



# Chemoprevention Options in Advanced Control and Elimination of Malaria (CHOICE) Framework

A decision-support framework to guide the selection, targeting and tailoring of chemoprevention strategies

The Malaria Elimination Initiative

**UCSF** Institute for  
Global Health  
Sciences

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The Malaria Elimination Initiative is an initiative of the UCSF Institute for Global Health Sciences.

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### **Recommended Citation**

Malaria Elimination Initiative (2021). *Chemoprevention Options in Advanced Control and Elimination of Malaria (CHOICE) Framework*. San Francisco: Institute for Global Health Sciences, University of California, San Francisco.

Produced in the United States of America.  
First Edition, June 2021.

The CHOICE framework provides decision-making guidance to support national malaria programs in the selection, implementation, monitoring and evaluation, and iterative adaptation of chemoprevention strategies in consideration of local transmission dynamics, programmatic objectives, and resource constraints. The CHOICE framework supports decision making specifically around the use of Mass Drug Administration and screen and treat strategies for which policy level guidance is not available. Information supporting the implementation, planning and measurement of Seasonal Malaria Chemoprevention (SMC), Intermittent Preventive Therapy of malaria in pregnancy (IPTp) and in infants (IPTi) can be found in WHO guidance documents.

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The Malaria Elimination Initiative (MEI) at the University of California San Francisco (UCSF) believes a malaria-free world is possible within a generation. As a forward-thinking partner to malaria-eliminating countries and regions, the MEI generates evidence, develops new tools and approaches, disseminates experiences, and builds consensus to shrink the malaria map. With support from the MEI's highly-skilled team, countries around the world are actively working to eliminate malaria.

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## Acknowledgements

We would like to thank the many individuals who contributed to the development of CHOICE, in particular Alyssa Young, the London School of Hygiene and Tropical Medicine, and the Anti-Parasite Roll Out Group. The Anti-Parasite Roll Out Group was a time-bound collaboration of national malaria programs, malaria research organizations, funders and global stakeholders to determine operational challenges to the implementation of MDA and screen and treat strategies. Catherine Maiteki and Leopoldo Villegas provided critical reviews. We also wish to thank our colleagues at the University of California, San Francisco (UCSF) Malaria Elimination Initiative (MEI) who supported the development of the tool: Michelle Hsiang, Henry Ntuku, Cara Smith Gueye, Emily Dantzer, Saehee Lee and Ellie Anderson.

CHOICE was developed by UCSF MEI team members Roly Gosling, Kelly Harvard and Ingrid Chen.

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# Acronyms

API	Annual Parasite Index
ESPT	Entomological Surveillance Planning Tool
fMDA	Focal Mass Drug Administration
fSAT	Focal Screen and Treat
HRP	High-Risk Population
IPTi	Intermittent preventive treatment in infants
IPTp	Intermittent preventive treatment of malaria in pregnancy
IRS	Indoor Residual Spraying
LLIN	Long Lasting Insecticide-Treated Net
MDA	Mass Drug Administration
RACD	Reactive Case Detection
RDT	Rapid Diagnostic Test
SAT	Screen and Treat
SMC	Seasonal Malaria Chemoprevention

## About the MEI Malaria Elimination Toolkit

The MEI Malaria Elimination Toolkit is a set of proven tools, frameworks, and guides to help malaria endemic countries accelerate progress toward malaria elimination. Developed by the Malaria Elimination Initiative (MEI) at the University of California, San Francisco (UCSF), the toolkit addresses the unique challenges faced by national malaria programs in heterogeneous transmission settings. These tools have been used successfully at the national and/or subnational levels, leading to important changes in malaria policy and practice.

The MEI Malaria Elimination Toolkit focuses on three primary areas: situation assessment, tailored responses, and program management and

sustainability – with the ultimate goal of building capacity and optimizing a country or district’s ability to advance toward elimination. These tools help malaria programs understand the drivers of transmission in a target area and the readiness of the health system for elimination; decide what actions to take and how to tailor its response; and ensure efforts are well-managed and sustainably funded.

The MEI offers direct technical assistance to support the adoption, tailoring, and implementation of its tools, frameworks, and guidelines. Please contact us to learn more at [mei@ucsf.edu](mailto:mei@ucsf.edu), or visit our website at [shrinkingthemalariamap.org](http://shrinkingthemalariamap.org).

### The MEI Malaria Elimination Toolkit



#### Situation Assessment

What are the drivers of transmission?  
What is the readiness of the health system for elimination and what are the gaps?



#### Tailored response

What actions should the program take based on identified and characterized gaps?



#### Program management and sustainability

How does the program effectively manage and fund malaria elimination?

## Introduction

As malaria can be prevented and treated using medicines, antimalarial drugs are a powerful asset for malaria control and elimination programs. All countries with endemic malaria use drugs for clinical case management, where antimalarial medicines are used to treat confirmed clinical cases of malaria. Beyond clinical case management, drugs can be used to prevent and treat malaria among specific at-risk populations. We refer to these as chemoprevention strategies, which can be used to 1) reduce malaria transmission; 2) reduce malaria morbidity; 3) improve surveillance; and 4) respond to emergencies including malaria outbreaks or situations where the health system is strained (e.g. during an Ebola outbreak or a pandemic).

When implementing a chemoprevention strategy, there are numerous options to choose from, depending on programmatic objectives, local contexts, resources available, and specific transmission dynamics. Chemoprevention strategies can be broadly categorized as Mass Drug Administration (MDA) strategies, where every member of a defined population or every person living in a defined geographical area (except those for whom the medicine is contraindicated) are administered antimalarial treatment, irrespective of their disease status, or Screen and Treat (SAT) approaches, where testing is administered to a population at risk for malaria and those that test positive are treated with antimalarial drugs. The initiation of MDA or SAT strategies can be reactive or proactive. Reactive responses are triggered upon the detection of positive cases of malaria infection, whereas proactive strategies target specific populations with known risks of malaria infection, often based on geographical location, or behavioral or occupational risks within a given population. Chemoprevention strategies can be implemented at the district, village, or focal level.

Although chemoprevention strategies have been used for more than 100 years, most national malaria programs restrict chemoprevention to those strategies where policy level guidance is available, namely: Seasonal Malaria Chemoprevention (SMC), Intermittent Preventive Treatment in infants (IPTi),

### Chemoprevention Options

- Mass Drug Administration (MDA)
- Screen and Treat (SAT)
- Seasonal Malaria Chemoprophylaxis (SMC)
- Intermittent Preventive Treatment in infants (IPTi)
- Intermittent Preventive Treatment in pregnancy (IPTp)
- Reactive Case Detection (RACD)

and Intermittent Preventive Treatment in pregnancy (IPTp). MDA has been used for interruption of *falciparum* malaria in areas approaching elimination, to reduce risk for spread of multi-drug resistance in the Greater Mekong Subregion, or during epidemics or complex emergencies. In low transmission settings many programs adopt Reactive Case Detection (RACD), a variant of SAT which is resource and time intensive, and has limited impact on malaria prevalence and incidence. This decision framework is aimed at national malaria program managers that are interested in using MDA and SAT chemoprevention strategies, but expressed uncertainty on which strategies to use in various transmission settings, and when to start, switch, or stop their implementation as local transmission dynamics change.

Designed for targeting *Plasmodium falciparum* malaria, the Chemoprevention Options in Advanced Control and Elimination of Malaria (CHOICE) framework was developed in response to the program for guidance on developing chemoprevention strategies tailored to local transmission dynamics and contexts. This framework guides programs to design chemoprevention strategies based on programmatic objectives, local transmission dynamics, human and financial capacity, the availability of infrastructure, and the socio-cultural context at the unit of implementation.

