in stools; urogenital schistosomiasis is characterized by the presence of blood in the urine. Chronic infection can lead to disability and, in some cases, death.

school-aged children (SAC)

All children aged 6–15 years (usually), regardless of whether they are attending school. In some countries, enrolment may include individuals older than 15 years.

sentinel site

A community or similar geographical area selected for periodic collection of infection data to monitor the success of a programme. The same site should be maintained throughout a programme, until the level of infection is below target thresholds.

soil-transmitted helminthiases (STH)

Parasitic diseases primarily caused by the roundworm (*Ascaris lumbricoides*), the whipworm (*Trichuris trichiura*), the hookworms (*Necator americanus*, *Ancylostoma duodenale* and *A. ceylanicum*) and *Strongyloides stercoralis*. They can produce a wide range of symptoms including intestinal manifestations (diarrhoea, abdominal pain), chronic intestinal blood loss, general malaise and weakness.

spot-check site

A community or similar geographical area selected for collecting infection data to complement data collected at sentinel sites. Spot-check sites that are considered to be at greatest risk for infection should be selected for each assessment. These could change during the programme.

supervisor's coverage tool (SCT)

A rapid, simple tool based on lot quality assurance sampling, whereby a small random sample is used to classify an area as exceeding or failing to reach a predetermined threshold of coverage. It is used within a given supervision area within the current round of MDA to identify areas in need of mop-up activities.

surveyed coverage

Coverage measured by population-based survey sampling. Calculated as a percentage, the denominator being the total number of individuals surveyed and the numerator the total number of individuals surveyed who were identified as having ingested the medicine.

trachoma

A disease of the eye caused by infection with the bacterium *Chlamydia trachomatis*. With repeated episodes of infection, scarring of the conjunctiva can turn the eyelid inward so that the eyelashes rub on the surface of the eye, causing pain, permanent damage and sometimes blindness. Infection spreads through contact with discharge from the eyes or nose of an infected person.

trachoma impact survey (TIS) or trachoma surveillance survey (TSS)

Standardized surveys designed to measure whether EUs have achieved (TIS) or maintained (TSS) WHO's defined elimination thresholds for prevalence of active trachoma. TIS are used to determine whether to stop MDA, whereas TSS are used to monitor for recrudescence at least two years after a TIS shows the elimination prevalence threshold has been achieved.

transmission assessment survey (TAS)

A survey to measure whether EUs have reduced the prevalence of infection to a level at which recrudescence is unlikely to occur, even in the absence of MDA.

validation

Documentation by WHO of a country's claim to have achieved elimination of a disease as a public health problem and official recognition of their achievement.

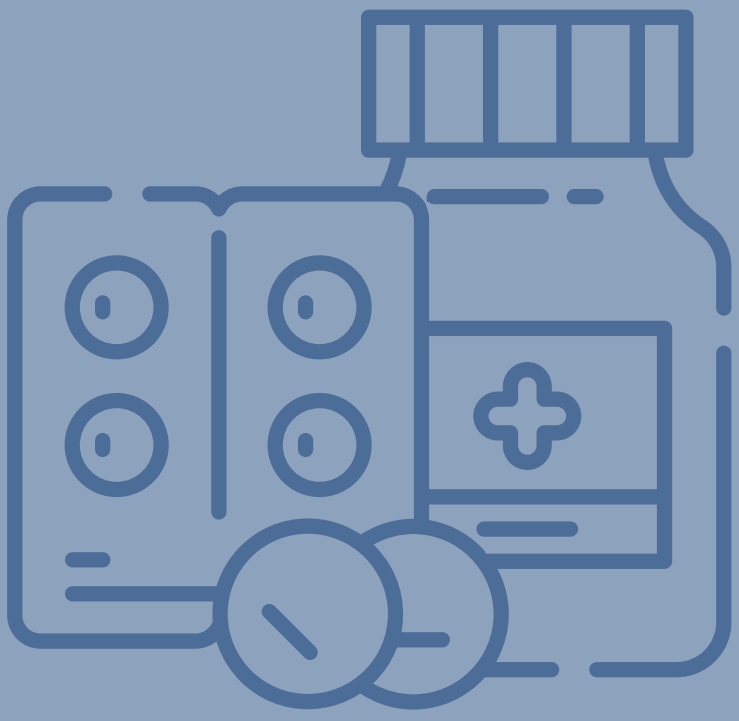
verification

Documentation by WHO of a country's claim to have achieved elimination of transmission of a disease and official recognition of their achievement.

zero-dose

Children who have not received the first dose of diphtheria, tetanus and pertussis-containing vaccine by the end of their first year of life.

1.
What is never treatment and why is it a concern?

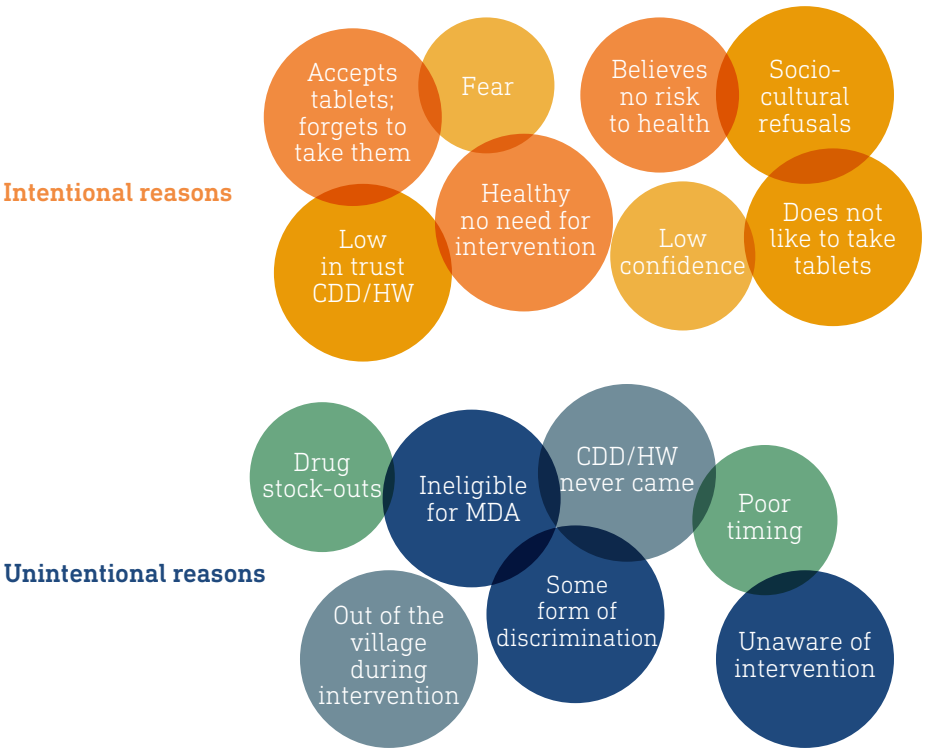


1.1 Introducing the terminology "never treatment"

In published literature, the concept of never treatment within NTD programmes has employed many different terms: systematic non-compliance, systematic non-adherence, systematic non-uptake, persistent non-compliance and others *(2,3,9–16)*. The definitions of these terms in the literature also vary, yet there are some commonalities across the definitions – most indicate that an individual never ingests indicated medicines over time (e.g. more than one round of MDA).

With increased attention on identifying and reaching those individuals who have never taken treatment during MDA, there was momentum to standardize the terminology, measurement and definition. Prior terms largely put the responsibility on the individual for their refusal of the treatment offered during MDA, ignoring the potential systemic reasons individuals may miss MDA. Definitions used different parameters, making it difficult to track never treatment over time. With this, it became clear that a new term was needed; one that was agreed on in the NTD community and one that was more balanced including both the intentional and unintentional reasons why people miss treatment.

Fig. 2. Example of intentional and unintentional reasons for never treatment



CDD: community drug distributor; HW: health worker; MDA: mass drug administration.

Fig. 2 identifies some of the reasons why people may miss treatment delivered in MDA over time. It does not represent all the reasons but provides an illustration of the complexity behind never treatment at the individual level. Reasons will vary by context and setting.

In May 2021, the term "never treatment" was proposed to and accepted by members of the NTD community during a series of Research Links meetings organized by the Coalition for Operational Research for NTDs *(17)*. This term allows for both the intentional and unintentional reasons why people miss treatment during MDA and aligns with the guiding principle of the Sustainable Development Goals to leave no one behind *(18)*. The term never treatment is also consistent with the terminology "zero-dose children" used by Gavi, the Vaccine Alliance to define children who do not receive a single dose "of diphtheria, tetanus and pertussis-containing vaccine" *(19)*.

Instead of only asking if someone has ever taken the medicine, the question includes a response of "one time". This can yield useful nuances about historical treatment status, particularly if followed up by asking when those respondents were treated (see Chapter 2). Analysing the results for people who answered "one time" but were not treated in the current round can help programmes better understand if certain population or geographical groups have been lost to treatment. In addition, when monitoring the impact of MDA strengthening interventions, it allows a programme to understand the characteristics of respondents who were reached and treated for the first time.

Never treatment is defined as a self-reported state of never having ingested indicated medicines during any round of MDA.

Never treatment is captured in the following question:

How many times have you taken the medicine for {*insert NTD*}?

a) Never

b) One time

c) Two or more times

1.2 Reviewing the evidence on never treatment

There is a growing body of evidence on never treatment, with much of the literature focusing on MDA for LF. While the evidence relates to LF MDA, many reasons also will be applicable to other NTD programmes. Based on an overview of published data, Table 1 lists characteristics and reasons associated with never treatment; the influence of these characteristics varies by setting.

Table 1. Reasons associated with never treatment

Characteristics	Description
People living in remote areas	Not reached by drug distributors *(20,21)*
People living in urban areas	• Difficult for drug distributors to access households • High mobility • Low risk perception *(22,23)*
People who migrate (economic, security, climate change)	• Not home at time of MDA • Not counted in MDA register • New to area, e.g. not accounted for in drug procurement • May be some form of discrimination *(24–26)*
People with limited awareness about the disease and MDA	• Do not know about the disease or the MDA in general • Do not like the awareness messages • Do not know about the transmission route • No prior knowledge of most recent MDA round *(12,20,22,27)*
People who do not know if others in their household took the recommended drugs	• Distributor not visiting the household • Lack of interest or approval to participate in the MDA by the head of the household *(12)*
Men	Not home during MDA hours due to work or social reasons *(3,20,25,28)*
Women	Fertility concerns, e.g. being pregnant and not eligible or being afraid of the effect of medicines on fertility *(29)*
People with low acceptability of MDA[a]	Lower acceptability scores are associated with never treatment *(22,23)*
People who miss other public health campaigns (COVID-19, childhood immunizations, bed nets)	Although reasons may vary, households not participating in other public health campaigns may also be missing MDA, e.g. people refuse any form of orthodox medicine *(30)*

COVID-19: coronavirus disease of 2019; MDA: mass drug administration.

[a] Acceptability scores are defined by a set of nine indicators; see *(31)* for details on the measure.

While Table 1 summarizes the data in peer-reviewed literature, there are important unpublished bodies of experience about never treatment among programme managers, researchers and implementing partners. This includes experiences with people living in urban areas who refuse treatment because they do not believe they are at risk of disease, or they do not trust medicines distributed free of charge by the government. Other experiences from the field include these missed populations: prisoners, people with substance abuse issues, people who are drinking or drunk at the time of MDA, and people living in border areas.

Because never treatment occurs over multiple rounds of MDA, it is possible that an individual's reasons for not ingesting medicines will vary over time. As a hypothetical example, a woman was ineligible in the first year MDA due to pregnancy (Fig. 3). In the second year, her husband did not want her to take the medicines because she was breastfeeding, while in the third year of MDA, she was outside of the village at the time of distribution. In subsequent rounds, the distributor did not visit her household, and she did not want to take the treatment as she had heard it was not necessary anymore. The combined effect of these intentional and unintentional reasons is that she was never treated.

This toolkit guides NTD programmes to evaluate the level of never treatment within programmatic areas

Fig. 3. Illustration of never treatment over time

MDA: mass drug administration.

As will be discussed in subsequent chapters, this toolkit guides NTD programmes to evaluate the level of never treatment within programmatic areas. If the levels of never treatment are concerning to the programme, subsequent questions and investigation can help to explore why people are missing the treatments. In this toolkit, quantitative questions are suggested to answer if and why people never ingested the medicine. These questions can be inserted into routine programmatic tools. In addition to survey questions, qualitative investigation is recommended to elicit a deeper understanding of the range of reasons for never treatment over time and how never treatment can be addressed. Previous research and unpublished data from NTD programmes found that context is critical in analysing and responding to never treatment. Even within a district or a city, variation in the levels of never treatment is possible. For this reason, both the understanding of never treatment and the response will need to be as context specific as possible.

1.3 Why is never treatment important?

Do people really remember if they are never treated?

The question used to elicit never treatment has been used across a variety of geographical, programmatic and NTD settings. The response does not seem to be affected by recall bias; rather, never treatment is consistently associated with low MDA acceptability, no information about the MDA and other factors that would suggest that an individual has been missed or refused to participate. *Think about your own health participation*. If someone asked you today how many times you taken the influenza (flu) vaccine for example, you may struggle to remember exactly how many times, especially if you received it more than once. However, you are more likely to remember that you had never received it. The never treatment questions should be used to give a signal to a programme that never treatment may be important and needs to be further investigated and acted upon.

There are several reasons why understanding never treatment is important.

First, never treatment may impede the elimination targets outlined in the 2021–2030 NTD road map, which rely on sustained high coverage of MDA. Never treated individuals may serve as reservoirs for ongoing transmission and or recrudescence in some settings, thereby representing a barrier towards elimination *(4,5)*. This is particularly important if those never treated individuals are not a random selection of the population but are socially or geographically clustered. Below are some examples of clusters of never treated individuals:

- People living in neighbourhoods where there is poor geographical allocation of drug distributors, insecurity or political differences.
- Group of nomads who move frequently throughout the year.
- Ethnic or religious groups who are left out of routine health services due to discrimination or who refuse based on religious norms or traditional beliefs.

A group of people who can act as a potential reservoir is of greater concern than individuals who miss for a variety of reasons (e.g. the pregnant woman, as illustrated in Fig. 3) and who are isolated cases within a neighbourhood where MDA coverage was relatively high.

Second, in some settings, we know that never treated individuals are also more likely to be infected. This has been shown in LF-endemic areas where never treated individuals are shown to be microfilaria positive *(3,9,32)*. Due to the relationship of never treatment to other factors like baseline prevalence, drug regimen and overall coverage, this finding is not consistent across all settings *(25,33–35)*. However, we can conclude that never treatment is a possible signal for an individual's higher risk of infection. Therefore, never treatment represents not only inequity in MDA delivery but also injustice for people left out of receiving free medicines, as infected individuals may develop chronic manifestations of LF later in life *(36)*.

Finally, addressing never treatment responds directly to the Sustainable Development Goals' central transformative promise to leave no one behind. To achieve this promise, the goals outline the steps needed to ensure there is equity in health interventions like MDA *(37)*. These steps include:

- identifying who is being left behind and why;
- identifying effective measures to address root causes;
- monitoring and measuring progress; and
- ensuring accountability for leaving no one behind.

This toolkit follows these steps to guide national programmes and partners to identify never treatment and provide a programmatic response.

1.3.1 Impact of never treatment on programmatic goals

To understand the impact of never treatment on NTD elimination programmes, the NTD Modelling Consortium used mathematical modelling across different scenarios for LF and SCH *(4,5)*. The models suggested that higher never treatment levels increase the required number of MDA rounds needed to achieve the programme's objective. This effect is stronger in high-endemic settings than in low-endemic settings. Some models are presented below, with additional models available in Annex 3.

As indicated in Fig. 4a, the LF transmission model demonstrates that, in areas with anopheline transmission and an albendazole and ivermectin drug regimen, the higher the percentage of never treatment (indicated as a percentage on the left under the heading NT), the stronger its impact in terms of the additional number of years of MDA required to reach LF elimination as a public health problem. Coverage levels in the columns represent coverage of eligible population. Fig. 4b represents a similar model for scenarios like those in India, where there is culicine transmission and a regimen of ivermectin, diethylcarbamazine (DEC) and albendazole (IDA) is used.

Fig. 4a. Required number of annual MDA rounds to reach the 1% baseline Mf prevalence threshold, anopheline areas

		MDA coverage among eligible age groups		
Baseline Mf prevalence	**NT**	**65%**	**80%**	**90%**
10%	0%	8.5	6.5	5.5
	1%	8.5	6.5	5.5
	5%	9.5	7.5	6.5
	10%	11	9.5	7.8
	15%	12.5	11.5	
	20%	14.5	13.5	
	25%	16.5		
	30%	21		
	35%	21		
20%	0%	10.5	8.5	8
	1%	10.5	9.5	8
	5%	14.5	11.5	10.5
	10%	16.5	15.5	13
	15%	20	19	
	20%	21	21	
	25%	21		
	30%	21		
	35%	21		
30%	0%	12.5	9.5	9
	1%	12.5	10.5	9
	5%	16.5	14.5	13.5
	10%	21	21	18.5
	15%	21	21	
	20%	21	21	
	25%	21		
	30%	21		
	35%	21		

Mf: microfilaraemia; NT: never treatment.

Note: Shaded areas = the 1% baseline mf prevalence threshold achieved within 10 years (green), 10–20 years (orange) or > 20 years (red); grey areas = scenarios not possible to simulate.

Source: Adapted with permission from *(5)*.

Fig. 4b. Required number of annual MDA rounds to reach the 1% baseline Mf prevalence prevalence threshold, culicine areas

		MDA coverage among eligible age groups		
Baseline Mf prevalence	**NT**	**65%**	**80%**	**90%**
5%	0%	2.5	2	1
	1%	2.5	2	1
	5%	3	2	1
	10%	4	2.5	1
	15%	6	4	
	20%	8	6	
	25%	10.5		
	30%	15		
	35%	16		
10%	0%	3	2	2
	1%	3	2.5	2
	5%	5	3	2
	10%	7	6.5	5.5
	15%	9.5	9	
	20%	12.5	10.5	
	25%	16		
	30%	19		
	35%	19		

Mf: microfilaraemia; NT: never treatment.

Note: Shaded areas = the 1% Baseline mf prevalence threshold achieved within 10 years (green), 10–20 years (orange), or > 20 years (red); grey areas = scenarios not possible to simulate.

Source: Adapted with permission from *(5)*.

Note that the analysis for LF in Fig. 4a and 4b may underestimate the true impact of never treatment because it assumes that the never treated individuals are a random selection of the total population.

For more details on modelling, see Annex 3.

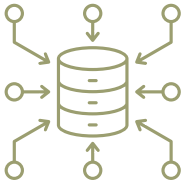
Chapter 1 conclusions

- Never treatment is an issue of inequity, revealing where programmes are not effective in their reach and approach and where unforeseen context-specific issues may impact the delivery of MDA (conflict, migration, climate change events).
- Never treatment may be an important contributor to low coverage in a programme. Never treated individuals may also continue to be infected and infective. Thus, never treatment may represent the reason behind persistence or recrudescence of transmission.
- While there are a variety of reasons why people may be never treated, it is important to understand both the intentional and unintentional reasons for never treatment and the extent to which never treated individuals are clustered.
- The number of MDA rounds required to reach elimination of LF as a public health problem increases with higher levels of never treatment. Similar modelling for schistosomiasis *(4)* and onchocerciasis [personal communication, Wilma Stolk, 2024] has revealed comparable trends.
- The impact of never treatment on elimination varies depending upon baseline prevalence, drug regimen used, vector, geographical clustering and overall coverage.
- Clustering (or non-random distribution) of never treatment in the population may be potential reservoirs of infection and is more important than random distribution of never treatment for programmatic action and elimination goals. Clustering of never treatment can lead to pockets of residual transmission within larger areas that are free of infection, forming a source from which infection can be reintroduced in the surrounding areas.
- Never treatment is highly context specific. Programmes can expect levels to vary within districts, subdistricts, and even within cities.

2.
Assessing never treatment through routine programmatic tools

This chapter describes the routine programmatic tools, e.g. supervisor's coverage tool (SCT), coverage evaluation surveys (CES) and LF epidemiological monitoring surveys (EMS), which can be used to collect data on never treatment (Table 2). Programmes can add questions to these tools to collect data on never treatment, measure its change over time and identify areas where programmatic action should address never treatment. These same questions can be added to various population-based household surveys, such as trachoma impact surveys (TIS) and onchocerciasis epidemiological surveys. While these surveys might target different sample populations, they can provide opportunities to ask others in the household questions about NTD treatment status. Depending on the tool or survey, data can be collected from a supervision area, from an implementation unit (IU) which is the area in which MDA occurs, or from an evaluation unit (EU) which is the area used for epidemiological surveys.

In addition to the above routine programmatic tools, national programmes can take advantage of other opportunities to add the never treatment questions to routine data collection. For example, in India, independent monitors visit several thousand houses (10 houses per village, covering four villages per day for 3 days per district) to collect MDA data. Primary research in endemic areas also can include the never treated questions in surveys and qualitative research, as can research related to hard-to-reach populations. Embedding the never treatment questions into different research and programmatic tools will aid the NTD programme to see if there is a potential challenge in treatment that requires a response.



National programmes can take advantage of other opportunities to add the never treatment questions to routine data collection.

Table 2. Assessing never treatment, by routine programmatic tools

Tool	What diseases	When implemented	Sampling method	Sample size
SCT	LF, OV, SCH, STH, trachoma	During MDA	Random selection of households, interview with 1 person per household	20 people per supervision area (subdistrict)
CES	LF, OV, SCH, STH, trachoma	Within 6 months after MDA	Sites chosen using probability proportionate to estimated size. Segments of ~50 households chosen from each site. Set fraction of households chosen per site.	> 500 people in 30 sites in an IU
EMS	LF	After the appropriate number of MDA rounds	Purposeful selection of at least two sites per EU; random selection of households	300 adults per site
Other household surveys	LF, OV, SCH, STH, trachoma	Varies	Varies	Varies

CES: coverage evaluation survey; EMS: epidemiological monitoring survey; EU: evaluation unit; IU: implementation unit; LF: lymphatic filariasis; MDA: mass drug administration; OV: onchocerciasis; SCH: schistosomiasis; SCT: supervisor's coverage tool; STH: soil-transmitted helminthiases.

The never treated question:

Including this year, how many times have you taken medicine for {enter the NTD}?

a) Never

b) One time

c) Two or more times

When are modifications to this question recommended?

- If using this question in EMS, there may not have been an MDA within the last year. If that is the case, then delete "including this year" from the question.
- If using this question in SCT, the survey takes place while MDA is ongoing or immediately afterwards. The question can be modified to say "Including this current MDA, …"
- If the translation into the local language needs precision, e.g. where "taken" does not mean "swallowed". In those cases, it is recommended to use "swallowed".
- Depending on the medicine formulation used, context and local language, "pills", "tablets", "medicine", or "drugs" might be most appropriate to use in the question.
- It is not recommended to add other responses to this question. For example, it is not recommended to add "I don't know" or "I don't remember" as responses as they cannot be easily interpreted.
- It is not recommended to add a time period, e.g. "in the last five years" to this question. Respondents struggle to remember their participation within a certain time frame, leading to response bias.

Follow-on question, "when":

For those who answer "one time", a follow-on question could be asked: *When did you take the medicine for {enter the NTD}?*

Response categories: {*enter the month/year of last MDA round*}, 2–5 years ago, more than 5 years ago

Respondents should be able to remember the time period in which they took the medicine, but not the exact year; thus, these categories are recommended. This information could be helpful to understand the impact of those treated more than 5 years ago, especially when collected along with information on infection status.

Follow-on question, "why":

For those who answer "never", a follow-on single-answer question could be asked: *What is the primary reason you have never taken the medicine for {enter the NTD}?*

Response categories: Absent during MDA, drug distributor did not come, side-effects/adverse events, ineligible, did not know about MDA, medicine not available/out of stock, other reasons.

When asking why individuals never took the drug, a programme might want to add additional reasons depending on the context. For example, in areas with security concerns, a response option might be "my area was too insecure for MDA".

When analysing the data, it is important to remember that the reasons for never being treated are likely to be multiple and might change over time.

Follow-on question, "how":

For those who answer "never", an open-ended question on "*What changes to the MDA would cause you to participate in it in the future?*" also could be asked to generate information on how MDA might be improved.

2.1 What training should be done when including never treatment questions in a survey?

Training agendas should be revised to ensure time for discussion of the never treatment indicators. It is important to reach consensus with surveyors during the training on appropriate translation of the never treatment questions and response options into the local language(s). This should also include referring to the disease of interest by the local or slang name, if one exists. The medicines used for MDA and dose poles, if used in MDA, should be available and shown to respondents to ensure respondents know what type of MDA is being referred to, especially in places with multiple MDA programmes for different diseases.

Adding a role play to survey training that explores asking survey participants about previous treatment, especially soliciting answers about why participants were never treated, is useful to improve the survey flow and help enumerators understand how to probe for responses. This role play could include examples of different answer scenarios, such as 'I don't know" or "I wasn't aware" and how enumerators could respond.

