

Transmission assessment surveys in the Global Programme to Eliminate Lymphatic Filariasis



World Health
Organization

WHO position statement



In 1997, the 50th World Health Assembly resolved to eliminate lymphatic filariasis as a public health problem.^{1,2} In response, the World Health Organization (WHO) established the Global Programme to Eliminate Lymphatic Filariasis to assist Member States in achieving this goal by 2020. The global programme has two components (i) reducing prevalence of infection to levels at which it is assumed that transmission can no longer be sustained; and (ii) managing morbidity and preventing disability.

Mass drug administration

Transmission occurs when microfilariae, produced by adult worms and circulating in the blood of an already-infected human, are ingested by a mosquito during blood-feeding, develop into infective larvae and migrate into the lymph system of a new human host when the mosquito bites. In order to eliminate lymphatic filariasis, WHO recommends treatment using combinations of two medicines delivered to entire populations at risk through a strategy known as mass drug administration (MDA).

Ivermectin and albendazole are administered through MDA in areas where onchocerciasis is co-endemic; diethylcarbamazine and albendazole are administered in areas where onchocerciasis is not co-endemic. These medicines safely and effectively reduce the number of microfilariae circulating in the blood. Delivering MDA annually in an endemic community for at least 5 years at adequate levels of coverage – estimated to be at least 65% of the total population in endemic areas – should be able to achieve (i) a reduction in the density of microfilariae circulating in the blood of infected individuals and (ii) a reduction in the prevalence of infection in the entire community to levels at which it is assumed that microfilariae can no longer be transmitted by mosquito vectors to new human hosts.

WHO recommends four sequential programmatic steps to eliminate lymphatic filariasis through MDA (*Figure 1*):

- mapping of the geographical distribution of the disease;
- administering MDA for at least 5 years to reduce the number of microfilariae circulating in the blood to levels that will likely prevent mosquito vectors from transmitting infection;
- implementing surveillance after discontinuation of MDA; and
- confirming interruption of transmission at the national level.

¹ *Elimination of lymphatic filariasis as a public health problem*. Geneva, World Health Organization, 1997 (WHA50.29).

² The operational definition of elimination is reduction in the prevalence of infection with *Wuchereria bancrofti*, *Brugia malayi* or *B. timori* to below target thresholds in all endemic areas in all countries. The indicator is prevalences as defined for the various species and vector complexes in transmission assessment surveys.

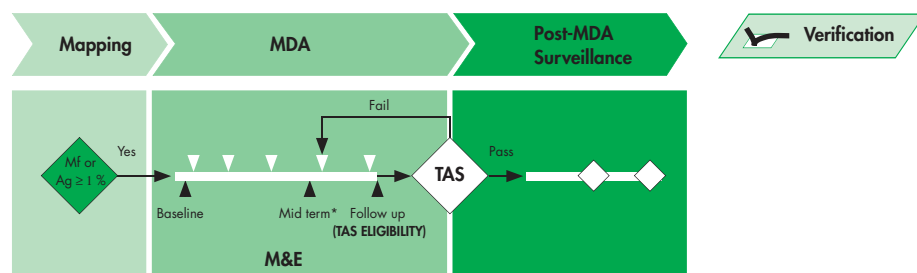


Figure 1. Programmatic steps for interrupting transmission of lymphatic filariasis through mass drug administration (MDA)

What is a transmission assessment survey?

Effective monitoring and evaluation is important throughout the lifespan of the programme. National elimination programmes must be able to monitor MDA effectively, assess whether infection has been reduced to levels where transmission is assumed to be no longer sustainable and recrudescence is unlikely to occur, and implement adequate surveillance after MDA to reveal whether recrudescence has occurred. The dynamics of transmission will differ by the type of filarial parasites and prevailing mosquito vectors; as will the target threshold below which transmission is assumed no longer to be sustainable even in the absence of MDA. WHO has published a standard methodology called the Transmission Assessment Survey (TAS) to assess whether a series of MDA have successfully reduced the prevalence of infection to levels equal to or below the critical cut-off threshold for the various vector species and complexes, and to decide whether MDA can be stopped.³ Transmission assessment surveys should be a standard component of monitoring and evaluation for elimination programmes. The objectives of a TAS are:

- to provide a simple, robust survey design for documenting that the prevalence of lymphatic filariasis among 6–7 year old children is below a predetermined threshold;
- to provide the evidence base for programme managers that MDA can be stopped; and
- to assure national governments that national programmes have achieved their elimination goals.



WHO Position Statement

by Neglected Tropical Diseases (NTD)

Transmission Assessment Surveys (TAS) as a component of MDA have successfully reduced the prevalence of infection to levels equal to or below the critical cut-off threshold for the various vector species and complexes, and to decide whether MDA can be stopped. Transmission assessment surveys should be a standard component of monitoring and evaluation for elimination programmes.

WHO recommends that all Member States where lymphatic filariasis is endemic should implement transmission assessment surveys at the end of the MDA phase in order to transition to a post-MDA surveillance phase.

³ Monitoring and epidemiological assessment of mass drug administration in the Global Programme to Eliminate Lymphatic Filariasis: a manual for national elimination programmes. Geneva, World Health Organization, 2011 (WHO/HTM/NTD/PCT/2011.4).

When and how are transmission assessment surveys conducted?

TAS eligibility criteria

As detailed in the methodology,³ transmission assessment surveys are implemented in geographical areas of endemic countries based on eligibility criteria. An implementation unit is considered eligible when (i) at least 5 rounds of MDA have been implemented, (ii) coverage exceeds 65% in the total population of the unit and (iii) the prevalence of infection in sentinel and spot-check sites is below 1% (for the presence of microfilariae) or below 2% (for the presence of antigen using the immunochromatographic test [ICT]). Some areas of an endemic country may therefore be eligible for a TAS and, depending on the results, can stop MDA, while other areas may still require MDA for a period of time. Eventually, it should be possible to stop MDA in all areas where lymphatic filariasis was previously endemic based on the results of the TAS.