## What is the CHOICE framework?

The CHOICE framework offers practical decision support to national malaria programs and sub-national staff to guide the selection, implementation, monitoring and evaluation, and iterative adaptation of malaria chemoprevention strategies in settings with *P. falciparum* malaria. This framework is structured to provide a step-by-step approach to characterize transmission settings, select a strategy to implement (MDA, SAT, or a hybrid of both approaches), tailor its implementation to the local context (proactive or reactive approach), assess financial resources required for the intervention, monitor and evaluate progress, and establish when and how to change strategies in response to shifting transmission dynamics.

This framework is intended to guide the design and implementation of all chemoprevention strategies that do not yet have policy-level guidance available. For strategies that have policy-level guidance available; SMC, IPTi, IPTp, and MDA use in emergency settings, official guidance should be followed on when they should and should not be used, instead of this framework. This framework is not an operational manual. Operational manuals

for large-scale MDA and Reactive Case Detection are available from the World Health Organisation (WHO).<sup>1,2</sup>

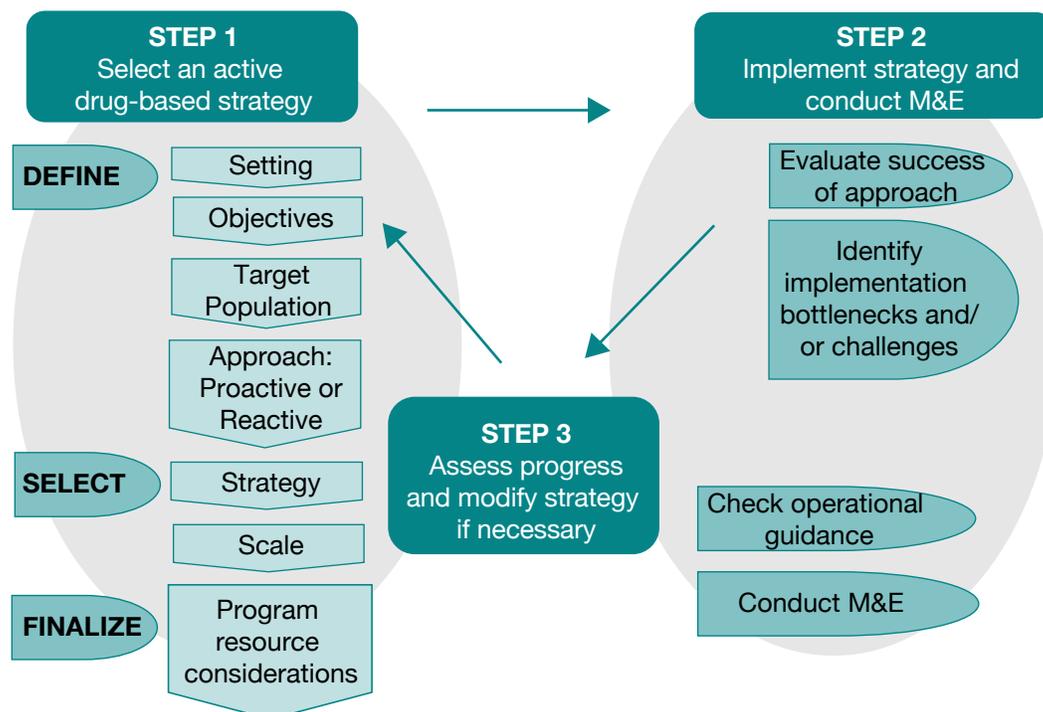
## Who should use this framework?

This framework is intended for use by national malaria program managers and sub-national health officers as well as any partners or research institutions involved in the design, implementation, and/or monitoring and evaluation of chemoprevention strategies for malaria control and elimination.

Technical assistance for the use of this framework is not anticipated; however, assistance is available to support the tailoring and implementation of all MEI tools. Please contact us to learn more at [mei@ucsf.edu](mailto:mei@ucsf.edu), or visit our website at [shrinkingthemalaria-map.org](http://shrinkingthemalaria-map.org).

- 1 World Health Organization (2017). Mass drug administration for *falciparum* malaria: a practical field manual. ISBN 978-92-4-151310-4.
- 2 World Health Organization (2018). Malaria surveillance, monitoring and evaluation: a reference manual. Geneva, Switzerland. <https://www.who.int/malaria/publications/atoz/9789241565578/en/>.

**Figure 1. The CHOICE framework process**



## How is this framework used?

This framework is useful for countries that are implementing routine surveillance, vector control, and case management strategies, and that are interested in chemoprevention strategies beyond the few that have official policy guidance on use (SMC, IPTi, IPTp, MDA in defined settings).<sup>1</sup> This framework will guide the development of chemoprevention strategies tailored towards local contexts and transmission settings, and can be used during national and sub-national malaria planning meetings, reviews and evaluations, and when developing operational research plans.

## How do I navigate this framework?

The CHOICE framework is organized into three steps to help guide the decision-making process (Figure 1):

1. **Step 1:** Uses six decision points to guide the selection of a chemoprevention strategy that is suitable to local settings, contexts, and human and financial resources available.
2. **Step 2:** Supports the development of a monitoring and evaluation (M&E) process.
3. **Step 3:** Provides practical guidance on when to shift strategies.

### Key Messages

- Chemoprevention strategies have been shown to be effective in reducing the burden of malaria, and are frequently deployed in both control and elimination settings as part of national malaria programs activities to drive down local transmission.
- There are numerous variants of chemoprevention strategies available for national malaria programs to choose from, depending on programmatic objectives, specific transmission dynamics, local contexts, and resources available.
- National program managers need more guidance on which chemoprevention strategies to use across different transmission settings, as well as when to shift strategies as transmission dynamics change.
- The goal of this framework is to provide decision-making guidance to support national malaria programs in the selection of chemoprevention strategies in consideration of local transmission dynamics, programmatic objectives, and resource constraints.
- Any chemoprevention strategy that does not yet have official policy-level guidance should be introduced in a region with optimized case management, vector control, and surveillance systems in place.

## Key Concepts

**Chemoprevention:** Administration of a medicine, at predefined intervals, to prevent either the development of an infection or progression of an infection to manifest disease. Examples include seasonal malaria chemoprevention (SMC), Intermittent Preventative Treatment in pregnancy (IPTp), and Intermittent Preventative Treatment in infants (IPTi).

**Foci Management:** Adoption of system of focus identification, characterization, classification and follow-up (further described in WHO's *Framework for Malaria Elimination*).<sup>3</sup>

**High-risk populations (HRPs):** Groups of people who share socio-demographic, geographic and/or behavioral characteristics that place them at higher risk of infection, such as low utilization of health services and interventions, or behaviors associated with increased exposure to *Anopheles* mosquitoes, the vector of malaria parasites.

**Hotpops:** High-risk populations who share socio-demographic behavioral characteristics of that place them at high risk of malaria infection. These are often occupational groups, but can be linked to certain migration pathways or religious gatherings.<sup>4</sup>

**Hotspots:** Geographically described areas of high malaria risk. Can be defined as a cluster of households, a village or a group of villages that share high malaria incidence, proximity to breeding sites, and/or favorable climactic features such as humidity, temperature and vegetation.<sup>4</sup>

### Intermittent Preventive Treatment in infants

**(IPTi):** Administration of a full therapeutic course of antimalarials to infants during routine health facility visits (for immunization services), without testing for malaria infection.

### Intermittent Preventive Treatment in pregnancy

**(IPTp):** Administration of a full therapeutic course of antimalarials to pregnant women during routine health facility visits (for antenatal care), without testing for malaria infection.

**Mass drug administration (MDA):** Administration of antimalarial treatment to every member of a defined population or every person living in a defined geographical area (except those for whom the medicine is contraindicated) at approximately the same time and often at repeated intervals.

### Mass drug administration/Screen and treat

**hybrid (MDA/SAT hybrid):** A hybrid approach that includes options to use SAT for surveillance, and MDA based on SAT results.

**Proactive response:** Conducting malaria diagnostic testing and/or providing antimalarial treatment to a population at risk of malaria, not prompted by the detection of a positive test result.

**Reactive response:** Responding to the detection of a positive malaria diagnostic test result by conducting testing and/or providing antimalarial treatment to a defined population at risk of malaria.