In addition, survey team supervisors should be trained to check to ensure teams are asking never treatment questions of the appropriate people at the household level and if the questions are well probed.

2.2 Assessing never treatment through the SCT

2.2.1 What is the SCT?

The SCT is a rapid monitoring tool that can be used to assess drug coverage during, at the end of, or immediately following a round of MDA. It does not provide statistically valid estimates of drug coverage. The tool is designed to be used by first-level supervisors to identify areas with inadequate coverage in real-time to direct activities to improve coverage during the ongoing round of MDA. The SCT is implemented by supervisors who interview 20 randomly selected individuals per supervision area. A supervision area is the catchment area corresponding to the first-level MDA supervisors. The aim of the SCT is to see if those interviewed were offered the drugs and if they ingested the drugs. If coverage is inadequate or if supervisors cannot determine if coverage is good, an action plan is then developed and implemented immediately.

The SCT is a rapid monitoring tool that can be used to assess drug coverage during, at the end of, or immediately following a round of MDA.

The responses to the never treatment questions from one or more SCT may still be informative by providing qualitative insight into who is never treated and potential reasons for never treatment.

2.2.3 How should data be collected on the never treated in SCT?

When should never treatment questions be included in the SCT?

A question on never treatment should be included in the SCT in places that have experienced at least three rounds of MDA. If fewer rounds have been delivered, it would not be uncommon to find people who are never treated, even if coverage was above the target threshold for each round. It is particularly important to include the never treatment questions in areas where the SCT is being conducted in response to persistent or recrudescent transmission, e.g. where an EMS, transmission assessment survey (TAS), TIS or trachoma surveillance survey (TSS) has failed.

Who should be asked about never treatment in the SCT?

It is simplest to ask the never treatment question of every survey respondent; however, special consideration should be given to including/excluding children in the analysis. For example, if the selected respondent is 6 years old, they may have only had one previous MDA in which they were eligible for MDAs which deliver ivermectin. Consequently, observing never treatment in young children is not an automatic indication of a problem. In addition, young children might not remember the name of the medicine or the indication for it.

Where in the SCT questionnaire should never treatment questions be asked?

The challenge for the SCT, which is often paper based, is fitting the questionnaire onto a single page; if electronic data collection is used, incorporating the never treatment questions should be straightforward and the analysis of never treatment information much easier. An example of a paper-based reporting form is included in Annex 4.

2.2.4 How should data be analysed on the never treated in the SCT?

As with coverage data collected in the SCT, the SCT does not provide a statistically valid estimate of the proportion never treated in the supervision area. Moreover, since there is not yet a target threshold for the never treatment indicator, the results will not currently be used to classify the level of never treatment as “good” or “inadequate”. Additionally, since never treatment questions are posed within an SCT that typically takes place part way through an MDA campaign (for example, on day 3 of 6 of an MDA), the responses to the never treatment question may change by the end of the campaign after mop-up takes place.

Nonetheless, the responses to the never treatment questions from one or more SCT may still be informative by providing qualitative insight into who is never treated and potential reasons for never treatment. These insights can lead programmes to prioritize actions and further investigate how to strengthen MDA. For example, knowing that all those individuals in a supervisory area who did not receive drugs in the current MDA are also never treated might help programme staff to better advocate for mop up with local officials.

At what level should results be analysed?

Results should be reviewed by supervision area. Annex 5 provides information about what to do when a programme would like to review results of SCTs conducted in multiple supervision areas.

What indicators should be used?

The following are indicators which can be analysed from a SCT.

- Number of respondents who were never treated
- Proportion (%) of respondents who were never treated
- Number of respondents who were treated only once
- Proportion (%) of respondents who were treated only once

Because sample size is small, disaggregation of individual SCT results is not recommended.

2.3 Assessing never treatment through CES

2.3.1 What are CES?

CES are valuable tools for evaluating NTD programme performance in relation to MDA. Coverage evaluations are population-based surveys designed to provide independent survey-based estimates of PC coverage to validate reported coverage obtained during MDA. While typically regarded as a tool for triangulating PC reported coverage, the uses for CES extend beyond the estimation of treatment levels, potentially including:

- Measuring coverage in specific demographic groups or special populations
- Identifying geographical locations that are undertreated
- Providing an opportunity for measuring target population attributes
- Identifying reasons for non-treatment in the current round
- Understanding effectiveness of social mobilization efforts
- Understanding how to improve MDA from beneficiaries

CES are useful in IUs with known coverage challenges and in areas that have had unsatisfactory results in previous epidemiological surveys, such as EMS, TAS, TIS or OV surveys, and further MDAs are required. For specific methods for designing, collecting and analysing CES data, see the WHO publication *(7)*.

Identifying the magnitude of never treatment and the characteristics of people who report being never treated may help direct an appropriate programme response. When a CES is being conducted in response to a school-based MDA (e.g. for SCH or STH), it is still useful to add the never treatment questions; however, it may not make sense to include all ages in the analysis, given that some younger age groups might not have had the opportunity to be treated in prior years.

2.3.2 Why should data be collected on never treatment in CES?

CES provide an opportunity for NTD programmes to estimate the prevalence of never treatment in the sampled population, while also permitting further understanding of the underlying factors that may be driving it. Adding two or three questions related to never treatment represents a minimal additional cost to the programmes, with the potential for adding benefit.

2.3.3 How should data be collected on never treatment in CES?

When should never treatment questions be included in CES?

Programmes are encouraged to always include a question on never treatment whenever a coverage survey is conducted. It is particularly important to include the never treatment questions in areas where CES is being conducted in response to an epidemiological survey failure, as those who are never treated may be more likely to harbour infection and perpetuate residual transmission. Identifying the magnitude of never treatment and the characteristics of people who report being never treated may help direct an appropriate programme response. When a CES is being conducted in response to a school-based MDA (e.g. for SCH or STH), it is still useful to add the never treatment questions; however, it may not make sense to include all ages in the analysis, given that some younger age groups might not have had the opportunity to be treated in prior years.

Who should be asked about never treatment in a CES?

Most CES for NTDs are conducted at the household level and the questionnaire is asked of every person in the household, regardless of age. However, often those aged under 5 or 10 years are included by proxy, i.e. by having their primary caregivers respond on their behalf. In addition, if a household member is not home at the time of the visit and cannot be reached on a repeat visit or by phone, a proxy response is often given by another household member.

Previous analyses have found that individuals responding via proxy can have significantly different responses with respect to MDA coverage compared to self-reporting individuals *(38)*; however, no published research has examined the reliability of proxy responses with regards to questions of never treatment. For simplicity's sake, it is recommended that never treatment questions be restricted to self-respondents only.

Where in the questionnaire should the never treatment questions be asked?

Annex 4 of *Preventive chemotherapy: tools for improving the quality of reported data and information. A field manual for implementation* includes a sample CES questionnaire with knowledge, attitude and practice questions *(7)*. Sometimes, a CES will stop asking questions of respondents who claim they have not been treated. But it is precisely this population on which more information is desired to better understand their characteristics. Therefore, it is recommended to ask further questions about never treatment following the never treatment question itself to facilitate gathering additional information on the never treated population.

Comparing the observed vs expected rate of never treatment

Overall, the never treatment questions will be most informative in places that have experienced at least three rounds of MDA. Where fewer than three rounds of MDA have been delivered, the prevalence of never treatment may be high even if effective coverage has been achieved. Consequently, it is important to consider the number of rounds that have been delivered in the IU when interpreting never treatment data from a CES.

For example, after only a single round of MDA at 85% coverage the never treatment level may be 15%, but observing the same level of 15% never treatment after seven rounds of similar coverage, would indicate that there are major systematic obstacles to treatment in a subgroup of the population. Programmes can operationalize this by comparing the *expected* proportion of never treated with that observed in the CES, under the assumption that missed treatments occur at random. The expected proportion of never treatment after *n* rounds of MDA can be crudely calculated as follows:

$$\text{Expected proportion of never treatment} = [1\text{-coverage}_{MDA1}] \times [1\text{-coverage}_{MDA2}] \times \ldots \times [1\text{-coverage}_{MDAn}]$$

The crude estimate of the "expected proportion of never treatment" is based on the prevalence of non-coverage at each round of MDA and assumes that people who are treated in one round are not more nor less likely to be treated in the other rounds, i.e. that there are no barriers that systematically prevent treatment in certain people or groups. If the observed proportion of never treatment from the CES is greater than the expected proportion of never treatment, it suggests that some of the same people are routinely being missed and follow-up action is likely needed.

Example: Consider examples from two settings. In both settings a CES is conducted and the observed proportion never treated is 5%.

First setting

- *MDA coverage*: Three rounds of MDA with 55%, 60% and 70% coverage
- *Expected proportion of never treatment*: (1–0.55) x (1–0.6) x (1–0.70) = 5.4%
- *Recommendation*: Observed level is similar to expected level, indicating no major systemic barriers to treatment. Further rounds of MDA are likely to further reduce proportion of people never treatment.

Second setting

- *MDA coverage*: Six rounds of MDA with 70%, 75%, 75%, 80%, 80%, and 85% coverage
- *Expected proportion of never treatment*: (1–0.7) x (1–0.75) x (1–0.75) x (1–0.8) x (1–0.8) x (1–0.85) = 0.01%.
- *Recommendation*: The observed level of never treatment is higher than the expected level, indicating a subgroup of the population (around 5%) is consistently not being treated. Despite the high overall level of coverage in each round, additional rounds of MDA may not be able to reach the population that has never been treated unless steps are taken to understand the underlying reasons for never treatment and adapt the MDA accordingly.

Overall, the analysis needs to be considered carefully in relation to younger age groups.

2.3.4 How should data be analysed on the never treated in the CES?

What groups should be excluded from the analysis?

Overall, the analysis needs to be considered carefully in relation to younger age groups. Most children will not be asked the never treatment questions because someone is responding on their behalf. However, in surveys where children above a certain age answer survey questions themselves, limiting the analysis to those children that have had the opportunity to participate in at least three rounds of MDA is recommended.

At what level should results be analysed?

A CES will generate an overall prevalence of never treatment for the geographical area included in the survey. However, there also is value in analysing data from each of the sampled clusters (typically villages) independently. While the sample size within each cluster will rarely be sufficient to produce independent cluster-level estimates with great precision, it is helpful to look at how never treatment varies between clusters to make sure it is not excessively uneven. For instance, one could produce bar charts for each cluster in relation to proportion never treated. Such analyses can help NTD programmes understand whether any challenges with never treatment are focal, e.g. due to CDD or population characteristics, or if never treatment is more widespread and indicative of broader delivery or messaging challenges.

Finally, it might be of interest to analyse the never treated population by geography in terms of accessibility (i.e. remoteness) of the cluster in which they are situated, to see if the never treated individuals are located in areas that are chronically missed by drug distributors. Such analyses can easily be undertaken using global positioning system (GPS) coordinates of the never treated population and plotting results on a map to facilitate a visual understanding of the location of the never treated population.

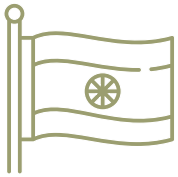
According to the CES protocol, if no-one is present in a house, the survey team leaves and moves on to the next house. However, research has shown that those missing the CES may also more likely to be missed in the MDA, therefore overestimating MDA coverage *(39)*. If low coverage or never treatment is suspected in an area, it may be worthwhile for the study teams to record the number of houses visited with no one present (e.g. skipped during the CES) and target these households along with those reporting never treatment, during any mop-up or future MDA activities.

What indicators should be used?

The following represents a non-exhaustive list of indicators which can be explored in a CES. Disaggregation can point to potential population groups or geographical areas for further investigation.

- Number of respondents who were never treated;
- Proportion (%) of respondents who were never treated, both the overall proportion and disaggregated by:
  - » age group (< 10, 10–19, ≥ 20 years),
  - » gender,
  - » age and gender (e.g. adult males), and
  - » other optional demographic characteristics included in the questionnaire (e.g. religion, education level, ethnicity, household wealth, urban/rural, school attendance);

- Number of respondents who were treated only once; and
- Proportion (%) of respondents who were treated only once, both the overall proportion and disaggregated by:
  - » age group (< 10, 10–19, ≥ 20 years),
  - » gender,
  - » age and gender (e.g. adult males),
  - » time of treatment (most recent MDA, 2–5 years ago, more than 5 years ago), and
  - » other optional demographic characteristics included in the questionnaire (e.g. religion, language, education level, ethnicity, household wealth, urban/rural, school attendance).



Surveys similar to EMS also can be used to collect never treatment information. For example, in India, an annual Mf survey is conducted in two sites in all IUs. This survey provides an additional opportunity to collect information on individuals who have never been treated.

2.4 Assessing never treatment through LF EMS

2.4.1 What are EMS?

EMS – previously called pre-transmission assessment surveys or pre-TAS – are implemented after at least five rounds of two-drug LF MDA or two rounds with the IDA three-drug regimen, each with ≥ 65% epidemiological coverage *(8)*. EMS are conducted in at least two sites per evaluation unit, usually one sentinel and one spot-check site. A sentinel site is a community or similar geographical area selected for periodic collection of parasitological data to monitor the success of a programme. The same site is maintained throughout the programme, until the level of infection is below target thresholds. A spot-check site is a site considered to be at greatest risk for LF infection, is selected for each assessment, and can change over the course of the programme.

From 2011 to 2023, WHO recommended conveniently sampling approximately 300 people aged 5 years and older per site, using tests to detect microfilaraemia (Mf) or filarial antigen (Ag) *(40)*. In 2024, WHO updated its guidance to recommend randomly sampling 300 people aged 20 years and older per site, using rapid diagnostic tests (RDTs) for Ag in areas endemic for *W. bancrofti* followed by Mf testing on Ag-positive people if possible *(8)*. In areas endemic for *Brugia* spp., Mf testing of all participants is still recommended. If results are below the target threshold of 2% Ag-positivity or 1% Mf in each site, the survey has "passed".

If EMS results are below the target threshold, a TAS or IDA impact survey (IIS) should be implemented, which is used to decide whether to stop MDA. If TAS or IIS results are above the target threshold, WHO recommends implementing two additional rounds of MDA. Survey results above the target threshold can occur for different reasons, including low MDA coverage among certain populations.

Surveys similar to EMS also can be used to collect never treatment information. For example, in India, an annual Mf survey is conducted in two sites in all IUs. This survey provides an additional opportunity to collect information on individuals who have never been treated.

2.4.2 Why should data be collected on the never treated in EMS?

Never treatment comes with a risk of disease to individuals and transmission to the community, jeopardizing efforts to eliminate LF as a public health problem. Data collection should identify sub-populations and geographical areas with levels of never treatment that need to be further investigated to improve future rounds of MDA. In addition, collecting data on never treatment can help answer the question of how never treated individuals are contributing to ongoing transmission by analysing the association between past treatment history and infection status.

2.4.3 How should data be collected on never treatment in EMS?

EMS includes a short questionnaire with name, age, gender, address and test results, which can be modified to include the never treatment questions. Many national programmes already include questions about treatment in previous MDA in their EMS.

When should never treatment questions be included in EMS?

Never treatment questions should *always* be included whenever an EMS is repeated after prior pre-TAS or EMS failure or after a TAS or IIS failure. However, they can be included in all EMS.

Who should be asked the never treatment questions?

Everyone participating in the EMS should be asked the never treatment questions.

Where in the questionnaire should the never treatment questions be asked?

The never treatment questions could be asked during survey registration, after collecting a participant's name, gender, age and address. If a programme hypothesizes that never treatment might be linked to a specific demographic category not already captured (e.g. religion, education level, ethnicity), those demographic questions could also be added to the EMS questionnaire. A sample EMS paper-based questionnaire is included in Annex 6.

More than one enumerator might be needed to speed up the registration process. If people have trouble remembering their past treatment, answering the questions about never treatment might take more time for enumerators to probe for responses.

2.4.4 How should data on never treatment be analysed from EMS?

The EMS can show that never treatment might be a problem in a specific geographical area or sub-population; however, further investigation will probably be required to determine how best to improve MDA to reach the never treated.

At what level should results be analysed?

Results should be analysed by site, which is usually a village or community, to identify sites with low coverage or high never treatment. Previous data reviews have shown that never treatment can vary greatly among sites, even within a single EU. However, results also can be analysed at different geographical levels, such as national or regional, depending on the purpose of the analysis.

For example, data can be aggregated across sites at country level to analyse trends and specific indicators, particularly the proportion of microfilaria- or antigen-positive people who were never treated.

What indicators should be used?

The following represents a list of indicators which can be explored in an EMS. Disaggregation can point to potential population groups or geographical areas for further investigation.

- Number and proportion (%) of respondents who were Mf- or Ag-positive, both overall and disaggregated by:
  - » treatment status (never treated, treated once, treated two or more times);
- Number and proportion (%) of respondents who were never treated, both overall and disaggregated by:
  - » gender,
  - » other optional demographic characteristics included in the questionnaire (e.g. occupation, religion, education level, ethnicity), and
  - » Mf/Ag test result (positive/negative); and
- Number and proportion (%) of respondents who were treated only once, both overall and disaggregated by:
  - » gender,
  - » time of treatment (most recent MDA, 2–5 years ago, more than 5 years ago),
  - » other optional demographic characteristics included in the questionnaire (e.g. occupation, religion, education level, ethnicity), and
  - » Mf/Ag test result (positive/negative).

Linking treatment and infection

One advantage of adding questions about never treatment to an EMS is that a programme can explore whether there is an association between treatment status and infection status. Having coverage, never treatment, and infection data for the same survey respondents provides a more complete picture to guide MDA improvements and other interventions. For example, if never treatment is associated with infection, this data can be used by local community leaders and drug distributors to advocate to those who have been resistant to taking the drugs or to develop new strategies to reach those who have been missed by drug distributors.

How should data be analysed over time?

Most EUs will only implement one EMS, passing it and moving on to TAS or IIS implementation. However, some EUs with EMS failure will implement many surveys over time. It is important to ensure consistency across EMS implementation, in terms of never treatment questions used and how data are collected, to compare across time points at the same site. If a programme has used a slightly different question to ask about historical MDA treatment in past surveys, it can continue to use the same question to compare over time.

In addition, programmes which collected never treatment data previously from pre-TAS might have included results from respondents aged 5 years and older. For purposes of comparison, when analysing data previously collected in pre-TAS and comparing them to current data collecting in EMS, it is recommended to include only data from respondents aged 20 years and older.

How should data be presented or visualized?

Below are examples of how data from two EUs could be analysed and presented. Table 3 shows treatment status at the site level. Tables 4 and 5 compare the prevalence of infection indicators between people who report being treated in zero, one, or two or more rounds of MDA.

In the example given in Table 3, the proportion never treated is higher in the sentinel site of EU1 and the spot-check site 1 in EU2 than in other sites. In Tables 4 and 5, the proportions of people Ag- and Mf-positive are also higher at these sites. Together these suggest that an investigation into the causes of never treatment at these two sites may be appropriate. The proportions of Ag- and Mf-positivity were also found to be higher in people who reported never being treated (Tables 4 and 5). This information could be used in advocacy to those hesitant to participate in MDA because they believe they are not at risk.

Table 3. Number and proportion of EMS respondents, by treatment status and site

EU	Site	Total sampled	# (%) never treated	# (%) treated once	# (%) treated two or more times
EU1	SS: Sentinel site 1	300	10 (3.3)	20 (6.7)	270 (90.0)
	SC1: Spot-check site 1	300	1 (0.3)	10 (3.3)	289 (96.3)
EU2	SC1: Spot-check site 1	300	20 (6.7)	50 (16.7)	230 (76.7)
	SC2: Spot-check site 2	300	0 (0.0)	10 (3.3)	290 (96.7)

SC: spot-check site; SS: sentinel site.

Table 4. Treatment status of EMS respondents, by Ag status and site

EU	Site	Total sampled		Never treated^		Treated once^		Treated two or more times^	
		# (%) Ag+	# (%) Ag-	# (%) Ag+	# (%) Ag-	# (%) Ag+	# (%) Ag-	# (%) Ag+	# (%) Ag-
EU1	SS: Sentinel site 1	5 (1.7)	295 (98.3)	4 (40)	6 (60)	1 (5)	19 (95)	0 (0)	270 (100)
	SC: Spot-check site 1	0 (0)	300 (100)	0 (0)	1 (100)	0 (0)	10 (100)	0 (0)	289 (100)
EU2	SC: Spot-check site 1	10 (3.3)	290 (96.7)	8 (40)	12 (60)	2 (4)	48 (96)	0 (0)	230 (100)
	SC: Spot-check site 2	1 (0.3)	299 (99.7)	0 (0)	0 (0)	1 (10)	9 (90)	0 (0)	290 (100)

Ag: antigen; SC: spot-check site; SS: sentinel site.

^ Percentages in each treatment status should equal 100.

Table 5. Treatment status of EMS respondents, by Mf status and site

EU	Site	Total sampled		Never treated^		Treated once^		Treated two or more times^	
		# (%) Mf+	# (%) Mf-	# (%) Mf+	# (%) Mf-	# (%) Mf+	# (%) Mf-	# (%) Mf+	# (%) Mf-
EU1	SS: Sentinel site 1	4 (1.3)	296 (98.6)	2 (20)	8 (80)	2 (10)	18 (90)	0 (0)	270 (100)
	SC: Spot-check site 1	0 (0)	300 (100)	0 (0)	1 (100)	0 (0)	10 (100)	0 (0)	289 (100)
EU2	SC: Spot-check site 1	5 (1.7)	295 (98.3)	3 (15)	17 (85)	2 (4)	48 (96)	0 (0)	230 (100)
	SC: Spot-check site 2	1 (0.3)	299 (99.7)	0 (0)	0 (0)	1 (10)	9 (90)	0 (0)	290 (100)

Mf: microfilariae; SC: spot-check site; SS: sentinel site.

^ Percentages in each treatment status should equal 100.

2.5 Assessing never treatment through other household-based surveys

While these surveys might sample different age groups than useful for collection of never treatment data, the household visit provides an opportunity to ask the head of household and/or other members questions about never treatment.

2.5.1 What are other household-based surveys?

Many NTD and other health programmes monitor progress towards control or elimination through household surveys. These surveys are often population-based surveys designed to provide precise estimates of disease prevalence. For example, TIS and trachoma surveillance surveys (TSS) are household-based stop-MDA and post-MDA surveillance surveys that collect data from people aged 1 year and older. The OV programme also recommends population-based surveys for stopping MDA and post-MDA surveillance; these surveys measure disease prevalence in children aged 5–9 years. While these surveys might sample different age groups than useful for collection of never treatment data, the household visit provides an opportunity to ask the head of household and/or other members questions about never treatment. Outside of NTD programmes, there may be population-based health surveys which offer opportunities to include the NTD never treatment questions as part of general health coverage data.

2.5.2 Why should data be collected on never treatment in household-based surveys?

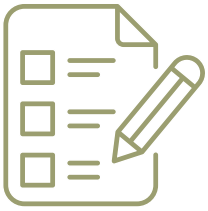
These surveys provide an opportunity for NTD programmes to estimate the prevalence of never treatment in the sampled population, while also permitting further understanding of the underlying factors that may be driving it. Adding two or three questions related to never treatment represents a minimal additional cost to the programmes, with the potential for adding benefit.

2.5.3 How should data be collected on never treatment in household-based surveys?

When should never treatment questions be included in household-based surveys?

Programmes are encouraged to include a question on never treatment if a household-based survey is being conducted in an area where there is concern about never treatment. This can cross diseases, e.g. if a TIS is conducted in an area with concern about OV MDA implementation, never treatment questions about OV MDA could be added to the TIS. In this case, training should emphasize how to appropriately explain to survey participants to ensure they understand the never treatment questions are being asked about a different disease. To minimize confusion, survey teams should carry examples of the pills and the timeline of treatment and ask the disease-specific questions separately.

Who should be asked about never treatment in a household-based survey?



Most household-based surveys include a set of questions that are asked of the head of household. In this case, the head of household can also be asked the never treatment questions for community-based MDA.

Alternatively, each person in the household could be asked the questions, following the approach in the CES section above. As in the CES section, survey teams should attempt to get first-hand (self-report) responses from individuals regarding their treatment status. If only a proxy response is available, never treated questions should not be asked of that respondent.

Where in the questionnaire should the never treatment questions be asked?

Each survey has slightly different questionnaires. If the questionnaire already includes questions on MDA participation, it is recommended to add the never treatment questions directly following. For surveys where only the head of household is included, the never treatment questions can be added after the introductory questions have been asked.

2.5.4 How should data on never treatment be analysed from household-based surveys?

What groups should be excluded from the analysis?

Overall, the analysis needs to be considered carefully in relation to younger age groups. For instance, those aged under 5 years may be excluded from the analysis for areas where ivermectin and albendazole are co-administered, as they have no expectation of having been treated either currently or in prior MDAs. Additionally, for 6-year-old individuals, in a scenario where there have been five MDAs in the past 5 years, there is an expectation that they can only have been treated at most once. In the case of SCH and STH where MDA is school based, limiting the never treated analysis to SAC that have had the opportunity to participate in at least three rounds of MDA is recommended.