TAS design

The design of the TAS is adapted to the type of filarial parasite and the prevailing mosquito vector, the net rate of primary-school enrolment, the size of the population aged 6–7 years, the number of schools or enumeration areas, and the feasibility of using different survey methods. The TAS is implemented in an area designated as an evaluation unit, which may not be the same as an implementation unit. Implementation units can be combined if they meet the eligibility criteria for TAS and have similar epidemiological features, to make up one evaluation unit, provided the human population of an evaluation unit does not exceed 2 million. A very large implementation unit can be divided into several evaluation units.

In order to help programme managers decide which survey strategy to use and calculate automated sample sizes, an Excel-based tool called the Survey Sample Builder is available.⁴ Depending upon the outcomes of this tool, programme managers can conduct blood-testing using either a school-based survey or a community-based household survey, targeting children aged 6–7 years (Figure 2). The design of the TAS gives managers a critical cut-off value. If the number of antigen-positive (*Wuchereria bancrofti*) or antibody-positive (*Brugia* spp.) results is equal to or below this number, the area has “passed” and it is assumed that transmission is no longer sustainable. A national programme can therefore decide to stop MDA and implement post-MDA surveillance. If the number of antigen- or antibody-positive results exceeds this number, the area has “failed” and MDA should be continued for two more rounds.

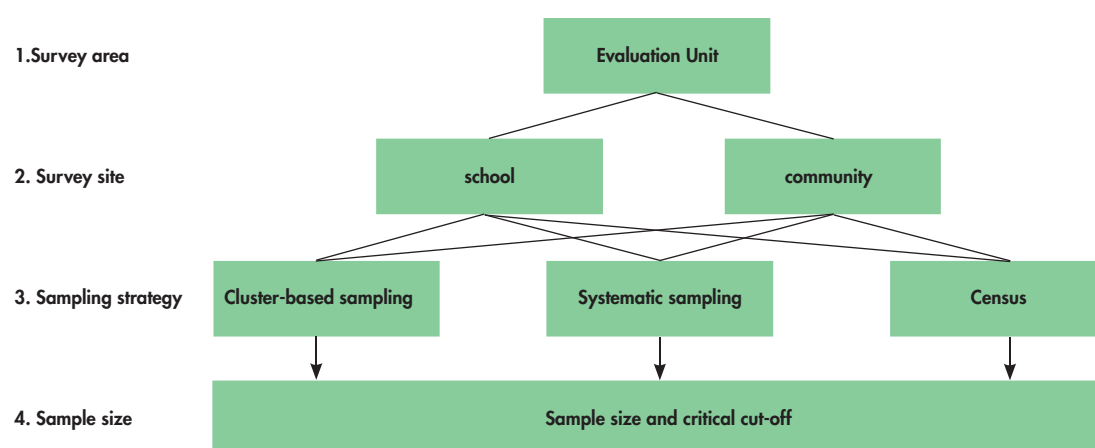


Figure 2. Steps for determining survey design in transmission assessment surveys

Post-MDA surveillance

A TAS is not only an important decision-making step towards stopping MDA at the end of the MDA phase but is also recommended as a method of post-MDA surveillance to detect whether recrudescence of transmission has occurred. Surveys should be repeated at least twice, with an interval of 2–3 years, in order to provide evidence that recrudescence has not occurred and therefore transmission can be considered as interrupted, before the final phase of verification of the absence of transmission can be initiated. Elimination is verified at national level.

⁴ <http://www.filariaasis.us/resources.html>

What are the key elements for successfully implementing transmission assessment surveys?

Successful implementation of transmission assessment surveys leading to achievement of the global elimination goal by 2020 requires five key elements.

- **Advocacy** – to promote TAS implementation as a component of standardized monitoring and evaluation of elimination programmes;
- **Evidence-based decision-making** – to guide national programmes in their decision-making and to assess global progress towards the elimination goal;
- **Capacity strengthening** – to develop adequate human and financial resources at national and local levels;
- **Collaboration** – to consider all options for collaboration among programmes and other partners to ensure appropriate implementation and sound programmatic decisions.
- **Integration** – to explore opportunities for integration in planning, implementation and reporting, in order to ensure the rational use of resources.

Conclusion

WHO recommends that all Member States where lymphatic filariasis is endemic should implement transmission assessment surveys at the end of the MDA phase in order to move to the post-MDA surveillance phase. Repeated TAS surveys are encouraged as a means of post-MDA surveillance and eventually to provide evidence that transmission has successfully been interrupted. Implementation of TAS will also help endemic countries to meet the targets set by the Strategic Plan of the Global Programme to Eliminate Lymphatic Filariasis (*Table 1*).

The success of the Global Programme to Eliminate Lymphatic Filariasis will depend on the collective efforts of national governments, WHO, nongovernmental organizations, donors, pharmaceutical and diagnostics companies, endemic communities and other partners to document that transmission is effectively interrupted. All Member States are therefore encouraged to support national, regional and global efforts to reach the 2020 target for elimination of lymphatic filariasis.

Table 1. Targets for interrupting transmission for 81 countries in the Global Programme to Eliminate Lymphatic Filariasis, by year, 2012–2020^a

YEAR	CATEGORY (OBJECTIVE)			
	Starting (implementation begun)	Scaling up MDA (full geographical coverage achieved)	Stopping interventions and starting surveillance (MDA stopped and post-MDA surveillance established)	Verifying absence of transmission (countries verified as free of lymphatic filariasis)

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