**Screen and Treat (SAT):** Screening of an entire population for risk factors and/or testing individuals at risk and treating those with a positive test result. This includes Reactive Case Detection. SAT is not the same as the WHO Test-treat-track mantra which is primarily used to improve testing rates, compliance with the test result and reporting of cases during passive case detection.

**Seasonal malaria chemoprevention (SMC):** The administration of full treatment course of antimalarials to children aged less than 5 years, irrespective of disease status, in areas with highly seasonal malaria transmission.

3 World Health Organization (2017). A framework for Malaria Elimination. Geneva, Switzerland.

4 Sturrock HJW, Hsiang MS, Cohen JM, Smith DL, Greenhouse B, Bousema T, Gosling RD. Targeting Asymptomatic Malaria Infections: Active Surveillance in Control and Elimination. Plos Med. (<https://doi.org/10.1371/journal.pmed.1001467>).

## Selection of a Chemoprevention Strategy

This selection framework will guide the program/ user through a series of six questions to inform the selection of an appropriate chemoprevention strategy for settings suitable for their implementation. It can be applied to the design and implementation of all chemoprevention strategies except for SMC, IPTi, IPTp, and MDA use in defined settings,<sup>1</sup> which should heed to policy-level guidance. The six questions listed below can be answered in any order:

1. Where do I want to implement chemoprevention strategies?
2. What do I want to achieve through my chemoprevention strategies?
3. How do I define and target malaria high-risk populations, and decide on intervention scale?
4. Should I use a proactive or reactive approach?
5. What strategy is the best fit for my district/ country?
6. What resources do I need to implement the selected strategy?

A surveillance system will be necessary to identify settings for the implementation of chemoprevention strategies, to monitor and evaluate progress, and to inform when a change in strategy is necessary. The

national malaria program is expected to compile and analyze background data on as many of the following key factors as possible, using operational manuals as necessary to examine:

- Strength of the routine surveillance system
- Intervention coverage (diagnosis, treatment, and LLINs and IRS for vector control)
- Malaria transmission (low, moderate, high)
- Malaria seasonality
- High-risk populations or geographic areas (villages or district level)
- Mobility, migration, and importation
- Presence of drug resistance

Information on the factors above, as available, will be used throughout this framework to identify promising settings for the implementation of chemoprevention strategies, design an appropriate strategy for each setting, and monitor, evaluate, and respond to progress made. [Worksheet 1](#) below should be filled out for each setting of interest as you complete [Decision Points #1–4](#). [Decision Point #5](#) will refer to [Worksheet 1](#), and will guide the design of your chemoprevention strategies.

## Worksheet 1. Summary of Decisions #1–4

**Instructions:** Fill out this worksheet as you complete Decisions #1–4 below. In Decision #5, you will use the information you have recorded to determine what strategy you should use. Use one sheet per setting of interest (identified in Decision #1).

### Decision #1: Identify settings suitable for implementation

#### Table 1: Surveillance system strength

- Surveillance is strong
- Surveillance system needs improvement

#### Table 2. Case management and vector control strategies

- Case management is strong
- Surveillance system needs improvement
- Vector control is strong
- Vector control needs improvement

#### Table 3. Setting characterization

- Malaria transmission is seasonal
- Malaria transmission is perennial
- Importation is likely
- Importation is unlikely

In this document "importation" refers both to diagnosis of a malaria case in a country where it did not originate and to the identification of a malaria case in a region or district that came from a different region or district within the same country.

Identify suitable settings here, where surveillance, case management, and vector control are strong:

Setting #1: \_\_\_\_\_

Setting #2: \_\_\_\_\_

Setting #3: \_\_\_\_\_

Choose one setting for this worksheet: \_\_\_\_\_

Record information about malaria season timing and/or importation:

### Decision #2: Defining objectives to identify general strategy

#### Table 4. Chemoprevention strategy objectives

Check all that apply

- Transmission reduction
- Morbidity reduction
- Improved surveillance

Recommended strategy:

- MDA
- SAT
- MDA/SAT hybrid

Record any important details about your goals here:

### Decision #3: Defining target populations and intervention scale

#### Table 5. Targeting method

- Hotspot (geographic)
- Hotpop or high-risk population (demographic)
- Both hotspots and hotpops

#### Table 6. Scale

- Target village and surrounding villages
- Target village only
- Entire district
- Focus or foci only
- Hotpop (demographic)/high-risk population
- Risks are the same year-round
- Risks are higher at certain times of year

If your target population is a hotspot, record details about their locations and clustering here. If your target population is a hotpop, record their risk factors here (e.g. age, gender, occupation, times of year, etc.):

### Decision #4: Deciding on a proactive versus reactive approach

#### Table 7. Proactive or reactive approach

- Proactive
- Reactive

Record any details on your choice of approach here (transmission intensity, timing, importation):

## Decision Point #1: Identify Settings Suitable for Implementation

In order to determine where to implement chemoprevention strategies that do not have policy-level guidance available (e.g., not SMC, IPTi, IPTp, or MDA use in emergency settings), the strength of the surveillance system, case management, and vector control interventions must first be assessed. This decision point assesses whether these standard interventions are in need of improvement, and should be strengthened before chemoprevention strategies are implemented.

Table 1 can quantify the strength and performance of the surveillance system. If the surveillance system needs improvement, that should be the focus of your program.

If the surveillance system in place is adequate, case management and vector control strategies in place can be evaluated using Table 2. If either are in need of improvement, these should be strengthened, using Table 2 to identify areas for optimization as appropriate, and drawing upon operational guidance from the *WHO Malaria Surveillance, Monitoring, and Evaluation Reference Guide* as well as the *Entomological Surveillance Planning Tool (ESPT)* (Box 1).

**Table 1. Quantifying surveillance system strength and performance**

Surveillance is <b>STRONG</b>	Surveillance <b>NEEDS IMPROVEMENT</b>
<ul style="list-style-type: none"> <li>Majority of facilities submit complete reports</li> <li>Majority of facilities submit reports on time (within program guidelines)</li> <li>Community-based surveillance exists (aggregate or case-based data are available) (Y/N)</li> <li>Case-based reporting exists in low transmission settings (Y/N)</li> <li>Routine entomological surveillance system well established (See Box 1 Entomological Surveillance Planning Tool) (Y/N)</li> </ul>	<ul style="list-style-type: none"> <li>Completeness of reporting is low among health facilities</li> <li>Health facilities do not submit reports on time</li> <li>It is not possible to distinguish health facility catchments or communities with high/low malaria risk (Y/N)</li> </ul>

**Table 2. Evaluating malaria case management and vector control strategies**

Case management is <b>STRONG</b>	Case management <b>NEEDS IMPROVEMENT</b>
<ul style="list-style-type: none"> <li>All suspected malaria cases are tested</li> <li>&gt; 90% of confirmed cases are effectively treated</li> <li>Community Health Workers have the mandate to test and treat</li> </ul>	<ul style="list-style-type: none"> <li>Not all suspected cases are treated</li> <li>Not all confirmed cases are treated</li> </ul>
Vector control is <b>STRONG</b>	Vector control <b>NEEDS IMPROVEMENT</b>
<ul style="list-style-type: none"> <li>Generally all at risk populations have access to at least one locally appropriate and effective vector control intervention that targets known local vector behavior</li> <li>Long-lasting Insecticide Treated Net (LLIN) coverage is optimized or &gt; 85%</li> <li>LLIN access and use are optimized or &gt; 80%</li> <li>Indoor Residual Spraying (IRS) coverage is optimized or &gt; 80% of targeted structures receive IRS</li> <li>IRS is implemented in a standardized manner (use of effective insecticide, in timing with seasonal transmission, and based on residual efficacy of the active ingredient)</li> <li>Insecticide resistance management plan in place</li> </ul>	<ul style="list-style-type: none"> <li>At risk populations lack access to at least one locally appropriate and effective vector control intervention that targets known local vector behavior</li> <li>LLIN coverage has not been optimized</li> <li>LLIN access and use have not been optimized among targeted populations</li> <li>Coverage of IRS has not been optimized</li> <li>IRS is not implemented in a standardized manner (use of suboptimal insecticide, poorly timed with the transmission season(s), and no insecticide resistance studies)</li> </ul>

NOTE: Vector control interventions should target vector behavior and its overlap with human behavior.