At what level should results be analysed?

Most household-based disease prevalence surveys can generate an overall prevalence of never treatment for the geographical area included in the survey. However, there also is value in reviewing data from each of the sampled clusters independently. While the sample size within each cluster will rarely be sufficient to produce independent cluster-level estimates with great precision, it may be helpful to explore how never treatment varies between clusters across the evaluation unit being surveyed. Such review may help NTD programmes understand whether any challenges with never treatment are focal (e.g. due to CDD or population characteristics) or if never treatment is more widespread and indicative of broader delivery or messaging challenges.

What indicators should be used?

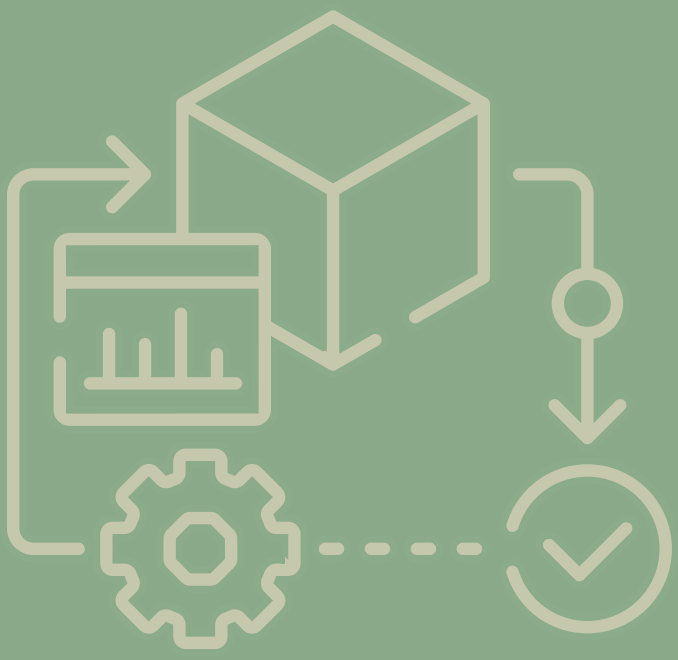
The following represents a non-exhaustive list of indicators which can be explored in a household-based survey. Disaggregation may point to potential population groups or geographical areas for further investigation.

- Number and proportion (%) of respondents who were never treated, both overall and disaggregated by:
  - » age group (< 10, 10-19, ≥ 20 years),
  - » gender,
  - » age and gender, and
  - » other optional demographic characteristics included in the questionnaire (e.g. religion, education level, ethnicity, household wealth, urban/rural, school attendance); and
- Number and proportion (%) of respondents who were treated only once, both overall and disaggregated by:
  - » age group (< 10, 10–19, ≥ 20 years),
  - » gender,
  - » age and gender,
  - » time of treatment (most recent MDA, 2–5 years ago, more than 5 years ago), and
  - » other optional demographic characteristics included in the questionnaire (e.g. religion, language, education level, ethnicity, household wealth, urban/rural, school attendance).

Chapter 2 conclusions

- Incorporating the never treatment questions into routine monitoring activities offers an opportunity to detect levels of never treatment at different time points of the elimination programme.
- Use the recommended questions for never treatment in these tools (SCT, CES, EMS) each time they are used.
- Consider adding the question to population-based household surveys for other NTD or other health programmes.
- Be aware of the strengths and limitations of each of the tool's methodologies when interpreting the findings.

3.
Interpreting and using the data to make decisions



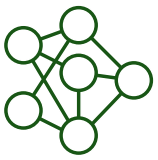
3.1 Introduction

Never treatment data help to understand the effectiveness and equity of an MDA programme; they serve as a measure of assessment to understand whether an MDA programme is functioning well or needs to be strengthened. Perhaps the never treatment data collected during routine programmatic assessments has indicated that there are people who were never treated in a particular geographical area. How does a programme interpret the data to know if action to address it is warranted? What level of never treatment is acceptable and when is action required to strengthen the programme? Should a programme be concerned that people who miss MDA may also miss the evaluation?

There is no single never treatment threshold above which corrective action is always required, as the epidemiological impact of never treatment depends on the disease of interest, at which stage in the programme never treatment was assessed, local transmission conditions, and the extent to which never treatment is clustered sociologically or geographically. However, from the perspective of "leaving no one behind", any level of never treatment should be explored further. Triangulation of available data and potentially further investigation should be done to better understand who are never treated and how best to improve MDA to reach the never treated. This could include collection of qualitative data from never treated individuals, drug distributors, supervisors, and community members (see Chapter 5). This is especially true if never treatment clusters in specific population subgroups, as it implies that these groups are underserved. This alone may be sufficient reason to trigger action. It is therefore important to consider never treatment within the broader programmatic context and to consider information from multiple sources to define whether corrective action is needed.

Programme actions to consider include targeted mop-up, improved drug distributor training and microplanning to ensure MDA is conducted at the optimal time of day and year, development of a new social mobilization strategy and targeted messaging to reach specific population groups (see Chapter 4).

This chapter outlines the steps a national programme can take to review the data and make decisions about never treatment.



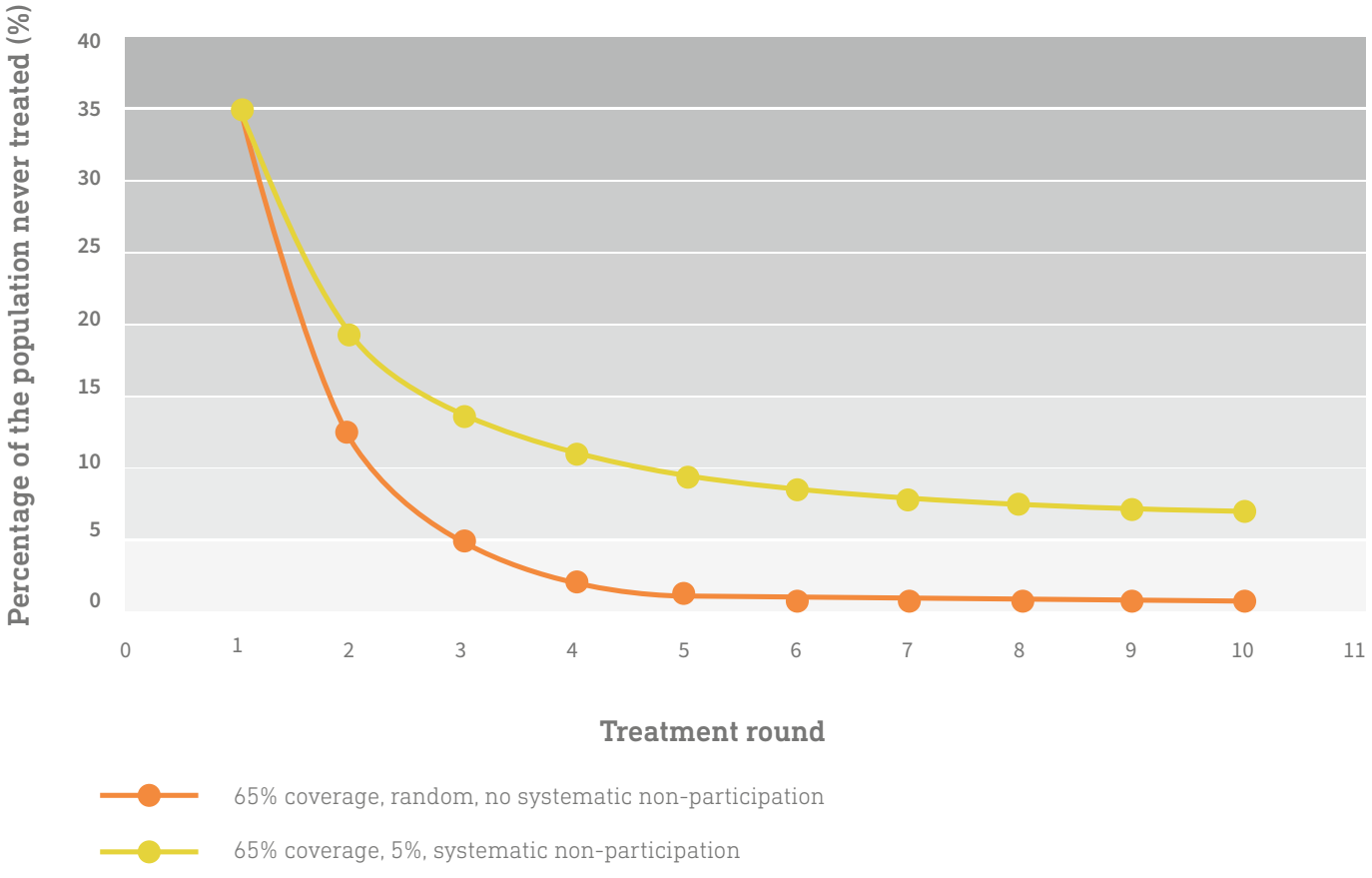
How does a programme interpret the data to know if action to address it is warranted? What level of never treatment is acceptable and when is action required to strengthen the programme? Should a programme be concerned that people who miss MDA may also miss the evaluation?

3.2 Interpreting never treatment data for decision-making

3.2.1 Trends in never treatment over time

To understand the potential impact of never treatment, it is important to know in what round the data were collected, as never treatment is expected to decline over time, at least in the first few years of an MDA programme. This point is illustrated in Fig. 5 for an annual treatment programme which reaches 65% of the eligible population per treatment round. The grey line, predicted by a model of MDA participation *(5)*, assumes that 5% of the population will systematically never participate in MDA over time. After the first round, 35% of the eligible population is never treated, i.e. 100% minus the treatment coverage of 65%. Some of those not treated in round one will be included in subsequent rounds, leading to a gradual decline in the proportion of those never treated towards the assumed 5% never treatment in the long run. In this case, additional rounds would not necessarily reduce the rate if there was no purposeful effort to address never treatment. For comparison, the orange line, obtained with the formula given in Annex 3, shows expected trends if treatment occurs fully at random. In the latter situation, 65% of the population is randomly selected in each round for treatment and all or nearly all people will be treated at least once after five treatment rounds.

Fig. 5. Proportion of the all-time eligible population that has never been treated over time



Source: Adapted with permission from *(5)*.

3.2.3 What level of never treatment is acceptable?

At present, while there is no agreed threshold for acceptable levels of never treatment, it is important for a programme to determine what level of never treatment is acceptable given its specific context. Before the review of data and exploration begins, NTD programmes can consider the maturity of the programme (number of years of MDA implemented), the setting and strategies (vector, drug regimen), the resources available to address never treatment, and programmatic goals (control versus elimination). It is recognized that there will always be people who will refuse to participate in MDA across all rounds, who will be missed across all rounds or who may be ineligible for treatment across all rounds. Therefore, some level of never treatment is expected.

In interpreting never treatment data, programmes should be aware that:

- With never treatment levels of 10%, the required number of treatment rounds for achieving programmatic goals often increases with a factor 1.5–2.5, as compared to a situation with minimal level of never treatment (1%).
- A higher percentage of never treatment entails a higher risk of systematically missing socially or geographically defined subgroups in the population, which is unacceptable from a leave-no-one-behind perspective.

3.2.4 Triangulating data

NTD programmes have access to a large amount of data, including routine programmatic assessments of coverage and disease prevalence, training records and operational research outputs, among others. If an area has found people never treated in one of the routine assessments, the programme should explore all available data and decide on a response.

The Guide to improving MDA using qualitative methods provides guidance on how to conduct a desk review of existing information, guided by 10 questions (see Box) and what data sources to include. The desk review can provide additional information about the community or area where never treatment levels were detected and the effectiveness and execution of MDA. The desk review data should be triangulated with the routine programmatic assessments to provide a more robust understanding of the never treatment signal detected. In addition, the second (2025) edition of the WHO LF M&E manual includes a chapter on how to respond to survey events above threshold, including questionnaires to explore why prevalence is persisting or recurring and how MDA can be strengthened *(8)*.

3.2.5 Decision tree on never treatment

Once the data on never treatment has been compiled and reviewed, programmes will need to decide on whether to act to address never treatment or whether to continue to monitor levels of never treatment.

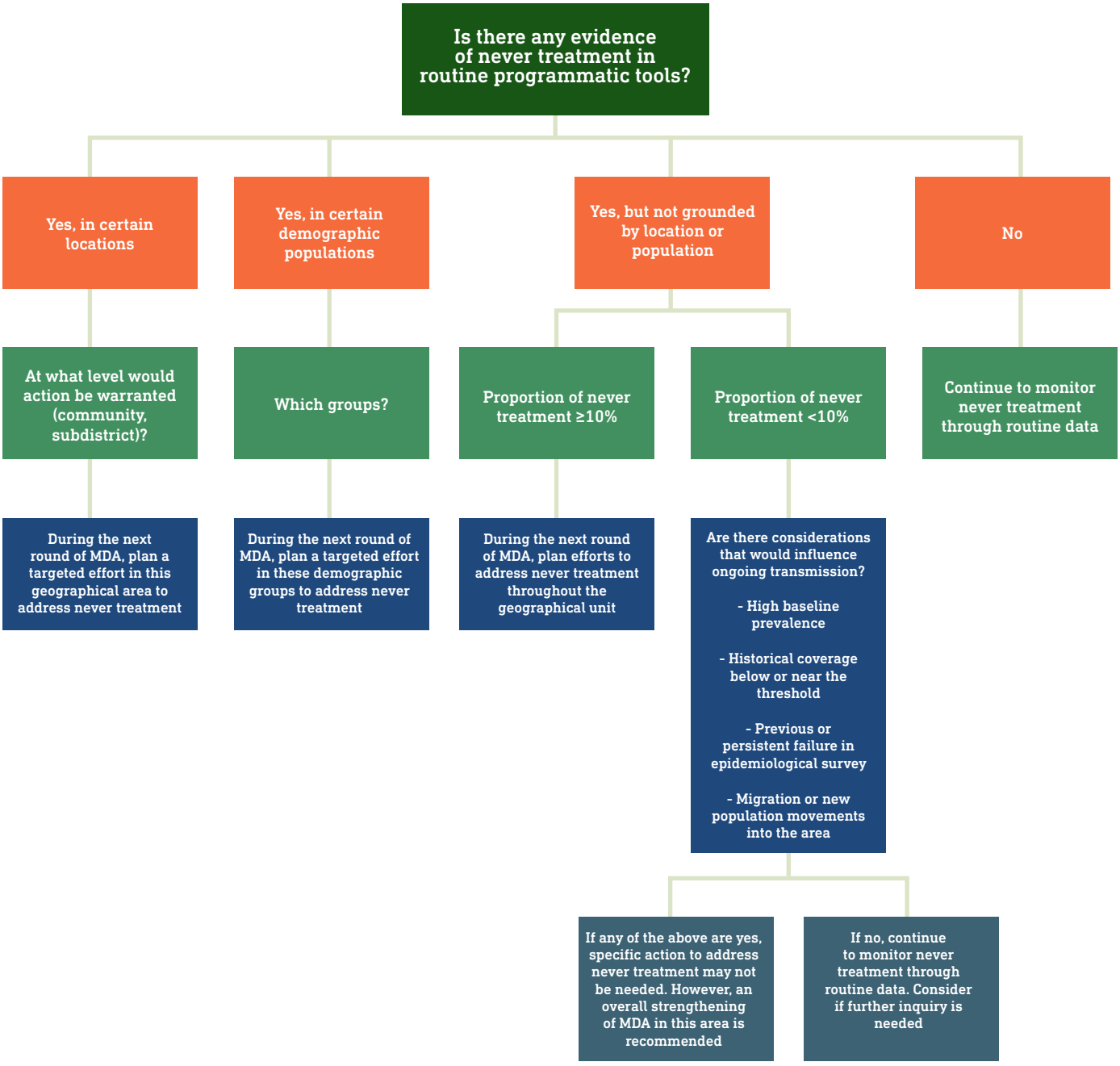
Fig. 6 outlines some of the key questions that programmes can ask as they decide about never treatment. It does not represent all the questions that could be asked, so locally specific contextual questions can be added where appropriate. As mentioned above, although there is not a specific threshold of never treatment to trigger action, when never treatment levels exceed 10%, modelling suggests the number of treatment rounds needed to achieve elimination will increase. The decision tree (Fig. 6) will guide discussion on whether further action is required.

10 QUESTIONS TO GUIDE DESK REVIEW

1. What was the reported coverage at the district and subdistrict levels?
2. How do the reported results compare with the coverage targets? If the results are lower than the targets, why?
3. How do the results for coverage and never treatment compare with previous years?
4. Are the results the same everywhere, or are there geographical differences between or within districts? If there are differences, what could be causing them (e.g. urban versus rural settings, migrant populations, insecurity, or large changes in the size of the population)?
5. Are there differences in results by type of population (e.g. men vs women, age, differences among different ethnic groups or socioeconomic groups, people with disabilities)? Are there geographically isolated populations or areas, e.g. prisons, military bases, closed communities, migrants?
6. Do data from different sources lead to the same conclusions? Is there evidence of never treatment from different sources?
7. Were MDA preferred practices, such as directly observed treatment, supportive supervision or targeted social mobilization, adhered to?
8. Was implementation of MDA different this year, compared with previous years?
9. What were some of the recent implementation challenges affecting this area?
10. What are the knowledge gaps related to low coverage and never treatment?

Source: Adapted with permission from *(41).*

Fig. 6. Decision tree to help interpret never treatment data



MDA: mass drug administration.

Table 6 illustrates the rationale behind the decision tree and provides some additional questions for consideration.

Table 6. Questions to consider when taking action on never treatment

Primary question	Sub-questions	Rationale
1. Is never treated thought to be non-random, e.g. clustered or localized?	• If yes, where are the pockets of never treatment detected? • At what level would action be warranted, e.g. neighbourhood, community, or subdistrict?	If never treatment is random, then it is less likely to be an issue for programme success. However, if the proportion of never treatment is ≥ 10%, the entire MDA in that geographical area (community, subdistrict, district) needs to be reviewed for improvement. If never treatment is clustered, there is a great chance of impact to the programme. Consider where levels of never treatment are detected and isolate to the lowest level (neighbourhood or community). What makes this population different? Why are they more likely to be never treated? What has worked for other programmes in these areas?
2. Was baseline prevalence of disease considered to be high?	• When was the disease prevalence last measured? • Since then, if the disease is vector borne, have there been significant public health measures in place (bed net campaigns, housing improvements, water, and sanitation improvements) that would decrease exposure to the vector? • Since then, if the disease is vector borne, have there been major climate events that would increase exposure to the vector?	If some of the past MDA rounds showed effective coverage or improved coverage over time, then it is likely that disease prevalence has reduced since baseline. Baseline disease prevalence may have been high in an area, but if it was measured a long time ago, then the local context may have changed so that people have increased or decreased exposure to vectors. Review the modelling figures in Chapter 1 or Annex 3 for additional interpretation.
3. Was MDA coverage historically below or near the threshold of effective coverage?	• How was coverage measured? • Was coverage validated? • Is the denominator (population size) accurate? • Do distributors practice directly observed therapy? • Is MDA supervised? How? • Is there a history of coverage-compliance gap?	Investigate what is known about the coverage data. How reliable is the data? What is known about how MDA was carried out? Has there been a change to the budget or funding support to MDA?

Table 6. Questions to consider when taking action on never treatment (Cont'd)

Primary question	Sub-questions	Rationale
4. Was there previous or persistent failure in epidemiological surveys?	• When was the last assessment carried out?	If epidemiological survey results have not met thresholds to stop MDA, can never treatment data be connected to infection data? If so, are the never treated individuals more likely to be infected?
5. Is there a history of migration or new population movements into the area?	• If yes, where did these populations originate from? • Do new populations come from endemic areas with a history of low MDA coverage? • Are the new populations stigmatized or marginalized by the local population? Are they excluded from routine health services provided by the primary health care centres?	With regional conflicts, severe climate events and economic migration, an influx of people into an endemic area may provide a new susceptible population or if untreated, may increase risk of transmission. Local health authorities may be slow to address the health needs of migrating peoples. Drug orders for MDA may not account for the increase in population to the area. People migrating may have a history of never treatment or poor participation in MDA and risk lowering MDA coverage in their new area.

3.2.6 Prioritizing action

The Guide to improving MDA using qualitative methods (41) provides an analysis framework template (adapted below in Table 7) which can help programmes to prioritize action. This framework guides the process to identify what actions must be taken to address never treatment. By focusing on what the current situation is (e.g. in the Table 7 example, economic migrants are never treated), the programme can determine the aim to address that current situation and outline the steps to get there (actions).

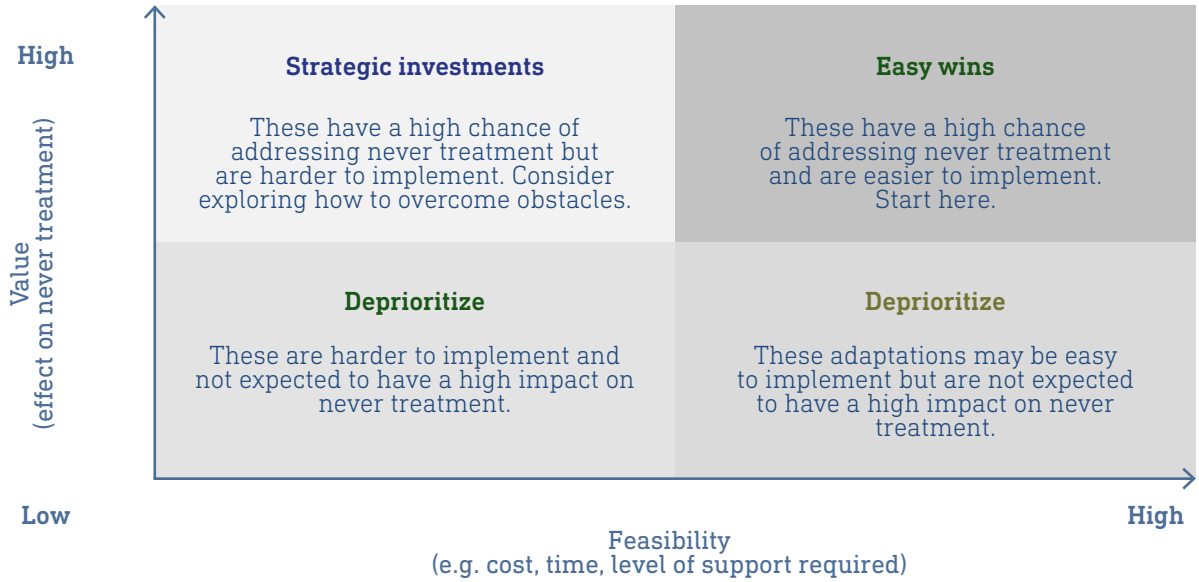
Table 7. Analysis framework template to prioritize MDA strengthening actions

Theme	Sub-theme	Where are we today? (current status)	Where do we want to be next? (aim)	How will we get there? (actions)
Migrant workers are more likely to be never treated in subdistrict A where they travel for seasonal work.	Timing of the MDA	Economic migrants (mostly young men) miss MDA because they travel for work during the dry season, missing the regularly scheduled MDA in their home communities. They are not counted by the health authorities in subdistrict A as they are not full-time residents.	Provide avenues for migrant men to be treated; options may be (i) to include migrant men in the MDA during the dry season in subdistrict A; or (ii) to ensure treatments are left in the primary health care centres for mop-up in communities where migrant workers come from.	Include migrant men in the MDA in the dry season, accounting for the increased need for MDA drugs. Request permission from companies/ bosses to carry out MDA in migrant worker sites. Implement awareness training with health care workers on the importance of treating migrant men.
	Men do not think they are at risk of the disease.	Most migrant men have little understanding of the disease but are concerned about their families.	Men understand their risk and how taking treatment helps protect their families.	District Health Office liaises with companies to hold information evening sessions, focused on importance of health, MDA and protecting families. Carry out intensive social mobilization activities through multiple channels. Discuss findings with communities and people involved to agree how to address the situation – participatory action planning.

MDA: mass drug administration.

Following this exercise, the value versus feasibility matrix shown in Fig. 7 can help to prioritize those actions which are best to address never treatment. Review the list of actions in the column in Table 7 and consider where they would fit in Fig. 7. This activity is best done in a group setting.

Fig. 7. Feasibility and value matrix



Source: Adapted with permission from *(41)*.