### Box 1. Entomological Surveillance Planning Tool (ESPT)

#### Objective

The ESPT equips malaria programs with operational and practical approaches, minimum essential indicators, and decision trees to help programs answer questions about local transmission drivers, gaps in protection with current vector control interventions (e.g., insecticide resistance, outdoor biting, etc.), and selecting supplemental vector control intervention to address the identified gaps.

#### Intended audience

This ESPT is for national malaria program managers, vector control officers, program entomologists, surveillance officers, and M&E officers to use in collaboration with their partners, including implementing, technical, and research partners. The ESPT is also for ministry of health individuals involved in planning entomological surveillance activities and interpreting entomological surveillance data at provincial and district levels.

#### The ESPT can be used as a framework for:

- Annual entomological surveillance planning and/or the development of national entomological surveillance plans/guidelines
- Entomological surveillance training
- Integrating entomological and epidemiological concepts and data, and integrating vector behavior and human behavior concepts and data
- Field and laboratory data collection
- Planning an outbreak or foci investigation
- Evaluating vector control interventions in operational settings

For more information please see: Malaria Elimination Initiative. (2020). *Entomological Surveillance Planning Tool*. San Francisco: Institute for Global Health Sciences, University of California, San Francisco. <http://shrinkingthemalariamap.org/tool/entomological-surveillance-planning-tool-espt>.

If surveillance, case management, and vector control interventions are adequate, target settings suitable for the implementation of chemoprevention strategies can then be identified, based on incidence, prevalence, and other basic indicators. Each suitable setting should then be characterized further, with transmission identified as either seasonal or perennial

(year-round), and the level of importation assessed as more or less likely (Table 3). If there is interconnectivity (i.e., population movement) between your target village and other villages or communities, importation of malaria cases to your target setting is likely, and your strategy should be introduced among all connected villages where frequent travel occurs.

**Table 3. Characteristics of seasonal transmission and importation**

Transmission is seasonal	Transmission is perennial
<ul style="list-style-type: none"> <li>Majority of transmission occurs (over 60% of annual cases for the region in question) during a short time period (3–4 months) <b>OR</b></li> <li>There are substantial peaks in case counts that coincide with the rainy season(s) in the region in question</li> </ul>	<ul style="list-style-type: none"> <li>Case counts are relatively consistent throughout the year <b>OR</b></li> <li>There are no substantial differences in monthly rainfall in the region in question <b>OR</b></li> <li>Cases are tied to non-seasonal migration of populations into the region</li> </ul>
Importation <sup>5</sup> likely	Importation less likely
<ul style="list-style-type: none"> <li>There is frequent migration of populations into the target region from areas of high malaria transmission due to urbanization, migrant labor or forced migration <b>OR</b></li> <li>Persons frequently travel from countries with high malaria transmission to your country, or reside in close proximity to borders of countries with high transmission (example. short-term migration occurs due to trade) <b>OR</b></li> <li>Populations tend to migrate from one region to another during specific times of the year (example for holidays)</li> <li>Ratio of imported to local cases is high</li> </ul>	<ul style="list-style-type: none"> <li>Short term migration occurs within country (for example journeys made to and from school, and/or work)</li> <li>Communities are isolated and experience limited connectivity with other communities or low mobility</li> </ul>

5 Whereas “importation” technically refers to diagnosis of a malaria case in a country where it did not originate, for the sake of the document, “importation” refers also to identification of a malaria case in a region or district that came from a different region or district within the same country.

Record your target settings and its characteristics in [Worksheet 1](#).

## Decision Point #2: Defining Objectives to Identify General Strategy

Once you have used [Decision Point #1](#) to identify and characterize settings that experience higher degrees of malaria transmission, a general chemoprevention strategy can be chosen based on your main programmatic objective in that setting. Four objectives to choose from are below, and corresponding recommended strategies are shown in [Table 4](#). In settings that aim to reduce both transmission and morbidity, transmission reduction should be chosen as the primary objective.

Objectives for chemoprevention strategy:

1. To reduce malaria transmission when optimized vector control, case management, and passive surveillance is in place
2. To reduce malaria morbidity
3. To improve surveillance
4. To reduce malaria morbidity and mortality during an emergency where the health system is in threat (e.g., during an Ebola outbreak)

Your program objectives will allow you to choose a general strategy for your setting of choice. The three options are: MDA, SAT, and MDA/SAT hybrid, each of which are described below.

### MDA

If a program or district has elected to focus its chemoprevention strategy solely towards reducing transmission, some form of MDA will be the most effective and appropriate choice. MDA is the administration of antimalarial treatment to every member of a defined population or every person living in a defined geographical area (except those for whom the medicine is contraindicated) at approximately the same time and often at repeated intervals. High levels of coverage are crucial for reducing malaria transmission, and individuals who are contraindicated for receiving the antimalarial medications for MDA must be excluded from this intervention. MDA is preferred to SAT if:

1. Current diagnostics miss many infections (low parasite density and/or asymptomatic),
2. Treatment without testing will offer chemoprophylaxis that prevents blood stage infections from emerging from the liver as well as future infections,
3. The target populations are well defined,
4. Anti-malarial drugs are considered safe within a target population,

**Table 4. Program objectives and corresponding chemoprevention strategies**

Program Objective	Recommended Strategy
Transmission reduction	MDA
Morbidity reduction	MDA, variants include: <ul style="list-style-type: none"> <li>• SMC among children less than 5 years old in regions with highly seasonal transmission</li> <li>• IPTp and IPTi</li> <li>• Targeted chemoprophylaxis (e.g., for military or travellers)</li> <li>• Outbreak containment in settings where the healthcare system is in threat</li> </ul>
Improved surveillance	SAT, including RACD, noting that in areas of low transmission, tests that can identify infection among persons with low parasite densities and multi- <i>plasmodium</i> species should be used
A combination of transmission reduction or morbidity reduction and improved surveillance	Hybrid MDA/SAT

5. Malaria risk in target population outweighs risks of treatment,
6. MDA can be delivered with appropriate vector control interventions.

SMC is a form of MDA that entails the administration of full treatment course of antimalarials to children aged less than 5 years, irrespective of disease status, in areas with highly seasonal malaria transmission. Policy guidance is available for the use of SMC for morbidity reduction. If it is possible for your program to increase the age range of those receiving SMC to cover older children who carry the burden of gametocytes responsible for malaria transmission, such as 10–15 year olds, this will likely improve SMC's transmission reducing effects.

Policy-level guidance is available on the use of both IPTi and IPTp. IPTi entails the administration of a full therapeutic course of antimalarials to infants during routine health facility visits (for immunization services), without testing for malaria infection. Intermittent Preventive Treatment in pregnancy (IPTp) entails the administration of a full therapeutic course of antimalarials to pregnant women during routine health facility visits (for antenatal care), without testing for malaria infection.

MDA can be administered at any chosen scale, ranging from targeting entire communities to a few individuals considered to be at risk of malaria.

### SAT

SAT, which includes testing and subsequent treatment of confirmed cases, is preferred to MDA if:

1. There is a need for improved surveillance to understand who is at risk of malaria and how transmission occurs,
2. Malaria transmission is extremely low,
3. Programs have the resources to conduct reactive case detection (RACD) and door-to-door screening, using a highly sensitive diagnostic test where possible,
4. A program or district is monitoring and evaluating an RACD program.

SAT can be conducted at any scale, however its effectiveness requires the use of highly sensitive diagnostic tests. Mass Screen and Treat using standard malaria rapid diagnostic tests is not recommended for use, as this has shown to miss many low-density infections.

### Hybrid MDA/SAT

Hybrid MDA/SAT combines both strategies, using SAT to provide surveillance data, and MDA to respond to malaria infection(s) detected from SAT. A few examples include:

- Using SAT to monitor the effects of MDA on transmission, acquire data on malaria risk, and inform whether further rounds of MDA are necessary and/or identify which other interventions should be implemented.
- Using SAT in a community to establish the test positivity rate. If this rate is above a defined threshold, the community receives MDA. If the rate is below the threshold, the community receives SAT.
- Using SAT to detect positive cases, and treating the households and neighbors of positive detected cases with focal MDA.
- Using SAT to find target populations when malaria risk is low, and then treating those populations with MDA. Examples of target populations include small geographical clusters of cases, sentinel populations, or specific demographic groups at high risk of malaria.

Hybrid MDA and SAT approaches can take many variations based on local epidemiology and context.

Record which strategy you have chosen for each setting of interest in [Worksheet 1](#), MDA, SAT, or MDA/SAT hybrid.

## Decision Point #3: Defining Target Populations and Intervention Scale

Once general strategies are identified for each setting of interest ([Decision Point #2](#)), the targeting methods and scale for each intervention can be established. Targeting can be based on geographic bounds (district, health facility catchment, village or sub-village level), demographic parameters (risk based on travel behavior, occupation, ethnicity, age, sex and/or pregnancy status), or a combination of the two ([Table 5](#)).

If the target population is a hotspot based on geographic bounds, information on distribution and clustering of transmission within a given region will allow for appropriate targeting and scaling of your chemoprevention strategy ([Table 6](#)). If the distribution of malaria infection is unknown or widely dispersed

across a geographic unit, it is best to target that entire unit. Alternatively, if cases are clustered, you can maximize the use of your resources by targeting a specific cluster, village, or community.

If the target population is a hotpop, demographic risk factors for high transmission must be identified to guide intervention development. If there are times of year when risks are higher, owing to migration patterns or otherwise, these times should be noted as well. More sophisticated methods for assessing the demographics of high-risk populations (HRPs) can be found in *A Malaria Elimination Guide to Targeted Surveillance and Response in High-Risk Populations* ([Box 2](#)).

**Table 5. Identifying geographic (hotspots) or demographic (hotpops) targets\***

HOTSPOT (geographic)	HOTPOP (demographic)
Target population is defined by geographic bounds: <ul style="list-style-type: none"> <li>• Transmission occurs primarily among children, both sexes (indicative of household-level transmission) <b>OR</b></li> <li>• Transmission occurs primarily among members of the same community or geographic unit, no particular age or gender</li> <li>• Transmission is related to rainfall</li> </ul>	Transmission occurs primarily among: <ul style="list-style-type: none"> <li>• Particular age group <b>OR</b></li> <li>• Particular gender <b>OR</b></li> <li>• Occupational group <b>OR</b></li> <li>• Behavioral risk group</li> </ul>

\*Information for this table can be drawn from data analysis at the central level, understanding of local transmission dynamics as observed by sub-national staff, or a combination of both.

**Table 6. Considerations when scaling strategies that target hotspots**

Characteristic	Level of scaling
Transmission is clustered and occurs primarily in a target village connected to surrounding communities or villages (interconnectivity)	Target village and surrounding villages
Transmission is clustered within an isolated village	Target village only
It is unknown if transmission is clustered or dispersed	Entire district
Transmission is highly focalized and is contained within a focus or select foci (typically in very low transmission regions)	Focus or foci only
Transmission is among an HRP in a specific geographical cluster	Target HRPs and consider targeting village if transmission is spilling over from HRP into village population

## Box 2. Malaria Elimination Guide to Targeted Surveillance and Response in High-Risk Populations

### Rationale

In some settings, chemoprevention strategies may target a subset of the population at higher risk of malaria due to greater exposure to mosquitos and/or lower access to health services. This guide can be used to identify these malaria high-risk populations (HRPs) and plan for targeted surveillance and response, including these chemoprevention strategies.

### Objective

The HRP Guide was developed to improve knowledge of HRPs, improve the targeting of interventions, and ultimately reduce malaria transmission. The HRP Guide provides a set of approaches to review transmission patterns and surveillance gaps, gather detailed epidemiological evidence of risk factors and behaviors of potential HRPs, track epidemiological trends in these populations, adapt routine surveillance activities, and improve targeted interventions for HRPs.

### Intended audience

The framework is for national malaria program managers, M&E officers, and their implementing partners, including non-governmental organizations, and researchers in countries with low malaria transmission.

### The HRP Guide can be used to:

1. **Plan for targeted surveillance and response in malaria HRPs.** The HRP Guide provides operational guidance on the design and implementation of a formative assessment to gather, update, review, and analyze current knowledge of HRPs, as well as collect information to optimize the delivery, access and use of malaria interventions in these populations.
2. **Identify risk factors for malaria and characterize HRPs.** The HRP guide includes guidance on how to design and implement a simple case-control study at health facilities to identify and quantify key actionable risk factors to guide targeted surveillance and response.
3. **Modify routine surveillance methods to improve case detection and deliver interventions to HRPs.** The HRP Guide provides approaches for adapting reactive and proactive surveillance to target delivery of screening-and-treatment and intervention packages to specific sites or social contacts of an index case identified in the community or at a health center.

For more guidance on these HRP methods, see: Malaria Elimination Initiative (2020). *A Malaria Elimination Guide to Targeted Surveillance and Response in High-Risk Populations*. San Francisco: Institute for Global Health Sciences, University of California, San Francisco: <http://shrinkingthemalariamap.org/tool/malaria-elimination-guide-targeted-surveillance-and-response-high-risk-populations-hrp>.

Record your targeting strategy in [Worksheet 1](#), including information on level of scaling and/or timing if appropriate.

## Decision Point #4: Deciding on a Proactive Versus Reactive Approach

The decision points above establish where, when, and amongst whom malaria transmission occurs. The next step is to target your chemoprevention strategy proactively or reactively in each setting of interest (Table 7). Proactive approaches are recommended for moderate to high transmission settings. These approaches can be designed to match predictable drivers of transmission, including timing

(seasonal malaria, Decision Point #1), migration patterns of infected persons into a specific region (high migration, Decision Point #1), and targeting to reach high-risk populations and areas (Decision Point #3). Reactive strategies are recommended for settings with extremely low transmission, and require the rapid availability of case-based data such that each detected case can be responded to.

**Table 7. Criteria for selecting a proactive, targeted versus reactive approach when implementing your chemoprevention strategy**

Proactive	Reactive
Malaria transmission is moderate to high	Malaria transmission is low
In low transmission settings when target population is defined annually, and migration patterns are predictable	Intervention is triggered by a single case or number of cases in a particular area
Delivery is timed to account for predictable or seasonal migration into the region in question (Decision Point #1)	Response to an outbreak in a typically low transmission setting
Transmission occurs among a specific high-risk group (Decision Point #3)	Can be used in both seasonal and perennial transmission
More suitable for areas with seasonal transmission	Migration into the region in question is frequent but unpredictable or unexpected (refugees, economic activity/migrants)
Works best if first round is before seasonal transmission starts	Reactive approaches are operationally feasible (human resources, transport etc. are available)

Record whether you plan to undertake a proactive or reactive approach for each setting of interest in [Worksheet 1](#).

## Decision Point #5: Finalizing Chemoprevention Strategy Design

The decision points above provide the basis for your targeting strategy, informing where and when to implement chemoprevention strategies, and which populations should be reached to meet your programmatic objectives.

[Worksheet 1](#) should now be complete, to guide the design of your chemoprevention strategy in each setting of interest. [Table 8](#) below should be used

to check whether the strategy you are designing is consistent with recommended strategies, and adapt your strategy if necessary, according to programmatic knowledge on local contexts, goals, transmission patterns, and risks. At this stage, you should choose the antimalarial medication for your chemoprevention strategy, which should depend on the presence of drug resistance.