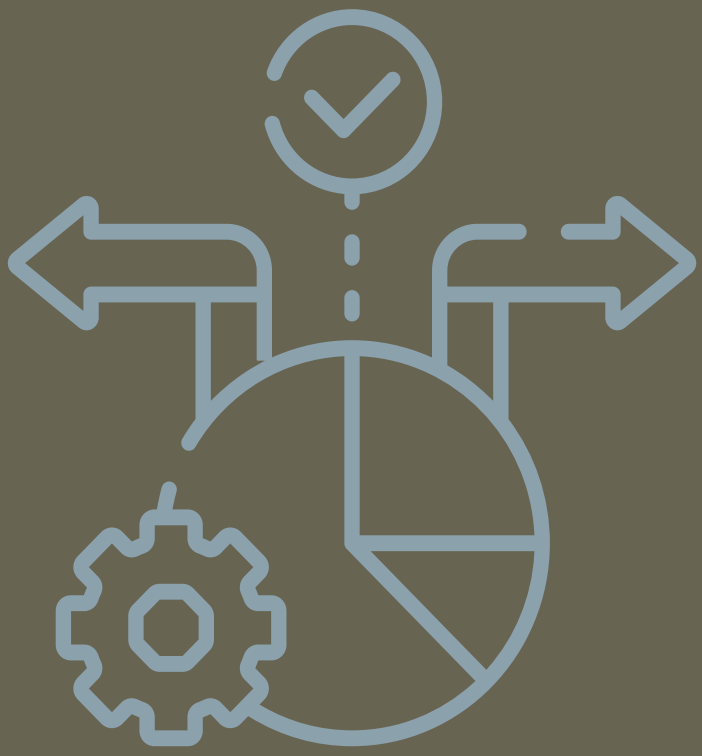
Building on the example of migrant men: the health ministry may have a good working relationship with factory owners in this region and so reaching out to them to provide education sessions for migrant men and a workplace MDA may be a strategic investment (high value and low feasibility). As such, this activity should be prioritized. In this example, using TV spots may sensitize men about the upcoming MDA and the importance of participation; however, TV spots are expensive to produce and to air on local stations and it is not clear that migrant men have access to televisions. This action should be deprioritized because of its high feasibility costs and low expected impact on never treatment.

Determining the action areas to reduce never treatment in migrant men should ideally include the men themselves, CDDs, health care workers serving those communities, and/or factory owners. These individuals can help to identify which actions will have the greatest impact to reduce never treatment and can speak to the feasibility of the action within that community.

Chapter 3 conclusions

- There is no acceptable threshold for never treatment; however, at 10% never treatment, the required number of MDA rounds for achieving programmatic goals often increases with a factor 1.5–2.5, as compared to a situation with a minimal level of never treatment (1%).
- There will always be a certain level of never treatment in a population. It is important to understand who the never treated population is, if they are clustered in some way (geography, ethnicity, sex, age, etc.), if they have been tied to increased rates of infection, and if they are new to the endemic area (from a non-endemic area).
- The decision tree can aid programmes in interpreting the data they have from routine programmatic assessments where the never treatment question has been added.
- If a decision has been made to address never treatment in a certain population group, it is important to prioritize which actions will have the greatest effect. The value-feasibility matrix is a helpful tool.
- Decisions on action to address never treatment are best done in a group setting so that varied perspectives can be explored. Ideally members of the population group where never treatment is detected should be included in the discussions

4.
What interventions can be implemented to address never treatment?



Review the case studies at the end of the toolkit to see how never treatment has been addressed in different countries and contexts.

Once programmes have identified a signal of never treatment as described in Chapters 2 and 3, what happens next? How do they respond to never treatment? Chapter 4 describes some approaches that have been used to address never treatment in different contexts. NTD programmes should consider the following points when deciding how to address never treatment.

First, be strategic in choosing adaptations that are feasible to implement within currently available resources and timeframes and have the greatest potential to affect outcomes for never treated populations.

Second, some adaptations to the MDA programme to address never treatment may require additional training time or training materials, changes in implementation protocols or scope, or other logistical support or aids to implement adequately. It is therefore imperative to appropriately document each adaptation, including identifying:

- what problem the adaptation hopes to solve,
- needed programme inputs,
- a feasible timeline for implementation, and
- roles and responsibilities for each aspect of implementation.

Third, the scope and scale of implementation should be documented, including:

- will the intervention adaptation be implemented as a pilot in certain areas?
- will it be rolled out in stages across areas requiring MDA?
- will the adaptation be a new standard of practice in all implementation units?

Fourth, the timing of the interventions depends on the specific setting, the disease of interest and the availability of funding to support the activities. If, for example, migration is determined to be a major cause for never treatment in an IU, the interventions should be planned when the target group of interest is most likely to be present. As such an understanding of the social, demographic and cultural context is of importance when implementing interventions to address never treatment. Projects such as COUNTDOWN have developed resources to help understand the local context and increase reach of NTD MDA campaigns, such as the *Participatory guide for planning equitable mass administration of medicines to tackle NTDs (42)*.

Finally, the strategy should detail a realistic vision for how the adaptations will affect MDA outputs and outcomes, if successful. While surveys will help programmes evaluate progress towards impact, programmes also need monitoring and evaluation data to understand how adaptations are contributing to fewer never treated individuals and to greater coverage. For example, if reporting issues have delayed a timely response to implementation challenges in the past, how are adaptations increasing the completion, timeliness, and accuracy of MDA reporting? How is the programme ensuring timely payments to CDDs and that all medicines are available before the start of MDA? Are the adaptations meant to increase awareness of MDA or reach a larger proportion of remote or insecure locations which would then lead to better reach and coverage among never treated populations?

This chapter includes a sample of interventions that have been tested to respond to never treatment in different settings (Table 8). They can be adapted to specific contexts and diseases.

Table 8. Various interventions tested to respond to never treatment

Name of intervention	Implementers	Level of effort
Inclusion of never treatment into microplanning	CDDs, first-level supervisors, implementation-unit supervisors and national programme staff	High first year Lower in subsequent years
Flowchart for CDDs to identify and respond to never treatment during MDA	CDDs	Low
Motivational communication to respond to never treatment during MDA	CDDs and supervisors	Medium
Review of MDA registers to identify and treat those never treated	CDDs, community health nurses, NTD programme staff	High

CDD: community drug distributor; MDA: mass drug administration, NTD: neglected tropical disease.

4.1 Incorporation of never treatment into microplanning

4.1.1 What is the intervention?

Microplanning uses a bottom-up approach to reach target populations during MDA. It is a cyclical process used to define the activities, resources, timing, and location of implementation and monitoring of MDA. This strategy can be particularly helpful at identifying which areas or communities of individuals are never treated and to create culturally-appropriate strategies to encourage participation in MDA. Microplanning is conducted at the level of the first-line supervisor or supervision area, but it includes support and supervision from the IU-level supervisor.

Community mapping

The first step in microplanning is preparing operational maps of each supervisory area. This will allow first-level supervisors to select the best strategy for MDA. Maps should include the location and quantity of any pockets of hard-to-reach or hard-to-treat populations including never treated populations. Details on preparing maps can be found on pages 13–15 in the WHO (2022) microplanning manual referenced below.

Considerations for special populations

Inherent in microplanning is the identification of hard-to-reach and hard-to-treat populations and the development of special distribution channels to reach these populations. During microplanning, stakeholders are engaged to better understand the most effective and acceptable drug distribution approach for these populations. Similarly, community drug distributors are engaged to better understand why some community members may refuse to participate in MDA.

Stakeholders can also be engaged during MDA and mop-up to encourage community members to participate in MDA. Feedback of never treatment data to local policy-makers, field programme officers, CDDs, and community representatives is critical. The microplanning meeting can include a focused discussion to determine how to address never treatment, depending on the specific reasons for never treatment, such as geographical constraints, religious beliefs, etc.

4.1.2 Who is using the intervention?

CDDs, first-level supervisors, IU supervisors and national programme staff all take part in microplanning. Community representatives and NGO representatives are often invited as well.

4.1.3 When is the intervention implemented?

Microplanning should begin at the national and subnational levels with training approximately 6 months prior to MDA (Fig. 8). Training of supervisory area level teams on how to implement microplanning should begin approximately 4 months prior to MDA to support the preparation of microplans at a health-facility level. These lowest level microplans should be done 3 months before MDA.

Microplanning is a cyclical process that should be repeated annually where resources allow.

Fig. 8. Timing of microplanning

MDA: mass drug administration.

4.1.4 What training is required for the intervention?

Training should be conducted at the supervisory-area-level and IU-level. WHO provides modules for microplanning training at the WHO Academy; these modules include preparing an operational map, estimating target populations, defining approaches to reach target populations, planning the activities, calculating resources and defining logistics, and monitoring coverage and taking actions.

4.1.5. What resources are needed for the intervention?

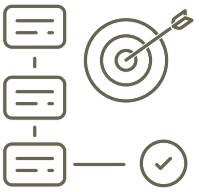
Microplanning can be resource intensive and therefore should be prioritized in areas with consistently low drug coverage, evidence of never treated populations, or where a survey has failed, e.g. prevalence has not declined beneath the disease-specific threshold required to stop MDA.

The first year of microplanning requires substantial effort to make accurate maps, compile and analyse historical data, and decide on targeted social mobilization and drug distribution improvements. However, each subsequent year may require less effort to update existing microplans.

4.1.6 Additional resources

Microplanning to guide implementation of preventive chemotherapy to control and eliminate neglected tropical diseases. In: WHO Academy [Courses]; 2024 (https://whoacademy.org/coursewares/course-v1:WHOAcademy-Hosted+H0023EN+H0023EN_Q3_2024?source=edX, accessed 24 October 2025).

World Health Organization and Pan American Health Organization. Microplanning manual to guide implementation of preventive chemotherapy to control and eliminate neglected tropical diseases. Geneva; 2022 (https://iris.who.int/handle/10665/362214).



Microplanning can be resource intensive and therefore should be prioritized in areas with consistently low drug coverage, evidence of never treated populations, or where a survey has failed, e.g. prevalence has not declined beneath the disease-specific threshold required to stop MDA.

4.2 CDD flowchart to identify and respond to never treatment during MDA

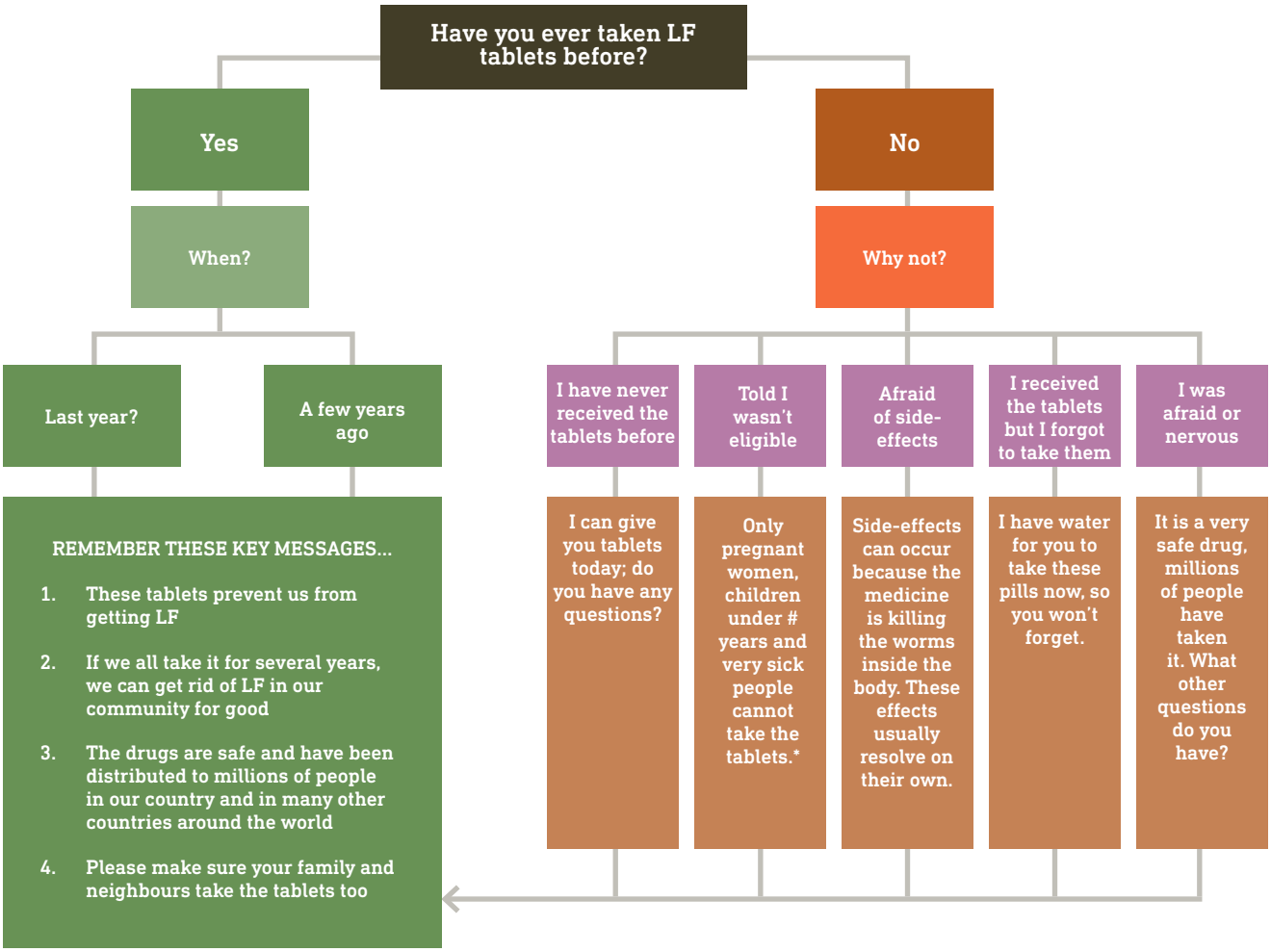
4.2.1 What is the intervention?

Fig. 9 describes a simple flowchart that CDDs can use while distributing MDA. When working in the community, CDDs frequently know who has taken the treatment in the past and where there are individuals who have refused or who have been missed. This flowchart serves three purposes: (i) it reminds CDDs of the importance of never treatment; (ii) it helps CDDs identify never treated individuals as they carry out the distribution, and (iii) it guides CDDs through possible responses to community members' questions to encourage treatment uptake.

Upon reaching the household, CDDs can lead with the question, "Have you ever taken medicine for {*insert NTD*} before or this during MDA?". If the respondent answers "no", the CDD is directed to a series of further prompts to assist with persuasive messages to encourage the uptake of MDA medicines.

The flowchart should be adapted to incorporate some of the common reasons for never treatment in the local context, if known. Besides the reasons in the chart below, other common reasons are: "I am healthy", "I am taking other medications", or "Nobody in my family takes this medicine". To respond to community members' questions, CDDs should be polite, use simple responses, and not be afraid to refer community members to other resources or their supervisors if they do not know the answer. Intervention 4.3 can be used in tandem with this if more resources on motivational communication are required. The flowchart can also provide resources for CDDs if community members have additional questions, such as a hotline or website.

Fig. 9. CDD never treatment flowchart, example for LF MDA



*Specify lowest age for eligibility depending on context.

LF: lymphatic filariasis.

4.2.2 Who is using the intervention?

CDDs are responsible for implementing the intervention. The flowchart can be developed by the national programme or by the regional or district programmes.

4.2.3 When is the intervention implemented?

The intervention can be used during social mobilisation before MDA and during drug distribution itself.

4.2.4 What training is required for the intervention?

Minimal training is required. It can be incorporated into existing CDD refreshing training. Review of the flowchart content and advice on its use should take less than an hour. For maximum effect in the training, use of role plays helps to solidify the communication skills and use of the flowchart. If using role plays, it is recommended to plan for one hour in the training schedule. The iCHORDS CDD Role Play guide provides examples and guidance on conducting role plays.

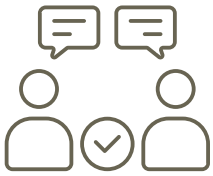
4.2.5 What resources are needed for the intervention?

The cost of the intervention is low. It includes photocopies of the flowchart and lamination of the sheets if funds allow. The level of effort to implement also is low as the existing human resources and training time are already in place for the MDA. As they use the flowchart regularly, CDDs should become accustomed to asking the initial question, "Have you ever taken medicines for {*insert NTD*}?" so that it should not add significant additional time to the MDA delivery.

4.2.6 Additional resources

The community drug distributor's role-play guide. Decatur (GA): iCHORDS; 2023 (https://www.ichords.org/wp-content/uploads/2025/01/CDD-Role-Play-Guide-2.pdf, accessed 24 October 2025).

Krentel A, Damayanti R, Titaley CR, Suharno N, Bradley M, Lynam T. Improving coverage and compliance in mass drug administration for the elimination of LF in two 'endgame' districts in Indonesia using micronarrative surveys. PLoS Negl Trop Dis. 2016;10(11):e0005027 (https://doi.org/10.1371/journal.pntd.0005027).



Motivational communication is a proven strategy – using empathy, respect, and a deeper understanding of individual perspectives – to motivate people to engage in behaviours to improve health outcomes.

4.3 Reaching never treated individuals through motivational communication

4.3.1 What is the intervention?

Conversations between NTD programme representatives (e.g. CDDs, health workers, disease control officers) and prospective participants are a key influence on decision-making regarding MDA participation. Research has shown that effective conversations with CDDs were key in motivating people previously never treated to participate in MDA [Lee Wilkers, personal communication, 2024]. These exchanges at doorsteps and distribution posts are where trust is established, concerns are addressed and the value of participation is effectively communicated. The challenge is how to motivate potentially disinterested individuals to participate during these interactions in a timely manner, given that drug distribution needs to be efficient to reach everyone in the allotted time frame.

Motivational communication is a proven strategy – using empathy, respect, and a deeper understanding of individual perspectives – to motivate people to engage in behaviours to improve health outcomes *(43,44)*. Motivational communication allows prospective MDA participants to feel acknowledged and heard. Positive rapport during these challenging conversations can have a positive influence on individuals' overall experience, increasing the likelihood of future participation even if they choose not to take the medication at the current visit.

Below are two motivational communication job aids that can be edited based on the local context. Table 9 is based on the OARS model, which stands for Open-ended questions, Affirmations, Reflective listening, and Summarizing. Table 10 provides examples of responses to common never treated scenarios in LF MDA. These job aids aim to provide prompts to improve the quality of brief conversations between NTD programme personnel and prospective MDA participants during social mobilization or drug distribution.

Table 9. The OARS model motivational communication job aid

OARS skill		Description	Examples
O	Open-ended questions	Open-ended questions invite others to tell their story in their own words without leading them in a specific direction and should be used often in conversation.	"Can you tell me about your previous experiences with the MDA campaign?"
A	Affirmations	Affirmations are verbal statements and physical gestures that recognize an individual's strengths and acknowledge behaviours that lead in the direction of positive change, no matter how big or small. Affirmations build confidence in one's ability to change, though must be delivered with skill and sincerity so that they are not perceived as rote, or at worst, patronizing.	"I can tell from our conversation that you clearly care very much about the health of your family. That is a great quality."
R	Reflective listening	Reflective listening involves the CDD echoing or paraphrasing the individual's remarks demonstrating understanding and validating their feelings. This encourages further discussion and helps the individual feel heard. Use the individual's own words and phrases where possible.	"I hear that you have concerns about potential side-effects based on a bad experience. Let's talk about that."
S	Summarizing	Summarizing consolidates the conversation's main points, validates the individual's concerns, and sets the stage for the next steps in the discussion.	"From our discussion today, I understand your main concerns are about the potential side-effects and the effectiveness of the treatment. Let's address these points."

CDD: community drug distributor; MDA: mass drug administration.

Table 10. Example OARS responses to common concerns

OARS skill	Fear of side-effects	Bad previous experiences	LF not a priority	Too many pills
Open-ended questions	"Could you share more about your worries regarding the side-effects?"	"I understand that you had a bad experience in the past. Could you share more about what happened?"	"It seems like LF prevention isn't at the top of your list right now. Could you tell me more about your other health priorities?"	"I noticed you mentioned the number of pills. Could you tell me more about your concerns?"
Affirmations	"I appreciate why you would be cautious. It's important to know what you are putting into your body."	"Your past experiences are important and can shape how we view things. I appreciate you sharing that with me."	"You clearly have a good understanding of your health needs and priorities. That's really important."	"It's understandable to be concerned about taking too many pills. Your safety is important."
Reflective listening	"So it sounds like you are specifically concerned about fatigue and not being able to go to work?"	"It sounds like your past experience was quite negative, and it has left you feeling hesitant about participating again."	"It sounds like you have other health concerns like diabetes and hypertension that you feel need more attention right now."	"It sounds like the number of pills is a bit overwhelming for you. That's a common concern."
Summarizing	"So, it seems your main worry is about potential side-effects. Let's discuss how we can address this concern."	"From our conversation, it seems your past experience wasn't positive, and it is affecting your decision. Let's see how we can make this time better."	"You've shared that there are other health issues you are more concerned about right now. Let's discuss how LF prevention fits into the bigger picture of health."	"You've expressed concern about the number of pills. Let's talk about why that specific number is recommended and how we can make it more manageable for you."

LF: lymphatic filariasis.

4.3.2 Who is using the intervention?

CDDs and supervisors are responsible for implementing the intervention.

4.3.3 When is the intervention implemented?

The cyclical nature of programmes offers multiple opportunities to apply motivational communication, with the most significant occurring during drug distribution and mop-up activities.

4.3.4 What training is required for the intervention?

The strategic integration of motivational communication within MDA programmes should not be overwhelming but it does require structured training for effective application. CDDs and their supervisors need to be equipped with effective conversational tools to encourage participation.

Training does not need to be overly complex, but it is more resource intensive than training for the CDD flowchart, as in section 4.2. It should begin with a basic understanding of the principles of motivational communication and how these principles can be used to facilitate meaningful conversations, address hesitations, and enhance the effectiveness of key messages (see section 4.2 for examples of integrating key messages into dialogue). Experiential learning, such as role-playing, is also a vital part of the training. This enables CDDs to apply their theoretical knowledge in a practical setting, learning how to ask open-ended questions, provide affirmations, listen reflectively and summarize discussions effectively. Regular feedback sessions are also key to the training process, providing an opportunity to review and refine communication skills.

4.3.5 What resources are needed for the intervention?

An additional full day for training for CDDs and supervisors would be useful to implement the motivational communication appropriately during MDA. CDDs will likely spend more time in conversations as they are implementing social mobilization or drug distribution, so more time will be needed to complete MDA.

4.3.6 Additional resources

The OARS model: essential communication skills. Salem (NY): Center for Health Training; 2010 (https://rhntc.org/sites/default/files/resources/rhntc_oars_model_job_aid_12-20-2021.pdf, accessed 21 November 2025).

Motivational interviewing pocket guide. Newark (NJ): MidAtlantic AIDS Education and Training Center Program; 2019 (https://www.maaetc.org/files/attachment/attachment/2670/MAAETC-%20Motivational_Interviewing2018.pdf, accessed 16 June 2025).

The effective physician: motivational interviewing demonstration. In: MerloLab [YouTube channel]. (https://www.youtube.com/watch?v=URiKA7CKtfc, accessed 16 June 2025).

Hall K, Gibbie T, Lubman DI. Motivational interviewing techniques: facilitating behaviour change in the general practice setting. Aust Fam Physician. 2012;41(9):660–7 (https://pubmed.ncbi.nlm.nih.gov/22962639/).

Wodnik BK, Louis DH, Joseph M, Wilkers LT, Landskroener, SD, Desir L, et al. The roles of stakeholder experience and organizational learning in declining mass drug administration coverage for lymphatic filariasis in Port-au-Prince, Haiti: a case study. PLoS Negl Trop Dis. 2020;14(5):e0008318 (https://pubmed.ncbi.nlm.nih.gov/32469860/).

4.4 Review of MDA registers to identify and treat those never treated

4.4.1 What is the intervention?

Reviewing MDA registers may constitute an approach to address never treatment by identifying, engaging, and treating individuals who have seldom or never taken part in an MDA. In some countries, LF MDA activities rely on community registers used mainly for the collection and reporting of treatment coverage data, including information on 3–5 rounds of treatment *(24,45)*. These registers also detail the names, age, gender of community members and their history of participation in MDA. The use of the MDA registers can be explored to offer treatment to those community members who have not been part of the MDA in an IU where never treatment is of concern. Through the MDA registers all never treated individuals can be approached by the CDD, engaged on the need to take the MDA drugs and, if they agree, treated according to the MDA guidelines. Programmes also should be prepared to monitor for and treat side-effects. If resources allow, testing of the never treated individuals can be incorporated in these activities, to demonstrate the presence or exposure to infection and assess the prevalence rates in these individuals. The use of the MDA registers in identifying never treated individuals may also enable an understanding of the reasons for never treatment, assessment of the levels of infection among the never treated population (if resources to conduct testing are available), improvement in treatment through MDA, and improvement of the overall treatment coverage. Where MDA registers are not used, other forms of information may be adopted. Never treated individuals may also be identified through community social networks, using a reference individual (like a CDD) to identify people who may have been missed.

MDA register reviews

MDA register reviews should be conducted after the MDA, by CDDs, community health nurses and disease control officers. The rationale for this is to help identify individuals who missed the most recent MDA as well as those who are never treated. The duration of the review should be considered carefully and include a review of community members who may not be listed in the registers. The level of effort required may be substantial considering the one-on-one engagements with community members to encourage treatment.