**Table 8. Considerations and setting characteristics relative to recommended strategy**

MDA	SAT	Hybrid (MDA + SAT)
<ul style="list-style-type: none"> <li>• Transmission is moderate to high</li> <li>• Surveillance, case management, and vector control is strong, or vector behaviour is not manageable by current vector control frameworks</li> <li>• Current diagnostics miss many infections and presumptive treatment will prevent future infections</li> <li>• Target populations are well defined</li> <li>• Importation is low or predictable</li> <li>• Drugs are considered safe within target population</li> <li>• Transmission is highly seasonal (SMC)</li> <li>• Benefit of treatment outweighs the risk in target population</li> </ul>	<ul style="list-style-type: none"> <li>• Transmission is extremely low</li> <li>• Surveillance data needs improving</li> <li>• Appropriate diagnostic tests are accessible for identification of asymptomatic persons, or individuals with low parasite density</li> <li>• Drugs chosen for MDA are contraindicated in a certain population</li> </ul>	<ul style="list-style-type: none"> <li>• Malaria risk is low</li> <li>• Importation is unpredictable</li> <li>• Finding sub-target population is difficult and the malaria program wants a reduction in transmission and gather information on malaria risk</li> </ul>

## Decision Point #6: Adapting Selected Chemoprevention Strategies Based on Available Resources

Decision Points #1–5 allow for the design of an optimal chemoprevention strategy for each setting of interest. This decision point compares the ideal strategy you have designed with the resources available in your program or district, to ensure you are able to execute the intervention effectively, and can monitor and evaluate its effects. Table 9 outlines some of the essential human and physical resources needed in order to effectively implement MDA or SAT; your implementation plan must include as many recommended resources for your strategy of choice as possible.

In addition to the resources and infrastructure recommended above, your program will need to plan

for continuous community engagement from the outset to ensure optimal intervention uptake, adherence, and community cooperation/acceptability, and will also need to ensure they can acquire the anti-malarial medications needed for their strategies of choice. A delivery approach should also be selected. For example, MDA or SAT can be delivered through a fixed point, or door to door delivery using community health workers.

If resources are insufficient to execute the ideal chemoprevention strategies identified, the implementation scale can be reduced, and the approach adjusted to match resources available.

**Table 9. Essential resources to effectively execute an MDA campaign or SAT intervention**

MDA	SAT
<ul style="list-style-type: none"> <li>√ Adequate stock of antimalarial chosen for MDA</li> <li>√ Workforce available (for example, network of Community Health Workers) to administer medications and observe course completion among target populations</li> <li>√ Drug safety monitoring (pharmacovigilance) system</li> <li>√ Monitoring and evaluation framework (see <a href="#">Monitoring and Evaluation</a>, below)</li> </ul>	<ul style="list-style-type: none"> <li>√ Access to sensitive diagnostic tests exists (for identification of infections among persons with low parasite density in low transmission settings)</li> <li>√ Available workforce to respond to cases (relevant to RACD activities)</li> <li>√ Appropriate platforms, training, and frameworks (e.g., DHIS2 platform, reporting forms) in place (or potential to produce), for reporting enhanced surveillance data</li> </ul>

## Monitoring and Evaluation

This component guides the design of a monitoring and evaluation process to routinely assess the impact of your chemoprevention strategy in each setting, identify risks and bottlenecks to implementation, and create solutions to mitigate identified challenges. The most insightful measure of the impact of all malaria interventions undertaken in any location are their combined effects on malaria transmission. While changes to transmission cannot be directly attributed to the chemoprevention strategy you are using, these changes will indicate whether it is necessary to change strategies, where decreasing transmission suggests that interventions can become more focal, whereas increasing transmission warrants a shift to larger-scale strategies. [Table 10](#) provides three key indicators that can help to estimate whether and how the interventions implemented in a given setting impact malaria transmission. These indicators should be applied to locations where any chemoprevention strategy is used, regardless of whether its goal is to reduce morbidity or impact transmission.

Impact evaluation should be conducted yearly, looking at changes to the three indicators in [Table 10](#) to determine whether you have met your program targets, are on track, or need to change strategies because you are not seeing the intended or desired effect on transmission. This will inform whether it is necessary to change your scaling, approach, or specific chemoprevention strategy. The amount of data needed to inform any changes in strategy depends on transmission intensity in your intervention region, country context, and intervention coverage level. It should be noted that changes in crude malaria cases, as well as Annual Parasite Index (API), will be larger in higher transmission settings than in low transmission settings, and that data on importation may only be available in low transmission settings. Due to these variations, the number of years of data necessary to inform a change in strategy will vary in different settings, and should be decided upon by the national malaria program.

**Table 10. Impact evaluation indicators to estimate effects on transmission**

Metric	Indicator	Indicator Description
<b>Transmission and Importation</b>	1. Number of crude malaria cases identified in target region (or other relevant administrative unit or target high-risk population) broken down by local and imported* if possible	A decrease in crude number of malaria cases, and incidence within the region targeted with MDA is a component of evaluating whether or not your MDA campaign may have reduced transmission.
	2. Annual parasite incidence per 1000 persons of target region (or other relevant administrative unit or target high-risk population) divided into local and imported* if possible. In very low transmission this could simply be the number of malaria cases.	Not only is it important to observe decreases in transmission within your target region, but if importation or migration is frequent, it is also beneficial to observe the impact of your intervention among a larger geographic scope, or within districts where the majority of persons migrate to and from.
	3. Ratio of local to imported* cases	It is important to quantify the number of cases that are acquired indigenously versus those that are imported*. If a high proportion of cases are imported*, targeting and the type of chemoprevention strategy you chose to implement may change. Identification of sinks and sources of malaria transmission are particularly important when introducing and targeting an MDA campaign.

\*Whereas “imported” technically refers to diagnosis of a malaria case in a country where it did not originate, for the sake of the document, “imported” refers also to identification of a malaria case in a region or district that came from a different region or district within the same country.

In addition to assessing the impact of your intervention on transmission, data on additional indicators can help to evaluate the overall success of your approach, and identify implementation bottlenecks and/or challenges that can improve the effectiveness of your strategy.

Specific guidance on MDA monitoring and evaluation is accessible through the WHO field manual on mass drug administration.<sup>1</sup> Although this WHO field guide is designed for community-scale MDA, the guidance provided on monitoring individuals who have received MDA during your campaign is applicable

to any scale of MDA, and will allow for the identification of any immediate issues that arise during implementation.

For the monitoring and evaluation of SAT or hybrid MDA/SAT approaches, methods and types of data for collection are outlined in the WHO reference guide on malaria surveillance, monitoring, and evaluation.<sup>2</sup> Additionally, a monitoring and evaluation framework for RACD is provided in the *Reactive Case Detection (RACD) Monitoring & Evaluation Tool* (Box 3).

### Box 3 Reactive Case Detection (RACD) Monitoring & Evaluation Tool

#### Objective

The reactive case detection monitoring and evaluation (RACD M&E) tool evaluates the operational components of an RACD program, including health facility reporting, malaria case investigation and follow-up response completeness, timeliness and screening coverage. The RACD M&E tool provides support to national malaria programs in making evidence-based decisions to strengthen their case investigation and RACD activities.

#### Intended audience

The RACD M&E tool is for national and provincial malaria program managers, surveillance and M&E officers to use in collaboration with provincial and district health officers and health-facility based staff. High-level malaria program staff leads implementation of the RACD M&E tool modules, with data collection and data entry supported by key provincial and district surveillance teams and health facility staff.

#### The RACD M&E tool can be used to evaluate malaria case reporting, investigation and RACD by:

1. **Reviewing key documentation on case reporting, investigation and RACD.** The M&E tool provides guidance and templates to assess whether standard operating procedures (SOPs), organizational diagrams, and activity and reporting flow diagrams exist, and if SOPs are being used by staff who conduct RACD activities.