It is important to note that some people may not be captured in the MDA registers, depending on how comprehensively the registers were compiled and updated before each MDA, and if a census of the population was used. In reviewing the registers, it may be useful to inquire about the presence of people in the community whose names are not in the registers or who do not take the treatment. These people could be interviewed to determine treatment status and added to the data collection tool if they have not been treated. Data can be collected using standardized tools such as provided in Annex 6.

Interventions for never treated individuals using the MDA registers

Following the identification of never treated individuals, CDDs or community health nurses should visit each individual listed and offer treatment. Treatment should be preceded with information about the purpose of the MDA, the disease, causes, treatment and control. If treatment is accepted, the information should be recorded on the data form and the register updated.

The following statistics can be compiled following the intervention and presented as tables and graphs:

- Number and proportion (%) of people never treated in the register, overall and disaggregated by age and gender.
- Number and proportion (%) of people reached by the response intervention, overall and disaggregated by age and gender.
- Number and proportion (%) of people never treated who accepted the treatment, overall and disaggregated by age and gender.
- Reasons for missing MDA, overall and disaggregated by age and gender, and
- RDT results (if testing resources allow and testing is done), overall and disaggregated by age and gender.

Based on the data, the MDA coverage for a particular year may be re-estimated.

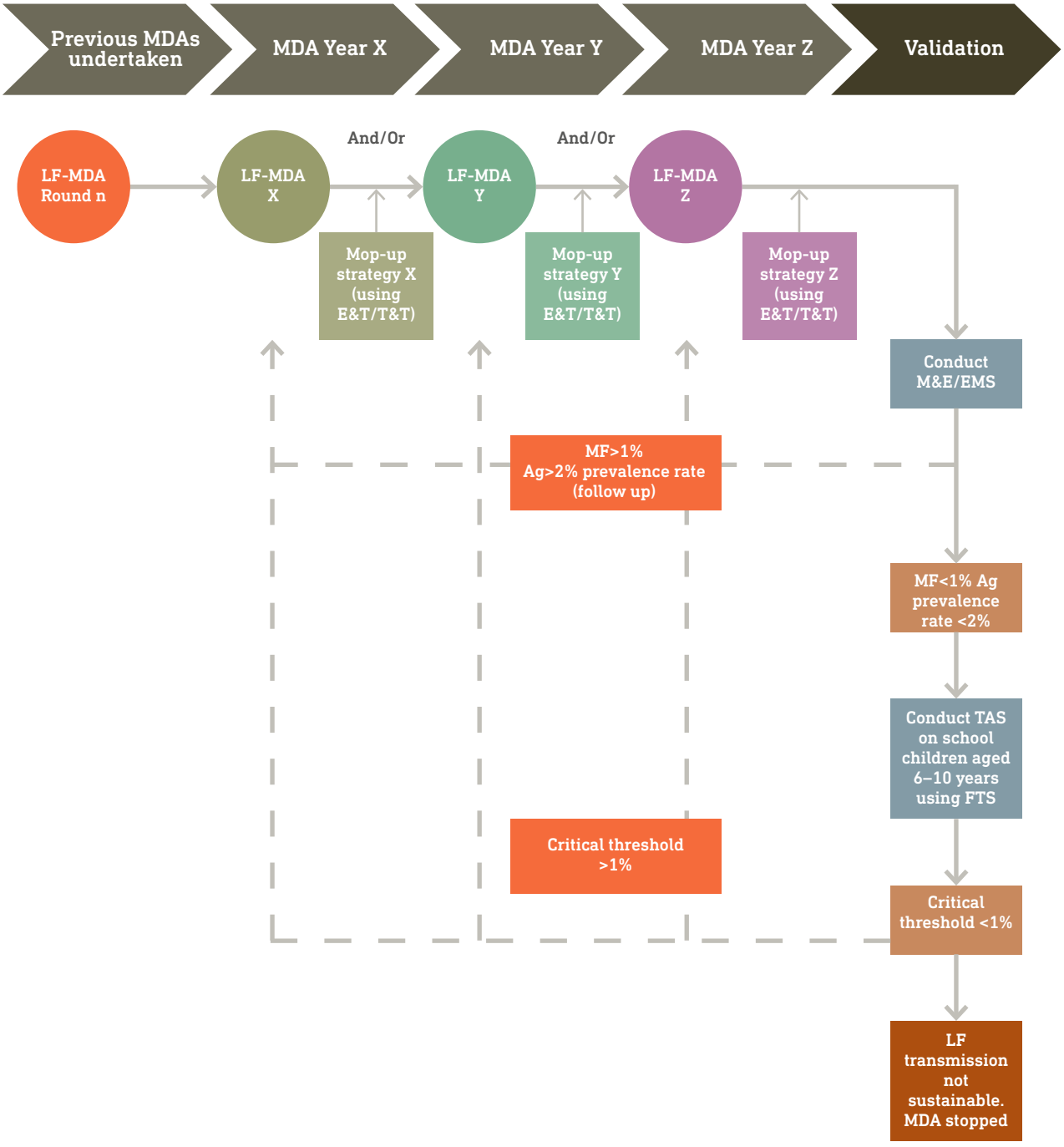
4.4.2 Who is using the intervention?

Interventions to address never treatment should be carried out by CDDs, community health nurses and NTD programme staff, in line with the treatment (drug regimen) recommendations for the country and the disease of interest. While interventions to address never treatment have mostly been undertaken in LF-endemic areas, the principles can be applied to cover other NTD-endemic areas.

4.4.3 When is the intervention implemented?

Implementing interventions using the registers should ideally be undertaken after the MDA. However, for a full assessment of the never treated population, registers detailing information for at least three rounds of MDA should be available to have a thorough overview of those who miss MDA. Fig. 10 shows a representation of a proposed implementation process.

Fig. 10. Timing of the MDA register review and mop-up strategy



E&T: engage and treat; EMS, epidemiological monitoring survey; LF: lymphatic filariasis; M&E, monitoring and evaluation; MDA, mass drug administration; T&T, test and treat.

Source: Adapted with permission from *(46)*.

4.4.4 What training is required for the intervention?

Training to review MDA registers can be incorporated into existing CDD and MDA cascade training. It is important to note that different countries may use different data collection tools, including tally sheets. Thus, considerations for the training on the use of these tools to identify never treated individuals may be required. Annex 7 presents an example data collection tool that can be adapted by national programmes.

In addition to training on the review of data in the MDA registers, personnel will need to be trained to engage community members, address questions regarding the importance of the MDA, and extract and analyse data. Where testing by RDTs is envisaged, an additional half-day training on the use of the diagnostic tests may be required. The use of the diagnostic tests should be limited to community health care providers (such as community health nurses) who are conversant with the use of other RDTs such as the malaria RDT.

4.4.5 What resources are needed for the intervention?

Implementing treatment strategies through MDA register reviews will come at additional cost to the elimination programmes, as the intervention will likely occur after the routine MDA period. Modelled costing data *(46)* showed that while this additional intervention after the routine MDA to address never treatment increases the cost to the programme, it can reach both those who have missed MDA or who are never treated, thus increasing the overall treatment coverage and the likelihood of attaining elimination faster. Further, integrating these treatment strategies into the health system may provide the most cost-effective solution to their implementation. Thus, the higher cost may be offset by the improved treatment coverage and fewer MDA rounds.

Addressing never treatment through MDA registers requires effort and investment. As such, interventions should be carefully considered for implementation only in settings with persistent transmission, where business as usual and other approaches do not yield the desired results. If resources permit, a population census can be implemented to compare with the results of the MDA register review. This comparison may be useful to assess the level of never treatment, particularly if there is a concern that specific groups are being excluded from MDA.

4.4.6 Additional resources

de Souza D, Gass K, Otchere J, Hyet Y, Asiedu O, Marfo B, et al. Review of MDA registers for lymphatic filariasis: findings, and potential uses in addressing the endgame elimination challenges. PLoS Negl Trop Dis. 2020;14(5):e0008306 (https://doi.org/10.1371/journal.pntd.0008306).

de Souza D, Otchere J, Sumboh J, Asiedu O, Opare J, Asemanyi-Mensah K, et al. Finding and eliminating the reservoirs: engage and treat, and test and treat strategies for lymphatic filariasis programs to overcome endgame challenges. Front. Trop. Dis. 2022;3 (https://doi.org/10.3389/fitd.2022.953094).

Adams N, Ahorlu C, de Souza D, Aikins M. Modelling the cost of engage & treat and test & treat strategies towards the elimination of lymphatic filariasis in Ghana. PLoS Negl Trop Dis. 2024;18(5):e0012213 (https://doi.org/10.1371/journal.pntd.0012213).

Chapter 4 conclusions

- Many resources already exist to support programmes to implement interventions during MDA planning, drug distribution and monitoring to address never treatment.
- Interventions vary in terms of level of effort needed; be strategic in choosing those that fit the programme's needs and available resources.
- This chapter only includes a sample of interventions used to address never treatment – programmes should consider the social, demographic and cultural context when choosing what interventions to adapt and implement.
- Most interventions require additional training, particularly of CDDs and supervisors.

5.
How should improved MDA implementation be monitored?

Worked example:

Never treatment clustered in a subgroup: male migrant workers are more likely to be never treated in subdistrict A where they travel for seasonal work during the dry season.

After reviewing the data and talking to stakeholders, the programme outlined three areas of action in response:

1. Include migrant men in MDA offered during the dry season.
2. Request permission from companies to carry out MDA in mining camps in subdistrict A.
3. Implement awareness training with health care workers and CDDs on the importance of treating migrant men.

When it becomes apparent that there are never treated populations in areas requiring MDA, programmes will inevitably look to strengthen MDA with an aim of improving programmatic reach and uptake among these populations. As discussed in previous chapters of the toolkit, programmes generally will use their own knowledge of local context, together with high-level information on the reasons for never treatment and demographics of the never treated populations, to develop and implement MDA adaptations to overcome these obstacles to treatment.

Programmes may find that they are unable to fully resolve the underlying, possibly longstanding, barriers to uptake in one round of MDA. Usually, some trial and error and additional evidence gathering is needed to change behaviour and overcome social, political, health system and environmental challenges that may be affecting MDA coverage.

In this chapter, we outline the M&E efforts that, combined with strategic programme implementation, are required to work effectively and efficiently towards a solution to reaching never treated populations with MDA medicines. Building upon the example presented in Chapter 3, Table 7, where the programme identified never treatment in male migrant workers.

5.1 Asking the right questions

Broadly speaking, the goals of M&E are to understand whether implementation of MDA adaptations went as planned and, ultimately, to know if implementation was "successful".

To demonstrate effectiveness of the adaptation, the programme can collect and analyse data on the following elements:

- process data – to show if the intervention was implemented and implemented well;
- outcome data – to show that the underlying programme logic is correct, e.g. that the adaptation is associated with decreasing numbers of never treated people; and
- impact data – to show if the programme is decreasing numbers of never treated people, thus making strides towards elimination and more equitable reach of the programme.

5.1.1 Process monitoring: did implementation go as planned?

In their efforts to address never treatment, programmes may decide to implement adaptations to MDA, such as those discussed in Chapter 4. When implementing adaptations to standard MDA to reach never treated individuals, it is important to monitor the inputs that will be required to roll out the changes to the MDA, such as:

- Will additional time for stakeholder coordination be needed?
- Are the current human resources sufficient or will additional personnel be required to implement adaptations to address never treatment?
- Will additional training for CDDs and/or MDA supervisors be needed?
- Are current transportation budgets sufficient? If no, how much additional transportation is needed and at what cost?
- Will the adaptation to reach never treated individuals also include new social mobilisation activities or communication materials?
- Is it necessary to change data collection forms?
- Will additional funding for supervision be required?

To implement MDA in the mining camps, the programme will need to plan and budget for:

- a coordination meeting with the mining companies in the subdistrict;
- six extra CDDs and one supervisor to treat at three mining camps in the subdistrict;
- transport costs to and from the mining camps for three days during the MDA; and
- addition of the names of mining camps and specific questions about past MDA participation into the electronic data collection forms.

Feasibility and acceptability assessments are useful in understanding how the implementation is received by both implementers and populations who are never treated. These assessments can also collect information on the practical considerations that should be considered if the adaptation is to be replicated, scaled up or implemented again in the future.

Documentation of any limitations to the originally planned scope, scale or intensity of intervention implementation is also important. Perhaps there was a problem with procurement, some insecurity in areas with groups known to be never treated, or a miscommunication regarding tracking those treated for the first time. Whatever the obstacle, it is important to understand the quality of implementation of the intervention when assessing whether that intervention adaptation really does have the potential to help programmes better serve never treated populations.

5.1.2 Outcome monitoring: was the implementation "successful"?

Once a programme knows that an intervention is both feasible and acceptable, data should be collected on whether this adaptation "works", e.g. it is helping achieve the objectives of improved reach or uptake by never treated populations. Ultimately, the impact on never treated populations will be answered as part of routine survey and surveillance activities. However, programmes may want to understand sooner if their adaptations to address never treatment are working in order to maximize the efficient use of limited resources. Monitoring can help provide some answers.

The programme collected the following information to monitor their intervention to reach migrant men:

- Process data
  - » Number of CDDs and supervisors assigned to mining camps
  - » Amount of funds allocated for mining camp activities
  - » Number of mining camps engaged
  - » Number of coordination meetings held
  - » Number of MDA posts in mining camps
  - » Acceptability and feasibility data from CDDs in mining camps
- Outcome data
  - » Number and proportion (%) of persons treated in each mining camp, disaggregated by historical treatment status
- Impact data
  - » Number and proportion (%) of persons treated in the subdistrict, disaggregated by occupation
  - » Number and proportion (%) of persons never treated in the subdistrict, disaggregated by occupation

Programmes may want to use qualitative evaluation methods that capture unexpected or unanticipated outcomes (whether positive or negative) when implementing a wholly novel adaptation. These methods, known as complexity-aware methods, are outside of the scope of this chapter, but can be helpful in best understanding how a programme adaptation is affecting programmatic outcomes and how contextual facilitators and barriers to service delivery may affect never treatment. More information on these methods can be found by searching by research methodology on the iCHORDS resource page.

If an innovation is completely novel or if there is a desire to demonstrate effectiveness to an external audience for possible scale up and replication, then it is possible that a higher level of evidence could be advantageous, and consultation with an expert and/or the pursuit of a more rigorous study design (such as a quasi-experimental design) would be a wise use of M&E resources.

5.2 Developing an effective M&E plan

Once the specific questions the programme wants to answer about the implementation of MDA adaptations have been identified, programmes should outline the M&E plan specifics, including a design and data collection plan. When designing an approach, the following questions should be kept in mind as they have implications on required technical and budget resources:

- Who will use the data? For what purpose?
- When are the data needed?
- What level of evidence is needed?
- What is the scope of the adaptation?
- What type(s) of data are needed?
- What opportunities exist to integrate data collection?

For example, if data are needed quickly then it may be necessary to employ a larger number of data collectors and/or analysts, or to invest in daily data reporting and electronic data capture during MDA. If the data are being used internally by stakeholders who are close to implementation, then descriptive data, collected alongside routine monitoring, may be sufficient to reassure the programme that adjustments to standard practice in implementation are being rolled out smoothly and the adaptation is having the desired effect on MDA delivery or uptake among never treated populations.

However, if an innovation is completely novel or if there is a desire to demonstrate effectiveness to an external audience for possible scale up and replication, then it is possible that a higher level of evidence could be advantageous, and consultation with an expert and/or the pursuit of a more rigorous study design (such as a quasi-experimental design) would be a wise use of M&E resources.

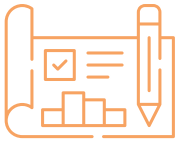
Another principle to consider is choosing the type of data – qualitative, quantitative or both – that are best suited to the study questions. Quantitative data are the type of data that are most often routinely collected to ascertain programmatic progress and effectiveness. Quantitative data include costs, counts and other types of information that can be summarized numerically and/or can be cited with some statistical certainty. This type of information is critical if a programme is interested in knowing the exact count, percentage or cost associated with a given activity and is particularly useful in summarizing inputs and outputs associated with implementation.

However, some of the types of questions associated with MDA adaptation for never treated populations will require going beyond the numbers to ask "why" and "how" questions. These emerge particularly when examining why an intervention was feasible or acceptable or why it was not. These questions emerge too, when programmes want to better understand variations in quantitative data. For example, why certain communities had better or worse outcomes than others. For these types of questions, qualitative data collection methods are most helpful *(41)*. In some cases, it is advantageous to collect both qualitative and quantitative data and triangulate the data to have the fullest picture of whether and why an MDA adaptation is effective in improving outcomes for never treated populations.

The programme created an M&E plan for the mining camps activity.

- Since district and subdistrict NTD programme staff needed MDA coverage data immediately to plan mop up, an electronic data collection platform was used to collect and quickly analyse MDA data.
- Because a CES was already planned for the IU, the programme also ensured never treatment questions were included in the survey instrument and "mining" was included as an occupation choice.
- The programme also wanted more specific information on the acceptability and feasibility of the MDA posts in mining camps, in part to decide whether to upscale the interventions to other subdistricts, so a district health staff member previously trained in qualitative methods was assigned to interview CDDs working in the mining camps.

5.3 Collecting M&E data



All data collection plans should describe how data will be stored and analysed and include a timeline, with roles and responsibilities for data collection and analysis.

Whether collecting quantitative or qualitative data, it is desirable to consider all routine implementation and data collection efforts to streamline data collection wherever possible. Not only does this extra effort make M&E more efficient, but it also minimizes the extra burden that data collection can place on staff.

Qualitative data collection often includes individual or group interviews with implementers (at all levels), key stakeholders and/or community members. Collecting these data can be streamlined if combined with activities that are already bringing these individuals together such as:

- training,
- microplanning,
- community sensitization,
- drug distribution and
- trip or supervision reports.

Similarly, quantitative data can also be collected in a way that leverages existing data collection tools that are routinely deployed by NTD programmes. Electronic data capture can assure these data are quickly and accurately reported for faster data analysis and improved data quality. Examples of tools that have been leveraged for effective M&E of MDA adaptations include:

- supervisor checklists,
- MDA tally sheets and registers,
- daily data reporting,
- data quality assessments,
- supervisor's data quality assessment and
- household surveys combined with RDTs.

Whether existing tools are adapted or entirely new tools are created, those tools should be designed and field tested wherever possible. Qualitative data can seem deceptively easy to collect but may benefit from careful design of the questions and the use of data collectors with experience in collecting qualitative data. Analysis requires transcription, translation and technical expertise to make full use of the data.

All data collection plans should describe how data will be stored and analysed and include a timeline, with roles and responsibilities for data collection and analysis. Last, it is important to understand whether the data collection is considered human subjects research and requires ethical clearance or Institutional Review Board (IRB) approval. Many times, collection of never treatment data done as part of MDA or M&E surveys is not considered human subjects research because it is part of routine programmatic data collection. It is best to consult with the local Institutional Review Board or Ethics Review Committee for determination, particularly if new data collection methods will be introduced.

The programme made a data collection plan for the MDA in mining camps. It included the following:

- Electronic data collection with daily data reporting which includes MDA distribution in mining camps.
- Supervision reports from the mining camps.
- CDDs assigned to mining camps identified for in-depth interviews to ascertain acceptability and feasibility of the approach in reaching never treated migrant men (likely requires IRB approval).
- CES including never treatment questions and occupation of "miner" in its choices.

5.4 Ensuring monitoring data are validated, disseminated, and used for programme decision-making

It is hoped that careful M&E of the adapted implementation will contribute to the global evidence base for how to better reach never treated populations. The following questions will help programmes understand how to use the data:

- What is the value of the adaptation in reaching never treated populations?
- Should the adaptation become the new standard of practice?
- Should the adaptation be scaled up?
- Are further data needed to better evaluate the effectiveness and efficiency of the adaptation?
- Are there additional improvements that could be made in the implementation of the adaptation?

Through M&E, programmes and the global community can collectively build the evidence to understand how to better reach these never treated populations.

Chapter 5 conclusions

- Programmes should collect data on how the intervention was implemented and if the numbers of never treated decreased.
- Feasibility and acceptability assessments are useful to determine how the intervention is received by implementers and the never treated population, particularly if the intervention might be scaled up in the future.
- Data collection can often be integrated into existing tools, such as MDA tally sheets and supervision checklists.
- Qualitative methods are often useful to understand the specific context of never treatment and how to develop interventions to reach that population. More information on their use can be found in the *Guide to improving MDA using qualitative methods (41)*.

6.

When and how should these activities be integrated with other public health programmes?

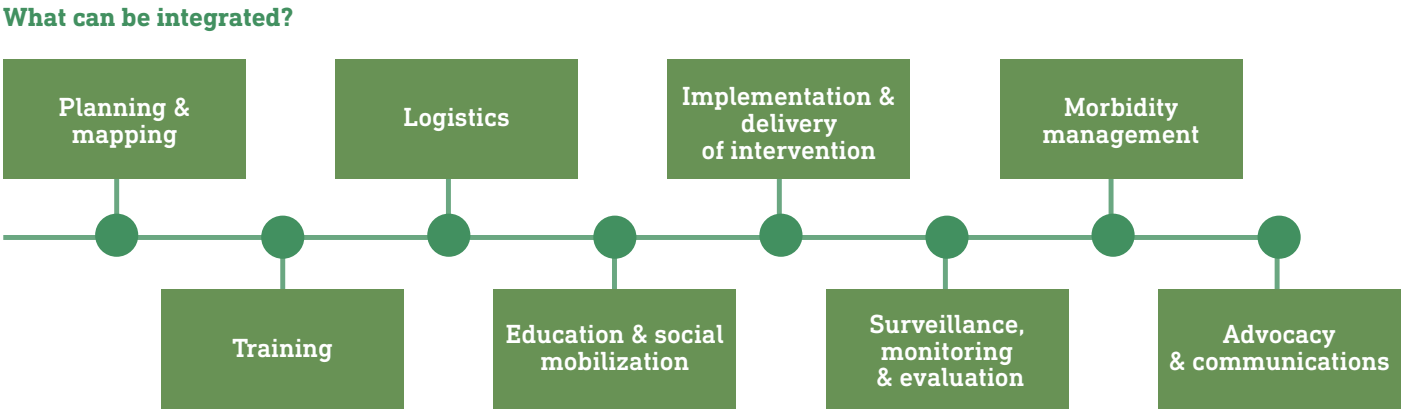
Given the focus on integration and mainstreaming in WHO's 2030 NTD road map, as well as overarching governmental policies such as universal health coverage, national programmes can strengthen approaches to finding and treating never treated populations by integrating with other health programmes and sectors. Opportunities for integration can be found across health programmes such as immunization, malaria, HIV, and maternal and child health to facilitate synergies and complementarities if the target populations and geographic areas overlap.

Integration is not confined to service delivery; there are other important areas that can be integrated to identify, find and treat never treated populations, and implement an effective campaign.

6.1 First step: identify integration opportunities

NTD programmes wishing to find and treat never treated populations can integrate a variety of activities (Fig. 11).

Fig. 11. Opportunities for integrating activities to find and treat never-treated populations



Source: Adapted with permission from *(47)*.

In some places, it might not be possible to convince all the never treated individuals to take part in MDA. Particularly if these populations are geographically clustered, supplementary interventions might be necessary to decrease or break transmission.

Planning and mapping: *High-quality demographic data* are essential for planning what strategies can be integrated. Inaccurate information can overlook vulnerable populations that should be treated. Accurate information is critical to identify and ensure access, not only to find and treat never treated populations but also zero-dose children and unvaccinated populations, malaria cases and people affected by chronic diseases, among others. By sharing demographic information, maps and platforms for data collection and coverage monitoring used by different health programmes, quality of coverage and timely reporting can be improved to support decision making. Specific examples include:

- Adding never treatment questions onto population-based surveys implemented by other health programmes (see Chapter 2, section 2.5).
- Including investigation of never treatment for NTDs during identification of zero-dose children.
- Sharing population census data.

Education and social mobilization: Most public health campaign programmes have *community engagement* as a cornerstone of their strategy. Collaboration with community health workers and key leaders is essential to make them part of the campaign and engage them to identify and target missed populations, and facilitate acceptability, adherence and quality of MDA delivery. Integration of training of community health workers can maximize available funding and provide opportunities to strengthen this workforce. Specific examples include:

- NTD programmes can learn from other programmes which have had success in reaching certain never treated populations. See Chapter 7 case study from the United Republic of Tanzania for learning from HIV programmes on how to reach fishing communities.
- NTD messages can be added to outreach to zero-dose populations.
- If pregnant women are a population likely to be never treated, questions about MDA participation and information about eligibility for MDA could be added to antenatal care visits.
- Integrating with other programmes using community health workers to co-administer training on community engagement, conflict resolution and communication skills in addition to disease-specific information.

Implementation and delivery of interventions: When determining where and how to integrate service delivery, consider the availability and needs of human resources, supplies, transportation and the need for per diem. Care should also be taken to ensure that recommendations on safety and timing of co-administration of various medicines are followed. Specific examples include:

- MDA in groups that are difficult to reach could be integrated with interventions to reach and vaccinate zero-dose children. These children and their families are likely to live in hard-to-reach, fragile, or challenging humanitarian settings where basic services are limited and they might be suffering from social, ethnic, and gender inequality *(19)*.
- MDA in hard-to-reach areas that have not been treated in the past could be integrated with polio campaigns in conflict or hard-to-reach areas where wild poliomyelitis remains endemic or vaccine-derived poliovirus is circulating. For example, Madagascar integrated LF MDA and polio vaccine distribution *(48)*.
- STH or SCH school-based MDA could be integrated with measles-rubella follow-up campaigns in pre-school and school-aged children.
- Delivery of MDA for NTDs can be combined with delivery of bed nets *(49)*.
- Digital data platforms can be repurposed for NTDs, such as how the Benin NTD programme used the malaria digital platform, including the population data, as the basis for digitizing the OV campaign, reaching 7 million people across 11 of the country's 13 departments. Consequently, treatment coverage increased from 74% to 84% compared to the previous MDA *(50)*.

In some places, it might not be possible to convince all the never treated individuals to take part in MDA. Particularly if these populations are geographically clustered, supplementary interventions might be necessary to decrease or break transmission. For diseases like LF, OV or SCH, integration with other programmes to ensure appropriate use of vector control activities is critical. Likewise, water, sanitation and hygiene (WASH) interventions can help decrease transmission of STH/SCH, as a complement to deworming campaigns. Integrating strategies and interventions with animal health, a One Health approach, might be necessary in places with zoonotic transmission of LF or SCH.

Surveillance, monitoring and evaluation: NTD MDA and never treated indicators can be added into monitoring, supervision and evaluation activities of various programmes and vice versa. Household visits conducted during mop-up, supervision and coverage assessments may identify people who have not been reached by different health programmes. This includes opportunities to identify persons in need of further care, such as people affected with NTD morbidity, children in need of vaccinations, or other priority conditions, based on the country context. Specific examples include:

- If the health ministry plans to investigate non-participation in public health interventions at the community level, never treatment for NTD programmes can be included. Research has shown that households miss or refuse to participate in multiple public health interventions (e.g. childhood vaccination, mass drug administration, bed nets, COVID-19 vaccine) for a diversity of reasons *(30)*. Investigating never treatment can be easily incorporated into other explorations in populations at risk of being left behind.
- As mentioned under planning and mapping, programmes could also add never treatment questions onto population-based surveys implemented by other health programmes (see Chapter 2, section 2.5) to monitor the impact of interventions to reach never treated populations.

6.2 Second step: identify overlaps

To make the process smooth and efficient, NTD programmes can find integration opportunities with other public health campaigns based on overlap of the target populations, geographical areas and calendars, complementarity of information systems, funding structures and resources.

To identify opportunities for overlap, the following questions are helpful:

- What type of campaigns are being planned during the following years?
- Are the campaigns nationwide or targeted interventions in specific areas?
- What are the target populations of each campaign?
    - » Preschool-aged children?
    - » SAC?
    - » Adolescents?
    - » Women of reproductive age?
    - » Adults? Of what age range?
- What are the characteristics of the geographical areas where the campaigns will be implemented?
- When are the campaigns being scheduled?
- Who is in charge and what programme is coordinating each campaign?
- How are the campaigns funded, what are the available/ needed resources and logistics?

Who are zero-dose children?

Immunization programmes use a term similar to never treated to recognize children who have not received even one routine vaccination – "zero-dose" children.

Zero-dose is defined as "children who have not received the first dose of diphtheria, tetanus, and pertussis-containing vaccine by the end of their first year of life" *(51)*.

Finding and responding to zero-dose children shares many similarities with addressing people never treated in NTD MDA campaigns.

- It can be difficult to quantify the extent of zero-dose children, particularly because of inaccurate denominators used in coverage calculations *(52)*. Collecting data on zero-dose children and those never treated in NTD MDA campaigns at the same time could save resources.
- Zero-dose children are likely to be found in *(19)*:
    - » conflict areas,
    - » urban areas,
    - » remote, hard-to-reach areas and
    - » migrating populations.
- These are the same populations that often have clusters of never treated people; thus activities could be planned to increase uptake of both immunization and NTD interventions.
- Interventions to reach zero-dose children include community engagement, health systems strengthening and integration, and technological innovations *(51)*.

Given the potential overlap in populations affected and interventions, if a NTD programme is concerned about never treated people in MDA campaigns, it could be worthwhile to discuss with the immunization programme staff to understand their lessons learned in finding and responding to zero-dose children and opportunities to collaborate.

Remember that integration takes time. It is a process that takes place over time and is important to allow sufficient time to identify key partners, shared target populations, geographical areas and goals, source of funding and logistics needed to succeed.

6.3 Third step: be realistic but also proactive, innovative and flexible

The following key elements should be considered when developing integration plans:

- Weigh the benefits and risks.
  - » Integrating campaigns requires effort and can be challenging.
  - » Integration can offer many benefits, but it is not always the best solution.
  - » Many health programmes receive "vertical" funding; that is, funding that can only be used specifically for activities towards a given health activity or disease focus. If this is the case, additional discussions may need to be held with partners and donors to make the case for integration or discussing how funding streams will be tracked.
- Define the level and extent of integration.
  - » MDA can be fully integrated for co-delivery of health interventions in all targeted populations, but integration can also be partial, working at different levels of the health system.
  - » Different programmes may also only integrate certain activities, such as the logistics needed to transport medicines, tools and other materials. Integration can be of particular benefit in hard-to-reach areas where the cost of delivery is high.
- Remember that integration takes time. It is a process that takes place over time and is important to allow sufficient time to identify key partners, shared target populations, geographical areas and goals, source of funding and logistics needed to succeed.
- Learn from previous experiences. It is important to learn from other programmes, sectors and partners to find the most effective integration strategies. Programmes hold meetings to coordinate and discuss the progress of their plans and interventions where different sectors and stakeholders may be involved. These meetings provide opportunities to find out what is happening in other programmes and learn from those experiences.
  - » It may be useful to start the process by learning from the community – what are their major health concerns? How are they already integrating health services?
- Ensure that leadership is supportive. Campaign managers should ensure that partners are invested in the success of the campaign, will take responsibility for its roles and will be acknowledged for their efforts and support.

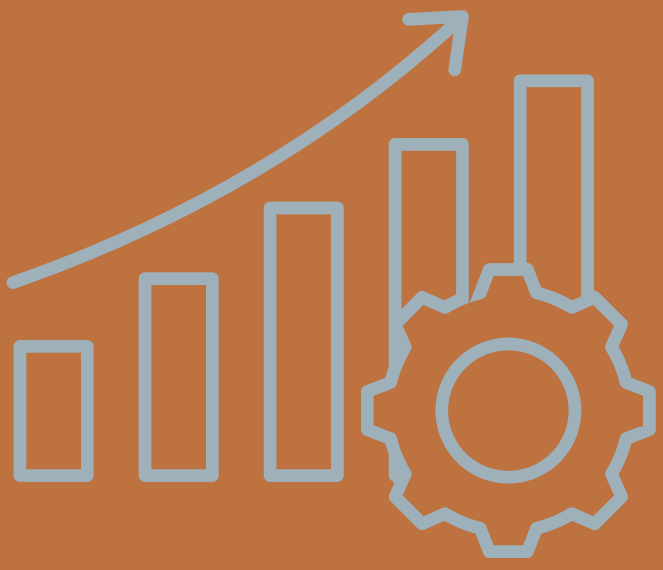
For more information on campaign integration, visit the Health Campaign Effectiveness Coalition website for resources and case studies on integration, and the GLIDE white paper on integration across public health programmes for NTDs.

Chapter 6 conclusions

- Opportunities to integrate never treatment with other programmes' activities exist in planning, training, social mobilization, drug delivery and monitoring.
- Populations which are never treated are often similar to populations missing other health services, such as zero-dose children. NTD programmes can share learnings with these programmes in how to reach such populations.
- To identify overlaps, programmes should consider target geographical areas, target populations and age ranges, timing and logistics of the activities.
- Integration is a complicated process – it can take time and can work at different levels of integration.

7.

How have never treatment data been used to improve NTD programmes?



Never treatment data can be powerful in communicating the need for continuing and strengthening MDA to policy-makers and community members. In certain cases, the simple proportion of people never treated in a site might be enough to convince people that past MDA implementation was not effective. In other cases, a more nuanced analysis and presentation of data could be presented during microplanning to help decide on best distribution methods and social mobilization approaches. The data can be used to target interventions to certain geographical areas or socio-demographic population groups.

Following is a collection of short case studies that illustrate how never treatment data have been used effectively in various situations to guide effective interventions to reach people left behind in NTD programmes.

7.1 Combatting LF MDA fatigue in Nepal with never treatment data

Authors: Sudip Raj Khatiwada, RTI International, Act to End NTDs East | Nepal; Nirmala Sharma, FAIRMED Foundation Nepal; and Ram Kumar Mahato, Epidemiology and Disease Control Division at the Nepal Ministry of Health and Population

Nepal is endemic for LF caused by *W. bancrofti* and transmitted by *Culex* mosquitoes. Nepal's LF elimination programme has been very effective, with 53 of 64 endemic districts having successfully stopped MDA using a two-drug regimen of diethylcarbamazine, and albendazole by passing a TAS. In 2024, 11 districts implemented MDA with the triple-drug regimen of IDA.

Since 2014, Nepal has conducted pre-TAS as part of monitoring and evaluation of the MDA as per WHO guidance. The sample size of pre-TAS is relatively small – only about 300 for each site among those aged 5 years and older. Among the 11 districts which still require MDA, six districts failed pre-TAS at least three times. To investigate the reasons behind a series of pre-TAS failures, the Nepal LF programme started to incorporate never treated information in every pre-TAS. Initially, these questions were focused more to antigen positives only but in 2019, learning its importance, the programme included them for all pre-TAS respondents and adapted the learnings over the years. These surveys were carried out by various local NGOs and the research entity of the Ministry of Health and Population, so questions on never treatment and the analysis changed slightly over the years. The questions included were "How many rounds of LF MDA have you taken?", "Have you taken the last round of LF MDA?" The respondents whose answer was "never" was again asked with a follow up question "What is the reason behind never taking LF MDA drugs?"

The findings from these data were used in sensitizing the community leaders, municipality officials, district health managers, health workers and stakeholders during LF MDA planning meetings, community meetings, health worker training and female community health volunteer training.

The collected information was analysed using simple statistics like:

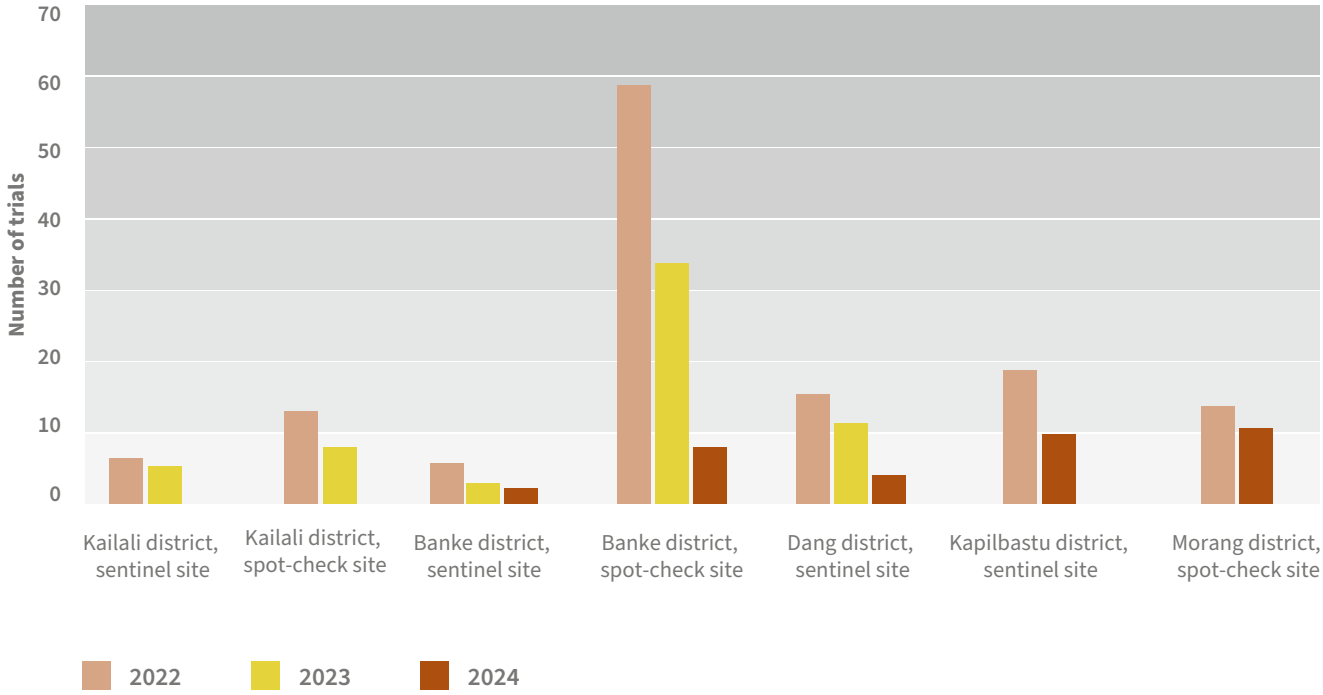
- Number and proportion (%) never treated in each site/district/EU
- Is there a significantly different percentage of individuals never treated between male or females and between adults (greater than 20 years and above) or children?
- Number and percentage of antigen positive cases never treated, treated once and treated two or more times by site/district/EU
- What percentage of never treated individuals are Ag-positive? Is this significantly different than those who were treated at least once?

The findings from these data were used in sensitizing the community leaders, municipality officials, district health managers, health workers and stakeholders during LF MDA planning meetings, community meetings, health worker training and female community health volunteer training. These data points were very helpful for the national programme in answering questions regarding MDA fatigue, why there was a series of survey failures despite high reported coverage, and the difference between high reported coverage versus low compliance. Stakeholders questioned why – in areas of good, reported coverage – prevalence was not falling enough to stop MDA. They hypothesized that drug efficacy, including possible drug resistance, or test kit efficacy were the reasons. Being able to show that there were groups of people who had never taken part in MDA helped convince them that MDA needed to be improved to reach all the population. This information was also equally helpful for policy-makers and planners on how to address the cycle of failures and strengthen LF MDA.

Nepal took the opportunity of these learnings to continue addressing those challenges through strategic changes like using health workers instead of Female Community Health Volunteers, adapting the SCT as part of MDA activities for identifying poor coverage or never treated areas and mopping up, sparking discussions about never treatment among local stakeholders, and moving towards microplanning.

In Kapilbastu, Jhapa and Morang districts, FAIRMED (a local NGO) supported local government MDA campaigns by identifying populations not accessing government services and social schemes, including LF MDA. Population groups who were never treated included religious communities (families and Madarsa schools), migrant workers, Natwa group (a nomadic group), persons with disability, LGBTQ people, highly educated people and ethnic groups such as Tharu and Madwadi. In border districts, daily wage earners who cross from Nepal to India and back also were often missed in MDA and other health campaigns. In addition to those people not being reached, there were people, including medical professionals and CDDs, who refused to take the MDA medicines because they did not trust the quality of them or were afraid of their side-effects. Once these groups were identified, community mobilizers spent 45 days working with them to raise awareness and address concerns. People with LF clinical signs, media, hospital health workers and influential people from the public and private sectors demonstrated swallowing medicines in front of the community. Biscuits and water were made available at drug distribution booths to overcome people's reluctance to take medicines on an empty stomach. Counselling was offered to people who refused and household visits were made to those who did not participate at the drug distribution booths.

Fig. 12. Proportion of individuals never treated, in sentinel and spot-check site surveys, Nepal



Source: LF Elimination Programme, Epidemiology and Disease Control Division, Nepal Ministry of Health and Population.

Over time, the improvements helped reduce the percentage of people reporting they were never treated (Fig. 12). The small efforts of adding few questions in regular surveys and exploring never treatment are very cost-effective approaches to advocating for strengthened MDA and sensitizing community leaders of the need to intensify elimination efforts.

7.2 Togo's integration of the never treated question into a SCH coverage evaluation "hotspot" survey that collected haematuria data

The treatment strategy for SCH was MDA once every year for the entire population in high-risk health districts, once every 2 years among SAC and adult women in moderate-risk health districts, and once every 2 years among SAC only in low-risk health districts.

Author: Diana Stukel, Act to End NTDs | West, FHI360

National baseline mapping for SCH and STH was conducted in 2009 in Togo. The mapping of every subdistrict outside the capital was conducted among school-aged children (SAC, aged 5–14 years) across 1070 schools in 562 subdistricts within 35 health districts using Kato–Katz (for STH and *S. mansoni*) and dipstick for haematuria (as a proxy for *S. haematobium*). Overall, all 35 health districts were found to be endemic for SCH and STH. As a result of this mapping, integrated SCH/STH/OV door-to-door MDA with praziquantel, albendazole and ivermectin started in 2010 targeting all SAC and at-risk adults in 35 health districts. The treatment strategy for SCH was MDA once every year for the entire population in high-risk health districts, once every 2 years among SAC and adult women in moderate-risk health districts, and once every 2 years among SAC only in low-risk health districts.

Following five rounds of MDA, an initial SCH/STH impact assessment was conducted in 2015, re-surveying the same villages across all 35 health districts mapped at baseline to evaluate the impact of treatment. This survey showed reductions in prevalence and these findings were used to amend target populations and treatment frequency to consolidate gains and intensify efforts in those areas with persistent high prevalence of infection. After another five years of MDA with at least 75% coverage, a second SCH/STH impact assessment was conducted in November/December 2021 in a subset of 10 districts (92 subdistricts), with the support of USAID's Act to End NTDs | West Program. The outcome of this survey showed SCH and STH prevalence in these ten districts had reduced from 17.9% in 2009 to 5.91% in 2021 and 25% in 2009 to 19.7% in 2021, respectively.

After a community-based SCH/STH/OV MDA in September 2022, an SCH/STH CES was conducted in 13 public health units. The CES took place in five public health units identified as SCH "hotspots" of persistent high prevalence, despite reported coverage values of 98% to 100%. Data were collected to verify reported coverage, identify risk behaviours, and measure haematuria. In addition, eight public health units with reported low treatment coverage of praziquantel were included. The questionnaire included questions about never treatment.

Additionally, the CES knowledge, attitudes and practices questionnaire captured basic characteristics of respondents (age, gender, education level, occupation, years lived in community) as well as respondents' knowledge of the MDA campaign that took place in September 2022, respondents' general knowledge on how to prevent SCH/STH, adverse events experienced as a result of taking the drugs, and practices surrounding WASH. During the MDA campaign, some of the 13 public health units treated only SAC for SCH/STH, while others additionally treated high-risk adults, and therefore, the CES questionnaire targeted either one SAC per household only or one SAC plus one high-risk adult per household, depending on the public health unit.

The fieldwork in all 13 public health units took place in April 2023 and covered 58 villages, 3100 households, and 3505 individuals (of whom 2927 were SAC). After the fieldwork was completed a survey report was produced by a consultant engaged by the NTD Programme. The associated dataset was shared with the Act to End NTDs| West programme, which undertook a special analysis focused specifically on the never treated population.

The analysis considered the odds ratio of being never treated by various characteristics (analysed individually) such as age, gender, education, occupation and years lived in the community. An odds ratio considers the likelihood of being never treated (as opposed to being treated at least once over a lifetime) in relation to categories of the characteristics under consideration. Importantly, to ascertain whether the never treated population could be considered a reservoir of infection, the odds ratio of never treated by haematuria status (positive versus negative) was also analysed. Although the odds ratio was 2.4 and was statistically significant, the same result was not statistically significant after taking into account the complex survey design. This odds ratio means that never treated individuals when compared to individuals treated at least once are 2.4 times more likely to have blood in urine (haematuria) than not. The lack of significance in the results was likely due to the fact that, although the prevalence of haematuria-positive individuals was quite high in the sampled population (21%), the percentage of never treated was very low (2.5%), and therefore the sample size of never treated who were actually infected was very small. Using the global positioning system data collected during the survey, the analysis then plotted surveyed villages on a map, differentiating villages with a high versus low percentage of households with at least one infected member who was never treated. The maps were able to identify several clusters of problematic villages with high percentages of likely infected never treated individuals; these will be communicated to the Togo NTD Programme for follow-up in the next MDA.

Additional analysis is currently under way to analyse the never treated population by other characteristics such as knowledge of MDA campaign and WASH practices to better understand the dynamics of this population and to improve targeting of treatment in future rounds of MDA. Finally, hierarchical linear models are being built with never treated as the outcome variable, to identify explanatory variables that are most associated with the outcome variable. In the coming months, when this analysis is complete, all results will be communicated with the Togo NTD Programme, along with recommendations for improvement to future MDA campaigns in relation to reaching the never treated population.

In conclusion, the integration of the never treated question into a specialized SCH/STH “hotspot” CES which collected haematuria data, is an innovative investigation into understanding the never treated population in Togo, their characteristics, knowledge and practices and possible infection status.

7.3 Never treatment in mobile and migrant populations in Mali: a barrier to eliminating NTDs

Authosr: Moussa Sangare, International Center of Excellence in Research in Mali and Alison Krentel, Bruyère Health Research Institute

Mali, like many West African countries, is characterized by significant internal and cross-border migration. The mobile and migrant populations, including nomadic pastoralists and seasonal labourers, often move in search of better living conditions, new economic opportunities or due to environmental factors such as drought. These populations are typically hard to reach during MDA campaigns, which are designed to distribute medicines to many people within a short period. The challenge is compounded by factors such as lack of permanent residence, limited access to health services, cultural differences and language barriers. From 2008 to 2022, Mali experienced a significant rise in internally displaced persons (IDPs), driven by conflict, climate change, and ongoing political instability. As a result, Mali's current population is made up of an overlap of multiple groups in movement at the same time. Some of these movements are predictable, e.g. those relating to seasonal changes, while others like IDPs are unpredictable.

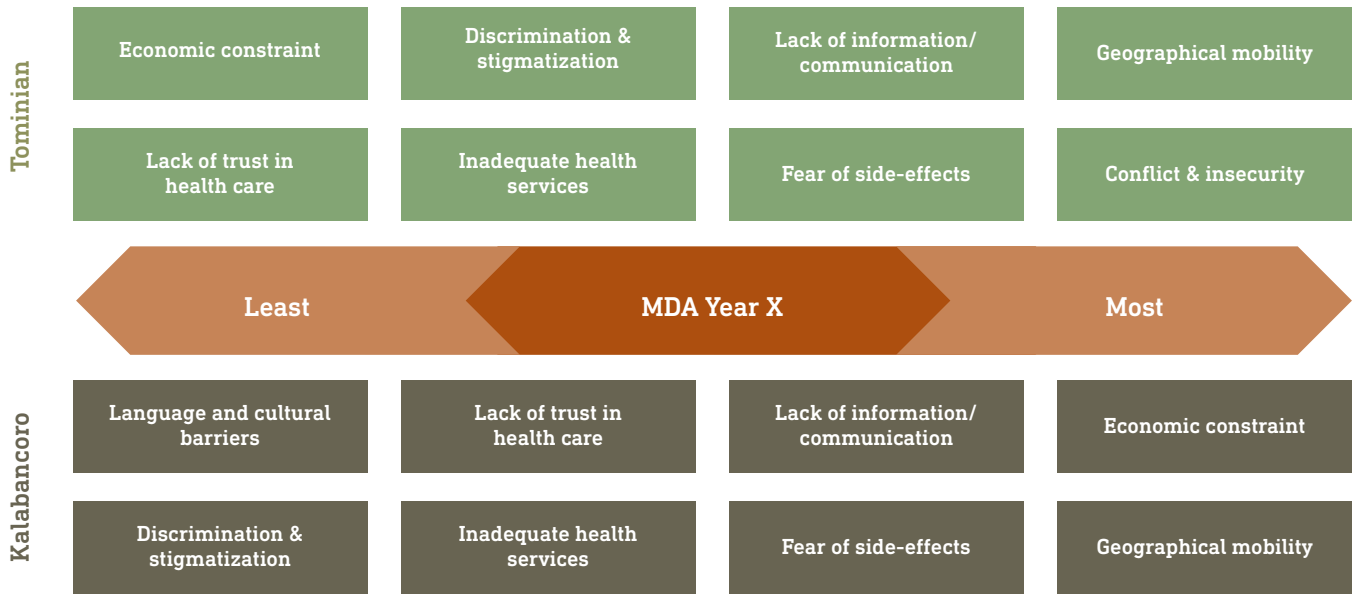
A qualitative study on barriers and facilitators to MDA participation was implemented to explore never treatment among mobile populations to improve outreach. Two health districts were selected: one semi-urban (Kalabancoro) and the other rural (Tominian/San). These districts are the epicentre of numerous migratory movements, including economic migrants, nomads, and informal miners, and massive population displacements due to their geographical location. They were previously endemic for most of the NTDs addressed by MDA campaigns.