2. **Assessing key malaria indicators.**

Through the use of templates, the M&E tool guides the collection of quantitative data to assess the quality of malaria case reporting, case investigation, and RACD activities on dimensions of completeness, timeliness, screening coverage and additional positive malaria cases identified.

3. **Evaluating standard operating procedures of staff.** Using questionnaires on SOPs, the baseline knowledge and understanding of the practices of program staff in implementing the SOPs for case investigation and RACD activities can be evaluated to identify key gaps and challenges.
4. **Estimating the costs.** Monthly and annual costs of conducting case investigation and RACD activities at district and provincial levels can be calculated through the use of standardized templates to support national malaria programs in budgeting the necessary resources to conduct case investigation and RACD.

For more information please see: Malaria Elimination Initiative (2020). *Reactive Case Detection (RACD) Monitoring & Evaluation Tool*. San Francisco: Institute for Global Health Sciences, University of California, San Francisco. <http://shrinkingthemalariamap.org/tool/reactive-case-detection-racd-monitoring-and-evaluation-tool>.

## Learning by Doing: When to Shift Strategies

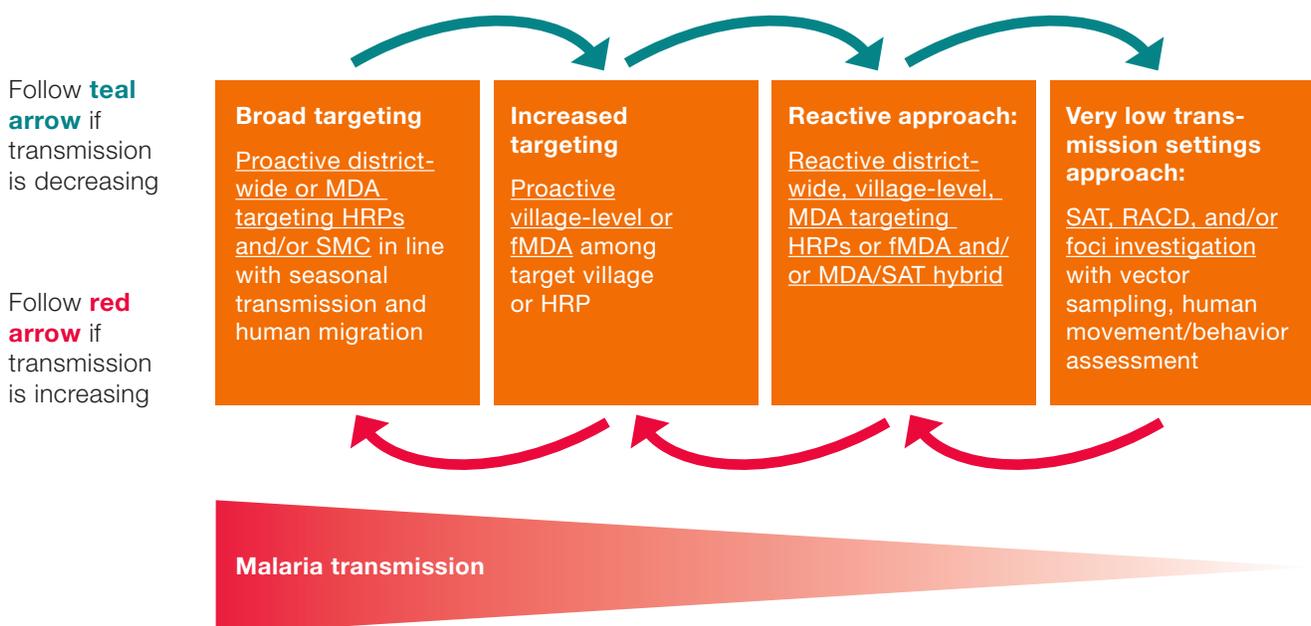
The annual monitoring and evaluation assessments detailed in [Monitoring and Evaluation](#) will provide information on whether your chemoprevention strategy in each setting is on track, has effectively achieved its objectives, or is not working. [Figure 2](#) shows the general progression of changes to chemoprevention strategies as malaria transmission declines, where higher transmission settings use variants of MDA, eventually shifting to SAT, RACD, or foci investigation when malaria elimination is approaching. As progress is made towards malaria elimination, the chemoprevention strategy can change to match decreasing transmission. If the strategy is not working, and malaria transmission has stalled or is increasing, strategies can shift to those appropriate for higher transmission settings. In this manner, the program can adapt their strategy periodically, until malaria elimination is achieved or chemoprevention strategies are otherwise no longer necessary.

[Table 11](#) below provides an example of a simple framework on whether it would be beneficial or appropriate to change your chemoprevention strategy. The framework in [Table 11](#) assumes that the malaria program sets targets periodically

(annually or biannually) at an appropriate administrative level, for example a district or village level. If, according to [Table 11](#), your chemoprevention strategy has achieved its objectives or is failing to do so, your program has two options. If there have been major changes to the malaria epidemiology and other interventions used in that setting since the setting was last assessed, return to step 1 and reassess the setting to develop a new strategy. If there have not been major changes as noted above, the framework in [Table 11](#) suggests specific interventions to switch to based on which intervention you started with. This framework can be used at the district level, and assumes that:

- Your goal is to reduce malaria transmission or malaria-associated morbidity
- You set goals for malaria reduction at the district or sub-district level
- Your health systems (including your passive, facility-based surveillance system) are functioning normally
- There are no disease outbreaks that require the administration of MDA for morbidity reduction

**Figure 2. Example of how chemoprevention strategies can change over time in response to changing malaria endemicity**



**Table 11. Example framework on when to shift between chemoprevention strategies**

**Legend**

Target Status	Characterization
<b>PROBLEM!</b>	<p>With your current intervention(s) you have failed to achieve your objective:</p> <ul style="list-style-type: none"> <li>• Cases are static or increasing</li> <li>• Improved targeting is needed and/or</li> <li>• More aggressive interventions are required</li> </ul> <p><b>→ Review and adapt strategy</b></p>
<b>SUCCESS!</b>	<p>You have managed to reach your district or program’s target or objective; it is time to change your strategy to more rapidly, effectively and efficiently reduce transmission/morbidity</p> <p><b>→ Change strategy</b></p>
<p>Assumptions:</p> <ol style="list-style-type: none"> <li>1. Current interventions have good (high) level of coverage with optimal delivery.</li> <li>2. If your cases are falling, however you have not yet reached your target, it is advised to continue with your current strategy and re-evaluate the following year. In each scenario, a strong community engagement component is essential.</li> </ol>	

**Strategy Decision Framework**

Current strategy	Target status	Strategy change options
Passive case management and community case management; Maximized coverage of LLINs and/or IRS	<b>PROBLEM!</b>	<ul style="list-style-type: none"> <li>• <b>Re-evaluate concurrent interventions</b> – consider adding an active chemoprevention strategy</li> <li>• Ensure that your high-risk populations (hotspots and hotpops) have access to timely case management and vector control</li> <li>• Consider entomological assessment of vector behaviour and presence of insecticide resistance</li> <li>• Ensure adherence to national testing guidelines and uninterrupted supplies of malaria commodities</li> <li>• Maximize community engagement, ensure communities understand malaria</li> </ul>
	<b>SUCCESS!</b>	<ul style="list-style-type: none"> <li>• Switch to <b>foci management</b></li> <li>• If programmatic goal was morbidity reduction, consider switching to either <b>proactive focal MDA (fMDA), proactive MDA targeting HRP</b>s or a <b>reactive strategy</b></li> </ul>