Mali's current population is made up of an overlap of multiple groups in movement at the same time. Some of these movements are predictable, e.g. those relating to seasonal changes, while others like IDPs are unpredictable.

Over the course of two months, 31 in-depth interviews and 10 focus group discussions among the targeted groups of community members, health professionals and community drug distributors were implemented. Never treatment was defined as the proportion of the population who self-reported that they had never been treated for any MDA in the past. To help facilitate their memory, participants were shown the tablets to remind them about the campaign and to distinguish between treatments offered across the NTDs.

Fig. 13 outlines the multifaceted reasons contributing to non-participation in the last SCH MDA campaign. It emphasizes important factors such as geographical mobility, conflict and insecurity, and economic migration which significantly impacted accessibility to MDA. Migrants were often missed by MDA teams who were not able to track their movements or predict their locations during the campaigns. In Tomianian, there were more IDPs, which may be why conflict and security emerged as more important barriers to participation. In Kalabancoro, an urban environment, there was more economic migration and gold mining which explains why economic constraints and geographical mobility are of higher importance. Additionally, participants noted that these populations may have limited awareness or understanding of the MDA programmes due to language barriers, low health literacy levels or distrust of governmental and NGOs. Traditional beliefs about disease causation and treatment may conflict with biomedical approaches, leading to reluctance in accepting the medicines provided during MDA. Furthermore, the fear of side-effects, fuelled by rumours or possible previous negative experiences, can deter individuals from participating in the campaign.

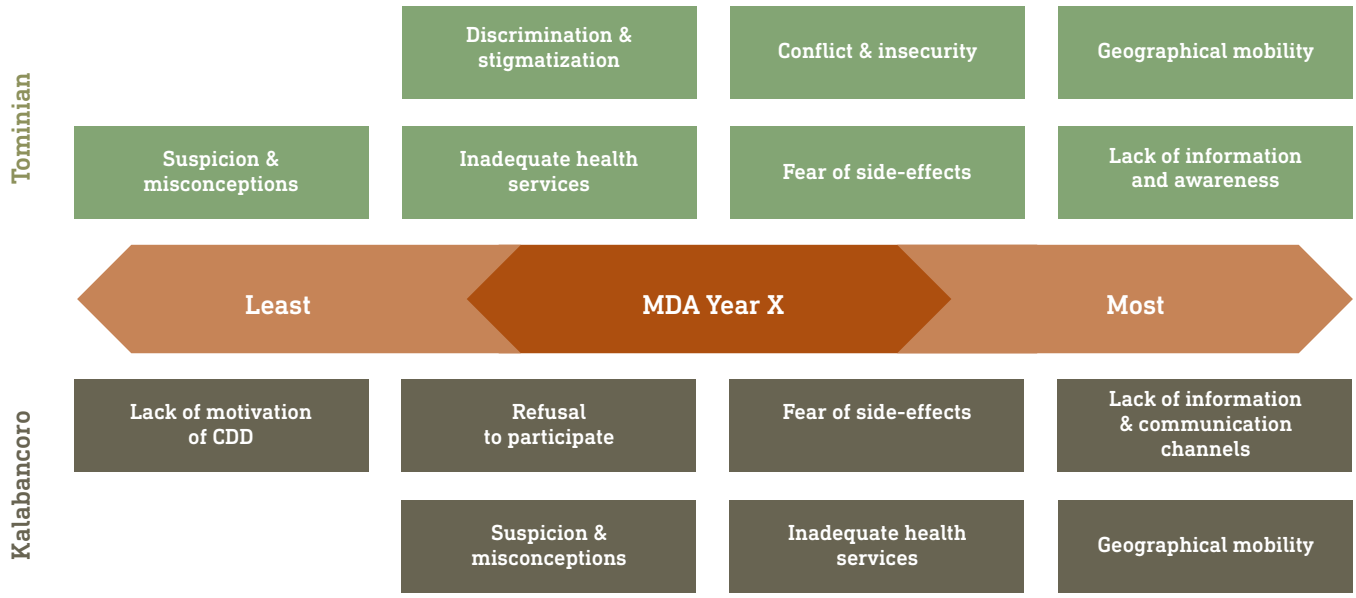
Fig. 13. Reasons for not taking part in the last SCH MDA campaign



Source: Adapted with permission from *(26)*.

Fig. 14 emphasizes critical factors contributing to "never treatment" among mobile and migrant populations. In Tominian, IDPs are reluctant to seek treatment. They reported feeling isolated because they have come from outside of the region. They can be discriminated against by the local community. For Kalabancoro, due to the high mobility of people interviewed here, they are not reached by regular communication channels so remain unaware about MDA. This complex interplay of mobility, limited awareness, language barriers and misconceptions emphasize the need for tailored interventions and culturally sensitive approaches to address never treatment in these populations.

Fig. 14. Reasons related to never treatment in SCH MDA



Source: Adapted with permission from *(26)*.

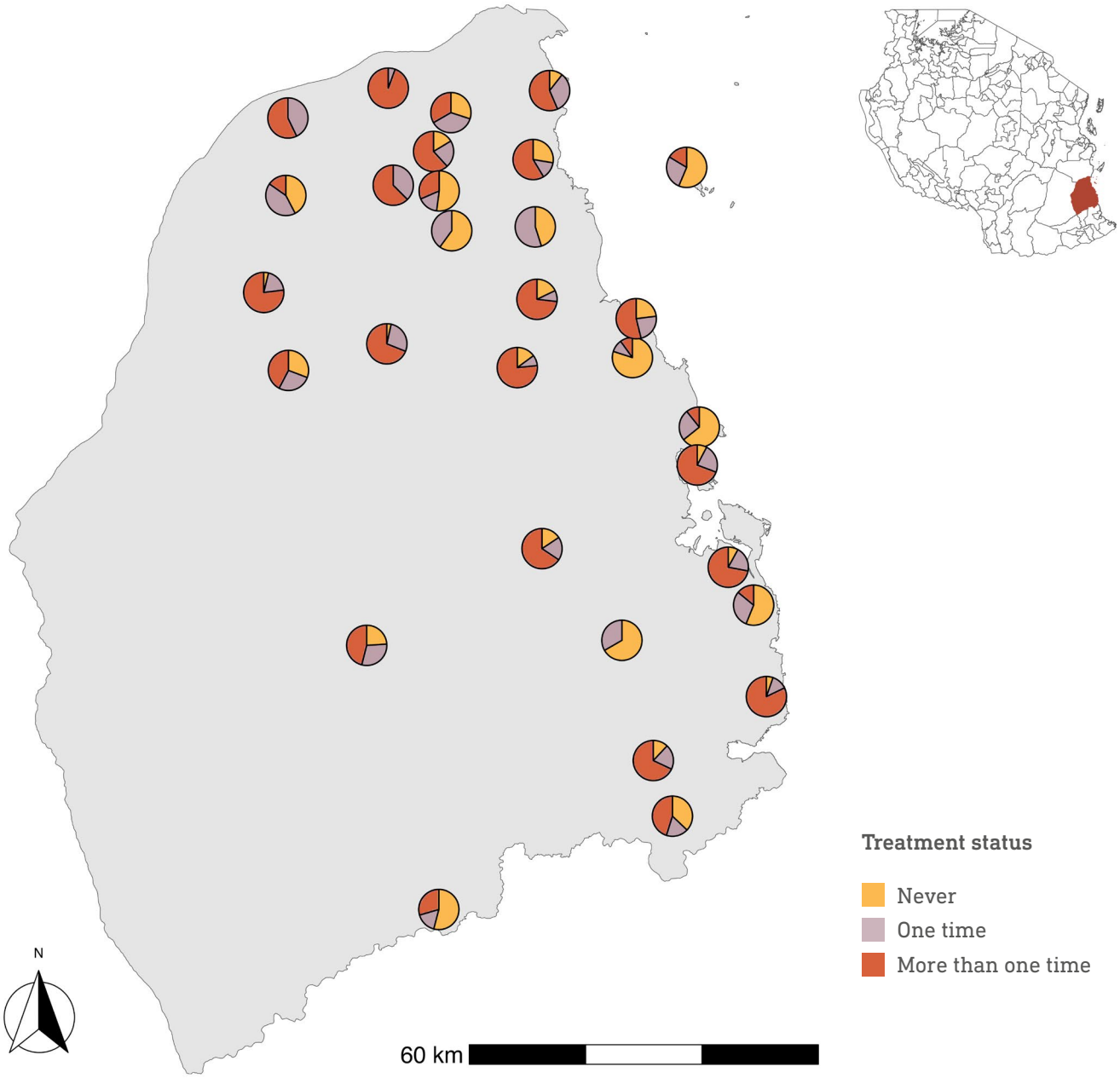
To improve the effectiveness of MDA programmes in Mali, it is essential to address the unique challenges faced by mobile and migrant populations. Although the study focused on SCH MDA, solutions can apply to other MDAs targeting mobile populations. The approach to MDA needs to be flexible with an understanding of the predictable movements as well as preparation for potential unpredictable population movements such as an influx of IDPs into a district. It is also critical to work with other health care programmes, such as immunization or seasonal malaria chemoprevention campaigns, as there may be opportunities to learn from their best practices in reaching these populations. Finally, not every mobile group should be treated in the same manner. A nomad is different than a young economic migrant and so approaches to reaching them should be tailored. By understanding and mitigating the barriers to treatment, and leveraging facilitators that enhance participation, public health initiatives can be more inclusive and impactful. Further research is needed to implement innovative approaches that can better integrate these populations into MDA campaigns, ensuring that no one is left behind in the fight against NTDs.

7.4 United Republic of Tanzania: "We need different strategies for the last few areas left."

Author: Dr Faraja S. Lyamuya, LF Focal Person, United Republic of Tanzania Ministry of Health

The national NTD control programme of the United Republic of Tanzania has made great strides in eliminating LF, with only seven of 119 districts still requiring MDA as of 2022. Yet, as the programme moves closer to elimination, new strategies are needed to respond to districts with persistent transmission. One such district – Kilwa – had a baseline prevalence of 56% antigenaemia and has conducted 14 rounds of MDA. While prevalence has fallen dramatically – to 2.3% antigenaemia in sentinel and spot-check sites in 2020, this district still requires MDA. A 2021 CES found that 23% of respondents noted that they had never been treated, despite all the rounds of MDA (Fig. 15). The CES included the question "How many times have you participated in MDA in your lifetime?" with answers of "never", "one time"', "more than one time" or "don't know/no answer".

Fig. 15. Past MDA treatment status, by cluster, in a 2021 coverage evaluation survey in Kilwa district, United Republic of Tanzania



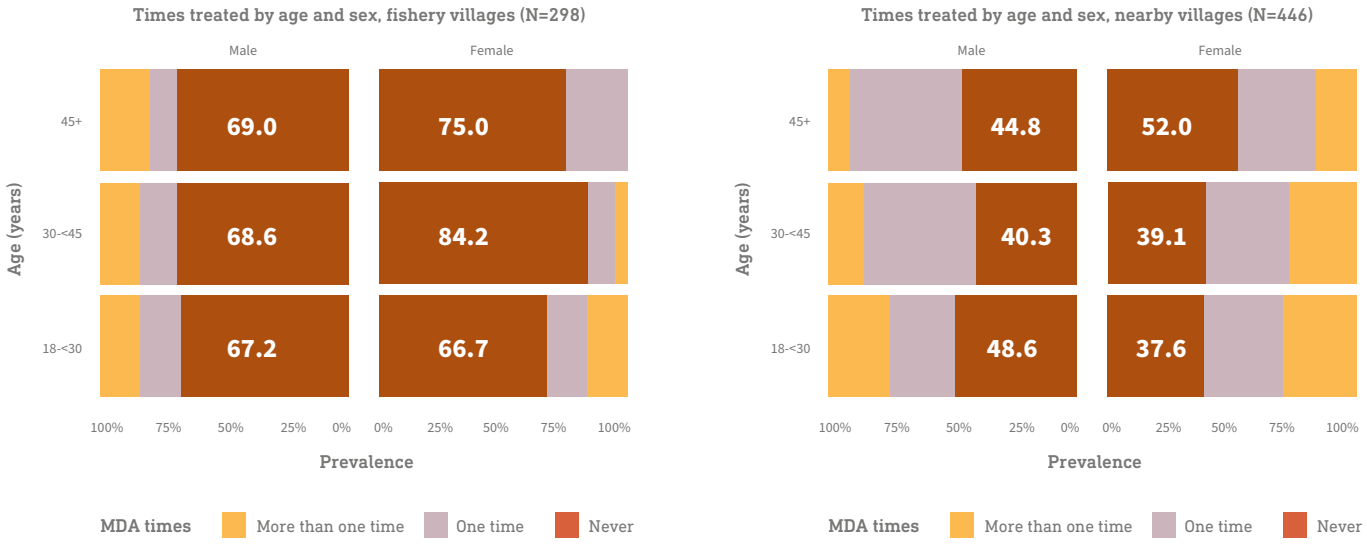
Source: National LF Elimination Programme, United Republic of Tanzania Ministry of Health.

^ Analysis excluded those who responded "don't know" or "no answer". Cluster locations have been adjusted for clarity (≤ 5 km). Boundaries and names shown and designations used on this map do not imply the expression of any opinion whatsoever on the part of the authors, or the institutions with which they are affiliated, concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries.

Anecdotal evidence that fishing communities might be missed during MDA and the high levels of never treatment near the coast led the national NTD programme to further investigate LF in fishing communities through focus group discussions and key informant interviews with fishing camp leaders, front-line health workers, LF MDA CDDs and HIV district coordinators who had experience with community outreach in fishing communities. The programme also collected and analysed new in-depth data on migration, past MDA participation and Ag status in two

fishing communities and two nearby villages. In the fishing communities, 69% of participants had never been treated, while 43% of participants in the nearby villages had never been treated (Fig. 16). The major reasons for not being treated were due to being unaware of MDA, not being present at home or not knowing enough about the medicine.

Fig. 16. Past MDA participation, by age and gender, in fishing communities and nearby villages



MDA: mass drug administration.

Source: National LF Elimination Programme, United Republic of Tanzania Ministry of Health.

In addition, fishing communities had high Ag-positivity with 8.7% and 6.7% of respondents positive, while nearby villages had levels of 1.9% and 2.6%. In fishing communities, Ag-positivity was 12.2% among people never treated, but only 2% among those treated once, and 0% among those treated two or more times.

The national programme presented this data back to the communities during MDA microplanning with fishery leaders and nearby communities. Boat owners, who were trusted by the fishing communities, were used to sensitize the fishing communities to MDA, in part by including MDA information in routine early morning meetings before boat launching. The programme also increased the number of CDDs, including using fishermen as CDDs, and established fixed drug distribution posts in fishing communities.

The August 2023 MDA treated 742 people in fixed posts in two fishing communities, 66% of whom were male. These catchment areas reported coverage of 86% and 81%. The number of people treated might seem small, but reaching these communities is critical to reaching elimination. Use of the never treated indicator in a CES provided a key signal that led to further data collection, and interventions to treat a population group that had been missed in previous MDA. In 2024, Kilwa district was split into two EUs for EMS, and both passed with Mf prevalence under 1% in all sites. The following TAS also passed, with fewer positives than the critical cut-off values in both EUs, and MDA stopped.

Fishing communities had high Ag-positivity with 8.7% and 6.7% of respondents positive, while nearby villages had levels of 1.9% and 2.6%. In fishing communities, Ag-positivity was 12.2% among people never treated, but only 2% among those treated once, and 0% among those treated two or more times.

Despite achieving over 65% coverage in the last two MDA campaigns in 2019 and 2021, Mf was present in three selected communities in two regions of Guyana. Notably, a majority (4/5, 80%) of those with circulating Mf were classified as "never treated", indicating that they self-reported never having consumed tablets during any round of MDA for LF.

7.5 Recommendations to address never treatment in the elimination of lymphatic filariasis in two regions of Guyana

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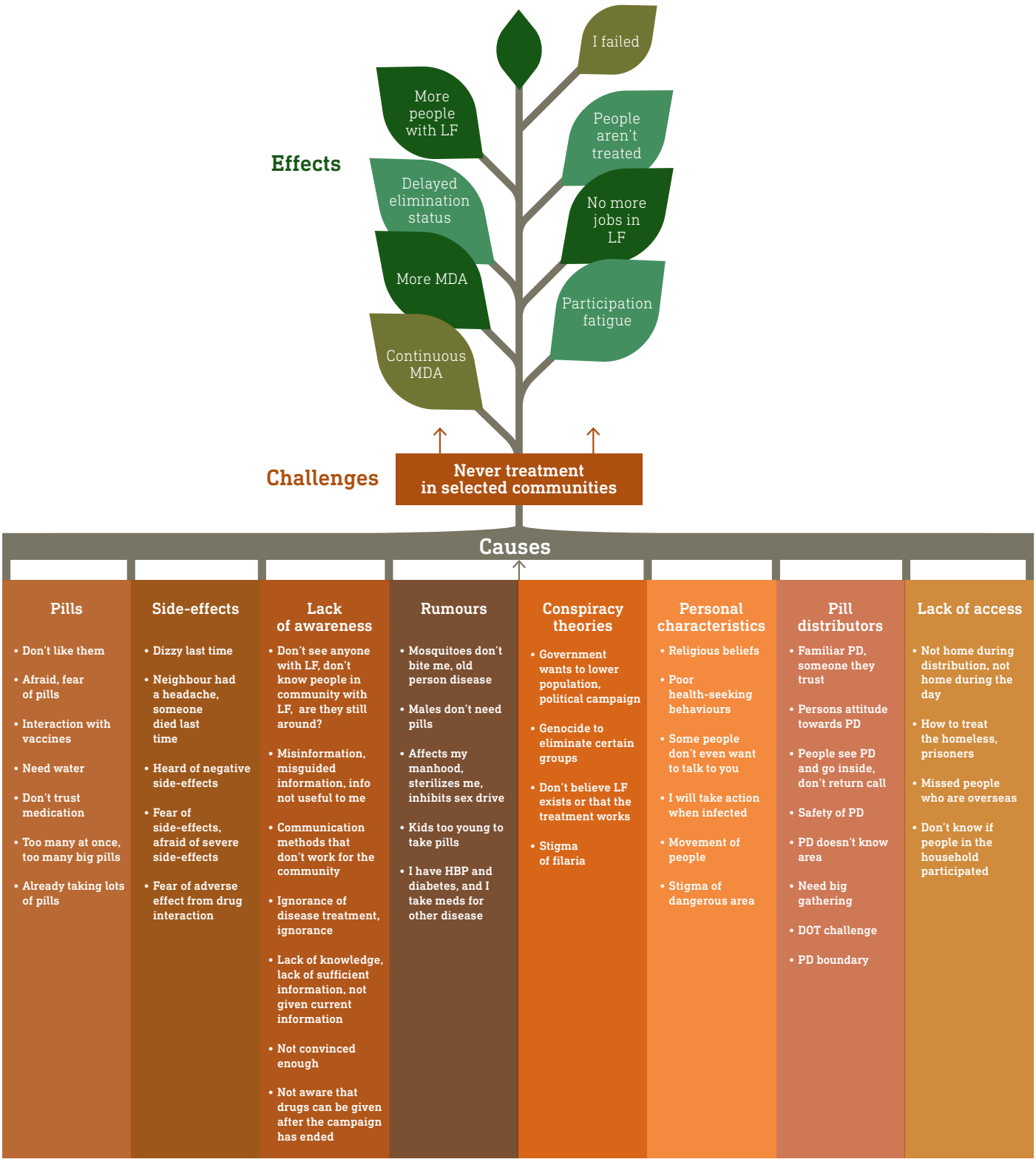
LF is targeted for global elimination as a public health problem. In the WHO Region of the Americas, Guyana is one of two countries still requiring MDA to interrupt transmission of LF. Despite achieving over 65% coverage in the last two MDA campaigns in 2019 and 2021, Mf was present in three selected communities in two regions of Guyana. Notably, a majority (4/5, 80%) of those with circulating Mf were classified as "never treated", indicating that they self-reported never having consumed tablets during any round of MDA for LF. To understand how to reach these individuals and their communities, the national NTD programme convened a two-day participatory workshop in May 2024 to collaborate with local stakeholders. Local stakeholders included nurses and midwives from the primary health care clinics, vector control senior operator, pill distributors (CDDs), local NGO representatives, national NTD programme personnel and health promotion specialists. Representatives from maternal and child health and TB control programmes were invited as special guest speakers.

The programme conducted the following activities to identify entry points to increase participation among the never treated individuals in Guyana:

1. Informal interviews with key stakeholders to contextualize information on Guyana.
2. Problem tree to understand never treatment in select communities where Mf was present (Fig. 17).
3. World Café to understand what works in reaching community members in select communities where Mf was present (Fig. 18).
4. Key message house to formulate messages for target groups (Fig. 19).
5. Analysis to understand strengths, weaknesses, opportunities, and threats for pill distributors.
6. Open discussion to invite guest speakers and identify MDA champions.

Fig. 17. Digital problem tree created during LF MDA planning in Guyana



DOT: directly observed therapy; HBP: high blood pressure; LF: lymphatic filariasis; MDA: mass drug administration; PD: pill distributor.

Source: NTD Programme, Guyana Ministry of Health.

Fig. 18. Easel pad output from World Café outlining effective strategies to reach men with LF MDA in Guyana

WHAT WORKS IN REACHING MEN?

- **Adequate information**
  - Dispel myths about fertility/sexual prowess
  - Using sport messages/references/appealing messages
- **Meeting at places of leisure/congregations**
  - Rhum shops
  - Bar
  - Churches
  - Coconut sticks
- **Listening from peers (other men)/mentors**
  - Pastor
  - Coaches
  - Village elders
  - Boss
- **Graphic messages**
- **Incorporate with other organizations that have already worked within the community (with men)**
- **Letting men know health is WEALTH**
- **Engage in games and sports**

Source: NTD Programme, Guyana Ministry of Health.

Fig. 19. Message house output from the Guyana LF MDA workshop

OBJECTIVE

How can we convince adult men to participate in the MDA?

Message #1	Message #2	Message #3
LF drugs help protect your manhood	It is safe with drug use and alcohol	It is a safe medication once use as prescribed
	Think of the people around you	
Facts	**Facts**	**Facts**
1. It reduces the risk of you getting LF	1. It does not affect the effectiveness of the drug	1. It will not harm you
2. Getting big balls can cause you to shoot blanks	2. There are no drug interactions with alcohol	2. Mild side-effects
3. No woman wants you with big balls/foot	3. You may be an unknown carrier	3. It only attacks the parasite

Target population

Adult men

LF: lymphatic filariasis; MDA: mass drug administration.

Source: NTD Programme, Guyana Ministry of Health.

Three themes on never treatment and participation in the MDAs emerged from the workshop including: concerns surrounding the safety of the pills, misinformation regarding the pills and the disease, and a general lack of awareness regarding the purpose and importance of participating in the MDA. As a result, a set of 10 actionable recommendations were proposed in preparation for the 2024 LF MDA:

1. Increase the number of pill distributors and supervisors in select communities where Mf was present.
2. Implement a large launching event in the community with the highest Mf.
3. Use sound trucks in selected communities where Mf was present ahead of the MDA to generate awareness and interest in the campaign.
4. Develop new messaging and informational content for men who go to rum shops in the community.
5. Implement specific outreach to community influencers in select communities where Mf infection was present.
6. Implement role-playing exercises to address various refusal scenarios through different levels of training.
7. Update the frequently-asked-question sheet for pill distributors and translate into French and Spanish.
8. Train pill distributors to capture the name, phone number and house information of those who refused MDA for follow up with the supervisor.
9. Intensify supervision, particularly in the second week of MDA as refusals increase.
10. Recap training with pill distributors on the first day before MDA begin.

This workshop increased understanding of the barriers to reaching all eligible individuals in selected endemic communities in Guyana. Of the 10 recommendations, nine were implemented during the MDA roll-out in July 2024, with mop-up activities carried out until September 2024. Final MDA coverage for the targeted areas exceeded 80%.