Current chemoprevention strategy (MDA, SAT, or hybrid)	Target status	Strategy change options
Proactive district-wide MDA	PROBLEM!	<ul style="list-style-type: none"> <li>• <b>Re-evaluate concurrent interventions</b> – ensure that a strong baseline vector control component is implemented simultaneously (LLIN distribution, IRS or additional vector control framework that targets vector behaviour/ insecticide resistance)</li> <li>• Ensure that your MDA campaign has <b>high coverage</b> (and assess acceptability of intervention if not)</li> <li>• Ensure that your MDA campaign is introduced during <b>low transmission season</b> (if applicable), or target rounds based on <b>times of migration</b> (if applicable)</li> <li>• Consider <b>increasing your number of rounds</b> of MDA annually if coverage needs improving</li> <li>• Consider SMC if required conditions are met (age group at risk and seasonality)</li> </ul>
	SUCCESS!	<ul style="list-style-type: none"> <li>• Switch to <b>reactive village-wide MDA or proactive village-wide MDA</b>, depending on your setting characteristics (migration, degree of transmission, etc. – see <a href="#">Decision Point #3</a> to determine a reactive or proactive approach)</li> <li>• Incorporate IRS with effective insecticide component in target villages or foci (reactive IRS) if LLIN is only current vector control intervention</li> </ul>
Proactive village-wide MDA	PROBLEM!	<ul style="list-style-type: none"> <li>• Expand to entire district: switch to <b>proactive district-wide MDA</b> if cases outside of targeted villages</li> <li>• Expand to interconnected village(s)</li> <li>• Re-evaluate surveillance data to see if potential HRP can be identified, if so, add in or switch to <b>proactive MDA targeting HRPs</b></li> <li>• Ensure that a baseline vector control intervention is introduced (LLIN distribution) with high coverage</li> <li>• Conduct entomological assessment to ensure correct vector targeting</li> </ul>
	SUCCESS!	<ul style="list-style-type: none"> <li>• Switch to:               <ul style="list-style-type: none"> <li>» <b>Proactive fMDA</b> if hotspots static/ incidence too high to do reactive MDA</li> <li>» <b>Reactive fMDA</b>, and introduce IRS component (Reactive IRS)</li> </ul> </li> <li>• Re-evaluate surveillance data to see if potential HRP can be identified within the community/village, if so, switch to or add in <b>proactive MDA targeting HRPs at the village level</b>, incorporating IRS component (Reactive IRS) within target village if LLINs are already routinely distributed</li> </ul>

Current chemoprevention strategy (MDA, SAT, or hybrid)	Target status	Strategy change options
Proactive fMDA	<b>PROBLEM!</b>	<ul style="list-style-type: none"> <li>Expand to entire community or village; switch to <b>proactive village-wide MDA</b></li> <li>Ensure that your MDA campaign is introduced during <b>low transmission season</b> (if applicable), or target rounds based on <b>times of migration</b> (if applicable)</li> <li>Ensure high compliance/adherence or assess this</li> <li>Ensure that a baseline vector control intervention is introduced (LLIN distribution, or IRS) with high coverage</li> <li>Conduct entomological assessment to ensure correct vector targeting</li> </ul>
	<b>SUCCESS!</b>	<ul style="list-style-type: none"> <li>Switch to <b>reactive fMDA</b></li> <li>If transmission is extremely low, switch to <b>hybrid approach: reactive fMDA and focal SAT (fSAT)</b></li> <li>Consider moving to <b>foci management</b></li> </ul>
Proactive MDA targeting HRP	<b>PROBLEM!</b>	<ul style="list-style-type: none"> <li>Switch to or add <b>proactive village-wide MDA</b></li> <li>Ensure that a baseline vector control intervention is introduced (LLIN distribution) with high</li> <li>Conduct entomological assessment to ensure correct vector targeting</li> <li>Review the timing of the current intervention to improve coverage</li> </ul>
	<b>SUCCESS!</b>	<ul style="list-style-type: none"> <li>Switch to <b>reactive MDA targeting HRP</b></li> <li>If transmission has become extremely low and is focalized, switch to <b>hybrid approach: reactive MDA targeting HRP and fSAT or foci management targeting foci</b> or areas where transmission is occurring</li> </ul>
Proactive SMC	<b>PROBLEM!</b>	<ul style="list-style-type: none"> <li>Switch to <b>proactive district-wide or village-level MDA</b></li> <li>Ensure that baseline vector control (LLIN distribution or IRS) is introduced (preferably simultaneously or concurrently) with high coverage</li> <li>Conduct entomological assessment to ensure correct vector targeting</li> </ul>
	<b>SUCCESS!</b>	<ul style="list-style-type: none"> <li>If substantial morbidity reduction and/or prevention of infections among children &lt;5 is achieved, continue and integrate <b>reactive district, village-wide, or fMDA</b> for general population</li> </ul>
Reactive district or village-wide MDA (outbreak response, or when Reactive fMDA or Reactive MDA targeting HRP are failing)	<b>PROBLEM!</b>	<ul style="list-style-type: none"> <li>Switch to <b>proactive district-wide MDA</b></li> <li>Ensure that your MDA campaign is introduced during <b>low transmission season</b> (if applicable), or target rounds based on <b>times of migration</b> (if applicable)</li> </ul>
	<b>SUCCESS!</b>	<ul style="list-style-type: none"> <li>Switch to <b>reactive village-wide MDA</b> or <b>reactive fMDA</b> if transmission is highly focal, incorporate IRS component in target areas (Reactive IRS) if LLIN is only current vector control intervention</li> </ul>

Current chemoprevention strategy (MDA, SAT, or hybrid)	Target status	Strategy change options
Reactive fMDA	<b>PROBLEM!</b>	<ul style="list-style-type: none"> <li>Switch to <b>proactive fMDA</b> or <b>proactive village level MDA</b> (if high-risk geographic region, “hotspot”, can be identified and targeted) or proactive MDA targeting HRP (if high-risk populations are identifiable and can be targeted)</li> </ul>
	<b>SUCCESS!</b>	<ul style="list-style-type: none"> <li>Switch to <b>foci management, and/or focal SAT</b> if appropriate diagnostic frameworks are available</li> </ul>
Reactive MDA targeting HRP	<b>PROBLEM!</b>	<ul style="list-style-type: none"> <li>Switch to <b>proactive MDA targeting HRP</b></li> </ul>
	<b>SUCCESS!</b>	<ul style="list-style-type: none"> <li>Switch to <b>foci management, and/or fSAT</b> if appropriate diagnostic frameworks are available</li> </ul>
Hybrid Approach (MDA + fSAT)	<b>PROBLEM!</b>	<ul style="list-style-type: none"> <li>Ensure that appropriate, highly sensitive diagnostics are used for SAT activities</li> <li>Ensure that strong vector control activities are optimally executed with high coverage (see <a href="#">Decision Point #4, Table 5</a>)</li> <li>If the above criteria are met, and transmission is not declining, switch to <b>proactive MDA</b> in areas where transmission is occurring</li> </ul>
	<b>SUCCESS!</b>	<ul style="list-style-type: none"> <li>If transmission is extremely low, switch to <b>foci management and/or RACD</b> if appropriate, highly sensitive diagnostics are available, incorporate IRS component in target areas (Reactive IRS) if LLIN is only current vector control intervention</li> </ul>
fSAT	<b>PROBLEM!</b>	<ul style="list-style-type: none"> <li>Switch to <b>hybrid approach: proactive fMDA and fSAT</b></li> </ul>
	<b>SUCCESS!</b>	<ul style="list-style-type: none"> <li>Switch to <b>RACD and foci management</b></li> </ul>
Foci Management	<b>PROBLEM!</b>	<ul style="list-style-type: none"> <li>Switch to <b>reactive fMDA, reactive MDA targeting HRP or reactive village-wide MDA</b>, depending on number of incident cases</li> <li>Consider reactive focal or village-wide vector control</li> <li>Review operational management of foci investigation and management and correct challenges</li> </ul>
	<b>SUCCESS!</b>	<ul style="list-style-type: none"> <li>Continue to elimination and prevention of reintroduction</li> </ul>

## References and Additional Guidance Documents

### References

1. Sturrock HJW, Hsiang MS, Cohen JM, Smith DL, Greenhouse B, Bousema T, Gosling RD. Targeting Asymptomatic Malaria Infections: Active Surveillance in Control and Elimination. *Plos Med*. (<https://doi.org/10.1371/journal.pmed.1001467>).
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