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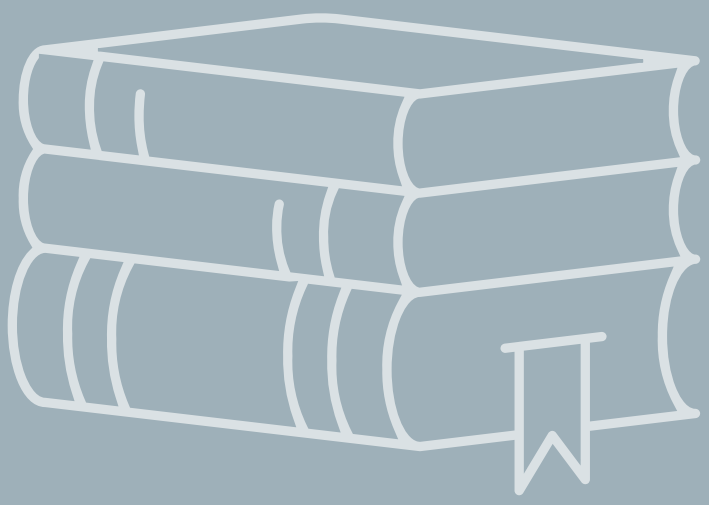

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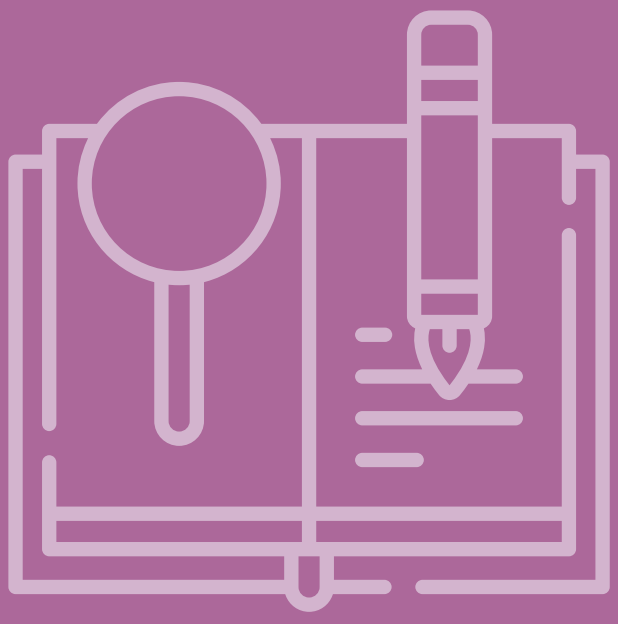
Annex 1. Methodology for the development of this toolkit



This toolkit was developed through a global consultative process involving experts from multiple regions of the World Health Organization (WHO) in which neglected tropical diseases (NTDs) are endemic to ensure its suitability across settings.

1. WHO became aware of the demand from Member States for technical guidance on never treatment through a series of virtual Research Links meetings to consolidate current evidence and determine priority operational and implementation research gaps in never treatment in NTD mass drug administration (MDA) hosted by iCHORDS and the Coalition for Operational Research on NTDs in 2020 and 2021. Guidance on the collection, analysis and use of data related to never treated was re-emphasized during an additional meeting in October 2022 to discuss progress in research, modelling data and programme experiences around the never treated.

2. In 2023, WHO formed a core drafting group, whose members are listed in Annex 2, to establish the scope of the toolkit, identify chapters and case studies, and draft sections. The approval of this WHO technical product was assessed against the document *WHO public health goods technical products on norms/standards, data and research (TPs) quality assurance companion: guidance for TP development.*[1] *The group met through virtual and in-person meetings to develop an outline and drafting plan and review the progress of the toolkit's development. Chapter leads organized virtual discussions. An October 2023 in-person meeting held in Chicago (United States of America) was held with all available core drafting group members to update progress and discuss emerging issues. WHO provided the final review of the toolkit content written by the Core Drafting Group.*

3. *WHO assigned a first round of peer reviewers (Annex 2) to the toolkit based on their expertise in the subject area. Peer reviewers provided feedback from May to June 2024.*

4. *Given that available data showed that never treatment was most prevalent in the South-East Asia Region and where the population requiring MDA is the largest, WHO convened an in-person meeting directly following the South-East Asia Regional Programme Review Group meeting on lymphatic filariasis in the region held in June 2024 to provide further regional feedback on the scope and development of the toolkit.*

5. *Following this meeting, WHO invited a second round of peer reviewers (Annex 2) from the South-East Asia Region to provide feedback on the toolkit in July 2024.*

Declarations of interests and their management

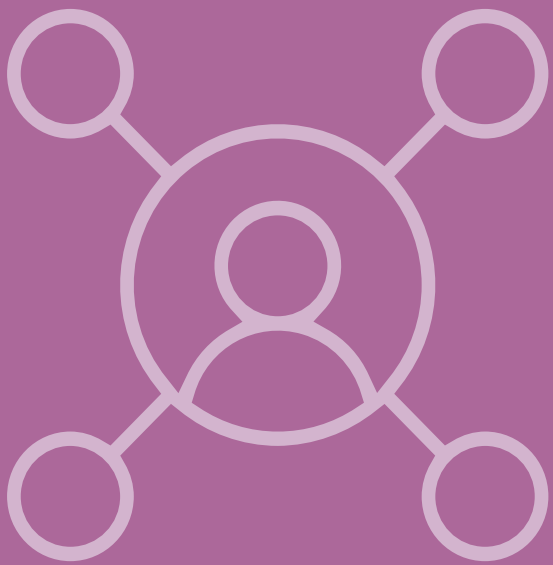
The "Declarations of interests for WHO experts" form was completed by all core drafting group members and peer reviewers and assessed by WHO. Any reported interests of concern were reported at the beginning of meetings. All external experts, in accordance with WHO policy, disclosed any potential conflicts of interest that might affect, or might reasonably be perceived to affect, their objectivity and independence in relation to the subject matter of the meetings. WHO reviewed each of the declarations and concluded that none could give rise to a potential or reasonably perceived conflict of interest related to the subjects discussed at the meeting or covered by the toolkit.

Disclaimer on presented data

In some instances, data presented in this toolkit are sourced from national or local authorities and may not represent WHO official statistics.

[1] Technical products on norms/standards, data and research (TPs). Quality assurance companion: guidance for TP development: quality assurance of TPs for 2023–2022 – Principle, criteria, process and checklists, March 2022. Geneva: World Health Organization [WHO public health goods].

Annex 2. Affiliations of those acknowledged



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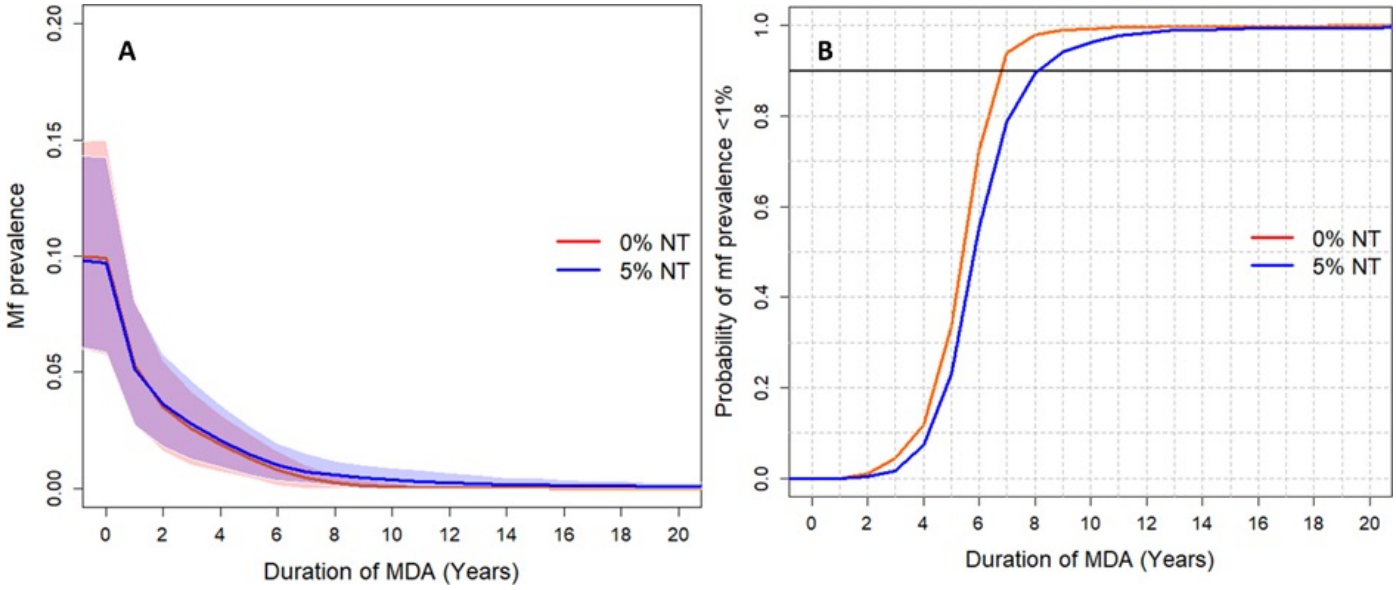
Annex 3. Further examples of modelling never treatment data

The NTD Modelling Consortium assessed the potential impact of never treatment on MDA programmes through mathematical modelling for lymphatic filariasis (LF) and schistosomiasis (SCH) *(1,2)*. Models suggested that higher proportions of people never treated increase the required duration of mass drug administration (MDA) needed to achieve the programme's objective, and the effect is stronger in settings with higher baseline prevalence.

For LF, modelling showed that the prevalence of microfilaraemia (Mf) declines somewhat less rapidly if a proportion of the population is never treated *(2)*. With a low percentage of never treatment, this only becomes visible after multiple treatment rounds. Fig. A3.1 presents an example of this in an anopheline area, with 10% baseline Mf prevalence and 80% of the eligible population treated with ivermectin and albendazole in each annual MDA round, using the TRANSFIL model. As can be seen in the graph on the left (A), on average, in the situation with 5% never treatment, it takes longer for the Mf prevalence to fall below the 1% Mf prevalence threshold, i.e. the threshold used by models to indicate that elimination as a public health problem is achieved, than in a situation with 0% never treatment. Shaded areas (transparent red and blue, respectively) represent the 90% prediction interval credible interval, i.e. 90% of the simulated results fall within these shaded areas. Where the prediction intervals around the lines overlap, the shaded area appears purple.

Fig. A3.1 Probability of achieving 1% Mf prevalence threshold, with different levels of never treatment



MDA: mass drug administration; Mf: microfilaraemia; NT: never treated.

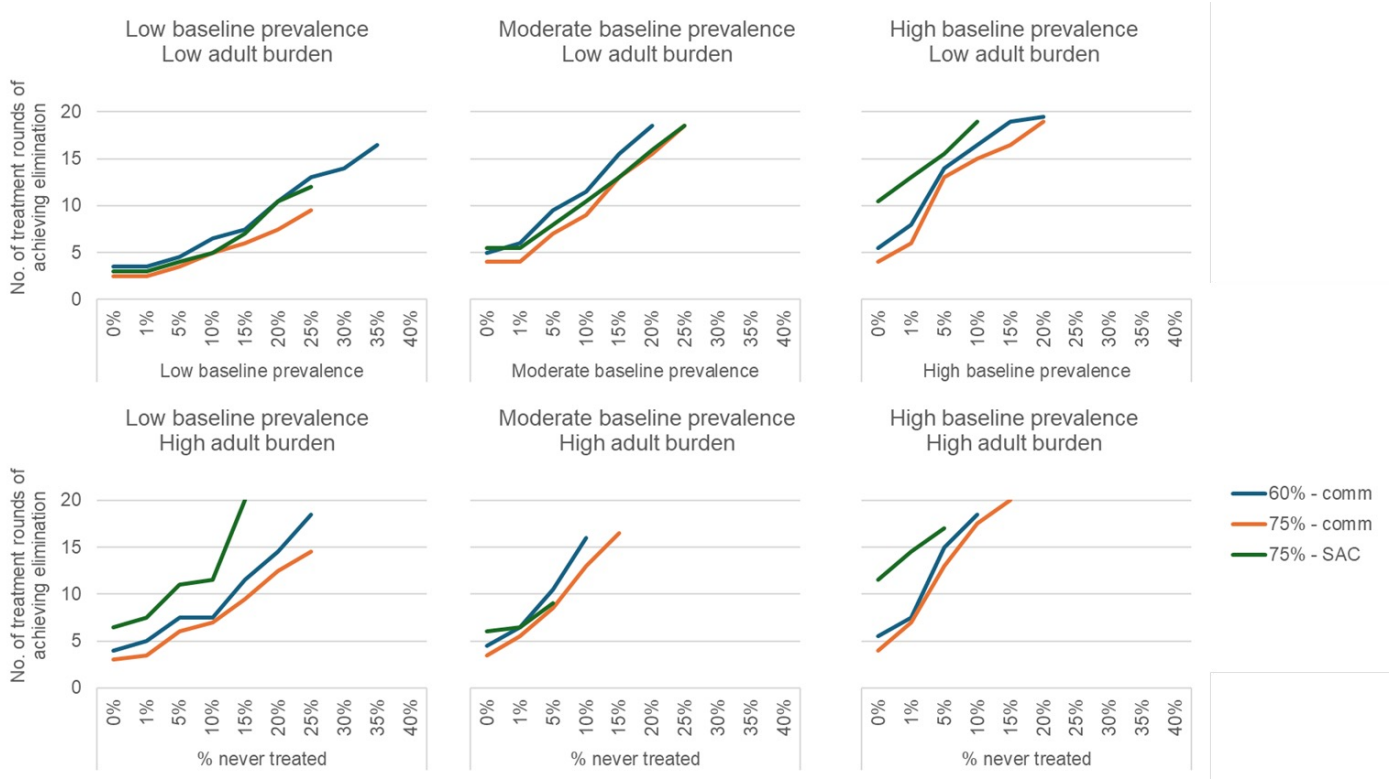
Source: Adapted with permission from *(2)*.

The graph on the right (B) shows how the probability of having achieved an Mf prevalence < 1% increases with increasing duration of MDA. The setting is the same as in graph A, and the red line corresponds to 0% proportion of individuals never treated. The blue line indicates 5% never treatment. The horizontal black line in indicates 90% probability of reaching the target. One or two extra treatment rounds are required to be 90% certain of achieving the threshold in the situation with 5% never treatment.

Modelling for schistosomiasis yielded very similar results (Fig. A3.2). Simulations were done by two different simulation models to predict the number of treatment rounds needed to achieve elimination of SCH as a public health problem, defined as < 1% prevalence of heavy intensity infections in school-aged children (SAC) *(1)*. The models found that the number of treatment rounds required for achieving elimination increase with increased baseline prevalence, increased prevalence in adults, and/or increased proportions of people never treated. Community-wide treatment (including preschool-aged children) could lead to elimination in all circumstances if coverage is good and never treatment distribution over the population is random.

In Fig. A3.2, the green line shows results for a strategy in which only SAC are treated with 75% coverage; the blue and orange lines show results for community-based treatment programmes with treatment from ages two years and above, reaching 60% or 75% of the eligible population, respectively. In areas with a low baseline prevalence and a high adult burden, elimination is still achievable within 7 years by community-wide treatment if never treatment is ≤ 5% and ≤ 10% respectively. However, even a small percentage of never treatment of just 1% jeopardizes the success of elimination programmes in moderate- and high-endemic settings with a high adult burden. Especially in high-endemic areas with a high burden in adults, strong efforts are needed to optimize coverage and minimize never treatment and additional interventions may be needed to achieve the goal.

Fig. A3.2. Number of treatment rounds required for achieving elimination of SCH as a public health problem, by burden of adult infection and proportion of population never treated



Comm: community; SAC: school-aged children.

Source: Adapted with permission from *(1)*.

References for Annex 3

1. Kura K, Mutono N, Basáñez MG, Collyer BS, Coffeng LE, Thumbi SM, et al. How does treatment coverage and proportion never treated influence the success of *Schistosoma mansoni* elimination as a public health problem by 2030? Clin Infect Dis. 78;2024(Suppl 2):S126–S130 (https://doi.org/10.1093/cid/ciae074).

2. Kura K, Stolk WA, Basáñez M-G, Collyer BS, De Vlas SJ, Diggle PJ et al. How does the proportion of never treatment influence the success of mass drug administration programmes for the elimination of lymphatic filariasis? Clin Infect Dis. 78;2024(Suppl 2):S93–S100 (https://doi.org/10.1093/cid/ciae021).

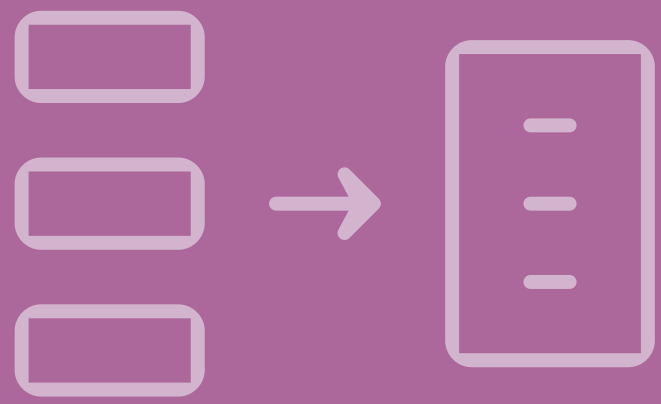
Annex 4. Sample data collection tool for supervisor's coverage tool

District: _____ **Locality:** _____ **Supervision Zone:** _____

Interviewer: _____ **Date:** _____

	Person selected				Type of response								
No.	**HH code**	**Age**	**Gender (M/F)**	**Tick (x) if verbal consent/ assent was given.**	**S=Self, P=Proxy, M=Mobile**	**Did you know about the MDA campaign for {NTD}?**	**If yes, how did you hear about it?** R=radio; T=television; K=crier; B=banner; S=social network; L=other	**Did you go to the distribution post to take the medicine or did someone come to your house to give you medicine?**	**If no, why not?** A=absent; D=drug distributor did not come; E=side-effects; I=ineligible; K= did not know about MDA; P=post was too far/could not find post; S=medicine out of stock; O=other *(If "other", explain)*	**Did you ingest the medicine?**	**If no, why not?** E=side-effects; I= ineligible; N=not enough information; T=taste of medicine; O=other (*If "other", explain*)	**Including this current MDA, how many times have you taken medicine for *{NTD}*?** 0=never; 1=one time; 2=two or more times	**Comments**
1			M F			Yes No		Yes No		Yes No		0 1 2	
2			M F			Yes No		Yes No		Yes No		0 1 2	
3			M F			Yes No		Yes No		Yes No		0 1 2	
4			M F			Yes No		Yes No		Yes No		0 1 2	
5			M F			Yes No		Yes No		Yes No		0 1 2	
6			M F			Yes No		Yes No		Yes No		0 1 2	
7			M F			Yes No		Yes No		Yes No		0 1 2	
8			M F			Yes No		Yes No		Yes No		0 1 2	
9			M F			Yes No		Yes No		Yes No		0 1 2	
10			M F			Yes No		Yes No		Yes No		0 1 2	
11			M F			Yes No		Yes No		Yes No		0 1 2	
12			M F			Yes No		Yes No		Yes No		0 1 2	
13			M F			Yes No		Yes No		Yes No		0 1 2	
14			M F			Yes No		Yes No		Yes No		0 1 2	
15			M F			Yes No		Yes No		Yes No		0 1 2	
16			M F			Yes No		Yes No		Yes No		0 1 2	
17			M F			Yes No		Yes No		Yes No		0 1 2	
18			M F			Yes No		Yes No		Yes No		0 1 2	
19			M F			Yes No		Yes No		Yes No		0 1 2	
20			M F			Yes No		Yes No		Yes No		0 1 2	
Total (yes response)						_____		_____		_____			

Annex 5. Combining results from multiple supervisor's coverage tools



When supervisor's coverage tools (SCTs) are conducted in multiple supervision areas in a district for a given mass drug administration (MDA), these data can be combined, using weighting, and used to estimate the prevalence of each indicator (Table A5.1). When combining multiple SCTs, the resulting prevalence estimates can only be extrapolated to areas represented by an SCT; these prevalence estimates will not be representative of unsampled supervision areas. Below is an example of how to calculate the weighted prevalence estimate for any of the indicators (including never treatment) in an SCT.

Table A5.1. Pooling never treatment estimates across individual supervision areas to get an estimate of the prevalence of never treatment across the sampled area of the implementation unit

SA	SA sample size (m)	SA sample number never treated (c)	SA sample proportion never treated (q=c/m)	SA population (N_i)	SA weight ($w=N_i/\Sigma N_i$)	w x q
SA_1	20	2	0.1	1700	0.2391	0.024
SA_2	20	1	0.05	1205	0.1695	0.008
SA_3	20	0	0	1230	0.1730	0.000
SA_4	20	3	0.15	1260	0.1772	0.027
SA_5	20	2	0.1	700	0.0985	0.010
SA_6	20	4	0.2	1015	0.1428	0.029
TOTAL	**120**			**7110**		**0.097**
Pooled never treated estimate: 9.7% (95% CI 4.4–15.0%)						

SA: supervision area.

ΣN_i = the summation of all the SA populations (N_i); in this example it would mean adding N_1-N_6, which corresponds to the total populations in SA_1 – SA_6.

The combined estimate of the proportion never treated across the six supervision areas that conducted SCTs is the total of the rightmost column (highlighted in green). To calculate the 95% confidence interval for the proportion, we can use the following formula:

$$p \pm 1.96 \sqrt{\frac{(p(1-p)}{\Sigma m_i}}$$

Where p = the never treated prevalence estimate (sum of the "*w x q*" column) and Σm_i = the sum of the sample sizes across the supervision areas. In this example, Σm_i=120 and p≈0.09738 so the pooled estimate and interval for never treatment across the six supervision areas are 9.7% (4.4–15.0%). Confidence intervals could be calculated if one wants to measure if never treatment is decreasing over time or to compare to a disease-specific threshold of never treatment.

Annex 6. Sample data collection tool for epidemiological monitoring survey

District: _____ **Locality:** _____ **Site name:** _____

Enumerator: _____ **Date:** _____

HH Code	Age	Gender (M/F)	Address	**RDT1 Result** P=positive, N=negative, I=invalid, R=refused, A=absent	**RDT2 Result** *(if invalid on RDT1)* P=positive, N=negative, I=invalid, R=refused	**Test for Mf made?**^ (*if RDT1 or RDT2 is positive*)	**Treated?** (*if RDT1 or RDT2 is positive*)	**Including this current MDA, how many times have you taken medicine for LF?** 0=never; 1=one time; 2=two or more times	**When did you take the medicine for LF?** (*if one time*) {month/year of last MDA round}, 2–5 years ago, more than 5 years ago	**What is the primary reason you have never taken medicine for LF?** (*if never*) A=absent; D=drug distributor did not come; E= side-effects; I=ineligible; K=did not know about MDA; S=medicine out of stock, O=other *(if "other", explain)*	**Comments**
1		M F				Yes No	Yes No	0 1 2			
2		M F				Yes No	Yes No	0 1 2			
3		M F				Yes No	Yes No	0 1 2			
4		M F				Yes No	Yes No	0 1 2			
5		M F				Yes No	Yes No	0 1 2			
6		M F				Yes No	Yes No	0 1 2			
7		M F				Yes No	Yes No	0 1 2			
8		M F				Yes No	Yes No	0 1 2			
9		M F				Yes No	Yes No	0 1 2			
10		M F				Yes No	Yes No	0 1 2			
11		M F				Yes No	Yes No	0 1 2			
12		M F				Yes No	Yes No	0 1 2			
13		M F				Yes No	Yes No	0 1 2			
14		M F				Yes No	Yes No	0 1 2			
15		M F				Yes No	Yes No	0 1 2			
16		M F				Yes No	Yes No	0 1 2			
17		M F				Yes No	Yes No	0 1 2			
18		M F				Yes No	Yes No	0 1 2			
19		M F				Yes No	Yes No	0 1 2			
20		M F				Yes No	Yes No	0 1 2			

LF: lymphatic filariasis; MDA: mass drug administration; Mf: microfilaraemia; RDT: rapid diagnostic test.

^Tests for Mf are usually read and cross-checked in laboratories, so data are aggregated later.

Annex 7. Sample data collection tool for review of mass drug administration register

District: ____ **Community:** ____

Name of CDD/Community health nurse: ________________________________ **Number of prior MDA rounds:** __________________________________ **Date:** ____________________

Name of individual (*list all who missed MDA in the register as well as those not in the register*)	**House number**	**Captured in register?**	**Consent?** (*if "no", no further action required*)	**Gender (M/F)**	**Age**	**Number of MDAs missed**	**Reasons for missing MDA** (*absence, side-effects, unaware of MDA, pregnant/breastfeeding, sickness*)	**RDT done?**	**RDT results** (*if done*) P=positive, N=negative, I=invalid	**Treated?**
		Yes No	Yes No	M F				Yes No		Yes No
		Yes No	Yes No	M F				Yes No		Yes No
		Yes No	Yes No	M F				Yes No		Yes No
		Yes No	Yes No	M F				Yes No		Yes No
		Yes No	Yes No	M F				Yes No		Yes No
		Yes No	Yes No	M F				Yes No		Yes No
		Yes No	Yes No	M F				Yes No		Yes No
		Yes No	Yes No	M F				Yes No		Yes No
		Yes No	Yes No	M F				Yes No		Yes No
		Yes No	Yes No	M F				Yes No		Yes No
		Yes No	Yes No	M F				Yes No		Yes No
		Yes No	Yes No	M F				Yes No		Yes No
		Yes No	Yes No	M F				Yes No		Yes No

MDA: mass drug administration; RDT: rapid diagnostic test.

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